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STUDIES ON THE ODONATE FAUNA OF MEGHALAYA

A. R. Lahiri

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Zoological Survey of India, Calcutta
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A. R. LAHIRI
Zoological Survey of India, Calcutta

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INTRODUCTION

Odonata, popularly known as dragon-and damselflies are very conspicuous among the flying insects, ranking perhaps in this respect, only next to the butterflies. They occur almost all over the world in varied ecological niches extending from the sea level to over 3,600 m altitude and from brakish, marshy areas to desert lands.

The adult odonates, on account of their completely carnivorous feeding habit, are beneficial to human society, thereby keeping low the intensity of various obnoxious insects. The larvae of odonates serve as food for fishes and ducks, while the adults are preyed upon by other carnivorous insects, e.g. Assilid flies, lizards, birds and other vertebrates.

Besides all odonates in general and specially the large dragonflies and those belonging to the genera Rhinocypha Rambur, Rhyothemis Hagen and others, are much adored as decorative museum specimens. As paleopterous insects with generalised wing venation, membraneous net-veined wings, general features of body, long slender abdomen and unique nature of male genitalia, they appear interesting to the students of entomology. In recent times, result of investigations on freshwater pollution, indicate that Odonates could be definitely used as one of the biological indicaters of pollution.

Sometimes, however, the adult odonates and their larvae may turn to be serious pests for culturing honey bees and fingerlings of fishes.

Study of Odonata dates back to pre-historic times. The first mention of Indian dragonfly is available in Sangam literature in Tamil written before the eight century A.D. (Bhaduri et. al., 1972). Fraser (1933-1936) provided a good account of Indian Odonate fauna in general, preceeded and followed by contributions of a number of authorities on this subject.

The present study initiated with the sorting out and identification of diversified Odonate collection accumulated at the Eastern Regional Station of the Zoological Survey of India, Shillong through surveys conducted by different survey parties over a period from 1959-1971. Subsequently having realised the richness of faunal composition of Meghalaya, a politically defined state of Eastern India that comprises of the Khasi, Jayantia and
Garo Hills of eastwhile Assam province, it was soon felt necessary to study the same in a comprehensive manner. To augment the existing collection, a number of fresh surveys were then undertaken to different parts of the state over a period from 1971-1979. The resulting total collection comprised 112 Odonate species and subspecies under 68 genera. Extensive consultation of available literature on earlier contribution on fauna of the region revealed that, among the known species quite a few were never reported from the area and for a majority of them existing description, in particular the illustrations are inadequate or even erroneous. Consequently adequate illustrations of different body parts of taxonomic importance were prepared for all the species studied to incorporate in this contribution together with additional descriptions, wherever felt necessary, to augment existing descriptions. Six species and one subspecies turned out to be new to science while nine of the rest could not be definitely identified either because of nonavailability of males or because of paucity of materials. The genus *Nihonogomphus* Oguma has been recorded for the first time from India and 48 known species recorded for the first time from the state of Meghalaya. All genera studied have been described in detail and running keys have been provided for the material studied. 35 species and subspecies recorded earlier from the state were however not represented in the collection studied. An attempt has been made to analyse the distribution pattern of the Odonate fauna now known from Meghalaya at the end.

All types are deposited in the National Zoological Collection, Zoological Survey of India, Calcutta.

**Topography Of Meghalaya**

Meghalaya lies between 23.47' and 26.10' north latitude and 89.0' and 92.47' east longitude. The state is bounded by Bangladesh on the south and west and by Assam on the north (Nowgong, Kamrup and Goalpara districts) and east (Mikir hills and north Cachar hill districts). It comprises an area of 22,549 sq. km. The state consists of three districts, viz. Garo hills, Khasi hills and Jaintia hills.

The state merges almost to sea level in the plains of Bangladesh and Assam on all sides, except in the east, where it extends to the main ranges of the eastern Himalayas by a contineous hill range through Mikir hills, north Cachar hills and Nagaland. The Jaintia hills on its eastern border merges gradually into BaraH range (highest altitude c 2,995 m), while its central part is characterised by comparatively lower altitude with flat lands, valleys, and meadows, a great portion of which being converted into wet-
Lahiri: Ononate fauna of Meghalaya

terraced and flat rice fields. The southern part of Khasi and Jaintia hills is formed mostly by gentle slopes. The central and northern parts of Khasi and Garo Hills are hilly, the foot hills gradually merge into Assam valley. The ranges of these hills are interwined with curved alignments and has the general character of mountain terrain. In Khasi hills, the highest plateau extends from Mawphlang to Raphlong hills, the highest altitude being that of Shillong peak (c 2000 m). In Garo hills, the Tura range (Nokrek, the highest peak c 1412 m) occupies a central position and runs from west to east upto Siju cave.

Geological formation The geological formation of Meghalaya is ancient and belongs to the archean, cretaceous, tertiary and quarternary ages. This land was partially submerged during mesozoic under the sea and was uplifted again at a later date, when Himalayas rose from the bed of Tethys sea. The age of Shillong plateau, which consists of the highlands of Khasi, Jaintia and Garo hills of Meghalaya and Mikir hills of Assam has been estimated to be about 472 million years.

Watersheds The state is watered with innumerable rivulets and streams flowing in the grooves and gorges of the hills and also in the vallyes, many of which remain dry during hotter months. Besides, there are a number of lakes, ponds and rivers. The rivers are torrential and follow the direction of ranges and form water falls along the precipitous edges. The Shillong peak and the Nokrek peak form the main watersheds of rivers flowing northward and southward in the plains of Assam and Bangladesh. Each of the three districts mentioned before are traversed by 6-8 main rivers.

Climate and rainfall Climate of Meghalaya varies from place to place, from subtropical in the foothills to temperate at higher elevations. In general, Khasi and Jaintia hills districts have warm summer and cold winter, with average maximum and minimum temperatures as 24°C and 12°C respectively while Garo hills district appeare slightly warmer. Southwestern monsoon lasting from June - July to September, accounts for 75% of the total rainfall. The north-eastern monsoon lasting from Autumn to January accounts for minor percentage of the rainfall. Relative humidity runs lowest between February and April and attends maximum during the rainy season. Southern part of the state receives maximum rainfall (300 cm to 1549 cm) per year and the northern part has the minimum (200 cm.).

Vegetation: The state shows different vegetation zones, ranging from tropical to temperate. Tropical evergreen vegetaton, with luxu-
rious growth is met at lower altitude up to 800 m, around the periphery of the state, where one frequently meets with wild bamboo and banana forests. More common plants are Vitex sp., Talauma sp., Polyalthia sp., Elaeocarpus sp., Xerospermum sp., Castanopsis sp., Carcina sp., Ficus sp., Sapium sp., Premna sp., Canthium sp., Carallia sp., Hibiscus sp. etc.; some tall shrubs e.g. Leena sp., Abroma sp., Boehmeria sp., Vahlia sp., etc. and dense herbs e.g. Hedyotia auricularia, Alpinia allughas, Bogonia thomsoni etc. and numerous species of ferns, Selaginella and fungi. At altitude above 800 m, tropical forest is gradually replaced by sub-tropical forest; this zone is characterised by short and bushy appearance of the trees, the epiphytes becoming more and more prominent. More important plants are Castanopsis, Lithocarpus, Elaeocarpus sp., Ficus sp., Viburnum sp., Quercus sp., Vernonia sp., etc. many shrubs e.g. Aspidoteryya sp., Rosa moschata, Nycteria longifolia, various species of Acanthaceae, Araliaceae, fungi, moss, Selaginella, Lycopodium and herbaceous angiosperms. Temperate vegetation with luxurious growth of Pinus insulares is predominant at altitude over 1200 m to 2000 m and above, specially around Shillong, Tura and Nokrek peaks; in this temperate zone, more common plants are Quercus sp., Castoaoopsis sp., various species of Rosaceae, Ranunculaceae, Begoniaceae and Asteraceae, Corylopsis, Exbucklandia, Albizia, Monglietia with climbing Schizandra, Kadaura and Acar sp. Trees are heavily loaded with epiphytes, mostly orchids.

Southern part of Khasi hills district, due to heavy rainfall and soil erosion, has rather scanty vegetation, where one usually meets with rolling grassland, frequented with short trees and undergrowth of bushes at places. Natural vegetation is much destroyed in central part of Jaintia hills in particular, and to variable extent at lower altitudes in other two districts, due to terrace cultivation. There are a number of Reserve Forests in the state, specially in the southern part of Khasi and Garo hills, where artificial planting of economically important timber producing plants have been made.

HISTORICAL REVIEW OF THE PREVIOUS WORKS
IN MEGHALAYA

Fabricius (1777, 1793 and 1798) and Rambur (1842) described several species from India, mentioning their type locality as “Indes Orientalis”. These therefore, do not clearly indicate, any specific locality. Ed. de Selys Longchamps contributed substantially to Indian Odonatology and described several species from localities belonging to Meghalaya. In 1853, Hagen and Selys described Echo margarita from a collection, which con-
tained a specimen from Cherrapunjee in Meghalaya. Subsequently, Selys described several species from localities now under the state, namely *Philoganga montana* (as *Anisoneura montana*) (1959), *Gomphus personatus* (1873), *Idionyx optata* and *Hemicordulia asiatica* (1878a), *Euphea ochracea brunnea* (as *Euphea brunnea*), *Bayadera hyalina*, *Echo marginata tripertita* (citing *tripertita* as a race), *Matrona basilaris nigripectus*, *Rhinocypha ignipennis R. immaculata*, *R. spuria* and *Vestalaria smaragdina* (as *Vestalis smaragdina*) (1879), *Sympetrum orientale* (as *Diplax orientale*) (1883a), *Sympetrum hypomelas* (as *Diplax hypomelas*) (1884) and *Elattoneura atkinsoni* (as *Disparoneura atkinsoni*) (1886). Selys (1891a) also recorded from Khasia hills *Aciagrion approximans* (Selys), *Orthetrum triangulare triangulare* (Selys) (as *Libella triangularia*) and *Trithemis festiva* Brauer. After the death of Selys in 1890, McLachlan (1896) described *Gynacantha khasiaca* from Khasi hills. Martin (1909) described *Aeshna petalura* and *Austroaeschna intercedens* and Ris (1916) described the subspecies *Neurothemis intermedia atlanta* from Khasi hills. Ris (1909-1919, 1912) confirmed the existence of some Odonate species earlier recorded from Meghalaya and also recorded a number of species, viz. *Bayadera indica* (Selys), *Crocothemis servilia servilia* (Drury), *Orthetrum glaucum* (Brauer), *O. luzonicum* (Brauer), *O. japonicum internum* McLachlan and *Trithemis aurora* (Burmeister) from the state. Laidlaw (1914a, 1917a,b, 1919, 1921, 1922a, 1932) described seven species and recorded three other species from the state: these are *Coeliccia bimaculata* Laidlaw *Indocnemis kempi* Laidlaw, *Aciagrion tillyardi* Laidlaw, *Onychogomphus aureus* Laidlaw, *Anisogomphus orites* Laidlaw, *Coeliccia fraseri* Laidlaw, *C. vacca* Laidlaw, *Matrona basilaris basilaris* Selys, *Gynacantha hyalina* Selys and *Heliogomphus selysi* [as *H.nietneri* (Selys)].] Fraser (1919a, 1921c, 1922e, 1924a, 1925a, 1926a,b,c,e, 1927a, 1929a,c, 1930b, 1935) described 17 new species and one new race and recorded eight other species; these are *Rhinocypha quadrimaculata race hemihyalina* Fraser, *Pradasineura autumnalis* Fraser (as *Caconeura autumnalis*), *Indolestes indica* Fraser, *Pseudagrion spencei* Fraser, *Agriocnemis clauseni* Fraser, *Heliogomphus spirillus* Fraser (as *Leptogomphus spirillus*), *Megalogomphus bicornutus*) Fraser (as *Gomphus bicornutus*), *Merogomphus martini* Fraser (as *Platygomphus martini*), *Paragomphus echiocapitellus* Fraser (as *Onychogomphus echiocapitellus*), *Idionyx imbircata* Fraser, *I. intricata* Fraser, *Davidius malloryi* Fraser, *Anisogomphus caudalis* Fraser, *Anisopleura subplatystyla* Fraser, *Periaeschna nocturnalis* Fraser, *Petaliaeschna flatcheri* Fraser, *Dubitogomphus bidantatus* Fraser (as *Leptogomphus bidantatus*), *Periaeschna biguttata* (Fraser) (as *Cephalaeschna bigutta*), *Palpopleura sexmaculata sexmaculata* (Fabriciús), *Macromia moorei* Seyls, *Ceriagrion olivaceum* Laidlaw, *Chlorogomphus atkinsoni* (Selys) (as
Orogomphus at kinsoni Selys), C. campioni (Fraser) (as O. campioni Fraser), Zygonyx i. iris Selys, Euphaea ochracea Selys [as Allophae ochracea (Selys)] and Megalestes major Selys. Needham (1932), Fraser and Laidlaw in their above mentioned contributions and Fraser (1918, 1919c, 1920c, 1922a, b,c,d, 1923d, 1924e 1925b,c,d,e, 1927b,c, 1928, 1929b, 1932, 1934a) also confirmed the existence of several Odonate species already known from Meghalaya. Fraser (1933, 1934 and 1936) published accounts of Indian Odonates and these contained all the works referred to above. In these monographs Fraser made detailed treatment of the different taxonomic categories. In the Fauna of India volumes Fraser (1933, 1934, 1936) recorded some Odonate species and subspecies from Meghalaya, namely Ceriagrion azureum (Selys), Caliphaea confusa Selys, Onychogomphus modestus Selys [as Nepogomphus modestus (Selys)], Chlorogomphus fraserti St. Quentin, Oligoaeschna martini (Laidlaw) (as Jagoria martini Laidlaw), Periaeschna magdalenensis Martin, Lyriothemis tricolor Ris and Zygonyx iris davina Fraser. In the same year as the publication of the 3rd volume of that Fauna, Cowley (1936) described a new species from Khasi hills namely, Bayadera kali. St. Quentin (1937) described Anisopleura vallei and the female of Indocnemis kempi Laidlaw, from Cherrapunjee. Cowley (1937) discussed and illustrated the penile organs of some species of Chlorocyphidae occurring in Meghalaya; in this work, the author recorded Rhinocypha quadrimaculata Selys from Cherrapunjee, besides confirming the existence of some more species already known from the state. Fraser (1940) discussed and illustrated the penile organs of some species of Gomphidae occurring in Meghalaya. Lieftinck (1966a) recorded Anax guttatus (Burmeister) from Meghalaya on the basis of a female specimen captured from Khasi hills. Lieftinck (1968) described Oligoaeschna decorata and O. khasiana from Khasi hills. Asahina (1963), Bhasin (1953), Lieftinck (1948a, 1960b) and Vershney (1971) confirmed the existence of some Odonate species in the state, already recorded from the area. Kimmins (1966, 1968, 1969a, b) designated lectotypes of some Odonate species and subspecies occurring in Meghalaya. Pinhey (1974) while revising the African species of Agriocnemis Selys, redescribed A. pygmaea (Rambur) and cited the differences between Shillong and Seychelles forms of this species. Lahiri (1975) discussed the behaviour of Bayadera hyalina Selys, in Shillong region during the rains. Lahiri (1976) described Calicnemia mukherjeei from Shillong. Lieftinck (1977a) described Somatochlora daviesi from Khasi hills.

Thus till the present work, 82 Odonate species and sub species under 49 genera belonging to 14 families were known from the state of Meghalaya.
MATERIAL AND METHOD

The present study has been based on Odonate collection from 80 localities spread over the entire state of Meghalaya. Specimens were usually collected during field trips with the aid of aerial nets. In certain cases, smaller damselflies were caught simply by hand. After killing, the insects were put in paper envelopes for further study in the laboratory. In the field, relevant ecological condition and body colour of freshly killed specimens were noted. In the laboratory the specimens were studied under stereo-binocular microscope with eye pieces 5X and 10X and objectives 2X and 5X. Measurements for smaller body-parts have been taken using ocular and stage micrometers and for larger body-parts by ordinary scales. Male penile organs had to be dissected out for study after suitably moistening the 2nd abdominal segment, overnight. The figures were drawn by the candidate by means of camera lucida drawing apparatus. Keys provided in the text are based only for the taxa available from the region under study.

Collection localities: A list of collection localities with their altitudes in panenthesis, is given below. Of these collection localities, Sl. Nos. 1-26 are located in Garo hills, Sl. Nos. 27-74 are located in Khasi hills and Sl. Nos. 75-80 are located in Jaintia hills. (1) Anogiri (430 m); (2) Bagmara (175 m); (3) Balfagram (125 m); (4) Bangsi (200 m); (5) Charikut (175 m); (6) Chitmaring beel (350 m); (7) Dainadubi (170 m); (8) Dambu (175 m); (9) Damra (150 m); (10) Darugiri (200 m); (11) Degrangiri (500 m); (12) Kobal (325 m); (13) Napak beel (350 m); (14) Nongchalma (275 m); (15) Nongharm (300 m); (16) Ramgiri (130 m); (17) Rongjeng (275 m); (18) Rongham river bank near Rongjeng (250 m); (19) Rongram (550 m); (20) c 10 kms east of Rongram (on Rongrengiri road) (425 m); (21) Rongrengiri (340 m); (22) Songkhama (500 m); (23) Songsok (300 m); (24) Tebangiri (500 m); (25) Wageasi (250 m); (26) c 7 kms South of Wageasi (on Rongjeng road) (325 m); (27) Balat (150 m); (28) c 18 kms north of Balat (on Mawsynram road) (425 m); (29) Barapani (1175 m); (30) Burnihat (190 m); (31) Jakrim (1460 m); (32) Lailad (360 m); (33) Lailynag (1975 m); (37) Mairang (1700 m); (38) Mawblong (1300 m); (39) Mawiong (1200 m); (40) Mawlai (1300 m); (41) Mawlyndep (1200 m); (42) Mawpat (1300 m); (43) Mawphleng (1050 m); (44) Mawrapat (1400 m); (45) Mawroh (1900 m); (46) Mawryngkeng (1450 m); (47) Mawsynram (1550 m); (48) 4 kms south of Mawsynram (on Rinku Road); (49) Mylliem (1825 m); (50) Naya Bunglow (750 m); (51) Nonghyllan (600 m); (52) Nongklan (1650 m); (53) Nongpoh (650 m); (54) Nongstoin (1875 m); (55) Old Barapani roadside (1175-1430 m); (56) Pynursla (1500 m); (57) Puksora (125 m); (58) Ranikor (160-225 m); (59) c 10 kms east of Ranikor (on Balat road) (475 m); (60) Satmawdon (125 m).
(61) Shella (170 m); (62) Shillong (1600-1650 m); (63) Upper Shillong (1850-2000 m); (64) Sonapahar (1925 m); (65) c 10 kms west of Sonapahar (on Darugiri road) (1950 m); (66) Sumer (950 m); (67) Unlyngkot (1800m) (68) Umran (790 m); (69) Umroi (1125 m); (70) Umsamlem (675 m); (71) Umsning (875 m); (72) Umtham (850 m); (73) Umtynger (1825 m); (74) Weiloi (1650 m); (75) Garampani (200 m); (76) Jowai (1350 m); (77) Ratachara (500 m); (78) Sonapurdi (175 m); (79) Shangphung (600 m); (80) Thadlaskain (1460 m).

The collections on which the present study has been based have been made by several scientists of the Survey. A list of collectors along with abbreviations used in the text is given below:

A. K. Dutta (AKD); A. K. Mandal (AKM); A. K. Sen (AKS); A. R. Lahiri (ARL); A. S. Rajagopal (ASR); B. Dutta (BD), B. K. Tikader (BKT); C. V. Srivastava (CVS); G. M. Yazdani (GMY); K. Deb (KD); K. Rai (KR); K. R. Rao (KRR); M. Dutta (MD); M. K. Sen (MKS); M. R. Rynth (MRR); M. Wankher (MW); N. Mazumder (NM); R. K. Subhani (RKS); R. K. Vershney (RKV); R. P. Ghosh (RPG); R. S. Giri (RSG); R. S. Pillai (RSP); R. Zoramthanga (RZ); S. Biswas (SB); S. Khera (SK); S. K. Chanda (SKC); S. K. Talukder (SKT); S. N. Prasad (SBP); S. Rai (SR); S. R. Prasad (SRP); T. G. Vazirani (TGV); V. D. Srivastava (VDS).

SYSTEMATICS

*Classified list of Odonate species and subspecies known from Meghalaya:*

Following is a list of Odonate species and subspecies known from Meghalaya, arranged in a systematic manner under suborders, superfamilies, families, divisions, subfamilies and genera. Species and subspecies present in the collection and studied are marked with either * (when these are new records from Meghalaya) or ** (when these are not so).

Order ODONATA
Suborder ZYGOPTERA
Superfamily CALOPTERYGOIDEA
Family AMPHIPTERYGIDAE
Subfamily PHILOGANGINAE

Genus 1. Philoganga Selys
Species **1. P. montana** (Selys)

Family CHLOROCYPHIDAE

Genus 2. Libellago Selys
Species *2. L. I. lineata* (Burmeister)
Genus 3. Rhinocypha Rambur
Species *3. R. beatifica Fraser
Species *4. R. biforata delimbata Selys
Species **5. R. ignipennis Selys
Species **6. R. immaculata Selys
Species 7. R. quadriraculata hemihyalina Fraser
Species **8. R. q. quadriraculata Selys
Species **9. R. spuria Selys
Species *10. R. vitrinella Fraser

Family EUPHAEIDAE

Genus 4. Anisopleura Selys
Species **11. A. subplatystyla Fraser
Species 12. A. vallei St. Quentin

Genus 5. Bayadera Selys
Species **13. B. hyalina Selys
Species **14. B. indica (Selys)
Species 15. B. kali Cowley

Genus 6. Euphaea Selys
Species **16. E. ochracea brunnea Selys
Species 17. E. o. ochracea Selys

Family CALOPTERYGIDAE
Subfamily CALIPHAEINAE

Genus 7. Caliphaea Selys
Species **18. C. confusa Selys

Subfamily CALOPTERYGINAE

Genus 8. Echo Selys
Species 19. E. m. margarita Selys
Species **20. E. m. tripartita Selys

Genus 9. Matrona Selys
Species 21. M. b. basilaris Selys
Species **22. M. b nigripectus Selys

Genus 10. Neurobasis Selys
Species *23. N. c. chinensis (Linnaeus)

Genus 11. Vestalaria May
Species 24. V smaragdina (Selys)
Genus 12. Vestalis Selys
Species *25. V. g. gracilis (Rambur)

Superfamily LESTIDOIDEA
Family CHLOROLESTIDAE
Subfamily MEGALESTINAE

Genus 13. Megalestes Selys
Species 26. M. major Selys
Species *27. M. raychoudhurii sp. nov.

Subfamily LESTIDAE
Subfamily SYMPECMATINAE

Genus 14. Indolestes Fraser
Species **28. I. indica Fraser

Subfamily LESTINAE

Genus 15. Orolestes McLachlan
Species *29 O. durga sp. nov.

Genus 16. Lestes Leach
Species *30. L. concinnus Selys
Species *31. L. dorothea Fraser
Species *32. L. garoensis sp. nov.

Superfamily COENAGRIONOIDEA
Family PROTONEURIDAE

Genus 17. Elattoneura Cowley
Species **33. E. atkinsoni (Selys)
Species *34. E. campioni (Fraser)

Genus 18. Prodasineura Cowley
Species **35. P. autumnalis (Fraser)

Family PLATYCNEMIDIDAE

Genus 19. Copera Kirby
Species *36. C. annulata (Selys)
Species *37. C. marginipes (Rambur)
Species *38. C. vittata (S.L.) (Selys)

Genus 20. Calicnemia Strand
Species *39. C. eximia (Selys)
Species 40. *C. imitans* Lieftinck
Species 41. **C. mukherjeei** Lahiri

Genus 21. *Coeliccia* Kirby
Species 42. **C. bimaculata** Laidlaw
Species 43. *C. didyma* (Selys)
Species 44. **C. fraseri** Laidlaw
Species 45. *C. sarbottama* sp. nov.
Species 46. **C. vacca** Laidlaw

Genus 22. *Indocnemis* Laidlaw
Species 47. **I. kemp**; Laidlaw

Family COENAGRIONIDAE

Genus 23. *Ceriagrion* Selys
Species 48. *C. azureum* (Selys)
Species 49. **C. coromandelianum** (Fabricius)
Species 50. *C. fallax* Ris
Species 51. **C. olivaceum** Laidlaw

Genus 24. *Pseudagrion* Selys
Species 52. *P. australasiae* Selys
Species 53. *P. r. rubriceps* Selys
Species 54. **P. spencei** Fraser

Genus 25. *Aciagrion* Selys
Species 55. *A. approximans* (Selys)
Species 56. *A. pallidum* Selys
Species 57. **A. tillyardi** Laidlaw

Genus 26. *Enallagma* Charpentier
Species 58. *E. Parvum* Selys

Genus 27. *Ischnura* Ebarpentier
Species 59. *I. a. aurora* (Hagen)
Species 60. *I. r. rufostigma* Selys

Genus 28. *Agriocnemis* Selys
Species 61. **A. clauseni** Fraser
Species 62. *A. lacteola* Selys
Species 63. **A. pygmaea** (Rambur)

Genus 29. *Argiocnemis* Selys
Species 64. **A. obscura** Laidlaw
Suborder ANISOPTERA
Superfamily AESHNOIDEA
Family GOMPHIDAE
Subfamily GOMPHINAE

Genus 30. Anisogomphus Selys
   Species **65. A. caudalis Fraser
   Species 66. A. orites Laidlaw

Genus 31. Burmagomphus Williamson
   Species *67. B. ? vermicularis (Martin)

Genus 32. Davidius Selys
   Species 68. D. mallyori Fraser

Genus 33. Dubitogomphus Fraser
   Species 69. D. bidentatus (Fraser)

Genus 34. Gomphus Leach
   Species **70. G. personatus Selys

Genus 35. Heliogomphus Laidlaw
   Species 71. H. selysi (Fraser)
   Species 72. H. spirillus (Fraser)

Genus 36. Megalogomphus Campion
   Species 73. M. bicornutus (Fraser)

Genus 37. Macrogomphus Martin
   Species **74. M. Martini (Fraser)

Genus 38. Nihonogomphus Oguma
   Species *75. N. indicus sp. nov.

Genus 39. Onychogomphus Selys
   Species **76. O. aureus Laidlaw
   Species *77. O. maculivertex Selys
   Species *78. O. meghalayanus sp. nov.
   Species **79. O. modestus Selys
   Species *80. O. sundersi duaricus Fraser

Genus 40. Paragomphus Cowley
   Species **81. P. echinoccipitalis (Fraser)
   Species *82. P. lineatus (Selys)

Genus 41. Perissogomphus Laidlaw
   Species *83. P stevensi Laidlaw
Genus 42. Stylogomphus Fraser
Species *84. *S. inglisi* Fraser

Family Aeshnidae
Division Brachytrini
Subfamily Gomphaeshninae

Genus 43. Oligoaeshna Selys
Species 85. *O. decorata* Lieftinck
Species 86. *O. Khasiana* Lieftinck
Species 87. *O. martini* (Laidlaw)

Subfamily Brachytrinae

Genus 44. Austroaeschna Selys
Species **88. *A. intersedens* Martin

Genus 45. Periaeshna Martin
Species *89. *P. biguttata* (Fraser)
Species 90. *P. biguttata* (Fraser)
Species 91. *P. magdalena* Martin
Species 92. *P. nocturnalis* Fraser

Genus 46. Petaliaeschna Fraser
Species 93. *P. fletcheri* Fraser

Genus 47. Tetracanthagyna Selys
Species *94. *T. waterhousei* McLachlan

Division Aeshninae
Subfamily Aeshninae

Genus 48. Aeshna Fabricius
Species 95. *A. petalura* Martin

Subfamily Anactinae

Genus 49. Anax Leach
Species 96. *A. guttatus* (Burmeister)
Species *97. *A. sp. A*

Subfamily Gynacanthaginae

Genus 50. Gynacantha Rambur
Species *98. *G. bayadera* Selys
Species 99. *G. hyalina* Selys
Species 100. *G. khasiaca* Mc Lachlan
Species *101. *G. sp. A*

Superfamily **Cordulegasteroidea**
Family **Cordulegasteridae**
Subfamily **Cordulegasterinae**

Genus 51. **Anotogaster** Selys
Species *102. A. sp. A.*

**Subfamily Chlorogomphinae**

Genus 52. **Chlorogomphus** Selys
Species **103. C. atkinsoni** (Selys)
Species 104. *C. campioni* (Fraser)
Species 105. *C. fraseri* St. Quentin

Superfamily **Libelluloidea**
Family **Corduliidae**
Subfamily **Corduliinae**

Genus 53. **Hemicordulia** Selys
Species **106. H. asiatica** Selys

Genus 54. **Somatochlora** Selys
Species 107. *S. daviesi* Lieftinck

**Subfamily Macromiinae**

Genus 55. **Idionyx** Hagen
Species 108. *I. imbricata* Fraser
Species 109. *I. intricata* Fraser
Species **110. I. optata** Selys

Genus 56. **Macromia** Rambur
Species **111. M. moorei** Selys

**Family Libellulidae**

Genus 57. **Tetrathemis** Selys
Species *112. T platyptera* Selys

Genus 58. **Lyriothemis** Brauer
Species *113. L. ? bivittata* (Rambur)
Species 114. *L. tricolor* Ris
Genus 59. Orthetrum Newman
Species **115. *O. glaucum* (Brauer)
Species **116. *O. japonicum internum* McLachlan
Species **117. *O. luzonicum* (Brauer)
Species *118. *O. pruinosum neglectum* (Rambur)
Species *119. *O. sabina* (Drury)
Species **120. *O. t. triangulare* (Selys)

Genus 60. Potamarcha Karsch
Species *121. *P. congener* (Rambur)

Genus 61. Palpopleura Rambur
Species **122. *P. S. sexmaculata* (Fabricius)

Genus 62. Brachydiplax Brauer
Species *123. *B. sobrina* (Rambur)

Genus 63. Nannophya Rambur
Species *124. *N. pygmaea* Rambur

Genus 64. Acisoma Rambur
Species *125. *A. p. panorpoides* Rambur

Genus 65. Brachythemis Brauer
Species *126. *B. contaminata* (Fabricius)

Genus 66. Crocothemis Brauer
Species **127. *C. s. servilia* (Drury)

Genus 67. Diplacodes Kirby
Species *128. *D. nebulosa* (Fabricius)
Species *129. *D. trivialis* (Rambur)

Genus 68. Neurothemis Brauer
Species *130. *N. fulvia* (Drury)
Species **131. *N. intermedia atlanta* Ris
Species *132. *N. i. intermedia* (Rambur)
Species *133. *N. t. tullia* (Drury)

Genus 69. Sympetrum Newman
Species **134. *S. hymomelas* (Selys)
Species **135. *S. orientale* (Selys)

Genus 70. Trithemis Brauer
Species **136. *T aurora* (Burmeister)
Species **137. T. festiva** (Rambur)
Species *138. T. pallidinervis* (Kirby)

Genus 71. Zyponyx Hagen
Species 139. Z. iris davina Fraser
Species 140. Z. i. iris Selys
Species *141. Z. i. intermedia* subsp. nov.

Genus 72. Onychothemis Brauer
Species *142. O. testaces* (S.L.) Laidlaw

Genus 73. Rhyothemis Hagen
Species *143. R. v. variegata* (Linnaeus)

Genus 74. Tholymis Hagen
Species *144. T. tillarga* (Fabricius)

Genus 75. Hydrobasileus Kirby
Species *145. H. croceus* (Brauer)

Genus 76. Pantala Hagen
Species *146. P. flavescens* (Fabricius)

Genus 77. Urothemis Brauer
Species *147. U. s. signata* (Rambur)

**TAXONOMIC ACCOUNT**

**Order ODONATA**

Out of three suborders e. g. Zygoptera, Anisozygoptera and Anisoptera, two i. e. Zygoptera and Anisoptera are represented in the state of Meghalaya. Anisozygoptera is known only by two species, one from India (West Bengal: Darjeeling district) and Nepal, the other from Japan.

**KEY TO THE SUBORDERS OF ORDER ODONATA**

Distance between inner margins of eyes greater than their own diameter (Fig. 7) ; in males inferior anal appendage paired and placed below anal opening (Figs. 4-5) ; fore- and hindwings more or less similar in shape and venation (Figs. 42 and 510-524). ... ... Zygoptera

Distance between inner margins of eyes always less than their own diameter (Figs. 9-12) ; in males inferior anal appendage single and placed above anal opening (Figs. 27-28) ; fore- and hindwings different in shape and venation (Figs. 33 and 525-539). ... ... Anisoptera.

**Suborder ZYGOPTERA**

Diagnostic characters: Head transversely elongated ; middle lobe of labium fissured and subequal to lateral lobe ; distance between inner
margins of eyes greater than their own diameter; ocelli not set in vesicle, lying free in middle of vertex; occiput trapezoidal; male genitalia with deeply cleft lamina, with anterior hamules well developed, posterior hamules inconspicuous and lobe elongated; both superior and inferior anal appendages in male paired and placed above and below anal opening respectively; female with fully developed ovipositor. Fore-and hindwings similar in shape and venation; discoidal cell in the form of a quadrangle.

Distribution: Cosmopolitan.

KEY TO THE SUPERFAMILIES OF THE SUBORDER ZYGOPTERA

1. More than 2 antenodal cross veins present; postnodals not in alignment with veins beneath (Figs. 510-518). Calopterygoidea

Only 2 antenodal cross veins present; postnodals in strict alignment with cross veins beneath (Figs. 33 and 519-524).

2. Origin of IR3 and R4+5 generally more near nodus than or even beyond level of nodus (Figs. 33 and 521-524); males with anterior hamules subquadrate (Fig. 18). Coenagrionoidea

Origin of IR3 and R4+5 generally more near arc than nodus (Figs. 519-520); males with anterior hamules elongated. Lestidoidea

Superfamily CALOPTERYGOIDEA

Diagnostic characters: Medium to large sized insects; hind margin of posterior lobe of prothorax rounded, trapezoidal, or shallowly tripartite; prothorax usually with a boss on either side; males with anterior hamules quadrate. Wings usually petiolated, sometimes not petiolated; more than two (usually more than 5) antenodal cross veins present; postnodals not in strict alignment with cross veins beneath; IR3 and R4+5 usually beginning nearer arc than nodus; a number of intercalated sectors present, at least between branches of Rs and MA.

Distribution: Virtually cosmopolitan.

KEY TO THE FAMILIES OF THE SUPERFAMILY CALOPTERYGOIDEA

1. Two primary antenodal cross veins easily distinguishable from the secondaries (Fig. 510-515). Amphipterygidae

Two primary antenodal cross veins not distinguishable from the secondaries (Figs. 516-518).

2. Petiolation of wing ending opposite to or slightly proximal to the level of arc (Fig. 43). Anphipterygidae
Petiolation of wing ending far proximal to the level of arc (Figs. 510-515).

Chlorocyphidae

3. 1st lateral suture of synthorax incomplete and not traceable up to the spiracle
   Euphaeidae

1st lateral suture of synthorax complete and well developed, traceable even beyond spiracle.
   Calopterygidae

Family AMPHIPTERYGIDAE

Diagnostic characters: Large in size; ground colour without metallic lusture. Wings hyaline; petiolation ending, at or slightly proximal to the level of arc; more than two antenodal cross veins present; primary antenodals easily distinguishable, other antenodals present either only in costal space or in both costal and subcostal space and then these not coinciding; discoidal cell short and broad or long and narrow, entire or traversed by cross veins; base of discoidal cell connected to radius by arc; are slightly bent, situated in line with distal antenodal cross vein; sectors of arc arising from above the middle of arc, these being either separated at origin or arising from a common point, or even from a common stalk; IR₆ arising closer to arc or midway between arc and nodus where it is close or widely spaced with R₄₊₅

Distribution: India; China; Burma; Thailand; Malaysia; Indonesia; Australia; Africa; South America.

Subfamily PHILOGANGINAE

Diagnostic characters: Secondary antenodals present both in costal and subcostal spaces; IR₆ arising midway between nodus and arc, where it is widely spaced with R₄₊₅; discoidal cell entire, short, straight and about one fifth less in length than the median space.

Distribution: India; China; Burma; Thailand.

Genus: Philoganga Kirby


Type-species: Anisoneura montana Selys

Selys (1859) established the genus Anisoneura with A. montana Selys as type-species. Kirby (1890) proposed the name Philoganga for Anisoneura Selys (nom. preoc.). Needham (1903) further elucidated the generic characters. Later, Ris (1912), Laidlaw (1917a), Fraser (1924f, 1929a
and 1934) and Asahina (1967b) also contributed towards the knowledge of this genus.

**Diagnostic characters:** Large sized insects (usually with abdomen 41.0-54.0 mm and hindwing 37.0-52.0 mm); yellowish with brown or black markings; spines on femora and tibiae very short; male superior anal appendages subcylindrical with apices curved inwards, nearly two to three times as long as abdominal segment 10 and minutely spined outwardly; inferior appendages rudimentary, ungulate or subquadrate; terminal fold of penis bifurcated at apex, with branches diverging, each bearing a row of hairs apically; female anal appendages a little longer than segment 10 of abdomen; vulvar scale extending beyond apex of abdomen, with ventral border coarsely serrate on apical half. Wings long and narrow, hyaline, sometimes partly enfumed or tinted with yellow; nodus situated markedly near base of wing; 10-19 antenodal and 17-30 postnodal cross veins in both fore-and hindwings; secondary antenodal cross veins present both in costal and subcostal spaces; primary antenodal cross veins coinciding and easily distinguishable, rest not coinciding; 1-5 basal incomplete antenodal cross veins present; pterostigma narrow, rectangular, nearly five times as long as broad and slightly swollen medially; arc slightly bent, situated at the level of distal primary antenodal cross vein; sectors of arc not arising from middle of arc but slightly basad, divergent from origin; discoidal cell short and straight, only about one fifth the length of median space, with inner margin slightly longer than costal margin; discoidal cell, as well as, median and cubital space (the latter except cross vein Ac) entire; R₃ arising a little distal to subnodus, IR₃ placed midway between nodus and arc, latter widely saperced with R₄₊₅ at origin; Ab arising from inner wing margin at a point where Ac meets it; 1A markedly convex and 1-3 rows of cells in anal field.

**Distribution:** India; China; Burma; Thailand.

**Philoganga montana** (Selys)
(Figs. 72-74 and 109-110)


**Material studied:** 1 ♂, Shillong, 28.v.1973, coll ARL ; 1 ♂, Umran, 30.v.1972, coll ARL ; 1 ♀, Urmoi, 7.vii.1970, coll SKT ; 1 ♀, Garmapani, 26.iv.1972, coll ARL.
Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th></th>
<th>Length of</th>
<th>Forwading</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abdomen</td>
<td>Forwarding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hindwing</td>
<td>An</td>
<td>Pn</td>
</tr>
<tr>
<td>♂ 51.4-54.4</td>
<td>46.0-49.0</td>
<td>12-15</td>
<td>25-30</td>
</tr>
<tr>
<td>♀ 41.0-41-5</td>
<td>46.0-48.0</td>
<td>12-14</td>
<td>28-30</td>
</tr>
</tbody>
</table>

Notes: Specimens examined of either sex vary from the description of the species provided by Fraser (1934) in size and nodal index, in the middle lobe of prothorax being yellowish on either side and in the presence of a short upper yellowish stripe on 2nd lateral suture, besides some other variations as noted here under:

Male: Labrum, in one specimen blue bordered with black; mandibles cheeks and frons black and without yellow markings; pterostigma extending over 4-5½ cells; 2-5 incomplete basal antenodal cross veins; absence of basolateral spots on abdominal segments 6 and 7, or even on segment 5 in one specimen and of lateral stripes on segments 4-7 or even segment 3 in one specimen.

Female: presence of 1-3 and 2 incomplete basal antenodal cross veins in fore- and hindwings respectively; in one specimen ventral borders of abdominal segments 7 and 8 yellowish and some indistinct patches of same colour on sides of vulver scale.

This species is commonly found along montane streams overhanged with bushes. They have been found either resting with wings spreaded or moving about.

Distribution: India: Assam, Meghalaya, West Bengal.

Family Chlorocypidae

Diagnostic characters: Usually medium sized insects; ground colour nonmetallic; clypeus markedly projected forming epistome; abdomen shorter than hindwing, synthorax large in comparison to body. Wings often markedly coloured in males, rarely so in female; petiolation not reaching the level of arc; more than 2 antenodal cross veins present; primary antenodals easily distinguishable and other antenodals not coinciding; base of discoidal cell connected to radius by arc; arc angulated (or oblique), situated in a line with the distal primary antenodal cross vein; sectors of arc arising from above the middle of arc and these either seperated right from origin, or arising from a common point.

Distribution: Virtually cosmopolitan in Old World countries.
KEY TO THE GENERA OF THE FAMILY CHLOROCYPHIDAE

Sectors of arc arising from a common point (Fig. 45).  
Libellago Selys

Sectors of arc separated at origin (Figs. 44 and 510-515).  
Rhinocypha Rambur

Genus: Libellago Selys


Type-species: Calopteryx lineatus Burmeister

The genus has been used here sessu Fraser (1934). Selys (1840, 1853, 1878b, 1889, 1891a), Rambur (1842), Kirby (1890), Williamson (1904), Laidlaw (1917a), Fraser (1928b, 1949b), Cowley (1937), Lieftinck (1937, 1940b, 1954, 1955a, 1971) and Montgomery (1967) have dealt with this genus. Bhasin (1953), Sahni (1973), Kumar and Juneja (1976) and Prasad and Singh (1976) contributed on the Indian species of this genus in recent times.

Diagnostic characters  Small in size (usually with abdomen 12.0-22.0 mm) hindwing 15.0-26.0 mm); red or black, marked with orange, blue or green; mesothoracic triangle on synthorax usually absent, but reduced and uncoloured when present; femora and tibiae usually pruinosed; epistome well developed; male superior anal appendages pincer-like and about twice as long as abdominal segment 10; inferiors ungulate, about one third the length of superiors, terminal fold of penis large, with its external branch slightly developed, the internal branch narrow and moderately developed. Wings long and narrow, hyaline, partly tinted yellow and marked with black or blackish brown in males; usually 4-7 antenodal and 8-18 postnodal cross veins in all wings; primary antenodal cross veins easily distinguishable, other antenodals not coinciding; pterostigma narrow, rectangular, about three times as long as broad, sometimes absent in forewing of males; situated at the level of distal primary antenodal cross vein; sectors of arc arising from above middle of arc, from a common point; discoidal cell short, a little less than half the length of median space, usually traversed by one or two veins; median space entire; cubital space usually traversed by 2-5 veins; R8 arising well distal to subnodus, IR8 arising from a point nearer arc than nodus and in close proximity to origin of R4+5; Ab arising from inner wing margin either proximal of or distal to the level of 1st primary antenodal cross vein; one or two rows of cells in anal field.
Distribution: India; Sri Lanka; Nicobar; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Philippines.

**Libellago lineata lineata** (Burmeister)
(Figs. 70-71 and 91-92)


Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th>Length</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen hindwing</td>
<td>An Pn</td>
<td>An Pn</td>
</tr>
<tr>
<td>♂ ♂ 14.4-16.0 18.0-19.0</td>
<td>4-6 —</td>
<td>4-6 6-11</td>
</tr>
<tr>
<td>♀ 14.0 27.0</td>
<td>5-6 9-12</td>
<td>4-6 10-11</td>
</tr>
</tbody>
</table>

Notes: Specimens under study vary from the description of the species provided by Fraser (1934) in the following:

Males: labrum and frons unmarked with yellow.

Females: epistome with two yellow spots on anterior surface; the yellow portion of mesepimeron divided by a black line at middle.

This species is commonly found in comparatively open habitat along streams or small rivers with sandy bottom and clear water.

Distribution: India: Assam, Himachal Pradesh, Kerala, Maharashtra, Meghalaya, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: Burma; Thailand; Vietnam; Malaysia; Indonesia.

Genus: *Rhinocypha* Rambur


Type-species: *Rhinocypha tincta* Rambur

The genus has been used here sensu Lieftinck (1954). The genus *Heterocypha* Laidlaw has been considered as a synonym of *Rhinocypha* Rambur because the characters used by Laidlaw (1950) for separating his genus *Heterocypha* from *Rhinocypha* Rambur, appear to overlap between the two genera. Rambur (1842), Selys (1853, 1854a, 1859a, 1878b, 1889, 1891a), Kirby (1890), Williamson (1904), Ris (1916b), Laidlaw (1917a), Fraser (1927c, d, 1934, 1949b), Navas (1930, 1933), Cowley (1937), Lieftinck (1947, 1948a, c, 1953c, 1954), Asahina (1952-1953, 1964b) and Montgomery (1967) have worked on this genus. Bhasin (1953), Kumar (1927c, 1973a, 1977b), Sahni (1973), Kumar and Juneja (1976), Prasad (1976a), Prasad and Singh (1976), Singh and Prasad (1976b, c) and Lahiri (1977b, 1979) have published accounts of Indian species.

*Diagnostic characters:* Medium in size (usually with abdomen 15.0-28.0 mm, hindwing 17.0-32.0 mm); red or black marked with yellow, green or blue; mesothoracic triangle usually developed on synthorax, variably extending as far as base of wings, or only up to one fourth this distance, usually pink, blue or green in males, in females black bordered with colours as in males; epistome moderately developed; male superior anal appendages pincer-like, about twice as long as abdominal segment 10; inferiors ungulate, about half the length of superiors; terminal fold of penis with variably developed and shaped internal and external branches. Wings moderately narrow or well-dilated, hyaline or partly opaque, opaque portion may be marked with metallic blue, violet, green or coppery, usually with 12-23 antenodal and 20-48 postnodal cross veins in all wings; primary antenodal cross veins easily distinguishable and other antenodals not coinciding; pterostigma narrow, five or six times as long as broad, a little swollen medially; arc angulated, usually situated at the level of distal primary antenodal cross vein, but occasionally either proximal or even distal to that level; sectors of arc arising from about its middle, separated at origin; discoidal cell more than half the length of median space, and usually traversed by 2-7 veins; median space entire; cubital space usually traversed by 3-8 veins; R₃ arising a little distal to subnodus, IR₃ from a point nearer arc than nodus and in close proximity to that of R₄₊₅; Ab arising from inner wing margin a little or quite distal to the first primary antenodal cross vein; 1-3 rows of cells in the anal field.

*Distribution:* India; Nepal; Tibet; China; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Ryukyu; Taiwan; Philippines; Australia; Pacific Islands.
KEY TO THE SPECIES AND SUBSPECIES OF THE GENUS RHINOCYPHA RAMBUR

Males

1. Dorsal mesothoracic triangle obsolete or absent (Fig. 66). .ingipennis Selys
   Dorsal mesothoracic triangle present (Figs. 64, 65 and 67). .2

2. Dorsal mesothoracic triangle never extending beyond half the length of syn-
thorax...
   Dorsal mesothoracic triangle extending almost up to the hind margin of syn-
thorax (Figs. 65 and 67). .5

3. Apical half of hindwing opaque and with two rows of vitreous spots (Fig. 510)
   beatifica Fraser
   Apical third of hindwing opaque and with one row of vitreous spots (Figs. 511
   and 515). .4

4. Opaque area in fore—and hindwing nearly equal; hindwing with an isolated
   vitreous spot distal to the row of vitreous spots (Fig. 515). .vitrinella Fraser
   Opaque area in forewing much smaller than that in hindwing; isolated vitreous
   spot in hindwing, as mentioned above, absent (Fig. 517). .biforata delimbata
   Selys.

5. Wings completely hyaline. .immaculata Selys
   Only about basal third of wings hyaline. .6

6. Smaller species with abdomen and hindwing, each less than 23.0 mm in length;
apical vitreous spot as in Fig. 513. .quadrirnaculata Selys
   Larger species, with abdomen and hindwing, each 20.0 mm or more in length;
apical vitreous spot of hindwing not as above (Fig. 514). .spuria Selys

Females

(Female of R. vitrinella Fraser was not available in the collection studied and there-
fore this species has not been included in the key to the females).

1. Dorsal mesothoracic triangle obsolete or absent. .ingipennis Selys
   Dorsal mesothoracic triangle present. .2

2. Dorsal mesothoracic triangle never extending beyond half the length of syn-
thorax...
   Dorsal mesothoracic triangle extending almost up to the hind margin of syn-
thorax. .4

3. Mesothoracic triangle smaller (1.25 mm in length); epistome without any spot
   on dorsum; hindwing smaller (23.0 mm in length). .biforata delimbata
   Selys.
   Mesothoracic triangle larger (1.50 mm in length); epistome with a large yellow-
ish spot on dorsum; hindwing longer (26.0 mm in length). .beatifica Fraser.
LAHIRI: Odonate fauna of Maghalaya

4. Mesothoracic triangle broad (never less than 0.75 mm in width at about middle); labrum black; without any spots. *immaculata* Selvs.

Mesothoracic triangle narrow (0.25-0.50 mm in width at about middle); labrum black and with yellow spots. *spuria* Selvs.

5. Mesothoracic triangle at least 0.50 mm wide at about middle; labrum marked with a pair of large yellow spots. *quadrimaculata* Selys.

Mesothoracic triangle never exceeding 0.25 mm in width at about middle; labrum marked with a pair of small yellow spots.

**Rhinocypha beatifica** Fraser

*(Figs. 68-69, 99-100 and 510)*


**Material studied**: 3♂ 2♀, Songsk, 25.iv.1973, coll ARL; 3♂ 2♀, Rongrengiri, 10.iv.1973, coll ARL; 1♀, Shella, 23.iii.1961, coll VDS; 1♀, Umran, 10.v.1967, coll RKV

**Measurements (in mm) and Nodal index**

<table>
<thead>
<tr>
<th></th>
<th>Length of Abdomen</th>
<th>Forwarding Hindwing</th>
<th>Hindwing</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>of hindwing</td>
<td>An</td>
<td>Pn</td>
</tr>
<tr>
<td>♂</td>
<td>20.0-23.0</td>
<td>13-18</td>
<td>25-30</td>
</tr>
<tr>
<td>♀</td>
<td>19.0</td>
<td>11-12</td>
<td>21-23</td>
</tr>
</tbody>
</table>

**Description**: Male (adult): Labium black, but its center largely bluish yellow; rest of head black, marked with blue as follows: bases of mandibles, two pairs of small rounded spots, one on outer side of each posterior ocellus, the other postocular, an median oval spot on hind border of occiput. Prothorax black, marked with yellowish largely at center of posterior lobe and by three pairs of bluish spots as follows: small middorsal oval pair on anterior lobe, a lateral large pair and a small ventrolateral pair on either side of middle lobe. Synthorax black, marked as follows: mesothoracic triangle lilaceous extending slightly more than one third up the dorsum and about 1.25-1.50 mm in length; on the outer side of mesothoracic triangle a little longer subtriangular blue spot and upper triangular humeral spot of the same colour; a rounded upper spot and most of anterior two third of mesepimeron with a narrow prolongation running up nearly to wing base beneath the humeral suture and median two third of met epimeron blue; beneath mainly black with a pair of obscured rounded yellowish spots behind. Legs black, inner surfaces of hind two pairs of femora and tibiae pruinose. Wings hyaline at base, marked with...
opaque black and vitreous spots of violaceous reflex as shown in Fig. 510; forewings opaque for more than one third apically, with a prolongation of costal streak, between costa and R₁ to within 1-4 cells distal to nodus; hind border of the body of opaque area serrated and broadly oval, bordered narrowly behind nearly to the apex of wing by vitreous; the body of the opaque area covers more than two third the distance from apex of wing to nodus and the vitreous border extends along the apex of wing right up to nodus; hindwings apically from near nodus broadly opaque; proximal border of the opaque area running obliquely basad, so that even though falling short of the nodus by 1-4 cells on costal side it extends proximal to nodus on inner side; the opaque area is ragged and indented deeply by a vitreous spot of 7-8 cells long between IR₃ and R₄₊₅; the opaque area narrowly bordered behind by vitreous which extends round the apex of wing as far as outer border of pterostigma; the opaque area also marked by 3 series of apical and 3 series of proximal vitreous spots; the apical series of vitreous spots slightly overlap the proximal and of pterostigma, with costal series 8-12 cells long lying between IR₃ and R₃, the inner series 4-8 cells long lying between IR₃ and R₄₊₅, while the median spot lying between these is 6-10 cells long; usually the inner series is deep by 3 cells, the middle by 2 cells and the costal by 1 and 3 cells at its promixal and distal ends; the series are mostly banded together by 1 or more cells or even entirely so and sometimes followed distally by a fourth series of one cell deep and 2-3 cell long; proximal series lying nearer nodus than pterostigma, with costal series 8-11 cells long lying between IR₂ and R₈, the median series 4-10 cells long between IR₃ and R₄₊₅ and inner series 6-14 cells long between MA and C₂; of these the median series is deep by 2-3 cells, the others by one cell; discoidal cells traversed by 3-4 cross veins; pterostigma blackish brown, comparatively paler in outer third. Abdomen black, marked with blue on sides as follows: triangular apical spots on segments 1-8, elongating in length progressively on segments 1-4 then again decreasing on segments 5-8; segment 9 with a vestige of these spots while segment 3 with an additional mid-ventrolateral elongated spot. Anal appendages black, as shown in Figs. 68-69. Penis as shown in Figs. 99-100

**Female:** Differ from the male in the following points: markings yellow instead of blue and are more extensive; head with the following extra markings: labrum, frons, upper surface of epistome and anterior ocellus marked by a oval spot on either side; epistome with a paid of additional spots; a longitudinal and a transverse narrow stripes crossing each other mid-dorsally on posterior lobe of prothorax; mesothoracic triangle black margined with yellow, about 1.50 mm in length; flexor surfaces of
hind femora and that of all coxa and trochanters striped with yellow; segments 2-8 of abdomen with fine mid-dorsal carinal line; segments 5-7 with short basolateral spots; segments 2, 4 and 5 are with ventrolateral median stripes.

Notes: Fraser (1927) considered his beatifica as a subspecies of R. perforata Percheron, but the same is considered here as a distinct species. This is chiefly done because in beatifica the wings are much broader than perforata and the opaque areas of wings are of greater extent than the later in forewing covering more than two third (vs one third) the distance between nodus to apex; in hindwing extending up to (vs falling short of) nodus]; the vitreous spots of hindwing also vary in extent between the two species.

In Meghalaya, this species has been collected near shaded montane streams in Garo and Khasi hills below 800 m. The bright wing colour and blue abdominal markings are very conspicuous even in shaded location. The specimens when disturbed, move quickly to nearby bamboo twigs or similar high perching spots.

Distribution: India: Meghalaya, Nagaland.

Rhinocypha biformata delimbata Selys
(Figs. 93, 94 and 511)


Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdomen</td>
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</tr>
<tr>
<td>♂ ♂</td>
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</tr>
<tr>
<td>♀</td>
<td>19.0</td>
<td>23.0</td>
</tr>
</tbody>
</table>

Notes: Mesothoracic triangle of synthorax in male, is rosepink, not extending even up to half the length of synthorax (length 1.25 mm, its sides twice as long as base) and in female it is black at the middle and bordered yellow, nearly as long as in male.
The specimens under study vary from the description of the species provided by Fraser (1934) in size, nodal index and also in the following characters:

**Male**: length of cell rows in vitreous spots of hindwing: apical series: costal 8-9, 2nd 9-10, 3rd 8, 4th: costal 6-8, middle 7-8, inner 6; middle series: costal 8-10, middle 6-7, inner 6-7; middle row of vitreous spots may or not touch opaque area; black colour on sides of synthorax extended with the blue markings as follows: a small upper antehumeral spot, an elongated curved spot below posterolateral suture at its upper end; lower and upper two thirds of mesepimeron and metepimeron also blue; abdominal segments 5-7 either without markings or with only apical spots; body arkings in teneral insects as in females given by Fraser (1934), the wing markings ill developed.

**Female**: epistome with a large yellow basolateral spot; synthorax and abdominal segments 1-3 marked as in male, besides a fine antehumeral line on synthorax, which on reaching nearly its posterior margin bends outwards; abdominal segment 4 without ventrolateral stripe, rest of abdomen unmarked.

This species is commonly found along montane streams or rivers. Both sexes are rather shy and usually take refuge inside jungle often at a height beyond the reach of the aerial net. The males are often perching on exposed boulders in mid-streams.

**Distribution**: India: Assam, Manipur, Meghalaya. Outside India: Nepal; Burma; Vietnam.

**Rhinocypha ignipennis** Selys

(Figs. 66, 95-96 and 512)


Measurements (in mm) and nodal index

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<th>Length of</th>
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<th>Hindwing</th>
</tr>
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<tr>
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</tr>
<tr>
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<td>25.5-27.5</td>
<td>15-19</td>
</tr>
<tr>
<td>♀ ♂ 20.5-22.5</td>
<td>28.0-30.0</td>
<td>16-17</td>
</tr>
</tbody>
</table>

Notes: Both sexes of the species under study vary from the description of the species provided by Fraser (1934) in nodal index, in having larger size and also in the following characters:

Male: Synthorax with an extra small oval yellowish spot just above base of posterolateral suture; yellow colour on sides of synthorax broken into 3 parts (as described by Fraser for female); segments 5-6 of abdomen unmarked and in some specimens segments 3-4 also lacking lateral spots. Measurements of hindwing mentioned by Fraser as 22.0 mm on page 23 is obviously an error since he in the running key on page 9, mentions the length of hindwing as 26.0 mm or more.

Female: the mid-dorsal ilne on prothorax incomplete, presence of an extra spot above base of 2nd lateral suture as in male and femora not pruinosed.

In Meghalaya the species is restricted in Khasi and Jaintia districts at altitude above 1100 m. They are commonly found along streams and in a comparatively open habitat.

Distribution: India: Meghalaya. Outside India: Burma

Rhinocypba immaculata Selys
(Figs. 67 and 97-98)


Material studied: 2 ♀♂, 1 ♀, Mowsynram, 10.x.1972, coll AKG; 1 ♂, 4 kms of Mowsynram, 5.xii.1977, coll ARL.

Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
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<tbody>
<tr>
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<td>15-16</td>
</tr>
<tr>
<td>♀ 22.5</td>
<td>31.0</td>
<td>15-17</td>
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</tbody>
</table>
Notes: Mesothoracic triangle of synthorax: In male (Fig. 67) very broad, blue, extending up to anteater sinus (1.0 mm or more in width at about middle of its length); in female black, finely bordered yellow, of similar extent as in male but slightly narrow (nearly 1.0 mm in width at about middle of its length).

The specimens under study vary from the description of the species provided by Fraser (1934) in the following points:

Male: Two pairs of bluish spots on occiput; prothorax with 3 yellowish spots on its side viz. one small sublateral and two large lateral ones; 4 spots beneath synthorax; segment 2 of abdomen also with a ventrolateral stripe.

Female: Antehumeral stripe complete extending as far as wing base and curved slightly outwards; abdominal segment 2 with additional ventrolateral stripe and a fine mid-dorsal stripe on segments 2-3.

