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DRAGONFLIES AND DAMSELFLIES (INSECTA: ODONATA) OF TRIPURA, NORTHEASTERN INDIA WITH A PICTORIAL CATALOGUE

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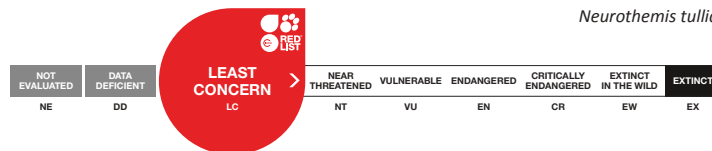
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Abstract: A survey of Odonata was conducted in four reserve forests, three wildlife sanctuaries and three unclassified natural areas of Tripura, northeastern India from 2008 to 2012, from May to August. A total of 53 species belonging to 37 genera under nine families of Zygoptera (damselflies) and Anisoptera (dragonflies) were recorded in five years from 1370 points by direct search. This included 25 species, 16 genera and five families reported as new records for the state. A list of the species, number of specimens examined, their habitats, local and IUCN status, and worldwide distribution are provided. A pictorial catalogue of adults of the recorded species is also provided.

Keywords: Biodiversity, distribution, eastern Himalaya, Odonata, Tripura.

Insects occupy three-fourths of all described species of animals on the planet (Westfall & Tennesen 1996). While most insects live on land, their diversity also includes about 76,000 species of aquatic insects (Balian et al. 2008). The importance and appropriateness of invertebrate taxa as ecological indicators in monitoring ecosystem health are well recognized (Merritt et al. 2008; Majumder et al. 2013a), and Odonata, popularly known as dragonflies (Anisoptera) and damselflies (Zygoptera), are one such insect group (Corbet 1999; Foote & Rice 2005; Samways et al. 2010). Odonates are among the most primitive of winged insects dating back to the Permian (Grimaldi & Engel 2005) and are very striking and attractive among the flying insects. They occur worldwide in varied ecological niches extending



Neurothemis tullia



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from sea level to over 3600m altitude and from brackish, marshy area, mangroves to semi-arid areas (Kalkman et al. 2008). They are amphibious with the adults being terrestrial and the larvae aquatic. Majority of the known species are highly specific to their habitats and are highly sensitive to changes in habitat quality (Smith et al. 2007; Silva et al. 2010). The insect diversity in a particular area or habitat has the potential to serve as a reliable indicator of stability, health, and integrity of aquatic (Foote & Rice 2005; Osborn 2005) as well as terrestrial ecosystems (Brown 1991; Clausnitzer 2003), and can be used as the predictor of other taxa present in the studied habitats (Oliver & Beattie 1993; Wilson 1997). Besides, these insects also play an important role in the prey-predator dynamics of natural ecosystems (Das et al. 2012). Dragonflies are also used as food and medicinal resources at a local scale (Kalkman et al. 2008; Shantibala et al. 2012).

Approximately, 6,500 extant species of Odonata are found worldwide representing about 600 genera (Vick 2002). About 1,500 species have been reported from the tropical rainforest regions (Kalkman et al. 2008). It is acknowledged that proportionately fewer studies were carried out on odonate diversity of this region (Corbet 2006). Many species in tropical forests are known from the type specimens alone (Clausnitzer et al. 2009). Prasad & Varshney (1995) and Mitra (2006) reported 499 species and sub-species under 139 genera, 17 families, and three sub-orders of Odonata from India which was later revised to 463 species (Subramanian 2009). Among the states of northeastern parts of India, Nagaland consists of 90 species under 53 genera and 14 families (Joshi & Kunte 2014), Mizoram by 64 species under 41 genera and 12 families (Prasad 2007), Manipur by 68 species under 41 genera and eight families (Srivastava & Sinha 2004), and Sikkim by 65 species under 34 genera and 11 families (Mitra 2003). At the time of this study, Tripura State was represented by 37 species under 21 genera and five families (Srivastava & Sinha 2000; Majumder et al. 2013a).

In view of the heterogeneous landscape of Tripura with diverse ecosystems including a large number of fresh water bodies consisting of several rivers, lakes, streams, ponds and canals (Majumder et al. 2012), it was thought that extensive exploration of remote and previously un-explored locations of Tripura State could bring out many more species of Odonata from this geographical region which had been sparingly surveyed for fauna and flora in the past (Agarwala & Bhattacharjee 2012). Accordingly a faunastic study was carried out for insect diversity from 2008–2012. A part of the results

of that study is presented here. A pictorial catalogue of adults of the recorded species is provided.

