

A CONTRIBUTION ON THE ESTUARINE ODONATA  
OF EAST INDIA

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Thirty five species of Odonata from the estuarine areas of East India (West Bengal and Orissa) are recorded by FRASER AND DOVER (1922), MITRA *et al.* (1976), PRASAD AND GHOSH (1982) and RAM *et al.* (1982). In the present communication 30 species under 21 genera are reported from these areas, of which 10 spp., *Lestes viridula* Rambur, *Copera annulata* (Selys), *Pseudagrion rubriceps* Selys, *Pseudagrion australasiae* Selys, *Pseudagrion spencei* Fraser, *Aciagrion pallidum* Selys, *Ischnura aurora* (Brauer), *Agriocnemis lactiola* Selys, *Potamarcha obscura* (Rambur) and *Tholymis illarga* (Fabricius), are reported for the first time. Out of these, seven are new records for the estuarine areas of West Bengal and three for the estuarine are of Orissa. The study raises total number of species known from East India to 42. In this paper a check-list, brief field notes and keys for species are given.

LIST OF COLLECTION LOCALITIES

*WEST BENGAL :*

A. *District Midnapore* : Balisai, Contai, Digha, Fatehpur (Nandakumar), Junput, Mahishadal, Nimalakhya, Nandakumar and New Digha.

B. *District 24 Parganas* : Bakkhali, Canning, Diamond Harbour, Fraserganj, Ghutiari Sharif, Kakdwip, Kulpi, Namkhana and Piali.

*ORISSA :*

A. *District Ganjam* : Barkul and Gopalpur.

- B. *District Puri* : Khandagiri, Nandakanan and Puri.  
 C. *Chilka* : Barkunda Island.

## SYSTEMATIC ACCOUNT

Order : ODONATA  
 Suborder : ZYGOPTERA  
 Superfamily : LESTINOIDEA  
 Family : LESTIDAE

1. *Lestes viridula* Rambur

1842. *Lestes viridula* Rambur, *Ins. Neurop.*, : 252-253.

1933. *Lestes viridula*, Fraser, *Fauna Brit. India*, 1 : 45-46.

*Material* : 1 ♂, Digha, 7.2.1985. coll. M. Prasad.

*Remarks* : Agrees fairly well with the published description of the species, but it differs by having 10-11 postnodal nervures in forewings and 11 in hindwings. Specimen was observed very active and flying within the dry long grasses present at the side of the pond. The pond is situated very nearer to the sea shore. It is recorded for the first time from the estuarine area of West Bengal.

*Distribution* : Kangra, Bilaspur, Dehra Dun, Nainital, Pauri Garhwal, Bihar, Deccan, Western India, South Coorg and Bombay.

2. *Lestes elata* Hagen

1858. *Lestes elata* Hagen, *Verh. zool. -bot., Ges. Wien*, 8 : 478.

1933. *Lestes elata*, Fraser, *Fauna Brit. India*, 1 : 37-40.

*Distribution* : Confined to Peninsular India, Orissa and Sri Lanka.

Family : PLATYCNEMIDIDAE

3. *Copera annulata* (Selys)

1863. *Psilocnemis annulata* Selys, *Bull. Acad. Belg.*, (2) 16 : 172.

1933. *Copera annulata*, Fraser, *Fauna Brit. India*, 1 : 203-206.

*Material* : 1 ♂, Mahishadal, 5.7.1984, coll. G. K. Srivastava.

**Distribution :** Assam, Himachal Pradesh, Manipur, South India, West Bengal and extended upto Malayasia.

**Remarks :** 12 postnodal nervures in forewings and 11 in hind wings. Specimens were seen fluttering above the pond water under the shadow of small bushes and aquatic vegetation present beneath the tree at the side of pond. Pairs were also observed in tandem flying above the surface of water. It is recorded for the first time from the estuarine area of West Bengal.

Family : COENAGRIONIDAE

#### 4. *Ceriagrion coromandelium* (Fabricius)

1798. *Agrion coromandelianum* Fabricius, *Ent. Syst. Suppl.* : 287.

1933. *Ceriagrion coromandelianum*, Fraser, *Fauna Brit. India*, 1 : 315-316.

**Material :** 1 ♂, Contai, 27.5.1984, coll. G. K. Srivastava ; 1 ♂, Kakdwip 20.10.1984, coll. M. Prasad ; 1 ♀, Bakkhali, 18.3.1985, coll. G. K. Srivastava ; 1 ♂, Barkul, 14.3.1985 ; 1 ♂, Gopalpur, 13.3.1985 and 1 ♂, Nanda Kanan, 6.3.1915, coll. R. K. Varshney.

