

## THE ODONATE FAUNA OF RAJASTHAN

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### I. INTRODUCTION

The study of the Odonata of Rajasthan is in continuation of the studies on the fauna of Rajasthan being carried out during the last few years by the Zoological Survey of India.

The Odonates, or dragonflies and damselflies, are carnivorous insects inhabiting marshy areas. The males usually remain near water whereas the females come there to breed. The larvae are aquatic. We find that the collections from Rajasthan are from the wetter parts of the desert.

The first record of these insects in Rajasthan is made by Adams (1899) under the general heading Neuroptera. He mentioned the family Libellulidae, but no species by name. Fraser (1933-1936) mentioned some species from North-West India. The second record is by Agrawal (1957) where he mentioned the presence of 15 species in Pilani but it was not possible to obtain the names of those species.

The present study is based on 9 small collections made by as many parties of the Zoological Survey of India.

In this study 13 species distributed over 2 suborders, 4 families and 12 genera have been recorded. Of these, 11 species are new distributional records.

Of the two suborders, the suborder Anisoptera forms the greater part of the Odonate fauna of the state (8 spp.). In this suborder the family Libellulidae is dominant (5 spp.). Of the other families, Gomphidae comes next to Libellulidae in number (2 spp.), and Aeshnidae being least represented. Coenagrionidae (5 spp.) is the sole representative family of the suborder Zygoptera.

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## II. FIELD-KEY FOR THE IDENTIFICATION OF ODONATA FROM RAJASTHAN

- 1(2) Fore- and hindwings similar ; discoidal cell quadrilateral.  
.....Suborder Zygoptera—17.
- 2(1) Fore- and hind wings dissimilar : discoidal cell triangular.  
.....Suborder Anisoptera—3.
- 3(4) Robust primary antenodals present.  
.....Aeshnoidea (Gomphidae & Aeshnidae)—5.
- 4(3) Robust primary antenodals absent.  
.....Libelluloidea (Libellulidae)—9.
- 5(6) Eyes widely separated. ....Gomphidae—7.
- 6(5) Eyes contiguous. ....Aeshnidae [*Hemianax ephippiger* (Burm.)]
- 7(8) Hypertriangle traversed.  
.....Genus *Ictinogomphus* [*I. rapax* (Rambur)]
- 8(7) Hypertriangle entire.  
.....Genus *Onychogomphus* [*O. grammicus* (Rambur)]
- 9(10) Frons nonmetallic or rarely metallic—11.
- 10(9) Frons metallic.  
.....Genus *Trithemis* [*T. aurora* (Burmeister)]
- 11(12) Pterostigma of the fore- and hindwings equal.....13.
- 12(11) Pterostigma of the fore- and hindwings, unequal.  
.....Genus *Tramea* [*T. basilaris burmeisteri* (Kirby)].
- 13(14) Posterior lobe of prothorax fringed with long hairs.  
.....Genus *Sympetrum* [*S. decoloratum* (Selys)].
- 14(13) Posterior lobe of prothorax naked or with only a few hairs  
on sides. ....15.
- 15(16) Wings with only basal yellow markings.  
.....Genus *Crocothemis* [*C. servilia servilia* (Drury)].
- 16(15) Wings with broad reddish-yellow medial fascia.  
.....Genus *Brachythemis* [*B. contaminata* (Fabr.)].
- 17(18) Arc situated distal to the level of distal antenodal nervure.  
.....Genus *Agriocnemis* [*A. pygmaea* (Ramb.)].
- 18(17) Arc situated at the level of the distal antenodal nervure.....19.
- 19(20) Pterostigma differing in size and shape in the fore and hind  
wings. ....21.
- 20(19) Pterostigma of the same colour and shape in the fore and  
hind wings. ....Genus *Enallagma* [*E. malayanum* Selys].

- 21(22) Post ocular coloured spots present.....Genus *Ischnura*—23.  
 22(21) Post ocular coloured spots absent.  
 .....Genus *Rhodischnura* [*R. nursei* (Morton)]  
 23(24) Both sexes bright orange red. ....*I. annandalei* Laidlaw.  
 24(23) Species with ground colour in male and isochrome female blue,  
 or pale grass green. ....*I. senegalensis* (Ramb.)