METHODS AND MATERIALS

Study area

Geographically, Tripura lies between 22°56'–24°32'N & 91°10'–92°21'E, and is the meeting point of two biodiversity hotspots, the eastern Himalaya hotspot in the east and the Indo-Myanmar hotspot in the west and, thus, occupies a critical position in the global biodiversity scene (Myers et al. 2000). The landscape of the state is dominated by 11 rivers, and six mountain ranges (Fig. 1) which create numerous ecological niches and biotopes ranging from hilly terrain with undulating slopes, valleys and plains dominated by semi-evergreen to moist deciduous forests and secondary bamboo brakes. Tropical climatic conditions prevail in Tripura with an average annual rainfall of about 2100mm from the southwest monsoon. Average annual temperatures range between 10–36 °C, with altitudes varying from 15–850 m (Majumder et al. 2013b).

Ten natural biotopes comprising four reserve forests (RF), three wildlife sanctuaries (PA) and three unclassified natural forests (UF) were chosen for a survey of odonates (Fig. 1). They are (1) Ballianchir (BC, RF, Kanchanpur), (2) Debbari (DB, RF, Amarpur), (3) Srirampur (SP, RF, Kamalpur), (4) Unakoti (UK, RF, Kailasahar), (5) Gomati Wildlife Sanctuary (GWS, PA, Jatanbari), (6) Rowa Wildlife Sanctuary (RWS, PA, Dharmanagar), (7) Trishna Wildlife Sanctuary (TWS, PA, Belonia), (8) Ishanchandranagar (ICN, UF, Bishalgarh), (9) Khupilong (KP, UF, Udaipur), and (10) West Bhubanban (WB, UF, Agartala). Data of latitude, longitude, altitude and habitat features of all the locations are provided in Table 1. Hereafter, only abbreviated names of locations are used.

Field sampling

The study was carried out from 2008 to 2012, from the months of May to August, considered to be favourable for the occurrence of adult odonates (Das et al. 2013). Data were collected by direct search technique (Sutherland 1996) at the potential habitats of odonates. For this purpose, 10–15 min halts were made at each search point chosen at random. During the five-year sampling period, collections/observations from 1,370 points were made. All the records were made during 800–1400 hr as odonates are found to be most active during this time of the day. Opportunistic sightings were also made to record maximum species richness. Specimens were photographed and initially

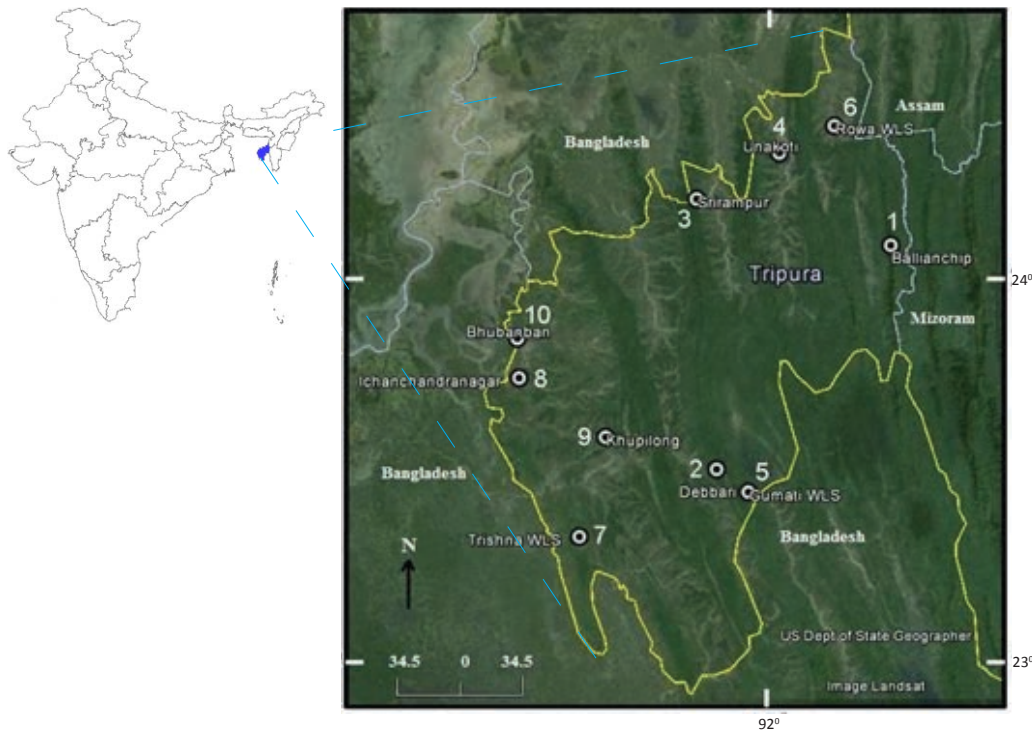


Figure 1. Locations of the study, Tripura (indicated).

identified in the field based on field guides of Nair (2011) and Subramanian (2009). In case of difficulty in field identification of specimens, one or two specimens, depending on their natural abundance, of each species were captured using insect nets for proper identification and preservation in the laboratory following the method of Fraser (1933–36). The classification scheme followed here was based on Schorr et al. (2009) and Dijkstra et al. (2014). The annotated checklist of species is presented alphabetically under respective suborder and family. Collected specimens and photographs of all the specimens from this study are kept in the Ecology and Biodiversity laboratories of Tripura University. Photographs were taken using Canon 50D and Sony Cyber-Shot HX200V cameras. Specimens of the previous records were not available for examination to the authors, therefore, the results presented here is confined to the actual specimens of 52 species under 37 genera and nine families that were either collected or photographed in the field and examined during this study.

