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ORTHOPTERA OF VAN VIHAR NATIONAL PARK, MADHYA PRADESH (INDIA)

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INTRODUCTION

Van Vihar National Park (VVNP) is situated in Bhopal city with an area of 445.21 hectare. The area lies between latitudes 22° 47' to 23° 33' N and longitudes 77° 21' to 78° 49' E. VVNP is developed and managed as a modern Zoological Park as per the guidelines of the Central Zoo Authority.

Vegetation is of southern tropical dry deciduous scrub forests, consisting of major trees like saja, bel, amaltas, babool, doodhi, lendia, amla and tendu etc. Many herbivores and carnivores are housed in the confines of Van Vihar. Carnivores like tiger, leopard, hyena, jungle cat and sloth bear, and herbivores like nilgai, chital, sambar are kept in large enclosures. The area serves as the green lung for Bhopal city.

Little information is available on the Orthopteran fauna of the National parks even though 94 species were reported from the state (Kirby, 1914, Chopard, 1969 and Chandra *et al.*, 2007). The present record of 16 species of Orthoptera accommodated under 16 genus belonging to 5 families from the first report of the group from this national Park.

SYSTEMATIC ACCOUNT

Order	ORTHOPTERA
Suborder	CAELIFERA
Infraorder	ACRIDIDEA
Superfamily	ACRIDOIDEA
Family	ACRIDIDAE
Subfamily	ACRIDINAE

Genus *Acrida* Linnaeus, 1758

1. *Acrida exaltata* (Walker)

1859. *Truxalis exaltata* Walker, *Ann. Mag. nat. Hist.*, 4(3) : 222.

1954. *Acrida exaltata*, Dirsh, *Bull. Soc. Fouad Ent.*, 38 : 149.

Material examined : Bhopal; VVNP, Vihar vithika, 12.x.2003(1♂), 16.x.2003(1♀), 17.x.2003 (2♀); Gate no. 1 & 2, 14.x.2003 (1♀); coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Head conically ascending, basal part narrow; fastigium of vertex broad, laminate and truncate at extremity; transverse sulcus of pronotum placed near middle of disc; male sub genital plate elongate; tegmina without pointed apex, a little produced beyond the hind knees; wings slightly shorter than tegmina.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Orissa, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. *Elsewhere*: Afghanistan, Bangladesh, Iran, Pakistan, Saudi Arabia, Sri Lanka, Yemen and West Aden.

Genus *Ceracris* Walker, 1870

2. *Ceracris nigricornis* Walker

1870. *Ceracris nigricornis* Walker, *Cat. Derm. Salt. Brit. Mus.*, 4 : 791.

1914. *Ceracris nigricornis* : Kirby, *Fauna Brit. India, Orth.*, : 110.

Material examined : Bhopal ; VVNP, 15.x.2003 (1♂), coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Body colour testaceous-brown; head rugosely punctuate, slightly convex above, with a dusky longitudinal curved depression on each side, but without distinct carina behind the eyes; a black band behind each eye followed by a black line

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below the lateral carinae; tegmina yellowish along inner margin; wings hyaline; hind femora with a blackish band near extremity, interrupted above and sides and base beneath of the terminal thickening black; hind tibiae black at the base with a yellow spot above.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Manipur, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Afghanistan, Myanmar, Taiwan, Thailand, South China and Vietnam.

Subfamily OEDIPODINAE

Genus *Trilophidia* Stål, 1873

3. *Trilophidia annulata* (Thunberg)

1810. *Trilophidia annulata* Kirby, *Syn. Cat. Orth.*, **3** : 244.

1815. *Gryllus annulatus* Thunberg, *Mem. Acad. Sci. St. Petersb.*, **5** : 234.

1965. *Trilophidia annulata*, Hollis, *Trans. R. ent. Soc. Lond.*, **117** (8) : 251-253.