## III. SYSTEMATIC ACCOUNT

## Suborder—ZYGOPTERA

## Superfamily—COENAGRIONIOIDEA

## Family—COENAGRIONIDAE

1. *Rhodischnura nursei* (Morton)

1907. *Ischnura nursei* Morton, *Trans. Ent. Soc. Lond.*: 306, 307.

1933. *Rhodischnura nursei*: Fraser, *Fauna Brit. India*, 1: 369-371.

*Material.*—♀, Z.S.I. Reg. No. 5083/H8, Rajasthan, coll. Z.S.I. party, 6.xii.1956.

*Distribution.*—India : N. W India, Rajasthan (present record), Uttar Pradesh, Bihar, Bengal, Agra, Hyderabad, Nagpur, Bhagowani. Pakistan.

*Remarks.*—The specimen differs from the description as given in the Fauna of British India, Odonata, as follows : (1) 7 postnodal nervures in the forewing (*Versus* : 6), (2) Greenish yellow postocular area divided into two parts by a black band (*Versus* : postocular area black).

This is a widely distributed species in India.

2. *Ischnura annandalei* Laidlaw

1919. *Ischnura annandalei* Laidlaw, *Rec. Indian Mus.*, 16: 175, 177.

1933. *Ischnura annandalei*: Fraser, *Fauna. Brit. India*, 1: 347, 364-366, fig. 157 (a & b).

*Material.*—1 ♂, Z.S.I. Reg. No. 5084/H8, Rajasthan, coll. Z.S.I. party, 6.xii.1956.

*Distribution.*—India : Rajasthan (present record). Burma and China.

*Remarks.*—The specimen under study differs from the description of the species, given by Laidlaw (1919), as follows : (1) 6 postnodal nervures in the fore wing, and 5 in the hind wing (*Versus* : 8 postnodals in the forewing and 6 in the hind wing). (2) Blackish colour on apex of segment 6 (*Versus* : Abdomen bright reddish orange ; segments 3-6 unmarked with black except annular fine rings).

3. *Ischnura senegalensis* (Rambur)

1842. *Agrion senegalensis* Rambur, *Ins. Nevrop.*: 276.

1933. *Ischnura senegalensis*, Fraser, *Fauna Brit. India*, 1: 346, 348, 351; figs. 150 and 151 (a & b).

*Material*.—1 ♂, Z.S.I. Reg. No. 5266/H8, 2♀♀, 5267/H8 and 5268/H8, Phulera, Rajasthan, coll. B. Biswas. 19.xii.1956.

<i>Measurements</i> .—	<i>Male</i>	<i>Female</i>
Length of Forewings	= 18.10 mm.	19.1-20.00 mm.
Length of Hindwings	= 16.90 mm.	17.9-18.10 mm.
Length of Abdomen	= 26.00 mm.	29.10 mm.

*Distribution*.—India : Phulera (present record), Maharashtra, Uttar Pradesh, Bengal, Burma, Ceylon and extends eastwards as far as Japan and the Philippines, and westwards throughout the greater part of the African continent.

*Remarks*.—Only the male differs from the description of the species, as given in the Fauna of British India, as follows : The specimen (♂) has 7 postnodal nervures in the forewing (*Versus* : 8 postnodals).

This species is very widespread in its distribution throughout the tropical parts of Asia and Africa.

4. *Enallagma malayanum* Selys

1876. *Enallagma malayanum* Selys, *Bull. Acad. Belg.*, (2), 41 : 536.

1933. *Enallagma malayanum*: Fraser, *Fauna Brit. India*, 1: 372, 375-376.

*Material*.—2 exs. as follows : (1) 1♀, Z.S.I. Reg. No. 4554/H8, Phulera, Rajasthan, coll. B. Biswas, 19.xii.1956 ; (2) 1 ♂ Z.S.I. Reg. No. 4555/H8, Rajasthan, coll. Z.S.I. party 6.xii.1956.