Data analysis

The recorded odonate species are considered under four categories based on their relative occurrence in the study area, viz., (i) common species represented by >100 sightings, (ii) frequent species represented by

<100 sightings but >50 sightings, (iii) occasional species represented by <50 sightings but >10 sightings, and (iv) rare species represented by <10 sightings. Conservation status of Odonata species recorded in this study was determined according to international conservation categories, viz., LC = Least Concern and NE = Not Evaluated (IUCN 2013).

RESULTS

The result comprises records of 53 species under 37 genera and nine families of dragonflies and damselflies. These included 25 species, 16 genera and four families reported here as new records from the state. Together with the earlier records (Srivastava & Sinha 2000; Majumder et al. 2013a), the odonate fauna of the state is now represented by 62 species under 39 genera and nine families. In the present study 53 species belonging to 37 genera in nine families were recorded. These included 33 dragonfly species (Anisoptera) and 20 damselfly species (Zygoptera). A family-wise list of species with number and sex of specimens examined, their habitat and distribution, local occurrence, and IUCN status are provided. Photographs of recorded species are provided in Images 1–80.

Family-wise records of species showed that Libellulidae is found to be the largest family represented by 29 species under 19 genera followed by

Table 1. Data of geo-coordinates, major forest types and habitats of the study locations.

| Location (forest category) | Latitude (N) | Longitude (E) | Altitude (m) | Forest types and habitats |
|---------------------------------|--------------|---------------|--------------|---|
| Ballianchip (RF) | 23°59'46.86" | 92°16'50.91" | 564.80 | Semi evergreen forests with several slow flowing seasonal streams |
| Debbari (RF) | 23°32'45.30" | 91°36'33.96" | 47.85 | Semi evergreen forests with several slow flowing perennial streams and rivers |
| Srirampur (RF) | 24°06'53.64" | 91°46'06.90" | 183.18 | Secondary mixed moist deciduous forests with a slow flowing seasonal stream |
| Unakoti (RF) | 24°20'10.20" | 92°03'13.59" | 114.91 | Semi evergreen to mixed moist deciduous forests with a slow flowing perennial stream |
| Gomati Wildlife Sanctuary (PA) | 23°31'53.73" | 91°51'48.34" | 75.90 | Secondary mixed moist deciduous forests with a perennial river |
| Rowa Wildlife Sanctuary (PA) | 24°12'02.36" | 92°05'54.12" | 39.93 | Secondary mixed deciduous forests with several seasonal lakes |
| Trishna Wildlife Sanctuary (PA) | 23°18'06.25" | 91°22'10.14" | 26.82 | Squashy evergreen to secondary moist mixed deciduous forests with several seasonal lakes |
| Ishanchandranagar (UF) | 23°45'30.21" | 91°15'29.52" | 43.56 | Fragmented mixed secondary deciduous forests with water-logged paddy field |
| Khupilong (UF) | 23°34'47.58" | 91°27'34.67" | 53.28 | Fragmented secondary mixed deciduous forests with a manmade water channel and paddy field |
| West Bhubanban (UF) | 23°51'02.28" | 91°15'08.46" | 12.34 | Fragmented secondary mixed moist deciduous forests with water-logged paddy field |

Coenagrionidae (10 species, 6 genera), Platycnemididae (4 species, 3 genera), Calopterygidae (2 species, 2 genera), Chlorocyphidae (2 species, 2 genera), Gomphidae (2 species, 2 genera), Macromiidae (1 species), Aeshnidae (1 species), and Euphaeidae (1 species), respectively. New reports of species and families from Tripura are indicated by the signs * and #, respectively, after their names. New reports of genera are those represented by new report of single species only.

Suborder: Anisoptera Selys, 1854

Family: Aeshnidae Rambur, 1842 #

1. *Gynacantha subinterrupta* Rambur, 1842*

Material examined: 1 male (TU/Odo/Aesh-3199), 18.vi.2010, 23°26'N & 91°28'E, TWS; 1 male (TU/Odo/Aesh-4421), 25.viii.2012, 23°51'N & 91°15'E, ICN; 1 female (TU/Odo/Aesh-4186), 25.iii.2014, 23°45'N & 91°16'E, ICN, coll. J. Majumder.

Habitat: Shady vegetation on the bank of ponds, lakes.

Conservation status: Occasional; LC.

Distribution: Cambodia, China, India, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Nepal, Singapore, Thailand and Vietnam.