Material examined : Bhopal; VVNP, Vihar vithika, 12.x.2003 (1 ♀), 13.x.2003 (1 ♀), coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Vertex behind eyes with a pair of tubercles; fastigium of vertex elongate-trapezoid, antennae filiform, longer than head and pronotum together; pronotum tectiform with well marked crest; prozona shorter than metazona, tooth like projections present on median carina on the dorsum of prozona; metazona with weak median carina; circus narrow and conical; apex of sub-genital plate obtuse-angular.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Delhi, Goa, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Orissa, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Afghanistan, Bangladesh, Borneo, Myanmar, Hong Kong, Japan, Java, Korea, Malaysia, Mongolia, Nepal, Pakistan, Thailand and Vietnam.

Subfamily GOMPHOCERINAE

Genus *Aulacobothrus* Bolivar, 1902

4. *Aulacobothrus* sp.

1902. *Aulacobothrus* Bolivar, *Ann. Soc. ent. Fr., Paris*, **70** : 597.

Material examined : Bhopal ; VVNP, P. area, 15.x.2003 (1 ♀) coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Antennae filiform with segments compressed in basal third or basal half, sub-cylindrical in remaining apical part. Foveolae visible from above, longer than broad. Fastigium with a transverse sulcus between the front margin of the eyes, lateral carinae incurved at and fading behind basal third of compound eyes. Frontal ridge with margins slightly converging above antennae. Disc of pronotum with a prominent median carina cut by the principal sulcus, lateral carinae subparallel or slightly diverging or converging before second or third sulcus.

Distribution : India : Chhattisgarh, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Meghalaya, Sikkim, Tamil Nadu and Uttar Pradesh. *Elsewhere*: Indonesia, Nepal and Sri Lanka.

Subfamily HEMIACRIDINAE

Genus *Spathosternum* Krauss, 1877

5. *Spathosternum prasiniferum prasiniferum* (Walker)

1871. *Heteracris* (?) *prasinifera* Walker, *Cat. Derm. Salt. Brit. Mus.*, **5** : 65.

1914. *Spathosternum prasiniferum* : Kirby, *Fauna Brit. India, Orth.*, : 208.

1936. *Spathosternum prasiniferum prasiniferum* : Tinkham, *Lingn. Sci. J.*, **15** : 51.

Material examined : Bhopal; VVNP, Vihar vithika, 13.x.2003 (1 ♂), 17.x.2003(1 ♀); coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Body size small, rufo testaceous or green colour; broad blackish or dark-green stripe runs behind the lower part of eyes and below the lateral carina of pronotum; prosternal tubercle spatulate; tegmina and wings well developed; central area of tegmen with a longitudinal black streak well marked in female and almost obsolete in male.

Distribution : India : Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Goa, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Rajasthan, Tamil Nadu and West Bengal.

Elsewhere : Bangladesh, China, Hainan, Myanmar, Sri Lanka, Thailand, Vietnam and West Malaysia.

Subfamily CATANTOPINAE

Genus *Diabolocatantops* Jago, 19846. *Diabolocatantops innotabilis* (Walker)

1870. *Acridium innotabile* Walker, *Cat. Derm. Salt. Br. Mus.* **4** : 629.
1943. *Catantops innotabilis* Uvarov, *Ann. Mag. nat. Hist.* **10**(11) : 127.
1953. *Catantops pinguis innotabilis* : Dirsh & Uvarov, *Tijdschr. Ent.*, **96**(3) : 233.
1984. *Diabolocatantops innotabilis* Jago, *Trans. Amer. Entomol. Soc.*, **110**(3) : 371.
1990. *Diabolocatantops innotabilis* Ingrisch, *Spixiana (Munich)*, **19** : 174.