<i>Measurements</i> .—	<i>Male</i>	<i>Female</i>
Length of Forewings	= 10.00 mm.	16.00 mm.
Length of Hindwings	= 15.10 mm.	15.00 mm.
Length of Abdomen	= —	21.10 mm.

*Distribution*.—India : Rajasthan, Phulera (present record), Assam, Nagpur., Ceylon, Burma.

*Remarks*.—The specimens under study differ from the description of the species, as given in the Fauna of British India, as follows : In the female the bluish red postocular spots are not connected by blue line (*Versus* : Bluish green postocular spots are connected by a narrow line of the same colour). Abdominal segment 10 completely black (*Versus* : Blue at the apical border only). In the male specimen the ventral side of the

abdominal segments 3 to 7 bluish (*Versus* : Abdomen pale blue at the sides changing to creamy yellow beneath)

This species is reported for the first time from Rajasthan.

### 5. *Agrionemis pygmaea* (Rambur)

1842. *Agrion pygmaeum*, Rambur, *Ins. Névrope*.: 278.

1933. *Agrionemis pygmaea* : Fraser, *Fauna Brit. India*, 1 : 379, 381, 398-401, figs. 163, 171 (a & b).

*Material*.—2 exs. as follows :—1 ♂, Z.S.I. Reg. No. 5081/H8, and 1 ♀, Z.S.I. Reg. No. 5082/H8, Rajasthan, coll. Z.S.I. party, 6.xii.1956.

*Distribution*.—India : Rajasthan, (present record), Calcutta, Assam, Madras, Malabars, Nicobars. Throughout the Oriental region, Ceylon, Burma, Singapore, Java, Philippines, Seychelles, Australia [Queensland, Sydney], Formosa, China, N. Celebes, New Guinea, Manila.

*Remarks*.—The specimens differ from the description of the species, as given in the *Fauna of British India*, as follows : (1) In the male no apple green colour in the prothorax (*Versus* : the anterior lobe, lower parts of sides and the extreme edge of the posterior lobe apple green) (2) In the male the abdominal segments 9 & 10 orange coloured (*Versus* : segments 8 to 10 with dorsum clouded or not with black) (3) In the female, no green stripe on the occiput (*Versus* : Postocular blue spots connected by a narrow green stripe across the occiput)

This very widely distributed species is recorded from Rajasthan for the first time.

#### Suborder—ANISOPTERA

Superfamily—(1) AESHNOIDEA

Family (1)—GOMPHIDAE

### 6. *Ictinogomphus rapax* (Rambur)

1842. *Diaslatoma rapax* Rambur, *Ins. Névrope*.: 169.

1934. *Ictinus rapax* : Fraser, *Fauna Brit. India*, 2 : 371, 372, 373-376. fig. 1196.

*Material*.—1 ♂, Z.S.I. Reg. No. 4476/H8, Mandor Gardens, Jodhpur Dist., ca. 10 km. north of Jodhpur, coll. Motilal, 11.ix.1963.

*Measurements.*—

Length of Forewings	= 44.08 mm.
Length of Hindwings	= 42.00 mm.
Length of Pterostigma	= 5.01 mm.

*Distribution.*—India : Rajasthan, Jodhpur, Mandor Gardens (First record). Assam, Bengal, Burma and Ceylon.

*Remarks.*—The specimen differs from the description of the species given by Fraser (1934) as follows:—(1) Labrum bluish yellow, deep brown at the base, no black lines (*Versus* : Labrum yellow with a heavy black border having a medium black prolongation of it). (2) Upper surface of frons deep brown (*Versus* : frons greenish yellow, with black stripe running upwards from base), (3) Spine on the occiput clearly bifid (*Versus* : single or slightly bifid) (4) Prothorax yellow on sides (*Versus* : Black marked with yellow). (5) Pterostigma covers 7 cells in the Fore- and 6 cells in the Hindwing. (*Versus* : Covers 5 to 6 cells in both). (6) Discoidal cell 2 celled in both wings. (*Versus* : 4 celled in the Fore- and 3 in the Hindwing).

This is a very widely distributed species throughout the Indian subcontinent.