**Distribution :** Throughout India, Sri Lanka, Burma, Malaysia, Indochina and South China.

**Remarks :** A very common species and recorded almost throughout the year nearby the estuarine areas of east India. Both males and females were observed in tandem and in copulation wheel position. Oviposition behaviour was also recorded during the course of collections.

#### 5. *Ceriagrion cerinorubellum* (Brauer)

1865. *Pyrrhosoma cerinorubellum* Brauer, *Verh. zool.- Bot. Ges. Wien.*, 15 : 511.

1933. *Ceriagrion cerinorubellum*, Fraser, *Fauna Brit. India*, 1 : 326-328.

**Material :** 2 ♂ ♂, Contai, 27.5.1984 and 1 ♂, 2 ♀ ♀, Mahishadal, 5.7.1984, coll. G. K. Srivastava.

**Distribution :** Assam, Himachal Pradesh, Coorg, Uttar Pradesh, West Bengal, Borneo, Burma, Sri Lanka, Malaysia and Sumatra.

*Remarks* : Adults were seen at the temporary and permanent water bodies near the sea shore. During the collection period males and females were seen commonly in tandem position.

#### 6. *Pseudagrion microcephalum* (Rambur)

1842. *Agrion microcephalum* Rambur, *Ins. Neurop.*, : 259.

1933. *Pseudagrion microcephalum*, Fraser, *Fauna Brit. India*, 1 : 278-280.

*Material* : 1 ♂, Diamond Harbour, 22.10.1984, coll. M. Prasad.

*Distribution* : Throughout the plains of India, Burma, Sri Lanka and extending to Australia.

*Remarks* : Postnodal nervures are 10 in forewings and 8 in hindwings.

#### 7. *Pseudagrion australasiae* Selys

1916. *Pseudagrion australasiae* Laidlaw, *Rec. Indian Mus.*, 12 : 21-23.

1954. *Pseudagrion australasiae*, Lieftinck, *Treubia*, 22 : 1-202.

*Material* : 1 ♂, Diamond Harbour, 22.10.1984, coll. M. Prasad and 1 ♂ Canning, 28.11.1984, coll. G. K. Srivastava.

*Distribution* : Assam West Bengal, Burma and extending into Malaysia.

*Remarks* : Agrees well with the published description except for having 10 postnodal nervures in forewings and 8 in hindwings. It is first time recorded from the estuarine area of West Bengal.

#### 8. *Pseudagrion decorum* (Rambur)

1842. *Agrion decorum* Rambur, *Ins. Neurop.*, : 258.

1933. *Pseudagrion decorum*, Fraser, *Fauna Brit. India*, 1 : 286-289.

*Material* : 1 ♂, Kulpi, 21.10.1984 ; 1 ♂, 1 ♂, Diamond Harbour, 22.10. 1984 ; 2 ♂ ♂, Digha, 7.2.1985 and 1 ♂, Contai, 8.2.1985, coll. M. Prasad.

*Distribution* : Coorg, Himachal Pradesh, Nilgiris, Uttar Pradesh, West Bengal, Burma and Sri Lanka.

*Remarks* : 10 postnodal nervures present in forewing and 8 in hindwing. It is one of the most common species of the genus *Pseudagrion* and found near temporary and permanent water bodies. Sometimes adults were observed performing tandem, wheel and oviposition behaviour at the ponds.

### 9. *Pseudagrion spencei* Fraser

1922. *Pseudagrion spencei* Fraser, *Mem. Dep. Agric. India ent. Ser.*, 7 (7) : 47-84.

1933. *Pseudagrion spencei*, Fraser, *Fauna Brit. India*, 1 : 292-294.

*Material* : 2 ♂♂, Barkunda Islands, Chilka, 14.3.1985 and 1 ♂, Barkul, 14.3.1985 coll. R. K. Varshney.

*Distribution* : Bihar, Madhya Pradesh, West Bengal and Pakistan.

*Remarks* : It is recorded for the first time from the estuarine areas of Orissa.

### 10. *Pseudagrion rubriceps* Selys

1876. *Pseudagrion rubriceps* Selys, *Bull. Acad. Belg.* (2) 42 : 510.

1933. *Pseudagrion rubriceps*, Fraser, *Fauna Brit. India*, 1 : 296-299.

*Material* : 1 ♂ Diamond Harbour, 22.10.1984, coll. M. Prasad ; 1 ♂, Ghutiari Sharif, 29.11.1984 and 1 ♂, Piali, 30.11.1984, coll. G. K. Srivastava.

*Distribution* : Widely distributed in the plains and sub-montane area of continental India except desert tract and Burma.