This interesting species with uncoloured wings in males is restricted in the southern slope of Khasi hills in Meghalaya and has been reported from the two most wettest parts of the world, i.e. Cherrapunjee and Mawsynram. Its preferred habitat is near montane streams in comparatively open habitat.

Distribution: India: Meghalaya, Uttar Pradesh.

Rhinocypha quadrimaculata Selys
(Figs. 65, 103-104 and 513)


Measurements (in mm) and Nodal index

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<th>Length of</th>
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<th>Hindwing</th>
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</tr>
<tr>
<td>♂ ♂</td>
<td>20.5-22.5</td>
<td>22.0-23.0</td>
<td>17-18</td>
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<tr>
<td>♀ ♂</td>
<td>19.0-20.0</td>
<td>25.0-26.0</td>
<td>16-17</td>
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</tbody>
</table>
Notes: Mesothoracic triangle of synthorax Male (Fig. 65): pink, extending as far as root of wings. narrow (0.5 mm in width at about middle of their length). Female black, bordered yellow, as long as in males but narrower (0.25 mm in width at about middle of their length).

The specimens under study vary from the description of the species provided by Fraser (1934) in respect of size, nodal index and also in the following points:

Male: Humeral line very short and broken resulting in formation of a small upper humeral spot, stripe on 2nd lateral suture extending two thirds up the dorsum from spiracle and below nearly to anterior border of synthorax; discoidal cell traversed by 3-4 cross veins in forewing, by 4-8 cross veins in hindwing where vitreous spot invading proximal border of opaque area with 6-8 cells; abdomen black.

Female: prothorax marked with a mid-dorsal line broken into 3 small sections, one on each lobe, a small rounded ventrolateral spot on middle lobe, a small one at outer border and a large sublateral one on either side of posterior lobe, both humeral and antehumeral stripes on synthorax broken; synthorax ventrally black and marked with 3 pairs of rounded yellowish spots behind legs; abdomen with a mid-dorsal stripe extending from apical third of segment 2-6 and segment 8-9 are unmarked; each of segments 2-3 marked with an additional mid-ventrolateral elongated spot.

The species has a wide distribution in high as well as low altitude, but has less often been collected in Jaintia hills. These are commonly found near montane streams, in comparatively open habitat.


Rhinocypha spuria Selys (Figs. 105-106 and 514)


Material studied: 1 ♂, Barapani, 17.viii.1968, coll RKV; 6 exs., Cherrapunjee (1 ♂, 8.v.1968, coll RKV; 4, ♂♂, 1 ♀, 20.vii.1973, coll ARL); 1 ♂, Mowblong, 22.ix.1972, coll AKG; 1 ♂, Nongklan, 1.xii. 1977, coll KRR; 1 ♂, Old Barapani roadside, 6.vi.1973, coll ARL; 1 ♂.
Measurements (in mm) and Nodal index

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<th>Hindwing</th>
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<tr>
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<td></td>
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<td></td>
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<td>Pn</td>
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<tr>
<td>♀ ♀</td>
<td>22.0-23.0</td>
<td>28.0-30.0</td>
</tr>
</tbody>
</table>

Notes: Mesothoracic triangle of synthorax in male is pink, extending as far as root of wings and of moderate width (0.75 mm in width at about middle) ; in female the same is black, bordered yellow and as long as in male, but narrower (0.5 mm in width at about middle).

The specimens examined vary from the description of the species provided by Fraser (1934) in size, nodal index and in the following points:

Male: hind margin of occiput with an additional median spot ; prothorax marked with only ventrolateral spots ; synthorax ventrally mostly yellow in tenerals, in adults with two pairs of large spots ; coxae yellow on flexor surface ; discoidal cell traversed by 4-5 and 5-6 cross veins in fore-and hindwings respectively ; opaque area of hindwing indented by vitreous spot anteriorly and posteriorly, such indentation marked by 6 cells anteriorly and by 5-8 cells posteriorly.

Female: markings on coxae and beneath synthorax as in male ; segment 1 of abdomen with apical border not yellow ; segment 6 with a basolateral spot.

In Meghalaya this species is restricted only to Khasi hills, but has a wide distribution there, i.e. found in areas situated both at higher as well as lower altitude. However, this species has less often been collected from northern parts of the hills. They are commonly found near montane streams in comparatively open habitat.


Rhinocypha vitrinella Fraser
(Figs. 64, 107-108 and 518)

Lahiri: Odonate fauna of Meghalaya


Material studied: 1♂, Nongpoh, 25.viii.172, coll AKG.

Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂ 18.0</td>
<td>21.0</td>
<td>15-16</td>
</tr>
</tbody>
</table>

Notes: Mesothoracic triangle on syntoracic in male (Fig. 64) pale blue, extending dorsally up to two fifth (1.0 mm in length; its base three fifths as long as sides).

The single male under study vary from the description of the species provided by Fraser (1934) in the following points: spot on posterior lobe of prothorax triangular; posthumeral stripe situated on upper third of anterolateral suture not broken; pterostigma black, outer two-third yellowish; vitreous spot vary in respect of cell-number as follows: apical series 6-10; median series: costal: 11, median and hind spots 7-8; proximal: 4; beneath syntorax, femora and 2 posterior pairs of tibiae not pruinose; wings not tinted with yellow at base; segment 1 of abdomen with apical border not lined with blue, segment 4 without apical spot; segment 3 with an extra basolateral spot.

Since its find from Cachar, Assam, this is the second record of occurrence of this species.

In Meghalaya, this species is restricted only at Nongpoh (650 m) in Khasi hills and is the only species of the genus found in that locality. Unlike most species of the genus, this species is found near dirty and stagnant water bodies, inside jungles.

Distribution: India: Assam, Meghalaya.

Family Euphaeidae

Diagnostic characters: Usually medium to large in size; ground colour non metallic; syntorax with 1st lateral suture incomplete. Wings often coloured in males; petiolation absent or when present very slight, ending slightly proximal to or even slightly distal to the 1st antenodal cross vein; antenodal cross vein always more than 2; primary antenodal cross vein not easily distinguishable; antenodal of 1st and 2nd series
coinciding; base of discoidal cell connected to radius by angulated arc; sectors of arc arising from about its middle and usually separated or even arising from a common point; discoidal cell short, less than half the length of median space; IA markedly curved, several rows of cells in the anal field; origin of R₃ in relation to subnodus variable.

_Distribution:_ India; Nepal; China; Pakistan; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Ryukyu; Taiwan; Philippines; Israel; Europe.

**KEY TO THE GENERA OF THE FAMILY EUPHAEIDAE**

1. Discoidal cells traversed; segment 10 of abdomen produced apically into a prominent mid-dorsal keel (Figs. 75-76). _Euphaea_ Selys.

Discoidal cells usually entire (Fig. 516); keel on segment 10 of abdomen absent (Figs 77-82).

2. _R₂₊₃_ fused with _R₁_ near its origin. _Bayadera_ Selys

_R₂₊₃_ not fused with _R₁_ near its origin (Fig. 516). _Anisopleura_ Selys

**Genus Anisopleura** Selys


Type-species: _Anisopleura lestoides_ Selys.

Selys (1853, 1854a) erected this subgenus under his genus _Euphaea_ with _Euphaea lestoides_ as its type. Later it was elevated to generic rank by Kirby (1890) by further elaboration of the generic concept. There has also been addition of some more species as a result of contributions of several authorities, and specially of Selys (1880, 1891a), Williamson (1904), Laidlaw (1917a), Fraser (1927a, 1934), Needham (1930), Sahni (1965) and St. Quentin (1937). Kumar (1927c) and Prasad and Singh (1976) dealt with some Indian species of this genus in recent times.

_Diagnostic characters:_ Moderately large in size (usually with abdomen 30.0-40.0 mm, hindwing 27.0-34.0 mm); black, marked with green, yellow or white, occasionally partly pruinose; 1st lateral suture of synthorax incomplete; no keel on abdominal segment 10 of male; male superior anal appendages a little longer than segment 10 of abdomen, more or less broadened apically and sometimes armed with ventrolateral spine at base; inferiors obtuse, more or less abortive; terminal fold of penis produced apically into a moderately long process on either side. Wings hyaline or with apices black in male; costal border of hindwing in male with an abrupt outward angulation at a point a little before midway from wing-base to nodus, resulting in widening of costal space, abruptly
at the point, then decreasing gradually outwards; usually with 14-22 antenodal and 17-22 postnodal cross veins; primary antenodal cross veins not easily distinguishable, antenodals of 1st and 2nd series coinciding; pterostigma narrow, about four or five times as long as broad, a little swollen medially; arc slightly angulated, usually situated at about the level of the third antenodal cross vein; sectors of arc arising from about its middle, separated at origin; discoidal cell short, about one third the length of median space, usually entire, rarely traversed by a single vein; median space entire; cubital space traversed by 1-5 veins; $R_{2+3}$ not fused with $R_1$ near its origin; $R_8$ arising 1 or 2 cells distal to the level of subnodus; $IR_8$ arising from about midway between arc and nodus, well separated from origin or $R_{4+5}$; petiolation almost absent, extending to about the level of the 1st antenodal cross vein; anal field with up to 5 or 6 rows of cells.

**Distribution:** India; Nepal, Burma.

**Anisopleura subplatystyla** Fraser

*Fig. 77-78, 113-114 and 516*


Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
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</tr>
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</table>

Notes: The specimens studied vary from the description of the species provided by Fraser (1934) in having larger size and in the following:

(i) in male antehumeral stripes on synthorax confluent with humeral stripe above; (ii) shape of the male superior anal appendages; figure of these organs provided by Fraser (1934) on p.88 is altogether different from those provided by Fraser (1927a) and possibly belong to some other species. (iii) vulvar scale of female reaching the end of abdomen.

In Meghalaya the species has a restricted distribution only in places lying above ca 110 m in the central Khasi hills. It is one of the most commonly occurring Odonate species around Shillong, occurring near streams, as well as in comparatively dryer habitats inside bushes and forest well away from the streams.

Distribution: India: Meghalaya.

Genus Bayadera Selys

*Epallage, group Bayadera, Selys, 1953, Syn. Cal., : 49*


Type-species: *Epallage indica* Selys

Here the genus *Bayadera* Selys has been used sensu Kirby (1890). Since then several important contributions on this genus have appeared [Williamson (1940), Ris (1912), Laidlaw (1917a), Fraser (1923d, 1928c, 1934), Needham (1930), Cowley (1936), Asahina (1964b, 1965) and St Quentin (1970)]. Bhasin (1953), Kumar (1972c, 1973a), Sahni (1972b), Lahiri (1957b), Kumar and Juneja (1976), Prasad (1976a), and Prasad and Singh (1976) have in recent times published accounts of a few Indian species of this genus.
Diagnostic characters: Moderately large in size (usually with abdomen 31.0-41.0 mm, hindwing 26.0-37.0 mm); black, marked with greenish yellow or blue, occasionally partly pruinosed; 1st lateral suture of synthorax incomplete; no keel present on abdominal segment 10 of male; male superior anal appendages two to three times as long as segment 10 of abdomen, subcylindrical and forcipate, obtuse or much flattened at apex with outer border usually bearing a few subapical spines, inner border with or without a broad sub-basal spine and submedian tubercle; inferiors much narrower, simple, about half the length of superiors; penis shaft occasionally with a subapical row of hairs on either side, the terminal fold of penis well developed with moderately long variably expanded apical processes. Wings hyaline, or tipped with black in males; usually with 14-15 antenodal and 19-26 postnodal cross veins; primary antenodals not easily distinguishable, antenodals of 1st and 2nd series coinciding; pterostigma narrow, about five or six times as long as broad, a little swollen medially; arc angulated, usually situated at about the level of the third antenodal cross vein; sectors of arc arising at about middle of arc either from a common point or very slightly separated at origin; discoidal cell short, entire and about half the length of median space which is also entire; cubital space traversed only by Ac; R_{2+3} fused with R_{1} at its origin; origin of R_{8} variable, being either at the level of subnodus or proximal or distal to that level by 1 or 2 cells; IR_{8} arising more close to arc than nodus, well separated from origin or R_{4+5}; petiolation nearly absent, extending at most up to the 1st antenodal cross vein; anal field with up to 4 or 5 rows of cells.

Distribution India; Nepal; China; Burma; Ryukyu; Taiwan.

KEY TO THE SPECIES OF THE GENUS BAYADERA SELYS

*Male*

Wings blackish brown apically; posterior lobe of prothorax trapezoidal, with hind margin erect and straight at middle. 

*indica* (Selys)

Wings hyaline; posterior lobe of prothorax broadly suboval, with its hind margin arched backward and a little sinuous at middle. 

*hyaline* Selys.

[Key to females has not been provided due to nonavailability of females of *B. indica* (Selys) in the collection studied].

Bayadera hyalina Selys

(Fig. 81-82 and 117-118)


Measurements (in mm) and Nodal index

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<th>Length of abdomen</th>
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<td>19-21</td>
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Notes: The specimens studied vary from the description of *B. hyalina* Selys provided by Fraser (1934) in the following:

**Male:** (i) larger in size; (ii) absence of antehumeral stripe and (iii) the presence of a small but prominent median tubercle on inner surface of superior anal appendages besides well developed basal spine.

**Female:** (i) the antehumeral and humeral stripes on synthorax confluent ventrally and (ii) presence of a mid-dorsal carinal stripe on abdominal segments 1-8.

The arboreal nature of this species has been discussed by Lahiri (1975). For two consecutive years, the species has been noticed at the same place, quite away from aquatic habitat.

Distribution: India: Meghalaya, West Bengal

*Bayadera indica* (Selys)

(Figs. 79-80 and 115-116)


Fraser, 1934, *Fauna Brit. India, Odon.*, 2 : 79.

Material studied: 1 ♂, Barapani, 24.vi.1967, coll RKV

Measurements (in mm) and Nodal index

<table>
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<th>Hindwing</th>
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<td></td>
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<tr>
<td>♂ 41.0</td>
<td>34.0</td>
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Notes: The single male under study vary from the description of the species provided by Fraser (1934) and Cowley (1936) in the following: apical wing markings rather pale and less extended in forewing; origin
of Rs distal to subnodus; antehumeral stripe on synthorax separated from humeral stripe; Superior anal appendages (without a median tubercle, the basal spine shorter and broader, denticulate apically; penis shaft without hairs and well-developed external fold.

Only a single male specimen of this species was collected near the artificially erected Barapani lake surrounded by deep forests all around.

**Distribution**: India: Himachal Pradesh; Meghalaya, Uttar Pradesh, West Bengal. Outside India: Nepal

**Genus Euphaea Selys**


Type species: *Euphaea variegata* Rambur.

The genus has been used here sensu Lieftinck (1954). Selys (1840) 1850, 1853, 1854a, 1859, 1878b, 1879, 1889, 1891a), Rambur (1842), Kirby (1890), Laidlaw (1917a, 1920a, 1931), Fraser and Dover (1922). Fraser (1929a, 1934), Cowley (1934) and Montgomery (1967) also made significant contribution in elucidating the generic concept.

**Diagnostic characters**: Moderately large in size (usually with abdomen 25.0-47.0 mm, hindwing 23.0-40.0 mm); black less often vermillion red, usually marked with yellow, green, blue or red, occasionally partly pruinose; 1st lateral suture of synthorax incomplete; segment 10 of abdomen with a median prominent keel in male; male superior anal appendages usually subequal to or a little longer than segment 10 of abdomen, variably forcipate, ungulate or expanded subapically; inferiors conical, less than half the length of superiors; penis shaft usually with a robust subapical spine and with terminal fold produced as a robust process on either side. Wings expanded, hyaline, occasionally enfumed with reddish or greenish brown, fore or hindwings or both in male partly or entirely saffronated or opaque brown with metallic lusture; such markings usually absent in females or when present less defined and limited to base of wings; usually 15-36 antenodal and 27-49 postnodal cross veins; primary antenodal cross veins not easily distinguishable; antenodals of 1st and 2nd series coinciding; pterostigma narrow, about four to six times as long as broad, a little swollen medially; arc straight or slightly angulated, situated variably between 2nd and 7th antenodal cross veins; sectors of
arc arising from about its middle, separated at origin; discoidal cell short, less than half the length of median space, traversed by 1-3 cross veins; median space entire; cubital space traversed by 2-5 cross veins; $R_{2+3}$ not fused with $R_1$ near its origin; $R_8$ arising variably either proximally or distally to subnodus; $IR_8$ arising from a point equidistant from arc and nodus or even from a point nearer to nodus, well separated from $R_{4+5}$; petiolation almost absent, extending variably proximally to 1st or 4th antenodal cross vein; cells in the anal field up to 8 rows;

**Distribution:** India; China; Sri Lanka; Burma; Thailand, Vietnam; Malaysia; Indonesia.

_Euphaea ochracea brunnea_ Selys

_(Figs. 75-76 and 111-112)_


**Measurements (in mm) and Nodal index.**

<table>
<thead>
<tr>
<th>Length of abdomen</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂♂</td>
<td>36.5-37.5</td>
<td>28.0-29.0</td>
</tr>
<tr>
<td>♀♀</td>
<td>30.5-32.0</td>
<td>28.5-30.0</td>
</tr>
</tbody>
</table>

**Notes:** Selys (1859a, 1978) described _Euphaea ochracea_ and _E. brunnea_ as two distinct species, stating differences in size and depth of wing.
markings. The specimens when sent to Late Dr. Lieftinck, for comments, he identified them as *Euphaea ochracea brunnea* Selys.

In Meghalaya the subspecies is more or less widely distributed at variable altitude in Garo and Khasi hills, but has not so far been collected in Jaintia hills. The insects are commonly found along montane streams and are often noticed perching on exposed boulders in mid-streams.

**Distribution**: India: Meghalaya. Outside India: Burma.

**Family Calopterygidae**

**Diagnostic characters**: Usually medium to large sized insects with usually metallic green ground colour; synthorax with 1st lateral suture complete. Wings hyaline or coloured; petiolation absent or sometimes extending slightly proximal to arc; antenodal cross veins more than 2; primary antenodals not easily distinguishable; antenodals of 1st and 2nd series usually coinciding; base of discoidal cell connected to radius by arc which is oblique or angulated; sectors of arc arising from about its middle and either separated at origin or arising from a common point; discoidal cell, IA and anal field variable in shape, extent and neuration.

**Distribution**: Virtually cosmopolitan.

**KEY TO THE SUBFAMILIES OF THE FAMILY CALOPTERYGIDAE**

IA fused at base with inner border of wing; discoidal cell about half the length of median space and traversed only once (Fig. 517). *Caliphaeinae*.

IA free from inner border of wings (Fig. 42); discoidal cell subequal to median space in length and traversed at least 4 times (Fig. 518). *Calopteryginae*.

**Subfamily Caliphaeinae**

**Diagnostic characters**: Medium in size. Wings only of moderate width and narrower than in Calopteryginae, fore- and hindwings nearly similar in shape; petiolation ending a little proximal to level of arc; discoidal cell a little convex above, traversed once or rarely twice, about half the length of median space; intercalated sectors restricted on apical half of wing and none present between Cu₂ and IA; IA simple, not branched or pectinate; only a single row of cells in anal field; R₂ at its origin confluent with R₁.

**Distribution**: India; Nepal; Bhutan; Tibet; China; Burma; Laos.
Genus *Caliphaea* Selys


Type-species: *Caliphaea confusa* Selys

Since the establishment of the genus *Caliphaea* by Selys in 1859, some important contributions have been made by Laidlaw (1917a), Munz (1919), Fraser (1929b, 1934, 1943), Lieftinck (1948a) and Asahina (1976).

**Diagnostic characters**: Moderately large in size (usually abdomen 34.0-40.0 mm, hindwing 30.0-32.0 mm); metallic green or coppery with yellow and blackish markings; posterior lobe of prothorax with shallowly notched posterior border; male anal appendages subequal to segment 10 of abdomen; superior forcipate, when viewed from above expanded at base and apex, with dorsal keel originating at base and outer border bearing a few spines subapically; inferiors slightly shorter than superiors, deeply bifurcate apically forming inwardly curved acute branches; terminal fold of penis very broad with long narrow, spirally coiled apical processes. Wings moderately wide, hyaline or uniformly light yellow, usually with 12-17 antenodal and 23-29 postnodal cross veins; primary antenodals not easily distinguishable, antenodals of 1st and 2nd series coinciding; pterostigma short, slightly more than twice as long as broad, slightly swollen in the middle; arc oblique, situated between 4th and 7th antenodal cross veins; sectors of arc arising from a little below the level of arc, slightly separated at origin; discoidal cell short, about half the length of median space, a little convex above and usually traversed by a vein; median space entire; cubital space traversed by 6 to 7 veins; \(R_{2+3}\) fused with \(R_{4}\) at its origin; \(R_{8}\) arising from a point which is about 2 cells distal to the level of subnodus; \(IR_{8}\) arising midway between arc and nodus, well separated from origin of \(R_{4+5}\); petiolation extending slightly beyond arc; IA simple; neither branched nor pectinate; anal field with one row of cells; intercalated sectors restricted to apical half of wing and none present between \(Cu_{2}\) and IA.

**Distribution**: Same as subfamily

*Caliphaea confusa* Selys

*(Figs. 4-5, 31-32 and 517)*


**Material studied**: 1 ♂, Mawphlong, 11.v.1973, coll ARL.
Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th></th>
<th>Length of abdomen</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>forewing hindwing</td>
<td>An Pn</td>
<td>An Pn</td>
</tr>
<tr>
<td>♂</td>
<td>38.5</td>
<td>31.0</td>
<td>13-15</td>
</tr>
</tbody>
</table>

**Notes:** The male under study varies from the description of the species provided by Fraser (1934) in having lower range in nodal index, segment I of abdomen in being yellow on sides, and in the shape of the superior anal appendages which are distinctly bulged on inner surface subapically.

In Meghalaya, the species is having a restricted distribution only in central Khasi hills. The specimen was collected inside a deep jungle near a small stream.

**Distribution:** India: Meghalaya, West Bengal. Outside India: Nepal; Bhutan; Tibet; China; Burma; Laos.

**Subfamily CALOPTERYGINAE**

**Diagnostic characters:** Usually large in size. Wings wide and comparatively wider than in Caliphaeinae; hindwings usually broader than forewings; petiolation absent; discoidal cells straight or sometimes slightly convex, traversed at least 4 times, about as long as median space; intercalated sectors well developed and these also present between Cu₂ and IA; IA usually branched and pectinate, sometimes not; R₂ may or may not confluent with R₁ at its origin.

**Distribution:** Virtually cosmopolitan.

**KEY TO THE GENERA OF THE SUBFAMILY CALOPTERYGINAE**

1. Arc oblique; median space entire. Vestalis Selys
   Arc angulated (Fig. 518); median space traversed or reticulated. .2

2. Pterostigma present. Echo Selys
   Pterostigma absent or if present then traversed by nervures (Fig. 518). .3

3. All wings in both sexes opaque. Matrona Selys
   Forewings in both sexes hyaline (Fig. 518). Neurobasis Selys

**Genus Echo Selys**

Type-species: *Echo margarita* Selys

Selys (1853, 1854a) established the genus *Echo* with *E. margarita* as the type-species. Selys (1879), Laidlaw (1903, 1917a) and Fraser (1934) made further contribution on the genus.

**Diagnostic characters:** Large in size (usually with abdomen 36.0-46.0 mm, hindwing 33.0-37.0mm); metallic green marked with black; male superior anal appendages about one and a half times as long as segment 10 of abdomen, this when viewed dorsally forcipate with apex swollen and outer border bearing a few spines; inferiors about two-third the length of the superiors, narrowing gradually to an acute apex; terminal fold of penis large, produced on either side into a moderately long apical process which ending in a terminal coil. Wings broad, hyaline or partly opaque; usually with 29-40 antenodals and 55-77 postnodal cross veins in forewing, 23-30 and 56-64 respectively in hindwing; primary antenodals not easily distinguishable, antenodals of 1st and 2nd series coinciding; pterostigma short, about twice as long as broad, with broadened and rounded inner margin; arc angulated, usually situated at the level of 5th antenodal cross vein; sectors of arc arising from a little below the level of arc, separated at origin; discoidal cell nearly straight, narrow, a little longer than median space, usually traversed by 7-10 veins; median and cubital space usually traversed by 6-9 and 16-20 veins respectively; $R_{2+3}$ fused with $R_1$ near base; $R_8$ usually arising at or a little promximal to the level of subnodus; $IR_8$ arising much nearer arc than nodus, well separated from origin of $R_{4+5}$; petiolation absent; IA simple, not branched; anal field with up to 5 or 6 rows of cells; intercalated sectors many, arising proximal to middle of wing and also present between $Cu_2$ and IA.

**Distribution:** India; China (vide Selys (1853, 1854a)); Burma.

*Echo margarita tripartita* Selys

( Figs. 85-86 and 121-122 )


*Echo margarita tripartita* Selys : Fraser, 1934, Fauna Brit. India, Odon., 2 : 137.

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂♂ 43.0-44.0</td>
<td>33.5-36.0</td>
<td>31-37</td>
</tr>
<tr>
<td>♀♀ 36.0-41.5</td>
<td>36.5</td>
<td>29.40</td>
</tr>
</tbody>
</table>

Notes: The specimens under study agree well with description of the species provided by Fraser (1934) excepting in the extent of opaque apical area of wing which covers one fourth to one third of the wing length.

The subspecies is restricted only in central and southern parts of Khasi hills and commonly occur along montane streams with clear water and at such places, where the banks are laden with bushes including ferns.

Distribution: India: Meghalaya.

Genus Matrona Selys

Matrona Selys, 1853, Syn. Cal., 17, Fraser, 1934 Fauna Brit. India, Odon. 2 : 144.

Type-species: Matrona basilaris Selys

Selys (1853, 1854a), established the subgenus Matrona with M. basilaris as its type. It was elevated to generic rank by Kirby (1890) who further elaborated the generic concept. Later, Selys (1891a), Ris (1916a), Munz (1919), Fraser (1929b, 1934) and Vershney (1971) accepted Kirby's (1890) views dealing with the genus.

Diagnostic characters: Large in size (usually with abdomen 42.0-60.0 mm, hindwing 38.0-45.0 mm); metallic green but marked with blue and black; male superior anal appendages subequal to segment 10 of abdomen, forcipate, broadened basally and also on distal half and outer border bearing a few spines; inferiors about two third the length of superiors, narrowing to an acute apex; terminal fold of penis large with its api-
cal process with short and acutely pointed external branch and moderately long internal branch, the latter bearing a row of hairs suapically. Wings very broad, opaque blackish or steely blue or partly hyaline apically; usually with 40-65 antenodal and 80-150 postnodal cross veins on either wing; primary antenodals not easily distinguishable, antenodals of 1st and 2nd series coinciding; in males pterostigma absent but in females the area reticulated and then the reticulated area about three times as long as broad and little broadened medially; arc angulated, situated at about the level of 10th antenodal cross vein; sectors of arc arising from a common point a little below the middle of arc; discoidal cell narrow, slightly convex towards costal side, about one and a half times as long as the median space, usually traversed by 8-10 veins; median and cubital spaces usually traversed by about 15 and 30 veins respectively; \( R_{2+3} \) not fused with \( R_3 \) at its origin; \( R_8 \) arising slightly proximal to the level of subnodus; \( IR_8 \) arising much nearer to arc than nodus, well separated from origin of \( R_{4+5} \); petiolation absent; anal field with up to 5-6 rows of cells; IA strongly forked just after its origin; intercalated sectors many and scattered.

_Distribution:_ India; China; Bangladesh; Burma; Vietnam; Taiwan.

**Matrona basilaris nigripectus** Selys
(Fig. 87-88 and 123-124)

*Matrona basilaris nigripectus* Selys: Fraser, 1934, _Fauna Brit. India, Odon._, 2: 147.

LAHIRI: Odonate fauna of Meghalaya

Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th></th>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td><strong>♂ ♂</strong></td>
<td>59.0-60.5</td>
<td>41.0-42.0</td>
<td>43-44</td>
</tr>
<tr>
<td><strong>♀ ♀</strong></td>
<td>47.5-52.5</td>
<td>38.5-43.5</td>
<td>41-56</td>
</tr>
</tbody>
</table>

No of cross veins in

<table>
<thead>
<tr>
<th>Discoidal cell</th>
<th>Median space</th>
<th>Cubital space</th>
</tr>
</thead>
<tbody>
<tr>
<td>forewing</td>
<td>hindwing</td>
<td>forewing</td>
</tr>
<tr>
<td>hindwing</td>
<td>forewing</td>
<td>hindwing</td>
</tr>
</tbody>
</table>

**♂ ♂** 15-19 19-20 10-12 10-12 21-24 24-29

**♀ ♀** 13-19 17-19 10-12 10-21 19-21 23-25

**Notes:** From the description of this subspecies provided by Fraser (1934) the specimens under study vary in size. The females further vary in having longer pterostigma (2.25-2.50 mm in forewing, 2.00-2.25 mm in hindwing).

Habit and distribution of this subspecies in Meghalaya is closely similar to *E. m. tripartita* Selys, but it exhibits less sustained flight.


**Genus Neurobasis Selys**


Type species: *Libellula chinensis* Linnaeus
The genus including only the type-species was established by Selys (1853, 1854a). The generic concept was further enlightened and there was addition of another species and several subspecies for the type-species as a result of contributions by Selys (1878b, 1883a, 1889, 1891a), Kirby (1890), Munz (1919), Fraser (1929b), 1934 and Lieftinck (1954). In recent times Bhasin (1953), Lieftinck (1955a, b, 1971a), Kumar and Juneja (1975), Prasad (1976a), Prasad and Singh (1976) and Lahiri (1977a, 1979) recorded the type-species from different places in India, Sri Lanka and Nepal.

**Diagnostic characters:** Large in size (usually with abdomen 42.0-51.0 mm, hindwing 32.0-40.0 mm); metallic green marked with blue, yellowish and black; male superior anal appendages subequal to segment 10 of abdomen, forcipate, broadened basally and again on distal half, outer border bearing a few spines; inferiors a little shorter than superiors, broadened at base, narrowing thereafter to an acute apex; terminal fold of penis large, apical process with short and acutely pointed external branch and moderately long internal branch bearing a row of hairs subapically. Wings broad and hyaline, but in males forewing partly opaque metallic blue or green; usually 31-42 antenodal cross veins on either wing in both sexes and in males 50-65 and 68-80 postnodal cross veins in fore- and hindwings respectively, in females 24-29 cross veins between node and pterostigma in hindwing, such cross veins in forewing as in males; primary antenodals not easily distinguishable, antenodals of 1st and 2nd series coinciding; pterostigma absent in males and frequently in forewing of females, but when present in females it is suboval and may or may not be reticulated; arc angulated, situated at about the level of 10th antenodal cross vein; sectors of arc arising from a common point at about the middle of arc; discoidal cell convex in costal side, a little shorter than the median space both the cell and space traversed by about 10 veins; cubital space traversed by about 20 veins; R_{2+3} not fused with R_1 at its origin; R_5 arising a little proximal to the level of subnodus; IR_5 arising much nearer to arc than nodus, well separated from origin of R_{4+5}; petiolation absent; anal field with about 5-6 rows of cells; 1A simple, not branched; intercalated sectors many and scattered.

**Distribution:** India; Nepal; China; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; New Guinea; Philippines; Australia.

*N. chinensis chinensis* (Linnaeus)
(Figs. 89-90, 125-126 and 519)


**Measurements (in mm) and Nodal index.**

<table>
<thead>
<tr>
<th></th>
<th>Length of abdomen</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>An</td>
<td>Pn</td>
</tr>
<tr>
<td>♂♂ 47.0-60.5</td>
<td>32.0-33.0</td>
<td>34-39</td>
<td>54-64</td>
</tr>
<tr>
<td>♀♀ 42.5-46.0</td>
<td>37.5</td>
<td>31-38</td>
<td>50-57</td>
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</table>

**Discoidal cell**

<table>
<thead>
<tr>
<th></th>
<th>Forewing</th>
<th>hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂♂ 7-9</td>
<td>11-12</td>
<td></td>
</tr>
<tr>
<td>♀♀ 8</td>
<td>9-10</td>
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</tbody>
</table>

**Median space**

<table>
<thead>
<tr>
<th></th>
<th>Forewing</th>
<th>hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂♂ 6-9</td>
<td>6-9</td>
<td></td>
</tr>
<tr>
<td>♀♀ 6-9</td>
<td>6-9</td>
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</tr>
</tbody>
</table>

**Cubital space**

<table>
<thead>
<tr>
<th></th>
<th>Forewing</th>
<th>hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂♂ 17-20</td>
<td>20-23</td>
<td></td>
</tr>
<tr>
<td>♀♀ 16-21</td>
<td>17-19</td>
<td></td>
</tr>
</tbody>
</table>

**Notes** : The males studied vary from the description of the subspecies provided by Fraser (1934) in nodal index and in number of cross veins in discoidal cell.

They are commonly found along montane streams and rivers with exposed surface of the boulders.

**Distribution** : India ; Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Tamil Nadu,
so REC. ZOO. SURV. INDIA, OCC. PAPER NO. 99

Uttar Pradesh, and Bengal (exact locality unknown); Outside India: Nepal; Sri Lanka; Burma; Thailand; Malaysia; Indonesia.

Genus Vestalis Selys


Type-species: *Calopteryx luctuosa* Burmeister

Selys (1853, 1854a) established this genus with a new species and incorporated 2 other species which were previously described under the genus *Calopteryx* Leach. The generic concept was further enlightened by Selys (1873a, 1878b, 1879, 1889, 1891a), Kirby (1890), Laidlaw (1917a, 1921), Munz (1919), Fraser (1934) and Lieftinck (1953c, 1954). Bhasin (1953) and Lieftinck (1948a, 1955a, 1971a) have published accounts of a few species occurring in Indian region.

Diagnostic characters: Large in size (usually with abdomen 35.0-59.0 mm, hindwing 31.0-42.0 mm); metallic bronze, blue or green marked with yellow or black, occasionally pruinose; male superior anal appendages a little longer than segment 10 of abdomen, forcipate, broadened at base and again on distal half, outer border bearing a few spines, usually with a variably developed basal spine and a notch at apex; inferiors about two-thirds the length of superiors, narrowing gradually from base to apex; terminal fold of penis large, rather elongated with its apical processes rather short, curved outwards and each bearing a median curved spine on its outer border. Wings moderately broad, hyaline but tinted with yellow or opaque black at apices; usually 17-37 antenodal and 36-85 postnodal cross veins; primary antenodal cross veins not easily distinguishable; antenodals of 1st and 2nd series coinciding; pterostigma absent; arc oblique, situated at about the level of 4th antenodal cross vein; sectors of arc arising from a common point on its lower half; discoidal cell convex above and a little longer than median space, usually traversed by 2-6 (rarely 1) veins; median space entire; cubital space traversed by 8-10 (rarely 4) veins; R₂₊₃ fused with R₁ at its origin; R₃ arising a little proximal or even slightly distal to the level of subnodus; IR₈ arising much nearer to arc than nodus, a little separated from origin of R₄₊₅; petiolation absent; anal field with up to 4 rows of cells; IA pectinate; intercalated sectors fewer and generally restricted on apical half of wing.

Distribution: India; Tibet; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Philippines.
Vestalis gracilis gracilis (Rambur)
(Fig. 83-84 and 119-120)

Vestalis gracilis gracilis (Rambur) : Fraser, 1929, J. Bombay nat. Hist.
Soc., 33 : 582 ; 1934, Fuana Brit. India, Odon., 2 : 126

Material studied : 1 ♂, Darugiri, 10.xi.1973, coll SB; 1 ♂, Rongrong-
giri, 21.iv.1973, coll ARL ; 3 ♂♂, Barapani, 31.v.1967, coll BKT ; 1 ♂,
10 kms east of Ranikor, 7.xii.1977, coll ARL ; 2 ♂♂, Sumer, 21.
iv.1972, coll GMY ; 2 ♀♀, Umroi, 30.iv.1968, coll RKV

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂♂</td>
<td>56.0-69.0</td>
<td>39.0-42.0</td>
</tr>
<tr>
<td>♀♀</td>
<td>52.0</td>
<td>40.0</td>
</tr>
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</table>

No. of cross veins in

<table>
<thead>
<tr>
<th>Discoidal cell</th>
<th>Cubital space</th>
</tr>
</thead>
<tbody>
<tr>
<td>forewing</td>
<td>hindwing</td>
</tr>
<tr>
<td></td>
<td>forewing</td>
</tr>
<tr>
<td>♂♂</td>
<td>5-6</td>
</tr>
<tr>
<td>♀♀</td>
<td>4-5</td>
</tr>
</tbody>
</table>

Notes : In either sex, 1-2 cell rows between 1A and CU₂, 1-5 cell rows
between CU₂ and inner wing margin.

From the description of the species provided by Fraser (1934) both
sexes studied vary in having abdominal segments 8 and 9 unmarked with
yellow on sides.

They are found commonly along montane and submontane streams.

Distribution : India : Andhra Pradesh, Assam, Gujarat, Karnataka,
Kerala, Maharashtra, Meghalaya, Tamil Nadu and Bengal (exact locality
unknown). Outside India : Burma ; Thailand ; Vietnam ; Malaysia.

Superfamily LESTIDOIDEA

Diagnostic characters : Usually medium to large in size and with
simple rounded hind margin of posterior lobe of prothorax ; males with
anterior hamules elongated. Wings petiolated ; only 2 antenodal cross
veins present ; postnodals in strict alignment with cross veins beneath ;
usually IR₈ and R₄₊₅ both originating nearer to arc than nodus, but sometimes IR₈ originating at a point midway between arc and nodus; intercalated sectors usually present on apical part of wing.

Remarks: Here the name Lestidiodea has been used in place of Lestinoidea as used by Fraser (1957). This has been done at the instance of Late Dr. M. A. Lieftinck, who (in litt.) pointed out that Lestidoidea owes its derivation to the genus *Lestes* Leach. Fraser (1957) distinguished his superfamily Lestinoidea into families Perilestidae, Chlorolestidae and Lestidae and at the same time pointed out that the position of Megapodagriddae was still uncertain in spite of the fact that in venational characters the members of the family together with other Lestid Odonates formed a Lestini complex.

In the present work species of the genera *Indoelstes* Fraser, *Lestes* Leach, *Megaelstes* Selys and *Orolestes* McLachlan have been considered since these were found from the area under study. *Megaelstes* Selys falls under Chlorolestidae and *Indoelstes* Fraser, *Lestes* Selys and *Orolestes* McLachlan under Lestidae. Fraser (1957) used the position of the point of origin of IR₈ and R₄₊₅ in relation to arc and nodus as distinguishing character for the two families and while doing so, he (op. cit.) put the genus *Megaelstes* Selys under Chlorolestidae inspite of the fact that in adults the points of origin of IR₈ and R₄₊₅ are nearer to arc. Fraser's (1957) idea has been upheld by Lieftinck (1939a) because of similarity in the forms of nymphal *Megaelstes* species and those of other Synlestid (=Chlorolestid) genera. So, in the present work, following Lieftinck (1939a) findings the genus *Megaelstes* Selys has been considered under the family Chlorolestidae. Since nymphal stages of any species were not examined by the writer during present study the running key for separation of the families of the superfamily Lestidoidea has not been provided.

Distribution: Cosmopolitan.

Family Chlorolestidae

Diagnostic characters: Wings hyaline or those of males sometimes banded with dark or blackish brown; discoidal cell well formed and separated from inner wing margin; usually both IR₈ and R₄₊₅ arising from points nearer nodus than arc or IR₈ arising from a point midway between arc and nodus and R₄₊₅ arising a little proximal to the point of origin of IR₈; an oblique cross vein usually present between R₈ and IR₈; Cu₂ on leaving the discoidal cell usually strongly arched towards the costal margin; anal vein arising from inner wing margin either at a point
proximal to arc and discoidal cell being at about the level of Ac, or below discoidal cell far distal to Ac; pterostigma longer than broad (upto 3 times).

Nymphs [after Lieftinck (1939a)]: Mid-lobe of labium with the median cleft well developed, deeply and narrowly incised. Side lobes narrow and straight, cleft into two simple unequal tooth, movable hook long and slender. No mental or lateral setae. Antennae variable, usually with the first and second segments stouter than the remaining (except Megalestes Selys). First joint long and slender but not as long as second; third segment is the longest (Chlorolestes Selys), first joint short and broad, second joint (pedicel) stout and very long, remaining joints much shorter than second joint (Synlestes Selys) or antennae rather short, segments sub-equal in length, third joint longest (Megalestes Selys). Gizzard with 8 major folds, no minor fold (Chlorolestes Selys) or with 4 major and 4 minor folds (Synlestes Selys, ? Megalestes Selys); caudal gills short or moderately long, elongate, oval, narrowed somewhat at their base, apices broadly rounded (Megalestes Selys, Chlorolestes Selys), or bluntly pointed (Synlestes Selys), secondary tracheae oblique to the main axis. Pedicel of caudal gills distinct, flattened, forming part of the gill lamella and separated from this by a breaking joint. Gills not caducous. Cercoids acute, conspicuous.

Distribution: India; Nepal; Bhutan; China; Burma; Vietnam; Taiwan; Australia; Africa.

Subfamily MEGALESTINAE

Diagnostic characters: Coloured metallic. Wings hyaline; IR₃ arising from a point midway between arc and nodus; R₄₊₊₅ arising a little proximal to the point of origin of IR₅; anal vein arising from inner wing margin at or slightly proximal to Ac.

Distribution: India; Nepal; Bhutan; China; Burma; Vietnam; Taiwan.

Genus Megalastes Selys


Type-species: Megalastes major Selys

Selys (1862) erected the subgenus Megalastes under Lestes Leach with his new species L. (M) major as itd type. Later, its elevation to generic rank can be credited to Kirby (1890). Further elucidation of the generic
concept and addition of some more species have been done chiefly by Munz (1919), Laidlaw (1920c), Fraser (1929c, 1933), Leiftinck (1939a) and Chao (1947, 1962). In recent times Lieftinck (1949a), Bhasin (1953), Asahina (1963, 1970b), Sahni (1965), St. Qunetin (1970) and Lahiri (1970) published accounts of the type-species of the genus collected from different parts of India and adjoining countries.

*Diagnostic characters:* Large insects (abdomen usually 43.0-65.0 mm long, hindwing 30.0-37.0 mm long); metallic green with yellowish mark, superior anal appendages in males as long as or a little longer than segment 10 of abdomen, forcipate with a basal subquadrate projection, inner margin sometimes dilated and sometimes also with s subapical expansion; inferiors about one third as long as superiors, triangular or spherical and either with a variously shaped basal spine or with a diverticate spine at apex; penis with large and much flattened apical fold, the terminal fold being usually short of abortive. Wings long and narrow, hyaline, sometimes partly enfumed; forewing usually with 16-24 postnodal cross veins and hindwing with 12-18; arc at the level of the distal antenodal cross veins; pterostigma elongated, a little more than twice as long as broad, slightly swollen at middle, with inner proximal end continuous or a little separated from brace; IR₈ arising at a point midway between arc and nodus; R₄₊₅ arising a little proximal to IR₈; IR₈ arising at a point much nearer nodns than pterostigma; Rs from arc to the point of origin of R₄₊₅ two and half times the distance from point of origin of R₄₊₅ and nodus in hindwing; discoidal cell with inner margin about twice as long as the costal margin, the inner distal angle being acute; discoidal cell of hindwing subequal to that of forewing; Ab arising from inner wing margin usually proximal to the point where Ac meets it.

*Distribution:* Same as subfamily.

*Megalestes raychoudhurii* sp. nov.

(Figs. 131-132, 298-299 and 519)

*Material studied:* Holotype ♂ and Allotype ♀, Shillong (Nonghtymai), 10.vii.1974, coll ARL (Z.S.I. Regd. Nos. 3909/H₁₈ and 3910/H₁₈ respectively); Paratypes: 2 ♂♂, Shillong, Tripura Castle Road, 7.vi.1974, coll KD (Z.S.I. Regd. Nos. 3911/H₁₈ and 3912/₁₈ respectively); 8 exs, Mawphlong (1 ♂, 17.xi.1964, coll JKP; 2 ♂♂, 8.ii.1967, coll RKV; 1 ♀, 11.v.1972, coll AKG; 2 ♂♂, 1 ♀, 21.x.1974, coll SKG; 1 ♂, 27.xii.1974, coll RZ); 10 exs, Shillong (1 ♂, 13.vi.1967, coll RKV; 1 ♂, 21.i.1973, coll AKG; 1 ♂, 1 ♂, 26.vi.1974, coll RZ; 1 ♂,

Measurements (in mm) and Nodal Index.

<table>
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<tr>
<td>abdomen</td>
<td>hindwing</td>
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<tr>
<td>♂♂ 52.0-57.5</td>
<td>30.5-33.5</td>
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<tr>
<td>♀♀ 43.0-45.5</td>
<td>33.0-33.5</td>
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Description: Male: Labium yellow; bases of mandibles, cheeks and a median rounded spot at hind margin of occiput citron yellow; anteclypeus and apical two segments of antennae black; eyes green, darker above; rest of head bright metallic green, but occiput and under surface less so. Prothorax black with some metallic greenish hue with a mid-dorsal stripe and lower parts of middle lobe citron yellow; mid-dorsal stripe in the middle lobe narrow, but widened on anterior and posterior lobe; posterior lobe broad, rounded and arched backwards at middle; mesostigmal lamina at its hinder border and the connecting bridge deeply raised. Synthorax glossy metallic green on dorsum upto second lateral suture, citron yellow on sides and ventre, a complete stripe on 1st lateral suture of same colour, the stripe being markedly narrowed above; anterior end of mid-dorsal carina with a yellow spot; surures finely black; lower parts of sides and under surface of thorax thinly pruinosed. Legs black with extensor surfaces of femora and tibiae yellowish to pale brown; coxae and trochanters citron yellow but those of hind legs with some black patches. Wings (Fig. 519) hyaline; pterostigma slightly swollen at middle, brown enclosed in thick black nervures, proximal and distal ends slightly black outwardly, a little more than twice as long as broad, covering nearly two and a half cells. Abdomen metallic green, paler and yellowish on dorsum of segments 3-6; on sides of segments 3-5 and on lower parts of sides of segments 6-8; extreme bases and sides of segment 1 and sides of segment 2 yellow; articulating area of abdominal segments and ventre of abdomen black; segments 8 and 10 variably pruinosed. Anal appendages as in Figs. 131-132, black; superiors slightly longer than segment 10 of abdomen, forcipate, with apices nearly meeting each other, broad at base, then little narrowed and twisted and then again broadening upto apex when viewed dorsally; inner margin with an expansion begining from about middle of appendage and ending a little before apex; on the inner side near base is a quadrate robust process which is slightly expanded and not-
Ched on its inner margin; inferiors subtriangular, approximately one third the length of superiors, tipped with a bunch of whitish hairs; dorsal margin at about middle provided with a robust spherical outgrowth, which in turn ends in a small pointed spine directed upwards; when seen from above, the inferiors appear closely apposed, with the small spine bearing outgrowth situated on outer border. Penis as in Figs. 298-299.

Female: More robust than male, coloured similarly, but differ in the following points: median spot on hind margin of occiput transversely elongated. Prothorax with anterior lobe entirely citron yellow. Synthorax with a moderately broad mid-dorsal citron yellow stripe; the yellow stripe on anterolateral suture confluent with yellow area on sides below the level of spiracle, coxae and trochanters citron yellow; pterostigmata yellow. Segments 8 and 9 with ventral border broadly and segment 10 entirely yellow. Anal appendages yellow, slender, pointed apically, about three fourth as long as segment 10 of abdomen; ovipositor yellow, robust, extending to the apex of abdomen, the apical third being serrated at ventral border.

Variations: In some paratype males the median yellow spot on hind border of occiput is very small and in some paratype females, the wings are enfumed with brown apically and the ovipositor is variably marked with black.

Notes: This species comes very close to *M. major* Selys, which has previously been recorded from Shillong, but differs from the same in size and the following points;

Male: the prothorax is marked with yellow and a median spot of the same colour on hind margin of occiput; anal appendages differing in shape; superiors dilated but not provided with any spine apically; the inferiors with the spine short and situated on a spherical outgrowth.

Female: the synthorax is marked with a mid-dorsal yellow stripe and the anal appendages are also yellow.

This species is known only from the Khasi hills in and around Shillong and Mawphlang and was collected near streams where specimens of either sex were noticed making slow to and fro flights over short distances.

Distribution: India: Meghalaya
Family LESTIDAE

Diagnostic characters: Wings hyaline, tinted with yellow or those of males sometimes banded with dark or blackish brown; discoidal cell well formed and separated from inner wing margin; both IR₃ and R₄₊₅ arising from points nearer arc than nodus; an oblique cross vein present between R₃ and IR₄; Cu₂ on leaving discoidal cell usually not arched towards costal margin; anal vein arising from inner wing margin at the point of Ac; pterostigma usually considerably longer than broad (upto 7 times).

Nymph [after Lieftinck (1939a)]: Median lobe of labium with median cleft only incompletely developed, very narrowly incised or closed. Side lobes greatly expanded, usually distinctly concave, mesal margin very irregularly and deeply cleft, mental and lateral setae present. Antennae long and slender, basal joints of usual size and appearance, pedicel elongate, not conspicuously longer than the distalia. Gizzard with 4 major and 4 minor folds. Caudal gills very long, subparallel, apices ellipsoidal, rounded or bluntly pointed, secondary trochanters apparently at right angles to the main axis. Pedicel of caudal gills unapparent, annular, no breaking joint. Gills caducous. Cercoids inconspicuous.

Distribution: Cosmopolitan

KEY TO THE SUBFAMILIES OF THE FAMILY LESTIDAE

Discoidal cell of hindwing one and a half times as long as that of forewing; in hindwing, distance of Rs from arc to the point of origin of R₄₊₅ half the distance between the point of origin of R₄₊₅ and subnodus. Sympecmatinae.

Discoidal cell, usually of similar size in fore- and hindwing and then Rs in hindwing from arc to the point of origin of R₄₊₅ may be half the distance between the point of origin of R₄₊₅ and subnodus; if however, discoidal cell in hindwing is longer than that of forewing, then Rs in hindwing from arc to the point of origin of R₄₊₅ never more than one third the distance between the point of origin of R₄₊₅ and subnodus. Lestinae.

Subfamily SYMPECMATINAE

Diagnostic characters: Small insects (usually with abdomen 21.0-36.0 mm and hindwing 18.0-24.0 mm in length); when at rest wings held vertically closely apposed on dorsum. Wings narrow (usually 5-6 times
as long as broad), hyaline or tinted with yellow; discoidal cell very narrow (usually 6-8 times as long as wide) with inner distal angle markedly acute; discoidal cell of hindwing one and half times as long as that of forewings; Rs from arc to the point of origin of R\textsubscript{4+5} half the distance from the point of origin of R\textsubscript{4+5} and subnodus of hindwing; pterostigma two and half to four times as long as broad with inner proximal end continuous or a little apart from brace.

**Distribution:** Virtually cosmopolitan in Old World countries.

**Genus Indolestes Fraser**


Type-species: *Indolestes indica* Fraser.

Fraser (1929a), while establishing this genus described 3 new species including the type and incorporated *Lestes bilineata* Selys 1891. The generic concept has since then been further enlightened through the contributions chiefly of Fraser (1930a, 1933) and Lieftinck (1955a, 1960a, 1971a).

**Diagnostic characters:** Medium in size (usually with abdomen 23.0-33.0 mm, hindwing 19.0-23.0 mm); blue or pale brown, marked with black or sometimes partly partly black; male superior anal appendages either subequal to or nearly one and a half times as long as segment 10 of abdomen, forcipate with outer margin bearing a few spines subapically and inner margin dilated, dilatation extending for variable length and ending in a spine and with or without a tubercle, apices of anal appendages nearly meeting or even sinuous for some distance; inferiors about half the length of superiors and obtusely triangular; penis with large and flattened apical fold, terminal part of which short and ending in a pair of moderately long coiled flagella. Wings narrow, usually tinted with pale brown; forewing usually with 9-14 postnodal cross veins and hindwing with 9-13; arc situated at the level of distal antenodal cross vein; pterostigma about 2-3 times as long as broad; IR\textsubscript{8} and R\textsubscript{4+5} arising closer to arc than nodus, R\textsubscript{8} much nearer to nodus than pterostigma; Rs from arc to the point of origin of R\textsubscript{4+5} is half the distance from the point of origin of R\textsubscript{4+5} and subnodus in hindwing; discoidal cell very narrow, with inner margin about 2-3 times as long as costal margin, with inner distal angle very acute; Ab arising from inner wing margin from a point where Ac meets it.

**Remarks:** Lieftinck (1960a) considered *Indolestes* Fraser as a subgenus of *Lestes* Leach basing mainly on the extent of slenderness of wing
together with variations of different structure of the wings and also of abdomen. Here, however, Indolestes Fraser has been considered as a genus distinct from Lestes Leach not only because members of the 2 genera differ in respect of position of the wings at rest, but also because the point of origin of $R_{4+5}$ is distinctly nearer to arc in Lestes than in Indolestes.

**Distribution:** India; Bhutan; Sri Lanka; Burma; New Guinea; Australia.

**Indolestes indica** Fraser
(Figs. 127-128 and 296-297)


*Indolestes buddha* (Laidlaw) : Fraser, 1922, *Mem. Dep. Agric. India (Ent.)* 7 : 59


**Measurements (in mm) and Nodal index**

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<th>Length of</th>
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<tr>
<td><strong>Abdomen</strong></td>
<td><strong>hindwing</strong></td>
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<tr>
<td>♂♂</td>
<td>27.5-31.0</td>
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<td>♀♀</td>
<td>26.0-30.0</td>
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**Notes:** The males under study markedly vary from the description of the species provided by Fraser (1933) in respect of the anal appendages. They do however, agree in general with original description of the species provided by the author (Fraser 1922h) but still differ in that the superiors dilated, directed backwards and sinuous on apical third; the inferiors comparatively longer, being more than half the length of superiors.

This species is known only from Khasi hills and is more common in dry areas, in fields and hill slopes covered with tall grasses where dull body colour render them very inconspicuous.
**Distribution**: India; Meghalaya

**Subfamily Lestinae**

**Diagnostic characters**: Small to large (usually with abdomen 22.0-57.0 mm and hindwing 18.0-39.0 mm) and stoutly built insects; at rest wings widely open on dorsum. Wings narrow or moderately broad (usually 4-5 times as long as broad), hyaline or partly tinted with yellow or banded with blackish brown, discoidal cell narrow or moderately broad (usually 2-6 times as long as wide) with inner distal angle acute or markedly so; discoidal cell usually of same size in fore- and hindwings or that in hindwings about one and a half times as long as in forewings; Rs from arc to the point of origin of $R_{4+5}$ usually one third (always so when discoidal cell of hindwing is longer than that of forewing), sometimes nearly half the distance from the point of origin of $R_{4+5}$ and subnodus in hindwing; pterostigma as long as or more longer (upto 7 times) than broad, with proximal inner end usually continuous with brace.

**Distribution**: Cosmopolitan.

**KEY TO THE GENERA OF THE SUBFAMILY LESTINAE**

$R_5$ arising after 7 or more cells beyond nodus (Fig. 520) .... .... *Oroastes* McLachlan.

$R_5$ arising at most after 4 cells beyond nodus. .... ... .... *Lestes* Leach

**Genus Oroastes** McLachlan


Type-species: *Oroastes malyai* McLachlan

McLachlan (1895) erected this genus with *Oroastes malyai* as its type. Further contribution on this genus have been rendered by Munz (1919), Laidlaw (1920b), Fraser (1929c, 1933, 1933a) and Lieftinck (1939, 1954).

**Diagnostic characters**: Large in size (usually with abdomen 47.0-60.0 mm, hindwing 28.0-39.0 mm); blue, green or yellowish marked with brown, black or metallic green; posterior lobe of prothorax usually rounded in either sex; male superior anal appendages subequal to nearly twice as long as segment 10 of abdomen, forcipate with outer border bearing subapically a few closely set small spines and inner border bearing a subbasal spine or tubercle which is followed by a dilatation that ends in a
broad, triangular acute spine; inferiors less than half as long as superiors, triangular and closely apposed; penis with large, much flattened apical fold which sometimes with subapical median process and an almost abortive terminal fold. Wings hyaline or partly opaque brown; usually 19-24 postnodal cross veins in forewing, 17-20 in hindwing; arc situated at the level of distal antenodal cross vein, pterostigma narrow, 4-7 times as long as broad, rectangular slightly swollen in the middle, hardly or not at all braced; IR₃ and R₄₊₅ arising closer to arc than nodus; R₃ arising after 7 or more cells beyond nodus; in hindwing distance of Rs from arc to the point of origin of R₄₊₅ two and a half times the distance between the point of origin of R₄₊₅ and subnodus; discoidal cell with inner margin about twice as long as costal margin; discoidal cell in hindwing subequal to that in forewing; inner distal angle of discoidal cell acute; Ab arising from inner wing margin at a point where Ac meets it.

**Distribution**: India; Indo-China (exact locality unknown); Malaysia; Indonesia; Taiwan.

**Orolestes durga** sp. nov. (Figs. 129-130, 294-295 and 520)


Measurements (in mm) and Nodal index

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<tr>
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<th>Length of hindwing</th>
<th>Length of forewing</th>
<th>Nodal index of hindwing</th>
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<tr>
<td>♂♂</td>
<td>33.0-35.0</td>
<td>20-22</td>
<td>18-19</td>
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<tr>
<td>abdomen</td>
<td>52.5-53.0</td>
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**Description** Male: Labium greenish yellow; labrum green; genae, base of mandibles and anteclypeus pale green; rest of head on dorsum blackish brown with a metallic green lusture specially in the ocellar space; head ventrally greenish yellow. Prothorax pale greenish yellow clouded with brown on dorsum and thinly pruinose ventrolaterally; posterior lobe narrow, arched backwards and slightly emerginale; mesothoracic stigma narrow, elongated and connecting bridge prominently raised. Synthorax greenish brown on dorsum and greenish yellow on sides and venter with broad metallic antehumeral stripe on either side which is diffused on inner side. Legs with coxae and trochanters greenish yellow;
femora pale greenish yellow but distal end and flexor surface striped with black; tibiae pale brown, changing to black distally, tarsi black. Wings (Fig. 520) hyaline, very palely enfumed at apical ends; in paratype, an opalescent white spot visible only in reflected light beneath pterostigma in all wings; pterostigma covering about 5 cells, dark brown between thick black nervures, about 3.5 mm long, a little swollen at middle with proximal inner end being a little separated from brace. Abdomen greenish yellow on segments 1-3, palely so on segments 4-10; segments 2-6 with dorsal black stripes, these being complete and finely bisected by a fine carinal greenish yellow line on segment 2 and falling short of base but joining with apical black annules on segments 3-6; segment 7 somewhat similar to segments 2-6 in respect of stripes except that the dorsal stripe broadened apically; segments 8-10 mostly black dorsally and laterally; segments 3-7 with thick minute spines all over. Anal appendages black, as in Fig. 129-130; superiors with the apices overlapping, longer than segment 10 of abdomen, slender, forcipate, regularly curved, but markedly so on apical two-third, outer border with a minute tubercle near base followed by a dilatation ending in an acute tooth a little before apex which is bluntly rounded; inferiors only one-third the length of superiors, yellowish at apex, broad, triangular with inner borders straight and closely apposed. Penis as in Figs. 294-295

**Notes:** This species differs from the only known species of the genus *O. selysi* McLachlan from Indian subregion in its smaller size (abdomen 52.5-53.0 mm vs 57.0 mm, hindwing 33.0-35.0 mm vs 36.0-39.0 mm), in having uncoloured wings and also in the shape of the anal appendages, specially that of the superiors. It is nearer to *O. wallacei* (Kriby), a Malaysian species known from individuals with hyaline as well as coloured wings in general features, but is larger and also differs from the same in details of body markings, the shape of the anal appendages and that of the penis.