## 7 *Onychogomphus grammicus* (Rambur)

1842. *Gomphus grammicus* Rambur, *Ins. Névropl.*: 164.

1934. *Onychogomphus grammicus*: Fraser, *Fauna Brit. India*, 2: 242, 256-257.

*Material.*—1 ♂, Z.S.I. Reg. No. 5072/H8, Chittorgarh, coll. S. Biswas, 9.ix.1965.

*Measurements.*—

Length of Forewings	= 25.9 mm.
Length of Hindwings	= 24.1 mm.
Length of Pterostigma	= 3.1 mm.
Length of Abdomen	= 34.2 mm.

*Distribution.*—India : Rajasthan, Chittorgarh (present record), North and Central parts of India.

*Remarks.*—The specimen differs from the description of the species given by Fraser (1934) as follows: (1) No black line below frons, or between ante- and postclypeus (*Versus* : A fine black line below frons and another between ante- and postclypeus). (2) Thorax greenish (*Versus* : Yellow marked with black). (3) Nodal index  $\frac{6-13/13-7}{7-10/9-7}$  (*Versus* :  $\frac{9-16/14-9}{9-10/10-9}$ )

This species has been recorded for the first time from Rajasthan.

Family (2)—AESHNIDAE

8. *Hemianax ephippiger* (Burmeister)

1839. *Aeschna ephippigera* Burmeister, *Handb. Ent. Band.*: 840.

1936. *Hemianax ephippiger*: Fraser, *Fauna Brit. India*, 3: 143, 147-149, fig. 446.

*Material*.—1♀, Z.S.I. Reg. No. 4477/H8, Pali, Rajasthan coll. B. Biswas, 1.xii.1956.

*Measurements*.—

Length of Forewings	= 47.10 mm.
Length of Hindwings	= 45.00 mm.
Length of Pterostigma	= 5.00 mm.
Length of Abdomen	= 43.10 mm.
Length of Anal appendages	= 5.00 mm.

*Distribution*.—India : Rajasthan, Pali, (previous and present record). Poona, Bombay, Kathiwar. S. Europe and Asia.

*Remarks*.—The specimen differs from the description of the species given by Fraser (1936) as follows: No reddish brown colour in the area between MA and IA (*Versus*: reddish brown colour between MA and IA present).

This species is widely distributed over North western India.

Superfamily—(2) LIBELLULOIDEA

Family—LIBELLULIDAE

9. *Trithemis aurora* (Burmeister)

1839. *Libellula aurora* Burmeister, *Handb. Ent.*, Band. ii: 859.

1936. *Trithemis aurora*: Fraser, *Fauna Brit. India*, 3: 382, 383-385, fig. 1096.

*Material*.—1 ♂, Z.S.I. Reg. No. 5073/H8, Jodhpur, Mandor, coll. R. K. Bhatnagar. 19.vi.1960.

*Measurements*.—

Forewing damaged	
Length of Hindwing	= 24.0 mm.
Length of Pterostigma	= 2.0 mm.
Length of Abdomen	= 21.0 mm.

*Distribution*.—India : Rajasthan, Mandor, Jodhpur (present record), Bengal, Bihar, Madhya Pradesh, Maharashtra, Uttar

Pradesh. Ceylon, Burma, extends eastwards as far as Phillipines and southwards to Java.

*Remarks.*—The specimen differs from the description of the species given by Fraser (1936) as follows: (1) No black marking on labium (*Versus*: middle lobe and sides of labium black). (2) Labrum dark brown (*Versus*: Black along the border). (3) Thorax not pruinose (*Versus*: pruinose).

This is one of the most common species of Odonata seen throughout India and in the islands of the Indian Ocean.

### 10. *Sympetrum decoloratum* (Selys)

1884. *Diplax vulgata* race *decolorata* Selys, *Ann. Soc. Ent. Belg.*, **28**: 35.

1936. *Sympetrum decoloratum*: Fraser, *Fauna Brit. India*, **3**: 371, 380-381, fig. 107c.