*Remarks* : 9-10 postnodal nervures in forewing and 8 postnodals in hindwings. It is also one of the most common species of the genus *Pseudagrion*. It is first time recorded from the estuarine area of West Bengal.

### 11. *Pseudagrion andamanicum* Fraser

1924. *Pseudagrion andamanicum* Fraser, *Rec. Indian Mus.*, 26 : 411-412.

1933. *Pseudagrion andamanicum*, Fraser, *Fauna Brit. India*, 1 : 281-282.

*Distribution* : Andaman and Orissa (Fraser, 1933 & Prasad:et. al. in press).

12. *Aciagrion pallidum* Selys

1891. *Aciagrion pallidum* Selys, *Ann. Mus. Civ. Genova*, (2) 10 : 512-513.  
 1933. *Aciagrion pallidum*, Fraser, *Fauna Brit. India*, 1 : 344-345.

*Material* : 1 ♀, Gopalpur, 13.3.1985, coll. R. K. Varshney.

*Distribution* : Deccan, Dry zones of Assam, Poona, Satara and Burma.

*Remarks* : It is recorded for the first time from the estuarine area of Orissa.

13. *Ischnura senegalensis* (Rambur)

1842. *Agrion senegalensis* Rambur, *Ins. Neurop.*, : 276.  
 1933. *Ischuura senegalensis*, Fraser, *Fauna Brit. India*, 1 : 348-351.

*Material* : 1 ♂, 1 ♀, Junput, 29.7.1984, coll. G. K. Srivastava, 1 ♀, Fatehpur (Nandakumar), 29.8.1984 ; 1 ♂, Kakdwip, 20.10.1984. coll. M. Prasad ; 1 ♂, Canning, 28.11.-1984 coll. G. K. Srivastava, 2 ♂ ♂, Puri, 10.3.1985 and 1 ♂, Barkul, 14.3.1985, coll. R. K. Varshney.

*Distribution* : Himachal Pradesh, Manipur, Maharashtra, Rajasthan, Uttar Pradesh, West Bengal, Burma, Sri Lanka and extends eastwards upto Malaysia.

14. *Ischnura aurora* (Brauer)

1858. *Agrion delicatum* Hagen., *Verh. zool.-bot. Ges. Wien.*, 8 : 479.  
 1965. *Agrion aurora*, Brauer, *Verh. zool.-bot. Ges. Wien.*, 15 : 510.  
 1915. *Ischnura aurora*, Ris, *Nova caledonia Zool.*, 2 : 4, 67.

*Material* : 1 ♂, Kulpi, 21.10.1984, coll. M. Prasad.

*Distribution* : Himachal Pradesh, Punjab, South India, Uttar Pradesh, Australia, Borneo, Burma, Sri Lanka, Malaysia, New Gunia, Philippines, Samoa and Sondaic Achipelago.

*Remarks* : It is recorded for the first time from the estuarine area of West Bengal.

15. *Rhodischnura nursei* (Morton)

1907. *Ischnura nursei* Morton, *Trans. Ent. Soc. Lond.*, : 306-307.  
 1933. *Rhodischnura nursei*, Fraser, *Fauna Brit. India*, 1 : 367-371.

*Distribution* : Dry zones of North West India, Madhya Pradesh, parts of West Bengal and Orissa.

### 16. *Enallagma insulae* Fraser

1920. *Enallagma insulae* Fraser, *Rec. Indian Mus.*, 19 : 32-33.

1933. *Enallagma insulae*, Fraser, *Fauna Brit. India*, 1 : 378-379.

*Distribution* : Orissa.

### 17. *Agriocnemis lacteola* Selys

1877. *Agriocnemis lacteola*, Selys, *Bull. Acad. Belg.*, (2) 43 : 144.

1933. *Agriocnemis lacteola*, Fraser, *Fauna Brit. India*, 1 : 381-383.

*Material* : 1 ♂, Fatehpur (Nandakumar), 29.8.1988, coll. M. Prasad and 1 ♂, Nandakanan 6.3.1985, coll. R. K. Varshney.

*Distribution* : Assam, Bihar, Sikkim and West Bengal.

*Remarks* : It is recorded for the first time from the estuarine area of Orissa.

### 18. *Agriocnemis pygmaea* (Rambur)

1842. *Agrion pygmaea*, Rambur, *Ins. Neurop.*, : 278.

1933. *Agriocnemis pygmaea*, Fraser, *Fauna Brit. India*, 1 : 398-401.

*Material* : 1 ♂, New Digha, 26.5.1984 ; 1 ♂, Junput 29.7.1984, coll. G. K. Srivastava, 1 ♂, Kakdwip, 20.10.1984 ; 1 ♂ Canning, 28.11.1984, coll. G. K. Srivastava and 1 ♀, Nandakanan, 6.3.1985, coll. R. K. Varshney.