The specimens were collected amongst dense and thorny bushes on sloping bank of montane streams.

**Distribution:** India: Arunachal Pradesh, Mghalaya.

**Genus Lestes Leach**


**Type-species:** *Agrion sponsa* Hansen*

* After Kirby (1890), Fraser (1936) and Davies (1981) but as opposed to Lieftinck's (9954) citation, viz. *Agrion barbara* Fabr.
Leach (1815) while erecting the genus Lestes did not provide sufficient characters for generic diagnosis. So his account was amplified by Selys (1840, 1850), Rambur (1842) and other authorities along with descriptions of a number of new species and transfer of quite a few from the genera Agrion Fabricius and Anapates Charpentier. Selys (1862) synthesised earlier works on this genus and there he published revised descriptions of about 50 species already known then from Africa, America, Asia, Australia, Europe and New Holland. Since then, upto very recent times several authorities have contributed on this genus either by describing new species or elucidating the generic concept, or both. More important of such contributions are those of Selys (1878b, 1883a, 1889 and 1891a), Kirby (1890), Laidlaw (1920b, 1931), Fraser (1923b, 1929c, 1931, 1933, 1951, 1960) Schmidt (1938, 1951a), Lieftinck (1952a, 1954, 1955a, 1960a, b, 1971a, 1975) Pinhey (1962) and Aguesse (1968). Probably for this reason Corbet et al (1960) in a discussion of the genus Lestes Stated that Leach (1815) while erecting Lestes "took Lestes away from agrion" Bhasin (1953), Singh (1955), Asahina (1965) and St. Quentin (1970) dealt with a few Indian species of this genus in recent times.

Diagnostic characters: Medium to large in size (usually with abdomen 24.0-52.0 mm, hindwing 17.0-40.0 mm); blue, green, yellow or orange marked with brown, black or metallic green, occasionally partly pruinose; posterior lobe of prothorax rounded or sometimes shallowly tripartite; male superior anal appendages subequal to or one and a half times as long as segment 10 of abdomen, with blunt or acute apices curling inwards, outer border bearing a few (3-5) denticles subapically, the inner border usually with a basal spine followed by a dilatation; inferiors about one third to one half the length of superiors, conical or projected as an ungulate process from a broad base; penis with large, much flattened apical fold, the terminal of which usually very short but sometimes absent. Wings hyaline, rarely partly enfumed; usually 9-16 postnodal cross veins; arc situated at the level of distal antenodal cross vein; pterostigma rectangular, a little swollen at middle, two to five times as long as broad, braced; IR₉ and R₄₊₅ arising closer to arc, R₉ within 4 cells after nodus; distance of Rs from arc to the point of origin of R₄₊₅ one third the distance from the point of origin of R₄₊₅ and subnodus in hindwing; discoidal cell with inner margin about twice as long as costal margin with inner distal angle acute; discoidal cell of hindwing nearly as long as to
one and a half times as long as that of forewing; Ab arising from inner wing margin from or slightly proximal to the point where Ac meets it.

**Distribution**: Cosmopolitan

**KEY TO THE SPECIES OF THE GENUS *LESTES* LEACH**

**Male**:

1. Superior anal appendage without a sub-basal spine on inner border and acutely pointed at apex (Figs. 135-136).  
   *garoensis* sp. nov.

   Superior anal appendages prolonged into a sub-basal spine on inner border and rounded at apex (Figs. 133-134, 137-138).  
   **2**

2. Larger species, with abdomen never less than 37.0 mm long; round colour black.  
   *dorothea* Fraser

   Smaller species, with abdomen never more than 33.0 mm long; ground colour reddish brown.  
   *concinnus* Selys

**Females**:

Larger species, with abdomen and hindwing never less than 36.0 mm and 31.0 mm in length respectively.  
*dorothea* Fraser

Smaller species, with abdomen and hindwing never more than 29.0 mm and 22.0 mm in length respectively.  
*garoensis* sp. nov.

[Female of *L. concinnus* Selys was not represented in the collection studied and this species has therefore not been included in the key to female of the genus *Lestes* Leach].

**Lestes concinnus** Selys

(Figs. 137-138 and 292-293)


**Material studied**: 1 ♂, 10 kms east of Rongram, 23.iv.1973, coll ARL.

**Measurements (in mm) and Nodal index**

<table>
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<th>Length of</th>
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<tr>
<td>abdomen</td>
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<tr>
<td>♂ 33.0</td>
<td>21.0</td>
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<td></td>
<td>10-11</td>
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</table>
Notes: Lieftinck (1960b) provided an excellent comparative account of the two closely allied species, namely *L. concinnus* Selys and *L. umbrinus* Selys along with figures of pterostigma and male anal appendages. The single male under study agrees well with the diagnostic characters of *L. concinnus* Selys provided by the author (op. cit.) However, some variations are noticed in respect of the shape of superior anal appendages.

Single specimen of this species was collected from Garo Hills in Meghalaya, from patch of grassy land surrounded by jungle, which is quite far from a stream flowing downhill.

**Distribution** India Andhra Pradesh, Gujrat, Maharashtra, Meghalaya, Uttar Pradesh, West Bengal. Outside India: China; Burma; Indonesia; Philippines; Australia.

**Lestes dorothea** Fraser

(Figs. 133-134 and 288-289)


**Measurements** (in mm) and Nodal index

<table>
<thead>
<tr>
<th>Length of</th>
<th>Pn in</th>
</tr>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂♂</td>
<td>37.5-41.5</td>
</tr>
<tr>
<td>♀♀</td>
<td>36.5-37.0</td>
</tr>
</tbody>
</table>

**Notes**: Specimens under study vary from the description of the species provided by Fraser (1933) in size, nodal index and also in the followings: tibiae black and black area on outer surface of hind femora with a fine yellowish line; pterostigma in hindwing 3 times as long as broad; segment 1 of abdomen unmarked with black on dorsum; apical black rings on segments 3-5 incomplete; dorsal black stripes on segments 6 and 7 reaching base of the segments. Males also vary in having the frons black while in females the dorsal markings of synthorax is black on greenish background.
The specimens were commonly collected from bushes near small stagnant water masses or slow running streams.

**Distribution:** India: Assam, Maharashtra, Meghalaya. Outside India: Nepal.

**Lestes garoensis** sp. nov.  
(Figs. 135-136 and 290-291)

**Material studied:** Holotype ♂, Rongrengiri, 20.iv.1973, coll ARL (Z.S.I. Registration No. 3915/H₁₈); Paratypes: 1 ♂, same data as the Holotype (Z.S.I. Registration No.3916/H₁₈); EXTRA LIMITAL: 1 ♂, Manipur, Ukhrul, I iii.1975, coll P. T Cherian, (Z.S.I. Registration No.3733/H₁₈); Allotype ♀, Manipur, Moreh, 22.ii.1975, coll P. T. Cherian (Z.S.I. Registration No. 3734/H₁₈)

**Measurements (in mm) and Nodal index**

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<th>Length of</th>
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<th>Pn in</th>
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<tr>
<td></td>
<td>abdomen</td>
<td>forewing</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂</td>
<td>32.5-34.5</td>
<td>21.0-22.0</td>
<td>14-15</td>
</tr>
<tr>
<td>♀</td>
<td>29.0</td>
<td>22.0</td>
<td>14-15</td>
</tr>
</tbody>
</table>

**Description:** Male: Ground colour brownish (sandy brown) but labium paler and labrum, bases of mandibles, cheeks and abdomen on dorsum variably suffused with bluish tinge; prothorax with bluish tinge and an anterior elongated black spot on lower edge of middle lobe; posterior lobe narrow, rounded and arched backwards at middle; mesothoracic stigma narrow, grooved and with moderately broad connecting bridge; synthorax pale bluish laterally and ventrally; two small black spots, one just above upper end of posterolateral suture, another at about middle of ventral border of metepimeron; bases of posterior legs broadly black; legs yellowish, the extensor surface of forefemora and distal ends of other femora black. Wings enfumed with pale brown, deeply so along costal border which later sharply deflected beyond pterostigma apically; pterostigma elongated, about four times as long as broad, covering 2-3 cells, narrowing on distal half in forewing, only slightly so in hindwing, blackish brown, margin yellow, except on inner side. Abdomen marked with elongated subapical lateral spots on segments 2-6; in addition, dorsum of abdominal segment 1, apical half and sides of segment 2, mid-dorsal carinal stripes on segments 3-6 and lower half of sides and venter of segments 8-10 also black in the paratype; Anal appendages (Figs. 135-136)
LAHIRI: Odonate fauna of Meghalaya

yellowish; superiors straight on basal two third, nearly one and a half times as long as segment 10 of abdomen, black at base and apex; apex rather sharply curved inwards and acutely pointed; inner border with a dilatation on basal two third ending in a short, outwardly directed spine, outer border bearing a few subapical spines; inferiors broadly suboval, only about one fourth the length of superiors, penis as in Figs. 290-291.

Female: exactly similar to male in respect of body markings, but without the additional black markings of the paratype. Vulvar scale yellowish, robust, extending to end of abdomen.

Notes: The new species is very close to L. nodalis Selys as figured by Lieftinck (1960) but differs from the same in the shape of the male superior anal appendages.

Biological Note: The specimens were collected amongst some scanty vegetation inside a dried out ditch.

Distribution: India: Manipur, Meghalaya.

Superfamily COENAGRIONOIDEA

Diagnostic characters: Small to medium sized insects, occasionally very small; posterior lobe of prothorax variable in shape; males with anterior hamules quadrato. Wings petiolated, only 2 antenodal cross veins present; postnodals in strict alignment with cross veins beneath: usually IR₈ and R₄₊₅ originate closer to nodus than arc; intercalated sectors usually absent.

Distribution: Cosmopolitan.

KEY TO THE FAMILIES OF THE SUPERFAMILY COENAGRIONOIDEA

1. IA reduced (or absent) (Figs. 40-41 and 521); Cu₂ reduced or of usual length
   Both IA and Cu₂ never reduced or absent.

   Both IA reduced (or absent) (Figs. 40-41 and 521) ; Cu₂ reduced or of usual length
   .Protoneuridae
   .2

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

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   Both IA and Cu₂ never reduced or absent.

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   Both IA and Cu₂ never reduced or absent.

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   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.

   Both IA and Cu₂ never reduced or absent.
no accessory cross vein in the cubitoanal space basal to Ac; discoidal cell with subequil costal and inner margins and with inner distal angle nearly a right angle; subdiscoidal cell free or contiguous with inner wing margin.

Remarks: Fraser (1957) has divided the family into 4 subfamilies, but the distinguishing characters used by him are variable and overlapping. Further, from the description of the different genera it appears that it is hard to group them into distinct subfamilies. Therefore in this work the family has been straightway distinguished into genera.

KEY TO THE GENERA OF THE FAMILY PROTONEURIDAE

Ab straight, running nearly parallel to inner margin of discoidal cell (Figs. 40 and 521)...

Ab curved, forming a marginal cell with inner wing margin (Fig. 41).

Genus Elattoneura Cowley

Fraser, 1933, Fauna Brit. India, Odon., 1 : 228 (partim).

Type-species: Disparoneura glauca Selys

Cowley (1936) proposed the name Elattoneura for Disparoneura Selys 1886 since Selys (1860) used the same genus for some other species. The genus Disparoneura Selys 1860 stands out as a distinct genus even this day. Lieftinck (1954, 1955a, 1971a) and Pinhey (1962) worked on this genus in recent times.

Diagnostic characters: Medium in size (generally with abdomen 30.0-33.0 mm, hindwing 25.0-29.0 mm); black, sometimes pruinose in aged adults and generally marked with yellow, blue or reddish tinge; posterior lobe of prothorax generally entire in males, deeply bifid in females where those produced into two triangular processes and these may have accessory process attached to them; male anal appendages subequal to segment 10 of abdomen, broad at base, tapering at apex; superiors with a broad ventral basal spine; inferiors sloping downwards and then again curving upwards at apex; terminal fold of penis ending in a pair of moderately long branches on either side. Wings hyaline; pterostigma small with almost equal margins; generally 10-21 postnodal cross veins in forewings, 9-19 in hindwing; IRs arising at the level of subnodus.
arising about one cell before that level; Ab present, arising at or before Ac, running approximately parallel to the inner margin of discoidal cell and ending at the cross vein descending from the inner distal angle of discoidal cell; Cu₂ reduced, not extending for more than 2-3 cells beyond the discoidal cell.

Distribution: India; Sri Lanka; Burma; Malaysia; Indonesia; Africa.

KEY TO THE SPECIES OF THE GENUS ELTTONEURA COWLEY (EITHER SEX)

Adults black but marked with reddish or bluish in tenerals; an ankle-shaped spot present just beneath upper end of antehumeral stripe. . atkinsoni Selys.

Both adults and tenerals black but marked with bluish markings; upper end of antehumeral stripe without any spot as above. . campioni Fraser.

Elattoneura atkinsoni (Selys)
(Figs. 143-144, 204, 236-237 and 521)

Fraser, 1933, Fauna Brit. India, Odon., 1 : 230.


Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th></th>
<th>abdomen</th>
<th>hindwing</th>
<th>forewing</th>
<th>hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Weiloi</td>
<td>♂♂</td>
<td>34.0-37.0</td>
<td>22.0-24.0</td>
<td>17-18</td>
</tr>
<tr>
<td>From Elsewhere</td>
<td>♀♀</td>
<td>30.0-32.0</td>
<td>20.5-21.5</td>
<td>15-18</td>
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<tr>
<td>From Weiloi</td>
<td>♂♂</td>
<td>33.0-36.0</td>
<td>24.0-25.0</td>
<td>16-17</td>
</tr>
<tr>
<td>From Elsewhere</td>
<td>♀♀</td>
<td>31.0-32.0</td>
<td>22.5-23.5</td>
<td>16-17</td>
</tr>
</tbody>
</table>
Notes: The specimens under study vary from the description of the species provided by Fraser (1933) in size, nodal index and also in having labrum and clypeus hairy. The males also vary in having labrum occasionally marked with black at base, on mid-lobe and at tips; occiput black and unmarked; abdominal segments 3-10 completely black, unmarked in nearly 50% of specimens, while in about 80% of specimens segments 3-6 marked with fine mid-dorsal carinal line; inferior anal appendages in 50% of specimens reddish yellow in middle.

This species is fairly well distributed in central high altitude zones of Khasi and Jaintia hills of Meghalaya and appears to be represented by two different and distinct biotypes in the state. Of the two biotypes, the more common one inhabits marshy areas of Khasi and Jaintia hills and is smaller in size, while the other inhabits comparatively dry rocky areas near montane streams at more southern part of Khasi hills and is larger in size.


Note: This species was recorded from Burma by Laidlaw (1915, 1917b), but Fraser (1933) considered it to be confined to Khasi hills. Hence an ? has been put against Burma in distribution.

Elattoneura campioni (Fraser)
(Figs. 141-142, 203 and 234-235)


Material studied: 3 exs, Barapani (1 ♂, 31.v 1967, coll BKT; 1 ♂, 1♀ 24.vi. 1967, coll RKV); 1 ♂, Umsning, 12.ix. 1967, coll RKV).

Measurements (in mm) and Nodal index

<table>
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<th>Length of</th>
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<tr>
<td>Abdomen</td>
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<td>hindwing</td>
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<td>abdomen</td>
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<td>hindwing</td>
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<table>
<thead>
<tr>
<th>Gender</th>
<th>Length of Abdomen</th>
<th>Hindwing</th>
<th>Nodal Index</th>
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<tr>
<td>♂ ♂</td>
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<td>15</td>
</tr>
<tr>
<td>♀ ♀</td>
<td>34.0</td>
<td>23.0</td>
<td>14</td>
</tr>
</tbody>
</table>

Description: Female: Differing markedly from the male as follows: Bases of mandibles, genae, cheeks, clypeus and frons pale blue; anterior border of postclypeus narrowly black which is extended backward medially. Prothorax with additional black marking on the dorsum of mid-
lobe; posterior lobe (Fig. 203) emerginate, bearing a pair of nearly triangular processes projected upwards when viewed laterally. Legs with entire flexor surface of femora pale blue. Abdomen more robust than in male and with azure blue markings. Vulvar scale black, bordered with blue, reaching apex of segment 10 of abdomen.

Notes The species was so far known by males only. The hitherto unknown female having been discovered has been described stating the differences from males. The males under study vary from the description of the species provided by Fraser (1933) in being larger in size and also in the following points: prothorax unmarked; synthorax with blue upper humeral spot and two oval spots near antealar sinus; $Cu_2$ 3-4 cells long in forewing; Pterostigma brown; abdominal segment 2 unmarked on sides; segments 4-6 with basal annules which are incomplete below; subapical lateral spots present on segments 3-6 but those on 3 and 4 extended basad as ventrolateral stripes; segment 8 azure blue with apical one fourth black.

The species is rare and has only been collected twice in Meghalaya at the same spot; i.e., bank of Barapani lake, near Shillong.


Genus Prodasineura Cowley

Alloneura Selys, 1860, Mem. Cour. Acad. R. Belg. (B), 38 : 160, 176 (nom. praecoc.)

Type-species: Alloneura dorsalis Selys

Species of this genus has been dealt with by Laidlaw (1917b, 1920d, 1931), Fraser (1919c, 1921b, 1922e, 1924b, 1927a, 1931, 1933), Lieftinck (1953a, 1954, 1955a, 1971a), and St. Quentin (1970). One Indian species has recently been dealt with by Prasad and Singh (1976).

Diagnostic characters: Medium in size (usually with abdomen 27.0-35.0 mm, hindwing 17.0-23.0 mm); black marked with bright red, orange, blue, whitish or yellow; posterior lobe of prothorax in male simple, usually rounded or sometimes notched in middle, in female deeply cleft at middle and with a robust spine on each lobe; male anal appendages subequal in length and a little longer than segment 10 of abdomen; supe-
riors broad at base, swollen medially and then tapering to an acute apex, armed with a basal broad ventral spine; inferiors broad at base, narrowing and sloping downwards to acute apex which is curled inwards; terminal fold of penis ending in a pair of short branches on either side. Wings hyaline; pterostigma about one and a half times as long as broad; usually 12-17 and 11-15 postnodal cross veins in fore- and hindwings respectively; 1R₈ arising at the level of subnodus, R₄₊₅ originating at a point about one cell proximal to 1R₈; Ab usually absent, if present then incomplete and curved to meet hind margin of wing; Cu₂ reduced, not extending for more than 4 cells beyond discoidal cell.

Distribution: India; Nepal; China; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; Africa.

Prodasineura autumnalis (Fraser)
(Figs. 139-140, 202 and 232-233)

Caconeura autumnalis Fraser, 1922, Mem. Dep. Agric. India (Ent.), 7: 43; 1933, Fauna Birt. India, Odon., 1: 223.


Measurements (in mm) and Nodal index.

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<th>Length of</th>
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<tr>
<td></td>
<td>Abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂♂</td>
<td>37.0</td>
<td>18.0-20.0</td>
</tr>
<tr>
<td>♀♀</td>
<td>35.0</td>
<td>22.0</td>
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</table>

Notes: The specimens under study agree broadly with the description of the species provided by Fraser (1933) but vary from the same in size, nodal index and the following points:

Male (teneral): Labrum pale brown; reminescence of a pale blue antehumeral stripe present on synthorax.

Male (Adult): All femora completely black; abdomen with segment 2 marked with a mid-dorsal whitish fine stripe, segments 5-6 with whitish complete ring at base.

Female: Antealar sinus without any spot; abdominal segment 8 unmarked; mid-dorsal marking on segment 9 not spear headed.
They make slow, unsustained flight along the bushy banks of slow running steams or lakes.


**Family Platycnemididae**

**Diagnostic characters:** IA nad Cu_2_ of normal length; no angulation at medio-anal link; no accessory cross vein in the cubito-anal space basal to Ac; discoidal cell with costal margin a little shorter than inner one and inner distal angle obtuse, subdiscoidal cell free from inner wing margin.

**Remarks:** Fraser (1957) divided family Platycnemididae into 2 subfamilies "mainly for convenience" but since that division was based on unstable characters, his division has not been followed in the present work.

**Distribution** Virtually cosmopolitan except Australia and American countries.

**KEY TO THE GENERA OF THE FAMILY PLATYCNEMIDIDAE**

1. Costal margin of discoidal cell our-fifth the inner one (Fig. 523); tibiae of males not dilated.
   - Costal margin of discoidal cell subequal to the inner one (Figs. 49 and 522); tibiae of males usually dilated.

2. Ab arising at the level of Ac (Fig. 523); 2-3 postquadrangular antenodal cells
   - Ab arising proximal to the point where Ac meets it; 3-4 postquadrangular antenodal cells.

3. Four postquadrangular antenodal cells; abdomen 45.0 mm or more in length
   - Three postquadrangular antenodal cells; abdomen 40.0 mm or less in length

**Genus Copera Kirby**


Type-species: *Platycnemis marginipes* Rambur

The genus (as *Psilocnemis*) was first proposed by Selys (1863) with an abbreviated description with *Platycnemis marginipes* Rambur as type.
He then incorporated some new species in the genus. Subsequently Selys (1883a, 1886, 1889), Kirby (1890), Laidlaw (1917b, 1931), Munz (1919), Fraser (1922e, 1923c, 1932, 1933) and Lieftinck (1040a, 1948a, 1954, 1955a, 1971a) not only broadened the concept of the genus but also included some more species in the genus. In recent times Bhasin (1953), Kumar (1973a), Kumar and Juneja (1976), Sahni (1972), Lahiri (1977a), and St. Quentin (1970) published accounts of different species of the genus from Indian subcontinent.

Diagnostic characters: Medium in size (usually with abdomen 28.0-37.0 mm, hindwing 15.0-24.0 mm), whitish, bluish, or seldom partly reddish, marked with black or brown; second segment of antennae as long as or longer than third segment; posterior lobe of prothorax simple in either sex and rounded, or deeply notched in females where the inferior lip occasionally visible from above as a narrow plate and provided with a triangular notch or a pair of ungulate processes projecting forward and/or upwards; tibiae of males sometimes dilated but never so in females; male anal appendages of variable shape and size, superiors triangular or rounded, sometimes hooked subapically, as long as or much shorter than segment 10 of abdomen; inferiors 2-4 times as long as superiors, ungulate or tapering to an acute apex, curved inwards, upwards or downwards; terminal fold of penis squarish with or without a pair of short apical flagella. Wings hyaline; pterostigma a little longer than broad; usually 11-15 postnodal cross veins in forewing, 9-13 in hindwing; $R_4$+$5$ a little proximal to that level; discoidal cell with costal and inner margin subequal.

Distribution: India; Nepal; Bhutan; China; Sri Lanka; Nicobar; Burma; Thailand; Malaysia; Indonesia; Japan; Taiwan.

KEY TO THE SPECIES OF THE GENUS COPERA KIRBY

Male:
1. Hind tibiae white and greatly dilated.
   Hind tibiae reddish or yellowish, only moderately dilated or not at all.
   2.

   2. Superior anal appendages only one fourth as long as inferiors (Figs. 147-148)
      Superior anal appendages at least half as long as inferiors (Figs. 149-150)
      .marginipes (Rambur)
      .vittata (S.L.) (Selys)
      .annulata (Selys).

Female:
Posterior lobe of prothorax broadly arched.
Posterior lobe of prothorax with a pair of divergent spines projecting forward (Fig. 207).
Female of *C. marginipes* (Rambur) was not represented in the collection studied. Hence this species has not been included in the key to females.

**Copera annulata** (Selys)
(Figs. 145-146 and 238-239)


*Material studied*: 4 ♂♂, 2 ♀♀, Chitmaring beel, 10.iv.1973, coll ARL.

**Measurements** (in mm) and **Nodal index**.

<table>
<thead>
<tr>
<th>Length of</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
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<tr>
<td>♂♂ 37.5</td>
<td>23.0</td>
</tr>
<tr>
<td>♀♀ 35.5</td>
<td>24.0</td>
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</table>

*Notes*: The specimens under study vary from the description of the species provided by Fraser (1933) in having postclypeus broadly black in males, its lateral edges blue; abdominal segments 9 and 10 black, unmarked in females.

In Meghalaya the species has been collected only from Garo hills around Chitmaring beel, a rather small water mass with muddy bottom and unclean water, much of which remains shed even in mid-day by big trees on its bank. The specimens generally rest on twigs overhanging water, make slow and short flights when chased or beaten up and then these become quite conspicuous with whitish parts of their body.

**Distribution**: India: Assam, Himachal Pradesh, Manipur, Meghalaya, West Bengal. Outside India: China; Indo China (exact locality unknown); Malaysia; Indonesia; Japan; Taiwan.

**Copera marginipes** (Rambur)
(Figs. 147-148, 205 and 240-241)


*Material studied*: 1 ♂, Napak beel, 12.iv.1973, coll ARL.
Measurements (in mm) and Nodal index

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<th>Length of</th>
<th>Pn in</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂</td>
<td>29.0</td>
</tr>
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</table>

Notes: The single male specimen under study varies from the description of the species provided by Fraser (1933) in having segments 3-6 of abdomen with mid-dorsal carinal lines and segments 6 and 7 with small blue baso-lateral paired spots.

The specimen was collected from the bank of Napak beel in Garo hills, which has more or less the same physical situation as Chitmaring beel. It was collected when it was flying slowly through small patches of bushes on the muddy bank.

Distribution: India: Assam, Bihar, Goa, Himachal Pradesh, Maharashtra, Meghalaya, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: Nepal; China; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; Taiwan.

Copera vittata (S.L.) (Selys)
(Figs. 149-150, 206-207, 242-243 and 522)


Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th>Length of</th>
<th>Pn in</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>33.0-36.0</td>
</tr>
<tr>
<td>♀ ♂</td>
<td>35.0</td>
</tr>
</tbody>
</table>

Description: Male: Head black, marked as follows: Labium reddish; labrum, genae, bases of mandibles, anteclypeus, a stripe on vertex extending from eye to eye between anterior and posterior ocelli, postocular area, sides of head and beneath eyes greenish yellow; postocular
greenish yellow area intersected by narrow black stripes which run across occiput but falls short of eyes on either side; the eyes marked with a narrow black equatorial belt. Thorax black dorsally yellowish on sides and venter, marked as follows: a fine mid-dorsal yellow carinal line on synthorax (incomplete in some specimens) with a pair of small spots at anterior end; narrow reddish yellow humeral stripe extended on prothorax; sides of synthorax between humeral and anterolateral stuture on upper half black striped with yellow, yellow on lower half; humeral and lateral sutures finely and two irregular stripes of variable extent on anterior part of mesepimeron and middle of metepemeron black; posterior lobe of prothorax (Fig. 206) simple, broadly arched backwards; mesostigmal lamina narrow, somewhat rectangular and emerginate on outer side. Legs reddish, the two posterior pairs of tibiae very slightly dilated. Wings (Fig. 522) hyaline; pterostigma brown with white margin. Abdomen black, marked with bluish yellow as follows: segment 1 with one mid-dorsal basal spot, a pair of mid-dorsal subapical spots and lateral stripe running diagonally from base to apex; segment 2 with a mid-dorsal narrow stripe on basal two third, a pair of subapical mid-dorsal spots, lower border and a semilunar apicolateral spot on either side besides in one specimen an obscured sublateral stripe; segments 3-6 at base and with fine mid-dorsal carinal ventrolateral apically incomplete stripes besides paired suboval subdorsal spots; on segment 3 the ventrolateral stripes expanded apically and extended based to basolateral spot; segment 7 with much reduced basolateral spot only; ventrolateral deges of segments 7 and 8 and dorsum of segment 9 either entirely or with a large dorsal triangular spot with its base at apex of segment; segment 10 blue except on lower half. Anal appendages as in Figs. 149-150, blue but inferiors sometimes black externally; superiors as long as segment 10 of abdomen, conical and depressed; inferiors broad at base and tapered to apex, twice as long as superiors, forcipate with a small median obtuse expansion on inner margin. Penis as in Figs. 242-243.

**Female:** Differ from male as follows: more robust in built with markings whitish and more extensive; clypeus entirely, frons but for 3 linear anterior spots and vertex anteriorly whitish. Posterior lobe of prothorax (Fig. 207) much narrower than male, undulated, inferior lip visible from above as a narrow plate and produced on either side as an ungueal process directed forwards and upwards; mesostigmal lamina broadly triangular, depressed with broad connecting bridge. Black area on mese pimeron and metepimeron reduced to some obscured spots. Tibiae not dilated. Basolateral spots on segments 3-6 larger and connected to lateral
stripes on each segment; the lateral stripes obscured medially; segments 8-10 almost entirely blue, except for some obscured lateral and sublateral black spots. Anal appendages small, conical, blue. Vulvar scale black with upper border bluish and extending a little beyond the apex of segment 10 of abdomen.

Female (teneral): Almost entirely whitish, marked with brown only on sides of synthorax.

Notes: The specimens studied were identified as C. vittata (Selys) and sent to Late Dr. M. A. Lieftinck for comments. Dr. Lieftinck opined that they might possibly belong to an yet undescribed subspecies of C. vittata vittata (Selys). Specific determination has however been avoided in view of non availability of sufficient maternal and literature.

The specimens were collected amongst bushes near stagnant dirty water masses.

Distribution: India; Meghalaya

Genus Calicenemia Strand


Type species: Calicenemia eximia Selys.

The genus along with the description of its type-species was first proposed by Selys (1863) under the name Calicenemia. Later more species were described under it and the generic concept was further elaborated by Selys (1886, 1891a) Laidlaw (1917b, 1931), Kennedy (1920), Fraser (1923e, 1932, 1933), Strand (1926) and Lieftinck (1927, 1948a, 1960, 1977b). It was strand (1926), who proposed the name Calicenemia for Calicenemia and Strands' proposal has been accepted by Cowley (1934) and other workers. From Indian region different species of this genus have also been dealt with by St. Quentin (1936a, 1970), Bhasin (1953), Sahni (1964a, 1972), Lahiri (1976, 1977b, 1979), Prasad (1976a) and Prasad and Singh (1976).

Diagnostic characters: Medium in size (usually with abdomen 25.0-36.0 mm, hindwing 19.0-29.0 mm); red or black, marked with yellow, sometimes pruinose; posterior lobe of prothorax simple and rounded; male superior anal appendages as long as or a little longer than segment 10 of abdomen, gently tapering to a blunt or acute apex, a little forcipate
and provided with a broad sub-basal spine; inferiors a little longer than superiors, after sloping upwards narrowed abruptly from a broad base while the apex abruptly turned downwards in some species; penis shaft sometimes with a few spines subapically, terminal fold of penis rather deeply cleft and produced into a pair of curled, moderately long apical flagella. Wings hyaline. Pterostigma subquadrate; usually 14-22 postnodal cross veins in forewing, 13-20 in hindwing; 1R3 arising at the level of subnodule, origin of $R_{4+5}$ a little proximal to that level; discoidal cell with costal margin about four fifths of inner margin; only 3 postquadranular antenodal cells in all wings; Ab arising from inner wing margin proximall to the point where Ac meets it.

*Distribution*: India: Nepal, Bhutan; Tibet; Burma; Vietnam; Laos; Malaysia.

**KEY TO THE SPECIES OF THE GENUS **CALICNEMIA **STRAND**

**Male:**
1. Head entirely black ventrally; abdomen mainly black. *imitans* Lieftinck.  
   Head coloured as above but marked with yellow; abdomen mainly red.  
   Abdomen entirely red. *eximia* (Selys)  
   Abdomen red up to segment 6, rest black. *nukherjeei* Lahiri  

**Female:**
1. Head entirely black ventrally; abdomen mainly black. *imitans* Lieftinck  
   Head though black ventrally also with yellow markings; abdomen mainly red.  
   Smaller species with hindwing at most 25.0 mm long. *eximia* Selys  
   Larger species with hindwing never less than 28.0 mm in length. *nukherjeei* Lahiri

**Calicnemia eximia** (Selys)  
(Figs. 151-152 and 244-245)


Measurements (in mm) and Nodal index

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<th>Length of</th>
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<td></td>
<td>abdomen</td>
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<td></td>
<td>forewing</td>
<td>hindwing</td>
</tr>
<tr>
<td><strong>♂ ♂</strong></td>
<td>31.0-34.0</td>
<td>21.0-24.0</td>
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<td>14-19</td>
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<td><strong>♀ ♀</strong></td>
<td>33.0</td>
<td>25.0</td>
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<td>17-19</td>
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**Notes:** In Meghalaya the species has a restricted distribution at high altitude, in and around Shillong. They are usually found along bank of slow running streams or lakes, in comparatively open habitats.

**Distribution:** India: Himachal Pradesh, Meghalaya, Uttar Pradesh, West Bengal, Outside India: Nepal; Burma; Vietnam.

**Calicnemia imitans** Lieftinck
(Figs. 153-154 and 246-247)


**Material studied:** 1 ♂, Balat, 8.xii.1977, coll MSJ; 1 ♂, Pynursla, 29.viii.1972, coll ARL; 4 ♂ ♂, 2 ♀ ♀, Sonapurdi, 28.viii.1974, coll ARL.

Measurements (in mm) and Nodal index

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<td>abdomen</td>
<td>hindwing</td>
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<td></td>
<td>forewing</td>
<td>hindwing</td>
</tr>
<tr>
<td><strong>♂ ♂</strong></td>
<td>30.0-32.0</td>
<td>21.0-22.0</td>
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<tr>
<td></td>
<td></td>
<td>16-18</td>
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<tr>
<td><strong>♀ ♀</strong></td>
<td>29.0</td>
<td>20.5</td>
</tr>
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<td></td>
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<td>15-17</td>
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**Notes:** Specimens under study vary from the description of the species provided by Lieftinck (1948) in size and nodal index. The females also in having a complete black stripe on posterolateral suture.

The species has been collected only in southern Meghalaya, near streams shed by overhanging bushes and creepers. The specimens are quite inconspicuous against such background with black groundcolour of their body.

**Distribution:** India: Meghalaya. Outside India: Burma.

**Calicnemia mukherjeei** Lahiri
(Figs. 155-156 and 248-249)

LAHIRI: Odonate fauna of Meghalaya


Measurements (in mm) and Nodal index.

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<th>Length of</th>
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<tr>
<td></td>
<td>abdomen</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>32.5-34.5</td>
</tr>
<tr>
<td>♀</td>
<td>33.5</td>
</tr>
</tbody>
</table>

Note: They were collected from bushes overhanging streams only at a higher altitude of Khasi hills and in Shillong.

Distribution: India: Meghalaya.

Genus Coeliccia Kirby


Type-species: Platycnemis membranipes Rambur.

The genus was formerly very briefly described by Selys in 1857 under the name Trichocnemis. Selys (1863) expanded the generic concept further and incorporated Platycnemis membranipes Rambur and 2 new species, e.g. Trichocnemis octogesima and T. didyma under it. Later it was further elaborated with addition of quite a number of species from various regions by Selys (1886), Kirby (1890), Ris (1912), Laidlaw (1914a, 1917b, 1931, 1932), Fraser (1923e, 1932, 1933) and Lieftinck (1948a, 1954). It was Kirby (1990) who porposed Coeliccia nom. nov. for Trichocnemis Selys (nom. praeoc.). From Indian region, accounts of different species have been published by Bhasin (1953), Asahina (1965) and St. Quentin (1970) in recent times.

Diagnostic characters: Medium in size (usually with abdomen 24.0-46.0 mm, hindwing 22.0-33.0 mm); black marked with white, bluish or yellowish; posterior lobe of prothorax rounded or trapezoidal, deeply or shallowly notched when in some species a pair of horn-like processes present; male superior anal appendages subequal to or longer than segment 10 of abdomen, narrowed apically or dilated medially, parallel or slightly diverging at apex and with projections on inner margin; inferiors usually slightly longer than superiors, abruptly narrowed from a broad base,
slopping upwards with apices often curved inwards or downwards; terminal fold of penis broad or reduced and usually prolonged into a pair of long curled apical flagella. Wings hyaline; pterostigma subquadrate; usually 11-23 postondal cross veins; \( 1R_9 \) arising at or distal to the level of subnodus; \( R_{4+5} \) arising a little proximal or distal to that level; post-quadrangular antenodal cell 2-3; Ab arising from inner wing margin proximal to the point where Ac meets it.

**Distribution:** India; Nepal; Tibet; Burma; Thailand; Vietnam; Malaysia; Indonesia; Ryukyu; Taiwan; Philippines.

**KEY TO THE SPECIES OF THE GENUS COELICCIA KIRBY**

**Male:**
1. Dorsum of synthorax marked with one or two pairs of spots (Fig. 168). \( \rightarrow \) .2
   Dorsum of synthorax marked with a pair of stripes (Figs. 165-167). \( \rightarrow \) .3

2. Dorsum of synthorax marked with two, e.g. one anterior and another posterior pairs of spots (Fig. 168). \( \rightarrow \) *didyma* (Selys)
   Dorsum of synthorax marked with only one, i.e. anterior pair of spots \( \rightarrow \) *bimaculata* Laidlaw

3. Superior anal appendages with two broad spines or projections on inner border (Figs. 159-160); antehumeral stripes when present narrow or absent \( \rightarrow \) *fraseri* Laidlaw
   Superior anal appendages with only one small spine or projection on inner border (Figs. 161-162); antehumeral stripes broad \( \rightarrow \) *sarbottama* sp. nov.

**Female:**
1. Midlobe of posterior lobe of prothorax only sligtly projected and is much broader than the lateral lobes (Fig. 212). \( \rightarrow \) *fraseri* Laidlaw
   Midlobe of posterior lobe of prothorax markedly projected and is shorter than the lateral lobes (Fig. 208). \( \rightarrow \) .2

2. Midlobe of posterior lobe of prothorax deeply notched into a pair of forwardly directed curved spines \( \rightarrow \) *vacca* Laidlaw
   Midlobe of posterior lobe of prothorax not notched, shaped as an equilateral triangle (Fig. 208). \( \rightarrow \) .2

*(Male of *c. vacca* Laidlaw and Females of *C. bimaculata* Laidlaw and *C. sarbottama* sp. nov. were not available in the collection studied and therefore, these species have not been included in the key to males and females respectively).*

**Coeliccia bimaculata** Laidlaw

Material studied: 1♂♂♂ Type, about Tura, Garo hills, 3,500'–3,900', S. Kemp, 13.vii.–31.viii.1917, Registration No. 7961/H₁, "returned by Col. (F.C.) Fraser" in the National Zoological Collection, Zoological Survey of India, Calcutta.

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Pn in</th>
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<tbody>
<tr>
<td></td>
<td>abdomen</td>
</tr>
<tr>
<td>♂ broken (36.0)</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Notes: The only specimen of the type series, i.e. 3♂♂♂ and 2♀♀ mentioned by Laidlaw (1932) still existing is the one cited above (the rest possibly lost) and in all probability it is also the "Type" referred to by Fraser (1933). As already mentioned by Fraser (1933), it is an incomplete male with head, part of abdomen and few legs missing. The pair of spots situated anteriorly on synthorax in close apposition to mid-dorsal carina are however, still very clearly visible. Measurements of missing part (abdomen) has been cited above from Fraser (1933).

Distribution: India: Meghalaya.

Coelicci didyma (Selys)
(Figs. 163-164, 168-169, 208-209 and 256-257)


Material studied: 1♂, 1♀, Anogiri, 6.xi.1973, coll SB; 1♂, 10 Kms east of Rongram, 7.xii.1977, coll ARL; 1♂, Ranikor, 7.xii.1977, coll ARL.

Measurements (in mm) and Nodal index.

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<th>Length of</th>
<th>Pn in</th>
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<tr>
<td></td>
<td>abdomen</td>
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<tr>
<td>♂ ♂ 37.5-42.0</td>
<td>23.5-26.0</td>
</tr>
<tr>
<td>♂♀ 40.5</td>
<td>26.0</td>
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</tbody>
</table>

Notes: From the existing description of the species provided by Laidlaw (1932) and Fraser (1933) the specimens studied vary in size, in having R₄₊₅ arising from the level of subnodus and Ab arising from the point where Ac meets it. The males also vary in having the antehumeral spots
on synthorax semi-oval or conically extended towards each other, abdominal segments 3-5 marked with fine mid-dorsal carinal line and paired blue subapical spots and also in the extent of apical curvature of the inferior anal appendages. The female differs in having apical half of segment 7 and and dorsum of segment 8 blue.

The species is rare. A pair was collected in Northern Garo hills and a male in Southern Khasi hills at a lower altitude near streams.

**Distribution:** India: Assam, Himachal Pradesh, Mehsylaya, Nagaland, West Bengal. Outside India: Tibet, Burma; Malaysia.

**Coeliccia fraseri** Laidlaw

*(Figs. 159-160, 165-167, 210, 212, and 252-253)*


Measurements (in mm) and Nodal index.

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<tr>
<td></td>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>36.5-38.0</td>
<td>23.0-25.0</td>
</tr>
<tr>
<td>♀ ♂</td>
<td>35.0-35.5</td>
<td>24.0-25.0</td>
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Redescription: Male Labium light yellow, tips of palpi black; bases of mandibles and lower border of anteclypeus green; rest of head black; eyes deep bottle green. Prothorax black on dorsum, light yellow on sides and yellow on venter; posterior lobe (Fig. 210) broadly trapezoidal and slightly emerginate; mesostigmal laminae broad but simple, slightly protruded on either end and connected with a broad connecting bridge. Synthorax black on dorsum up to 1st lateral suture, marked with a pair of antehumeral narrow green stripes, these running parallel close to mid-dorsal carina, diverging a little from each other anteriorly (antehumeral stripe very variable in the extent of its development as shown in Figs. 165-167); laterally and ventrally green, with a narrow black stripe on postero-lateral suture which narrowing to a mere black line beneath spiracle. Legs pale green; both extensor and flexor surfaces of fore-femora, extensor surface of other femora and flexor surface of all tibiae black. Wings hyaline, venetion black; pterostigma rhombiodal, covering about one cell, pale brown with margin narrowly green and enclosed by thick nervures; 2 postquadrangular antenodal cells in all wings. Abdomen narrow, pale yellow marked with black on dorsum, which appears pale on segments 3-6; narrow black apical annules on segments 1-6; black markings on segments 7 and 8 or on 7-10 extended laterally almost entirely replacing the ground colour, that on dorsum of segment 2 may be dumb-bell shaped. Anal appendages as in Figs. 159-160, superiors broadly triangular with the apex nearly as long as segment 10 of abdomen, black, with inner surface pale green, inner border with two projections at about basal and distal third of the organ, basal one being visible from above and distal one from side; inferiors slightly longer than superiors, black except at base, ungulate, narrowing and sloping upwards, curled at apex. Penis as in Figs. 252-253.

Male (teneral) Differ from adult in the following: vertex anteriorly and cheeks green, anteclypeus green and with a pair of baso-lateral black spots; distal end of 1st antennal segment also green and a narrow stripe connecting the eyes also of the same colour, though in some specimens slightly interrupted just behind antennae. Synthorax: antehumeral stripes absent, Abdomen: marking on 2nd segment straight. Anal appendages: superiors green, sometimes marked with black only on outer border.

Female: Slightly robust than male; colour differing from teneral male in the following: Labrum broadly black at base; black colour of frons approaching vertex at middle; the green stripe of vertex through anterior ocellus is uninterrupted, occiput with a narrow postocular spot on either side. Prothorax: posterior lobe (Fig. 212) short and narrow,
projected backwards and tripartite; lateral lobes very short, median lobe much broader. Synthorax: antehumeral stripes absent. Abdomen: dorsal black marking broader and extending half way on to sides on segments 2-6 and covering almost entirely segments 7-10. Vulvar scales robust and extending beyond the end of abdomen, yellow with basal half of upper border and distal half of lower border marked with black. Anal appendages short, conical and black.

**Female** (teneral): Differs from adult female in the following: labrum yellow with only a small median black spot at base; yellow colour on sides of prothorax continued on dorsum of midlobe; antehumeral stripes of even thickness throughout; abdominal segments 9 and 10 as well as vulvar scales yellow and not marked with black.

**Notes**: The available specimens of both sexes have been redescribed in view of inadequate description of the species provided by Fraser (1933).

The species having restricted distribution in the high altitude areas of Meghalaya is common in bushes along the banks of stream, which are evidently their breeding ground also.

**Distribution**: India, Meghalaya

**Coelliccia sarbottama** sp. nov.  
(Figs. 161-162, 170, 211, 254-255 and 523)

**Material studied**: Holotype ♂, Wageasi, 6.vi.1973, coll ARL. (Z.S.I. Registration No. 3908 H 13)

Measurements (in mm) and Nodal index.

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<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>forewing</td>
</tr>
<tr>
<td>♂</td>
<td>37.0</td>
<td>22.0</td>
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</table>

**Description**: Male: Labium pale yellow; labrum pale brown; bases of mandibles, genae, anteclypeus and frons greenish yellow; postclypeus blackish brown with base on either side greenish yellow; vertex, occiput and under surface of head black and this colour encroaching a little on middle of frons; antennae black with distal half of 1st segment and proximal half of 2nd greenish yellow; a narrow greenish-yellow stripe across eyes; occiput with greenish yellow postocular spots on either side on hind border. Prothorax greenish yellow with dorsum of anterior and poste-
rior lobes black; posterior lobe (Fig. 211) broad, arched back and rounded at middle, posterior border tilted up vertically. Synthorax black on dorsum, which extends up to anterior half of mesepimeron, greenish yellow laterally and ventrally but marked with a black spot at the upper end of lateral suture, dorsum of thorax (Fig. 170) marked with a pair of greenish yellow stripes running very close to mid-dorsal carina on either side and parallel to each other except at their anterior end where they tend to diverge a little from each other, these stripes being broad below and gradually narrowed above extending up to the antealar sinus; mesostigma lamina triangular, simple and depressed at middle. Legs greenish yellow, femora narrowly striped with black on extensor surface. Wings (Fig. 523) hyaline; pterostigma blackish brown with margin narrowly yellow and framed in thick black nerves extending over one and a half cell; R₄₊₅ arising slightly proximal to subnodus and R₃ slightly distal to that level; only 2 postquadrangular antenodal cells in all wings. Abdomen greenish yellow; segments 2-6 marked with black stripes, these on segments 3-6 narrowing to a point at base of segments and again at apical ends before becoming confluent with apical black ring; segments 7 and 8 black except at venter. Anal appendages yellow, as in Figs. 161-162; superiors roughly triangular, one and a half times as long as segment 10, broadened a little at base, then gradually narrowing to a blunt apex; inner margin when viewed from above, with a small black tooth inwardly and downwardly directed at about middle; inferiors nearly one and a half times as long as superiors, broad on basal third, then of uniform width and unguulate, directed backwards and slightly upwards, the apices curved and overlapping. Penis as in Figs. 254-255.

Notes: C. sarbottama sp. nov. is closely allied to C. fraseri Laidwla, but differs from it in the shape of posterior lobe of prothorax, shape of dorsal thoracic markings, situated in close apposition to the mid-dorsal carina and also in the shape of anal appendages, the superiors being armed with only one spine placed on its inner border. The two species also differ in their altitudinal distribution, C. fraseri Laidlaw being distributed at high altitude in and around Shillong in Khasi hills district, C. sarbottama sp. nov. at a much lower altitude at Wageasi in Garo hills district. The specimen was captured in a thick jungle.

Distribution: India: Meghalaya.

Coeliccia vacca Laidlaw

Coeliccia vacca Laidlaw, 1932, Rec. Indian Mus., 34 : 15. Fraser, 1933, Fauna Brit. India, Odon., 1 : 155,
Material studied: 1 ♀, "Type, above Tura, Garo hills, 3,500'-3,900', Assam, S. Kemp, 13.vii.-31.viii.1917, Registration No. 7965/H1" in the National Zoological Collection, Zoological Survey of India, Calcutta.

Measurements (in mm) and Nodal index.

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<tr>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♀ broken (36.0)</td>
<td>missing (25.0)</td>
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</tbody>
</table>

Notes: This interesting species is known only from its "Type", the one cited above, and is an incomplete female with hindwings and abdomen but for basal two segments missing. This species differs at once from all other species of the genus by the unique shape of the posterior lobe of protothorax well illustrated by Laidlaw (1932). Measurements of missing parts have been cited above from Fraser (1933).

Distribution: India: Meghalaya.

Genus Indocnemis Laidlaw


Type-species: *Indocnemis kempii* Laidlaw

Laidlaw (1917b) established the genus with *Indocnemis kempii* sp. nov. which was further elaborated by Fraser (1932, 1933) St. Quentin (1937) and more recently, Lieftinck, (1954).

Diagnostic characters: Large in size (usually with abdomen 49.0-52.0 mm, hindwing 34.0-38.0 mm) ; black, marked with bluish ; posterior lobe of prothorax rounded and simple ; male superior anal appendages digitate, a little longer than segment 10 of abdomen and with spines on inner margin ; inferiors a little longer than superiors, narrowed after the basal third, the apex curled inwards ; terminal fold of penis broad and produced into a pair of moderately long apical flagella. Wings hyaline ; pterostigma a little longer than broad ; usually 18-22 postnodal cross veins in forewing, 17-21 in hindwing ; IR3 arising at the level of sub-nodus, origin of R4+5 a little proximal to that level ; inner margin of the discoidal cell a little longer than the costal margin ; 4 postquadrangular antenodal cells ; Ab arising from inner wing margin well proximal to the point where Ac meets it.

Distribution: India; Nepal; Malaysia.
**Indocnemis kempi** Laidlaw
(Fig. 157-158 and 250-251)


Material studied: 3♂ ♂, Umran, 7.vii.1970, coll SKT

Measurements (in mm) and Nodal index.

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<td>hindwing</td>
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<tr>
<td>♂ ♀ 49.5-50.0</td>
<td>34.0-35.5</td>
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</table>

Notes: The specimens under study vary slightly from the description of the species provided by Laidlaw (1917) and Fraser (1933) in size and in number of postnodal cross veins and markings of synthorax and shape of male anal appendages.

The species, earlier known only from the southern slopes of Khasi hills, has now been discovered from also the northern part of the same hills at a comparatively lower altitude. The specimens were collected beside a torrential stream with mostly rocky bed and scantly vegetation in the surroundings.

Distribution: India: Meghalaya.

Family *COENAGRIONIDAE*

Diagnostic characters: IA and Cu₂ of normal length; medio-anal link almost always well angulated, no accessory cross vein basal to Ac in the cubitoanal space; discoidal cell with costal margin much shorter than inner margin and with the inner distal angle subacute or acute; subdiscoidal cell free from inner wing margin.

Remarks: Tillyard and Fraser (1938-1940) divided the family into 2 subfamilies and Fraser (1957) divided the family into 6 subfamilies. But since the distinguishing characters are either not constant or applicable only to one sex, the division of the family into subfamilies has not been followed in the present work.

Distribution: Cosmopolitan

KEY TO THE GENERA OF THE FAMILY COENAGRIONIDAE

**Male:**

1. Arc situated well distad of the level of the distal antenodal cross vein (Fig. 51)...

   ...
Are situated at or slightly distad of the level of the distal antenodal cross vein (Fig. 33 and 524).

2. Abdomen 25.0 mm or more in length. \( \textit{Argiocnemis} \) Selys
Abdomen 20.0 mm or less in length. \( \textit{Agriocnemis} \) Selys

3. Ab arising from inner wing margin at or slightly proximal to the point where Ac meets it (Fig. 524).

Origin of Ab distinctly proximal to the point where Ac meets it.

4. Pterostigma in hindwing much smaller than in forewing (Fig. 524).

Pterostigma in both wings nearly equal.

5. Frontal ridge present.

Frontal ridge absent.

6. Pterostigma of similar colour in both wings.

Pterostigma differing in colour in fore-and hindwing.

Female:

1. Arc situated well distad of the level of the distal antenodal cross vein.

Arc situated at or slightly distad to the level of the distal antenodal cross vein.

2. Abdomen 28.0 mm or more in length.

Abdomen 25.0 mm or less in length.

3. Anal bridge arising from inner wing margin at or slightly proximal to the point where Ac meets it. Vulver spine present or absent.

Origin of anal bridge distinctly proximal to the point where Ac meets it. Vulver spine present.

4. Pterostigma in hindwing much smaller than in forewing.

Pterostigma in both wings nearly equal.

5. Frontal ridge present.

Frontal ridge absent.

6. Labrum narrowly black at base.

Labrum entirely yellow or green.

Genus \textit{Ceriagrion} Selys

Type-species: *Agrion cerinorubellum* Brauer

Selys (1876) established *Ceriagrion* as a subgenus in his classification and incorporated under it a new species and a few others considered earlier to the genera *Agrion* Fabricius and *Pyrrhosoma* Charpentier. Later, when it was elevated to generic status its concept was greatly elaborated and many species were included under it from different countries by a number of workers. More important of these up to recent times are those by Selys (1883a, 1889, 1891), Kirby, (1890), Ris (1913), Laidlaw (1916b, 1919, 1931), Fraser (1923e, 1933), Lieftinck (1954, 1955a, 1971a), Pinhey (1962) and Asahina (1967a, 1970a). Different species of this genus occurring in Indian region have in recent times been dealt with by Bhasin (1953), Asahina (1965), St. Quentin (1790), Kumar (1972c, 1973a), Sahni (1972), Kumar and Juneja (1976), Mitra (1976), Prasad (1976a), Prasad and Singh (1976), Kumar and Prasad (1977a), Lahiri (1977a, b, 1979) and Prasad and Kumar (1977b).

**Diagnostic characters:** Medium in size (usually with abdomen 23.0-41.0 mm, hindwing 15.0-25.0 mm); yellow, orange, olivaceous or rarely bluish, sometimes partly marked with black or red. Frons with a well-developed ridge; posterior lobe of prothorax generally simple and rounded, sometimes very shallowly tripartite; male anal appendages subequal to or more usually much shorter than segment 10 of abdomen, superiors generally sub triangular, often hooked, inferiors narrowing from base to apex, subequal to superiors; terminal fold of penis generally unbranched, narrowing apically when viewed laterally; females without vulvar spine. Wings hyaline; pterostigma rectangular, usually 9-16 postnodal cross veins in forewing, 8-14 in hindwing; arc situated at or slightly distal to the level of distal antenodal cross vein; IR3 arising at the level of subnodus, origin of R4+5 well proximal to that level; discoidal cell with inner margin about twice as long as costal margin, inner distal angle acute; Ab usually arising from inner wing margin at a point where Ac meets it or occasionally slightly proximal to that point.

**Distribution:** India, Nepal, China; Sri Lanka; Burma; Thailand; Vietnam; Laos; Malaysia; Indonesia; Cambodia; Japan; Pacific islands; Europe; Mauritius; Africa, Madagascar; Seychelles.

**KEY TO THE SPECIES FOR THE GENUS CERIAGRION SELYS (EITHER SEX)**

1. Ab arising a little proximal to Ac; abdomen yellow, changing to black on segments 7-10.

... *fallax* Ris
Ab arising at the point where Ac meets it; abdomen yellow or brown, unmarked with black.

2. Abdomen yellow, 29.0-31.0 mm in length. _Coromandelianum_ (Fabricius)
Abdomen plate brown, 31.0-41.0 mm in length.

..._olivaceum_ Laidlaw

_Ceriagrion coromandelianum_ (Fabricius)
(Figs. 171-172 and 258-259)

_Agrion coromandelianum_ Fabricius, 1798, _Ent. Syst. Suppl._, : 287.


Measurements (in mm) and Nodal index.

<table>
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<tr>
<th>Length of</th>
<th>Pn in</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>29.5-32.0</td>
</tr>
<tr>
<td>♀</td>
<td>29.5</td>
</tr>
</tbody>
</table>

_Notes_ : The available male specimens under study vary from the description of the species provided by Asahina (1967) in having dorsum of segments 8-10 of abdomen darker.

The species is rare in Meghalaya; a few specimens were collected around water bodies having weeds in lower altitude of Garo hills.

_Distribution_ : India: Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala. Maharashtra, Manipur, Meghalaya, Mizoram Orissa, Punjab, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal. Outside India: Nepal; Sri Lanka; ? also China; Burma; Indochina and Thailand [vide Asahina (1967)].

_Ceriagrion fallax_ Ris
(Figs. 173-174, 213-214 and 260-261)

_Ceriagrion fallax_ Ris, 1914, _Ent. Mitteil._, 3 (2) : 47. Fraser, 1933, _Fauna Brit. India, Odon._ 1 : 321.


Measurements (in mm) and Nodal index

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<tr>
<th></th>
<th>abdomen</th>
<th>hindwing</th>
<th>forewing</th>
<th>hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂ ♂</td>
<td>34.0-35.0</td>
<td>20.0-21.0</td>
<td>13-14</td>
<td>11</td>
</tr>
<tr>
<td>♀ ♀</td>
<td>29.0-31.0</td>
<td>21.0-22.5</td>
<td>14</td>
<td>11-12</td>
</tr>
</tbody>
</table>

Notes: Asahina (1967a) in a revision in "A revision of the Asiatic species of Ceriagrion (Odonata : Agrionidae)" considered C. pendleburyi Laidlaw and C. cerinomelas Lieftinck as the subspecies of C. fallax Ris and there provided a key for separating the two subspecies from the nominate subspecies. A look at the key at once reveals that most of the characters used by him are somewhat overlapping e.g., "absence of dark abdominal rings on proximal abdominal 5 segments in C. f. fallax ; abdominal segments 1-6 of C. f. pendleburyi with black end ring (seldom lacking) ; abdomen of C. f cerinomelas without black and ring (seldom exceptions)" Moreover, a careful reading of the original description of the 3 species would lead one to suspect that, the 3 species are conspecific. That this suspicion is not unjustified is revealed from Fraser's (1933) redescription of C. fallax Ris where he considered C. cerinomelas Lieftinck as a synonym of C. fallax Ris. Moreover, the specimens at the disposal of the writer when considered along with the description of the 3 other species lead one to believe that there exists only one species i.e. C. fallax Ris showing variation in important taxonomic characters. Therefore C. cerinomelas Lieftinck and C. pendleburyi Laidlaw have here been treated as a synonyms of C. fallax Ris.

In Meghalaya this species is restricted in Khasi hills around Shillong and Nongpoh, but is unknown at altitude lower than Nongpoh and from the more southern parts of the hills. They are commonly found only in
the few months following the monsoon, around ephemeral water pools formed by rain water, where, many pairs could be seen also in couplula.