*Material.*—2 exs., Pali, Rajasthan, coll. Z.S.I. Party, 7.xii.1956, as follows:—(1) 1 ♂, Z.S.I. Reg. No. 4445/H8 and (2) 1 ♀, Z.S.I. Reg. No. 4499/H8.

<i>Measurements.</i> —	<i>Male</i>	<i>Female</i>
Length of Forewing	= 25.1 mm.	22.9 mm.
Length of Hindwing	= 22.0 mm.	22.1 mm.
Length of Pterostigma	= 2.0 mm.	2.0 mm.

*Distribution.*—India: Rajasthan, Pali (present record). N. Africa, Persia, Mesopotamia.

*Remarks.*—The specimens (♂ & ♀) differ from the description of the species, as given by Fraser (1936), as follows:—(1) Reddish brown stripe on the abdomen of the male (*Versus*: only tiny reddish dots on each side of the dorsal carina). (2) In both specimens (♂ & ♀) eyes black below. (*Versus*: Greenish Yellow). (3) Nodal indices.

$$\begin{array}{c} \text{♂} \\ 8-9\frac{1}{2} | 10\frac{1}{2}-8 \\ 8-7\frac{1}{2} | 7-8 \end{array}; \begin{array}{c} \text{♀} \\ 6-10\frac{1}{2} | 9\frac{1}{2}-6 \\ 7-7 | 6-8 \end{array} \quad (\textit{Versus} : \begin{array}{c} 6-6\frac{1}{2} | 6\frac{1}{2}-6 \\ 6-5 | 5-6 \end{array})$$

This is the first record of its occurrence in the oriental region.

### 11. *Crocothemis servilia servilia* (Drury)

1770. *Libellula servilia* Drury, *Ill. Exot. Ins.*, **1**: 112, 113; pl. xlvii.

1936. *Crocothemis servilia servilia*: Fraser, *Fauna Brit. India*: 344, 345-347; fig. 100.

*Material.*—Lot (A). (i) 1 ♂, Z.S.I. Reg. No. 5077/H8. Rajasthan, coll. K. K. Tiwari & S. Biswas, 8.ix.1958. Lot (B).



2 eyes., Takhat Sagar, Kailana, Jodhpur Dist., Rajasthan, Stn. No. 6, coll. Z.S.I. Party, 21.iv.61, as follows: (ii) 1 ♂, Z.S.I. Reg. No. 5076/H8, (iii) 1 ♀, Z.S.I. Reg. No. 5076/H8. Lot (C) (iv) 1 ♂, Z.S.I. Reg. No. 5265/H8, Patodi House, Paota lines, Jodhpur dist., Rajasthan, coll. R. C. Sharma, 16.viii.1963. Lot (D) 3 exs., coll. S. Biswas as follows: (v) 1 ♂, Z.S.I. Reg. No. 4836/H8, Happyvalley, Ajmer, Rajasthan, 14.viii.1965, (vi) 1 ♂, Z.S.I. Reg. No. 4835/H8, Bhilwara, Rajasthan, 17.ix.1965, coll. K. K. Tiwari and S. Biswas, 8.ix.1958,

<i>Measurements.</i> —	<i>Male</i>	<i>Female</i>
Length of Forewing	= 29.8-30.0 mm.	27.0-30.0 mm.
Length of Hindwing	= 26.0-27.0 mm.	20.0-28.0 mm.
Length of Pterostigma	= 2.9- 3.0 mm.	2.9- 3.0 mm.
Length of Abdomen	= 22.0-24.0 mm.	17.0-20.0 mm.

*Distribution.*—India : Rajasthan : Jodhpur, Ajmer, Gudha (present records), Bengal. Ceylon, Burma, S. Asia to Japan, Philippines and southwards to Sondaic Archipelago, Mesopotamia.

*Remarks.*—This beautifully coloured and very bright dragon-fly is one of the commonest species found throughout the whole of India from the base of the Himalayas to the shores of the Indian Ocean and beyond.

## 12. *Brachythemis contaminata* (Fabricius)

1793. *Libeliula contaminata* Fabricius, *Ent. Syst.*, 2: 382.

1936. *Brachythemis contaminata*: Fraser, *Fauna Brit. India*: 364, 365-366, fig. 103.