*Distribution* : Assam, Himachal Pradesh, Madras, Malabar, Manipur, Nicobar, Punjab, Rajasthan, Uttar Pradesh, West Bengal, Australia, Burma, Sri Lanka, China, Formosa, Java, Malaysia, Manila, North Guina, Philippines, Signapore and Seychelles.

*Remarks* : It is most commonly found near the water body. Sometime adults were observed even at very small ditches with dry or green vegetations. Tandem and wheel position invariably observed at the waterbody.

19. *Onychargia atrocyana* Selys

1865. *Onychargia atrocyana* Selys, *Bull. Acad. Belg.* (2) 20 : 416.  
 1933. *Onychargia atrocyana*, Fraser, *Fauna Brit. India*, 1 : 417-418.

*Distribution* : Assam, North Coorg, Malabar, Anaimalai Hills and West Bengal.

Suborder : ANISOPTERA  
 Superfamily : AESHNOIDEA  
 Family : GOMPHIDAE

20. *Ictinogomphus rapax* ( Ramour )

1842. *Diastatomma rapax* Rambur, *Ins. Neurop.*, : 169.  
 1934. *Ictinus rapax*, Fraser, *Fauna Brit. India*, 2 : 373-376.

*Material* : 1 ♂, Nimalakhya, 31.8.1984, coll. M. Prasad.

*Distribution* : Throughout India, Burma, Sri Lanka and Malaysia, except in desert area.

*Remarks* : Differs from the published descriptions in having the nodal index  $\frac{10-9}{11-14} : \frac{20-11}{15-12}$ .

Family : AESHNIDAE

21. *Anax guttatus* ( Burmeister )

1839. *Aeshna guttata* Burmeister, *Handb. Ent.*, 2 : 840.  
 1936. *Anax guttattus*, Fraser, *Fauna Brit. India*, 3 : 140-142.

*Distribution* : Assam, Annaimalai Hills, Coorg, Nilgiris, Madras Waltair, West Bengal and extends from Seychalles to Samoa in the Pacific.

Superfamily : LIBELLULOIDEA  
 Family : MACRODIPLACTIDAE

22. *Macrodiplax cora* (Brauer)

1867. *Diplax cora* Brauer, *Ver. zool. -bot. Ges. Wien*, 17 : 20, 289.  
 1936. *Macrodiplax cora*, Fraser, *Fauna Brit. India*, 3 : 448-450.

*Distribution* : Coimbatore, Plateau, Western Ghat, West Bengal, East coast of Africa, Oceania, Australia and throughout southern Asia.

**23. Aethriamanta brevipennis brevipennis (Rambur)**

1842. *Libellula brevipennis* Rambur, *Ins. Neurop.*, : 114.

1936. *Aethriamanta brevipennis brevipennis*, Fraser, *Fauna Brit. India*, 3 : 445-447.

*Material* : 1 ♂, 1 ♀, Mahishadal, 5.7.1984 and 1 ♂, Contai, 30.7.1986, coll. G. K. Srivastava.

*Distribution* : Assam, South India, West Bengal, Sri Lanka and Burma.

**24. Urothemis signata signata (Rambur)**

1842. *Libellula signata* Rambur, *Ins. Neurop.*, : 117.

1936. *Urothemis signata signata*, Fraser, *Fauna Brit. India*, 3 : 442-444.

*Material* : 1 ♀, Contai, 27.5.1984, coll. G. K. Srivastava ; 1 ♀, Kulpi 21.10.1984 ; 1 ♂, Balisai, 9.2.1985, coll. M. Prasad and 1 ♂, Frasersgang, 19.3.1985, coll. G. K. Srivastava.

*Distribution* : Eastern Uttar Pradesh, Peninsular India, West Bengal, Burma and Sri Lanka.

*Remarks* : Occurs commonly along the sea shore during May to November. Sometimes found flying in the sky along with *Pantala flavescens* (Fabr.) within the bed of seashore.

Family : LIBELLULIDAE

**25. Lathrecista asiatica asiatica (Fabricius)**

1798. *Libellula asiatica* Fabricius, *Ent. Syst. Suppl.*, : 283.

1936. *Lathrecista asiatica asiatica*, Fraser, *Fauna Brit. India*, 3 : 281-284.

*Distribution* : Borneo, New Guinea, Malabar, Philippines, West Bengal, Somoa and Sondaic Archipelago.

**26. Potamarcha obscura (Rambur)**

1942. *Libellula obscura* Rambur, *Ins. Neurop.*, : 64.

1936. *Potamarcha obscura*, Fraser, *Fauna Brit. India*, 3 : 289-291.