Family: Gomphidae Rambur, 1842

2. *Ictinogomphus rapax* Rambur, 1842*

Material examined: 1 male (TU/IMG/ODO/0001), 12.v.2008, 23°34'N & 91°27'E, KL; 1 male (TU/IMG/ODO/0002), 22.vii.2008, 23°51'N & 91°15'E, ICN; 1 male (TU/IMG/ODO/0003), 22.vi.2009, 24°17'N & 24°17'E, RWS, coll. J. Majumder.

Habitat: Open areas on banks of perennial ponds,

lakes, stream and rivers

Conservation status: Occasional; LC.

Distribution: Bangladesh, India, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam.

3. *Paragomphus lineatus* (Selys, 1850)

Material examined: 1 male (TU/IMG/ODO/0005), 11.vi.2010, 23°34'N & 91°27'E, KL; 1 female (TU/Odo/Gomp-4437), 16.vii.2012, 23°31'N & 91°33'E, DB, coll. J. Majumder.

Habitat: Open areas near banks of perennial ponds, lakes and forested stream margins.

Conservation status: Occasional; LC.

Distribution: Afghanistan, India, Iran, Nepal, Pakistan, Syrian Arab Republic and Turkey.

Family: Libellulidae Rambur, 1842

4. *Acisoma panorpoides* Rambur, 1842

Material examined: 1 female (TU/IMG/ODO/0006), 10.vii.2008, 23°34'N & 91°27'E, KL; 1 male (TU/IMG/ODO/0007), 21.v.2009, 23°26'N & 91°28'E, TWS, coll. J. Majumder; 1 male (TU/IMG/ODO/0008), 09.viii.2008, 23°51'N & 91°15'E, ICN, coll. P.P. Bhattacharjee.

Habitat: Paddy fields, marshy areas.

Conservation status: Frequent in Tripura; LC.

Distribution: Algeria, Angola, Benin, Botswana, Burkina Faso, Chad, China, Côte d'Ivoire, Egypt, Equatorial Guinea, Ethiopia, Gambia, Ghana, Guinea, Hong Kong, India, Indonesia, Japan, Kenya, Liberia, Libya, Madagascar, Malawi, Malaysia, Mozambique, Myanmar, Namibia, Nepal, Nigeria, Pakistan, Philippines, Senegal, Sierra Leone, Singapore, South Africa, Sri Lanka, Swaziland, Taiwan, Tanzania, Thailand, Togo, Uganda,

Vietnam, Zambia and Zimbabwe.

5. *Aethriamanta brevipennis* (Rambur, 1842)*

Material examined: 1 female (TU/IMG/ODO/009), 14.vii.2011, 23°31'N & 91°33'E, DB; 1 male (TU/Odo/Libe-4423), 14.vi.2008, 23°26'N & 91°28'E, TWS, coll. J. Majumder.

Habitat: Ponds and lakes covered with weeds, water-logged vegetative areas.

Conservation status: Frequent; LC.

Distribution: Bangladesh, Indonesia, India, Laos, Malaysia, Myanmar, Singapore, Sri Lanka, Thailand and Vietnam.

6. *Brachydiplax chalybea* Brauer, 1868*

Material examined: 1 male (TU/Odo/Libe-3189), 05.v.2011, 23°25'N & 91°49'E, GWS; 1 male (TU/IMG/ODO/0010), 10.viii.2011, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Marshy areas, eutrophic ponds and lakes, vegetation rich areas near slow streams.

Conservation status: Frequent; LC.

Distribution: Brunei, Darussalam, Cambodia, China, Hong Kong, Indonesia, India, Japan, Laos, Malaysia, Myanmar, Philippines, Singapore, Taiwan, Thailand and Vietnam.

7. *Brachydiplax farinosa* Krüger, 1902*

Material examined: 3 males (TU/Odo/Libe-4431, TU/IMG/ODO/0011, TU/IMG/ODO/0012), 2 females (TU/Odo/Libe-4193, TU/IMG/ODO/0013), 09.vii.2012, 23°51'N & 91°15'E, ICN, coll. J. Majumder.

Habitat: Ponds and lakes covered with weeds, marshy areas close to forests.

Conservation status: Rare; LC.

Distribution: Bangladesh, Brunei Darussalam, China, Indonesia, India, Laos, Malaysia, Myanmar, Thailand and Vietnam.

8. *Brachydiplax sobrina* (Rambur, 1842)

Material examined: 1 male (TU/IMG/ODO/0016), 25.viii.2012, 23°51'N & 91°15'E, KL, coll. J. Majumder.

Habitat: Ponds, lakes and marshes with weed infestation.

Conservation status: Occasional; LC.

Distribution: Bangladesh, India, Myanmar, Nepal, Sri Lanka, and Thailand.

9. *Brachythemis contaminata* (Fabricius, 1793)

Material examined: 1 female (TU/IMG/ODO/0017), 1 male (TU/IMG/ODO/0018), 09.viii.2008, 23°51'N &

91°15'E, ICN; 2 female (TU/IMG/ODO/0019), 1 male (TU/IMG/ODO/0020), 08.viii.2009, 23°31'N & 91°33'E, DB; 1 male (TU/IMG/ODO/0021), 01.v.2012, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Ponds, lakes, and marshes with weed infestation, near slow streams.