*Distribution*: India: Assam, Himachal Pradesh, Meghalaya, Sikkim and Bengal (exact locality unkonwn). Outside India: Nepal; China; Burma; Thailand; Malaysia; Indonesia; Taiwan.

**Ceriagrion olivaceum** Laidlaw

(Figs. 175-176 and 262-263)


*Ceriagrion olivaceum race auranticum* Fraser, 1933, *Fauna Brit. India, Odon.*, 1 : 325.


*Material studied*: 1 ♂, Barapani, 21.vi.1973, coll AKG; 2 ♂♂, Mawsynram, 10.x.1972, coll AKG; 1 ♂, Nongpoh, 15.x.1975, coll SB; 1 ♀, Umroi, 2.xi.1972, coll ARL; 1 ♀, Umtham, 29.xi.1967, coll RKV

Measurements (in mm) and Nodal index

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<th>Length of</th>
<th>Pn in</th>
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<tr>
<td></td>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>35.0-41.0</td>
<td>25.0</td>
</tr>
<tr>
<td>♀ ♀</td>
<td>35.0</td>
<td>22.0</td>
</tr>
</tbody>
</table>

*Notes*: Laidlaw (1914) described *C. olivaceum* from north India, Fraser (1923) described *C. auranticum* from south India. In 1933, Fraser, while redescribing *C. olivaceum* considered his *C. auranticum* as a race of *C. olivaceum* Laidlaw. There he stated that “the general build, the uniform coloration, and anal appendages of the same shape are sufficient justification” for considering *auranticum* as a race of *olivaceum*. Asahina (1967a) divided *olivaceum* into two subspecies viz. *o. olivaceum* and *o. auranticum*. A careful reading through the description of the two species given by Fraser (1933) will lead one to conclude that the two species are conspecific. This idea is further strengthened by the specimens collected at Meghalaya. So, in the fitness of things, *C. olivaceum* and *C. auranticum* are treated as synonyms.

The specimens were collected from hill slopes covered mostly with grasses.
Distribution: India: Assam, Kerala, Manipur, Maharashtra, Meghalaya, Uttar Pradesh, West Bengal. Outside India: Burma; Thailand; Vietnam; Laos; Cambodia; Malaysia.

Genus Pseudagrion Selys


Type-species: Agrion furcigerum Rambur

Selys (1876) established Pseudagrion as a subgenus of Agrion Fabricius and incorporated under it a number of new species. Later Kirby (1890) gave it the generic status. Subsequently it was greatly elaborated and many species were added to it from different countries by a number of authorities. More important of these up to recent times are Laidlaw (1916a, 1919, 1931), Munz (1919), Fraser (1923e, 1931, 1933) Ris and Schmidt (1936, 1938), Lieftinck (1954, 1955a, 1962, 1971a), Pinhey (1962, 1964a) and Watson (1969) Navas (1930), Bhasin (1953), St. Quentin (1970), Kumar (1972c, 1973a), Mitra and Lahiri (1972), Sahni (1972), Kumar and Juneja (1976), Mitra (1976), Prasad and Singh (1976), Kumar and Prasad (1977a), Lahiri and Mitra (1976), Lahiri (1977a) and Prasad and Kumar (1977b) published accounts of different species of the genus occurring in Indian region.

Diagnostic characters: Medium in size (usually with abdomen 23.0-39.0 mm, hindwing 16.0-29.0 mm); bluish, marked with black, green, orange or red, occasionally partly pruinose; postocular coloured spots usually present. Frons without a ridge; posterior lobe of prothorax simple and rounded in males, with a pair of forwardly directed ungulate processes, the 'styles' in females and with inferior lip occasionally visible in the middle in either sex; male superior anal appendages as long as or shorter than segment 10 of abdomen, occasionally notched or provided with hooks or spines; inferiors conical, shorter than the superiors; terminal fold of penis often deeply bifid and usually with a short projection on either side; females without vulvar spine. Wings hyaline; usually 8-17 postnodal cross veins in forewing, 7-14 in hindwing; pterostigma narrow, rectangular; arc situated at the level of the distal antenodal cross vein; IR₃ arising at the level of the subnodus, origin of R₄₊₅ well proximal to that level; discoidal cell with inner margin nearly two to four times as long as the costal margin, the inner distal angle acute, Ab arising from inner wing margin at the point where Ac meets it.
Distribution: India, Nepal; China; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Japan; Taiwan; Philippines; Australia; Pacific islands; Syria, Mauritius; Africa, Madagascar.

KEY TO THE SPECIES OF THE GENUS *PSEUDAGRION* SELYS

*Male:*

1. Face, frons and vertex bright reddish orange or dark ochreus .... ... .

   *rubriceps* rubriceps Selys.

2. Superior anal appendage only about half the length of segment 10 (Figs. 177-178).

   *australasiae* Selys

2. Superior anal appendage nearly as long as segment 10 (Figs. 181-182).

   *spencei* Fraser

(Females of *P. australasiae* Selys and *P. spencei* Fraser were not available in the collection studied and therefore no key to females have been provided).

*Pseudagrion australasiae* Selys

(Figs. 177-178, 217 and 264-265)


*Material studied:* 1 ♂, 7kms south of Wageasi, 7.iv.1973, coll ARL.

*Measurements* (in mm) and *Nodal index*.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Pn in</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂</td>
<td>31.0</td>
</tr>
</tbody>
</table>

*Notes:* The single male studied varies from the description of the species provided by Fraser (1933) in having longer hindwing and in the shape of the anal appendages.

The species is comparatively rare. Only one specimen was collected from a small roadside tank covered with weeds in the Garo hills. It was patrolling rapidly over the surface of the tank and seldom perching for a short while.
**Distribution:** India: Assam, Manipur, Meghalaya, West Bengal. Outside India: Burma; Indonesia; Thailand; Malaysia; Australia.

**Pseudagrion rubriceps rubriceps** Selys
(Figs. 179-180, 216 and 266-267)


Measurements (in mm) and Nodal index.

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<tr>
<td></td>
<td></td>
<td>abdomen</td>
</tr>
<tr>
<td>♂</td>
<td>29.5-31.0</td>
<td>17.0-18.5</td>
</tr>
<tr>
<td>♀</td>
<td>29.0</td>
<td>19.0</td>
</tr>
</tbody>
</table>

**Notes:** Both sexes vary from the description of the species provided by Fraser (1933) in having shorter hindwing besides the following:

**Male:** Abdomen longer; vertex bright orange; fine black lines on synthorax parallel and close to mid-dorsal carinal line sometimes absent; sides of synthorax only with an upper spot on 2nd lateral suture; segment 8 of abdomen on dorsum with a triangular mark on apical third; the figures of the anal appendages.

**Female:** Labrum, clypeus and bases of mandibles orange; antennae blue on basal two segments.

In Meghalaya, the subspecies has been collected from places situated at variable altitudes in Garo hills and Khasi hills. In Ward lake at Shillong, it was commonly found perching on twigs or flying along the edges of water.

**Distribution:** India: Assam, Himachal Pradesh; Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: Nepal; Burma; Indo-China (exact locality unknown) Malaysia; Indonesia; Taiwan; Philippines.
Pseudagrion spencei Fraser  
(Figs. 181-182, 215 and 268-269)


Material studied: 2 $\varnothing\varnothing$, Bangsi, 5.iv.1973, coll ARL ; 6 $\varnothing\varnothing$, Wageasi, 5.8.iv.1973, coll ARL ; 2 $\varnothing\varnothing$, Shillong, 20.xi.1971, coll ARL ; 2 $\varnothing\varnothing$, Ratachara, 26.viii.1974, coll ARL.

Measurements (in mm) and Nodal index.

<table>
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<th>Length of</th>
<th>Pn in</th>
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<tr>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>$\varnothing\varnothing$</td>
<td>24.5-25.5</td>
</tr>
</tbody>
</table>

Notes: In Meghalaya the species was collected at various altitudes but has not been collected from more southern parts of Khasi hills. Usually these are found near small water bodies, occasionally wandering on grassy ground in such surrounding. But, in Jaintia hills specimens were collected beside a river.


Genus *Aciagrion* Selys


Type-species: *Pseudagrion hisopa* Selys.

Selys (1891a) established *Aciagrion* as a subgenus of *Agrion* Fabricius with a new species and 2 other already known ones which were described by Selys (1876) as *Pseudagrion* spp. The generic concept has since then been further elaborated as it was elevated to generic rank and there has been addition of more species to this genus mainly by the contributions of the following authorities: Munz (1919), Laidlaw (1919, 1924a, b), Fraser (1923e, 1933), Lieftinck (1948a, 1954, 1955a, 1971a) and Pinhey (1962, 1972) Bhasin (1953), St. Quentin (1970) and Lahiri (1977a, 1979) dealt with certain species of this genus occurring in Indian region.

Diagnostic characters: Medium in size (usually with abdomen 23.0-35.0 mm, hindwing 15.0-24.0 mm) ; very slender in built ; bluish or reddish, marked with black, sometimes partly pruinose ; postocular coloured...
sports present; posterior lobe of prothorax simple and rounded or shallowly tripartite, with inferior lip generally visible; male superior anal appendages shorter than segment 10 of abdomen, triangular or squarish, occasionally notched at apex; inferiors short or rudimentary, generally shallowly notched and sometimes with a prominent tooth at apex; penis shaft bearing a few spines subapically, the terminal fold broad, sometimes constricted subapically; vulvar spine present in females. Wings hyaline, very narrow; usually with 9-14 postnodal cross veins in forewing, 8-11 in hindwing; arc situated at the level of the distal antenodal cross vein; pterostigma short, rectangular, shorter (about one half) in hindwing than in forewing; 1R₃ arising at the level of the subnodus, origin of R₄₊₅ a little proximal to that level; discoidal cell very narrow, with inner margin twice as long as costal margin; the inner distal angle very acute; Ab arising from the inner wing margin from the point where Ac meets it.

Distribution: India; Nepal; China; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; New Guinea; Japan; Australia; Africa.

KEY TO THE SPECIES OF THE GENUS ACIAGRION SELYS (EITHER SEX)

Ground colour pale brown and without black markings on head and thorax.

.....pallidum Lelys.

Ground colour blue with black markings on head and thorax.

.....tillyardi Laidlaw.

Aciagrion Pallidum Selys
(Figs. 185-186, 228-229 and 272-273)


Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th>Length of</th>
<th>Pn in</th>
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<tbody>
<tr>
<td>abdomen hindwing</td>
<td>forewing hindwing</td>
</tr>
<tr>
<td>♂ ♂ 29.5</td>
<td>17.0</td>
</tr>
<tr>
<td>♀ ♀ 28.0-30.5</td>
<td>19.0-19.5</td>
</tr>
</tbody>
</table>
Notes: Specimens of both sexes examined vary from the description of the species provided by Fraser (1933) in having a fine line at base of anterior lobe and a mid-dorsal black spot on posterior lobe of prothorax; the females also vary in having a black median spot at base of labrum. Further, nearly 50% of the specimens also vary in having postclypeus and frons brown, abdominal segments 9-10 variably marked with black dorsally and the elongated and cone-shaped black mark on segment 2.

In Meghalaya the species is distributed at various altitude in Garo and Khasi hills. It is essentially a species of comparatively drier habitat. In Meghalaya the species has been found in fields covered with dry grasses and also in surroundings simulating dull, brownish ground colour of the body.

Distribution: India: Arunachal Pradesh, Assam, Bihar, Goa, Karnataka, Madhya Pradesh, Maharashtra, Manipur Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: Nepal; Burma.

Aciagrion tillyardi Laidlaw
(Figs. 187-188, 230-231, 274-278 and 524)


Measurements (in mm) and Nodal index.

<table>
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<th>Length of</th>
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<tbody>
<tr>
<td>abdomen hindwing</td>
<td>forewinghindwing</td>
</tr>
<tr>
<td>♂♂ 20.0-25.5</td>
<td>16.5-17.5</td>
</tr>
<tr>
<td>♀♀ 22.0-26.5</td>
<td>16.5-18.0</td>
</tr>
</tbody>
</table>

Notes: The species is fairly well distributed in Meghalaya except Garo hills in various altitude and are commonly found along grassy edges of small streams or even stagnant water bodies.


Genus Enallagma Charpentier


Type-species: Agrion cyathigerum Charpentier

Charpentier (1840) while describing cyathigerum under Agrion Fabricius introduced Enallagma as a subgenus. Selys (1876) apparently accepted Charpentiers' view about Enallagma. Later Kirby (1890) raised it to the generic status. Subsequently through the works of Ris (1908), Laidlaw (1919), Munz (1919), Fraser (1923e, 1933, 1949a), Lieftinck (1955a, 1971a) and Pinhey (1962) the concept of the genus has been broadened and a few more species have been described under the genus. Accounts of some species of this genus occurring in Indian region have been published by Asahina (1965), St. Quentin (1970), Sahni (1972), Bose and Mitra (1975), Lahiri and Mitra (1976), Kumar and Prasad (1977a), Lahiri (1977a) and Prasad and Kumar (1977b) in recent times.

Diagnostic characters: Small in size (usually with abdomen 17.0-20.0 mm, hindwing 11.0-22.0 mm); blue or green, marked with black, sometimes partly pruinose; postocular coloured spots present; posterior lobe of prothorax usually simple and rounded; male anal appendages variable; superiors shorter than segment 10 of abdomen, conical, squarish or curled plate like; inferiors as long as or longer than superiors, usually sloping upwards and narrowed to an acute apex; penis usually with its shaft bearing a few spines subapically, the terminal fold constricted medially and with its apical angles projected a little; vulvar spine present in females. Wings hyaline; usually with 7-15 postnodal cross veins in
forewing, 6-13 in hindwing; arc situated at the level of the distal antenodal cross vein; pterostigma small, rectangular; 1R₃ arising at the level of the subnodus, origin of R₄₊₅ much proximal to that level; discoidal cell with inner margin about twice as long as the costal margin, the inner distal angle acute; Ab arising from inner wing margin well proximal to the point where Ac meets ti.

**Distribution**: Virtually cosmopolitan all over Africa, America, Asia and European countries.

*Enallagma parvum* Selys

*(Figs. 183-184 and 270-271)*


**Material studied**: 1 ♂, Napak beel, 12.iv.1973, coll ARL; 2 ♂♂, 1 ♀, 10 Kms east of Rongram, 23.iv.1973, coll ARL; 3 ♂♂, 1 ♀, Wageasi, 6,8.iv.1973, coll ARL; 1 ♂, Barapani, 6.x.1967, coll RKV

Measurements (in mm) and Nodal index

<table>
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<th>Length of</th>
<th>Pn in</th>
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<tr>
<td></td>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂♂</td>
<td>19.0-20.0</td>
<td>12.0</td>
</tr>
<tr>
<td>♀♀</td>
<td>20.0-20.5</td>
<td>12.5</td>
</tr>
</tbody>
</table>

**Notes**: The specimens examined vary from the description of the species provided by Fraser (1933) in size. The males also vary in shape of the anal appendages. The females vary in having labrum, clypeus and frons reddish and unmarked.

In Meghalaya the species has been collected at various altitude in northern Garo and Khasi hills. They were found commonly wandering in grassy fields close to partly stagnant water bodies.

**Distribution**: India: Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Punjab, Uttar Pradesh, West Bengal. Outside India: Nepal; Sri Lanka; Burma.

*Genus Ischnura* Charpentier

Type-species: *Agrion tuberculatum* Charpentier

Charpentier (1825) described *Agrion Pumilio* as a new species. Later, according to Evans (1845), the species *Pumilio* was named as *Agrion (Ischnura) pumilio* by Charpentier in 1840. Selys (1876, 1883a, 1889) also treated *Ischnura* as a subgenus in his classification and added a few species to it. Later workers like Kirby (1890), Laidlaw (1916b, 1919, 1931), Fraser (1923e, 1933, 1949a), Needham (1930a), Schmidt (1938), Lieftinck (1954, 1955a, 1962, 1971a), Pinhey (1962) and Watson (1969) gave *Ischnura* the generic status, but Kirby (1890) substituted the name *Ischnura* by *Micronympha* because according to him the name *Ischnura* was pre-occupied by *Ischnurus* Koch, 1837, in Arachnida. But all workers subsequent to Kirby retained the name *Ischnura* and here also the name *Ischnura* is kept. In recent times Bhasin (1953), Asahina (1965), St. Quentin (1970), Kumar (1972c, 1973), Bose and Mitra (1976), Mitra (1976), Prasad (1976a), Prasad and Singh (1976), Kumar and Prasad (1977a), Lahiri (1977a, 1979) and Prasad and Kumar (1977a, b) dealt with different species of this genus occurring in Indian region.

**Diagnostic characters:** Small in size (usually with abdomen 20.0-25.0 mm, hindwing 13.0-18.0 mm); yellow, blue, green or reddish, marked with black; postocular coloured spots present; females polychromatic; posterior lobe of protothorax variable, simple and rounded or shallowly tripartite, the mid-lobe sometimes deeply notched; in males segment 10 of abdomen with a pair of dorsal tubercles at apex; male anal appendages very variable; superiors subequal to one fourth the length of segment 10 of abdomen, quadrate or rectangular, sometimes armed with a basal spine; inferiors usually triangular, minute or subequal to segment 10 of abdomen' often forcipate and sloping upwards; penis shaft sometimes bearing a few subapical spines, the terminal fold broad, ending on either side in a pair of unequal flagella; vulvar spine present in females. Wings hyaline; usually with 8-12 postnodal cross veins in forewing, 6-9 in hindwing; arc situated at or slightly distal to the level of distal antenodal cross vein; pterostigma small, rectangular or with inner and distal margins continuous as an arc; in males pterostigma differing in shape and colour in fore- and hindwing, being yellowish, but partly black or reddish in forewing; 1R₃ arising at the level of subnodus, origin of R₄₊₊₊ well proximal to that level; discoidal cell with inner margin twice or a little less than twice the length of costal margin, the inner distal angle acute; Ab arising from inner wing margin well proximal to the point where Ac meets it.

**Distribution:** Cosmopolitan.
KEY TO THE SPECIES OF THE GENUS *ISCHNURA* CHARPENTIER

**Male:**

Ground colour orange red; abdominal segments 8-10 black.  
\[rufostigma\] rufostigma Selys.

Ground colour bright yellow; abdominal segments 7-10 black.  
\[aurora\] aurora (Brauer).

**Female:**

Larger species with abdomen 22.0 mm and hindwing 15.0 mm or more in length; posterior lobe of prothorax simple with its hind margin rounded at middle (Fig. 218).  
\[rufostigma\] rufostigma Selys.

Smaller species with abdomen 20.0 mm and hindwing 4.0 mm or less in length; posterior lobe of prothorax with its hind margin deeply notched at middle (Fig. 219).  
\[aurora\] aurora (Brauer)

*Ischnura aurora aurora* (Brauer)  
(Figs. 189-190, 219 and 278-279)

*Agrion delicatum* Hagen, 1858, *Verh. zool. bot. Ges. Weih.,* 8 : 479  
*Ischnura aurora* (Brauer) : Ris, 1915, *Nova Caledonia, zool.,* 2 : (4) : 67,  

Material studied:  

Measurements (in mm) and Nodal index.

| Length of | Pn in |
|---|---|---|---|
| abdomen | hindwing | forewing | hindwing |
| ♂ ♂ | 23.0-23.5 | 14.0 | 7-8 | 6 |
| ♀ ♀ | 21.0-22.0 | 11.0-12.5 | 6-7 | 5 |
Notes: Specimens examined vary from the description of the species provided by Fraser (1933) in size, nodal index, in having the distal 2 antennal segments black. Further, in males a pair of small, fine projections curled a little upwards on synthorax just proximal to mesostigmal laminae are found.

The subspecies is well distributed in many parts of Meghalaya. They are commonly found in marshy areas flying through grasses and weeds, but in the months following rainy seasons these also spread over grassy fields in the neighbourhood of stagnant waterbodies or slow running streams.

Distributions: India: Andhra Pradesh, Arunachal Pradesh, Assam, Himachal Pradesh, Kerala, Maharashtra, Manipur, Meghalaya, Orissa, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: Nepal; China; Sri Lanka; Malaysia; Indonesia; Australia; New Zealand; Pacific Islands.

Ischnura rufostigma rufostigma Selys
(Figs. 191-192, 218 and 276-277)


Measurements (in mm) and Nodal index.

<table>
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<th>Length of</th>
<th>Pn in</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>23.0-23.5</td>
</tr>
<tr>
<td>♀ ♂</td>
<td>22.0-22.5</td>
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</table>

Notes: Lahiri (1977) being advised by Late Dr. Lieftinck treated I. rufostigma Selys as a polytypic species and also discussed about the distinguishing characters of various subspecies of the same.

The specimens under study vary a little from the description of the nominate species provided by Fraser (1933) in size. The males also vary in having a pair of oblong reddish dorsal spots extending from base nearly
to middle of segment 8 of abdomen. Approximately 50% of specimens also vary in the absence of black mark at base of labrum and at upper part of posterolateral suture of synthorax, in having synthorax brownish in upper half and pterostigma pale brick red. The females vary in having black markings of segment 1 and 2 of abdomen.

The species, occurring only at lower altitude in Meghalaya, has a much more restricted distribution in the state than *I. a. aurora* (Brauer). Also, it has not so far been collected in Khasi hills. The species is usually found swarming in good numbers on and around weedy stagnant and often ephemeral water bodies like the paddy fields.

_Distribution_: India: Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Manipur, Meghalaya, West Bengal. Outside India: ? China (vide Fraser (1933)); Burma.

**Genus Agriocnemis** Selys


_Type-species_: *Agrion rufipes* Rambur*

Selys after having proposed *Agriocnemis* as a new subgenus in his classification in 1869 elaborated the same added with descriptions of a number of species in 1877. Later, its elevation to generic rank and further elaboration of concept along with addition of many more species has been the outcome of contribution of several authorities. More important of these are Selys (1878b, 1889, 1891a), Kirby (1890), Laidlaw (1919, 1931), Munz (1919), Fraser (1923e, 1933), Schmidt (1938), Lieftinck (1948a, 1954, 1955a, 1962, 1971a), Pinhey (1962, 1974) and Watson (1969). Mention can be made of a few more papers dealing with different species of the genus occurring in Indian region by Navas (1930), Bhasin (1953), Kumar (1972c, 1973a), Bose and Mitra (1975), Mitra (1976), Prasad and Singh (1976), Kumar and Prasad (1977a), Lahiri (1977a, b, 1979) and Prasad and Kumar (1977 b).

_Diagnostic characters_: Small in size (usually with abdomen 13.0-20.0 mm, hindwing 9.0-17.0 mm); whitish, bluish or reddish, marked with black, sometimes pruinosed; postocular coloured spots present; females polychromatic; posterior lobe of prothorax usually differing in shape in

* After Kirby (1890), Gloyd (in litt) and Mitra (1893), but as opposed to the citation by Fraser (1949), Lieftinck (1954) and Davies (1981), viz. *Agrion pygmaeum* Rambur.
male and female, tripartite, the mid-lobe being variably produced backwards, subquadrate, triangular or excavated and with or without distinct inferior lip; male anal appendages very variable, superior shorter than, subequal to or longer than segment 10 of abdomen, triangular, rounded, cylindrical or paddle shaped, often armed with basal or apical spines; inferiors shorter or longer than and as variable in shape as superiors; terminal fold of penis ending in a pair of blunt or acuminate short flagella; female without a vulvar spine. Wings hyaline; usually with 4-12 antenodal cross veins in forewing, 3-9 in hindwing; arc situated widely distal to the level of the distal antenodal cross vein; Pterostigma small, rectangular, sometimes differing in male and female, or even in fore- and hindwings of same sex in colour; 1R₃ arising at the level of the subnodus, origin of R₄₊₅ much proximal to that level; discoidal cell with inner margin twice or little less than twice the length of costal margin; Ab arising from inner wing margin much proximal to the point where Ac meets it.

Distribution: India; Nepal; China; Sri Lanka; Nicobar Islands; Burma; Thailand; Malaysia; Indonesia; New Guinea; Ryukyus; Taiwan; Philippines; Australia; Pacific Islands; Mauritius; Africa; Madagascar; Seychelles.

KEY TO THE SPECIES OF THE GENUS AGRIOCNEMIS SELYS

Male:

1. Labrum metallic violet.
   Labrum bluish, yellowish or whitish, non metallic.
   Labrum metallic violet. . . pygmaea (Rambur).
   Labrum bluish, yellowish or whitish, non metallic. . . 2

2. Abdomen whitish, without black dorsal stripe on segments 4-8.
   Abdomen blue with black dorsal stripes on segments 4-8.
   Abdomen whitish, without black dorsal stripe on segments 4-8.
   Abdomen blue with black dorsal stripes on segments 4-8.
   Abdomen whitish, without black dorsal stripe on segments 4-8.
   Abdomen blue with black dorsal stripes on segments 4-8.

Female:

1. Posterior lobe of prothorax very narrow and shallowly tripartite, with mid-lobe and lateral lobes almost equally produced (Fig. 227).
   Posterior lobe of prothorax broad and markedly tripartite, with mid-lobe produced much more than lateral lobes (Fig. 223-225).
   Posterior lobe of prothorax very narrow and shallowly tripartite, with mid-lobe and lateral lobes almost equally produced (Fig. 227).
   Posterior lobe of prothorax broad and markedly tripartite, with mid-lobe produced much more than lateral lobes (Fig. 223-225).

2. Mid-lobe of posterior lobe of prothorax much less broad that lateral lobes (Fig. 223).
   Mid-lobe of posterior lobe of prothorax wider than lateral lobes (Fig. 225).
   Mid-lobe of posterior lobe of prothorax much less broad that lateral lobes (Fig. 223).
   Mid-lobe of posterior lobe of prothorax wider than lateral lobes (Fig. 225).

.... lacteola Selys.
Agriocnemis clauseni Fraser

(Figs. 195-196, 222-223 and 280-281)


Measurements (in mm) and Nodal index.

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<th>Length of</th>
<th>Pn in</th>
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<td></td>
<td>abdomen</td>
<td>hindwing</td>
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<tr>
<td>♂ ♂</td>
<td>20.0-23.5</td>
<td>14.5-15.0</td>
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<tr>
<td>♀ ♂</td>
<td>21.5-25.0</td>
<td>14.0-17.0</td>
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Notes: Available specimens of both sexes vary from the description of the species provided by Fraser (1933) in size and nodal index. The teneral males also vary in having anal appendages variably shedded with black while matured specimens differ from adults in the followings: ground colour of head, thorax and abdomen reddish yellow; thorax and abdominal segments 1-6 unmarked with black except for two upper spots on humeral and lateral sutures.

The species is fairly well distributed in Meghalaya, except in the southern slopes of Khasi hills. It is commonly found near slow running streams or stagnant water bodies, but sometimes also among bushes quite far from such habitat.

Distribution: India: Assam, Meghalaya, Punjdb, Uttarakhand and 'Bengal' (exact locality unknown). Outside India: Burma; Thailand.
Agriocnemis lacteola Selys
(Figs. 193-194, 224-225 and 282-283)


**Measurements (in mm) and Nodal index.**

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<tr>
<td>abdomen</td>
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<tr>
<td>Pn in hindwing</td>
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<tr>
<td>18.0-18.5</td>
<td>10.0</td>
<td>6</td>
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<td>5</td>
</tr>
<tr>
<td>17.5-18.0</td>
<td>11.5-12.0</td>
<td>7</td>
<td></td>
<td>6</td>
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</table>

**Notes:** The specimens examined vary from the description of the species provided by Fraser (1933) in the following points:

**Male:** Pterostigma in teneral specimens unmarked with black; abdominal segment 1 without apical black ring, but the same present on segments 3-6; segment 2 with dorsal stripe not reaching the apex, no apical annules; the stripe on segment 3 not extending subapically on segments 2-5.

In Meghalaya the species is restricted only at lower altitude and has not so far been collected in Garo hills. It is commonly found in grassy lands or paddy fields near river or stagnant water masses, often with *A. pygmaea* (Rambur).

**Distribution:** India: Assam, Bihar, Meghalaya, Sikkim, Tripura, West Bengal and ‘Bengal’ (exact locality unknown).

Agriocnemis pygmaea (Rambur)
(Figs. 197-199, 226-227 and 284-285)


Measurements (in mm) and Nodal index.

<table>
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<tr>
<td>abdomen</td>
<td>hindwing</td>
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<tr>
<td>♂</td>
<td>18.5-20.5</td>
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<tr>
<td>♀</td>
<td>18.0-19.5</td>
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Notes: Specimens studied vary from the description of the species provided by Fraser (1933) and that provided by Pinhey (1974) based on specimens from Shillong in size, nodal index and details of male anal appendages.

The species is commonly found on grassy lands, rarely also inside bushes in the vicinity of slow running streams or even stagnant water bodies.

Distribution: India: virtually cosmopolitan. Outside India: China; Sri Lanka; Buram; Malaysia; Indonesia; New Guinea; Taiwan Philippines; Australia, Pacific Islands; Seychelles.

Genus Argiocnemis Selys


Type-species: Argiocnemis rubescens Selys.

Selys (1877) established this genus along with description of a few new species. The generic concept has since then been further elaborated and there has also been additions of some more species chiefly by Selys (1878b, 1891a), Kirby (1890), Ris (1913), Laidlaw (1919, 1931), Munz (1919), Fraser (1923e, 1933), Schmidt (1938) and Lieftinck (1954).

Diagnostic characters: Medium in size (usually with abdomen 28.0-32.0 mm, hindwing 16.0-20.0 mm); coloured blue, green, yellowish or red, marked with black, sometimes pruinose; postocular colorured spots
present; posterior lobe of prothorax tripartite, with semicircular midlobe and inferior lips visible in female; male superior anal appendages subequal to segment 10 of abdomen, compressed laterally, obtuse and a little forcipate; inferiors about one third the length of superiors, squarish with outer angles acute; terminal fold of penis as in _Agriocnemis_ Selys but more elongate; female without vulver spine. Wings hyaline; usually with 10-13 postnodal cross veins in forewing, 8-10 in hindwing; arc situated widely distal to the level of the distal antenodal cross vein; pterostigma about twice as long as broad, rectangular; 1R₃ arising at the level of the subnodus; origin of R₄₊₅ much proximal to that level; discoidal cell with inner margin twice or a little less than twice as long as the costal margin; Ab arising from inner wing margin well proximal to the point where Ac meets it.

_Distribution:_ India; Burma; Thailand; Malaysia; Indonesia; Australia; Madagascar.

_Argiocnemis obscura_ Laidlaw
(Figs. 200-201, 220-221 and 286-287)

_Argiocnemis obscura_ Laidlaw, 1914, _Rec. Indian Mus._, 8 : 345.


_Measurements (in mm) and Nodal index_

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<td>abdomen</td>
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<tr>
<td>♂ ♂</td>
<td>28.5-29.5</td>
<td>16.5-17.0</td>
</tr>
<tr>
<td>♂ ♀</td>
<td>28.0-31.8</td>
<td>17.0-19.0</td>
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_Description:_ Male: Green, thinly pruinosed on coxae, trochanters, flexor surface of femora, sides of thorax and abdomen and dorsum of first two abdominal segments, marked as follows: labium pale yellowish; labrum, genae, bases of mandibles and clypeus green (in one specimen a fine black line at base of labrum); rest of head on dorsum, including antennae black, with a moderately large bluish postocular spot on either side. Prothorax black, with anterior lobe, lower lateral edges and an oblong lateral spot on middle lobe and lateral edges of posterior lobe greenish; posterior lobe (Fig. 221) of prothorax emerginate and tripartite; lateral lobes narrow, midlobe rather short and extended backward as semicircular
processes, lower lip not visible, the connecting bridge as well as mesostigmatic lamina narrow, the latter sub-rectangular with outer border slightly raised. Synthorax black on dorsum upto 1st lateral suture, marked with narrow antehumeral stripe; a black narrow stripe on posteralateral suture, broadening into a large spot below spiracle (in one specimen shortly broken before that level). Legs with extensor surface of femora broadly and proximal half of flexor surface of tibiae narrowly black; wings hyaline; pterostigma blackish, finely yellow at margin, covering a little more than one cell, inner and distal margins forming a continuous arc, rather narrow, more so in hindwing (slightly more than two times as long as wide in forewing, three times as long, in hindwing. Abdomen marked with black as follows: segment 1 with a complete dorsal stipe, broadening a little at apex and more markedly so at base so as to extend on sides; segment 2 with a mid dorsal stripe which is pointed at base and thereafter broad, but again narrowed subapically; on segments 3 and 4 the dorsal stripe pointing basally and contracted subapically, then again expanding to become confluent with a narrow apical ring; segments 6-7 with dorsal stripes becoming progressively broader, without subapical contraction, but gradually expanding from base to encroach on to sides at apical end; segments 8-10 black but for lateral patches of variable extent on segments 8 and 9 and under surface of segment 10. Anal appendages (Figs. 200-201) black, the inferiors and inner surfaces of the superiors yellowish; superiors subequal to segment 10 of abdomen, thin palate-like when seen from dorsum a little forcipate, outer border convex, inner excavate; when seen from side elongated, subrectangular, outer border obtusely rounded; inferiors less than half the length of superiors, quadrately produced when seen from dorsum, a little upwards, the outer angles produced as two little short spines; seen from side, triangular, the outer spines only visible. Penis as in Figs. 286-287.

Female: Differ from male in the following points: labrum narrowly black at base, and this is expanded into a small median spot. Prothorax with lateral lobes of posterior lobe (Fig. 220) very narrow, the midlobe much larger, produced backwards as suboval process, the inner lip being visible as two small rounded processes on either side of the same. Mesostigmatic laminae with outer border more markedly raised and with an oblique ridge on it; the stripe on postero-lateral suture always broken before the level of spiracle. Flexor surface of tibiae black only on basal third, femora less pruinosed. Pterostigma blackish grey. Segment 7 of abdomen with an additional ventrolateral black stripe falling short of
apex, but confluent with dorsal black stripe at apical end (in one example segments 5 and 6 also with the ventrolateral stripe) ; segments 8-10 completely black. Anal appendages short, conical, black. Vulver scales yellow, just falling short of apex of abdomen.

*Teneral specimens*: Reddish in either sex, with few black markings. The green colour and black markings in such specimens develop first on head and spread gradually thereafter on thorax and then on abdomen.

*Notes*: Lakilaw (1914a) described this species from Upper Burma, but Fraser (1933) considered it synonymous with *A. rubescens* Selys. From the latter species, however, *A. obscura* differs a little in size and markedly so in markings, specially of labrum and abdomen. The species has been redescribed above as per suggestion of Late Dr. Lieftinck, based on specimens under study, in view of existing inadequate description.

This species was collected from some scattered spots in Garo and Khasi hills amongst bushes near small stagnant water bodies.


Suborder ANISOPTERA

*Diagnostic characters*: Head compact, more or less globular; labium with middle lobe usually smaller than lateral lobes and with or without a median fissure; inner margin of eyes never separated by a space greater than their own diameter; male genitalia variable, lamina usually arched, both hamules or only the posterior one well developed; paired superior and single inferior anal appendage present in males, all placed above anal opening; ovipositor variable in female, either fully developed or aborted. Fore- and hindwing dissimilar in venation and outline, anal field of hindwing broader than that of forewing; usually more than 5 antenodal cross veins present in all wings; discoidal cell differentiated into a triangle and a hypertriangle.

*Remarks*: Families belonging to the sugorder Anisoptera were grouped under three superfamilies viz. Aeshnoidea, Cordulegasteroidea and Libelluloidea by Tillyard-Fraser (1938-1940) and Fraser (1957). Out of 8 Anisopteran families mentioned by Fraser (1957), the families Gomphidae, Aeshnidae, Cordulegas-teridae, Corduliidae and Libellulidae have been considered here because representatives of those five families have been found in the area of study. Of these, the families Gomphidae and Aeshnidae belong to the superfamily Aeshnoidea, the family Cordulegasteriade to superfamily Cordulegasteroidea and the families Cordullidae
and Libellulidae to the superfamily Libelluloidea. Fraser (1957) pointed out that consideration of only the adult characters may lead to confusion about the taxonomic status of the three superfamilies and for that reason, he laid emphasis on nymphal characters. That Fraser (1957) was correct, can be substantiated when one looks into some important taxonomic characters in adults, e.g. distance between the eyes on vertex and the presence or absence of ovipositor. However, the three superfamilies also overlap in respect of some important taxonomic characters in nymphs, e.g. flattened or deeply cupped labial mask with or without setae on the lateral lobes and presence of single robust or numerous small teeth on the folds of the gizzard. Therefore, consideration of nymphal characters alone also leads one to confusion regarding the taxonomic status of the three superfamilies. It is possibly for this reason that neither Tillyard-Fraser (1938-1940), nor Fraser (1957) provided a complete key for all the three superfamilies of the suborder Anisoptera. So, here an attempt has been made to provide a key to the three superfamilies taking both nymphs and adults into consideration. The nymphal characters have been taken from Fraser (1957).

**Distribution**: Cosmopolitan.

**KEY TO THE SUPERFAMILIES OF THE SUBORDER ANISOPTERA**

1. Labial mask of nymphs of primitive zygopterous type, flattened and without setae; lateral lobes narrow, with a long robust movable hook; gizzard with 4-8 folds, each with numerous small teeth. **Aeshnoidea.**

   Labial mask of nymph broad and deeply concave or cupped and with numerous setae; lateral lobes broad, their apposed borders being more or less deeply incised, crenate or serrate and often bordered with tuft of setae; gizzard with 4 folds, each with a robust tooth. **2.**

2. Adults with costal and subcostal cross veins not coinciding (Fig. 532); inner margin of eyes in adults very slightly separated or meeting only at a point (Figs. 10-11); adult males with anterior and posterior hamules of genitalia well developed (Fig. 26) and females without ovipositor (Fig. 24) or only with pseudovipositor (Fig. 25). **Cordulegasteroidea**

   Adults with costal and subcostal antenodal cross veins coinciding (Fig. 533-539); inner margin of eyes in adults broadly contiguous (Fig. 12), adult males with obsolete anterior hamules of genitalia (Figs. 376, 379, 385-386 and 387-417) and females with ovipositor usually inconspicuous (Figs., 418-441). **Libelluloidea**

   **Superfamily Aeshnoidea**

   **Diagnostic characters**: Head nearly globular; inner margins of eyes contiguous or well separated; vesicle not well differentiated; occuput
large or small, trapezoidal or triangular; male genitalia with well-developed hamules; ovipositor present or absent. Costal and subcostal antenodal cross veins not coinciding; two primary antenodal cross veins usually well developed.

_Nymphs_: [After Fraser (1957)] Labial mask of primitive Zygopterous type, flattened and without setae; lateral lobes narrow, with a long robust movable hook and without setae.

_Distribution_: Cosmopolitan.

**KEY TO THE FAMILIES OF THE SUPERFAMILY AESHNOIDEA**

- Inner margins of eyes well separated; occipital plate large and trapezoidal (Fig. 9); female without ovipositor (Figs. 332-341). _Gomphidae_.
- Inner margins of eyes broadly contiguous on vertex; occipital plate small and triangular; female with well-developed ovipositor (Figs. 21-23) and 445-446). _Aeshnidae_.

**Family GOMPHIDAE**

_Department characters_: Head subglobular; labium with middle lobe lacking median incision, broader than lateral lobes; inner margins of eyes well separated; occiput large, transversely elongate and trapezoidal; male genitalia not covered by 2nd abdominal tergite; ovipositor absent; vulvar scale usually present. Subtrigone well differentiated, it and hypertrigone entire or traversed by cross veins; discoidal cell entire or traversed by cross veins, similar or dissimilar in shape in foreand hindwings; usually 1-4 cross veins in cubital space and 2-8 cross veins between Rs and MA in hindwing; forking of Rs symmetrical or asymmetrical; median space entire; anal loop rudimentary or absent.

_Distribution_: Cosmopolitan.

**Subfamily GOMPHINAE**

_Department characters_: Hypertirgone and subtrigone entire; discoidal cell not markedly elongated lengthwise, this being different in shape in fore- and hindwings and usually entire or sometimes traversed by cross veins; no prominent supplementary vein running from the distal margin of discoidal cell.

_Remarks_: Lieftinck (1964) considered Epigomphinae and Gomphiinae as synonymous because the characters like number of cross veins between Rs and MA in hindwing and nature of forking of Rs appear overlapping. Here the subfamily Gomphiinae has been used sensu Lieftinck (1964).
**Distribution**: Cosmopolitan.

**KEY TO THE GENERA OF THE SUBFAMILY GOMPHINAE**

1. Discoidal field in hindwing with 4 rows of cells a little proximal to the level of nodus (Fig. 520).

   2. Discoidal field in hindwing with less than 4 rows of cells proximal to the level of nodus (Fig. 525-527 and 529-530).

2. Two cubital cross veins present in hindwing; discoidal cell frequently traversed by a cross vein (Fig. 528). *Perissogomphus* Laidlaw.

   Only one cubital cross vein present in hindwing; discoidal cell always entire. *Gomphus* Leach.

3. Hind femora with 6-10 evenly spaced long robust spines in addition to closely set small spines.

   4. Hind femora with only closely set small spines.

4. Inner margin of subtrigone extending over 3 cells of adjacent anal field in hindwing. Vulvar scale extending over at most the basal third of segment 9 (Fig. 334).

   5. Inner margin of subtrigone extending over 2 cells of adjacent anal field in hindwing. Vulvar scale extending over the basal half of segment 9 (Fig. 339).

   Anisogomphus* Selys

5. Hypertrigone distinctly shorter than the space between nodus and origin of IR₃ in hindwing (Fig. 525-526).

   6. Hypertrigone as long as or longer than the space between nodus and origin IR₃ in hindwing (Figs. 527 and 530).

6. Discoidal field beginning with a row of 2 cells in hindwing (Fig. 526). Male inferior anal appendage subequal to superiors, its branches parallel or weakly divergent and usually armed with tooth (Figs. 310-313). *Onychogomphus* Selys.

   Discoidal field beginning with a row of 3 cells in hindwing (Fig. 525). Male inferior anal appendage about half the length of superiors, its branches strongly divergent and never armed with tooth (Figs. 308-309). *Nihonogomphus* Oguma.

7. Distal primary antenodal cross vein in hindwing equidistant from nodus and basal primary antenodal cross vein (Fig. 530). Male superior anal appendages forcipate at base (Fig. 304-305).

   Stylagomphus* Fraser.

   Distal primary antenodal cross vein situated much nearer to basal primary antenodal cross vein than nodus (Fig. 527). Male superior anal appendages not forcipate (Figs. 300-303 and 331).

7. Distal primary antenodal cross vein in hindwing equidistant from nodus and basal primary antenodal cross vein (Fig. 530). Male superior anal appendages forcipate at base (Fig. 304-305).

   Stylagomphus* Fraser.

   Distal primary antenodal cross vein situated much nearer to basal primary antenodal cross vein than nodus (Fig. 527). Male superior anal appendages not forcipate (Figs. 300-303 and 331).

8. 4th cell of anal field adjacent to subtrigone extending upto base of subtrigone in hindwing (Fig. 527). Male superior anal appendages much longer than segment 10 of abdomen, closely apposed and curled downward at apex (Figs. 300-303).

   Paragomphus* Cowley.

3rd cell of anal field adjacent to subtrigone extending upto base of subtrigone in hindwing. Male superior anal appendage sub-equal to segment 10 of abdomen and shaper not as above (Fig. 331).

Birmagomphus* Williamson.
Genus Anisogomphus Selys


Type-species: Gomphus occipitalis Selys.

Selys (1857) established Anisogomphus as a ‘group’ within the genus Gomphus Leach and incorporated 2 species under this group. Later Anisogomphus was elevated to generic rank by Kirby (1890). Its concept further elaborated through contributions specially by Williamson (1907), Laidlaw (1922a), Fraser (1923a, 1926b, 1940), Lieftinck (1949b), Chao (1954) and Asahina (1965). In recent times St. Quentin (1970), Kumar (1972c, 1973b) and Sahni (1972) published accounts of different species of this genus occurring in Indian region.

Remarks: Laidlaw (1922a) erected the genus Temnogomphus with Anisogomphus bivittatus (Selys) as type-species and distinguished his new genus from Anisogomphus Selys by the presence of an incomplete basal antenodal cross vein in all wings. Fraser (1934) pointed out that, the character used by Laidlaw for seperating Temnogomphus from Anisogomphus was a highly variable one and therefore considered Temnogomphus Laidlaw and Anisogomphus Selys congeneric. But Fraser (1953a) again while reviving Temnogomphus for Laidlaw’s type-species and A. orites Laidlaw stated that Temnogomphus differed from Anisogomphus in having only one cubital cross vein in contrast to 2 such in Anisogomphus Selys.

It is interesting to note that, in the same work (p. 190), Fraser pointed out the variation in the number of cubital cross vein even in one female examined by him for each of A. orites Laidlaw and A. caudalis Fraser, but considered such variation as aberration.

In the specimens of A. caudalis Fraser under study it is found that basal incomplete antenodal cross vein may or may not be present and cubital cross vein may or may not be duplicated. Thus it is observed that, the characters used for separation of the two genera are highly variable. Therefore, Fraser’s (1934) openion regarding the status of Temnogomphus is upheld in this work.

Diagnostic characters: Medium to large in size (usually abdomen 31.0-52.0 mm, hindwing 30.0-36.0 mm) ; black marked with yellow ; hind femora armed with evenly spaced much larger spines on distal half of
males and 8-10 pair on distal two third of females; male anal appendages shorter than segment 10 of abdomen; superiors more or less narrowing towards apex, parallel or a little diverticate and armed with ventral protuberence near base; inferior very deeply and broadly bifid, the two branches widely diverging and upturned at apex; male genitalia with lamina deeply and broadly arched, slightly emerginate; hamules variable, anteriors short and slender, posteriors much larger and robust; vesicle large; 2nd segment of penis with large lateral folds, occasionally spon-like in profile, the median lobes sometimes terminating in a pair of small flagella; vulvar scale short, triangular, cleft for about one third its length at apex and extending at most upto basal one third of segment 9 of abdomen. Wings with tornus rounded in both sexes or slightly angulated in males; usually 13-20 antenodal and 9-15 postnodal cross veins present; 1st and any one of 6th, 7th and 8th cross veins form primary antenodals; basal incomplete antenodal cross vein present, or absent; pterostigma elongated, about 4-5 times as long as broad; a little swollen medially, braced; discoidal cells entire, situated at a point which is about one cell distal to the level of arc; the same in forewing with costal margin subequal to basal margin and three fourth as long as distal margin, in hindwing with costal margin about one and one third as long as basal margin and slightly shorter than distal margin; hypertrigone shorter than the space between nodus and origin of 1R3 in hindwing; subtrigone covering parts of 3 cells of adjacent anal field at its inner side in hindwing; 3rd cell of adjacent anal field from wing base extending to base of subtrigone in hindwing; discoidal field beginning with a row of 2 cells and not widening upto 4 rows of cells proximal to the level of nodus in hindwing; arc situated between the 2nd and 3rd or at the level of 3rd antenodal cross vein; anal triangle 3 celled; anal loop absent; 1 or 2 cubital cross veins in forewing, 1 in hindwing besides the one forming base of subtrigone; 1A pectinate in forewing; 1 or 2 rows of postanal cells in forewing and 4 rows in hindwing; 2-4 cross veins between sectors of arc in forewing, 1 or 2 in hindwing between arc and the point of bifurcation of Rs.

**Distribution**: India; Nepal; China.

*Anisogomphus caudalis* Fraser

(*Figs. 15, 327-329, 334 and 368-369*)


**Material studied**: 1 ♂, 1 ♀, Old Barapani roadside, 6.vi.1973, coll ARL; 1 ♀, Shillong, 26.iv.1973, coll RZ.
Measurements (in mm) and Nodal index

<table>
<thead>
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<th>Hindwing</th>
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<td>18-20</td>
<td>11-12</td>
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<tr>
<td><strong>♀</strong> 34.5-35.5</td>
<td>17-18</td>
<td>13-15</td>
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</table>

**Description**: Female: Closely similar to male in colouration and markings but differing as follows: Labium with middle lobe almost entirely black; labrum black, with a pair of large suboval and subbasal greenish yellow spots; postclypeus black; posterior margin of occiput slightly emerginate. Prothorax with additional greenish yellow markings on anterior middle and posterior lobes. Wings palely enfumed with brown up to arc; 1st and 6th or 7th of the antenodals in forewing primary; 1 cubital and 1 incomplete antenodal cross vein in either wing. Abdomen: segment 2 with a mid-dorsal stripe which slightly narrowing towards apex and a complete moderately broad stripe on either side; segments 7 and 8 with or without any trace of subapical lateral spot; segment 8 with mid-dorsal carinal stripe extending more than half way from base; segment 9 with a small rounded subapical spot. Anal appendages greenish yellow; vulvar scale (Figs. 334) black.

**Notes**: The hitherto undescribed female has been described above.

The single male under study varies from the description of the species provided by Fraser (1934) in the following: (1) middle lobe of labium greenish yellow on basal half; (ii) postclypeus with an additional median greenish yellow spot; (iii) absence of basal incomplete cross vein; (iv) 2 and 1 cubital cross vein in fore-and hindwing respectively; (v) segment 8 of abdomen unmarked on dorsum.

So far known, the species is restricted to central Khasi hills in Meghalaya. A pair collected at Old Barapna road side was noticed to settle over a patch of thorny bushe near a rolling stream.

**Distribution**: India: Meghalaya, Uttar Pradesh.

**Genus Burmagomphus** Williamson

Type-species: *Burmagomphus arboreus* Lieftinck

Williamson (1907) established this genus for 3 males which were then considered as males of *Gomphus vermiculatus* Martin. Subsequently the generic concept was further elaborated when the type-species was renamed and there was addition of a number of species. This was due to the contributions chiefly of Laidlaw (1922a, 1930), Fraser (1923a, c, 1924b, 1926c, 1931, 1933d, 1934, 1940), Lieftinck (1940 b, 1953a, 1954) and Chao (1955). A few Indian species have recently been dealt with by Kumar (1972c, 1973b).

**Diagnostic characters:** Medium in size (usually abdomen 25.0-35.0 mm, hindwing 21.0-31.0 mm); black, marked with yellow; hind femora armed only with closely set small spines; male anal appendages subequal to segment 10 of abdomen; superiors parallel or divergent, tapered to apex, sometimes twisted, 1-2 angulations on outer surface; branches of the inferior broadly triangular; male genitalia with lamina arched and depressed; anterior hamules short, slim and curved; posteriors very large, broad, flattened, armed with forwardly directed spines on outer border and sometimes long hairs distally; vesicle long, tumid, rounded and shallowly grooved in front; 2nd segment of penis with its median lobe extended into a very long, whip like flagella; vulver scale triangular, bifid, sometimes ending in two long narrow processes extending at least upto basal two third the length of segment 9 of abdomen. Wings with tornus angulated in males, rounded in females; usually 8-16 antenodal and 6-13 postnodal cross veins; the 1st and either 4th or 5th antenodals form primary; basal incomplete antenodal cross vein usually absent; pterostigma elongated; about 3-5 times as long as broad, slightly swollen medially, braced; discoidal cells entire; situated at a point which is one cell distal to the level of arc; the same in forweing with costal margin subequal to basal margin and three fourth the length of distal margin, in hindwing with the costal margin subequal to distal margin and nearly twice the length of basal margin; hypertrigone as long as or longer than the space between nodus and origin of 1R₃ in hindwing; subtrigone covering parts of 2 cells of adjacent anal at its inner side in hindwing; 3rd cell of adjacent anal field from wing base extending to base of subtrigone in hindwing; discoidal field not widening upto 4 rows of cells proximal. to level of nodus in hindwing; arc situated between the first and 2nd or at the level of 2nd antenodal cross vein; distal primary antenodal cross vein situated at a point which is distinctly nearer to basal primary antenodal corss vein than nodus; anal tri-

* = B. williamsoni Fraser (nom. praecoc.) vide Lieftinck (1940, 1954)
angle 3 celled; anal loop absent; only 1 cubital cross vein in all wings, besides the one forming base of subtrigone; IA pectinate in forewing; upto 3 rows of postnodal cells in forewing and 4 rows in hindwing; 2 traversing cross veins between sectors of arc in forewing, only 1 in hindwing between arc and the point of bifurcation of Rs.

Distribution: India; China; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia.

Burmagomphus ? vermicularis (Martin)
(Figs. 330-331, 338 and 370-371)


Material studied 2 ♂ ♂, Ranikor, 10.xii.1977, coll ARL; 1 ♂, Sumer, 21.iv.1973, coll RSP; 3 exs, Umran (1 ♂, 1 ♂, 18.v.1967, coll RKV; 1 ♂, 13.v.1972, coll ARL.

Measurements (in mm) and Nodal index.

<table>
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<th>Length of</th>
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<th>Hindwing</th>
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<tr>
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<td>13-14</td>
</tr>
<tr>
<td>♀ 34.5-37.0</td>
<td>29.0-30.0</td>
<td>11-14</td>
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Description: Male: Labium greenish yellow, apical half of middle lobe and tips of lateral labes blackish brown; base of mandibles greenish yellow; rest of head blackish brown but marked with greenish yellow as follows: a subrectangular spot on either side of base of labrum, narrow basal line on anteclypeus, a small rounded spot on outer corner of postclypeus, a narrow hand near base of frons. A strong ridge connecting lateral ocelli. Prothorax blackish brown, the sides as well as anterior and posterior lobes narrowly greenish yellow. Synthorax blackish brown on dorsum and sides upto humeral suture, marked with greenish yellow as follows: a complete mesothoracic collar, a small spot on the alar sinus, an oblique stripe beginning close to mid-dorsal carina and alar sinus and running outwards and downwards up the 2nd pairs of legs, the stripe being broad at middle and narrow basad and distad; an upper rounded humeral spot close to alar sinus; greenish yellow on sides and beneath, marked with a complete blackish brown stripe on posterolateral suture and another stripe broadly interrupted at middle on anterolateral suture. Legs brownish, femora paler at middle, all coxae greenish yellow outwardly.

Wings
hyaline, membrane whitish, pterostigma whitish within thick yellow nerves, covering 3½-4 cells in forewing and 4½-5 cells in hindwing; cells beneath pterostigma narrowly opaque yellowish along the length of pterostigma; 1st and 5th antenodals in all wings primary. All veins, specially those of anal field bearing minute spicules. Abdomen blackish brown marked with greenish yellow as follows: dorsum of segment 1 at apex besides sides and ventre; broad basal annule confluent narrowly along ventrolateral border with a larger lateral apical spot on segment 2; broad basal annules expanded to a small basolateral triangular spot on each of segments 2-7; large dorsal apical spot on segment 9; remaining segments unmarked. Anal appendages (Fig. 331) greenish yellow, superiors blackish at base; superiors broad on basal half, outer margin elbowed at this point and then tapering to a fine point at apex, with a small tooth a little after the elbow; inferior with branches sharply upturned into a small black tooth at apex. Genitalia blackish brown, as in Fig. 330; anterior hamules small stilet-like processes, posterior hamules long and curved with forwardly directed spine on outer corner; lobe deeply notched. Penis as in Fig. 370-371.

Female: almost similar to males in colouration and marking but differing as follows: The ridge between lateral ocelli stronger. Apical annule of segment 1 broader, basal annule of segment 2 more broadly confluent laterally with lateral apical spot; basal annules not expanded as basolateral triangular spots on segments 4-7; narrowly interrupted on mid-dorsum of segment 6 and also on apical half of segment 7; segments 4 and 5 with elongated lateral spots between basal annules and apex; segment 8 with the apical spot interrupted on mid-dorsum. Anal appendages blackish brown; vluver scale (Fig. 338) triangular and deeply bifid.

In Ranikor specimens ground colour black, markings green, and lateral spot on segments 4 and 5 of abdomen absent.

Notes: The specimens under study come very near to *B. vermicularis* (Martin) in respect of male anal appendages; but they differ from the same in size, detail shape of the male genitalia and in the absence of median spine on hind border of segment 9 of abdomen. In view of these rather marked differences this species has been treated here as *vermicularis* (Martin) with doubt. Late Dr. Lieftinck when requested for opinion on the identity of the species considered the females as conspecific with *B. vermicualris* (Martin), but the males as doubtful.
This species appears to be restricted only in the southern parts of Khasi hills in Meghalaya. The specimens were collected near a stream in a comparatively open habitat.

**Distribution**: India: Meghalaya.

**Genus Gomphus Leach**


Type-species: *Libellula vulgatissima* Linnaeus

Corbet et. al (1960) stated that Leach 'separated Gomphus. ...from Libellula. Leach's formal and very brief account was later elucidated by Selys (1840, 1850, 1854b, 1858, 1878c and 1883a,), Rambur (1842) and Hagen (1861) when a number of new species were transferred from different genera. In the present century important contributions on this genus are chiefly those of Williamson (1907), Laidlaw (1922a, 1930), Fraser (1923a, c, 1925c, 1934, 1940) Asahina (1949, 1951, 1956b) and Chao (1953).

**Diagnostic characters**: Large in size (usually abdomen 26.0-53.0 mm, hindwing 26.0-42.0 mm); black, brown or maroon, marked with yellow or green; hind femora armed only with closely set small spines; male anal appendages subequal to or slightly longer than segment 10 of abdomen, superiors divergent, gradually narrowed from base to apex, the apex sometimes notched; inferior cleft nearly to base, each branch similar to superiors, but broader and upturned at apex; male genitalia with lamina arched and slightly emerginate; anterior hamules slim, narrowed to apex; posteriors very large with pointed apex and recurved basad; vesicle large, long and flask shaped with outer border slightly notched medially; 2nd segment of penis with moderately long and closely apposed median lobes; vulvar scale variable, rudimentary or broadly triangular and bifid at apex and then extending up to basal half or more than basal half of segment 9 of abdomen. Wings with tornus angulated in males, rounded in females; usually 10-20 antenodal cross veins in forewing, 8-11 in hindwing and 7-15 postnodal cross veins in either wing; basal incomplete antenodal cross vein present or absent; the 1st and any one of 4th to 7th cross veins form primary antenodals; pterostigma elongated, about 4 times as long as broad, slightly swollen medially, sometimes braced; discoidal cells entire, situated at a point which is about one cell distal to the level of arc; the same with costal margin shorter than distal margin and about one and one
fourth as long as the basal margin in forewing, nearly one and a half time as long as the basal margin in hindwing; hypertrigone subequal to the space between nodus and the point of origin of 1R3 in hindwing; subtrigone covering parts of 2 cells of adjacent anal field at its inner side in hindwing; 3rd cell of adjacent anal field from wing base extending to base of subtrigone in hindwing; discoidal field widening upto 4 rows of cells a little proximal to the level of nodus in hindwing; arc situated between the 1st and 2nd or at the level of 2nd antenodal cross vein; anal triangle 3-5 celled; anal loop absent; only 1 cubital cross vein besides the one forming the base of subtrigone; IA pectinate in forewing; upto 3 rows of post-anal cells in forewing and 5 rows in hindwing; 1-3 cross veins between sectors of arc in forewing, 1 or 2 in hindwing, between arc and the point bifurcation of Rs.