*Material* : 1 ♀, Digha, 28.5.1984 ; 1 ♂, Bakkhali, 18.3.1985, coll. G. K. Srivastava ; 1 ♂, Khandagiri, 7.3.1985 and 1 ♀, Gopalpur, 13.3.1985, coll. R. K. Varshney.

*Distribution* : Himachal Pradesh, Madhya Pradesh, Uttar

Pradesh, West Bengal, from Sri Lanka to Tibet and from West coast of India to Philippines and Formosa.

*Remarks* : It is commonly found away from the seashore nearby residential area or near water bodies resting on the bushes or twigs. It is recorded for the first time from the estuarine area of West Bengal.

### 27. *Orthetrum sabina* (Drury)

1770. *Libellula sabina* Drury, III. *Exot. Ins.*, 1 : 114-115.

1936. *Orthetrum sabina*, Fraser, *Fauna Brit. India*, 3 : 300-302.

*Material* : 1 ♂, New Digha, 26.5.1984, coll. G. K. Srivastava.

*Distribution* : Assam, Bihar, Himachal Pradesh, Manipur, Punjab, Uttar Pradesh, West Bengal, North East Africa, Eastward across to Australia, Nepal and Pacific Islands.

### 28. *Orthetrum pruinosum neglectum* (Rambur)

1842. *Libellula neglecta* Rambur, *Ins. Neurop.*, : 86.

1936. *Orthetrum pruinosum neglectum*, Fraser, *Fauna Brit. India*, 3 : 311-313.

*Distribution* : Throughout India, Burma, Hong Kong, Nepal, Indochina, Malaya, Thailand and Tibet.

### 29. *Brachydiplax sobrina* (Rambur)

1942. *Libellula sobrina* Rambur, *Ins. Neurop.*, : 114.

1936. *Brachydiplax sobrina*, Fraser, *Fauna Brit. India*, 3 : 325-327.

*Material* : 2 ♂ ♂ 1 ♀, Balisai, 23.7.1984, coll. G. K. Srivastava.

*Distribution* : Assam, Himachal Pradesh, Maharashtra, Punjab, Uttar Pradesh, Travencore, Western coast of India, West Bengal, Burma and Sri Lanka.

*Remarks* : During the course of collection of specimens it was seen that it is very common all along the sides of a pond. Specimens were resting on twigs. These are very small in size and length in comparison to the other common

specimens of this species. Following are the measurements of male and female.

	<i>Abdomen</i>	<i>Forewing</i>	<i>Hindwing</i>
Male :	17.50 mm	23.00 mm	22.00 mm
Female :	16.00 mm	24.00 mm	22.00 mm

### 30. *Brachydiplax chalybea* Brauer

1968. *Brachydiplax chalybea* Brauer, *Verh. zool.-bot. Ges. Wien.*, 18 : 173.

1936. *Brachydiplax chalybea*, Fraser, *Fauna Brit. India*, 3 : 328-329.

*Distribution* : Assam, West Bengal, Burma, Java, Malaysia Siam and Sumatra.

### 31. *Acisoma panorpoides panorpoides* Rambur

1842. *Acisoma panorpoides* Rambur, *Ins. Neurop.*, : 28.

1936. *Acisoma panorpoides panorpoides*, Fraser, *Fauna Brit. India*, 3 : 330-331.

*Material* : 1 ♀, Contai, 27.5.1984 and 1 ♀, Mahishadal, 5.7.1985, coll, G. K. Srivastava.

*Distribution* : Assam, Himachal Pradesh, Madhya Pradesh, Manipur, Punjab, Uttar Pradesh, Western India, West Bengal, Sri Lanka Celebes, China, Japan, Moluccan islands, Sumatra and Tiwan.

### 32. *Diplacodes trivialis* (Rambur)

1842. *Libellula trivialis* Rambur, *Ins. Neurop.*, : 115.

1936 *Diplacodes trivialis*, Fraser, *Fauna Brit. India*, 3 : 336-338.

*Material* : 1 ♂, New Digha, 26.5.1984, coll. G. K. Srivastava and 1 ♀, Nandankanan, 6.3.1985, coll. R. K. Varshney.

*Distribution* : Himachal Pradesh, Madhya Pradesh, Madras, Punjab, Manipur, Uttar Pradesh, West Bengal, Australia, Burma, Sri Lanka, Nepal and Seychelles.

*Remarks* : It is one of the most common species in the area. specimens were also observed either flying or resting on the sand of the seashore. Female were performing oviposition behaviour in the tidal water.

### 33. *Diplacodes nebulosa* (Fabricius)

1793. *Libellula nebulosa* Fabricius, *Ent. Syst.*, 2 : 379.