Conservation status: Common; LC.

Distribution: Bangladesh, Cambodia, China, Hong Kong, Indonesia, India, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

10. *Camacinia gigantea* (Brauer, 1867)*

Material examined: 1 female (TU/Odo/Libe-3190), 14.vii.2011, 23°34'N & 91°27'E, KL; 1 female (TU/Odo/Libe-3194), 16.vii.2012, 23°31'N & 91°33'E, DB, coll. J. Majumder.

Habitat: Marshy areas near edges of secondary mixed moist deciduous forest.

Conservation status: Rare; LC.

Distribution: Indonesia, India, Malaysia, Myanmar, Papua New Guinea, Philippines, Singapore, Thailand, Timor-Leste and Vietnam.

11. *Cratilla lineata* (Brauer, 1878)*

Material examined: 1 female (TU/IMG/ODO/0022), 07.viii.2012, 23°34'N & 91°27'E, KL, coll. J. Majumder.

Habitat: Shady edges of rubber plantation with scrub jungles.

Conservation status: Rare; LC.

Distribution: China, Indonesia, India, Malaysia, Myanmar, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

12. *Crocothemis servilia* (Drury, 1770)

Material examined: 3 females (TU/Odo/Libe-4194, TU/IMG/ODO/0023, TU/IMG/ODO/0024), 2 males (TU/IMG/ODO/0025, TU/IMG/ODO/0026), 09.viii.2008, 23°51'N & 91°15'E, ICN; 1 female (TU/IMG/ODO/0027), 1 male (TU/IMG/ODO/0028), 04.vi.2009, 23°25'N & 91°49'E, GWS; 1 female (TU/IMG/ODO/0029), 1 male (TU/IMG/ODO/0030), 07.viii.2010, 24°07'N & 91°46'E, SP; 1 female (TU/IMG/ODO/0031), 22.vi.2011, 23°31'N & 91°33'E, DB; 1 male (TU/IMG/ODO/0032), 10.vii.2008, 23°48'N & 92°15'E, BC; 1 female (TU/IMG/ODO/0033), 1 male (TU/IMG/ODO/0034), 10.vii.2008, 23°26'N & 91°28'E, TWS, coll. J. Majumder; 1 female (TU/IMG/ODO/0035), 1 male (TU/IMG/ODO/0036), 28.viii.2010, 23°51'N & 91°15'E, WB; 2 female (TU/IMG/ODO/0037), 14.vi.2009, 24°29'N & 92°21'E, UK, coll. P.P. Bhattacharjee.

Habitat: Ponds, lakes, ditches, marshy areas, edges of slow stream, paddy fields.

Conservation status: Common; LC.

Distribution: Afghanistan, Armenia, Cambodia, China, Hong Kong, Indonesia, India, Iran, Iraq, Israel, Japan, Jordan, Korea, Kuwait, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Qatar, Saudi Arabia, Singapore, Sri Lanka, Syrian Arab Republic, Thailand, Turkey and Vietnam.

13. *Diplacodes nebulosa* (Fabricius, 1793)*

Material examined: 1 female (TU/IMG/ODO/0038), 11.vi.2010, 23°51'N & 91°15'E, ICN; 1 male (TU/IMG/ODO/0039), 22.viii.2011, 23°26'N & 91°28'E, TWS; 1 female (TU/IMG/ODO/0040), 07.viii.2012, 24°17'N & 24°17'E, RWS, coll. J. Majumder.

Habitat: Banks of vegetation rich ponds, lakes, edges of marshy areas.

Conservation status: Common; LC.

Distribution: Australia, Bangladesh, Cambodia, China, Hong Kong, Indonesia, India, Laos, Malaysia, Myanmar, Nepal, Papua New Guinea, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

14. *Diplacodes trivialis* (Rambur, 1842)

Material examined: 1 male (TU/IMG/ODO/0041), 28.viii.2010, 23°51'N & 91°15'E, ICN; 1 female (TU/Odo/Libe-3193), 21.v.2009, 23°26'N & 91°28'E, TWS; 1 male (TU/IMG/ODO/0042), 15.v.2008, 24°17'N & 24°17'E, RWS, coll. J. Majumder; 1 male (TU/IMG/ODO/0043), 15.vii.2008, 23°51'N & 91°15'E, WB, coll. P.P. Bhattacharjee.

Habitat: Edges of shallow ponds, lakes, paddy fields, vegetation rich marshy areas.

Conservation status: Common; LC.

Distribution: Australia, Bangladesh, Brunei Darussalam, Cambodia, China, Fiji, Hong Kong, Indonesia, India, Japan, Laos, Malaysia, Micronesia, Myanmar, Nepal, Papua New Guinea, Philippines, Seychelles, Singapore, Solomon Islands, Sri Lanka, Thailand, Timor-Leste and Vietnam.