_Distribution_: Virtually cosmopolitan in north America, Europe and Asian Countries.

**Gomphus personatus** Selys

(Figs. 324-326, 341 and 366-367)


Measurements (in mm) and Nodal index.

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<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tr>
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</tr>
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<td>37.0-38.0</td>
<td>14-15</td>
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<tr>
<td>♀</td>
<td>45.0-45.5</td>
<td>37.5-40.0</td>
<td>14-20</td>
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_Notes_: The specimens under study vary from the description of the species provided by Fraser (1934) in the following: (i) postclypeus unmarked in males, in 50% of females with a lateral yellow spot; (ii) synthorax: only humeral upper spot present; (iii) segment 3 of abdomen with a basolateral spot on either side; (iv) hind margin of occiput of 25% of females armed with 2 or 3 spines on either side; (v) vulver scale bifid only on apical fourth.
In Meghalaya, the species is restricted only to central Khasi hills. They are commonly found near montane streams, but occasionally far away from aquatic habitat, patrolling rapidly some distance along the streams or footpaths.

**Distribution:** India: Meghalaya. Outside India: Bhutan; Burma

Genus *Merogomphus* Martin


*Platygomphus* Fraser, 1922, *Mem. Dept. Agric. India (Ent)*., 7: 68.

Type species: *Merogomphus paviai* Martin.

Martin (1904) established this genus along with description of its type. Since then, its generic concept has further been enlightened and there has also been addition of some more species as a result of contributions chiefly of Asahina (1968), Fraser (1934, 1940, 1953), Laidlaw (1930) and Lieftinck (1954).

**Diagnostic characters:** Medium in size (usually abdomen 27.0-48.0 mm, hindwing 22.0-30.0 mm); black, marked with greenish yellow; hind femora armed with 5 or 6 pairs of very large and evenly spaced spines in addition to closely set small spines; the large spines spaced over the distal half of hind femora in males, but almost over the entire hind femora in females; male superior anal appendages subequal to or shorter than segment 10 of abdomen, divergent, sometimes curled at apex, tapering from base and with or without a basal spine; inferior shorter than superiors, deeply and broadly cleft into widely diverticate branches; male genitalia variable, lamina arched, depressed or emerginate; anterior hamules directed backwards slender, narrow and curved, sometimes aborted; posteriors robust, sometimes with a mid-rib and ending in a recurved spine; vesicle shaped like a spout, prominent, emerginate and sometimes cleft; 2nd segment of penis with median lobes closely apposed and sometimes bearing a small lateral flagella on either side; vulvar scale broadly triangular and very slightly bifid at apex. and extending up to basal half of segment 9 of abdomen. Wings with tornus angulated in males, rounded in females; usually 14-21 antenodal cross veins in forewing, 9-14 in hindwing and 9-15 postnodal cross veins in either wing; the 1st and one of 5th-8th cross veins form primary antenodals; basal incomplete antenodal cross
vein usually present; pterostigma elongated, about 4-6 times as long as broad, braced; discoidal cells entire, situated at a point one and a half cell distal to the level of arc; the same in forewing with costal margin subequal to basal margin and a little shorter than the distal margin, in hindwing about twice the length of basal margin and nearly as long as the distal margin; hypertrigone as long as or longer than the space between nodus and the point of origin of IR_{9} in hindwing; subtrigone covering parts of 2 cells of adjacent anal field at its inner side in hindwing; 3rd cell of adjacent anal field from wing base extending to base of subtrigone in hindwing; hypertrigone not widening to 4 rows of cells proximal to level of nodus in hindwing; arc situated at the level of 2nd or between the 2nd and 3rd antenodal cross veins; anal triangle 3 celled; anal loop absent; only 1 cubital cross vein in all wings besides the one forming base of subtrigone; IA pectinate in forewing; upto 3 rows of postanal cells in forewing, upto 4 rows in hindwing; 3 or 4 traversing cross veins between sectors of arc in forewing, only 1 in hindwing, between arc and the point of bifurcation of Rs.

**Distribution**: India; Nepal; China; Burma; Indo-china (exact locality unknown); Malaysia; Indonesia; Taiwan.

**Merogomphus martini** (Fraser)

(Figs. 314-315, 321, 339 and 364-365)

*Platygomphus martini* Fraser, 1922, *Mem. Dept. Agric. India (Ent.)*, 7 : 68.


**Measurements** (in mm) and Nodal index.

<table>
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<tr>
<th></th>
<th>Forewing</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
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<td>25.5-36.0</td>
<td>25.0-30.0</td>
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<tr>
<td>♀ ♀</td>
<td>36.0-37.0</td>
<td>30.0-31.0</td>
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</table>
Notes: The specimens under study vary from the description of the species provided by Fraser (1934) in size, nodal index and in the following (i) base of labium narrowly greenish yellow and so also outer edges of labrum; (ii) middle lobe of prothorax bearing additional ventrolateral and dorsal geminate greenish yellow spots; (iii) segment 2 of abdomen in male with mid-dorsal stripe not trilobed, greenish yellow basal annule on segment 4 and mid-dorsal carina of same colour on segment 8; (iv) in female segments 4-6 with greenish yellow basolateral triangular spots; (v) 8-10 spines on hind margin of occiput and the frequent presence of an incomplete cross vein in all wings in female.

In Meghalaya, the species has a restricted distribution in central Khasi and Jaintia hills. In Jaintia hills, the species was collected from shrubby bushes overhanging the bank of a permanent but rather small lake at Thadlaskein. Apparently the species formed a colony there, using the lake for breeding purposes. In Khasi hills, however, the species has been, collected in deep jungles near streams.

Distribution: India: Meghalaya.

Genus Nihonogomphus Oguma


Type-species: *Nihonogomphus viridia* Oguma

Oguma (1926) established this genus along with the description of the type species. Late Dr. Lieftinck (in litt.) opined that a few Burmese *Onychogomphus* spp., e.g. *O. circularis* Selys, *O. annularis* Selys and *O. pulcherrimus* Fraser also belong to this genus.

Diagnostic characters: Medium in size (usually abdomen 33.0-43.0 mm, hindwing 28.0-38.0 mm); black or brown, marked with yellow, green or orchebrus; femora armed with closely set small spines; male superior anal appendages 2-3 times as long as segment 10 of abdomen, variably forcipate as seen from dorsum, tapering or compressed apically, apex variably curved downwards; inferior about one half the length of superiors, deeply bifid with dorsally recurved and strongly diverging branches; male genitalia with slightly projecting lamina, concave at its free border; hamules moderately broad with pointed recurved apex; vesicle large and deeply notched; 2nd segment of penis with median and lateral lobes well developed, the later narrowed apically; vulvar scale short, falling well short of segment 9, triangular, broadly and shallowly bifid at apex. Wings with
tornus angulated in males, rounded in females; usually 12-16 antenodal and 9-14 postnodal cross veins; 1st and 5th veins form primary antenodals; basal incomplete antenodal cross vein absent; pterostigma about 4 times as long as broad, a little swollen medially, braced; discoidal cells entire, situated at a point which is about one cells distal to the level of arc; the same with its margins subequal in forewing, the basal a little shorter than the rest in hindwing; hypertrigone shorter than the space between nodus and origin of 1R₃ in hindwing; subtrigone covering parts of 2 or 3 cells of adjacent anal area at its inner side in hindwing; 3rd or 4th cell of adjacent anal area extending to base of subtrigone in hindwing; discoidal field beginning with a row of 3 cells and not widening up to 4 rows of cells proximal to the level of nodus in hindwing; anal triangle 4 celled; anal loop rudimentary; usually 1, (sometimes 2 in hindwing) cubital cross veins besides the one forming the base of subtrigone; IA pectinate in forewing; up to 3 rows of postanal cells in forewing, up to 4 rows in hindwing; usually 3 traversing cross veins between sectors of arc between arc and the point of bifurcation of Rs.

**Distribution**: India; Burma; Japan.

**Nihonogomphus indicus** sp. nov.
(Figs. 1, 9, 308-309, 316, 337, 358-359 and 525)

**Material studied**: Holotype ♂ and Allotype ♀, Rongrengiri, 19. iv.1973, coll ARL (Z.S.I. Registration No. 3917/H₁₃ and 3918/H₁₃).

Measurements (in mm) and Nodal index.

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<tr>
<td>♀</td>
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**Description**: Male: Labium yellow, blackish apically; labrum black, with a large transversely oval subbasal greenish yellow spot on either side; bases of mandibles and anteclypeus greenish yellow; rest of head black, marked with greenish yellow as follows: a small rounded subbasal spot near outer margin on each side and a transverse stripe running across upper surface of frons; eyes greenish. Prothorax black with middle lobe having a sublateral greenish yellow oblong spot on each side. Synthorax (Fig. 1) black on dorsum and also laterally a little beyond humeral suture, marked with greenish yellow as follows: narrow mesotho-
racic collar slightly interrupted medially and separated from a narrower oblique antehumeral stripe on either side; medially greenish yellow tergum having large greenish yellow spot at each wing base and a median projection extending up to the base of middorsal carina; synthorax greenish yellow on sides and on venter with narrow black stripe on each lateral suture; black stripe on anterolateral suture broader and ventrally confluent with its fellow from other side, the stripe also joining dorsal black colour by a line a little below spiracle; black stripe on posterolateral suture becoming narrower downwards and obsolete at the region of spiracle. Legs black; all coxae and trochanters on inner surfaces, anterior and posterior femora on outer lateral surface broadly striped with greenish yellow; trochanters with minute spines on distal half of inner surface. Wings (Fig. 525) hyaline, extreme base up to 1st primary antenodal cross vein enfumed with brown; pterostigma black covering 5½-6½ cells in forewing 4½-5½ cells in hindwing; 1st and 5th antenodals in all wings primary. Abdomen black, marked with greenish yellow as follows: sides and venter of segment 1 besides an apical triangular spot on dorsum; sides of segment 2 including oreillets besides a mid-dorsal stripe shaped like a wine glass; basal annules of segments 3-7, those narrowly interrupted on mid-dorsum of segments 4-6 and much broader on segment 7 covering nearly basal half of the segment; basal annule on segments 3-5 followed by a lanceolate mid-dorsal stripe; a basolateral triangular spot on segment 8 and a vestige of same on segment 9; Anal appendages (Fig. 308-309) black, apical third and tips of inferiors greenish yellow; superiors nearly 3 times as long as segment 10 of abdomen, curving a little downwards near apex where somewhat laterally compressed and bluntly pointed at tip; inferior anal appendage a little more than half the length of superiors with divergent evenly narrowing branches without any tooth at base. Genitalia (Fig. 316) black; anterior hamules hook like at end, posteriors sharply pointed and abruptly turned backwards; lobe large, rather deeply notched medially at free border. Penis as in Figs. 358-359.

Female: Very closely similar to the male in colouration and markings, differing from the same as follow: Posterior margin of occiput (Fig. 9) yellowish and armed with a robust spine on either side. Prothorax with sides of middle lobe greenish yellow and so also a lateral spot on either side of posterior lobe. Synthorax with an additional upper greenish yellow humeral spot close to antealar sinus; antehumeral stripe extending nearly up to base of antealer sinus. Pterostigma covering 6-7 cells in all wings; the 1st and 5th, or 7th antenodals in forewing and 1st and 5th or 6th in hindwing primary. Mid-dorsal stripe on 2nd segment of abdomen
is trilobed; the basal annule on 3rd segment connected to mid-dorsal lanceolate stripe by a fine mid-dorsal carinal line; mid-dorsal lanceolate stripes shorter; basolateral spot on segment 8 only narrow. Anal appendages greenish yellow, slightly longer than segment 10 of abdomen. Vulvar scale (Fig. 337) black, broadly triangular and bifid at apex for about half its length, not extending even upto half the length of segment 9; ventral surface of segment 9 with a broad depressed impression extending over basal two-third, outer margin being rounded and strongly ridged.

Notes: This species comes very close to *N. circularis* (Selys) but differs from the same in details of male anal appendages, vulvar scale and in the following;

**Male**: (i) Superior anal appendages relatively shorter (two and a half times vs three and a half times as long as segment 10 of abdomen); (ii) inferior anal appendage relatively longer (two third vs less than half the length of superiors); (iii) larger in size; (iv) labium yellow, blackish apically; (v) anteclypeus greenish yellow; (iv) postclypeus black with a subbasal spot on either side; (vii) 2nd segment of penis with rudimentary internal lobe, the lateral lobes not expanding beyond the apex of the median lobe distally; (viii) absence of humeral spot on synthorax.

**Female**: (i) smaller in size; (ii) labium and anteclypeus as noted for males; (ii) hind margin of occiput armed with a prominent robust spine on either side; (iv) antehumeral stripes not confluent with mesothoracic collar; (v) stripe on anterolateral suture well developed; (vi) segment 8 unmarked on dorsum.

The species is restricted only at southern Garo hills in Meghalaya. The specimens were collected inside a patch of deep forest on the bank of a river having cultivated lands nearby.

**Distribution**: India: Meghalaya.

**Genus Onychogomphus** Selys


Type-species: *Libellula forcipata* Linnaeus
Selys (1854b) established *Onychogomphus* as a subgenus of *Gomphus* Leach along with description of a number of new species and also incorporated in it a few species from other genera. Kirby (1890) raised it to generic status. Since then a number of authorities worked on this genus. However, the more important publications are of Selys (1858, 1869b, 1891a, 1894), Williamson (1907), Laidlaw (1922a, 1930a), Fraser (1923b, c, 1924c, 1934, 1940, 1953), Lieftinck (1937, 1941a, 1948a, 1954), Chao (1954) and Pinhey (1962). Navas (1930), Bhasin (1953), St. Quentin (1970), Bose an Mitra (1975), Prasad (1975), Kumar and Juneja (1976) and Singh and Prasad (1976a) published accounts of some species of the genus occurring in Indian region.

**Diagnostic characters:** Small to medium in size (usually abdomen 27.0-50.0 mm, hindwing 21.0-38.0 mm); black or brown marked with yellow or green; femora armed only with closely set small spines but, those on hind femora comparatively longer at distal end; male superior anal appendages nearly twice as long as or longer than segment 10 of abdomen, cylindrical or a little compressed laterally, forcipate, the apices variably curled; inferior subequal to the superiors, bifid almost to base, the branches closely apposed or a little divergent, sometimes with a basal or median tooth, the apex variably curled, pointed or notched; male genitalia with lamina projecting a little, arched; hamules sharply pointed at apex, anteriors slim, posteriors much broader; vesicle variable, large to very large, its free border sometimes variably notched; 2nd segment of penis with median and lateral lobes variably developed, either or both sometimes terminating in a pair of short, slender flagella; vulvar scale variable, rudimentary or even extending beyond segment 9 of abdomen, subtriangular or variably narrowed apically. Wings with tornus angulated in males, rounded in females; usually 9-18 antenodal and 5-14 postnodal cross veins; 1st and either 5th or 6th cross veins form primary antenodals; basal incomplete antenodal cross vein absent; pterostigma elongated, about 3-5 times as long as broad, a little swollen medially, braced; discoidal cells entire, situated at a point which is a little more than one cell distal to the level of arc; the same with its margins subequal or with costal (in forewing) or basal (in hindwing) margin a little shorter than the rest; hypertrigones shorter than the space between nodus and origin of 1Rs in hindwing; subtrigone covering parts of 2 or 3 cells of adjacent anal area at its inner side in hindwing; usually 3rd cell of adjacent anal area extending to base of subtrigone in hindwing; discoidal field beginning with 2 cells and not widening to 4 rows of cells proximal to the level of nodus in hindwing; are usually situated at the level of 2nd antenodal cross vein.
or a little proximal or distal to that level; anal triangle 3 or 4 celled; anal loop rudimentary; usually 1 (rarely 2) cubital cross vein in all wings besides the one forming base of subtrigone; IA usually but variably pectinate in forewing; usually up to 3 roes of postanal cells in forewing, 4 rows in hindwing; 2-5 traversing cross veins between sectors of arc in forewing, 1-4 in hindwing, between arc and the point of bifurcation of Rs.

Distribution: India; Nepal; China; Nicobar; Burma; Vietnam; Malaysia; Indonesia; Taiwan; Turkey; Iran; Iraq; Europe; Africa; Madagascar.

KEY TO THE SPECIES OF THE GENUS ONYCHOGOMPHUS SELYS

Male:

1. Antehumeral stripes separated from mesothoracic collar; species smaller with hindwing 25.0 mm or less in length. ...modestus Selys.
   Antehumeral stripes confluent with mesothroacic collar; species larger with hindwing 30.0 mm or more in length. ...2

2. Anterolateral stripe on thorax vestigeal; inferior anal appendage without a basal tooth. ...aureus Laidlaw
   Anterolateral stripe on thorax well marked; inferior anal appendage with a basal tooth. ...saundersi duaricus Fraser

Female:

Larger species with abdomen 44.0 mm and hindwing 35.0 mm in length; vulvar scale extending to apex of abdomen. ...?..maculivertex (Selys)

Smaller species with abdomen 39.0 mm and hindwing 30.0 mm in length; vulvar scale extending nearly to apex of segment nine of abdomen. ...meghalayanus sp. nov.

(Male of O. ...maculivertex (Selys) and female of O. aureus Laidlaw and O. saundersi duaricus Fraser were not available in the collection studied. Therefore, these species have not been included in the key to the male and female respectively).

Onychogomphus aureus Laidlaw

(Figs. 306-307, 319 and 356-357)


Material studied: 1 ♂, Songsok, 16.iv.1973, coll ARL.
Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td>abdomen</td>
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</table>

♂ 33.0  28.0  16      12  11-14  12

Notes: Lieftinck (1969) referred *O. aureus* Laidlaw to his genus *Phaenandrogomphus* (Lieftinck, 1964). Here its original generic status has been restored in consideration of the fact that *O. aureus* Laidlaw exhibits closer affinity to the genus *Onychogomphus* Selys in respect of ground colour (greenish yellow vs pink) and armature of femora (absence of duplicate series of longer spines).

The single male specimen under study (a teneral one) varies from the description of the species provided by Fraser (1934) in size, nodal index, yellow tinge at bases of wings and preponderence of yellow ground colour.

In Meghalaya, the species is having restricted distribution only in central and southern Garo hills. The male under study was collected, near a stream, just after its emergence and not strong enough to take to rapid sustained flight.

**Distribution**: India: Meghalaya.

**Onychogomphus ? maculivertex** (Selys)

(Fig. 335)


**Material studied**: 1 ♀, Barapani, 24.vii.1967, coll RKV

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
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</table>

♀ 44.0  35.0  15      12  11  13

Description: Female: Labium and bases of mandibles greenish yellow; labrum and clypeus reddish yellow; labrum narrowly black at base and along anterior border; postclypeus with a larger black median transverse spot; rest of head black but marked with greenish yellow as follows: a broad median stripe across frons, a small triangular spot in between posterior ocelli and occiput; posterior margin of occiput
shallowly concave and with a small spine on either side. Prothorax greenish yellow but marked dorsally with black as follows: a large transverse bilobed spot covering part of anterior and middle lobes and a fine line between middle and posterior lobes. Synthorax black dorsally and also laterally a little beyond humeral suture but marked with greenish yellow as follows: mid-dorsal carina; a medially interrupted narrow mesothoracic collar confluent on either side with moderately broad oblique antehumeral stripe; antehumeral stripe narrowed posteriorly, where the same bending anteriorly to become confluent with a still narrow but complete humeral stripe; synthorax greenish yellow on sides and venter, but upper third of anterolateral and upper half of posterolateral suture narrowly black. Legs black but marked with greenish yellow as follows: all coxae, trochanters and either side of posterior femora. Wings hyaline, tinted with light yellow upto arculus except in anal area; pterostigma yellow covering 5-6 cells; 1st and 5th antenodals in all wings primary. Abdomen black, marked with greenish yellow as follows: segment 1 on sides and a triangular apical dorsal spot; segment 2 on sides and trilobed mid-dorsal stripe; segments 3 and 4 with a basal narrow ring confluent with mid-dorsal and ventrolateral stripes both falling short of apex of the segment; ventrolateral stripe narrowed apically, mid-dorsal stripe broader and partly interrupted by black at jugal suture; segments 5 and 6 similar, but ventrolateral stripes widely confluent beyond jugal suture not confluent with basal annule; sides of segments 8 and 9 and whole of segment 10 greenish yellow, Anal appendages greenish yellow, slightly shorter than segment 10 of abdomen. Vulver scale (Fig. 336) large, extending slightly beyond apex of abdominal segment 10, yellow, blackish on apical third, strongly grooved lengthwise, narrowed on apical half, slightly bifid with few hairs at paex.

Notes: Late Dr. Lieftinck, when requested for opinion on the identity of the specimen considered it as *O. maculivertex* (Selys) suggesting thereby, a change in the generic status of the species from *Leptogomphus* Selys to *Onychogomphus* Selys and his opinion has been uphold here. Although the specimen studied comes close to *O. maculivertex* (Selys) in the shape of the vulver scale, but is much larger (abdomen 44.0 mm vs 33.0 mm, and hindwing 35.0 mm vs 31.0 mm). It also differs from *maculivertex* in having more elaborate greenish yellow markings and a complete humeral stripe.

Only one female specimen of this species was collected near Barapani lake in central Khasi hills.

Onychogomphus meghalayanus sp. nov.
(Fig. 336 and 529)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of abdomen</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td></td>
<td>An</td>
<td>Pn</td>
</tr>
<tr>
<td>abdomen</td>
<td>hindwing</td>
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<tr>
<td>♀</td>
<td>38.0</td>
<td>31.0</td>
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Description: Female: Labium, Labrum, bases of mandibles and anteclypeus greenish yellow; labium black at apices, labrum finely black at base and narrowly so at apex with a median projection that fails to reach the basal line; rest of head black, marked with greenish yellow as follows: a large basal triangular spot on either side of postclypeus; a broad but medially interrupted stripe on either side of postclypeus; a broad but medially interrupted stripe traversing crest of frons; a median patch against each eye beneath head; eyes greenish, dark brown in preserved specimen. Prothorax greenish yellow, the posterior lobe and sides of midlobe ventrally blackish. Systorax black on dorsum and laterally up to a little below the humeral suture marked with greenish yellow as follows: a moderately broad medially interrupted mesothoracic collar confluent on either end with equally broad antehumeral stripe extending to base of antealar sinus; a narrow humeral stripe broken into an isolated upper spot lying above the humeral suture; greenish yellow on sides and beneath except at upper third of anterolateral suture which is finely black. Legs black but coxae, trochanters and inner surface of femora greenish yellow. Wings hyaline, palely tinted with golden yellow as far as arculus at base; pterostigma yellow, framed in brown nervures, covering 5½ cells in forewing and 4½-5½ cells in hindwing; the first and fifth antenodals in forewing, the first and fifth or sixth antenodals in hindwing primary. Abdomen greenish yellow, marked with black as follows: sublateral blackish stripes on segment 2 falling short of base and apex of the segment; segments 2-7 with apical broad annules confluent with ventrolateral stripes and variably developed mid-dorsal stripes; segment 8 entirely and basal half of segment 9 black. Anal appendages slightly longer than segment 10 of abdomen, greenish yellow. Vulvar scale (Fig. 336) blackish, extending over basal two third of segment 9, somewhat fusiform and slightly bifid at paex.
Notes: From closely related species of the genus *O. meghalayanus* sp. nov. differs in having very restricted black markings and in the shape of its well developed vulver scale.

So far known *P. meghalayanus* sp. nov. is restricted to southern Garo hills where the type was collected near the outskirts of a forest on the bank of a river.

**Distribution**: India; Meghalaya.

**Onychogomphus modestus** Selys
(Figs. 312-313, 318 and 362-363)


**Material studied**: 1 ♂, Barapani, 17.viii.1968, coll RKV; 1 ♂, Umran, 12.ix.1967, coll RKV

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Length of abdomen</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂</td>
<td>30.5-34.0</td>
<td>23.5-24.5</td>
<td>13-14</td>
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</table>

**Notes**: The material studied vary from the description of the species provided by Fraser (1934) in having longer abdomen and abdominal segments 3-6 marked only with basal spots.

In Meghalaya the species is restricted only to central and southern Khasi hills. The specimens were collected from forested areas near streams.

**Distribution**: India: Himachal Pradesh; Meghalaya; Uttar Pradesh.

**Onychogomphus saundersii duaricus** Fraser
(Figs. 310-311, 317 and 360-361)


**Material studied**: 1 ♂, Rongrengiri, 19.iv.1973, coll ARL.
Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
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</tr>
<tr>
<td>♂</td>
<td>39.0</td>
<td>14-16</td>
</tr>
<tr>
<td>♀</td>
<td>30.0</td>
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Notes: Fraser (1924c) described *duaricus* as a distinct species and treated the same in further details in Fauna of British India volume (Fraser, 1934). However, Late Dr. Lieftinck (in litt.) and Tyagi (1977) considered it as a subspecies of *O. saundersii* Selys, 1851.

The single male studied varies from the description of *duaricus* provided by Fraser (1934) in size, in nodal index and in the following: (i) anteceelypeus black; (ii) dorsal carina of synthorax unmarked with yellow; (iii) distal half of inner lateral surface of middle femora greenish yellow; (iv) pterostigma yellow, covering 4 cells; (v) segment 1 of abdomen yellow unmarked with black; (vi) mid dorsal stripe on segment 2 trilobed; (vii) abdominal segments 3-6 with large dorsolateral yellow spots at base; (viii) abdominal segment 6 with a small mid dorsal yellow spot; (ix) segment 7 with dorsal spot at base.

The species is restricted to only southern Garo hills in Meghalaya. The specimen was collected while perching on shrubs at the fringe of a forest on a river bank.

Distribution: India: Meghalaya, West Bengal.

Genus *Paragomphus* Cowley


Type-species: *Mesogomphus nguelicus* Forster*

The genus was proposed by Forster (1906a) under the name *Mesogomphus* with *Gomphus cognatus* Rambur as the type-species. Later, the generic name was changed, its concept further enlightened and there

*Gloyd (1983) in correcting Cowley’s (1934) selection of type species, still considered *Gomphus cognatus* Rambur to be the type-species following Pinhey’s (1962) observation that *Mesogomphus nguelicus* Forster is a variety of *G. cognatus* Rambur. However, Gloyd (in litt.) informed present worker Mr. Nelville’s suggestion that *M. nguelicus* Forster remains the type-species of *Paragomphus* Cowley irrespective of its taxonomic status.
has also been addition of a number of species as a result of contributions Chiefly of Fraser (1924c, 1934, 1940), Laidlaw (1930), Cowley (1934), Chao (1953), Lieftinck (1954, 1955a, 1971a) and Pinhey (1962). Bhasin (1953), St. Quentin (1970), Kumar (1922c, 1973b), Prasad (1976a), Singh and Prasad (1976a) and Prasad and Kumar (1977b) dealt with certain species of this genus occurring in Indian region in recent times.

**Diagnostic characters:** Medium in size (usually abdomen 27.0-40.0 mm, hindwing 24.0-31.0 mm); black marked with greenish yellow or orange; femora armed only with closely set small spines; segments 8 and 9 of abdomen in male with broad lateral extensions; male superior anal appendages nearly twice as long as segment 10 of abdomen, closely apposed, basal half flattened, thereafter curled strongly downwards and narrowing towards apex; inferior less than half the length of superiors, bifid nearly to base, the branches closely apposed, curled first downward and then upward, shallowly notched at apex; male genitalia with lamina depressed, broadly arched; hamules sloping blackwards, somewhat flattened, narrowing to and curled at apex, anterior short, the posteriors much broader and longer, armed at apical third with a small spine on inner surface; vesicle spout like, deeply emerginate; 2nd segment of penis with median lobe terminating in a pair of long flagella; vulvar scale broadly triangular, extending up to basal third of segment 9 of abdomen, notched at apex for at most the apical half; ventral surface of segment 9 of abdomen with a broad depression around the vulvar scale, extending up to basal two third of the segment, with strongly ridged outer margin. Wings with tornus angulated in males, rounded in females; usually 12-16 antenodal cross veins in forewing, 9-11 in hindwing and 6-10 postnodal cross veins; 1st and 5th cross veins form primary antenodals; basal incomplete cross vein absent; pterostigma elongated, about 5-6 times as long as broad, a little swollen medially, braced; discoidal cells entire situated at a point which is one cell distal to the level of arc, with costal and basal margins respectively subequal and a little shorter than the distal margin; hypertrigone subequal or longer than the space between nodus and origin of 1R$_3$ in hindwing; subtriagones covering parts of 2 cells of adjacent anal area at its inner side in hindwing; 4th cell of adjacent anal area from wing base extending to base of subtrigone in hindwing; discoidal field not widening up to 4 rows of cells proximal to the level of nodus in hindwing; distal primary antenodal cross vein situated at a apoint which is distinctly nearer to basal primary antenodal cross vein than nodus; anal triangle 4-5 celled; anal loop absent; only 1 cubital cross vein in all wings, besides the one forming base of subtrigone; IA pectinate in forewing; up to 3 rows of post-
anal cells in forewing and 4 rows in hindwing; 2 or 3 traversing cross veins between sectors of arc in forewing, 1 in hindwing, between arc and the point of birufection of Rs.

Distribution: India; Nepal; China; Sri Lanka; Burma; Malaysia; Indonesia; Africa; Madagascar.

KEY TO THE SPECIES OF THE GENUS PARAGOMPHUS COWLEY (EITHER SEX)

Synthorax on either side marked by 3 narrow parallel black stripes; pterostigma greenish yellow.

Synthorax marked by a median broad black stripe on either side; pterostigma black.

Paragomphus echinoccipitalis (Fraser)
(Figs. 300-301, 323, 332, 350-351 and 527)

Onychogomphus echinoccipitalis Fraser, 1922, Mem. Dep. Agric. India (Ent.), 7: 75; 1934, Fauna Brit. India, Odon, 2: 287


Measurements (in mm) and Nodal index.

<table>
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<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂ ♀ 36.5-39.5</td>
<td>26.0-27.0</td>
<td>13-14</td>
</tr>
<tr>
<td>♀ 33.0</td>
<td>26.0</td>
<td>13-14</td>
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Description: Male: labium and labrum greenish yellow; labrum broadly black at base, black mark extended forward as a marginal line along sides; bases of mandibles and clypeus greenish yellow with a transverse black band running along anterior margin of post clypeus; rest of head black with a large oval dorsal greenish yellow spot on either side of frons; 10-14 minute spines arranged in 2-3 rows across frons just behind crest; occiput armed with 1-3 minute spines on either side of posterior margin; eyes dark brown in preserved specimen, greenish in life. Prothorax black. Synthorax black, yellowish beneath and marked with greenish yellow as follow: a broad mesothoracic collar interrupted narrowly and medially; a short oblique antehumeral stripe close to mid-dorsal carina at upper end and falling well short of alar sinus and outer end of mesothoracic collar; an upper triangular humeral spot almost apposed to alar
sinus; in one specimen traces of lower humeral line separated from upper spot; two broad lateral stripes, one between humeral and 1st lateral suture and broken into a small spot below just above 2nd pairs of legs and another covering large part of middle of metapimeron. Legs black; all coxae, inner surface of anterior femora except at its distal end and outer lateral surface of anteiror and posterior femora except at proximal and distal ends greenish yellow. Wings (Fig. 527) hyaline, costa greenish yellow from base to proximal end of pterostigma; membrane blackish, short; anal triangle 5 celled, but only 4- celled in left hindwing of one specimen; pterostigma black covering 4½-5½ cells; 1st and 5th antenodals primary. Abdomen black, marked with greenish yellow as follows: segment 1 with an apical annule broadly interrupted on sides and in one specimen also on dorsum; segment 2 with broad mid dorsal and ventrolateral stripes, the latter falling short of base of the segment; in one specimen mid dorsal stripe of even width, but in other roughly trilobed, basal lobe being much larger than other two; segment 3 with a large dorsal and a small ventrolateral triangular spot on either side at base; segments 4-7 with broad basal annules; spots and annules at bases of segments 3-7 extending up to jugal suture beneath, but crossing that level on dorsum of segments; segment 8 with a small basolateral spot, segment 9 with a ventrolateral narrow stripe and segment 10 with a small dorsal subapical spot. Anal appendages (Figs. 300-301) black, superiors yellowish on inner side on basal two this in one specimen; inferior slightly more than one third the length of superiors. Genitalia (Fig. 323) black; lobe very deeply notched at its outer border. Penis as in Figs. 350-351.

Female: closely similar to male in colouration and markings but differing from the same as follows: Postclypeus broadly black medially; frons with only one minute spine on either side behind crest; occiput yellowish. Synthorax without either humeral spot or lower line of the same. Apical annule on segment 1 of abdomen broadly interrupted on sides; segment 2 with mid dorsal stripe narrower and with an additional oblique lateral stripe ascending slightly posteriorly and falling short of base; segment 9 with a small basolateral spot; segment 10 black, unmarked. Anal appendages and vulvar scale (Fig. 332) black, the latter very broadly cleft at middle on apical third.

Notes: The material studied was identified by the writer as *P. henryi* (Laidlaw) and sent to Late Dr. Lieftinck for confirmation. He then informed that the material belong to *P. echinoccipitalis* (Fraser). Incidentally, it may be mentioned that *P. echinoccipitalis* so far known, belonged to the
genus *Onychogomphus* Selys. Both sexes have been described here in view of the fact that, the male was unknown so far and the female, although considered conspecific with the type by Late Dr. Lieftinck, show some marked variations from the published account of the species.

So far known, the species has a restricted distribution only in northern Garo hills at lower altitude. The specimens were collected near streams passing through light forest.

**Distribution**: India: Meghalaya.

**Paragomphus lineatus** (Selys)

(Figs. 302-303, 322, 333 and 352-353)


Measurements (in mm) and Nodal indes.

<table>
<thead>
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<th>Length of abdomen</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Forewing An</td>
<td>Forewing Pn</td>
</tr>
<tr>
<td>♂♂</td>
<td>38.5-39.0</td>
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<td>13-14</td>
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<tr>
<td>♀♀</td>
<td>34.0-35.0</td>
<td>26.0-27.0</td>
<td>13-14</td>
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**Notes**: The species is recorded for the first time from Meghalaya. Examined specimens of both sexes vary from the description of the species provided by Fraser (1934) in having on either side 7-8 small black spines in a row on upper surface of frons just behind the crest, but often with a row of 2-3 spines lying posteriorly ; fewer spines on vertex in males, 3-8 in females. The males also vary in having longer abdomen.

So far known, the species is restricted to Meghalaya in the lower altitude of northern Garo hills. They were found near streams, often settling on sandy shores of the streams and then becoming very inconspicuous on account of dull body colour.
**Distribution**: India: Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Punjab, Tamil Nadu, Uttar Pradesh and Bengal (exact locality unknown). Outside India: Nepal; Burma.

**Genus Perissogomphus** Laidlaw


Type-species: *Perissogomphus stevensi* Laidlaw.

Laidlaw (1922 a) established this genus along with description of its type-species. Since then, some more contributions on this genus have been made by Fraser (1923b, c, 1926d, 1934, 1940) and Laidlaw (1930).

**Diagnostic characters**: Medium in size (usually abdomen 36.0-43.0 mm, hindwing 33.0-38.0 mm); green or yellowish, marked with brown and black; male superior anal appendages subequal to segment 10 of abdomen, divergent, narrowed to an acute apex; inferior about two-third the length of superiors, deeply cleft into two short, conical, divergent branches; male genitalia with lamina narrowly and deeply arched, projected prominently; long, narrow anterior hamules, terminating in fine, backwardly curved spines; posteriors much more robust, stout at base, terminating in a robust, forwardly directed spines; vesicle shaped like a pitcher, with its spout strongly emerginate; 2nd segment of penis with median lobe terminating in a pair of moderately long divergent flagella; vluver scale short, extending up to less than basal half of segment 9 of abdomen, cleft at apex into a pair of short, somewhat ungulate, subtriangular processes. Wings hyaline, sometimes enfumed, base with a yellowish tint; tornus angulated in males, rounded in females; usually 16-19 antenodal cross veins in fore-wing, 12-14 in hindwing, and 11-14 postnodal cross veins; the 1st and any one of 6th or 7th cross veins form primary antenodals; no basal incomplete antenodal cross vein present; pterostigma elongated, about 5-6 times as long as broad, a little swollen medially, braced; discoidal cells transversely traversed once in hindwing, entire in forewing (often vice versa or entire in all wings) and situated at a point which is one and a half cells distal to the level of arc; the same with costal margin a little shorter than the distal and subequal to basall margin in forewing, about one and a half times as long as basal margin in hindwing; hypertrigone shorter than the space between nodus and origin of 1R₃ in hindwing; subtrigone covering parts of 2 cells of adjacent anal area in hindwing; 4th cell of adjacent anal area from wing base extending to base of subtri-
gone in hindwing; discoidal field widening up to 4 rows of cells a little proximal to the level of nodus in hindwing; arc situated at the 2nd or between the 2nd and 3rd antenodal cross veins; anal triangle 4 celled; anal loop rudimentary; 2-3 cubital cross veins in all wings besides the one forming base of subtrigone; IA pectinate in forewing; up to 4 rows of postanal cells in forewing and 5 rows in hindwing; 4-5 traversing cross veins between arc and the point of bifurcation of Rs.

**Distribution**: India.

**Perissogomphus stevensi** Laidlaw

(Figs. 340 and 528)


**Material studied**: 1 ♀, Upper Shillong, 13.vi.1967, coll RKV

**Measurements (in mm) and Nodal index.**

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♀ 43.0</td>
<td>34.0</td>
<td>17-19</td>
</tr>
</tbody>
</table>

**Description**: Female: Labium reddish yellow, middle lobe on distal third and lateral lobes at tips black; bases of mandibles and anteclypeus greenish yellow; labrum pale brown but narrowly blackish along anterior border; frons pale brown but dorsally greenish yellow and at base narrowly black; antennae and vesicle black, the latter brownish at center; occiput and venter of head pale brown; eyes dark brown in preserved specimen. Prothorax greenish yellow, sides and area between anterior and middle lobe black. Synthorax dorsally and laterally up to a little beyond humeral suture black but marked by a large M-shaped greenish yellow mark formed by the confluence of mesothoracic collar, narrow mid-dorsal carina and broad antehumeral stripe extending from alar sinus; humeral suture also finely yellow; synthorax greenish yellow on sides and venter, but 2nd lateral suture narrowly black. Legs black, marked with greenish yellow as follows: anterior coxae and trochanters; inner surface of 1st and 2nd femora except base and pair of narrow lateral stripes on 3rd femora. Wing (Fig: 528) hyaline, with a basal golden yellow tint excepting anal area extending along subcostal and cubital space up to the arc; membrane whitish; pterostigma brownish covering 4 cells; 1st and 7th antenodals primary. Abdomen black, marked with greenish yellow as follows: a
mid-dorsal stripe on segments 1-7, this very broad and confluent on segments 1 and 2, on other segments falling short of base narrowly and of apex broadly and gradually narrowing from base to apex; a ventrolateral stripe on segments 1-7, which broken into a basal spot and a distal stripe on segments 5-7; segment 8 greenish yellow but narrowly black at base and apex. Anal appendages greenish yellow. Vulvar scale (Fig. 340) black.

**Notes**: The single female studied differs from the description of the species provided by Laidlaw (1922) and Fraser (1934) in having a little longer abdomen, and in details of body markings. In view of inadequate description, it has been redescribed.

So far known, the species is having a restricted distribution in Meghalaya, only at high altitude areas of central Khasi hills. The single female was collected near a stream flowing across a grassy land.

**Distribution**: India: Meghalaya, West Bengal.

**Genus Stylogomphus** Fraser


**Type-species**: *Stylogomphus inglisi* Fraser

Fraser (1922e) established this genus along with description of its type-species. The generic concept has since then been enlightened and there has also been addition of a few more species as a result of contributions chiefly of Fraser (1923b, c, 1925b, 1934, 1940), Laidlaw (1930), Asahina (1951, 1956a, 1966, 1968) and Chao (1954).

**Diagnostic characters**: Small ins size (usually abdomen 22.0-31.0 mm, hindwing 21.0-27.0 mm); yellowish marked with black; hind femora armed only with closely set small spines; male superior anal appendages a little longer than segment 10 of abdomen, broad at base, basal two third gradually narrowed and semi forcipate, thereafter abruptly narrowed, cylindrical and divergent; the outer border produced into a prominent angle near base, and again into a less prominent angle at about middle; inferior about two-third the length of the superiors, narrowly triangular, cleft in apical half, the two branches subcylindrical, closely apposed, parallel and upturned at apex; male genitalic with lamina arched, emerginate, projecting a little; hamules curved, the anteriors long and cylindrical, the posteriors broad and spatulate, with apex narrowed and turned outward; vesicle elongate, emerginate and purse-shaped at apex; 2nd segment of
penis with rather short median lobe; vulvar scale short and triangular. Wings hyaline, pale yellow at extreme base, with tronus angulated in males, rounded in females; usually 11-12 antenodal cross veins in forewing, 7-9 in hindwing and 7-12 postnodal cross veins; basal incomplete antenodal cross vein absent; 1st and any one of 5th or 6th cross veins form primary antenodals; pterostigma elongated, about 4-5 times as long as broad, a little swollen medially, braced; discoidal cells entire, situated at a point which is nearly one cell distal to the level of arc with costal margin a little shorter than the distal margin, but subequal to basal margin in forewing and a little more than one and half times as long as basal margin in hindwing; hypertrigone subequal or longer than the space between nodus and origin of 1R3 in hindwing; subtrigone covering parts of 2 cells of adjacent anal area at its inner side in hindwing; 3rd cell of adjacent anal area from wing base extending to base of subtrigone in hindwing; discoidal field not widening upto 4 rows of cells proximal to level of nodus in hindwing; arc situated at or a little proximal to the level of 2nd antenodal cross vein; distal primary antenodal cross vein situated at a point which is equally distant from nodus and basal primary antenodal cross vein; anal triangle 3 celled; anal loop absent; only 1 cubital cross vein in all wings besides the one forming base of subtrigone; IA pectinate only in distal half in forewing; upto 2 rows of postanal cells in forewing, and 3 rows in hindwing; 2 or 3 traversing cross veins between sectors of arc in forewing, only 1 in hindwing, between arc and the point of bifurcation of Rs.

*Distribution*: India; China; Ryukyu; Taiwan; North America.

**Stylogomphus inglisi** Fraser

(Figs. 304-305, 320 and 354-355)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂♂</td>
<td>29.0-30.5</td>
<td>25.0</td>
</tr>
</tbody>
</table>

*Notes*: The specimens examined differ from the description of the species provided by Fraser (1934) in being larger in size, in having
higher postnodal index and in the following: (i) apical half or more of labium black; (ii) postclypeus with lateral suboval greenish yellow spots; (iii) legs: trochanters black, anterior femora greenish yellow on inner surface; (iv) pterostigma greenish; (v) abdomen: segment 3 with middorsal basal triangular spot; segments 4-6 with basal ring complete and projecting apically on mid-dorsum; segment 7 marked as segments 4-6; (vi) anal appendages: superiors brownish on apical third with its 2nd angulation situated more basally.

The find of the material of this species in Meghalaya has extended the knowledge of its distribution from West Bengal to this state.

The specimens were collected near a small stream flowing close to maize field.

*Distribution*: India; Meghalaya, West Bengal.

*Family* †Aeshnidae

*Diagnostic characters*: Head globular; labium with middle lobe nearly as wide as lateral lobes and bearing a median incision; inner margin of eyes on vertex very broadly contiguous; occiput small and triangular; male genitalia hidden, being variably overlapped by the expanded targite of segment 2 of abdomen; a robust complete ovipositor present, often associated with well formed accessory apparatus. Subtrigone not well differentiated; median space entire or traversed; anal loop well developed, compact and usually subquadrate.

*Distribution*: Cosmopolitan.

**KEY TO THE DIVISIONS OF THE FAMILY Aeshnidae**

\[ R_{4+5} \text{ and } MA \text{ running parallel to one another, } MA \text{ without bulging shortly after nodus} \]

... … … … … … Brachytrini

\[ MA \text{ gradually converging towards } R_{4+5} \text{ and shortly after nodus distinctly bulged.} \]

... … … … … … Aeshnini

**Division Brachytrini**

This division is distinguished into 3 subfamilies viz. Brachytrinae, Neopetalinae and Gomphaeshninae. Such distinction is based on branching of \[ 1R_{3} \], presence or absence of anal loop and of reddish spots along the costal border of wings. Only the members of the subfamily Brachytrinae have been found by the writer in Meghalaya.
Distribution: Virtually cosmopolitan.

Subfamily Brachytrinae

Diagnostic characters: Female genitalia rounded or produced into 2 or more robust spines. Base of hindwing rounded in both sexes or angulated and excavated in male; R₃ with or without an abrupt curve towards proximal end of pterostigma; 1R₃ symmetrically forked; median space entire or traversed by veins; arc situated usually proximal to, but sometimes distal to outer primary antenodal cross vein; one or more cell rows between 1R₃ and Rspl, between MA and Mspl and also between Cu₂ and IA.

Distribution: Virtually cosmopolitan except Africa.

KEY TO THE GENERA OF THE SUBFAMILY BRACHYTRINAЕ

1. Median space in wings traversed by one or more veins. .Periaeschna Martin

   Median space in wings entire. .2

2. Only one row of cells between IR₃ and Rspl and also between MA and Mspl.

   Austroaeschna Selys

   Cells between IR₃ and Rspl and between MA and Mspl arranged always in more than one row.

   Tetracanthagyna Selys

Genus Austroaeschna Selys


Type species: Austroaeschna parvistigma Selys

Selys (1883b) established Austroaeschna as a subgenus along with the description of its type-species. Later it was elevated to generic rank by Kirby (1890). The generic concept has further been elaborated and a few more species have been added as a result of contributions chiefly of Karsch (1891d), Martin (1909), Tillyard (1916), Laidlaw (1921, 1923), and Fraser (1922c, 1934, 1960).

Diagnostic characters: Large in size (usually abdomen 40.0-92.0 mm, hindwing 36.0-68.0 mm); brown, black or maroon marked with yellow, blue or green; frons elevated, rounded or occasionally pointed at crest; 3rd abdominal segment constricted in male; male superior anal appendages with or without a basal tooth, subequal to or about twice as long as segment 10 of abdomen, variably undulated, parallel, forcipate or divergent, dilated apically, but the apex sometimes narrowed, blunt or notched; inferior subequal to or about one third the length of superiors, bifid at apex; ovipositor large, but usually not extending beyond abdomen; dentigerous plate formed by prolongation of sides of abdominal segment 10, rounded with finely spined free border. Wings hyaline, sometimes
tinted with yellow at base or enfumed with brown; base of hindwing in male slightly or not excavated, nearly right angled tornal angle; anal triangle 3 celled; usually 10-31 antenodal and 9-27 postnodal cross veins; 1st and 5th antenodal cross veins primary; pterostigma short and about twice as long as broad, may or may not be braced; arc situated nearer basal than distal primary antenodal cross vein; discoidal cell situated about 1 cell distal to level of arc, usually 3-4 celled in forewing, 2-3 celled in hindwing where it is shorter and broader; hypertrigones traversed by 3-4 cross veins; median space entire; cubital space basal to subtrigone usually traversed by 4-5 or more veins; 4-9 cells in anal loop; R₉ not showing an abrupt curve towards pterostigma; R₉ not showing an abrupt curve towards pterostigma; IR₉ forked; R₄₊₅ and MA running parallel to one another, MA not bulged away from R₄₊₅; a single row of cells between IR₉ and Rspl, MA and Mgpl as well as between Cu₂ and IA.

**Distribution**: India; Japan; Taiwan; Australia.

*Austroaeschna intersexedens* Martin

(Figs. 347-349 and 372-373)


**Material studied**: 1 ♂, Shillong, 5.viii.1967, coll RKV

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Forewing</th>
<th>Hindwing</th>
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</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂</td>
<td>51.0</td>
<td>41.0</td>
</tr>
</tbody>
</table>

**Notes**: The single male specimen studied varies from the description of the species provided by Fraser (1936) in size, nodal index and also in the following: (i) oblique stripe between humeral suture and spiracle broken; (ii) discoidal cell in forewing with 3-4 cells and in hindwing with 2-3 cells; (iii) hypertrigones in forewing traversed 4 times.

So far known, the species is restricted to central Khasi hills in Meghalaya. The specimen under study was collected near a montane stream.

**Distribution**: India: Meghalaya. Outside India: Burma.

*Genus Periaschana* Martin

LAHIRI : *Odonate fauna of Meghalaya*

Type-species: *Periaeschna magdalena* Martin.

Martin (1909) established this genus along with description of its type-species. The generic concept has later been further enlightened and there has also been an addition of a few more species through the works of Laidlaw (1921, 1923), Fraser (1922b, 1936, 1936a), and Asahina (1956a).

*Diagnostic characters:* Large in size (usually abdomen 48.0-57.0 mm, hindwing 30.0-51.0 mm); brown or black, marked with yellow or green; frons elevated and usually cone shaped; 3rd abdominal segment constricted in male; male superior anal appendages a little more than twice as long as segment 10 of abdomen, lanceolate with basal third narrowed; inferior a little more than half the length of superiors, broadly triangular and curved upwards a little; ovipositor large, but not extending beyond abdomen; dentigerous plate formed by the prolongation of sides of abdominal segment 10 into a 2-pronged fork. Wings hyaline, sometimes palely enumped with brown, with bases tinted with amber or blackish brown; bases of hindwing nearly straight in male, right angled tornal angle; anal triangle 3 celled; usually 23-27 and 17-22 antenodal cross veins in forewing and hindwing respectively and 19-26 postnodal cross veins; the 1st and 4th or 5th antenodals primary; pterostigma short and about twice as long as broad, may or may not be braced; arc situated slightly distal to the level of distal primary antenodal cross veins; discoidal cell situated about one cell distal to level of arc, usually 6-7 celled in forewing, 5-7 celled in hindwing, where it is shorter and broader; hypertrigone, median and cubital space basal to subtrigone traversed by 3-7, 4-7 and 7-9 cross veins respectively; 8-15 cells in anal loop: $R_8$ not showing an abrupt curve towards pterostigma; $IR_8$ forked, $R_{4+5}$ and MA running parallel to one another, MA not bulged away from $R_{4+5}$: a single row of cells between $IR_8$ and $R_{sp1}$, MA and $M_{sp1}$, as well as between $Cu_3$ and IA.

*Distribution:* India; China; Vietnam.

*Periaeschna? biguttata* (Fraser)

(Figs. 21 and 531)


*Material studied:* 1 ♀, Rongtham river, bank, 10.iv.1973, coll ARL.

Measurements (in mm) and Nodal index.
Length of abdomen hindwing Forewing An Pn Hindwing An Pn
♀ 50.0 44.0 26-27 22 20-22 23-24

Description: Female: Labium, labrum and bases of mandibles reddish yellow, lateral lobes of labium blackish on outer half; eyes dark brown; rest of head yellowish; crest of frons cone-shaped and blackish. Prothorax yellowish, but brownish on dorsum. Synthorax blackish brown; two broad lateral yellow stripes, one being between lateral sutures and another on metepimeron; venter of synthorax yellow. Legs greenish yellow, extensor surfaces of femora on distal half black. Wings (Fig. 531) hyaline, at base reddish brown; membrane whitish; pterostigma blackish grey enclosed in reddish nervures, covering 4 cells; discoidal cell in forewing with 6-7 cells, in hindwing with 7 cells; hypertrigone traversed by 6-7 veins, cubital space by 8 and 7-8 and median space by 6-8 and 5-6 veins in fore- and hindwing respectively; the 1st and 5th or 6th antenodals in forewing, 1st and 5th antenodals in hindwing primary; 10-13 cells in anal loop. Abdomen compressed laterally from segment 4 caudad, greenish yellow but blackish brown on dorsum and gain marked with greenish yellow as follows: segment 1 on basal half besides a large apical mid-dorsal spot; apical narrow, subdorsal paired spots on segments 2-5, those on segment 2 connected to a narrow complete mid-dorsal stripe; narrow vestigial paired subdorsal post jugal spots on segments 4 and 5. Ovipositor and genital plate as in Fig. 21.

Notes: Fraser (1935) described a male dragonfly as Cephaleaeschana biguttata. Later, Asahina (1952-1953) described from Nepal the female of the same species. The specimen under study was tentatively identified as Periaeschna magdelena Martin and sent to Late Dr. Lieftinck for confirmation, who identified the same as Periaeschna? biguttata (Fraser). So, here, Late Dr. Lieftinck's opinion has been upheld.

The single female was collected near a montane stream at dusk, while the same was rapidly patrolling.

Distribution: India: Meghalaya.

Genus Tetracanthagyna Selys

LAHIRI : Odonate fauna of Meghalaya

Type-species: *Gynacantha plsgiata* Waterhouse

Selys (1883b) established *Tetracanthagyna* as a subgenus in his classification when he included only the type-species. Later, it was elevated to generic rank by Kirby (1890). Its concept has been further elaborated and there has also been an addition of a few more species as a result of contributions chiefly of Selys (1889), Martin (1909), McLachlan (1898), Ris (1911), Laidlaw (1923) and Fraser (1936).

**Diagnostic characters:** Large in size (usually abdomen 52.0-80.0 mm, hindwing 50.0-84.0 mm); maroon, black or brown, marked with yellow and green; frons rounded or cone shaped, projecting, but not elevated; 3rd abdominal segment not constricted in male; male superior anal appendages about one and a half to three times as long as segment 10 of abdomen, lanceolate; inferior a little more than half the length of superiors, broadly triangular and a little curved upwards; ovipositor large, but not extending beyond abdomen; dentigerous plate large and 4 spined, of which the median two larger. Wings hyaline, sometimes variably marked or enfumed with brown; base of hindwing oblique in male with obtuse tornal angle and 3 celled anal triangle; usually 20-41 antenodal 20-27 postnodal cross veins; the 1st and any one of 8th-10th antenodals primary; pterostigma short, not braced, sometimes subequal, but usually distinctly shorter in hindwing than in forewing, where it is about twice as long as broad; in males one or two cells immediately beneath pterostigma black; arc situated nearer basal than the distal primary antenodal cross vein; discoidal cell situated about three cells distal to the level of arc, usually 6-7 celled in forewing, shorter and 5-6 celled in hindwing; median space entire; hypertrigone and cubital space basal to subtrigone traversed by 6-8 and 6-9 veins respectively; 13-20 cells in anal loop; $R_8$ showing an abrupt curve towards and a little before pterostigma; $IR_9$ forked; $R_{4+5}$ and MA running parallel to one another, MA not bulged sawy from $R_{4+5}$; cells between $IR_9$ and $R_{spl}$ and between MA and $M_{spl}$ arranged in 1-4 rows; cells between $Cu_2$ and IA arranged in 1-2 rows.

**Distribution:** India; Thailand; Vietnam; Malaysia; Indonesia.

*Tetracanthagyna waterhousei* McLachlan

(Fig. 23)


**Material studied:** 1 ♀, Barapani, 15.v.1971, coll RSP.
Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of abdomen</th>
<th>Forwarding hindwing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>An</td>
<td>Pn</td>
</tr>
<tr>
<td>♂ 59.0</td>
<td>60.0</td>
<td>27-29</td>
</tr>
</tbody>
</table>

Notes: The single female studied varies from the description of the species provided by Fraser (1936) as follows: (i) absence of antehumeral stripes on synthorax, of basal annules on abdominal segments 4-6 and of apical annules on abdominal segments 5-7 and (ii) pterostigma in forewing (4.0 mm) longer than that in hindwing (3.0 mm).

The species was collected in forested areas near a stream flowing to the Brapani reservoir.

Distribution: India: Meghalaya, West Bengal. Outside India: Vietnam; Malaysia; Indonesia.

Division AESHNINI

Diagnostic characters: Oreillete present or absent; dentigerous plate rounded or produced into 2-4 robust spines. Base of hindwing rounded in both sexes or excavated in males; R₅ may or may not be bent towards pterostigma; MA gradually converging on R₄₊₅, shortly after nodus with a distinct bulging away from R₄₊₅ and becoming thereupon attached to the R₄₊₅ by a short, oblique cross vein; MA may sometimes be indistinct or atrophid.

Distribution: Cosmopolitan.

KEY TO THE SUBFAMILIES OF THE DIVISION AESHNINI

MA distinctly fused with R₄₊₅ shortly after nodus becoming thereafter indistinct; R₅ not abruptly bent just proximal to inner end of pterostigma. ... ... ... Anactinae.

MA imperfectly joined with R₄₊₅ shortly after nodus and not atrophid beyond that point; R₅ with an abrupt curve just proximal to the inner end of pterostigma ... ... Gynacanthaginae.

Subfamily ANACTINAE

Diagnostic characters: Dentigerous plate rounded and with fine spines; oreillets small or atrophid; abdominal segments 4-8 with or without supplementary longitudinal ridges. Base of hindwing rounded in both sexes or angulated in males; anal triangle present or absent; MA
distinctly fused with $R_{4+5}$ by an oblique vein shortly after nodus and more or less atrophid beyond that point; $R_8$ without an abrupt bent just promixal to inner end of pterostigma.

\textit{Distribution:} Cosmopolitan.

**Genus Anax Leach**


**Type-species:** \textit{Anax imperator} Leach

Leach (1815) established the genus \textit{Anax} but provided only a very brief description for the same. The generic concept was, however, amplified later chiefly by Selys (1840, 1950, 1878b, 1883a, b), Brauer (1866) and Hagen (1875), who also incorporated into it quite a few species from nearly all parts of the world. Martin (1908), Tillyard (1917), Fraser (1921d, 1936, 1949a), Laidlaw (1921, 1923), Needham (1930a), Schmidt (1938), Lief tinck (1942, 1954, 1955a, 1962, 1971a, 1975), Asahina (1962), Pinhey (1962) and Aguesse (1960), among others, have also worked on this genus. Bhasin (1956), St. Quentin (1970), Kumar (1972c, 1973c), Singh and Prasad (1976a), Kumar and Prasad (1977a) and Prasad and Kumar (1977b) dealt with a few species of this genus occurring in Indian region in recent times.

**Diagnostic characters:** Large in size (usually abdomen 46.0-70.0 mm, hindwing 46.0-60.0 mm); black or brown, marked with blue, green, red or yellow; frons projecting, but not elevated; in male oreillet absent and 3rd abdominal segment sometimes a little constricted; abdominal segments 5-6 with supplementary lateral ridges; male superior anal appendages about twice as long as segment 10 of abdomen, lanceolate and with a strong ridge on upper surface, inferior a little less than half the length of superiors, subquadrate, sometimes notched and frunished apically with two or more imbricated spines; female anal appendages about twice or more in length than segment 10 of abdomen, lanceolate; ovipositor short, falling well short of apex of abdomen; dentigerous plate simple, rounded and coated with short spines. Wings hyaline, sometimes enfumed with pale yellow or brown; bases of hindwing straight; tornus rounded; usually 13-21 and 10-15 antenodal cross veins in fore- and hindwings respectively and 8-12 postnodal cross veins in either wing; usually the 1st and either 6th or 7th antenodals primary; pterostigma very narrow, about 4-5 times as long as broad, braced; arc situated much nearer basal primary antenodal than distal; discoidal cell situated about one cell distal to the level of
arc, 5-7 celled in forewing, shorter and broader and 4-5 celled in hindwing; median space entire; hypetrigone and cubital space basal to sub-trigone traversed by 2-4 and 4-7 cross veins respectively; 10-12 cells in anal loop, R₈ with an abrupt curve towards the outer end of pterostigma; IR₃ not forked or imperfectly so; MA gradually converging on R₄₊₅, with a distinct bulging away from R₄₊₅ shortly after nodus and there-upon becoming weakened or atrophid; cells between IR₈ and Rₛₚ and between MA and Mₛₚ arranged in 1-6 rows; cells between Cu₂ and IA arranged in 1-2 rows.