1933. *Diplacodes nebulosa*, Fraser, *Fauna, Brit. India*, 3 : 335-336.

*Material* : 1 ♂, Mahishadal, 30.8.1984, coll. *M. Prasad*.

*Distribution* : Himachal Pradesh, Madhya Pradesh, Madras, Uttar Pradesh, West Bengal, extended from Western India, and from Sri Lanka to Australia and Southwards to Java.

### 34. *Brachythemis contaminata* (Fabricius)

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

1936. *Brachythemis contaminata*, Fraser, *Fauna Brit. India*, 3 : 365-366.

*Material* : 1 ♀, Contai, 27.5.1984 ; 1 ♂, Mahishadal, 5.7.1984. coll. *G. K. Srivastava* and 1 ♀, Contai, 8.2.1985, coll. *M. Prasad*.

*Distribution* : Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Punjab, Rajasthan, Uttar Pradesh, West Bengal, Burma, Sri Lanka and extending east of China, Java, Formosa, Philippines and Sumatra.

*Remarks* : It is very common species and occurring through out the year in the estuarine areas, It was observed ovipositing or in Tendem position within the seashore or in the ditches in which tidal water entered. Some times adults were recorded flying over the sea water in the sea.

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

1770. *Libellula servilia* Drury, *III. Ex. Ins.*, 1 : 112-113.

1936. *Crocothemis servilia servilia* Fraser, *Fauna Brit. India*, 3 : 345-347.

*Material* : 1 ♀, Contai, 27.5.1984 ; 1 ♀, Fraserganj, 19.3.1985 and 1 ♀, Namkhana, 20.3.1985, coll. *G. K. Srivastava*.

*Distribution* : Bihar, Himachal Pradesh, Madhya Pradesh, Manipur, Punjab, Rajasthan, Uttar Pradesh, West Bengal, Australia, Nepal, Philippines and Sondaic Archipelago.

*Remarks* : Most common species in estuarine areas of Eastern India.

**36. *Neurothemis tullia tullia* (Drury)**

1773. *Libellula tullia* Drury, *III Exot. Ins.*, 2 : 85.

1936. *Neurothemis tullia tullia*, Fraser, *Fauna Brit. India*, 3 : 360-362.

*Material* : 1 ♂, Mahishadal, 5.7.1984, coll. G. K. Srivastava ; 1 ♂, Kulpi, 21.10.1984, coll. M. Prasad and 1 ♂, Canning, 24.11.1984, coll. G. K. Srivastav.

*Distribution* : Bihar, Bombay, Himachal Pradesh, Madhya Pradesh, Penisular India, Punjab, Uttar Pradesh, West Coast of India, West Bengal, Burma, Sri Lanka, Hongkong, Indo-China and Malacca.

**37. *Trithemis pallidinervis* (Kirby)**

1889. *Sympetrum pallidinervis* Kirby, *Trans. zool. Soc. India.*, 12 : 327.

1936. *Trithemis pallidinervis*, Fraser, *Fauna Brit. India*, 3 : 389-391.

*Material* : 1 ♂, Contai, 27.5.1984, coll. G. K. Srivastava.

*Distribution* : Assam, Bihar, Himachal Pradesh, Punjab, Uttar Pradesh, West Bengal, Burma, Sri Lanka, Formosa and and Philippines.

*Remarks* : A common species around stagnant water, some times observed near seashore either on wing or resting on twigs.

**38. *Rhyothemis variegata variegata* (Linn.)**

1763. *Libellula variegata* Linnaeus, *Amoenitates. Acad.*, 6 : 412.

1936. *Rhyothemis variegata variegata*, Fraser, *Fauna Brit. India*, 3 : 423-424.

*Material* : 1 ♀, Mahishadal, 26.5.1984, coll. G. K. Srivastava ; 1 ♀, Nandankanan, 6.3.1985 and 1 ♀, Barkunda islands, 14.3.1985, coll. R. K. Varshney.

*Distribution* : Assam, Bihar, Himachal Pradesh, West Bengal, Burma, Sri Lanka, Malaysia and Philippines.

**39. *Zyxomma petiolatum* Rambur**

1842. *Zyxomma petiolatum* Rambur, *Ins. Neurop.*, : 30.

1936. *Zyxomma petiolatum*, *Fauna Brit. India*, 3 : 409-410.

*Distribution* : Throughout India, Burma, and Sri Lanka.

40. *Tholymis tillarga* (Fabricius)

1798. *Libellula tillarga* Fabricius, *Ent. Syst. Suppl.*, : 285.

1936. *Tholymis tillarga*, Fraser, *Fauna Brit. India*, 3 : 411-413.