15. *Lathrecista asiatica* (Fabricius, 1798)*

Material examined: 1 female (TU/IMG/ODO/0044), 07.v.2008, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Edges of slow streams close to secondary mixed moist deciduous and semi-evergreen forests.

Conservation status: Occasional; LC.

Distribution: Australia, Bangladesh, Brunei Darussalam, China, Indonesia, India, Laos, Malaysia, New Caledonia, Papua New Guinea, Philippines, Samoa,

Singapore, Thailand and Vietnam.

16. *Neurothemis fulvia* (Drury, 1773)

Material examined: 1 female (TU/Odo/Libe-3203), 3 males (TU/IMG/ODO/0045, TU/IMG/ODO/0046, TU/IMG/ODO/0047), 09.viii.2008, 23°51'N & 91°15'E, ICN; 1 female (TU/Odo/Libe-3204), 28.vii.2008, 23°26'N & 91°28'E, TWS; 1 female (TU/IMG/ODO/0048), 06.vi.2010, 23°31'N & 91°33'E, DB; 1 male (TU/Odo/Libe-4189), 19.vii.2010, 23°48'N & 92°15'E, BC; 1 female (TU/Odo/Libe-4188), 1 male (TU/IMG/ODO/0049), 17.v.2010, 24°17'N & 24°17'E, RWS, coll. J. Majumder; 1 female (TU/IMG/ODO/0050), 1 male (TU/IMG/ODO/0051), 29.vi.2009, 23°51'N & 91°15'E, WB; 2 females (TU/IMG/ODO/0052), 04.vii.2008, 24°29'N & 92°21'E, UK, coll. P.P. Bhattacharjee.

Habitat: Edges of ponds, lakes, and marshes infested with weeds, paddy fields, edges of secondary moist deciduous forests.

Conservation status: Common; LC.

Distribution: Bangladesh, Bhutan, Cambodia, China, Hong Kong, Indonesia, India, Laos, Malaysia, Myanmar, Nepal, Taiwan, Thailand and Vietnam.

17. *Neurothemis intermedia* (Rambur, 1842)

Material examined: 1 female (TU/Odo/Libe-4424), 02.vii.2009, 23°26'N & 91°28'E, TWS; 2 female (TU/Odo/Libe-4425), 11.vi.2011, 24°17'N & 24°17'E, RWS, coll. J. Majumder.

Habitat: Water logged vegetation-rich areas.

Conservation status: Occasional; LC.

Distribution: Cambodia, China, Indonesia, India, Laos, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam.

18. *Neurothemis tullia* (Drury, 1773)

Material examined: 1 male (TU/Odo/Libe-4422), 04.vii.2009, 23°51'N & 91°15'E, ICN; 2 female (TU/IMG/ODO/0053, TU/IMG/ODO/0054), 08.viii.2009, 23°31'N & 91°33'E, DB; 1 male (TU/Odo/Libe-3198), 09.viii.2008, 23°34'N & 91°27'E, KL; 1 female (TU/IMG/ODO/0055), 01.v.2010, 23°26'N & 91°28'E, TWS, coll. J. Majumder; 1 female (TU/IMG/ODO/0056), 1 male (TU/IMG/ODO/0057), 24.vi.2010, 23°51'N & 91°15'E, WB, coll. P.P. Bhattacharjee;

Habitat: Weedy marshes, edges of vegetation-rich ponds and lakes, water inundated paddy fields.

Conservation status: Common; LC.

Distribution: Bangladesh, China, Hong Kong, India, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam.

19. *Onychothemis testacea* Laidlaw, 1902*

Material examined: 1 male (TU/IMG/ODO/0058), 16.vii.2012, 23°31'N & 91°33'E, DB, coll. J. Majumder.

Habitat: Riparian slow streams.

Conservation status: Rare; LC.

Distribution: China, Hong Kong, India, Laos, Malaysia, Myanmar, Sri Lanka, China, Thailand and Vietnam.

20. *Orthetrum glaucum* (Brauer, 1865)

Material examined: 1 male (TU/Odo/Libe-4426), 17.vi.2009, 24°07'N & 91°46'E, SP; 2 males (TU/Odo/Libe-4427, TU/Odo/Libe-4187), 02.vii.2009, 23°26'N & 91°28'E, TWS; 1 female (TU/IMG/ODO/0059), 08.viii.2009, 23°31'N & 91°33'E, DB, coll. J. Majumder.

Habitat: Banks of ponds, lakes, and marshes, edges of slow streams lined with herbs and shrubs.

Conservation status: Common; LC.