Material examined : Bhopal; VVNP, Vihar vithika, 12.x.2003 (4 ♀); Gate no. 1&2 14.x.2003 (1 ♀), coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Antennae filiform, shorter than head and pronotum together; basal disc of wing from colourless to weakly greenish; external disc of the hind femur with a small black median spot with varying size.; prosternal tubercle short, sub-cylindrical, rounded at apex; lateral lobe of pronotum without pattern; hind femur broad and thick, external disc without black median spot below upper carinula, internal disc with four small black, irregular spots; hind tibia light red; tegmina and hind wings extend beyond the hind knees; cercus short and conical; valve of ovipositor moderately curved; subgenital plate with truncated apex.

Distribution : India : Assam, Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Delhi, Goa, Himachal Pradesh, Jammu & Kashmir, Kerala, Madhya Pradesh, Meghalaya, Orissa, Sikkim, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : Afghanistan, Bangladesh, Borneo, Cambodia, China, Hong-Kong, Indo-China, Java, Japan, Kambodia, Korea, Malaysia, Maldives Islands, Myanmar, New Guinea, Pakistan, Philippines, Sri Lanka, Sumatra, Tibet and Thailand.

Family PYRGOMORPHIDAE

Genus *Atractomorpha* Saussure, 18617. *Atractomorpha crenulata* (Fabricius)

1793. *Truxalis crenulata* Fabricius, *Ent. Syst.*, **2** : 28.
1969. *Atractomorpha crenulata*, Kevan and Chen, *Zool. J. Lin. Soc.*, **48** : 187.

Material examined : Bhopal; VVNP, Vihar vithika, 12.x.2003 (1 ♂), coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Body medium, narrow and slender; antennae sub-filiform; head conical, fastigium of vertex shorter; eyes oval and long; cheeks with a row of granules extending to middle coxae; pronotum submarginate in front, angulated behind and slightly tricarinate; metazona shorter than prozona; tegmina pointed, extending for one-fourth of their length beyond the hind femora; hind wings normally tyrian pink to light mallow purple at base.

Distribution : India : Andaman & Nicobar Islands, Andhra Pradesh, Bihar, Chhattisgarh, Goa, Jammu & Kashmir, Madhya Pradesh, Rajasthan, Tamil Nadu and West Bengal.

Elsewhere : Bangladesh, Lower Myanmar, Malaysia, Sri Lanka, South Vietnam and Thailand.

Genus *Chrotogonus* Serville, 18398. *Chrotogonus (Chrotogonus) trachypterus trachypterus* (Blanchard)

1836. *Ommexycha trachypterus* Blanchard, *Ann. Soc. Ent. France*, **5** : 618.
1959. *Chrotogonus (Chrotogonus) trachypterus trachypterus* : Kevan, *Publ. cult. Diamang*, **43** : 147.

Material examined : Bhopal; VVNP, Gate No. 1 & 2, 14.x.2003 (1 ♀), coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Body colour brown, small, rugose and tuberculate; head short, broad and rugose; fastigial furrow present; antennae fulvous; pronotum short, broad with small tubercle, sternum yellowish, with black spot; tegmina shorter than abdomen; hind wings hyaline.

Distribution : India : Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Uttar Pradesh and West Bengal.

Elsewhere : Bangladesh, Iran, Nepal and Pakistan.

Infraorder TETRIGIDEA

Superfamily TETRIGOIDEA

Family TETRIGIDAE

Subfamily TETRIGINAE

Genus *Hedotettix* Bolivar, 18879. *Hedotettix gracilis* (De Haan)

1842. *Acridium (Tetrix) gracile* De Haan, *Temminck. Verhandl., Orth.*, : 167-169.

1914. *Hedotettix gracilis* : Kirby, *Faun. Brit. India, Orth.*, : 72.

Material examined : Bhopal; VVNP, Vihar vithika, 11.x.2003 (1 ♀), 12.x.2003 (2 ♀), 13.x.2003 (1 ♀), 17.x.2003 (1 ♀), coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Head not exerted above the pronotum; vertex equal to or narrower than an eye, front margin rounded, frontal costa widely sulcate, rami widened between antennae, antennae inserted below the middle of eyes; pronotum angulated anteriorly, extended behind upto the apex of hind femora or beyond it, dorsum finely granulose, tectiform between shoulders, wings extending upto pronotum or surpass a little.