*Material.*—Lot (A) (i-iii) 3 ♂♂, Z.S.I. Reg. Nos. 5078/H8, 5079/H8, 5080/H8, Jhapog, Rajasthan, coll. T. G. Vazirani, 25.iv.1958. Lot (B) (iv) 1 ♂, Z.S.I. Reg. No. 4834/H8, Sardarasamand ca., 49 kms. south of Jodhpur, Rajasthan, Stn. 19, Fd. Coll. No. 138/31.7.62, coll. K. C. Kansal, 31.vii.1962. Lot (C). 2 exs., Bhilwara, Rajasthan, coll. S. Biswas, 17.ix.65 as follows: (v) 1 ♂, Z.S.I. Reg. No. 4833/H8, (vi) 1 ♀, Z.S.I. Reg. No. 4835/H8.

<i>Measurements.</i> —	<i>Male</i>	<i>Female</i>
Length of Forewing	= 23.0-25.0 mm.	27.0 mm.
Length of Hindwing	= 21.0-22.0 mm.	25.0 mm.
Length of Pterostigma	= 3.0 mm.	3.0 mm.
Length of Abdomen	= 19.0-22.0 mm.	18.0 mm.

*Distribution.*—India : Rajasthan : Jhapog, Jodhpur, Sadar-samand, Bhilwar (present record), throughout India. Ceylon,

Burma and extending east of China, Formosa and the Philippines and southwards to Java and Sumatra.

*Remarks.*—The specimens under study differ from the description of the species as given by Fraser (1936) as follows : (i) In one male (Z.S.I. Reg. No. 4833/H8) mid-dorsal carina of the segments 5 to 8 black. (*Versus* : segment 8 and 9 often black on mid-dorsum). (ii) In another male (Z.S.I. Reg. No. 4834/H8) humeral stripe absent (*Versus* : Obscure reddish brown humeral stripe).

This is also a fairly common species in India.

### 13. *Tramea basilaris burmeisteri* Kirby

1839. *Libellula chinensis*, Burmeister, *Handb. Ent.*, 2: 852.

1936. *Tramea basilaris burmeisteri*: Fraser, *Fauna Brit. India*, 3: 432-434, fig. 119(b).

*Material.*—1 ♂, Z.S.I. Reg. No. 5074/H8, Rajasthan, Mandor gardens, 10 kms. North of Jodhpur Dist., coll. Motilal, 11.ix.1963.

*Measurements.*—

Length of Forewing	=	43.00 mm.
Length of Hindwing	=	4.10 mm.
Length of Pterostigma	=	F.W = 2.05 mm.
		H.W = 2.00 mm.
Length of Abdomen	=	30.01 mm.

*Distribution.*—India : Rajasthan : Mandor gardens (present record) Saugar, Deccan. Ceylon, Burma and extending up to Malaysia.

*Remarks.*—The specimen differs from the species description as given by Fraser (1936) as follows :

Venation of the dark basal area of the hindwing reddish yellow (*Versus* : Venation in the dark area bright yellow).

This is the first record of this species from Rajasthan.

#### IV. SUMMARY

This paper embodies a revised key for the Odonates of Rajasthan. In this paper 13 species *viz.*, *Rhodischnura nursei* (Morton), *Ischnura annandalei* Laidlaw, *Ischnura seneglensis* (Rambur), *Enallagma malayanum* Selys, *Agriocnemis pygmaea* (Rambur), *Ictinogomphus rapax* (Rambur), *Onychogomphus grammicus* (Rambur) *Hemianax ephipiger* (Burmeister), *Trithemis aurora* (Burmeister), *Sympetrum decoloratum* Selys,

*Crocothemis servilia servilia* (Drury), *Brachythemis contaminata* (Fabricius), *Tamea basilaris burmeisteri* Kirby have been reported. Of them *Sympetrum decoloratum* is a new record from the Oriental region, *Ischnura annandalei* is a new record from India and *Enallagma malayanum*, *Agriocnemis pygmaea*, *Onychogomphus grammicus* and *Tamea basilaris burmeisteri* are new records from Rajasthan.

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