*Distribution*: Cosmopolitan.

*Anax sp. A*  
(Fig. 22)

*Material studied*: 1 ♀, Shillong, 6.ix.1975, coll KD.

Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th></th>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>abdomen</td>
<td>anal app.</td>
<td>hindwing</td>
</tr>
<tr>
<td>♀</td>
<td>52.0</td>
<td>5.5</td>
<td>50.0</td>
</tr>
</tbody>
</table>

*Description*: Female: Labium green; bases of mandibles black; labrum, clypeus and frons dark greenish yellow; anterior border of labrum, a 'T' shaped spot on frons (the stem of which expanded into a triangular basal spot), vessicle, antenna and occiput black, the later with a central rounded yellow spot; eyes dark green in front and on dorsum, greenish yellow behind; beaneath head pale greenish yellow. Thorax dark green; mid-dorsal carina finely black, but narrowly enclosed in pale brown; antealar sinus and tergum green; an upper humeral spot, a narrow stipe on posterolateral suture and venter of thorax black; lower third of metepimeron blackish. Legs black, marked with green as follows: broad outer stripe on 1st and 2nd coxae, anterior trochanters and narrow inner stripe on basal third of anterior femora. Wings hyaline, bases except anal area nearly upto 1st anennodal cross vein amber yellow; costal and subcostal space palely enfumed from arc to nodus; the 1st and 7th in forewing, the 1st and either 6th or 7th antenodal in hindwing primary; pterostigma reddish eyellow, covering nearly 3 cells and strongly braced; discoidal cells 5-celled in forewing, 4-5 celled in hindwing; 4-5 cubital cross veins in forewing, 4 in hindwing; hypertrigones traversed twice; costa green, venation black otherwise. Abdomen brown on segments 1-3, with apical borders and jugal sutures narrowly black, blackish there-
after and marked with bright greenish yellow as follows: segment 1 with a large lateral spot; segment 2 on sides; apical lateral rounded spots growing progressively larger from segment 3-10; a lateral lanceolate transverse spot at base of segment 8; a lateral rounded spot on segment 7 at about one third distance from base; isolated ventrolateral stripes on segments 6-8; vestiges of the same on segment 5; venter of segments 9 and 10; segment 9 except at base armed with close small black spines. Anal appendages (5.5 mm) and genitalia as shown in Fig. 22. Ovipositor black at lower border, its styles whitish at base.

*Notes*: The specimen under study was supposed close to *A. nigrolineatus* Fraser. Late Dr. Lieftinck, Netherlands, when requested to confirm pointed out that it was *A.? cf nigrolineatus* Fraser. In view of insufficient literature and material for comparison, the specimen is described here as *Anax* sp. A.

The specimen was collected from Ward lake, Shillong, apparently resting on the grassy bank.

*Distribution*: India: Meghalaya.

**SUBFAMILY GYNACANTHAGINAE**

*Diagnostic characters*: Dentigerous plate produced into a robust two progned fork; oreillets usually well developed. Base of hindwing excavated and angulated in males, rounded in females; Sc may or may not be prolonged beyond nodus; MA imperfectly joined with R\(_{4+5}\) shortly after nodus and not atrophid beyond that point; R\(_5\) showing an abrupt curve just proximal to the inner end of pterostigma.

*Distribution*: Virtually cosmopolitan.

Genus *Gynacantha* Rambur


Type-species: *Gynacantha nervosa* Rambur.

Rambur (1842) established this genus including only the type-species. The generic concept has been further enlightened and there has also been addition of a number of new species from different parts of the world as a result of contributions chiefly of Selys (1878b, 1882, 1889, 1883a, 1891a) and Hagen (1861, 1875). Karsch (1891c), Krugger (1898), Martin (1909), Ris (1911), Laidlaw (1921, 1923, 1931), Fraser (1922b, 1927a, 1935, 1936), Williamson (1923), Needham (1930a), Schmidt (1938), Lieftinck (1953a, b, 1954, 1960b, 1975) and Pinhey (1962) have also worked on this genus.
Different species of this genus occurring in Indian region have also been dealt with by Navas (1933), Lieftinck (1948a), Bhasin (1953), St. Quentin (1970) and Lahiri and Mitra (1973, 1975).

Kirby's (1980) and Cowley's (1934) proposal for a different generic name for *Gynacanthes* Selys nec Rambur has not been accepted by most authorities.

**Diagnostic characters**: Large in size (usually abdomen 42.0-79.0mm, hindwing 35.0-59.0 mm) ; brown or black marked with maroon, yellow or green ; 3rd abdominal segment in male usually constricted ; male superior anal appendages long and narrow, about 2-3 times as long as segment 10 of abdomen, dilated apically for variable extent where these are usually coated with long hairs on inner surface, inferior less than half the length of superiors, narrow and triangular ; less than half the length of superiors, narrow and triangular ; female anal appendages lanceolate and usually longer in comparison to those of male superior anal appendages ; ovipositor large, usually extending to apex of abdomen ; dentigerous plate shaped as a 2-pronged fork. Wings hyaline, sometimes tinted with yellow or brown ; usually in males base of hindwing obtusely notched, tornus angulated and anal triangle 3-celled ; usually 13-42 antenodal and postnodal cross veins ; the 1st and any one of 6th-10th antenodals primary ; pterostigma narrow about 4-5 times as long as broad, braced ; discoidal cell 5-9 celled and situated about 2-3 cells distal to the level of arc ; median space entire ; hypertrigone and cubital space basal to subtrigone traversed by 4-9 and 6-10 veins respectively ; generally 8-17 cells in anal loop ; R₈ with an abrupt curve towards proximal end of pterostigma ; IR₈ forked ; MA distinct upto wing margin, gradually converging on R₄₊₅ and with a bulging away from R₄₊₅ shortly after nodus ; cells between IR₈ and Rs₈ and between MA and Ms₈ arranged in 17 rows ; usually only one row of cells between Cu₈ and IA.

**Distribution**: Virtually cosmopolitan.

**KEY TO THE SPECIES OF THE GENUS GYNACANTHA RAMBUR (FEMALES)**

Frons greenish yellow and unmarked ; smaller species with abdomen 45.0-45.5 mm and hindwing 41.0-42.0 mm in length.

... ... ... bayadera Selys

Frons greenish yellow but on upper surface marked with a black T-shaped spot ; larger species with abdomen 49.5 mm and hindwing 45.0 mm in length...

... ... ..sp. A

(Due to nonavailability of males of either species studied, no key to males has been provided.)
**Gynacantha bayadera** Selys
(Fig. 346)


**Material studied:** 2 ♀♂, Rongrengiri, 22.iv.1973, coll ARL.

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>anal app.</td>
<td>hindwing</td>
</tr>
<tr>
<td>♀ ♂</td>
<td>45.0-45.5</td>
<td>2.5</td>
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**Notes:** The specimens studied vary from the description of the species provided by Fraser (1936) a little in size, nodal index and in the following: (i) pterostigma covering 3-4 cells; (ii) discoidal cells 5 celled in forewing; (iii) hypertrigones traversed 4 times in forewing; (iv) 8-9 cells in anal loop; (v) abdomen brown, but darker on segments 3-9; segment 1 and sides of segment 2 green; apical border and jugal suture black on all segments.

So far known, the species is restricted to Meghalaya only at lower altitude of northern Garo hills. The specimens were collected at dusk when noticed hovering over a small ephemeral pond with unclean water.

**Distribution:** India: Meghalaya, Sikkin, West Bengal. Outside India: Burma; Thailand; Indonesia; New Guinea; Philippines.

**Gynacantha sp. A**
(Fig. 345)

**Material studied:** 1 ♀, Songsok, 16.iv.1973, coll ARL.

Measurements (in mm) and Nodal index.

<table>
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<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tr>
<td>abdomen</td>
<td>anal app.</td>
<td>hindwing</td>
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<tr>
<td>♀</td>
<td>49.5</td>
<td>4.0</td>
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**Description:** Female: Head greenish yellow but labium and labrum palely so; vesicle black and a black T-shaped mark on upper surface on frons somewhat like an anchor with its stem much broader and little longer than the short and pointed arms; antennae pale brown with a yellow apical ring on 1st segment; fine black hairs on clypeus and frons; longer hairs
on vesicle. Thorax brownish dorsally, greenish yellow otherwise; synthorax with mid-dorsal carina finely black. Legs yellowish, the tibiae and the distal ends of femora brown. Wings hyaline; membrane whitish grey; pterostigma yellow; discoidal cells with 6-7 cells in forewing, 5-6 cells in hindwing; the 1st and either 8th or 9th antenodals primary; 6-7 traversing cross veins in hypertrigones in forewing, 5-7 in hindwing; 8 cubital cross veins in forewing, 7 in hindwing; 9-10 cells in anal loop. Abdomen dark brown to almost black on dorsum, pale brown on venter, marked with green as follows: segment 1 pale brown and with broad green apical annules; segment 2 with mid-dorsal carina and an isolated stripe bordering jugal suture proximally green; segments 3-6 with similar but, less prominent stripes bordering jugal sutures apically; segments 3-7 with paired apical and segments 5-7 and segment 10 with paired subbasal transverse spots; segments 6-8 with ventrolateral stripes confluent with basal spots, falling short of apex of segments; apical border of all segments as well as all jugal sutures finely black; segment 3 moderately constricted; Anal appendages fructured off at apex, brown but black at outer edge with straight inner and slightly convex outer border; ovipositor and dentigerous plate (Fig. 345) as for genus, pale brown, but the styles and two diver­ticulate spines black.

**Notes**: Late Dr. Lieftinck, when requested to comment on the material reported it as *Gynacantha* sp. However, the specimen under study comes very close to *G. hyaline* Selys, in size, in having black 'T' shaped markings on the frons and untinted wings, but differs from the description of the species provided by Fraser (1936) in details of markings on face, thorax and abdomen. The female of *G. hyaline* Selys in turn has close similarity to that of *G. subinterrupta* Rambur and *G. bainbriggei* Fraser, as stated by the same author, and hence it is impossible to make sure the true identity of the species in absence of a male.

It was collected long after dusk when it flue inside a room apparently being attracted by light.

**Distribution**: India: Meghalaya.

**Superfamily Cordulegasteroidea**

This superfamily contains only one family, i.e. family Cordulegasteridae.
Diagnostic characters: Head globular; labium with middle lobe cleft or notched at the middle, narrower than lateral lobes; inner margin of eyes meeting at a point only or but slightly separated; occiput small and triangular; male genitalia hidden, being variably overlapped by the expanded tergite of segment 2 of abdomen; ovipositor absent, but usually well developed psuedoovipositor or vulver scale present. Wings similar or dissimilar in both sexes, hyaline or coloured at base; subtrigone not well differentiated; median space entire or traversed; anal loop variable; rudimentary or well developed.

Nymphs: [after Fraser (1957)]: Labial musk broad and deeply concave or cupped with numerous setae; lateral lobes broad, their apposed borders being more of less deeply incised, crenate or serrate and often bordered with tuft of seate; gizzard with 4 fold, each with a robust tooth.

Distribution: Virtually cosmopolitan.

KEY TO THE SUBFAMILIES OF THE FAMILY CORDULEGASTERIDAE

Median space entire; tibiae of males without a keel or only foretibiae with a distal keel; females with a well developed pseudoovipositor (Fig. (24).

Cordulegasterinae.

Median space traversed by one or more veins; all tibiae of males with well developed keel; females without ovipositor (Fig. 24). Chlorogomphinae.

Subfamily CORDULEGASTERINAE

Diagnostic characters: Tibiae of males without a keel, or only foretibiae with a distal keel; in females a well developed pseudoovipositor made up of two greatly elongated apposed laminae steadily narrowing to apex. Basal incomplete antenodal cross vein absent; median space entire; discoidal cell elongated along length of wing, these similar in shape in either wing; anal loop rudimentary.

Distribution: Same as family.

Genus Anotogaster Selys


Type-species: Anotogaster nipalensis Selys

Selys (1854b) established Anotogaster for a few of his new species and gave it the status of a subgenus in his classification. Later, it was
elevated to generic rank by Kirby (1890). Its concept has been further elaborated and there has also been addition of some more species as a result of contribution chiefly of Selys (1858, 1873, 1883a), Williamson (1907), Needham (1930a) and Fraser (1923a, 1924a, 1929d, 1936). Bhasin (1953) and St. Quentin (1970) dealt with a few species of the genus occurring in Indian region.

**Diagnostic characters:** Large in size (usually abdomen 52.0-80.0 mm, hindwing 42.0-67.0 mm); black, marked with yellow or green, more rarely with some shades of brown or red; frons elevated, but not higher than occiput, shallowly notched above and fringed with hairs; antennae 7 segmented; in males, only the foretibiae with a short distal keel and slightly constricted 2nd abdominal segment without oreillet; male superior anal appendages subequal to segment 10 of abdomen, acuminate, occassionally twisted or a little compressed laterally and armed with a pair of ventral teeth, inferior about three fourth the length of superiors, subquadrate, shallowly notched at apical border; male genitalia with broadly arched lamina, stout, foliate anterior hamules with inner border curled strongly inwards, slender, stilet shaped posterior hamules and short variably notched lobe; female with greatly hypertrophid pseudovipositor. Wings hyaline, sometimes amber tinted at base or enfumed with brown; base of hindwing straight, tornus rounded in either sex; anal triangle indistinct or 4-5 celled; usually 15-27 and 10-18 antenodal cross veins in fore- and hindwings respectively and 8-21 postnodal cross veins; veins; the 1st and any one amongst 5th-10th antenodals primary; pterostigma narrow, that of hindwing a little longer than forewing, about 5-7 times as long as broad, not braced; arc situated much nearer to the basal than the distal primary antenodal cross vein; discoidal cell situated about one cell distal to the level of arc, usually traversed once, rarely 2-3 times, similarly shaped in either wing, with costal and inner margines subequal and nearly double the length of basal margin; median space entire; hypertrigone entire, or the same and cubital space basal to subtrigone traversed by 1-2 and 2-4 cross veins respectively; 3-7 cells in anal loop; IA markedly pectinate.

**Distribution:** India; Nepal; Tibet; China; Burma; Japan; Ryukyu; Taiwan.

**Anotogaster sp. A**

(Figs. 3, 10 and 25)

**Material studied:** 1 ♀, Mawpat, 14.vii.1967, coll RKV; 1 ♀, Shillong, 3.vii.1974, coll ARL; 1 ♀, Upper Shillong, 30.viii.1968, coll JKP.
Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td>abdomen</td>
<td>ovipositor</td>
<td>hindwing</td>
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</tbody>
</table>
| ♀ ♂ 61.0-68.0 | 10.0-10.5 | 52.0-57.0 | 19-22 | 16-17 | 14-16 | 15-17

*Description*: Female: Labium and bases of mandibles brown; labrum citron yellow sometimes brownish at center, with a median longitudinal line and the edges broadly marked with black; frons brown, but black above; antennae, vesicle and occiput black; beneath head dark brown to black; eyes green during life, brown in preserved specimen; clypeus and frons with short fine hairs, those on sides more thick; hind margin of occiput (Fig. 10) fringed with thick fine, black and moderately long erect hairs. Prothorax black, anterior lobe with a narrow dorsal yellow stripe and posterior lobe with a pair of subdorsal narrow transverse yellowish stripes. Synthorax black but paler beneath and marked with greenish yellow as follows; a pair of pyriform antehumeral stripes, reaching close to antealer sinus, falling well short of mesothoracic collar and widely divergent below; two broad oblique stripes on either side, one post humeral, the other covering most of metepimeron; some spots on tergium at bases of wings. Legs black but coxae brown at base. Wings hyaline, apices sometimes enumped with brown and bases of all wings tinted with golden amber from base to distal end of discoidal cells and variably over anal area; pterostigma black, covering nearly 4 cells; membrane greyish white; discoidal cells 2-3 celled in all wings; hypertrigones transversed once only, but sometimes entire in forewing; the 1st and any one of 7th-9th antenodals in forewing, the 1st, and 5th, 7th or 8th in hindwing primary; 3-4 cubital cross veins in forewing, only 3 in hindwing; 5-7 cells in anal loop. Abdomen black, marked with greenish yellow as follows: segment 2 with a narrow annule covering jugal suture, traversing dorsum at about middle of the segment, broader and oblique on sides; segments 3-8 with similar, but narrower post-jugal annules, interrupted on dorsum narrowly on segments 3-7, broadly on segment 8, complete ventrally only on segments 7 and 8; segment 9 with a narrow basal annule and some obscured spots on sides; segment 10 unmarked. Anal appendages black, shaped as for genus; ovipositor (Fig. 25) brownish to black, subcylindrical and a little compressed laterally.

*Notes*: The specimens studied appear to be intermediate in size between *A. gigantica* Fraser known from Burma and *A. nipalensis* Selys known from Nepal, Sikkin, and West Bengal. Besides, these also vary
from both in details of colouration. No specific determination has been possible in absence of males.

So far known the species is restricted in central Khasi hills. The specimens were collected from forested areas in the vicinity of human dwellings.

*Distribution*: India: Meghalaya.

**Subfamily CHLOROGOMPHINAE**

*Diagnostic characters*: All tibiae of males with well-developed keel; females with a short vulvar scale but without a pseudoovipositor. Basal incomplete antenodal cross vein present; median space traversed by cross veins; discoidal cells may or may not be elongated along length of wing, these are differing in shape in fore- and hindwings; anal loop well developed.

*Distribution*: India; Nepal; Burma; Vietnam; Malaysia; Indonesia; Japan; Ryukyu; Taiwan.

**Genus Chlorogomphus** Selys


*Type-species*: *Chlorogomphus magnificus* Selys

Selys (1854b, 1978c) established respectively the genus *Chlorogomphus* and its subgenus *Orogomphus* along with descriptions of some new species. Kirby (1890) gave *Orogomphus* generic status. Further contribution on these genera and addition of some more species came chiefly from Selys (1891a), Martin (1904, 1910), Williamson (1907), Laidlaw (1914b, 1915, 1920d), Fraser (1923a, 1924a, 1925a, f), and Oguma (1926). Fraser (1929d) suppressed *Orogomphus* under *Chlorogomphus* along with a revisionary account of the genus and all its known species. All later workers have accepted Fraser’s opinion. Fraser (1931, 1933b, c, 1936, 1936b), St. Quentin (1936), Asahina (1949, 1973) and Lieftinck (1954, 1960b) have also worked on this genus. Navas (1930) and Bhasin (1953) dealt with a few, species of the genus occurring in Indian region.

*Diagnostic characters*: Large to very large in size (usually abdomen 45.0-74.0 mm, hindwing 38.0-70.0 mm); black, usually marked with yellow, but sometimes also with red; frons raised, rounded above, as high
as or higher than occiput; antennae 6-7 segmented; all tibiae with well developed keel in males; male 2nd abdominal segment with oreillets, rarely constricted and then only slightly; mel superior anal appendages a little longer than segment 10 of abdomen, separated at base, a little converging and of even width, but sometimes narrowed apically or armed with ventral spines; inferior subequal to superiors, deeply cleft into slightly diverticate branches; male genitalia with depressed lamina having two low rounded bossess, backwardly directed hamules curled at apex and small grooved vesicle; 2nd segment of penis with median lobe projected forward, narrowed and diverged at apex. lateral lobe having similar, but backwardly directed shorter branches; female with small, but conspicuous, variably wide vulver scale notched at free border. Wings hyaline, sometimes, specially in female, tinted with yellow along costal border or at base, rarely enfumed with brown, marked with black fasciae or tipped with black; base of wings rounded, those of males with shallow excavations filled in by membrane, anal triangle indistinct or 3 celled; usually 18-33 and 9-20 antenodal and postnodal cross veins in forewing, 12-26 and 11-24 respectively in hindwing; 1st or 2nd and any one among 7th-10th antenodals primary; pterostigma narrow, about 4-5 times as long as broad, poorly braced or not at all; arc situated much nearer to basal than distal primary antenodal cross vein; discoidal cell situated about 2-4 cells distal to the level of arc, similar or dissimilar in shape in fore- and hindwings, entire, or 2-5 celled, with distal margin usually subequal to costal and variably longer than basal margin; median space, hypertrigone and cubital space basal to subtrigone usually traversed by 1-5, 2-6 and 4-9 cross veins respectively; usually 8-20, but sometimes upto 35 cells in anal loop; IA forked, but sometimes pectinate in hindwing.

Distribution: Same as subfamily.

**Chlorogomphus atkinsoni** (Selys)  
(Figs. 2, 8, 11,24, 26-28, 374-753 and 532)  


**Material studied**: 1 ♂, Cherrapunjee, 8.v.1968, coll RKV; 1 ♀, Shillong, 6.x.1961, coll SNP.

**Measurements (in mm) and Nodal index.**

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<thead>
<tr>
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<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td></td>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂</td>
<td>58.5</td>
<td>40.0</td>
<td>18-19</td>
</tr>
<tr>
<td>♀</td>
<td>56.0</td>
<td>42.0</td>
<td>21-22</td>
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</table>
Notes: Both sexes studied vary a little from the description of the species provided by Fraser (1936) in nodal index, details of body markings and wing venation. The male is also a little larger in size.

So far known, in Meghalaya, the species is restricted to high altitude areas of Khasi hills. The specimens were collected during short interval of rest on bushes between speedy soaring flights and at places quite away from streams.

Distribution: India: Assam, Meghalaya, Uttar Pradesh, West Bengal

SUPERFAMILY LIBELLULOIDEA

Diagnostic characters: Head globular; inner margins of eyes broadly contiguous; vesicle well defined; occiput small and triangular; tibiae in males with or without keel on flexor surface; oreillet usually absent; male genitalia with anterior hamules more or less abortive; ovipositor usually inconspicuous. Base of hindwing rounded or sometimes in males angulated; costal and subcoxtal antenodal cross veins coinciding; two primary antenodal cross veins usually not distinguishable from other antenodal cross veins; distal antenodal cross vein complete or incomplete; sectors of arc fused or separated at origin; median space usually entire.

Nymphs: [after Fraser (1957)]: Labial mask broad and deeply concave or cupped and with numerous setae; lateral lobes broad, their apposed borders being more or less deeply incised, crenate or serrate and often bordered with tuft of setae; gizzard with 4 folds, each with a robust tooth.

Remarks: Fraser (1957) erected the family Macrodiplactidae under the superfamily Libelluloidea which, however, is not generally accepted.

Distribution: Cosmopolitan.

KEY TO THE FAMILIES OF SUPERFAMILY LIBELLULOIDEA

Eyes with a small sinuous projection at middle of the posterior border (Fig. 12); synthorax metallic blue or green; tibiae of males with a long membraneous keel on flexor surface (Fig. 16).

- Corduliidae.

Eyes without a projection at posterior border; thorax rarely of metallic colour; tibia of males without a keel on flexor surface.

- Libellulidae.

Family CORDULIIDAE

Diagnostic characters: Body colour, specially of synthorax, partly or wholly metallic blue or green; eyes with a small sinuous projection.
at middle of the posterior border; males usually with oreillets and a membranous keel on flexor surface of tibiae. Wings usually hyaline; hind-wing usually in males notched at base and anal triangle well formed.

**Remarks:** Lieftinck’s (1971b) concept of the family Corduliidae has been followed here.

**Distribution:** Cosmopolitan.

### KEY TO THE SUBFAMILIES OF THE FAMILY CORDULIIDAE

Sectors of arc in both wings arising from a common point and without any stalk at origin (Fig. 533). *Corduliinae.*

Sectors of arc in both wings fused for a short distance at origin to form a stalk; in hindwing stalk elongated (Fig. 534). *Macromiinae.*

### Subfamily CORDULIINAE

**Diagnostic characters:** Sectors of arc in either wing arising from a common point but not forming a stalk; discoidal cell entire or traversed by cross veins and with straight costal margin; base of discoidal cell in hindwing situated at or a little proximal to the level of arc; subtrigone made of 2-3 cells; anal loop elongate with well developed mid-rib.

**Distribution:** Cosmopolitan.

#### Genus Hemicordulia Selys


**Type-species:** *Cordulia australiae* Rambur

Selys (1870) established *Hemicordulia* for a few of his new species and a few others earlier considered to the genus *Cordulia* Leach. This generic concept has further been enlightened and there has also been an addition of some more species, as a result of contribution chiefly of Selys (1871, 1878a, b), Kirby (1890), Martin (1906), Fraser (1921c, 1936, 1944), Lieftinck (1933, 1953b, 1954, 1975), Chao (1962), Pinhey (1962) and and Watson (1969).

**Diagnostic characters:** Medium in size (usually abdomen 28.0-42.0 mm, hindwing 25.0-37.0 mm); metallic green, blue or black, marked with yellow; vesicle small and simple; posterior lobe of prothorax not erected as a collar and usually not bearing specialised tuft of hairs; in males, fore- and hind pairs of tibiae on flexor surface with membranous keel, the same
extending nearly to base of hind tibiae; tibial claws with inner arm shorter than outer; in males, oreillets absent and segment 10 of abdomen not carinated or bearing a mid-dorsal spine; male superior anal appendages 2-3 times as long as segment 10 of abdomen, constricted a little near base, laminated thereafter, forcipate or sinuous apically for variable extent, sometimes twisted or armed with a median spine; inferior a little shorter than superiors, narrow, triangular and curved a little upwards at apex; male genitalia with lamina depressed, hamules with broad base and narrowed strongly curved apex, and short, triangular lobe projected a little in profile; 2nd segment of penis with moderately broad and closely apposed median lobes, the apical lobes produced into a long, whip-like flagella; vulvar sacle small, extending over basal third of segment 9, shortly triangular, bifid at apex and deeply emerginante. Wings hyaline, sometimes partly saffronated or enfumed with yellow; apices of wings moderately pointed; base of hindwing rounded in either sex; usually 7-9 and 5-6 antenodal cross veins in fore- and hindwings respectively and 5-9 postnodal cross veins in either wing; pterostigma about 3-4 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles, that of forewing traversed by a vein, shorter than subtrigone, elongated in breadth of wing, situated far distal to level of arc, with costal margin a little shorter than other margins, of hindwing entire, elongated in length of wing, situated slightly proximal to the level of arc, with basal margin about half the length of other margins; arc situated between the 1st and 2nd antenodal cross-veins; discoidal field commencing with a row of 2-3 cells; \( \text{Cu}_2 \) and MA covering at wing margin in forewing; hypertrigones entire in either wing; subtrigone 3 celled; sectors of arc arising from a common point, but not fused at base; only 1 cubital cross vein in either wing; anal loop elongated, usually made of 14-18 cells; upto 4 rows of postanal cells in forewing.

**Distribution**: India; China; Burma; Malaysia; Indonesia; New Guinea; Japan; Ryukyus; Taiwan; Philippines; Australia; New Zealand; Pacific Islands; Mauritius; Africa; Madagascar; Seychelles.

**Hemicordulia asiatica** Selys

(Figs. 12, 16, 379-381, 442-443 and 533)


**Material studied**: 1 ♂, Jowai, 4.x.1972, coll ARL

Measurements (in mm) and Nodal index.
Notes: From the description of the species provided by Fraser (1936) the male under study varies in having shorter hindwing, sides of segment 4 unmarked and that on segments 5-8 marked only with basolateral triangular spots.

The species has been noticed to patrol very swiftly over slow running shallow streams or lakes with muddy bottom.

Distribution: India: Assam, Kerala, Maharashtra, Meghalaya, Tamil Nadu. Outside India: Africa.

Subfamily MACROMIINAE

Diagnostic characters: Sectors of arc in both wings form a common stalk at base; discoidal cell usually entire with costal margin in either wing nearly always straight; base of hindwing situated distal to the level of arc; subtrigone variable, entire or traversed by cross veins; anal loop quadrate or elongate with moderately developed or indistinct mid-rib.

Distribution: Virtually cosmopolitan.

KEY TO THE GENERA OF THE SUBFAMILY MACROMIINAE

In males anal triangle present and hindwing notched at base; stalk at base of sectors of arc in hindwing longer than that of forewing; discoidal field proximally with usually 3 transverse rows of cells (Fig. 534). … Macromia Rambur.

In males anal triangle absent and hindwing rounded at base; length of stalk at base of sectors of arc almost similar in either wing; discoidal field proximally with at most 2 transverse rows of cells… … … Idionyx Hagen.

Genus Idionyx Hagen


Tyep-species: Idionyx yolanda Selys.

Hagen (1867a) published only a very short account of the genus Idionyx and he was followed by Brauer (1868b, c). Selys (1871) treated the genus in some further detail along with description of the only then known species i.e. I. Yolanda Selys. The generic concept has been further elaborated and there has also been an addition of quite a number of species
as a result of contribution chiefly of Selys (1878a), Kirby (1890), Karsch (1891a), Martin (1905), Fraser (1921c, 1924a, 1926a, 1931, 1936, 1939) and Lieftinck (1939b, 1953b, 1954, 1960b, 1971b). Asahina (1965) Bhasin (1953) and St. Quentin (1970) also made some contribution on different species of the genus occurring in Indian region.

**Diagnostic characters:** Medium in size (usually abdomen and hind-wing 27.0-38.0 mm); metallic green or blue, marked with yellow, or black; vesicle simple, rounded or sometimes, specially in females, highly specialised, forming cones of variable shape frequently surmounted by an obtuse tubercle and apex bifid or produced into a variably shaped spine; posterior lobe of prothorax not erected as a collar and usually not bearing specialised tuft of hairs; tibiae of males on flexor surface with membranous keel, a long one on hind tibiae, short, distal on others; tibial claws with arms equal in length; oreillet present, segment 10 of abdomen carinated and sometimes produced into a mid-dorsal apical spine in male; male anal appendages subequal and either as long as orupto more than twice as long as the segment 10 of abdomen; superiors forcipete, sometimes with subapical excavation on inner margin and bearing robust tooth or spines on ventral surface; inferior broad at base, narrowed thereafter, blunt, bifid or trifid at apex, with or without lateral spines; male genitalia with lamina depressed, large hamuls bearing a robust strongly curved hook and small, rounded lobe bearing a tuft of hairs; 2nd segment of penis with rather short, triangular median and long apical lobes, the lateral projecting forwards and with long, whip like flagella produced from near its base; vulvar scale short, triangular and projecting markedly in profile. Wings hyaline, sometimes, specially in females, saffronated at base or deeply enfumed; apices of wings moderately pointed; base of hindwing shallowly notched in males, rounded in females; usually 11-17 and 7-10 antenodal cross veins in fore- and hindwings respectively and 5-11 postnodal cross veins; pterostigma about 3-4 times as long as broad, not braced; discoidal cell entire, the same equilateral and smaller than subtrigone in forewing, situated a little distal to the level of arc, with basal margin slightly shorter than other margins in hindwing; arc situated at the 2nd or between 2nd and 3rd antenodal cross-veins; discoidal field commencing with a single row of cells; Cu2 and MA parallel or divergent at wing margin in forewing; subtrigone entire, hypertrigone traversed by 1 or 2 veins in forewing, entire or traversed by 1 vein in hindwing; sectors of arc with a long fusion; 1 or 2 cubital cross veins in either wing; anal loop elongated, usually made of 4-10 cells; upto 2 rows of postanal cells in forewing.
Distribution: India; Nepal; China; Burma; Malaysia; Indonesia; Philippines.

**Idionyx optata** Selys

(Figs. 376-378 and 446-447)


**Material studied:** 1 ♂, Cherrapunjee, 16.v.1976, coll SB.

Measurements (in mm) and Nodal index.

<table>
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<th></th>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tr>
<td></td>
<td>abdomen</td>
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<td>An</td>
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<td>♂</td>
<td>35.0</td>
<td>32.5</td>
<td>12-13</td>
</tr>
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**Notes:** The single male under study varies from the description of the species provided by Fraser (1936) in having entire hypertrigone and detail shape of the anal appendage.

The specimen studied was collected from the type locality, Cherrapunjee near the entrance of Mawsmai cave, while it was noticed perching on a twig of a small bush.

**Distribution:** India: Meghalaya.

Genus **Macromia** Rambur


**Type-species:** *Macromia cingulata* Rambur

Rambur (1842) established this genus for 2 of his new species. The generic concept has further been elaborated and there has also been addition of a number of species as a result of contributions rendered chiefly by Selys (1870, 1871, 1874, 1878a, 1889), Hagen (1875), Kiry (1890), Kruger (1899), Martin (1904, 1906), and Williamson (1909). Fraser (1921c, 1922c, 1924b, f, 1927a, 1935a, 1936), Laidlaw (1920d, 1922b), Lieftinck (1929, 1950, 1955a, c, 1971a, b), Needham (1930a), Asahina (1949, 1964a), Gloyd (1959) and Pinhey (1962) have also worked on this genus. Bhasin (1953), Asahina (1963), St. Quentin (1970), Vershney (1971), Kumar (1972c, 1973b,), Prasad (1976a) and Singh and Prasad (1976a) published accounts on different species of this genus occurring in Indian region.
Remarks: Gloyd (1959) proposed elevation of Macromia group of genera to family rank but Lieftinck (1971, 1977) favoured their placement under a subfamily of Corduliidae as has been followed in the present work.

Diagnostic characters: Medium to large in size (usually abdomen 32.0-59.0 mm, hindwing 29.0-59.0 mm); metallic green or blue and black, marked with yellow; vesicle small and simple; posterior lobe of prothorax not erected as a collar and usually not bearing specialised tuft of hairs; in males, membranous keel on flexor surface extending nearly to the base of hind tibiae, limited only on the distal half on fore-tibiae and either atrophid or of variable extent on middle tibiae; tibial claws with inner arms stouter and longer than the outer arms; in male, a small oreillet present and segment 10 of abdomen carinated with apical margin with or without a prominent keel or a pair of tubercles; male superior anal appendages subequal to or longer than segment 10 of abdomen, narrowed from base, to an acute apex, the outer border usually bearing a variably developed median or subapical spine, inferior as long as or slightly longer than superiors, narrow, trignaular and curved a little upwards at apex; male genitalia with lamina depressed, long hamules more or less narrowed from base to strongly curved apex and sometimes with undulated ventral margin and either broad or rather narrow lobe; 2nd segment of penis with large, moderately long and almost fused median lobes, the apical lobes produced into a long, whip-like flagella; vulver scale variable, inconspicuous or even extending to more than halfway along the length of segment 10 of abdomen, oval or triangular and sometimes followed by a transverse ridge with a short ungulate process on either side. Wings hyaline, sometimes partly enfumed with brown or tinted with yellow or amber; apices of wings well pointed; base of hindwing markedly angulated in males, rounded in females; in males tornal angle pronounced, rounded or sharply acute; usually 13-18 and 8-15 antenodal cross veins in fore- and hindwings respectively and 8-13 postnodal cross veins; pterostigma about 3-4 times as long as broad, not braced; discoidal cell usually entire and roughly the shape of bilateral triangles, that of forewing subequal to subtrigone, elongated in breadth of wing, situated for distal to the level of arc, with costal margin a little more than half the length of other margins, of hindwing elongated in length of wing, situated well distal to the level of arc, with basal margin half the length of other margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field commencing with a row of 2-3 cells; hypertrigone traversed by 1-2 cross veins in forewing, by 1-4 cross veins in hindwing; subtrigone entire; Cu and MA diverging at wing margin in forewing; sectors of arc fused at base, a longer fusion in hind-
wing ; 2-3 cubital cross veins ; anal loop quadrate, made of 6-14 cells ;
upto 3 rows of postanal cells in forewing.

**Distribution** : Virtually cosmopolitan.

**Macromia moorei** Selys

(Figs. 382-385, 444-445 and 534)


**Material studied** : 2 exs, Mawphlang (1 ♂, 6.viii.1963, coll VDS ;
1 ♂, 26.iv.1972, coll SB) ; 2 ♂♂, Mylliem, 25.vii.1968, coll RKV ; 4 exs,
Shillong (1 ♂, 8.vi.1967, coll SB ; 1 ♀, 10.v.1975, coll KD ; 1 ♀, 13.vii.
1975, coll ARL ; 1 ♀, 9.viii.1975, coll RSG) ; 2 exs, Upper Shillong, coll

Measurements (in mm) and Nodal index

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<th>Length of Forewing</th>
<th>Hindwing</th>
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<td>abdomen</td>
<td>hindwing</td>
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<td>An</td>
<td>Pn</td>
</tr>
<tr>
<td>♂♂</td>
<td>51.0-52.0</td>
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<td>♀♀</td>
<td>50.0-53.0</td>
<td>47.0-48.5</td>
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**Notes** : From the description of the species provided by Frasser
(1936) the specimens under study vary in having longer pterostigma (2.50
2.75 mm in males, 2.00-2.75 mm in females).

Solitary specimens of this species were often noticed making to and
fro patrolling over a distance of 40'-70'; near streams, lakes and even
open ground or foot paths.

**Distribution** : India : Himachal Pradesh, Meghalaya, Uttar Pradesh,
West Bengal.

**Family LIBELLULIDAE**

**Diagnostic characters** : Body colour usually non metallic or even
metallic ; eyes without a sinuous projection at middle of the posterior
border ; in males oreillets and membraneous keel on flexor surface of tibiae
absent, Wings usually hyaline or even markedly coloured ; hindwing
rounded at base ; anal triangle absent.

**Remarks** : No subfamily has been recognised under this family be­
cause the characters of separation of the subfamilies as suggested by Fraser-
Tillyard (1938-1940) and Fraser (1957) appear overlapping.

**Distribution** : Cosmopolitan.
KEY TO THE GENERA OF THE FAMILY LIBELLULIDAE

1. Anal loop well formed, with borders meeting the inner margin of wing, apex of loop open (Fig. 62). ... Tholymis Hagen

   Anal loop absent or rudimentary, or well developed; when well developed, the borders covering and meeting before inner margin of wing and apex of loop closed (Figs. 63 and 535-539). ... 2

2. Claw simple, not bifid. ... Onychothemis Brauer

   Claw bifid into inner and outer arms. ... 3

3. Arms of claw equal in length. ... Zygonyx Hagen

   Claw with inner arm shorter than outer. ... 4

4. Sectors of arc in either wing separated almost from origin and without definite stalk (Fig. 47). ... Urothemis Brauer

   Sectors of arc in forewing separated almost from origin and without a definite stalk; these in hindwing form a common stalk. ... Rhyothemis Hagen

   Sectors of arc in both wing forming a common stalk at base (Figs. 536-539). ... 5

5. Costal margin of discoidal cell in forewing angulated; anal loop absent, or when present very small and formed of 4 or less cells (Figs 536 and 538). ... 6

   Costal margin of discoidal cell in forewing straight; anal loop well developed and formed of 6 or more cells (Figs. 536-537 and 539). ... 7

6. Anal loop absent; Cu₂ arising from distal margin of discoidal cell and well removed from the inner angle of the same (Fig. 538). ... Namnophya Rambur.

   Anal loop present; Cu₂ arising from inner angle of the discoidal cell (Fig. 535). ... Tetrathemis Brauer

7. Distal antenodal cross vein of forewing complete (Fig. 536). ... 1

   Distal antenodal cross vein of forewing incomplete (Fig. 539). ... 11

8. Posterior lobe of prothorax small and tumid and same not emerginate as a collar. ... Lyriothemis Brauer

   Posterior lobe of prothorax large and emerginate as a collar (Fig. 13). ... 9

9. Discoidal cell and hypertrigone traversed by one or more cross veins in forewing and always more than 10 antenodal cross veins. ... Orthetrum Newman

   Discoidal cell and hypertrigone entire in forewing and never more than 6 antenodal cross veins. ... 10

10. Abdomen dilated on segments 1-6 and thereafter slim and compressed up to the tip. ... Acisoma Rambur

   Abdomen variable, but never shaped as above. ... Brachyoiplax Brauer.

11. Posterior lobe of prothorax large and emerginate as a collar. ... 12

   Posterior lobe of prothorax small, tumid and not emerginate as a collar (Fig. 14). ... 14
12. Cu₂ in hindwing arising from distal margin of discoidal cell being well removed from inner angle of the same. \textit{Diplacodes} Kirby

\textbf{13.} Hypertrigone in forewing traversed by 1 or more cross veins; in the same wing Cu₂ and MA diverging at wing margin (Fig. 537). \textit{Palpoleonura} Rambur

\textbf{14.} Cu₂ and MA in forewing strongly converging at wing margin (Fig. 539). \textit{Juvela} Kirby

\textbf{15.} Discoidal cell of forewing with costal margin about at most one third in length of basal margin (Fig. 539). \textit{Pantala} Hagen

\textbf{16.} Hypertrigone in forewing traversed by 1 or more cross veins. \textit{Hypertrigone} in forewing entire; in the same wing Cu₂ and MA strongly converging at wing margin. \textit{Sympteryx} Newman

\textbf{17.} Antenodal cross veins in forewing 7½ or less. \textit{Hypertrigone} in forewing entire.

\textbf{18.} Arc situated between 2nd and 3rd antenodal cross veins; wings narrow. \textit{Potamarcha} Karsch

\textbf{19.} Rs not undulated; antenodal cross veins in forewing 11½ or less. \textit{Crocothemis} Brauer

\textbf{20.} Rs markedly undulated; antenodal cross veins in forewing 14½ or more. \textit{Hydrobasileus} Kirby

\textbf{Genus Tetrathemis} Brauer


\textit{Neophlebia} Selys, 1859, \textit{Pollin and van Dam, Mad., Ins.}, : 18.

\textbf{Type-species:} \textit{Tetrathemis irregularis} Brauer

The genus has been used here sensu Ris (1909). Brauer (1868a, b, c), Selys (1869a, 1878b, 1896), Karsch (1889b), Kirby (1889, 1890), Krueger (1902), Foerster (1906), Fraser (1918c, 1924a, f, 1931, 1936), Laidlaw (1926, 1931), Lieftinck (1954, 1955a, 1971a) and Pinhey (1962) also worked on this genus. On Indian species, there appeared two papers by Bhasin (1953) and Prasad and Kumar (1977a).
Diagnostic characters: Small in size (usually abdomen 14.0-22.0 mm, hindwing 18.0-27.0 mm); black or metallic green marked with yellow or green; vesicle high; posterior lobe of prothorax large, emarginate and provided with specialised tuft of hairs; tibial claws with inner arms much shorter than outer; male genitalia with depressed, arched lamina, distally hooked hamules with a little broadened base and moderately wide lobe rounded at outer margin and projected beyond the hamules in profile; 2nd segment of penis broadened apically with thin short median lobes having minute hairs on outer free margin; in females, borders of segment 9 of abdomen not dilated; vulvar scale markedly projected in profile; 9th ventral plate tongue like reaching apex of segment 10 of abdomen with minutely spined distal free margin. Wings hyaline, or sometimes partly marked with yellow or opaque blackish brown; usually 9-12 and 6-11 antenodal cross veins in fore- and hindwings respectively and 5-10 postnodal cross veins; pterostigma about 4 times as long as broad, not braced; discoidal cells entire, that of forewing appearing as a rectangle, situated a little distal to level of arc with costal margin markedly angulated, of hindwing elongated in length of wing, roughly shaped as a bilateral triangle, situated slightly distal to level of arc with costal margin a little longer than the other margins; arc situated usually between the 1st and 2nd or at 2nd or between 2nd and 3rd antenodal cross veins; discoidal field commencing with a row of single cell; hypertrigone in hindwing entire or traversed once, in forewing traversed by 1-2 veins or distorted, being arrested at the point of angulation of costal margin of discoidal cell; subtrigone a single cell in forewing; sectors of arc forming a common stalk; Cu₂ and MA parallel at wing margin in forewing; 1-5 cubital cross veins; Rs₁ and Mₛ₁ not clearly differentiated; anal loop short, made of 3-4 cells; up to 2 rows of postanal cells in forewing.

Distribution: India; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; New Guinea; Philippines; Australillia; Africa; Madagascar.

Tetrathemis platyptera Selys (Figs. 416, 502-503 and 536)


Tetrathemis aurea Fraser, 1924. Mem. Dep. Agric. India (Ent), 8 : 69.

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Length of abdomen</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tbody>
<tr>
<td></td>
<td>hindwing</td>
<td>An Pn</td>
<td>An Pn</td>
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<tr>
<td>♂ ♀</td>
<td>15.0-18.0</td>
<td>10-11</td>
<td>6-7</td>
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<td></td>
<td>23.0-24.0</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>17.0-18.0</td>
<td>8-9</td>
<td>7-8</td>
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*Notes:* Specimens of both sexes studied vary from the description of the species provided by Fraser (1936) in having labrum entirely black; the males vary further in having entirely black prothorax, longer hindwing and higher nodal index.

The specimens were collected only near stagnant, usually small dirty water masses where these were mostly noticed to perch on tall weeds or branches of trees overhanging such water masses.

*Distribution:* India: Karnataka, Kerala, Maharashtra, Meghalaya, Tamil Nadu and "Bengal" (exact locality unknown). Outside India: Burma; Thailand; Malaysia; Indonesia.

**Genus Lyriothemis** Brauer


Type - species: *Lyriothemis cleis* Brauer.

Brauer (1868a, b, c) and Selys (1878 b) established the 2 genera *Lyriothemis* and *Calothemis* for some of their new species, but Selys also included in his genus *Libellula bivittata* Rambur 1842. Further contribution on the two genera came from Selys (1882, 1883a), Karsch (1889a, 1900), Kirby (1889, 1890), Krueger (1902), Laidlaw (1902) and Martin (1904), Ris (1909) suppressed *Calothemis* Selys under *Lyriothemis* Brauer and his opinion was accepted by all later workers. Since then, amongst others Ris (1916, 1916a), Fraser (1918, 1921a, 1936), Lieftinck (1954) and Chao (1962) also worked on this genus.

*Diagnostic characters:* Small to large in size (usually abdomen 19.0-37.0 mm, hindwing 24.0-42.0 mm); coloured black or red, partly marked with yellow and metallic blue; vesicle bifid; posterior lobe of prothorax not erected as a collar and usually not bearing specialised tuft of hairs; tibial claws with inner arms shorter than outer; male genitalia
with a little projected hood shaped lamina, markedly projected large, foliate hamules, with very short inner spine and small lobe with rounded or angulated free margin; in females, borders of segment 8 of abdomen only slightly dilated or not at all; vulver scale small but deeply cleft, or inconspicuous. Wings hyaline or partly marked with yellow, amber or blackish brown; usually 10-19 and 9-16 antenodal cross veins in fore- and hindwings respectively and 6-13 postnodal cross veins; pterostigma about 6-7 times as long as broad, a little dilated medially, not braced; discoidal cells appearing roughly as bilateral triangles, traversed once in hindwing, entire or traversed by 1-2 cross veins in forewing, in forewing elongated in breadth of wing, situated far distal to the level of arc, with costal margin about half the length of other margins, in hindwing elongated in length of wing, situated at or slightly distal to the level of arc with basal margin about half the length of other margins; arc situated between 2nd and 3rd or even between 1st and 2nd antenodal cross veins; discoidal field commencing with a row of 2-3 cells in forewing, or 2 cells in hindwing; hypertrigone entire or traversed by 1-2 cross veins; subtrigone 2-5 celled; Cu₉ and MA converging at wing margin in forewing; sectors of arc forming a common stalk; usually 1-5 cutibial cross veins; Rₘ₉ and Mₛ₉ poorly formed and are separated by a single row of cells from IR₉ and MA respectively; anal loop stocking shaped, usually made of 18-24 cells; upro 4 rows of postanal cells in forewing.

**Distribution**: India; Tibet; China; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Japan; Ryukyus; Philippines; Pacific Islands.

**Lyriothemis ? bivittata** (Rambur)
(Fig. 427-and 536)


**Material studied**: 1 ♀, Rongrengiri, 19.iv.1973, coll ARL.

Measurements (in mm) and Nodal index.

<table>
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<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<tr>
<td></td>
<td>abdomen</td>
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<td>An</td>
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<tr>
<td>♂</td>
<td>33.0</td>
<td>42.0</td>
<td>17-18</td>
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**Notes**: The female specimen reported here was identified as *L. bivittata* (Rambur) and sent to Late Dr. Lieftink for comments. He
then identified it as *L. ?bivittata* (Rambur) and his instance has been followed here. However, the specimen comes very close to *bivittata* as described by Fraser (1936), varying from the same only in having abdominal segments 1 and 2 unmarked with black and 2 cubital cross veins in hindwing.

The specimen studied was collected inside a small but thick patch of forest surrounded by cultivated field on the bank of Simsang river in Garo hills.

**Distribution**: India: Assam, Meghalaya, West Bengal. Outside India: Burma; Thailand; Vietnam; Malaysia.

**Genus Orthetrum** Nawman


**Type-species**: *Libellula coerulescens* Fabricius

Newman (1833) and Brauer (1868a, b, c) established the 2 genera *Orthetrum* and *Libella* but the accounts provided by these authors were very brief. Kirby (1889) while revising the genus *Orthetrum* suppressed *Libella* Brauer under it and all later workers accepted his opinion. Later, a number of authorities worked on this genus but the more important contributions are of Kirby (1890), Foerster (1906b), Ris (1909, 1916, 1916a), Fraser (1918, 1936), Needham (1930b), Laidlaw (1931), Pinhey (1951, 1961, 1962, 1970) and Lieftinck (1954, 1975). Different Indian species of the genus have been dealt with by Navas (1930), Lieftinck (1948a, 1955a, 1971a) Bhasin (1953), Asahina (1964b), St, Quentin (1970), Kumar (1971, 1972b, 1973b), Vershney (1971), Mitra and Lahiri (1974), Mitra and Sen (1975), Ghosh *et. al* (1975b), Kumar and Juneja (1976), Singh and Prasad (1976a), Jumar and Prasad (1977a), Lahiri (1977a, b, 1979) and Prasad and Kumar (1977a).

**Diagnostic characters**: Small to medium in size (usually abomen 20.0-40.0 mm, hindwing 22.0-50.0 mm); coloured white, yellow, green, orange, red or brown, marked with black, sometimes markings obscured by pruinescence; vesicle raised, rounded or notched above; posterior lobe of prothorax large, emerginate as a collar and provided with specialised tuft of hairs; tibial claws with inner arms shorter than outer; abdomen sometimes very broad, markedly swollen at base, such swelling followed by an abrupt constriction, or laterally compressed; male genitalia with
well developed, hood shaped and emerginate lamina, sometimes bearing minute spines or specialised tuft of hairs and broad or narrow, entire or bifid lip, hamules with variably developed hooks sometimes forming a ridge below the normally more developed inner hooks, and variably developed lobes sometimes bearing specialised tuft of hairs; 2nd segment of penis swollen distally, with very short or long, variably apposed, median lobes and normally longer apical lobes, sometimes supplemented by a ventral whip like flagella; in females, usually the borders of segment 8, rarely that of segment 9 of abdomen variably dilated; vulver scale small or inconspicuous, lips of vulver aperture thin or swelled, variably splayed out or for­cipate; 9th ventral plate timid, sometimes variably carinated. Wings hyaline, sometimes enfumed with brown and marked at base with golden yellow, amber or blakish brown; usually with 11-21 and 8-15 antenodal cross veins; in fore- and hindwings respectively and 8-16 postnodol cross veins; pterostigma about 3-5 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles, that of forewing elongated in breadth of wing, traversed by 1-2 cross veins, situated far distal to level of arc with costal margin less than half the length of other margins, of hindwing elongated in length of wing, entire or traversed once, situated at the level of arc with basal margin about half the length of other margins; arc situated between 2nd and 3rd or between 1st and 2nd antenodal cross veins; discoidal field commencing with a row of 3 cells in forewing, of 2 cells in hindwing; hypertrigone traversed by 1-2 cross veins in forewing, entire or traversed once in hindwing; subtrigone 3-4 celled; Cu₉ and MA diverging at wing margin in forewing; sectors of arc forming a common stalk; only one cubital cross vein; Rsₚ₁ and Msₚ₁ poorly developed and are mostly separated by a single row of cells from IR₉ and MA respectively; anal loop stocking shaped, usually made of about 14-30 cells; up to 4 rows of postanal cells in forewing.

**Distribution**: Virtually cosmopolitan all over the Old World countries and the Pacific Islands.

**KEY TO THE SPECIES OF THE GENUS ORTHETRUM NEWMAN**

**Male**

1. Abdomen enormously swollen at base and then abruptly slender and compressed laterally unto the tip. 
   
   *s. sabina* (Drury)

   Abdomen variable, but never abruptly slender and compressed as above. 

2. Body violaceous red.
   
   *pruinosum neglectum* (Rambur)

   Body brown or black, with yellow markings.

   . . . . .

   .3
3. Discoidal cell in hindwing entire.
   Discoidal cell in hindwing traversed by a cross vein.

4. In hindwing Cu₂ arising from distal margin of discoidal cell well away from its inner angle; sides of thorax yellow or pale green with sutures finely black.
   .Luzonicum (Brauer)

   In hindwing Cu₂ arising from the inner angle of discoidal cell; sides of thorax with two narrow whitish stripes separated by a broad reddish brown stripe.
   .glaucum (Brauer)

5. A large black triangular mark at base of hindwing; face and frons glossy black.
   .t. triangulare (Selys)

   Only extreme base of hindwing tinted with amber yellow; face and frons greenish.
   ... .japonicum internum McLachlan

Female

1. Abdomen enormously swollen at base and then abruptly slender and compressed laterally up to tip.
   .s. sabina (Drury)

   Abdomen variable, but never abruptly slender and compressed as above.
   .2

2. Discoidal cell in hindwing entire.
   Discoidal cell in hindwing traversed by a cross vein.
   .3

3. In hindwing Cu₂ arising from distal margin of discoidal cell well away from its inner angle; lip of vulvar aperture as in Fig. 420.
   .Luzonicum (Brauer)

   In hindwing Cu₂ arising from the inner angle of discoidal cell; lip of vulvar aperture as in Fig. 418.
   .glaucum (Brauer)

4. Base of all wings tinted with amber yellow; vulvar aperture as in Fig. 419.
   .japonicum internum McLachlan

   Only base of hindwing tinted with golden yellow at base; lip of vulvar aperture as in Fig. 421.
   .pruinosum neglectum (Raumbur)

   Base of wings unmarked; lip of vulvar aperture as in Fig. 423.
   .t. triangulare (Selys)

Orthetrum glaucum (Brauer)


Material studied: 1 ♂, 1 ♀, Anogiri, 8.xi.1973, coll SB ; 1 ♀, Kobal, 11.v.1973, coll ARL ; 1 ♂, Remgiri, 5.xi.1973, coll SB ; 1 ♂, Rongtham river bank, 11.v.1973, coll ARL ; 4 exs, Rongrengiri (1 ♂,

Measurements (in mm) and Nodal index.

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<thead>
<tr>
<th>Length of</th>
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<th>Hindwing</th>
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<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
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<tr>
<td>♂ ♂</td>
<td>30.0-34.0</td>
<td>32.5-38.0</td>
</tr>
<tr>
<td>♂ ♀</td>
<td>28.5-31.0</td>
<td>34.0-35.0</td>
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Notes: Nearly 50% females studied vary from the description of the species provided by Fraser (1936) in having sides of synthorax and abdomen marked by pale brown stripes and hindwing unmarked or nearly so at base.

In Meghalaya the species was noticed to be very common except in southern part of the state. They appear to prefer paddy fields with narrow irrigation channels.

Distribution: India: Andhara Pradesh, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Tamil Nadu, Sikkim, Uttar Pradesh, West Bengal. Outside India: Nepal; China; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; New Guinea; Philippines.
Orthetrum japonicum internum McLachlan
(Figs. 392, 419 and 476-477)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂♂</td>
<td>30.0-32.0</td>
<td>33.0-34.5</td>
</tr>
<tr>
<td>♀</td>
<td>27.0-28.0</td>
<td>32.0-32.5</td>
</tr>
</tbody>
</table>

Notes: The species was collected in Meghalaya only in Khasi hills above 88 m. It is however, more common above 1300 m around Shillong.

Distribution: India: Himachal Pradesh, Kashmir, Meghalaya, Nagaland, Uttar Pradesh, West Bengal. Outside India: Nepal; Tibet; China; Vietnam.

Orthetrum luzonicum (Brauer)
(Figs. 367, 420 and 478-479)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
</tr>
<tr>
<td>♂♂</td>
<td>28.5-31.5</td>
</tr>
<tr>
<td>♀♀</td>
<td>28.5-31.5</td>
</tr>
</tbody>
</table>

Note: Distribution in Meghalaya and habitat of this species appear to be very similar to those of G. glaucum (Brauer).

Distribution: India: Virtually cosmopolitan. Outside India: Nepal; Sri Lanka; Burma; Vietman; Malaysia; Indonesia; Philippines.

Orthetrum pruinosum neglectum (Rambur)

(Figs. 390, 421 and 480-481)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of abdomen</th>
<th>Forewing An</th>
<th>Pn</th>
<th>Hindwing An</th>
<th>Pn</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂♂ 31.0-32.5</td>
<td>36.0-37.5</td>
<td>15</td>
<td>10-11</td>
<td>10-12</td>
</tr>
<tr>
<td>♀ ♀ 27.0-30.0</td>
<td>32.0-35.0</td>
<td>14-16</td>
<td>9-11</td>
<td>10-12</td>
</tr>
</tbody>
</table>

Note: This species was noticed to be very common in Meghalaya except in southern part of the state.

Distribution: India: Virtually cosmopolitan, Outside India: Nepal; Tibet; China; Sri Lanka; Burma; Malaysia; Indonesia; Taiwan.

Orthetrum sabina sabina (Drury)
(Figs. 13, 391, 422 and 484-485)


Orthetrum sabina sabina (Drury): Lieftinck, 1942, Treubia, 18 : 475.

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂</td>
<td>36.0-40.0</td>
<td>33.5-36.5</td>
</tr>
<tr>
<td>♀</td>
<td>31.5-34.0</td>
<td>30.0-31.5</td>
</tr>
</tbody>
</table>

Notes: The males under study vary from the description of the species provided by Fraser (1936) in nodal index and in having longer abdomen with more extensive black markings.

This is very widely distributed species in all parts of Meghalaya.

Distribution: Virtually cosmopolitan except America.