Distribution: Brunei Darussalam, China, Hong Kong, Indonesia, India, Japan, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

21. *Orthetrum luzonicum* (Brauer, 1868)*

Material examined: 2 males (TU/Odo/Libe-4195, TU/IMG/ODO/0060), 03.vi.2011, 23°26'N & 91°28'E, TWS; 1 female (TU/IMG/ODO/0061), 1 male (TU/IMG/ODO/0062), 11.vi.2012, 23°34'N & 91°27'E, KL; 1 female (TU/Odo/Libe-4197), 13.vii.2012, 23°25'N & 91°49'E, GWS; 1 female (TU/IMG/ODO/0063), 11.vii.2010, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Marsh lands, banks of well vegetated ponds and lakes, paddy fields.

Conservation status: Frequent; LC.

Distribution: Afghanistan, Bangladesh, Bhutan, China, Hong Kong, Indonesia, India, Japan, Malaysia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

22. *Orthetrum pruinosum* (Burmeister, 1839)

Material examined: 2 females (TU/IMG/ODO/0064, TU/IMG/ODO/0065), 2 males (TU/IMG/ODO/0066, TU/IMG/ODO/0067), 01.v.2008, 24°07'N & 91°46'E, SP; 1 female (TU/IMG/ODO/0068), 1 male (TU/IMG/ODO/0069), 08.vii.2008, 23°48'N & 92°15'E, BC; 3 female (TU/IMG/ODO/0070), 1 male (TU/IMG/ODO/0071), 01.viii.2008, 23°25'N & 91°49'E, GWS; 1 female (TU/IMG/ODO/0072), 27.vii.2009, 24°29'N & 92°21'E, UK, coll. J. Majumder; 1 female (TU/IMG/ODO/0073), 1 male (TU/IMG/ODO/0074), 22.vi.2009, 24°17'N & 24°17'E, RWS; 1 male (TU/IMG/ODO/0075), 14.vi.2008, 23°51'N & 91°15'E, WB, coll. P.P. Bhattacharjee.

Habitat: Water logged weedy habitats, banks of small streams and rivers.

Conservation status: Common; LC

Distribution: Afghanistan, Bangladesh, Brunei Darussalam, China, Hong Kong, Indonesia, India, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

23. *Orthetrum sabina* (Drury, 1770)

Material examined: 2 females (TU/IMG/ODO/0076, TU/IMG/ODO/0077), 1 male (TU/IMG/ODO/0078), 17.vi.2009, 24°07'N & 91°46'E, SP; 1 female (TU/IMG/ODO/0079), 27.vii.2009, 24°29'N & 92°21'E, UK, coll. J. Majumder; 1 female (TU/IMG/ODO/0080), 1 male (TU/IMG/ODO/0081), 09.viii.2008, 23°51'N & 91°15'E, ICN; 1 female (TU/IMG/ODO/0082), 15.v.2008, 24°17'N & 24°17'E, RWS; 2 females (TU/IMG/ODO/0083, TU/IMG/ODO/0084), 15.vii.2008, 23°51'N & 91°15'E, WB, coll. P.P. Bhattacharjee.

Habitat: Shallow ponds, paddy fields, slow streams.

Conservation status: Common; LC.

Distribution: Afghanistan, Algeria, Armenia, Australia, Azerbaijan, Bahrain, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, Chad, China, Cyprus, Egypt, Eritrea, Ethiopia, Georgia, Greece, Hong Kong, Indonesia, India, Iran, Iraq, Israel, Japan, Jordan, Kazakhstan, Kuwait, Laos, Lebanon, Libya, Malaysia, Micronesia, Myanmar, Nepal, New Caledonia, Oman, Pakistan, Papua New Guinea, Philippines, Qatar, Russian Federation, Samoa, Saudi Arabia, Singapore, Solomon Islands, Somalia, Sri Lanka, Sudan, Syrian Arab Republic, Tajikistan, Thailand, Timor-Leste, Tunisia, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan, Vietnam and Yemen.

24. *Orthetrum triangulare* (Selys, 1878)

Material examined: 1 female, 1 male (TU/IMG/ODO/0085, TU/IMG/ODO/0086), 01.v.2012, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Edges of well-vegetated streams.

Conservation status: Rare; LC.

Distribution: Afghanistan, Bhutan, China, Hong Kong, Indonesia, India, Laos, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Taiwan, Thailand and Vietnam.

25. *Palpopleura sexmaculata* (Fabricius, 1787)

Material examined: 2 females (TU/Odo/Libe-3191, TU/Odo/Libe-3192), 1 male (TU/IMG/ODO/0087), 15.v.2008, 24°07'N & 91°46'E, SP; 1 male (TU/IMG/ODO/0088), 06.vi.2010, 23°48'N & 92°15'E, BC; 1 female (TU/IMG/ODO/0089), 1 male (TU/Odo/Libe-3196), 15.v.2008, 24°17'N & 24°17'E, RWS; 1 female (TU/

IMG/ODO/0090), 12.v.2008, 23°34'N & 91°27'E, KL, coll. J. Majumder; 1 female (TU/Odo/Libe-4191), 13.vii.2012, 23°51'N & 91°15'E, WB, coll. P.P. Bhattacharjee.