Distribution : India : Arunachal Pradesh, Assam, Chhattisgarh, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Sikkim, Tripura and West Bengal.

Elsewhere : Celebes, Java, Myanmar, Sumatra, Sri Lanka, Taiwan, Thailand and Vietnam.

Genus *Ergatettix* Kirby, 1914

10. *Ergatettix dorsiferus* (Walker)

1871. *Tettix dorsiferus* Walker, *Cat. Derm. Salt. Brit. Mus.*, 5 : 825.

1929. *Ergatettix dorsiferus*: Hebard, *Revue Suisse. Zool.*, 36 : 588.

Material examined : Bhopal : VVNP, Vihar vithika, 11.x.2003 (24 ♂, 22 ♀), 12.x.2003 (1 ♂, 2 ♀), 13.x.2003 (1 ♂), 17.x.2003 (2 ♂, 3 ♀) coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Head distinctly exerted above the surface of pronotum, vertex narrower than an eye; antennae situated below inferior margin of eyes; pronotum and wings extend beyond the apex of hind femora, dorsum wide between shoulders, rugulose, median carina depressed in front, undulate behind the shoulders, lateral carinae wavy.

Distribution : India : Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Sikkim, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Bangladesh, Central Asia, Java, Myanmar, Nepal, South China, Sumatra, Greater Sunda Islands, Taiwan and Turkmenistan.

Suborder ENSIFERA

Infraorder GRYLLIDEA

Superfamily GRYLLOIDEA

Family GRYLLIDAE

Subfamily GRYLLINAE

Genus *Phonarellus* Gorochov, 1983

Subgenus *Phonarellus* Gorochov, 1983

11. *Phonarellus (Phonarellus) minor* Chopard

1959. *Gymnogryllus minor* Chopard, *Stuttg. Beitr. z. Naturk.*, : 1.

1967. *Gymnogryllus minor* : Chopard, *Orth. Cat.*, pt. 10 : 19.

1983. *Phonarellus (Phonarellus) minor*, Gorochov, *Entomologicheskoe Obozrenie*, 62(2) : 323.

Material examined : Bhopal; VVNP, Vihar vithika, 13.x. 2003 (1 ♂), 17.x. 2003 (1 ♂); coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Head reddish or blackish; middle part of antennae with a long whitish ring; pronotum blackish; anterior and median legs yellowish, posterior femora blackish with yellowish top; posterior tibiae armed with 4 spine on each margin; cerci brown, yellowish at base; male elytra transparent; ovipositor rather short.

Distribution : India : Assam, Bihar, Chhattisgarh, Goa, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Pondicherry and Tamil Nadu. *Elsewhere* : Afghanistan, Iran, Java, Myanmar, Pakistan and South Vietnam.

Genus *Modicogryllus* Chopard, 1961

12. *Modicogryllus confirmatus* (Walker)

1869. *Gryllus confirmatus* Walker, *Cat. Derm. Salt. Brit. Mus.*, 1 : 371.

1964. *Modicogryllus confirmatus*, Randell, *Can. Ent.*, 96(12) : 1584.

Material examined : Bhopal; VVNP, Vihar vithika, 12.x.2003 (1 ♀), coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Head brown with narrow yellow band connecting the lateral ocelli; occiput with 6 short yellowish lines, mirror longer than wide, divided by a curved vein; 2 oblique veins, lateral field transparent, two anterior veins strongly curved and separated from other posterior veins.

Distribution : India : Andaman Islands, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Haryana,

Karnataka, Kerala, Maharashtra, Madhya Pradesh, Manipur, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : Bangladesh, China, Iran, Israel, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka and Thailand.