*Material* : 1 ♀, Nimalakhya, 31.8.1984, coll. M. Prasad.

*Distribution* : Himachal Pradesh, Madhya Pradesh, Punjab, Uttar Pradesh, West Bengal, Australia, Burma, Sri Lanka, Madagascar and tropical africa.

*Remarks* : It is recorded for the first time from the estuarine arears of West Bengal.

41. *Pantala flavescens* (Fabricius)

1798. *Libellula flavescens* Fabricius, *Ent. Syst. Suppl.* : 285.

1936. *Pantala flavescens*, Fraser, *Fauna Brit. India*, 3 : 414-416.

*Material* : 1 ♂, 1 ♀, Contai, 8.2.1985, coll. M. Prasad.

*Distribution* : Circumtropical and subtropical in distribution.

*Remarks* : A most common species in the estuarine area of east India. Swarms of this species were mostly seen either at seashore or sometimes they were flying above the sea water and moves upto 10 to 20 metres in side the sea. Specimens of *Tamea basilaris burmeisteri* Kirby were also seen in its swarm.

42. *Tamea basilaris burmeisteri* Kirby

1889. *Tamea burmeisteri* Kirby, *Trans. zool. Soc. Lond.*, 12 : 316.

1936. *Tamea basilaris burmeisteri*, Fraser, *Fauna Brit. India*, 3 : 432-434.

*Distribution* : Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh, West Bengal, Burma, Sri Lanka and Malaysia.

*Key to the Odonata of Estuarine area of East India*

A key to the 42 species of Odonata under 30 genera and 7 families known to occur in Estuarine areas of East India is given below. Fraser (1933, 1934, 1936 and 1957) has been adopted with some modifications.

1. Eye well separated ; fore and hind-wings approximately similar in shape and breadth ...

Eye not well separated; fore and hindwings variable in shape and breadth	...	20
2. Veins IRiii and Riv arising nearer to the arc than the nodes	...	3
Veins IRiii and Riv arising nearer to the arc	...	4
3. Thorax with a uniform narrow ante humeral stripe on each side; sides of the thorax khaki brown and black points absent	...	<i>L. viridula</i> Rambur
Thorax with narrow ante humeral stripes expended outwardly at the upper ends, sides of the thorax pale brown with a few black points	...	<i>L. elata</i> Hagen
4. Discoidal cell elongate, anterior and posterior sides subequal, legs very long	...	<i>Copera annulata</i> Selys
Discoidal cell short, anterior, side considerably shorter than the posterior legs not very long	...	5
5. Arc situated distal to the level of distal antenodal nervure, the junction of the ab and 1A markedly angulated	...	6
Arc situated at the level of distal antenodal nervure	...	7
6. Labrum metallic blue; abdominal segment (1-6) pale greenish yellow	...	<i>Agriocnemis pygmaea</i> Rambur
Labrum non-metallic, abdomen whitish in colour	...	<i>Agriocnemis lactiola</i> Selys
7. ab arising from the hind border of the wing at the point where ac meets it	...	8
ab arising from the hind border of the wing, more or less proximal to the point where ac meets it	...	16
8. A proximal ridge on the frons; postocular coloured spots absent	...	9
Ridge absent on the frons	...	10

9. Abdomen bright red at base ... *Ceriagrion cerinorubellum*  
(Brauer)  
Abdomen citron yellow ... *Ceriagrion coromandelianum*  
(Fabr.)
10. Pterostigma in forewing longer than  
that in the hind wing ... *Aciagrion pallidum* Selys  
Pterostigma in fore and hindwing of  
the same size ... 11
11. Face and vertex reddish orange ... *Pseudagrion rubriceps* (Selys)  
Face and vertex not reddish orange... 12
12. Thorax pale blue ... *Pseudagrion decorum*  
(Rambur)  
Thorax sky blue or green ... 13
13. 10th abdominal segment bigger than  
superior anal appendages ... *Pseudagrion australasiae*  
Selys  
10th abdominal segment and supe-  
rior anal appendages equal in size ... 14
14. Hind wing 14-16 mm in length ... *Pseudagrion spencei* Fraser  
Hind wing more than 17 mm in  
length ... 15
15. Second abdominal segment on dorsal  
side with black goblet shape making *Pseudagrion microcephalum*  
(Ramb.)  
Second abdominal segment on dorsal  
side with black rectangular marking *Pseudagrion andamanicum*  
Fraser
16. Postocular coloured spots always  
present in adult stage ... 17  
Postocular coloured spots absent in  
the adult stage ... *Rhodischnura nursei*  
(Morton)
17. Dorsal apical tubercles on 10th  
abdominal segment of male present 18  
Dorsal apical tubercles on 10th  
abdominal segment of male absent ... 19
18. Abdominal segments 3 to 6 citron on  
dorsum ... *Ischnura aurora* (Brauer)  
Abdominal segments 3 to 6 black on  
dorsum ... *Ischnura senegalensis*  
(Rambur)