Orthetrum triangulare triangulare (Selys)
(Figs. 389, 423 and 482-483)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Length of abdomen</th>
<th>Forewing An</th>
<th>Pn</th>
<th>Hindwing An</th>
<th>Pn</th>
</tr>
</thead>
<tbody>
<tr>
<td>♂</td>
<td>31.5-35.0</td>
<td>37.0-41.0</td>
<td>16-17</td>
<td>11-12</td>
<td>12</td>
</tr>
<tr>
<td>♀</td>
<td>31.0-33.0</td>
<td>41.0-42.0</td>
<td>16-18</td>
<td>11-13</td>
<td>12-14</td>
</tr>
</tbody>
</table>

Notes: Nearly 80% of males studied vary from the description of the species provided by Fraser (1936) in having synthorax black, unmarked, discoidal cell in forewing 2 celled and subtrigone entire or 2-3 celled.

The species noticed to be more common at higher altitude was collected from several localities in Meghalaya except Jaintia hills and southern part of the state.


Genus Potamarcha Karsch

Type-species: *Libellula obscura* Rambur

Karsch (1889a) established this genus incorporating only the type-species. Later, Kirby (1890), Karsch (1890), Krueger (1902), Martin (1904), Ris (1909, 1916), Fraser (1918, 1936), Laidlaw (1920d, 1930b) and Lieftinck (1954) also worked on this genus. Lieftinck (1955a, 1971a), St. Quentin (1970), Kumar (1972c, 1973b), Prasad (1975), Singh and Prasad (1976a), Kumar and Prasad (1977a) and Lahiri (1977a, b, 1979) have in recent times published accounts on the type-species collected from different parts of Indian region.

**Diagnostic characters:** Medium in size (usually abdomen 29.0-32.0 mm, hindwing 33.0-37.0 mm); black or brown, marked with yellow; markings sometimes obscured by pruinescence; vesicle shallowly bifid; posterior lobe of prothorax not erected as a collar and usually not provided with specialised tuft of hairs; tibial claws with inner arms shorter than outer; male genitalia with a little projected, hood shaped and minutely spined lamina, broad base and distally strongly curved hamules and broad, slightly projected, lobe rounded at free border; 2nd segment of penis broadened apically with short and thin median lobes; in females, borders of segment of 9 of abdomen diatled, vulver scale in conspicuous and feebly keeled 9th ventral plate having a row well spaced marginal hairs.

Wings narrow and hyaline but sometimes the apices clouded with brown and costal area tinted with yellow; usually 13\(\frac{1}{2}\)-14\(\frac{1}{2}\) and 9-12 antenodal cross veins in fore- and hindwings respectively and 9-11 postnodal cross veins; pterostigma about 5-6 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles and traversed once, that the forewing elongated in breadth of wing, situated far distal to the level of arc with costal margin barely half the length of other margins, of hindwing elongated in length of wing, situated at the level of arc, with basal margin a little more than half the length of other margins; arc situated between the 2nd and 3rd antenodal cross veins; discoidal field commencing with a row of 3 cells in forewing, with a row of 2 cells in hindwing; hypertrigone entire; subtrigone 3 celled; *Cu*\(_9\) and MA slightly diverging at wing margin in forewing; sectors of arc forming a common stalk; only 1 cubital cross veins; *Rsp\(_1\) and *Msp\(_1\) poorly formed and are seperated by a row of mostly single cells from *IR*\(_8\) and *MA* respectively; anal loop stocking shaped, usually made of about 15-20 cells; upto 3 rows of postanal cells in forewing.

**Distribution:** India; Nepal; Bangladesh; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; New Guinea; Taiwan; Philippines; Australia.
Potamarcha congener (Rambur)
(Figs. 393 and 454-455)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>31.0-32.0</td>
<td>33.0-34.0</td>
</tr>
<tr>
<td>♀</td>
<td>30.0</td>
<td>34.0</td>
</tr>
</tbody>
</table>

Notes : It appears to be a rare insect in Meghalaya. Specimens were collected around bushes near stremas.

Distribution : India : Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Orissa, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal. Outside India : As for genus.

Genus Palpopleura Rambur


Type-species : Palpopleura vestita Rambur

Rambur (1842) established this genus for some of his new species and also included in it a few species which were earlier referred to the genus Libellula Linnaeus. Brauer (1868b, c) ; Selys (1869a), Krasch (1889a), Kirby (1889, 1890), Foerster (1906b), Ris (1910), Fraser (1919a, 1936a, 1936) and Pinhey (1962) also worked on this genus. Indian species of the genus have also been dealt with by Bhasin (1953), St. Quentin (1970),

**Diagnostic characters:** Small in size (usually abdomen 12.0-19.0 mm, hindwing 14.0-26.0 mm); yellowish, marked with brown, black or metallic blue, the markings sometimes obscured by pruinescence; vesicle markedly raised, notched above; posterior lobe of prothorax subquadrate, large, emerginate and provided with specialised tuft of hairs; tibial claw with inner arms smaller than outer; male genitalia small with arched, depressed hooks and distally narrowed large and projected lobe; 2nd segment of penis swollen distally, with short, broad, closely apposed median lobes; female with borders of segment 8 of abdomen not dilated, vulvar scale small or inconspicuous and tumid 9th ventral plate having a pair of small subbasal angulate processes. Wings hyaline, sometimes partly yellowish, amber tinted, brown or black; usually 10½-12½ and 7-9 antenodal cross veins in fore- and hindwings respectively and 4-9 postnodal cross veins; pterostigma about 3-5 times as long as broad, not braced; costal border in forewing with a sharp convexity lying nearer base than nodus; discoidal cells roughly the shape of bilateral triangles and usually traversed by 1-2 cross veins, elongated in breadth of wing, situated well away from the level of arc in forewing with costal margin a little more than half the length of other margins, sometimes entire, elongated in length of wing, situated at or slightly distal to the level of arc with basal margin about half the length of other margins in hindwing; arc situated between 1nd and 2nd antenodal cross veins; discoidal field commencing with a row of 3 cells in forewing, of 2 cells in hindwing; hypertrigone traversed by 1-2 cross veins in forewing, entire in hindwing; subtrigone 3 celled; Cu₂ and MA diverging at wing margin in forewing; sectors of arc arising from a common point or these forming a small stalk at base in forewing, these always forming a common stalk in hindwing; usually only 1 cubital cross vein; Rs₁ and Ms₁ not well differentiated; anal loop nearly straight, made of about 12-15 cells; upto 3 rows of postanal cells in forewing.

**Distribution:** India; Nepal; Tibet; Bangladesh? Sri Lanka; Burma; Vietnam; Malaysia; Africa; Madagascar. (The genus although recorded from Sri Lanka and Malaysia by Fraser (1936), it was not so by Lief tinck (1954, 1971). Hence an? has here been put against these countries.)

*Palpoleura sexmaculata sexmaculata* (Fabricius)  
(Figs. 414, 430, 498-499 and 537)
Libellula sexmaculata Fabricius, 1787, Mant. Inst. 1 : 338.

Aeshna minuta Fabricius 1787, Mant. Ins., 1 : 339.


Palpopleura sexmaculata sexmaculata (Fabricius) : Fraser, 1936, Fauna Brit. India, Odon., 3 : 318.


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂♂</td>
<td>16.0-17.0</td>
<td>17.0-18.0</td>
</tr>
<tr>
<td>♀♀</td>
<td>14.5-15.0</td>
<td>18.0-18.5</td>
</tr>
</tbody>
</table>
Notes: The males studied vary from the description of the species provided by Fraser (1936) in having cubital spot extended into anal area over 1-4 cells and the females vary in not having "third" stripe interposed between the subcostal and intersector spots.

In Meghalaya the species was noticed to be well distributed but comparatively rare in southern parts of the state. They usually occur in large number near open grassland.

Distribution: India: Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal. Outside India: Tibet; China; ? Sri Lanka; Burma; Vietnam; ? Malaysia.

(Note: An ? has been put against Sri Lanka and Malaysia for the same reason as mentioned under generic distribution).

Genus Brachydiplax Brauer


Type-species: Diplax denticauda Brauer

The genus has been used here sensu Ris (1909, 1910). Brauer (1868 a, b, c), Kirby (1889, 1890), Selys (1878b, 1889, 1891a), Laidlaw (1914a), Fraser (1919a, 1936) and Lieftinck (1953b, 1954) also worked on this genus. Lieftinck (1955a, 1971a), St. Quentin (1970), Prasad (1976a), Singh and Prasad (1976a) and Kumar and Prasad (1977a) published accounts on different species of this genus occurring in Indian region on recent times.

Diagnostic characters: Small to medium in size (usually abdomen 16.0-25.0 mm, hindwing 22.0-30.0 mm); green, metallic green yellow or brown marked with black; the markings sometimes obscured by pruinescence; vesicle rounded, low; posterior lobe of prothorax moderately large, emerginate, subrectangular and provided with specialised tuft of hairs; tibial claws with inner arms shorter than outer; male genitalia with emerginate or depressed lamina with concave or deeply notched margin, small or large, moderately broad based hamules with short, inwardly directed distally curled hooks and narrow lobe; female with borders of segment 8 of abdomen not dilated and broad, projecting vulver scales. Wings hyaline, sometimes tinted with yellow or brown at base; usually 7-8 and 6-7 antenodal cross veins in fore- and hindwings respectively and 6-7 postnodal cross veins; Pterostigma about 4-5 times as long as broad, not braced;
discoidal cells roughly the shape of bilateral triangles and entire, that of forewing elongated in breadth of wing, situated far distal to the level of arc with costal margin about half the length of other margins, of hindwing elongated in length of wing, situated at or slightly distal to the level of arc with basal margin a little shorter than the outer margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field beginning with a row of 2 cells in forewing, with a row of single cell in hindwing; hypertrigone entire; subtrigone 3 celled; Cu$_2$ and MA divergent at wing margin in forewing; sectors of arc forming a common stalk; only 1 cubital cross vein; Rspl and Mfpl poorly formed and are mostly separated by a single row of cells from IR$_4$ and MA respectively; anal loop only a little angulated, usually made of about 14 cells, up to 3 rows of postanal cells in forewing.

**Distribution:** India; Nepal; Bangladesh; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Australia.

**Brachydiplax sobrina** (Rambur)  
(Figs. 395 and 450-451)


**Material studied:** 1 ♀, Rongrengiri, 15.iv.1973, coll ARL.

Measurements (in mm) and Nodal index:

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♀</td>
<td>22.0</td>
<td>29.0</td>
</tr>
</tbody>
</table>

**Note:** The single specimen studied was collected near a stream as it was perching on a twig of a small bush.

**Distribution:** India: Assam, Himachal Pradesh, Karnataka, Kerala Maharashtra, Meghalaya, Orissa, Punjab, Uttar Pradesh, West Bengal Outside India: Nepal; Bangladesh; Sri Lanka; Burma; Thailand; Vietnam.

Genus **Nannophya** Rambur


Type-species: *Nannophya Pygmaea* Rambur.

The genus has been used here sensu Ris (1910). Rambur (1842), Hagen (1849), Brauer (1868b,c), Selys (1878b, 1889), Karsch (1889c), Kirby (1889, 1890) Laidlaw (1931), Fraser (1921a, 1936) and Lifetinck (1954, 1962) also worked on this genus.

**Diagnostic characters**: Small in size (usually abdomen 9.0-16.0 mm hindwing 12.0-18.0 mm); red and yellow, marked with green or black; vesicle high, rounded or shallowly notched; posterior lobe of prothorax large, squarely emerginate and provided with specialized tuft of hairs; tibial claws with inner arms shorter than outer; male genitalia with arched, depressed lamina, moderately broad based hamules with broadly triangular and bluntly pointed outer hooks and a little projected, narrow lobe; 2nd segment of penis dilated apically with lobes converging, the median lobe short, subtriangular, the apical and lateral lobes narrower and longer; female with borders of segment 8 of abdomen not dilated and long vulvar scales extending nearly to apex of segment 9 of abdomen. Wings hyaline, sometimes marked with yellow or amber at base; usually 5 and 4-5 antenodal cross vein in fore- and hindwings respectively and 4-6 postnodal cross veins in either wing; pterostigma about 3-4 times as long as broad, not braced; discoidal cells entire, that of forewing appearing as a quadrangle, situated well distal to the level of arc with distal margin angulated, of hindwing elongated in length of wing, roughly the shape of a bilateral triangle, situated at or slightly distal to the level of arc with basal margin a little shorter than the other margins; arc situated between the 1st and 2nd antenodal cross veins; Cu₈ widely separated from the inner angle of the discoidal cells; discoidal field beginning with a row of single cell; hypertrigone and subtrigone entire; sectors of arc forming a common stalk; Cu₈ and MA diverging at wing margin in forewing; only 1 cubital cross vein or sometimes 2 in hindwing; Rs₁, Ms₁ and anal loop not properly differentiated; upto 2 rows of postanal cells in forewing.

**Distribution**: India; China; Burma; Thailand; Vietnam; Malaysia; Indonesia; Australia.

*Nannophya pygmaea* Rambur
(Figs. 394, 448-449 and 538)


**Material studied**: 2 exs, Barapani (1 ♂, 24.vii.1967, coll RKV; 1 ♂, 21.vi.1973, coll AKG); 8 ♂♂, Naya Bunglow, 26.vi.1978, coll SKC.
Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length of</strong></td>
<td><strong>Forewing</strong></td>
<td><strong>Hindwing</strong></td>
</tr>
<tr>
<td>Abdomen hindwing</td>
<td>An (An) Pn (Pn)</td>
<td>An (An) Pn (Pn)</td>
</tr>
<tr>
<td></td>
<td>11.0-12.0</td>
<td>13.5-15.0</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4-5</td>
</tr>
<tr>
<td></td>
<td>4-5</td>
<td>4-5</td>
</tr>
</tbody>
</table>

**Notes:** The males studied vary from the description of the species provided by Fraser (1936) a little in size and nodal index.

This very small dragonfly species appears to be restricted to areas situated at a comparatively higher altitude in Meghalaya in northern Khasi hills.

**Distribution:** India: Assam, Meghalaya. Outside India: China; Burma; Thailand; Vietman; Malaysia; Indonesia.

Genus *Acisoma* Rambur


Type-species: *Acisoma panorpoides* Rambur

Rambur (1842) established this genus for 2 of his new species. The generic concept has further been enlightened and there has also been addition of a few more species as a result of contribution rendered chiefly by Hagen (1849), Bruaer (1868b, c), Kriby (1889, 1890), Karsch (1889a), Forster (1906b), Ris (1909-1910) and Fraser (1919a, 1936). Different Indo-Malaysian species of this genus have been dealt with by Lieftinck (1954, 1955a, 1971a), Bhasin (1953), St. Quentin (1970), Kumar and Juneja (1976), Prasad (1976a), Singh and Prasad (1976a) and Lahiri (1977a, 1979).

**Diagnostic characters:** Small in size (usually abdomen 15.0-20.0 mm, hindwing 16.0-23.0 mm); black or brown marked with blue or green; vesicle low, rounded above; posterior lobe of prothorax large, emerginate as a collar and provided with specialised tuft of hairs; tibial claw with inner arms shorter than outer; abdomen markedly dilated on segments 1-6 and then markedly narrowed upto the end; male genitalia small with arched depressed lamina, broad based projected hamules with strongly curved hooks and narrow lobes with margin subquadrate; 2nd segment of penis swollen distally, with thin moderately long median lobes; female with borders of segment 8 of abdomen not dilated, oval, projecting, vulvar scale and tumid 8th ventral plate. Wings hyaline, sometimes marked with golden yellow or blackish brown at base; usually 6-8½ and 5-6 antenodal cross...
veins in fore- and hindwings respectively and 6-8 postnodal cross veins; pterostigma about 3-4 times as long as broad, not braced; disocidal cells roughly the shape of bilateral triangles and entire, that of forewing elongated in breadth of wing, situated well distal to the level of arc with costal margin sometimes angulated and less than half the length of other margins, of hindwing elongated in length of wing, situated at the level of arc with basal margin about half the length of other margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field commencing with a row of 2 cells; hypertrigone entire; subtrigone entire or 3-4 celled; Cu₂ well separated from inner angle of disocidal cell in hindwing; sectors of arc forming a common stalk; only 1 cubital cross vein, Rscp and Mscp not well differentiated; anal loop nearly straight, made of about 12-15 cells; up to 3 rows of postanal cells in forewing.

Distribution: India; Nepal; China; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; Japan; Taiwan; Philippines; Africa; Madagascar.

**Acisoma panorpoides panorpoides** Rambur
(Figs. 400 and 456-457)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂♂</td>
<td>18.0-20.0</td>
<td>21.0-22.0</td>
</tr>
</tbody>
</table>

Note: In Meghalaya this species appears to be restricted only at a lower altitude and is commonly found near marshy areas.

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Punjab, Tamil Nadu, Uttar Pradesh and ‘Bengal’ (exact locality unknown). Outside India: Nepal; China; Sri Lanka; Thailand; Malaysia; Indonesia; Japan; Taiwan; Philippines.
Genus *Brachythemis* Brauer


*Type-species : Libellula contaminata* Fabricius

The genus has been used here sensu Ris (1909, 1911). Brauer (1868a, b, c), Karsch (1889a), Kirby (1889, 1890), Selys (1891a), Laidaw (1914a, 1931), Fraser (1919b, 1936), Lieftinck (1954, 1962) and Pinhey (1962) also worked on this genus. Accounts on the type-species collected from different parts of Indian region have been published by Lieftinck (1948a, 1955a, 1971a), Bhasin (1953), Lahiri et al. (1969), St. Quentin (1970), Kumar (1972c, 1973b), Bose and Mitra (1975), Mitra and Sen (1975), Mitra (1976), Kumar and Juneja (1976), Singh and Prasad (1976a), Kumar and Prasad (1977a) and Lahiri (1979).

*Diagnostic characters :* Small to medium in size (usually abdomen 18.0-23.0 mm, hindwing 20.0-26.0 mm) ; black, brown or red, marked with yellow ; vesicle high, notched at apex ; posterior lobe of prothorax not erected as a collar and usually not provided with specialised tuft of hairs ; tibial claw with inner arms smaller than outer ; male genitalia with depressed, arched lamina, broad based hamules with strongly curled hooks and large, subquadrate or rounded, projected lobe ; 2nd segment of penis swollen diatally with closely apposed median lobes of moderate length and width and somewhat similar but, longer apical lobes ; female with borders of segment 8 of abdomen not dilated, distally narrowed vulvar scale extending to base of segment 9, with apex terminating in a pair of short cones and 9th ventral plate extending distally to cover the 10th segment with a pair of stumped subbasal ungulate processes and about 15 equally spaced marginal long hairs. Wings hyaline, sometimes partly coloured reddish yellow or blackish brown ; usually 6½-7½ and 5-6 antenodal cross veins in fore- and hindwings respectively and 5-6 postnodal cross veins ; pterostigma about 4-5 times as long as broad, not braced ; discoidal cells roughly the shape of bilateral triangles, that of forewing elongated in breadth of wing, entire or traversed once, situated well distal to the level of arc, with costal margin slightly more than half the length of other margins, of hindwing elongated in length of wing, entire, situated at the level of arc, with basal margin about half the length of other margins ; arc situated between the
1st and 2nd antenodal cross veins; discoidal field commencing with a row of 3 cells in forewing, of 2 cells in hindwing; hypertrigone entire; subtrigone 3 celled; Cu₂ and MA parallel at wing margin in forewing; sectors or arc forming a common stalk; only one cubital cross vein; Rs₁ and Ms₁ poorly formed and are mostly separated by a single row of cells from IR₁ and MA respectively; anal loop only a little angulated, usually made of about 15-22 cells; upto 3 rows of postanal cells in forewing.

**Distribution**: India; Nepal; China; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; Taiwan; Philippines; Iraq.

**Brachythemis contaminata** (Fabricius) (Figs. 398, 439 and 470-471)


**Measurements (in mm) and Nodal index.**

<table>
<thead>
<tr>
<th>Length of abdomen</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>An</td>
<td>Pn</td>
</tr>
<tr>
<td>♂♂ 21.0-23.0</td>
<td>7½</td>
<td>5-8</td>
</tr>
<tr>
<td>♀♀ 18.0</td>
<td>24.0</td>
<td>7½</td>
</tr>
</tbody>
</table>

**Notes**: In Meghalaya this species was collected near lakes or slow running streams at variable altitude, but it appears to be a commoner insect at lower altitude.

**Distribution**: India: Virtually cosmopolitan. Outside India: Nepal; China; Bangladesh; Sri Lanak; Burma; Thailand; Malaysia; Indonesia; Japan; Taiwan; Philippines.
Genus *Crocothemis* Brauer


**Type-species:** *Libellula erythraea*

The genus has been used here sensu Ris (1909, 1911, 1916). Brauer (1868a, b, c), Selys (1878b, 1883a, 1889, 1891a), Kirby (1889, 1890), Foerster (1906b), Laidlaw (1914a, 1931), Fraser (1919a, 1936), Lieftinck (1933, 1942, 1954), Watson (1969) and Pinhey (1962) also worked on this genus. Different species of the genus occurring in Indian region have been dealt with by Bhasin (1953), Lieftinck (1955a, 1971a), Lahiri *et al.* (1970, 1972), St. Quentin (1970), Kumar (1972c), Bose and Mitra (1975), Ghosh *et al.* (1975b), Kumar and Juneja (1976), Mitra (1976), Prasad (1976a), Singh and Prasad (1976a), Kumar and Prasad (1977a), and Lahiri (1977a, 1979).

**Diagnostic characters:** Medium in size (usually abdomen 20.0-35.0 mm, hindwing 26.0-38.0 mm); red or yellow marked with brown or black; vesicle low, rounded; posterior lobe of prothorax not erected as a collar and usually not provided with specialised tuft of hairs; tibial claw with inner arms shorter than outer; male genitalia with emeriginte or depressed arched lamina, broad based, projected hamules evenly narrowed to an acute hook distally with a lateral ridge and lobe broadly rounded at outer margin; 2nd segment of penis a little swollen distally, with rather short, narrow diverging median lobes, and longer apical lobes; female with borders of segment 8 of abdomen not dilated, prominent, tongue shaped vulvar scale projecting nearly at a right angle, and tumid 9th ventral plate with a pair of stumped subbasal ungulate processes and a few marginal hairs. Wings hyaline, sometimes marked with amber at base or enumed with brown at apex; usually 10½-12½ and 8-9 antenodal cross veins in fore- and hindwings respectively and 7-11 postnodal cross veins; pterostigma about 5-6 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles; that of forewing elongated in the breadth of wing, traversed by a cross vein and situated well distal to the level of arc with costal margin less than half the length of other margins, of hindwing elongated in length of wing, entire or traversed by a cross vein and situated at the level of arc with basal margin about half the length of other margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field begining with a row of 3 cells in forewing, of 2 cells in hindwing; hypertrigone entire; subtrigone 3 celled; *Cu₂* and MA parallel at wing margin in forewing; sectors of arc forming a common stalk; only one cubital
cross veins; Rspl and Mspl poorly formed and are separated by a single row of cells from IRs and MA respectively; anal loop nearly straight, broadened subapically and usually made of 19-27 cells; upto 4 rows of postanal cells in forewing.

**Distribution**: India; Nepal; China; Bangladesh; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; New Guinea; Japan; Taiwan; Philippines; Australia; Iran; Iraq; Europe; Africa; Madagascar.

**Crocothemis servilia servilia** (Drury)  
(Figs. 399, 435, and 472-473)

*Lebellula servilia* Drury, 1770, 111. ex. Ins., 1 : 112.


**Crocothemis servilia servilia** (Drury): Ris, 1911 *Cat. Coll. Selys.*, 13 : 533.  
Fraser, 1936, *Fauna Brit. India, Odon. 3* : 345.

LAHIRI: Odonate fauna of Meghalaya

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Forewing An</th>
<th>Hindwing An</th>
<th>Forewing Pn</th>
<th>Hindwing Pn</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>♂</td>
<td>23.5-24.5</td>
<td>10½-11½</td>
<td>8-10</td>
<td>8-9</td>
</tr>
<tr>
<td>♀</td>
<td>24.0-25.0</td>
<td>10½-11½</td>
<td>7-10</td>
<td>9</td>
</tr>
</tbody>
</table>

Note: This species appears to be the most common dragonfly in Meghalaya and has been collected all over the state and in all seasons of the year. However, it was noticed to be more common near human habitations and during the monsoon months.

Distribution: India: Virtually cosmopolitan. Outside India: Nepal; China; Bangladesh; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; Japan; Taiwan; Philippines; Iran; Iraq.

Genus Diplacodes Kirby


Type-species: *Lebellula lefebvrei* Rambur*

Kirby (1889) established this genus including a number of species earlier referred to the genera *Diplacina* Brauer and *Diplax* Charpentier. Later, several authorities worked on this genus of which the more important contributions came from Karsch (1889a), Kirby (1890), Foerster (1906b), Ris (1909, 1910), Laidlaw (1914a, 1931), Fraser (1919a, 1936), Lieftinck (1954, 1962, 1975) and Pinhey (1962, 1967). Different Indian species of the genus have also been dealt with by Lieftinck (1948a, 1955a, 1971a), Bhasin (1953), Asahina (1957), St. Quentin (1970), Lahiri *et al.* (1969), Kumar and Juneja (1976), Mitra (1976), Prasad (1976a), Singh and Prasad (1976a), Kumar and Prasad (1977a) and Lahiri (1977a, 1979).

Diagnostic characters: Small to medium in size (usually abdomen 14.0-25.0 mm, hindwing 17.0-29.0 mm); coloured yellow, brown or red marked with black, the markings sometimes obscured by preuinescence; vesicle high, rounded or shallowly notched; posterior lobe of prothorax large, subrectangular, emerginate and provided with specialised tuft of

After Fraser (1936), Lieftinck (1954) and Davis (1981), but as opposed to Kirby's (1890) citation, viz. *Diplacodes tetra* (Rambur).
hairs; tibial claw with inner arms shorter than outer; male genitalia with arched, depressed or projecting lamina, broad based hamules with short, distal, inwardly curled hooks and broad or narrow, projecting lobe; 2nd segment of penis moderately swollen distally, with both median and apical lobes short, narrow, and branched; female with borders of segment 8 of abdomen not dilated, vulvar scale variably projected, extending to base of segment 9 of abdomen, with rounded or shallowly notched margin and tumpid 9th ventral plate having a pair of stumped subbasal ungulate processes.

Wings hyaline, sometimes partly marked with yellow, black or blackish brown; usually 5½-9½ and 5-6 antenodal and 5-7 and 4-6 postnodal cross veins in fore- and hindwings respectively; pterostigma about 4-5 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles, that of forewing elongated in breadth of wing, entire or traversed by a cross vein and situated far distal to the level of arc with costal margin less than half the length of other margins; of hindwing elongated in length of wing, entire, situated at the level of arc with basal margin about half the length of other margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field beginning with a row of 2-3 cells in forewing, of a single cell in hindwing; hypertrigone entire, subtrigone entire or 2-3 celled in forewing; Cu₂ widely displaced from the inner angle of the discoidal cell in hindwing; Cu₂ and MA diverging at wing margin in forewing; sectors of arc forming a common stalk; Mspl not clearly differentiated; Rspl poorly formed and separated by a single row of cells from IR₈; anal loop angulated a little, usually made of 11-14 cells; upto 3 rows of postanal cells in forewing.

**Distribution**: India; China; Sri Lanka; Andamans; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Japan; Ryukyus; Taiwan; Philippines; Australia; Pacific Islands; Iraq; Saudi Arabia; Turkey; Mauritius; Africa; Madagascar; Seychelles.

**KEY TO THE SPECIES OF THE GENUS DIPLOCODES KIRBY**

**Male**

- Wings hyaline apically.  
  *trivialis* (Rambur)
- Wings black apically.  
  *nebulosa* (Fabricius)

**Female**

Vulvar scale only slightly emerginate, extending upto one third along the length of abdominal segment 9 and with its apical margin broadly notched (Fig. 431).  

...  
*nebulosa* (Fabricius)
Vulvar scale markedly emerginate, extending half way along the length of abdominal segment 9 and with apical margin broadly rounded (Fig. 432). 

**Diplacodes nebulosa** (Fabricius)  
(Figs. 401, 431 and 458-459)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>18.0-19.0</td>
<td>20.0-21.0</td>
</tr>
<tr>
<td>♀ ♀</td>
<td>16.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>

*Note*: Specimens of both sexes under study vary from the description of the species provided by Fraser (1936) a little in size.

In Meghalaya this species appears to be more common at lower altitude in fields covered with tall grasses or mastered fields having slow running irrigation channels.

*Distribution*: India: Assam, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: China; Sri Lanka; Burma; Vietnam; Malaysia; Indonesia; New Guinea; Australia.

**Diplacodes trivialis** (Rambur)  
(Figs. 402, 432 and 460-461)


*Diplax trivialis* (Rambur) : Brauer, 1866, *Novara* : 104.


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length of</td>
<td>abdomen</td>
</tr>
<tr>
<td>♂♂</td>
<td>hindwing</td>
<td>21.0-22.5</td>
</tr>
<tr>
<td>♀</td>
<td>20.5-21.0</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Notes : This species appears to have wider distribution in Meghalaya than D. nebulosa (Fabricius) and is equally common in areas situated at both higher and lower altitude. These are commonly found in the open, on grassy lawns, foot paths etc, in the vicinity of water masses.

Distribution : India : Andaman Islands, Andhra Pradesh, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Tamil Nadu, Tripura, Uttar Pradesh, Outside India : China ; Sri Lanka ; Burma ; Thailand ; Vietman ; Malaysia ; Indonesia ; New Guinea ; Japan ; Ryudyus ; Philippines ; Australia ; Pacific Islands ; Iraq ; Seychelles.

Genus Neurothemis Brauer

Type-species: *Libellula fulvia* Drury

This genus under the name *Polyneura* was established by Rambur (1842) for a few species earlier referred to the genus *Libellula* Linnaeus. Brauer (1867a, b) proposed the name *Neurothemis* for *Polyneura* and his concept was accepted by all later workers. Subsequently the generic concept has further been elaborated and there has also been addition of quite a number of species as a result of contribution rendered chiefly by Brauer (1868a, b, c), Selys, (1878b, 1889, 1891a), Kirby (1889, 1890), Foerster (1898), Krueger (1903), and Ris (1909, 1911). Laidlaw (1914a, 1931), Fraser (1919a, 1936), Schmidt (1938) and Lieftinck (1954) have also worked on this genus. Lieftinck (1927, 1948a, 1955a, 1971a), Bhasin (1953), St. Quentin (1970), Ghosh *et al.* (1975a, b), Mitra and Sen (1975), Kumar and Juneja (1976), Prasad (1976a), Singh and Prasad (1976a), Kumar and Prasad (1977a) and Lahiri (1977b, 1979) published accounts of different species of the genus occurring in Indian region.

**Diagnostic characters:** Small to medium in size (usually abdomen 16.0-28.0 mm, hindwing 19.0-32.0 mm); black, red or brown, partly marked with yellow or green; vesicle high, rounded or shallowly notched; posterior lobe of prothorax a little emerginate, but not erected as a collar and usually not provided with specialised tuft of hairs; tibial claw with inner arms shorter than outer; male genitalia with a little emerginate arched lamina, broad hamules with strongly curled distal hooks and broad or narrow, projecting lobe; 2nd segment of penis dilated distally, with narrow, closely opposed median lobes and longer acutely pointed and forcipate apical lobes; female with borders of segment 8 of abdomen not dilated, moderately large, subacute projecting vulvar scale and tumid 9th ventral plate extended over segment 10 of abdomen bearing a pair of stumped sub-basal ungulate processes. Wings sometimes with close secondary reticulation, hyaline, or partly or wholly coloured with orange, black or opalescent white; usually 10½-15½ and 8-12 antenodal cross veins in fore- and hindwings respectively and 7-12 postnodal cross veins; pterostigma about 4-5 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles and traversed by 1-3 cross veins, that of forewing elongated in breadth of wing, situated far distal to the level of arc with costal margin a little more than half the length of other margins, of hindwing elongated in the length of wing, situated at the level of arc with basal margin a little more than half the length of other margins; arc situated at the 2nd or between 2nd and 3rd antenodal cross veins; discoidal field beginning with a row of 3 cells in forewing, of 2 cells in hindwing; hyper-
trigone and cubital space usually 3-6 celled; Cuₐ and MA parallel or a little divergent at wing margin in forewing; sectors of arc forming a common stalk; Rs₁ and Mₛ₁ poorly formed and are mostly separated by a single row or cells form IRₐ and MA respectively; anal loop angulated a little, usually made of 18-33 cells; upto 4 rows of postanal cells in forewing; (in species with secondary reticulation, all parts of wing, with higher number of cells and cross veins).

**Distribution**: India; Nepal; Tibet; China; Bangladesh; Sri Lanka; Nicobar Islands; Burma, Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Japan, Taiwan; Philippines; Australia; Pacific Islands.

**KEY TO THE SPECIES OF THE GENUS NEUROTHEMIS BRAUER (EITHER SEX)**

1. Neuration open; wings marked with golden yellow only at base. **.intermedia** group  
Neuration very to moderately close; wings marked otherwise. **2**

2. Wings marked with reddish brown which extends from base to nearly apex.  
   . . . . . **fulvia** (Drury)  
   Wings marked with black or blackish brown which variably extends from base to nodus. **.t. tullia** (Drury)

**KEY TO THE SUBSPECIES OF INTERMEDIA GROUP**

**Male**

Base of wings deep amber yellow upto a little beyond discoidal cell... **i. atlanta** Ris  
Base of wings pale golden yellow upto a little beyond discoidal cell...  
... **.i. intermedia** (Rambur)

(Female of *N. i. atlanta* Ris was not available in the collection studied. Therefore, no key is provided for the females of *intermedia* group.)

**Neurothemis fulvia** (Drury)  
(Figs, 404, 436 and 466-467)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂ ♀</td>
<td>24.5-26.5</td>
<td>30.0</td>
</tr>
<tr>
<td>♀ ♂</td>
<td>22.0-23.0</td>
<td>29.5-30.0</td>
</tr>
</tbody>
</table>

*Note*: In Meghalaya this species is usually found in submontane areas at lower altitude, in forests with thick undergrowth of bamboo and canes near small streams filled with muddy water.

*Distribution*: India: Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: Nepal; China; Bangladesh; Burma; Thailand; Vietnam; Malaysia; Indonesia.

**Neurothemis intermedia atlanta** Ris
(Figs. 405 and 462-463)


*Material studied*: 2 ♂ ♀, Sonapurdi, 27.viii.1974, coll ARL.

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂ ♀</td>
<td>21.0</td>
<td>19.0</td>
</tr>
</tbody>
</table>

*Notes*: This subspecies appears to have a restricted distribution in Meghalaya. The specimens were collected near dense tropical forests at lower altitudes having mostly hot and humid climate.

*Distribution*: India: Assam, Kerala, Meghalaya, Sikkim, Tripura. Outside India: Nepal; Burma; Thailand.
**Neurothemis intermedia intermedia** (Rambur)  
(Figs. 406, 437 and 464-465)


**Material studied** : 1 ♀, Bagmara, 2.iii.1965, coll ASR ; 1 ♂, 1 ♀, Damra, 20.xi.1973, coll SB ; 1 ♂, 1 ♀, Songkhama, 15.xi.1973, coll SB ; 1 ♂, 1 ♀, Songsok, 18.xi.1973, coll SB ; 1 ♂, 1 ♀, 18 Kms north of Balat, 8.xii.1978, coll ARL ; 3 exs, Nongpoh (1 ♂, 1 ♀, 6.xi.1972, coll RSP ; 1 ♂, 15.x.1975, coll SB) ; 3 ♂, 4 ♀, Ranikor, 10.xii.1977, coll ARL ; 3 exs, Shillong (1 ♂, 3.xi.1961, coll SNP ; 1 ♂, 25.viii.1968, coll RKV ; 1 ♂, 25.xi.1972, coll RSG) ; 2 ♂♂, Umtham, 29.xi.1967, coll RKV ; 5 exs, Garampani, coll AKG (1 ♂, 26.i.1975, 4 ♀, 27.i.1975) ; 5 ♂♂, 3 ♀♀, Ratachara, 24.i.1975, coll AKG.

**Measurements (in mm) and Nodal index.**

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>22.0</td>
<td>25.0-26.0</td>
</tr>
<tr>
<td>♀ ♀</td>
<td>20.0-21.0</td>
<td>24.0-25.0</td>
</tr>
</tbody>
</table>

**Notes** : In Meghalaya this subspecies was noticed to have a wider distribution than *N. i. atlanta* Ris and equally common in areas at lower and higher altitude, although it was not collected from central Jaintia hills and southern Khasi hills. They were most commonly found in fields covered with tall grasses near streams.

**Distribution** : India : Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal. Outside India : Nepal ; Sri Lanka ; Burma.

**Neurothemis tullia tullia** (Drury)  
(Figs. 403, 430 and 468-469)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂♂</td>
<td>19.0-22.5</td>
<td>21.0-24.5</td>
<td>10 1/2-12 1/2</td>
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<tr>
<td>♀</td>
<td>18.0</td>
<td>22.0</td>
<td>11 1/2</td>
</tr>
</tbody>
</table>

Notes: This species appears to have a scattered distribution in Meghalaya. These are commonly found in flower gardens and vegetable fields.

Distribution: India: Assam, Bihar, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Punjab, Tamil Nadu, Tripura, Sikkim, Uttar Pradesh, West Bengal. Outside India: Nepal; Tibet; China; Sri Lanka; Burma; Thailand; Vietnam; Malaysia.

Genus Sympetrum Newman


Type-species: *Libellula vulgata* Linnaeus

Newman (1833) established this genus incorporating 2 species. Kirby (1889) greatly elaborated the generic concept and suppressed under it the genus *Diplax* Charpentier 1840. All later workers accepted Kirby's opinion. Amongst others Kirby (1890), Fraser (1919a, 1936, 1949a), Borer (1945), Lieftink (1954, 1962) and Pinhey (1962) also worked on *his* genus. Different species of the genus from Indian region have also been dealt with by Bhasin (1953), Lieftink (1955a, 1971a), St. Quentin (1970), Kumar (1973b), Bose and Mitra (1975), Singh and Prasad (1976a), Prasad and Kumar (1977a) and Lahiri (1979).

Diagnostic characters: Small to medium in size (usually abdomen 18.0-35.0 mm, hindwing 20.0-40.0 mm); coloured black, brown or red marked with green and yellow; vesicle small, shallowly notched; posterior lobe of prothorax large, emerginate as a collar and provided with specialised tuft of hairs; tibial claw with inner arms smaller than outer; male genitalia with arched, emerginate lamina and variably developed lobe,
hamules and hooks of the later; 2nd segment of penis slightly dilated dis- tally with well developed sub-parallel median lobes, bearing a median apical process and shorter apical lobes; female with borders of segment 8 of abodmen not dilated; vulver scale variably projected and notched at apex, minute, moderately large or even extending beyond apex of abodmen; 9th ventral plate tumid, extended over 10th abdominal segment, sometimes keeled, and bearing a pair of stumped, sub-basal ungulate processes. Wings hyaline, sometimes partly marked with yellow, brown or black; usually $6\frac{1}{2}-11\frac{1}{2}$ and 5-6 antenodal cross veins in fore- and hindwings respectively and 6-11 postnodal cross veins; pterostigma about 4-5 times as long broad, not braced; discoidal cells roughly the shape of bilateral triangles, that of forewing elongated in bredght of wing, traversed once, situated far distal to the level of arc with costal margin a little more than half the length of other margins, of hindwing elongated in length of wing, entire or rarely traversed once, situated at the level of arc with basal margin a little more than half the length of other margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field begining with a row of 3 cells in forewing, of 2-3 cells in hindwing; hypertrigone entire; subtrigone 3 celled; only 1 cubital cross vein, rarely 2 in hindwing; Cu$_2$ and MA strongly converging at wing margin in forewing; sectors of arc forming a common stalk; R$_{spl}$ and M$_{spl}$ poorly formed and are mostly separated by a single row of cells from IR$_3$ and MA respectively; anal loop angulated a little, usually made of 19-26 cells; upto 4 rows of postanal cells in forewing.

**Distribution**: Virtually cosmopolitan all over Africa, America, Europe and Asian countries.

**KEY TO THE SPECIES OF THE GENUS SYMPETRUM NEWMAN (EITHER SEX)**

Synthorax bright yellow laterally and with a broad black stripe on postero-leteral suture; wings amber yellow at extreme base. *Symptetrum hypomelas* (Selys)

Synthorax reddish or dull yellow laterally and with posterolateral suture marked finely with black; bases of wings pale amber yellow upto about level of cubital cross vein. *Symptetrum hypomelas* (Selys) *orientale* (Selys)

**Symptetrum hypomelas** (Selys)

(Figs. 29-30, 396 and 434)


Material studied: 4 exs, Pynursla (3 ♂♂, 29.viii.1972, coll ARL; 1 ♂, 29.viii.1973, coll SKC); 1 ♀, Shillong, 15.viii.1980, coll ARL.

Measurements (in mm) and Nodal index.

<table>
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<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
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<td>34.0</td>
</tr>
<tr>
<td></td>
<td>26.5</td>
<td>34.5</td>
</tr>
</tbody>
</table>

Notes: The males studied vary from the description of the species provided by Fraser (1936) a little in size and nodal index.

In Meghalaya this species was noticed to be restricted only to central and southern Khasi hills. At Pynursla, these were hovering over a temporary water pool near a small village in the valley.

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh Sikkim, Uttar Pradesh, West Bengal. Outside India: Nepal; Tibet; China; Burma.

Sympetrum orientale (Selys)
(Figs. 397, 435 and 452-453)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
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<td>hindwing</td>
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<tr>
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<td>25.0-26.0</td>
<td>26.0-28.0</td>
</tr>
<tr>
<td>♂</td>
<td>23.0-25.0</td>
<td>27.0-27.5</td>
</tr>
</tbody>
</table>
Notes: This species appears to be more common in Meghalaya than S. hypomelas (Selys). They were collected mostly near streams from bushes covered with tall grass.

Distribution: India: Meghalaya. ? Outside India: China (vide Ris 1911).

Genus Trithemis Brauer


Type-species: *Libellula aurora* Burmeister

Brauer (1868a, b, c) established this genus for a few new species and some others earlier referred to the genus *Libellula* Linnaeus. The generic concept has further been elaborated and there has been addition of some more species, as a result of contributions rendered chiefly by Selys (1878b, 1883a, 1889, 1891a), Karsch (1889a), Kirby (1889, 1890), Foerster (1906b) and Ris (1909-1912). Laidlaw (1914a), Fraser (1920a, 1936), Fraser and Dover (1922), Lieftinck (1954) and Pinhey (1962) also worked on this genus. Accounts on different species of the genus occurring in Indian region have been published by Navas (1930), Lieftinck (1948, 1955a, 1971a), Bhasin (1953), Asahina (1965), St. Quentin (1970), Kumar (1972a, c, 1973b), Sahni (1972), Bose and Mitra (1975), Kumar and Juneja (1976), Prasad (1976), Singh and Prasad (1976a), Kumar and Prasad (1977a) and Lahiri (1977a, b, 1979).

Diagnostic characters: Small to medium in size (usually abdomen 19.0-32.0 mm, hindwing 24.0-36.0 mm) ; coloured black or reddish marked with yellow, green, metallic blue or violet, sometimes partly pruinosed ; vesicle depressed ; posterior lobe of prothorax not erected as a collar and usually not provided with specialized tuft of hairs ; tibial claw with inner arms much smaller than outer ; male genitalia with emerginate or depressed arched lamina, broad based small to very large hamules with distal strongly curled hooks and variably developed lobe ; 2nd segment of penis broadened distally, short, narrow, apposed or subparallel median lobes and similar but broader apical lobes ; female with borders of segment of 8 abdomen not dilated, vulvar scale obsolescent and tumid, sub-oval 9th ventral plate extending over base of segment 10 of abdomen with a pair of stumped, sub-basal ungulate processes. Wings hyaline, sometimes enfumed with brown at apex and usually marked with yellow, brown or black at base for variable extent with reddish or black neuration ; usually with 7½-18½ and 6-14 antenodal cross veins in fore- and hindwings respectively.
and 6-14 postnodal cross veins; posterostigma usually 4-5 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles, that of forewing elongated in breadth of wing, traversed once, situated far distal to the level of arc with costal margin about half the length of other margins; of hindwing elongated in length of wing, entire or rarely traversed once, situated at the level of arc with basal margin a little more than half the length of other margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field beginning with a row of 3 cells in forewing, of 2 cells in hindwing; hypertrigone entire; subtrigone 3 celled; 1 or rarely 2 cubital cross veins; Cu2 and MA strongly converging at wing margin in forewing; sectors of arc forming a common stalk; Rspl and Mspl poorly formed, and are mostly separated by a single row of cells from IRs and MA respectively; anal loop angulated, usually made of 17-28 cells; upto 4 rows of postanal cells in forewing.

Distribution: India; Nepal; Tibet; China; Pakistan; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Taiwan; Philippines; Pacific Islands; Syria; Turkey; Mauritius; Africa; Madagascar.

KEY TO THE SPECIES OF THE GENUS TRITHEMIS BRAUER (EITHER SEX)

1. Legs very long, hind femora extending to apex of segment 2 of abdomen; pterostigma bicolorous.
   .pallidinervis (Kirby)
   Legs not unusually long, hind femora extending only up to the end of synthorax; pterostigma unicolorous.
   
2. Base of hindwing with a small reddish brown spot; neuration crimson.
   .aurora (Burmeister)
   Base of hindwing with a small dark brown spot; neuration black festiva (Rambur)

Trithemis aurora (Burmeister)
(Figs. 407, 426 and 486-487)


LAHIRI: Odonate fauna of Meghalaya

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Length of abdomen</th>
<th>Hindwing</th>
<th>Forewing</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>An</td>
<td>Pn</td>
<td>An</td>
<td>Pn</td>
</tr>
<tr>
<td><strong>♂</strong></td>
<td>26.5-27.5</td>
<td>28.5-31.0</td>
<td>12½-13½</td>
<td>9-11</td>
<td>9-10</td>
</tr>
<tr>
<td><strong>♀</strong></td>
<td>22.5-24.5</td>
<td>27-0-31.0</td>
<td>12½-15½</td>
<td>7-10</td>
<td>9-12</td>
</tr>
</tbody>
</table>

Notes: This is a widely distributed species all over Meghalaya. They appear to prefer montane streams with exposed boulders, but are also seen near lakes.

Distribution: India: Virtually cosmopolitan. Outside India: Nepal; Tibet; Pakistan; Sri Lanka; Burma; Vietnam; Malaysia; Indonesia; Taiwan; Philippines.

Trithemis festiva (Rambur)
(Figs. 408, 427 and 488-489)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂</td>
<td>23.0-26.0</td>
<td>27.0</td>
</tr>
<tr>
<td>♀</td>
<td>22.0-25.5</td>
<td>27.5-30.5</td>
</tr>
</tbody>
</table>

**Notes:** Distribution in Meghalaya and habitat of this species are very similar to those of *T aurora* (Burmeister), but they are rarely found near lakes. Specimens are often noticed perching upon exposed boulders in mid-streams.

**Distribution:** India: Arunachal Pradesh, Assam, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: Nepal; Pakistan; Sri Lanka; Burma; Malaysia; Indonesia; Taiwan; Loo Vhoo Islands; Philippines; New Guinea; Turkey; ? Africa.

(Note: The species although recorded from Africa by Lieftinck (1953), it was not so, by Pinhey (1962). Hence an ? has been put against Africa).

**Trithemis pallidinervis (Kirby)**

(Fig.s. 409, 428 and 490-491)


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂</td>
<td>29.0-31.0</td>
<td>32.0-33.0</td>
</tr>
<tr>
<td>♀</td>
<td>26.0-27.0</td>
<td>32.0-33.0</td>
</tr>
</tbody>
</table>

Notes: Males studied vary from the description of the species provided by Fraser (1936) in having labium variably marked with black and entirely black labrum.

In Meghalaya this species was often collected near streams or rivers and it appears to be more common in southern part of the state.

Distribution: India: Andhra Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland Orissa, Punjab, Uttar Pradesh, West Bengal. Outside India: Tibet; Burma; Malaysia; Indonesia; Taiwan; Philippines.

Genus Zygonyx Hagen


Type-species: Zygonyx iris Selys *

Hagen (1867a) published a very short account of the genus Zygonyx and he was followed by Brauer (1968b, c). Kirby (1889) established the genus Psudomacromia for a new species. Further contribution on either or both genera came from Selys (1868, 1891b), Karsch (1889, 1891b), Kirby (1890), Foerster (1906b), Ris (1908, 1909, 1912), and Fraser (1919b, 1924a). Fraser (1926f) suppressed the genus Pseudomacromia under

* After Kirby (1890), Fraser (1936) and Davis (1981), but as opposed to Lieftincks (1984) citation *Zygonyx ida* Selys.
Zygonyx and his opinion was accepted by all later workers. Laidlaw (1924a), Fraser (1931, 1936), Lief tinck (1953a, 1954, 1955a, 1971a), Bhasin (1953) and Pinhey (1962, 1964) also worked on this genus.

**Diagnostic characters:** Large in size (usually abdomen 36.0-50.0 mm, hindwing 45.0-60.0 mm); black or ferruginous, marked with white, green, yellow, steely blue or metallic green, sometimes partly pruinosed; vesicle high, rounded or groved; posterior lobe of prothorax not erected as a collar and usually not provided with specialised tuft of hairs; tibial claw with arms subequal; male genitalia with hood shaped, emerginate, lamina, usually bearing a specialised tuft of hairs apically, large to very large, projecting hamules with a broad base, and robust, strongly curved hooks and variably developed lobe; 2nd segment of penis swollen distally, with short, narrow, subparallel median lobe and broader, longer, forcipate api cal lobe; female with short triangular valver scale and timid 9th ventral plate extending to base of segment 10 of abdomen; abdomen sometimes with terminal segments inflated. Wings hyaline, tinted with yellow, en fumed with brown, marked with amber at base or with black spots and bands all over; usually 13½-19½ and 8-13 antenodal cross veins in fore- and hind-wings and 6-14 postnodal cross veins; pterostigma usually about 4-5 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles and entire or traversed by 1-3 cross veins, that of forewing elongated in breadth of wing, situated far distal to the level of arc, with costal margin less than half the length of other margins; of hindwing elongated in length of wing, situated at or slightly proximal to the level of arc, with basal margin about half the length of other margins; arc usually situated between the 1st and 2nd antenodal cross veins or opposite to the 2nd; discoidal field beginning with a row of 3-4 cells; 1-3 cubital cross veins in forewing, 1-2 in hindwing; hypertrigone entire; subtrigone 1-5, usually 3 called; Cu₄ and MA parallel or convergent at wing margin in forewing; sectors of arc forming a common stalk; Rs₅ and M₅ poorly formed and are mostly separated by a single row of cells from IR₅ and MA respectively; anal loop strongly angulated, usually made of 25-50 calls; upto 6 rows of postanal cells in forewing.

**Distribution** India; China; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia; Philippines; Israel; Europe; Africa; Madagascar; Seychelles.

*Zygonyx iris intermedia* subsp. nov.
(Figs. 413 and 504-505)

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th></th>
<th>Length of abdomen</th>
<th>Hindwing</th>
<th>Forewing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>An Pn</td>
</tr>
<tr>
<td>♂♂</td>
<td>36.0-39.5</td>
<td>39.5-46.5</td>
<td>14¹₂⁻¹²⁻¹²</td>
</tr>
</tbody>
</table>

Description: Male: *Zygonyx iris intermedia* subsp. nov. comes very close to *Z. i. mildredae* Fraser, but differs from the same in being larger in size, nodal index and in the following: (i) occiput without bright yellow mark at its center; (ii) abdominal segments 1 and 2 unmarked with fine mid-dorsal carinal yellow line; (iii) the middorsal carinal line of segment 7 of abdomen expanded to form a sagittate shaped marking.

Note: *Zygonyx iris intermedia* subsp. nov. has been described above by citing its difference with its nearest ally, *Z. i. mildredae* Fraser which is “characterised by the absence of the mid-dorsal spot on segment 7 of both sexes” (Fraser 1936).

This is a rare subspecies and has only twice been collected in northern Khasi hills at comparatively higher altitude.

Distribution: India: Meghalaya.

Genus *Onychothemis* Brauer


Type-species: *Onychothemis abnormis* Brauer.

Brauer (1968a,b,c) established this genus giving a brief account. Later, the generic concept has been further elucidated and there has also been addition of a few more species as a result of contribution rendered chiefly by Karsch (1889), Kirby (1889, 1890, 1905), Ris (1909, 1911, 1912), Fraser (1919b, 1924a, 1936), Laidlaw (1924a,1930b) and Lieftinck (1953a, 1954, 1955a, 1971a).

Diagnostic characters: -Medium in size (usually abdomen 28.0-38.0 mm, hindwing 37.0-46.0 mm); black or metallic blue, marked with yellow, green or red; vesicle high, rounded; posterior lobe of prothorax
large, emerginate as a collar and provided with specialised tuft of hairs; tibial claw not bifid; male genitalia with hood shaped, emerginate lamina, broad based projecting hamules with short strongly curved, robust hooks and short lobe bearing an accessory lobe at apex; 2nd segment of penis dilated distally, with internal lobes produced into a pair of long flagella, and subparallel, short and subungulate median and apical lobes; in females, borders of segment 8 of abdomen not dilated, vulvar scale indistinct. Wings hyaline or variably enfumed with brown; usually 123/4-17 1/4 and -9-11 antenodal cross veins and 8-13 and 10-12 postnodal cross veins in fore- and hindwings respectively; Pterostigma about 6-7 times as long as broad, not braced; discoidal cells roughly the shape bilateral triangles, that of forewing elongated in breadth of wing, traversed by a cross vein, situated far distal to the level of arc with costal margin a little less than half the length of other margins; of hindwing elongated in length of wing, entire, situated at or slightly proximal to the level of arc with basal margin about half the length of other margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field beginning with a row of 3 cells in forewing, of 2-3 cells in hindwing; hypertrigone entire; subtrigone 3-4 celled; 1 cutibial cross vein; Cu2 and MA diverging a little at wing margin in forewing; sectors of arc forming a common stalk; Rspl and Mspl poorly formed and are mostly separated by a single row of cells from IR3 and MA respectively; Rs and IRs markedly undulated; anal loop strongly angulated, usually made of 22-26 cells; upto 5 rows of postanal cells in forewing.

**Distribution:** India; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia; Philippines.

**Onychothemis testacea** (S. L.) Laidlaw
(Figs. 417 and 492-493)


**Material studied:** 1 ♂, Shillong, 26.viii.1971, coll RSG.

Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An Pn</td>
</tr>
<tr>
<td>♂</td>
<td>34.0</td>
<td>40.0</td>
</tr>
</tbody>
</table>

**Description:** Male: black with metallic lusture on dorsum of head and synthorax, marked with yellow as follows: sides of mid-lobe and bases of lateral lobes of labium, anterior margin of anteclypeus, base of postcly-
peus narrowly, frons anteriorly and a large spot on either side of occiput connected by a median line; eyes dark brown. Prohorax with anterior margin and dorsum of the posterior lobe yellow. Synthorax with following yellow markings: a fine mid-dorsal carinal line bifurcating along anterolateral sinus, an S-shaped humeral stripe made of an upper and a lower surrounded spots and a narrow elongated curved section in between, a narrow stripe of anterolateral suture, another similar stripe on metepimeron, which however is narrowed at either end and falling a little short of lower margin of synthorax and a small rounded upper spot on the 2nd lateral suture. Wings hyaline extreme apices enfumed with brown; membrane blackish brown; neuration black; pterostigma elongated, covering about 2 cells, dark brown, lighter on proximal one fourth. Abdomen black, marked with yellow as follows: segment 2 with a mid dorsal spot, finely interrupted along the jugal suture and a ventrolateral spot on either side; segments 3-7 with large dorso-apical spots falling short of apical border except on segment 5; segments 5-7 with ventro-lateral apical spots, segments 8 and 9 with very small ventro-lateral basal spots. Anal appendages black, superiors finely denticulate near base beneath. Genitalia black, as shown in Fig. 417. Penis is in Fig. 492-493.

Notes: The single male specimen under study comes very close to *O. t. ceylonica* Ris, but differs from the description of that subspecies provided by Fraser (1936) in details of body markings. However, subspecific determination has not been possible in view of absence of good material.

It appears to be a rare insect, being restricted to central Khasi hills in Meghalaya.

**Genus Rhyothemis Hagen**


Type-species: *Libellula phyllis* Sulzer.

Hagen (1867b) established this genus giving a brief account. Later the generic concept has further been elaborated and there has also been addition of some more species as a result of contributions rendered chiefly by Selys (1978b, 1883a, 1889, 1891a), Brauer (1868b, c), Karsch (1889), Kirby (1889, 1890), Kruger (1902), Foerster (1906) and Ris (1909, 1911, 1913), Laidlaw (1902, 1914a), Martin (1904), Fraser (1920a, 1924a, 1931, 1936), Schmidt (1938), Lieftinck (1953b, 1954, 1975) and Watson (1969) also worked on this genus. Lieftinck (1948a, 1971), Bhasin (1953), St. Quen-
tin (1970) and Prasad (1976a) dealt with different species of the genus occurring in Indian region.

Diagnostic characters: Small to medium in size (usually abdomen 15.0-27.0 mm, hindwing 21.0-38.0 mm); Black, metallic blue or green marked with brown or yellow; vesicle high, rounded; posterior lobe of prothorax not erected as a collar and usually not provided with specialised tuft of hairs; tibial claw with inner arms much smaller than outer; male genitalia with broadly arched, depressed lamina, moderately broad based hamules with strongly curved hook and narrow lobe; 2nd segment of penis swollen distally with narrow, subequal and subparallel median and apical lobes; female with borders of segment 8 of abdomen not dilated, indistinct vulvar scale and tumid 9th ventral plate extending to base of segment 10 with a pair of stumped sub basal ungulate processes and a row of long marginal hairs. Wings hyaline, variably marked with black, golden yellow or steely blue black; usually 7½-11½ and 5-12 antenodal and 7-13 and 9-15 postnodal cross veins in fore- and hindwings respectively; pterostigma about 3-4 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles, that of forewing elongated in breadth of wing, traversed by one or more cross veins, situated far distal to the level of arc with costal margin about half the length of other margins; of hindwing entire, situated at the level of arc with basal margin about half the length of other margins; arc situated between the 1st and 2nd or opposite to the 2nd antenodal cross vein; discoidal field beginning with a row of 3-5 cells; hypertrigone usually traversed by 1-2 cross veins in forewing, entire in hindwing; subtrigone made of 11 or more cells, but ill defined; 1 cubital cross vein; 

Distribution: India; Nepal; Tibet; China; Bangladesh; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Japan; Taiwan; Philippines; Australia; Pacific Islands; Syria; Mauritius; Africa; Madagascar; Seychelles.

Rhyothemis variegata variegata (Linnaeus) (Figs. 410, 440 and 500-501)

Libellula variegata Linnaeus, 1763, Amaeotates Acad., 6: 412.
LAHIRI: Odonate fauna of Meghalaya


Measurements (in mm) and Nodal index.

<table>
<thead>
<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂ ♀</td>
<td>22.5</td>
<td>33.0-35.0</td>
</tr>
<tr>
<td>♀</td>
<td>21.5-22.5</td>
<td>33.0</td>
</tr>
</tbody>
</table>

Notes: This species appears to have a scattered distribution in Meghalaya. They are sometimes noticed swarming 30'-40' above ground, but settling on nearby bushes when it is about to rain.