Genus *Teleogryllus* Chopard, 1961

13. *Teleogryllus* sp.

1961. *Teleogryllus* Chopard, *Eos.*, **37** : 277.

1967. *Teleogryllus*, Chopard, *Orth. Cat.*, pt. **10** : 95.

Material examined : Bhopal; VVNP, Vihar vithika, 16.x.2003 (1 ♀) coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Body size large, pubescent body, colour reddish-brown, long legs, well developed tegmina, tegmina and legs often paler. Head with a faint yellowish band long internal margin of eyes.

Distribution : India : Andaman & Nicobar Islands, Assam, Bihar, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal.

Elsewhere : China, Indochina, Indonesia, Japan, Malaysia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Thailand, Tibet and Vietnam.

Subfamily NEMOBIINAE

Genus *Pteronemobius* Jacobson & Bianchi, 1905

14. *Pteronemobius fascipes* (Walker)

1869. *Eneoptera fascipes* Walker, *Cat. Derm. Salt. Brit. Mus.*, **1** : 67.

1931. *Pteronemobius fascipes* : Chopard, *Bull. Raffles Mus.*, **6** : 134.

Material examined : Bhopal; VVNP, Vihar vithika, 17.x.2003 (1 ♀), coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Head blackish with four pale lines on the occiput; palpi blackish at base with 4th and 5th joints white; pronotum brownish above, posterior tibiae with 3 external and 4 internal spines in male.

Distribution : India : Assam, Arunachal Pradesh, Bihar, Chhattisgarh, Goa, Himachal Pradesh, Haryana, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Orissa, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal.

Elsewhere : China, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Sri Lanka and Taiwan.

Infraorder ONIIDEA

Superfamily TETTIGONIOIDEA

Family TETTIGONIIDAE

Subfamily COIPHORINAE

Genus *Euconocephalus* Karny, 1907

15. *Euconocephalus incertus* (Walker)

1869. *Conocephalus incertus* Walker, *Cat. Derm. Salt. Brit. Mus.*, **2** : 320.

1912. *Euconocephalus incertus* Karny, *Gen. Insect.*, **2**(139) : 35.

Material examined : Bhopal; VVNP, Vihar vithika, 11.x.2003 (1 ♂), coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Fastigium of vertex produced conically in front; radius sector 2 arise much before the middle of wing; male subgenital plate bears two styles at apex, style bifurcated apically; ovipositor subequal to the length of body.

Distribution : India : Andaman & Nicobar Islands, Chhattisgarh, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Sikkim, Tripura and West Bengal.

Elsewhere : Australia, Borneo, China, Java, Malaysia, Myanmar, Sri Lanka and Sumatra.

Subfamily PHANEROPTERINAE

Genus *Holochlora* Stål, 1873

16. *Holochlora* sp.

1873. *Holochlora* Stål, *Ofv. vet. Akad. Forh.*, **30**(4) : 42.

Material examined : Bhopal; VVNP, Vihar vithika, 12.x. 2003 (1 ♂), 13.x.2003 (1 ♂) coll. Dinesh Nema & S. Ahirwar.

Diagnostic characters : Body colour greenish; antennae long, yellowish; fastigium conically produced with round apex; anterior margin of pronotum concave and posterior margin convex; male subgenital plate at region of bifurcation forms a circle; style foot shaped.

Distribution : India : Andaman & Nicobar Islands, Madhya Pradesh, Meghalaya, Orissa, Rajasthan, Sikkim, Tamil Nadu, Tripura and West Bengal. *Elsewhere* : Bhutan, Java and Sri Lanka.

SUMMARY

The present study reports 16 species of Orthoptera belonging to 16 genera under five families, viz. Acrididae

(06), Pyrgomorphidae (02) and Tetrigidae (02), Gryllidae (04) and Tettigoniidae (02), from the Van Vihar National Park, Bhopal, Madhya Pradesh. All the species are recorded for the first time from Van Vihar National Park.

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