19. Dorsum of 1st abdominal segment with a broad quadrate black spot confluent with an apical ring ... *Enallagma insulae* Fraser
- Dorsum of 1st abdominal segment totally black ... *Onyahargia atrociana* Selys
20. Eye meeting at point or broadly confluent ; 8th abdominal segment with a yellow ring ... *Ictinogomphus rapax* (Ramb.)
- Eye confluent above ... 21
21. Discoinal cells closely similar in fore and hind wings and traversed ... *Anax guttatus* (Burmeister)
- Discoinal cells differing in fore and hindwings, not traversed ... 22
22. Sectors of arc separated from origin, feebly developed primary antenodal present ... 23
- Sectors of arc fused at their origin, primary antenodal absent ... 25
23. Subtrigone in forewing entire ... *Aethriamanta b. brevipennis* (Rambur)
- Subtrigone in forewing 3 celled ... 24
24. Abdomen blood red ... *Urothemis s signata* (Rambur)
- Abdomen bright pale yellow ... *Macrodiplax cora* (Brauer)
25. Apex of loop in the wing open ... 26
- Apex of loop in the wing closed ... 27
26. An opalescent white spot in the hind wings present ... *Tholymis tillarga* (Fabr.)
- An opalescent white spot in the middle of the hind wing absent ... *Zyxomma petiolatum* (Rambur)
27. Distal antenodal nervure in forewing complete ... 28
- Distal antenodal nervure in forewing incomplete ... 32
28. Frons metallic above ... 29
- Frons non-metallic above ... 30

29. Bases of both fore and hindwings  
dark-brown ... *Brachydiplax chalybea*  
Brauer
- Bases of both fore and hindwings  
uncoloured hyaline ... *Brachydiplax sobrina*  
(Rambur)
30. Small sized species ; only 6 antenodal  
nervures in forewings ... *Acisoma panorpoides*  
*panorpoides* Rambur
- Medium sized species ; not less than  
12 antenodal nervures in forewings ... 32
31. Males violaceous-red due to a thin  
overlying pruinescens, abdomen not  
enormously swollen at the base ... *Orthetrum pruinosum*  
neglectum (Ramb.)
- Males not violaceous-red, abdomen  
enormously swollen at base ... *Orthetrum sabina* (Drury)
32. Lobes of prothorax with long hairs ... 33
- Lobes of prothorax without long  
hairs ... 34
33. Apices of fore and hindwing tipped  
with black ... *Diplacodes nebulosa* (Fabr.)
- Apices of fore hindwing not tipped  
with black, anal appendages yellow ... *Diplacodes trivialis*  
(Rambur)
34. Sectors of arc in forewing separated  
and divergent at the origin ; black  
and golden yellow markings present  
on the wings ... *Rhyothemis v. variegata*  
(Linn.)
- Sectors of arc in forewing arising  
from common long stalk ... 35
35. Discoidal field converging at wing  
border ... 36
- Discoidal field parallel or divergent  
at the wing border ... 37
36. Nervure IRii present in between Rii  
and Riii ... *Pantala flavescens* (Fabr.)
- Nervure IRii absent in between Rii  
and Riii, Leg very long and spidery,  
ptrostigma bicolourous ... *Trithemis pallidinervis*  
(Kirby)

37. Pterostigma unequal in fore and hindwings, two large black spots surrounded by golden yellow markings present at the base of wings ... *Tramea basilaris burmeisteri* Kirby
- Pterostigma equal in size in fore and hind wings ... 38
38. Only one cubital nervure present in all the wings ... 39
- More than one cubital nervure present in all the wings, an opalescent white band in the wings present ... *Neurothemis tullia tullia* (Drury)
39. Red or pale yellow species, basal or medial yellow marking present on wings ... 40
- Variable coloured species, base of wings rarely marked with red or pale yellow ... 41
40. Broad reddish yellow medial marking present on the wings ... *Brachythemis contaminata* (Fabr.)
- Small basal yellow marking present at the base of wings ... *Crocothemis s. servilia* (Drury)
41. Only one row of cells present in between IRii and RSpl ... *Lathrecista a asiatica* (Fabr.)
- Two rows of cells present inbetween IRii and RSpl ... *Potamarcha obscura* (Rambur)

#### SUMMARY

Altogether 42 species of Odonata are recorded from the estuarine area of East India. Out of these 7 are new records for the estuarine area of West Bengal and 3 for the estuarine area of Orissa.

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