Distribution: India: Assam, Himachal Pradesh, Karnataka; Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Tamil Nadu, West Bengal. Outside India: Nepal; Tibet; Bangladesh; Burma; also China [vide Lieftinck (1971)].

Genus Tholymis Hagen

Tholymis Hagen, 1867, Ent. Ztg. 28 : 221. Fraser, 1936, Fauna Brit. India, Odon., 3 : 410

Type-species: Libellula tillarga Fabricius.

Hagen (1867b) established this genus for a new species and also including Libellula pallida Bauvier in it. The generic concept was further elaborated as a result of contributions rendered chiefly by Brauer (1868b,c), Hagen (1875), Selys (1878b, 1891a), Kirby (1889, 1890), Foerster (1906b) and Ris (1909, 1913). Laidlaw (1924a, 1931), Borer (1945), Fraser (1920c, 1924, 1931, 1936), Lieftinck (1954, 1962), and Pinhey (1962) also worked on the genus and its species from different countries. The type-species collected from different parts of India and adjacent countries has been dealt with by Lieftinck (1948a, 1955a, 1971a), Bhasin (1953), Baijal et al. (1955), Kumar (1972c, 1973b), Mitra and Lahiri (1974), Kumar and Prasad (1977a) and Lahiri (1977b).
Diagnostic characters: Medium in size (usually abdomen 28.0-35.0 mm, hindwing 31.0-39.0 mm); reddish, marked with yellow or green; vesicle flat or shallowly rounded; tibial claw with inner arms shorter than outer; male genitalia with short, projecting, arched and hairy lamina, narrow hamules and wide projecting lobe; 2nd segment of penis swollen distally with short, narrow, converging apical lobe female with borders of segment 8 of abdomen not dilated, deeply cleft, hart shaped, projecting vulver scale and narrow 9th ventral plate extending to apex of segment 10 of abdomen. Wings hyaline, marked with golden brown at base in forewing, upto nearly nodus in hindwing, where in males sometimes there is a opalescent white distal band; usually 9½-11½ and 7 antenodal cross veins in fore- and hindwings respectively and 7-10 postnodal cross veins; pterostigma about 4-5 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles, the same in forewing elongated in breadth of wing, traversed by a cross veins, situated far distal to the level of arc with costal margin less than half the length of other margins; in hindwing elongated in length of wings, entire, situated slightly proximal to the level of arc with basal margin about half the length of other margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field begining with a row of 3 cells in forewing, of 2 cells in hindwing; hyper-trigone entire; subtrigone 3-4 celled; 1 cubital cross vein; Cu₄ and MA divergent at wing margin in forewing; sectors of arc forming a common stalk; Rspl and Mspl poorly formed and are mostly separated by a single row of cells from IR₈ and MA respectively; anal loop angulated a little, open at apex with borders meeting the wing margin and usually made of 23-25 cells; upto 4 rows of postanal cells in forewing.

Distribution: India; Sri Lanka; Burma; Thailand; Malaysia; Indonesia; Taiwan; Philippines; Australia; Pacific Islands; Mauritius; Africa; Madagascar; North America; South America.

Tholymis tillarga (Fabricius)

(Figs. 415, 429 and 506-507)


coll ARL; 1 ♂, Shella, 22.ix.1972, coll ARL; 2 exs., Shillong (1 ♂, 5. viii.1968, coll RKV; 1 ♀, 25.vi.1975, coll KD); 1 ♂, Ratachara, 24.i.1975, coll AKG.

Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th></th>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂ ♂</td>
<td>30.5-35.0</td>
<td>32.0-33.0</td>
<td>10½-11½</td>
</tr>
<tr>
<td>♀ ♂</td>
<td>29.0</td>
<td>35.0</td>
<td>9½-10½</td>
</tr>
</tbody>
</table>

Notes: This species appears to have a stray distribution in Meghalaya, but was noticed to be more common at lower altitude. These are usually found before dusk, swiftly patrolling over stagnant water mass or slow running streams. Sometimes specimens were beaten up from bushes adjacent to such water mass during day time.

Distribution: India: Assam, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Orissa, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: As for genus but unknown from America.

Genus Hydrobasileus Kirby


Type-species: *Hydrobasileus vittatus* Kirby.

Kirby (1889) established this genus for a new species. Further contribution on this genus came from Karsch (1889a), Ris (1909, 1913) Fraser (1920b, 1924a, 1931, 1936), Lailedaw (1924a), Navas (1933), Lieftinck (1954, 1955a, 1971a) and Baijal et al. (1955)

Diagnostic characters: Medium in size (usually abdomen 28.0-34.0 mm, hindwing 38.0-48.0 mm); coloured black or reddish brown, marked with green; vesicle hinge, notched; posterior lobe of prothorax not erected as a collar and usually not provided with specialised tuft of hairs; tibial claw with inner arms smaller than outer; male genitalia with arched lamina, hamules with indistinct base produced into acutely pointed projecting hooks, and moderately broad, obtusely rounded lobe; 2nd segment of penis swollen distally, with short, subtriangular median and narrow diverging apical lobes; female with borders of segment 8 of abdomen not dilated,
variably projecting vulvar scale deeply cleft into a pair of divergent ungululate processes extending beyond segment 9 of abdomen and tumid 9th ventral plate with a pair of subbasal stumped ungulate processes. Wings hyaline, sometimes variably marked with yellow or brown; usually 12½-18½ and 9-12 antenodal cross veins in fore- and hindwings respectively and 8-12 postnodal cross veins; pterostigma about 5-6 times as long as broad, not braced; discoidal cells roughly the shape of bilateral triangles, the same in forewing elongated in breadth of wing, traversed by 1-2 cross veins, situated far distal to the level of arc with costal margin less than half the length of other margins; in hindwing elongated in length of wing, entire or traversed once, situated at the level of arc with basal margin less than half the length of other margins; arc situated between the 1st and 2nd antenodal cross veins; discoidal field beginning with a row of 3-4 cells; hypertrigone entire; subtrigone 3-8 celled; 1 cubital cross vein; Cu₂ and MA parallel at wing margin in forewing; sectors of arc forming a common stalk; R₈ markedly undulated; Rs₃ and Ms₃ rather poorly defined and are mostly separated by a single row of cells from IR₈ and MA respectively; anal loop angulated, usually made of 21-37 cells; up to 3 rows of postanal cells in forewing.

Distribution: India; Sri Lanka; Burma; Thailand; Vietnam; Malaysia; Indonesia; New Guinea; Taiwan; Philippines; Australia.

Hydrobasileus croceus (Brauer)
(Figs. 411 and 494-495)


Material studied: 1 ♂, Umtham, 29.xi.1967, Coll RKV

Measurements (in mm) and Nodal index

<table>
<thead>
<tr>
<th></th>
<th>Length</th>
<th>forewing</th>
<th>Hindwing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>abdomen</td>
<td>hindwing</td>
<td>An</td>
</tr>
<tr>
<td>♂</td>
<td>29.5</td>
<td>38.5</td>
<td>14½-15½</td>
</tr>
</tbody>
</table>

Notes: The male studied varies from the description of the species-provided by Fraser (1936) in having shorter hindwing and more extensive black markings on abdomen.
The species, seldom noticed near human habitation, appears to inhabit forested areas.

**Distribution:** India: Assam, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Rajasthan. Outside India: Sri Lanka; Burma; Vietnam; Malaysia; Indonesia; Taiwan; Philippines.

**Genus** *Pantala* Hagen


**Type-species:** *Libellula flavescens* Fabricius

Hagen (1861) established this genus for 2 species which were earlier referred to the genus *Libellula* Linnaeus. Later, the generic concept has further been elaborated as a result of contributions rendered chiefly by Brauer (1868b, c), Hagen (1875), McLachlan (1877), Selys (1878b, 1883a, 1889, 1891a), Kirby (1889, 1890), Calvert (1895) and Ris (1909, 1913, 1916). Fraser (1920b, 1921b, 1931, 1936), Fraser and Dover (1922), Leif tinck (1954, 1962, 1975), Schmidt (1938), Borer (1945), Pinhey (1962) and Watson (1969) also worked on this genus. Lieftinck (1948a, 1955a, 1971a), Bhasin (1953), Sing (1955), Gorodkov (1961), St. Quentin (1970), Kumar (1972c, 1973b), Mitra (1973, 1976), Mitra and Sen (1975), Prasad (1976a), Singh and Prasad (1976a), Kumar and Prasad (1977a) and Lahiri (1979) published accounts on the type species collected from different parts of India and adjacent countries.

**Diagnostic characters:** Medium in size (usually abdomen 29.0-35.0 mm, hindwing 37.0-43.0 mm); yellow or reddish brown with restricted black markings; vesicle moderately high, rounded; posterior lobe of prothorax not erected as a collar and usually not provided with specialised tuft of hairs; tibial claw with inner arms much smaller than outer; male genitalia with projecting, deeply fissured lamina, small but broad based hamules with short, curled hooks and shorter, projecting and rounded lobe; 2nd segment of penis swollen distally, with short, ungulate and converging median lobe and longer, converging, distally dialted apical lobes; female with segment 8 of abdomen not dialted, vulver scale inconspicuous and tumid 9th ventral plate extending to base of segment 10 of abdomen. Wings hyaline, sometimes enfumed with brown and marked at base with brown or golden yellow; usually 12 1/2-15 1/2 and 7-8 antenodal and 6-8 and 8-10 postnodal cross veins in fore-and hindwings respectively; pterostigma smaller in hindwing, about 3-5 times as long as broad, not braced;
discoidal cells roughly the shape of bilateral triangles, that of forewing elongated in the breadth of wing, traversed by a cross vein, situated far distal to the level of arc with costal margin about one third the length of other margins; of hindwing elongated in length of wing, entire, situated at the level of arc with basal margin a little more than half the length of other margins; arc situated between 1st and 2nd antenodal cross veins; discoidal field beginning with a row of 3-4 cells in forewing, of 2-3 cells in hindwing; hypertrigone entire; subtrigone ill defined; sectors of arc forming a common stalk; Rs markedly undulated; Rspl and Mspl rather poorly defined and are mostly separated by a single row of cells from IRs and MA respectively; anal loop only a little angulated, usually made of 22-28 cells; up to 4 rows of postanal cells in forewing.

Distribution: Cosmopolitan.

_Pantala flavescens_ (Fabricius)
(Figs. 412, 425, 496-497 and 539)


Measurements (in mm) and Nodal index.

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<tr>
<th>Length of</th>
<th>Forewing</th>
<th>Hindwing</th>
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<td>♂</td>
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<td>33.0-35.0</td>
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Notes: Specimens of both sexes studied vary from the description of the species provided by Fraser (1936) in having two small upper black spots on synthorax one each on humeral and posterolateral suture.

This appears to be a widely distributed species in Meghalaya. These are commonly found in large swarms 30'-40' above ground but settling on bushes and trees just before it is going to rain.

Distribution: Cosmopolitan.

Genus *Urothemis* Brauer


Type-species: *Urothemis bisignata* Brauer

Brauer (1868a,b,c) established this genus for one of his new species and also included in it 2 other species earlier referred to the genus *Libellula* Linneaus. The generic concept has since then been elucidated as a result of contribution rendered chiefly by Selys (1889, 1890), Ris (1908, 1909, 1913) and Foerster (1906b). Fraser (1920c, 1924a, 1931, 1936), Laidlaw (1924a), Lieftinck (1971a, 1954, 1962) and Pinhey (1962) also worked on this genus. The only known Indian species has in recent past been dealt with by Bhasin (1953) and Prasad (1976b).
**Diagnostic characters**: Medium in size (usually abdomen 25.0-31.0 mm, hindwing 34.0-38.0 mm); coloured black or red, marked with blue, green and metallic blue black; vesicle high, broad; posterior lobe of prothorax not erected as a collar and usually not bearing specialised tuft of hairs; tibial claw with inner arms much shorter than outer; male genitalia with arched lamina, markedly projecting, nearly straight hamules with base only little dilated and moderately wide lobe rounded at outer margin; 2nd segment of penis broadened apically, with short median lobes; in females, borders of segment 8 of abdomen not dilated; vulvar scale deeply cleft into two spatulate lobes extending to base of segment 10 and tongue like 9th ventral plate overlapping segment 10 of abdomen. Wings hyaline, sometimes marked with yellow, brown or black near base; usually 7 and 5 antenodal cross veins in fore- and hindwings respectively and 6-8 postnodal cross veins; pterostigma about 5 times as long as broad, not braced; discoidal cell entire nad roughly the shape of bilateral triangles, that of forewing elongated in length of wing, situated well distal to the level of arc, with costal margin a little more than half the length of other margins, of hindwing elongated in length of wing, situated at the level of arc, with costal margin a little longer than the distal margin and more than double the length of basal margin; arc situated between the 1st and 2nd antenodal cross veins; discoidal field commencing with a row of 2 cells; hypertrigone entire; subtrigone 3 celled; Cu₂ and MA parallel or slightly converging at wing margin in forewing; sectors of arc separated at origin; 1 cubital cross vein; Rs₁ and Ms₁ poorly formed and are mostly separated by a single row of cells from IR₈ and MA respectively; anal loop stocking shaped, made of 12-17 cells; upto 4 rows of postanal cells in forewing.

Distribution: India; Tibet, China; Bangladesh, Sri Lanka, Burma, Thailand, Vietnam, Malaysia, Indonesia, New Guinea, Philippines, Australia, Africa, Madagascar.

*Urothemis signata signata* (Rambur)  
(Figs. 386 and 508-509)

*Urothemis signata signata* (Rambur) : Ris, 1913, *Cat. Coll. Selys*, 16 : 1023.  

**Material studied**: 1 ♂, Barapani, 21.vi.1973, coll AKG; 1 ♂, Sonapurdi, 27.viii.1974, coll ARL.
Measurements (in mm) and Nodal index.

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<th>Length of</th>
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<td>abdomen</td>
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<td>♀♂ 31.0</td>
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Notes: The males studied vary from the description of the species provided by Fraser (1936) in having longer abdomen and basal spot of hindwing broken into a cubital and an anal spot.

This species appears to have a scattered distribution in Meghalaya.

Distribution: India: Assam, Bihar, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh, West Bengal. Outside India: Tibet; China; Bangladesh; Sri Lanka; Burma; Vietnam.

DISCUSSION

A. Richness of the state and prepondarence of the different families:

The Odonate fauna state (147) is represented by approximately one third of the (of a total of nearly 460) species and subspecies known so far from India and is approximately 2.9% of that known from the entire world [estimated at 5,000 by Corbet (1974)]. Considering the total area of the state under consideration (approximately only 0.68% of total area of the Indian union), it can be said that the state has a rich Odonate fauna.

This is perhaps due to varied bio-physical condition, as discussed earlier, existing in the state. Such difference has resulted in the formation of diverse ecological niches.

A break up of the total number of species and subspecies found in the state at the family level reveals following percentage composition:

(i) Amphipterygidae-1 (approximately 0.7%); (ii) Chlorocyphidae-9 (approximately 6.1%); (iii) Euphaeidae-7 (approximately 4.8%); (iv) Calopterygidae-8 (approximately 4.4%); (v) Chlorolestidae-2 (approximately 1.4%); (vi) Lestidae-5 (approximately 3.4%); (vii) Protonuridae-3 (approximately 2.0%); (viii) Platycnemididae-12 (approximately 8.2%); (ix) Coenagrionidae-17 (approximately 11.6%); (x) Gomphidae-20 (approximately 13.0%); (xi) Aeshnidae-same as Coenagrionidae; (xii) Cordulegasteridae-4 (approximately 2.7%); (xiii) Corduliidae-6 (approximately 4.1%); (xiv) Libellulidae-36 (approximately 24.5%).
From the above it is noticed that, the family Libellulidae is represented by maximum number of species, followed by Gomphidae, Coenagrionidae and Aeshnidae; nearly 60.9% of the species and sub-species is represented by these 4 families. Contrastingly enough, 4 other families e.g. Anisoptera, Chlorostidae, Protoneridae and Cordulegasteridae comprise approximately 6.8% of the total number of species and sub-species found in the state of Meghalaya. Remaining species and subspecies (nearly 32.3% of the total) are represented by the rest of the 6 families.

Again out of the two suborders Zygoptera and Anisoptera, the latter (approximately 56.2%) is more preponderant over the former (approximately 43.8%).

A break up of the number of genera under each of the 14 families stated above, shows the following number and percentage composition: (i) Amphipterygidae and Chlorostidae-1 each (approximately 1.3%); (ii) Chlorocyphidae, Protoneridae and Cordulegasteridae-2 each (approximately 2.6%); (iii) Euphaeidae and Lestidae-3 each (approximately 3.9%); (iv) Platycnemididae and Coduliidae-4 each (approximately 5.2%); (v) Calopterygidae-6 (approximately 7.8%); (vi) Coenagrionidae-7 (approximately 9.1%); (vii) Aeshnidae-8 (approximately 10.4%); (viii) Gomphidae-13 (approximately 16.9%); (ix) Libellulidae-12 (approximately 27.3%).

Of the 14 families Libellulidae is the most significantly represented family. It is followed, in the order, by the families Gomphidae, Aeshnidae and Coenagrionidae and when considered together, these four families are noticed to comprise 49 (approximately 63.6%) genera known from the state; remaining genera, i.e. 28 being represented by the rest of 10 families.

Prevalence of the different families, when considered with regard to composition of families in respect of species and subspecies on one hand and genera on the other, appears basically same.

Analysis of generic composition of 2 suborders, viz. Zygoptera and Anisoptera, indicates that, as in species-subspecies level, the latter (approximately 62.4%) is more predominant over the former (approximately 37.6%).

Odonate fauna of India comprising of about 460 species and subspecies under 142 genera and 17 families, when considered as a whole, show that, the suborder Anisoptera (comprising of about 63.3% of the total genera and 57.1% of the total species) is more prevalent than the suborder Zygop-
tera (leaving aside the only species and genus belonging to suborder Anisozygoptera). Four families, viz. Libellulidae, Gomphidae, Coenagrionidae and Aeshnidae considered most prevalent, together hold about 264 species and subspecies (approximately 57.4% of the total) under 88 genera (approximately 61.9% of the total) least number of genera (one each) and species (six) of Indian Odonates are held by four other families viz. Chlorolestidae, Megapodagriidae, Amphipterygidae and Epiophlebiidae. Thus prevalence of different suborders and families in respect of genera and species composition, in the Odonate fauna of state of Meghalaya as that of Indian union appear to be basically similar.

B. Faunal affinities:

Analysis of the Odonate fauna occurring in the state of Meghalaya reveal that about 97.4% of the genera (75) and 64.6% of the species and subspecies (95) are common to rest of eastern India and countries adjacent to India, i.e. Bangladesh and Nepal. Commonness of the faunal component with other parts of India and that of the world in general, follow in decreasing order as follows: (i) Burma, Thailand, Vietnam [67 genera (approximately 87.0%) and 79 species and subspecies (approximately 53.7%)]; (ii) Indonesia and Malaysia [57 genera (approximately 74.0%) and 44 species and subspecies (approximately 29.9%)]; (iii) China, Taiwan, Japan and its adjoining islands [61 genera (approximately 79.1%) and 38 species and subspecies (approximately 25.9%)]; (iv) Peninsular (Southern) India [46 genera (approximately 59.8%) and 44 species and subspecies (approximately 29.9%)]; (v) North West India and Pakistan [44 genera (approximately 57.1%) and 57 species and subspecies (approximately 38.8%)]; (vi) Sri Lanka [42 genera (approximately 54.5%) and 29 species and subspecies (nearly 19.7%)]; (vii) Australia, New Zealand and the Pacific Islands [31 general (approximately 40.3%) and 12 species and subspecies (approximately 8.2%)]; (viii) Africa and Madagascar [30 genera (approximately 38.9%) and 5 species and subspecies (approximately 3.5%)]; (ix) Europe [15 genera (approximately 19.5%) and only 3 species (approximately 2.0%)]; (x) North America [14 genera (approximately 18.2%) and only 1 species (approximately 0.7%)]; (xi) South America [9 genera (approximately 11.8%) and only one species (approximately 0.7%)].

It can be noticed that the state shows closest affinity with Indochinese and least so with Neotropical elements in respect of Odonate fauna. Fraser (1933) also made similar observation since he wrote ‘In the north-eastern provinces—Bengal, Assam and Bihar—the Malaysian affinities become pronounced and increases further towards lower Burma, which is purely Malaysian’
C. Endemism:

One genus (approximately 1.3%) and 33 species and subspecies (approximately 21.8%) are endemic to the state of Meghalaya. This shows that the state is quite rich in endemicty at the species-sub-species level, but nearly negligibly so, at the generic level. However, figures, of familywise distribution of the endemic species and subspecies indicate that endemism is not uniform in all the families. e.g. (i) Corduliidae-3 out of 6 species (50.0%) ; (ii) Platycnemididae-7 out of 12 species (approximately 58.3%) ; (iii) Chlorolestidae-1 out of 2 species (50.0%) ; (iv) Euphaeidae-3 out of 7 species (approximately 42.9%) ; (v) Lestidae-3 out of 5 species (approximately 60.0%) ; (vi) Gomphidae-8 out of 19 species (approximately 42.1%) ; (vii) Cordulegasteridae-1 out of 4 species (25.0%) ; (viii) Aeshnidae-4 out of 21 species (approximately 19.0%) ; (ix) Calopterygidae-1 out of 8 species (approximately 12.8%) ; (x) Libellulidae-2 out of 36 species (approximately 5.2%). No endemism is exhibited in the families Amphipterygidae, Chlorocyphidae, Protoneuridae and Coenagrionidae.

D. Distribution pattern of species and subspecies within the state:

Some of the species and subspecies are very widely distributed all over the state e.g. Aciagrion tillyardi Laidlaw (family Coenagrionidae), Orthetrum sabina (Drury), Crocothemis s. servilia (Drury) (family Libellulidae) etc., but many species and subspecies have localised distribution in the state. Such distribution seems to be related to the prevalent variable bio-physical condition of the different parts of the state under consideration.

Based on the prevailing bio-physical condition, the state can conveniently be subdivided into 5 major distinct zones, each with some characteristic faunal component, as follows:

1. Foothills (upto 600 m) : It forms the periphery of entire state but extends over more area in the Garo hills. This zone is characterized by tropical luxurious evergreen forest, hot and humid climate and low (less than 200 cm/annum) rainfall. Collection localities of Sl. Nos. 1-28, 30, 32, 35, 51, 57-61, 74 and 76-78 fall under this zone.

71 species and subspecies (approximately 48.9%) are represented in this zone. Of these, 21 (approximately 14.3%) are limited to this zone only.

2. Northern slope of Khasi hills (600-1100 m) : In this zone, vegetation is mainly subtropical, rainfall slightly more than in the foothills (200-300 cm/annum). The climate is less hot and humid here. Collection localities of Sl. Nos. 53, 67 and 69-71 fall under this zone.
In this zone 46 species and subspecies (approximately 31.3%) are found. Only two of these species are restricted to this zone.

(3) Central hilly region of Garo and Khasi hills (1100-2000 m): This zone covers most of the central area of Garo and Khasi hills. Temperate luxurious vegetation, cold climate and rainfall of about 300-400cm/annum are characteristics of this zone. Tura, Garo hills and collection localities of Sl. Nos. 29, 40-43, 45, 46, 55, 62-63 and 69 fall under this zone.

99 species and subspecies (approximately 67.4%) occur in this zone and 31 of these (approximately 21.1%) are limited to this zone.

(4) Southern slope of Khasi hills (1500-2000 m): It is characterised by scanty vegetation due to erosion of soil caused by heavy rainfall (500-1549 cm/annum, maximum recorded rainfall in the world) and cold climate. Collection localities of Sl. Nos. 31, 33, 34, 36-39, 44, 47-49, 52, 54, 64, 65, 67, 73 and 74 fall under this zone.

46 species and subspecies (approximately 31.5%) are found here. Six of these (approximately 4.9%) are limited only to this zone.

(5) Central upland of Jaintia hills (600-1500 m): This zone is comprised of nearly flat valleys with scanty vegetation, much of natural forest being removed by terrace cultivation. Rainfall (300-700 cm/annum) is less than in southern slope of Khasi hills and climate is warmer than in the two preceding zones. Collection localities 76 and 89 fall under this zone.

Only 17 species and subspecies (approximately 11.6%) occur in this zone. All of these are also known from one or more of the other zones named above.

Thus it is noticed that central hilly region of Garo and Khasi hills is most rich from the viewpoint of occurrence of Odonate fauna. This is followed, in decreasing order, by foothills, southern slope of Khasi hills, northern slope of Khasi hills and central upland of Jaintia hills. It is also noteworthy that, excepting central upland of Jaintia hills, some of the species and subspecies in each of the other zones are very much restricted to a particular zone. This fact is well marked in the foothills and the central hilly region of Garo and Khasi hills.

Central upland of Jaintia hills, where natural forest has been depleated to a great extent on account of extensive terrace cultivation, has the least number of species and subspecies. This suggests a direct co-relation
between available forests and faunal component in a particular area. Need of vegetation to provide necessary shelter to immature adults has been pointed out by Corbet (1980) and Parr (1973). However, such correlation might also be due to limitation of desired breeding ground caused by deforestation as has been suggested by Lieftinck, (1968) in connection with Malaysian fauna.

Richness of faunal component of the central zone of Garo and Khasi hills in comparison to that of southern slope of Khasi hills, can be accounted for by the aforementioned reasons. Preference for a higher rainfall area by the species may also play a role in limiting the distribution of some species which are known only from either one of these zones in the state. e.g. *Rhinocypha immacualta* Selys (known only from southern slope of Khasi hills) or nearly all species of a genus e.g. *Bayadera* Selys (that of *B. kali* Cowley being uncertain) which are endemic in central zone of Khasi hills).

As indicated above, a number of species and subspecies occurring in the state are known either from foothills (altitude 600 m or less) or from zones with higher altitude (over 1100 m). Altitudinal influence, in limiting the distribution of many Odonate species and subspecies, is possibly brought about through a change in either temperature or atmospheric pressure or both. Apparently many Odonate species and subspecies are able to thrive only within a limited range of atmospheric pressure and temperature.

Northern slope of Khasi hills can be said to have a moderately rich fauna. Its general biophysical factors appear to be suitable for many species and subspecies excepting perhaps those which are specifically sensitive to their ability to withstand only a limited range of altitude and rainfall.

In summing up, it may be stated that a few factors apparently appear to act as barriers, limiting the distribution of species and subspecies. These are (i) extent of available vegetation; (ii) amount of rainfall and (iii) altitude. It may be noted that, these factors in general are effective only at species subspecies level, but in certain cases, also tend to hold good at generic level as well. This is exemplified by the genera *Bayadera* Selys and *Paragomphus* Cowley, besides others, where all the members are exclusively known from, the central zone of Khasi hills and northern foothills respectively, in the state.

It is obvious that, the species which are very widely spread all over the state are very highly adaptive and are able to tolerate a wide range of bio-physical factors.
While analysing zonal faunal components, 8 species have been kept out of consideration, since their actual distribution within the state is uncertain from available records. These are *Bayadera kali* Cowely, *Aciaagrion approximaans* (Selys), *Oligoeaschna Khasiana* Lieftinck, *Anax guttatus* (Burmeister), *Gynacantha khasiaca* McLachlan, *Aeshna petalura* Martin, *Chlorogomphus fraseri* St. Quentin and *Somatochlora daviesi* Lieftinck, all being recorded from Khasi hills.

From the nature of collection available at hand, (the same having not been at regular intervals in every season throughout the years) it is not possible to present a data regarding seasonal fluctuation of population of different species and subspecies. Also, actual time of collection for a number of species reported earlier from the state, remains uncertain from the available information. However, the data available shows that, most of the species have been collected during the period of March—November; 23 species and subspecies (approximately 15.5%) were collected during the period December-February as well; but only for 6 of them, some collections could be made between the middle of December—middle of February. Those few, truly overwintering species and subspecies are *Aciagrion tillyardi* Laidalw, *Palpopleura s. sexmaculata* (Fabricius), *Crocothemis s. servilia* (Drury), *Diplacodes trivialis* (Rambur), *Neurothemis i. intermedia* (Rambur) and *Trithemis festiva* (Rambur). Maximum number of species and subspecies [91 (approximately 61.5%)] were collected during the month of June, July and August which was followed by the collections made during the months of March-May [34 (approximately 57.1%)] and between September-November [58 (approximately 39.5%)]. A few species not appearing till the month of August, take to wing only from September onwards. These are, *Rhinocypha immaculata* Selys, *Echo margirita m. Selys, Vestalaria smaragdina* (Selys), *Coeliccia didyma* Selys, *Anax sp. A, Hemicorduiia asiatica* Selys and *Hydrobasileus croceus* (Brauer). In general, most species and subspecies appear from March onwards and many of them continue to be on wing during the next 4-6 months. Availability of desired optimum temperature and opportunity for breeding resulting from the ensuring rainfall possibly lead to a rapid enhancement of population from March onwards.

**Summary**

1.0 Odonate fauna of the state of Meghalaya in Eastern India has been studied in a comprehensive manner for the first time.
2.0 A total of 147 species and subspecies belonging to 77 genera under 14 families known till date from the state have been listed including 49 which are now records from Meghalaya.

3.0 Collection data, distribution, measurements of body parts and notes of taxonomic importance have been provided for all the 112 species and subspecies studied during the present work together with adequate illustrations of different body parts of taxonomic importance.

4.0 All the 68 genera studied have been treated in detail on the basis of material available and literature, while supergeneric categories have been briefly dealt with.

5.0 Six species and one subspecies turned out to be new to science; these are: *Magalestes raychoudhurii* sp. nov. (Family Chlorolestidae), *Orolestes durga* sp. nov. and *Lestes garoensis* sp. nov. (Family Lestidae). *Calicnemia mukherjeei* sp. nov. (Family Platycnemididae), *Nihonogomphus indicus* sp. nov. and *Onychogomphus meghalayanus* sp. nov. (Family Gomphidae) and *Zygonyx iris intermedia* subsp. nov. (Family Libellulidae)

Three species, one each belonging to the genera *Anotogaster* Selys. (Family Cordulegasteridae), *Anax* Leach and *Gynacantha* Rambur (Family Aeshnidae), whose specific identity could not be exactly determined due to lack of males, have been described in detail. Four species, namely, *Coeliccia raseri* Laidlaw, *Aciagrion tillyardi* Laidlaw, *Argioenemis obscura* Laidlaw and *Paragomphus echinoccipitalis* (Fraser) have also been completely re-described in view of their existing inadequate description. The male of *P. echinoccipitalis* (Fraser) and females of *Elattoneura compioni* (Fraser) and *Anisogomphus caudalis* Fraser, have been described for the first time. *Rhinocypha perforata* subsp. *beatifica* Fraser has been elevated to the rank of a species. *Cariagrion fallax* Ris and *C. olivaceum* Laidlaw have been both treated only as a monotypic species since in both case characters used for subspecific ranking of population appeared to overlap in specimen studied. *O. echinoccipitalis* Fraser and *C. biguttata* (Fraser) have been removed from the genera *Onychogomphus* Selys and *Cephalaeschna* Selys, to *Paragomphus* Cowley and *Periaeschna* Martin, respectively, while *O. duaricus* Fraser has been treated as a subspecies of *O. saundersi* Selys.

6.0 Running keys for the material studied have been provided in the text together with important synonyms and original references for all the genera and species.

7.0 Finally an attempt has been made to correlate the distribution pattern of various Odonate species and subspecies known from Meghalaya with
different physical and environmental factors prevalent in the state and to analyse the faunal component from zoogeographical point of view.

Acknowledgements

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REFERENCES


Asahina, S. 1949, New dergonflies from Japan, Insecta Matsum, 17 : 28-34.


LAHIRI: *Odonate fauna of Meghalaya* 241

Habricius, J. C. 1793. Libellula, 2 : 373-383. (in *Entomologiae Systematicae. Hafniae, Proft. 8*).


Foerster, F. 1906. Die Libelluliden gattungen von Afrika and Madagas


Fraser, F. C. 1925a. The true position of the genera *Orogomphus* and *Chlorogomphus* as demonstrated by a study of the larvae of *O. atkin-
soni and C. compioni and by a comparison of the latter with the larva of Anotogaster nipalensis (Odonata). Rec. Indian Mus., 27 : 423-429.


Fraser, F. C. 1931. Additions to the survey of the Odonata (Dragonfly) fauna of Western India with descriptions of nine new species. Rec. Indian Mus., 33: 443-474.


Kumar, A. 1973b. Descriptions of the last instar larvae of Odonata from Dehra Dun valley (India) with notes on biology. II. Suborder Anisoptera. Orient Ins., 7: 291-333.


LAHIRI: Odonate fauna of Meghalaya


LIEFTINCK, M.A. 1969. Two new Odonata from south-east Asia with comments on previously described species. *Dt. ent. Z.*, **16**: 205-215.


LAHIRI : Odonate fauna of Meghalaya


LAHIRI: Odonate fauna of Meghalaya


Selys Longchamps, E. De. 1850. .See Selys, Longchamps, E de and Hagen, H. 1850.


Tillyard, R. J. 1917. The biology of dragonflies (Odonata or Paraneuroptera) pp. xii +396. Cambridge Univ. Press.


DISTRIBUTION MAPS
OF ODONATE FAUNA
OF MEGHALAYA
LAHIRI: Odonate fauna of Meghalaya

Map - 1

R. montana (Selys)  L. l. lineata (Burmeister)
R. beatifica Fraser  R. B. delimbata Selys
R. ignipennis Selys  R. immaculata Selys
R. g. hemihyalina Fraser  R. g. quadrinaculata Selys
R. spuria Selys  R. vitrinella Fraser
A. subplatystyla Fraser

A. vallei St. Quentin

B. hyalina Selys

B. indica (Selys)

E. o. brunnea Selys

E. o. ochracea Selys

C. confusa Selys

E. m. marginata Selys

E. m. tripartita Selys

N. c. chinensis (Linn.)

Map—2
LAHIRI: Odonate fauna of Meghalaya

Map-3
L. concinnus Selys

L. dorothea Fraser

L. garoensis sp. nov.

C. annulata (Selys)

C. marginipes (Rambur)

C. vittata (S.L.) (Selys)

P. autumnalis (fraser)

C. eximia (Selys)

C. imitans Lieftinck

C. mukherjeei Lahiri

Map—4
LAHIRI: Odonate fauna of Meghalaya

- C. bimaculata Laidlaw
- C. fraseri Laidlaw
- C. vacca Laidlaw
- C. didyma (Selys)
- C. sarbottama sp. nov.
- C. kempi Laidlaw
- C. azureum (Selys)
- C. coromandelianum (Fabricius)
- C. fallax Ris
- C. olivaceum Laidlaw

Map—5
Map—6
LAHIRI: Odonate fauna of Meghalaya

Map 7

I. a. aurora (Hagen)
I. r. rufoestigma Selys
A. caudalis Fraser
A. orites Laidlaw
B. ? vermicularis (Martin)
D. mallyori Fraser
D. bidentatus (Fraser)
G. personatus Selys
M. bicornutus (Fraser)
M. martini (Fraser)
N. indicus sp. nov.

O. meghalayanus sp. nov.

O. ? maculivertex (Selys)

O. aureus Laidlaw

O. modestus Selys

O. s. duaricus Fraser

P. echinoccipitalis (Fraser)

P. lineatus (Selys)

P. stevensi Laidlaw

S. inglesi Fraser

Map—8
<table>
<thead>
<tr>
<th>Species</th>
<th>Map Location</th>
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<tbody>
<tr>
<td>D. decorata Lieftinck</td>
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<tr>
<td>D. martini (Laidlaw)</td>
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<tr>
<td>A. intersedens Martin</td>
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<tr>
<td>P. biguttata (Fraser)</td>
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<tr>
<td>P. biguttata Fraser</td>
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<td>P. magdalena Martin</td>
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<td>P. nocturnalis Fraser</td>
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<td>P. fletcheri Fraser</td>
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<td>I. waterhousei McLachlan</td>
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<td>A. sp. A</td>
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Map—9
\[ C. \textit{bayadera} \text{ Selys} \]
\[ C. \textit{hyalina} \text{ Selys} \]
\[ C. \text{sp. A} \]
\[ A. \text{sp. A} \]
\[ C. \textit{atkineoni} \text{ (Selys)} \]
\[ C. \textit{campion} \text{ (Fraser)} \]
\[ H. \textit{asatica} \text{ Selys} \]
\[ I. \textit{imbricata} \text{ Fraser} \]
\[ I. \textit{intrinsic} \text{ Fraser} \]
\[ I. \textit{optata} \text{ Selys} \]

Map—10
LAHIRI: Odonate fauna of Meghalaya

Map - 11
![Map-12](image-url)
LAHIRI: Odonate fauna of Meghalaya

Map-13
D. testacea (S.L.) Laidlaw

R. v. variegata (Linn.)

I. tillarga (Fabr.)

H. croceus (Brauer)

P. flavescens (Fabr.)

U. s. signata (Rambur)

Map—14
FIGURES
Fig. 1. External morphology of a dragonfly, *Nihonogomphus indicus* sp. nov., male (lateral view, showing only clipped right wings and legs of left side); [1, head; 2, prothorax; 3 synthorax; 4, abdomen; 5, eye; 6, antenna; 7, frons; 8, postcylpeus; 9, anteclypeus; 10, labrum; 11, mandible (base); 12, labium; 13, foreleg; 14, middle leg; 15, hindleg; 16, coxae; 17, trochanter; 18, femur; 19, tibia; 20, tarsi; 21, tibial claw; 22, spiracle; 23, mesothoracic collar; 24, mid-dorsal carina; 25, antehumeral stripe; 26, antealar sinus; 27, humeral suture; 28, right forewing; 29, tergum; 30, first lateral suture; 31, right hindwing; 32, second lateral suture; 33, oreillettes; 34, accessory male genitalia; 35, lamina; 36, anterior hamule; 37, posterior hamule; 38, vesicula spermalis; 39, first abdominal segment; 40, tenth abdominal segment; 41, jugal suture; 42, superior anal appendages; 43, branches of inferior anal appendages].

Figs. 2-3. Antenna of two dragonflies; Fig. 2, *Chlorogomphus atkinsoni* (Selys), male; Fig. 3, *Anotogaster* sp. A., female; (1-7, antennal segments first to seventh).

Figs. 4-5. Male anal appendages (lateral and dorsal view respectively) of a damselfly, *Caliphaea confusa* Selys; (1 superior anal appendage; 2 inferior anal appendage; 3, tenth abdominal segment).

Figs. 6-7. Head (lateral and dorsal view respectively) of a damselfly, *Rhinocypha immaculata* Selys, female; (1 eyes; 2, antenna; 3, epistome; 4, labrum; 5, bases of mandibles; 6, frons; 7, labium; 8, anterior ocellus; 9, posterior ocelli; 10, vertex; 11, occiput).

Fig. 8. Head (ventral view) of a dragonfly, *Chlorogomphus atkinsoni* Selys, male; (1, eyes; 2, postcylpeus; 3, bases of mandibles; 4, lateral lobes of labium; 5, labial palpi; 6, labrum; 7, middle lobe of labium).
Figs. 9-12  Head of dragonflies (dorsal view of rear part) : Fig. 9. *Nihonogomphus indicus* sp. nov., female; Fig. 10. *Anotogaster* sp. A, female; Fig. 11. *Chlorogomphus atkinsoni* (Selys), male; Fig. 12. *Hemicordulia asiatica* Selys, male; (1, anterior ocellus; 2, antenna (base); 3, vertex; 4, vesicle; 5, lateral ocelli; 6, eyes; 7, occiput; 8, spines on posterior margin of occiput; 9, hairs on posterior margin of occiput; 10, sinuous projection on posterior margin of occiput).

Figs. 13-14  Prothorax (lateral view) of Libelluloid male dragonflies; Fig. 13. *Orthetrum sabina* (Drury); Fig. 14. *Crocothemis s. servilia* (Drury); (1, anterior lobe; 2, middle lobe; 3, posterior lobe). (Figs. 9-14 in same scale)

Figs. 15-17  Hindlegs of dragon and damselflies; Fig. 15. *Anisogomphus caudalis*, Fraser, female; Fig. 16. *Hemicordulia asiatica* Selys, male; Fig. 17. *Coptera annulata* (Selys), male; (1, coxa; 2, trochanter; 3, femur; 4, tibia; 5, tarsus; 6, inner arm of claw (hook); 7, claw; 8, keel on tibiae).

Fig. 18.  Male external genitalia (ventral view) of a damselfly, *Argiocnemis obscura* Laidlaw; (1, first abdominal segment; 2, lamina; 3, anterior hamule; 4, posterior haumle; 5, penis; 6, vesicula spermalis; 7, third abdominal segment).
Fig. 19. Thorax (lateral view) of a demselfly, Fig. 20. Anterior part of the same in dorsal view (both hypothetical and not to scale); (1 prothorax; 2, syn- thorax; 3, 4 and 5, anterior, middle and posterior lobe respectively of prothorax; 6, 7, 8 and 9, midlobe, lateral lobe, inferior lip and stylet of posterior lobe of prothorax; 10, middorsal carina; 12, mesothoracic acrotergite; 13, 14 and 15, anterior, lateral and posterior carina respectively of frame; 16, pit; 17, mesostigmal lamina (plate); 18, posterior ridge of mesostigmal lamina; 19, depression behind mesostigmal plate for locking the male anal (caudal) appendage; 20, mesothoracic stigma; 21, epaulette; 22, pre-episternum; 23, mesepisternum; 24, mesinfraepisternum; 25, mesopimeron; 26, metepisternum; 27, metinfraepisternum; 28, metepimeron; 29, 30 and 31, fore, middle and hindlegs respectively; 32, 33 and 34, humeral, 1st and 2nd lateral suture respectively; 35, antealar sinus; 36 and 37, fore- and hindwings respectively; 38, mesothoracic spiracle; 39, abdomen; 40, antenumeral stripe; 41, humeral stripe).

Figs. 21-25 Apical abdominal segments of dragonflies showing female genitalia; Fig. 21, Periaeschna biguttata (Fraser), in left lateral view; Fig. 22, Anax sp. A, in left lateral view; Fig. 23, Tetracanthagyna waterhuosei McLachlan, in ventral view; Fig. 24, Chlorogomphus atkinsoni (Selys), in ventral view; Fig. 25, Anotogaster sp. A, in left lateral view; (1, 2 and 3, abdominal segments 8, 9 and 10, respectively; 4, epiproct; 5, anal appendage; 6, ventral or first valvulae; 7, inner or second valvulae; 8, lateral or third valvulae; 10, dentigerous plate; 11, pseudoovipositor; 12, vulver scale; 13, sternite of 8th abdominal segment).
Fig. 26. Male accessory genitalia of *Chlorogomphus atkinsoni* (Selys); (1, 2 and 3 abdominal segments 1st, 2nd and 3rd respectively; 4, oreillet; 5, lamina; 6, bosses on lamina; 7 and 8, anterior and posterior haumles respectively; 9, penis; 10, vesicula spermalis).

Figs. 27-28. Male anal appendages of *Chlorogomphus atkinsoni* (Selys) in dorsal and right lateral view respectively; (1, 10th abdominal segment; 2, and 3, superior and inferior anal appendages respectively; 4, paraproct).

Figs. 29-30. Penis of a dragonfly, *Sympetrum hypomelas* (Selys); Fig. 29. In left lateral view, Fig. 30. Apex more magnified in dorsal view; (1, vesicula spermalis; 2, proximal or 1st segment; 3, apical or 2nd segment; 4, apical lobe; 5, median lobe; 6, lateral lobe; 7, internal lobe; 8, median process).

Figs. 31-32. Penis of a damselfly, *Caliphaea confusa* Selys; Fig. 31. In right lateral view; Fig. 32. Apex more magnified in dorsal view; (1, first segment or shaft; 2 and 3, internal and terminal fold respectively, of second segment; 4, lateral apical process; 5 and 6, internal and external branches respectively of lateral apical process).
Fig. 33. Left hindwing of a damselfly, *Pseudagrion spencei* Fraser, male.

Figs. 34 & 35. Left fore- and hindwing of a dragonfly *Anax* sp. A, female.

(1, forewing; 2, hindwing; 3 and 4, hyaline and opaque areas of wing respectively; 5, 6 and 7, basal, median and apical bands respectively of vitreous areas of wings; 8, 9, 10 and 11, anterior, inner, basal and distal margins respectively of wings; 12, nodus; 13, pterostigma; 14, tornus; 15, membrane; 16, C; 17, Sc; 18, R+M; 19, R₁; 20, Rs; 21, R₂; 22, R₄₊₅; 23, R₃; 24, 1R₁; 25, 1R₂; 26, MA; 27, Cu₁; 28, IA; 29, Rs₁; 30, Mₛ₁; 31, Aₛ₁; 32, and 33, costal and subcostal cross veins respectively; 34, An; 35, Pn; 36, primary An; 37, O; 38, Ab; 39, Ac; 40, Arc; 41, Br; 42, Sn; 43, Dc; 44, Ht; 45, St; 46, median space; 47, Cubital space; 48, Bg; 49, anal area; 50, At; 51, A₁; 52, Sectors of Arc; 53, discoidal field).
Figs. 36-37 Outline of fore- and hindwings of right side; Fig. 36. A dragonfly, *Austrolestes intercedens* Martin, male; Fig. 37, A damselfly, *Rhinocypha q. quadriraculata* Selys, male.

Figs. 38-43 Inner side, near base, of right hindwings of damselfly showing origins of Ab and IA; Fig. 38, *Megalestes raychoudhurii* sp. nov.; Fig. 39, *Oroleslestes durga* sp. nov.: Fig. 40, *Elattoneura atkinsoni* Selys; Fig. 41, *Prodasineura autumnalis* (Fraser); Fig. 42, *Vestalis g. gracilis* (Rambur); Fig. 43, *Philoganga montana* (Selys).

Figs. 44-47 Base of hindwings near arc showing origin of sectors of arc; Fig. 44, *Rhinocypha q. quadriraculata* Selys; Figs. 45, *Libellago l. lineata* (Burmeister); Fig. 46, *Lyriothemis ? bivittata* (Rambur); Fig. 47, *Urothemis s. signata* (Rambur).

Figs. 48-51 Base of hindwing of damselfly showing Dc and its relation to arc; Fig. 48, *Prodasineura autumnalis* (Fraser); Fig. 49, *Copera marginipes* (Rambur); Fig. 50, *Ceriagrion coromandelianum* (Fabricius); Fig. 51. *Argiocnemis obscura* Laidlaw.

(Lettering as in Figs., 33—35).
Figs. 52-53 Base of hindwings of dragonflies showing Dc and its relations to arc; Fig. 52. *Tetrathemis platyptera* Selys; Fig. 53. *Nannophya pygmaea* Rambur.

Figs. 54-55. Dc and basal part of discoidal field of hindwing of dragonflies; Fig. 54. *Acisoma p. panorpoides* Rambur; Fig. 55. *Orthetrum t. triangulare* (Selys)

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Figs. 58-61. Inner side, near base of hindwings of dragonflies showing anal area in relation to St and Dc; Figs. 58-59. *Paragomphus lineatus* (Selys), male and female respectively; Figs. 60-61. *Nihonogomphus indicus* sp. nov., male and female respectively.

Figs. 62-63. Inner side near base of hindwings of dragonflies showing Al and its relation to Dc and rest of anal area; Fig. 62. *Tholymis tillarga* (Fabricius); Fig. 63. *Acisoma p. panorpoides* Rambur.

( Lettering as in Figs. 33-35 )
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Figs. 68-69. Male 10th abdominal segment and anal appendages of *Rhinocypha beatifica* Fraser, in dorsal and left lateral view.

Figs. 70-71. Male 10th abdominal segment and anal appendages of *Libellago l. lineata* (Bermeister), in left lateral and dorsal view.

Figs. 72-74. *Philoganga montana* (Selys); Figs. 72-73. Male 10th abdominal segment and anal appendages in dorsal and left lateral view; Fig. 74. End segments of abdomen including anal appendages showing female genitalia.

(Scale=1.0 mm for Figs. 64-67 and 74; 0.5 mm for Figs. 68-73).
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Scale = 1mm & 0.5mm (68 to 73)
Figs. 75-82. Male 10th abdominal segment and anal appendages of damselflies

Figs. 75-76. *Euphaea ochracea brunnea* Selys, in dorsal and right lateral view.

Figs. 77-78. *Anisopleura subplatystyla* Fraser, in dorsal and right lateral view.

Figs. 79-80. *Bayadera indica* (Selys), in dorsal and right lateral view.

Figs. 81-82. *Bayadera hyalina* Selys, in dorsal and right lateral view.

(Scale = 0.5 mm)

Figs. 83-84. *Vestalis* g. *gracilis* (Rambur), in dorsal and right lateral view.

Figs. 85-86. *Echo margarita tripertita* Selys, in dorsal and right lateral view.

Figs. 87-88. *Matrona basilaris nigripectus* Selys, in dorsal and right lateral view.

Figs. 89-90. *Neurobasis c. chinensis* (Linnaeus), in dorsal and right lateral view.

( Scale = 0.5mm )
Figs. 91-102. Penis of damselflies in lateral view and their apex more magnified in dorsal views, respectively.

Figs. 91-92. *Libellago l. lineata* (Bermeister).

Figs. 93-94. *Rhinocypha biforata delimbata* Selys.

Figs. 95-96. *Rhinocypha ignipennis* Selys.

Figs. 97-98. *Rhinocypha immaculata* Selys.

Figs. 99-102. *Rhinocypha beatifica* Fraser. (Figs. 99-100 from Songsok; Figs. 101-102 from Shella).

( Scale—0.25mm )
Figs. 103-114. Penis of damselflies in lateral views and their apex more magnified in dorsal views respectively.

Figs. 103-104. *Rhinocypha quadrimaculata* Selys

Figs. 105-106. *Rhinocypha spuria* Selys.


Figs. 109-110. *Philoganga montana* (Selys)

Figs. 111-112. *Euphaea ochracea brunnea* Selys

Figs. 113-114. *Anisopleura subplatystyla* Fraser

( Scale=0.25mm )
Figs. 115-126. Penis of damselflies in lateral views and their apex more magnified in dorsal views respectively.

Figs. 115-116. *Bayadera. indica* (Selys).
Figs. 117-118. *Bayadera hyalina* Selys.
Figs. 119-120. *Vestalis g. gracilis* (Rambur)
Figs. 121-122. *Echo margarita tripartita* Selys
Figs. 123-124. *Matrona basilaris nigripectus* Selys
Figs. 125-126. *Neurobasis c. chinensis* Linneaus.

( Scale=0.35mm )
Figs. 127-132. Male 10th abdominal segment and anal appendages of damselflies.

Figs. 127-128. *Indolestes indica* Fraser, in dorsal and right lateral view.

Figs. 129-130. *Orolestes durga* sp. nov., in dorsal and left lateral view.

Figs. 131-132. *Megalestes raychaudhurii* sp. nov., in dorsal and right lateral view.

(Scale = 0.5mm)
LAHIRI: Odonate fauna of Meghalaya

Scale = 0.5 mm
Figs. 133-138. Male 10th abdominal segment and anal appendages of damselflies.

Figs. 133-134. *Lestes dorothea* Fraser, in dorsal and right lateral view.

Figs. 135-136. *Lestes garoensis* sp. nov., in dorsal and right lateral view.

Figs. 137-138. *Lestes concinnus* Selys, in dorsal and right lateral view.

( Scale $= 1.0$ mm )
LAHIRI: Odonate fauna of Meghalaya
Figs. 139-144. Male 10th abdominal segment and anal appendages of damselflies.

Figs. 139-140. *Prodasineura autumnalis* (Fraser), in dorsal and right lateral view.

Figs. 141-142. *Elattoneura campioni* (Fraser), in dorsal and right lateral view.

Figs. 143-144. *Elattoneura atkinsoni* (Selys), in dorsal and left lateral view.

(\textit{Scale}=0.2\text{mm})
Scale = 0.2 mm
Figs. 145-150. Male 10th abdominal segment and anal appendages of damselflies.

Figs. 145-146 *Copera annulata* (Selys), in dorsal and left lateral view.

Figs. 147-148. *Copera marginipes* (Rambur), in dorsal and left lateral view.

Figs. 149-150. *Copera vittata* (S.L.) (Selys), in dorsal and left lateral view.

(Scale—0.5mm)
Figs. 151-158. Male 10th badominal segment and anal appendages of damselflies.

Figs. 151-152. *Calicnemia eximia* (Selys), in dorsal and left lateral view.


Figs. 155-156. *Calicnemia mukherjeei* Lahiri, in right lateral and dorsal view.

Figs. 157-158. *Indocnemis kempi* Laidlaw, in right lateral and dorsal view.

( Scale = 0.5mm )
Scale = 0.5 mm
Figs. 159-164. Male 10th abdominal segment and anal appendages of damselflies.

Figs. 159-160. *Coeliccia fraseri* Laidlaw, in left lateral and dorsal view.

Figs. 161-162. *Coeliccia sarbottama* sp. nov., in right lateral and dorsal view.

Figs. 163-164. *Coeliccia didyma* (Selys), in left lateral and dorsal view.

( Scale=0.5mm )
Figs. 165-170. Thoracic markings of damselflies, showing varying extent of development of antehumeral stripes.

Figs. 165-167. *Coeliccia fraseri* Laidlaw, males, in dorsal views.

Figs. 168-169. *Coeliccia didyma* (Selys), in lateral views; Fig 168, male, from right side; Figs. 169, female, from left side.

Figs. 170. *Coeliccia sarbottama* sp. nov., male, in dorsal view.

( Scale=1.0mm )
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Scale: 1 mm
Figs. 171-176. Male 10th abdominal segment and anal appendages of damselflies.

Figs. 171-172. Ceriagrion coromandelianum (Fabricius), in dorsal and right lateral view.

Figs. 173-174. Ceriagrion falax Ris, in dorsal and right lateral view.

Figs. 175-176. Ceriagrion olivaceum Laidlaw, in dorsal and right lateral view.

(Scale = 0.3 mm)
Scale = 0.3 mm
Figs. 177-182. Male 10th abdominal segment and anal appendages of damselflies.

Figs. 177-178. *Pseudagrion australasiae* Selys, in right lateral and dorsal view.

Figs. 179-180. *Pseudagrion r. rubriceps* Selys, in right lateral and dorsal view.

Figs. 181-182. *Pseudagrion spencei* Fraser, in right lateral and dorsal view.

( Scale=0.3mm )
Scale = 0.3 mm
Figs. 183-192. Male 10th abdominal segment and anal appendages of damselflies.


Figs. 185-186. *Acigrion pallidum* Selys, in dorsal and left lateral view.

Figs. 187-188. *Aciagrion tillyardi* Laidlaw, in dorsal and dorsolateral view from right side.

Figs. 189-190. *Ischnura a aurora* (Hagen), in dorsal and right lateral view.

Figs. 191-192. *Ischnura r. rufostigma* Selys, in dorsal and right lateral view.

(Scale=0.3mm)
Figs. 193-201. Male 10th abdominal segment and anal appendages of damselflies.

Figs. 193-194. *Agriocnemis lacteola* Selys, in dorsal and left lateral view.
Figs. 195-196. *Agriocnemis clauseni* Fraser, in dorsal and right lateral view.
Figs. 197-199. *Agriocnemis pygmaea* (Rambur), in left lateral, dorsal and ventrolateral view from left side.
Figs. 200-201. *Agriocnemis obscura* Laidlaw, in dorsal and right lateral view.

(Scale=0.3mm)
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Scale = 0.3 mm
Figs. 202-212. Posterior lobe of prothorax and anterior part of synthorax of damselflies in dorsal views.

Figs. 202. *Pradasineura autumnalis* (Fraser), Female.
Figs. 203. *Elattoneura compioni* (Fraser), female.
Figs. 204. *Elattoneura atkinsoni* (Selys), female.
Fig. 205. *Copera marginipes* (Rabmur), male.
Figs. 206-207. *Copera vittata* (S.L.) (Selys), male and female respectively.
Figs. 208-209. *Coeliccia didyma* (Selys), female and male respectively.
Figs. 210 and 212. *Coeliccia fraseri* Laidlaw, male and female respectively.
Figs. 211. *Coeliccia sarbottama* sp. nov., male.

(Scale=0.25mm)
Figs. 213-221. Posterior lobe of prothorax and anterior part of synthorax of damselflies in dorsal views.

Figs. 213-214. *Ceriagrion fallax* Ris, male and female respectively.

Fig. 215. *Pseudagrion spencei* Fraser, male.

Fig. 216. *Pseudagrion r. rubriceps* Selys, female.

Fig. 217. *Pseudagrion australasiae* Selys, male.

Fig. 218. *Ischnura r. rufostigma* Selys, male.

Fig. 219. *Ischnura a. aurora* (Hagen), female.

Figs. 220-221. *Argiocnemis obscura* Laidlaw, female and male respectively.

(Scale=0.25mm)
Figs. 222-231. Posterior lobe of prothorax and anterior part of synthorax of damselflies in dorsal views.

Figs. 222-223. *Agriocnemis clauseni* Fraser, male and female respectively.

Figs. 224-225. *Agriocnemis lacteola* Selys, male and female respectively.

Figs. 226-227. *Agriocnemis pygmaea* (Rambur), male and female respectively.

Figs. 228-229. *Aciagrion pallidum* Selys, male and female respectively.

Figs. 230-231. *Aciagrion tillyardi* Laidlaw, male and female respectively.

( Scale=0.25mm )
Figs. 232-241. Penis of damselflies in lateral views and their apex, more magnified, in dorsal views respectively.

Figs. 232-233. *Prodasineura autumnalis* (Fraser).

Figs. 234-235. *Elattoneura cmapioni* (Fraser).

Figs. 236-237. *Elattoneura atkinsoni* (Selys).

Figs. 238-239. *Copera annulata* (Selys)

Figs. 240-241. *Copera marginipes* (Rambur).

( Scale=0.25mm)
Figs. 242-251. Penis of damselflies in lateral views and their apex more magnified in dorsal views respectively.


Figs. 244-245. *Calicnemia eximia* (Selys).

Figs. 246-247. *Calicnemia imitans* Lieftinck

Figs. 248-249. *Calicnemia mukherjeei* Lahiri.

Figs. 250-251. *Indocnemis kempi* Laidlaw.

( Scale=0.25mm )
Figs. 252-263. Panis of damselflies in lateral views and their apex more magnified dorsal views respectively.

Figs. 252-253. *Coeliccia fraseri* Laidlaw.
Figs. 254-255. *Coeliccia sarbottama* sp. nov.
Figs. 256-257. *Coeliccia didyma* (Selys)
Figs. 258-259. *Ceriagrion coromandelianum* (Fabricius).
Figs. 260-261. *Ceriagrion fallax* Ris.
Figs. 262-263. *Ceriagrion olivaceum* Laidlaw.

(Scale=0.25mm)
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(Scale=0.25 mm)

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( Scale=0.5mm )

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Scale = 1mm
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