Habitat: Vegetation-rich marshes near forest edges, paddy fields close to forests.

Conservation status: Common; LC.

Distribution: Afghanistan, Bangladesh, China, Hong Kong, India, Lao, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam.

26. *Pantala flavescens* (Fabricius, 1798)

Material examined: 1 male (Tu/Odo/Libe-4436), 1 female (TU/Odo/Libe-4432), 18.v.2011, 23°51'N & 91°15'E, ICN, coll. J. Majumder

Habitat: Edge of water-logged paddy fields close to secondary moist deciduous forests.

Conservation status: Rare; LC.

Distribution: Angola, Argentina, Australia, Bahamas, Belize, Benin, Bhutan, Bolivia, Botswana, Brazil, Brunei Darussalam, Burkina Faso, Cambodia, Cameroon, Central African Republic, Chile, China, Colombia, Comoros, Congo, Congo, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Equatorial Guinea, Ethiopia, French Guiana, French Polynesia, Gabon, Gambia, Ghana, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Indonesia, India, Jamaica, Kenya, Korea, Lesotho, Liberia, Madagascar, Malawi, Malaysia, Martinique, Mauritius, Mayotte, Mexico, Mozambique, Myanmar, Namibia, New Caledonia, Nicaragua, Nigeria, Northern Mariana Islands, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Puerto Rico, Réunion, Rwanda, Saint Pierre and Miquelon, Sao Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Singapore, Solomon Islands, South Africa South Sudan, Sri Lanka, Suriname, Swaziland, Tanzania, Thailand, Togo, Trinidad and Tobago, Uganda, Uruguay, Vanuatu, Venezuela, Vietnam, Zambia and Zimbabwe.

27. *Potamarcha congener* (Rambur, 1842)

Material examined: 1 male (TU/IMG/ODO/0091), 11.vii.2010, 24°07'N & 91°46'E, SP; 1 male (TU/IMG/ODO/0092), 22.vi.2011, 23°34'N & 91°27'E, KL; 1 female (TU/IMG/ODO/0093), 12.v.2010, 23°51'N & 91°15'E, ICN, coll. J. Majumder.

Habitat: Banks of shallow ponds, lakes, paddy fields, slow streams and marshes, close to secondary mixed moist deciduous forests.

Conservation status: Frequent; LC.

Distribution: Australia, Bangladesh, Cambodia, China, Hong Kong, Indonesia, India, Laos, Malaysia, Myanmar,

Nepal, Papua New Guinea, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

28. *Rhodothemis rufa* (Rambur, 1842)*

Material examined: 1 male (TU/IMG/ODO/0094), 1 female (TU/IMG/ODO/0095), 18.v.2011, 23°51'N & 91°15'E, ICN; 1 female (TU/IMG/ODO/0096), 14.vii.2011, 23°31'N & 91°33'E, DB, coll. J. Majumder.

Habitat: Ponds and lakes infested with weeds, edges of riparian habitats.

Conservation status: Rare; LC.

Distribution: Bangladesh, Brunei Darussalam, China, Hong Kong, Indonesia, India, Malaysia, Myanmar, Philippines, Singapore, Solomon Islands, Sri Lanka, Thailand and Vietnam.

29. *Rhyothemis variegata* (Linnaeus, 1763)*

Material examined: 1 female (TU/Odo/Libe-3197), 1 male (TU/IMG/ODO/0097), 12.v.2008, 23°34'N & 91°27'E, KL; 1 male (TU/Odo/Libe-4435), 04.vii.2009, 23°51'N & 91°15'E, ICN; 1 female (TU/Odo/Libe-4434), 07.viii.2010, 24°07'N & 91°46'E, SP, coll. J. Majumder; 1 female (TU/IMG/ODO/0098), 1 male (TU/IMG/ODO/0099), 18.vii.2009, 23°51'N & 91°15'E, WB, coll. P.P. Bhattacharjee.

Habitat: Banks of ponds, lakes, marshes and water-logged paddy fields.

Conservation status: Frequent; LC.

Distribution: Bangladesh, Cambodia, China, Hong Kong, India, Laos, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam.

30. *Tholymis tillarga* (Fabricius, 1798)

Material examined: 2 males (TU/Odo/Libe-4430, TU/Odo/Libe-4433), 25.viii.2012, 23°51'N & 91°15'E, ICN, coll. J. Majumder.

Habitat: Edges of ponds, lakes infested with weeds, vegetation-rich marshy areas.

Conservation status: Rare; LC

Distribution: American Samoa, Angola, Australia, Bangladesh, Benin, Botswana, Brunei Darussalam, Burkina Faso, Cambodia, Cameroon, Central African Republic, Chad, China, Comoros, Congo, Congo, Cook Islands, Côte d'Ivoire, Equatorial Guinea, Ethiopia, French Polynesia, Gabon, Gambia, Ghana, Guam, Guinea, Hong Kong, Indonesia, India, Japan, Kenya, Kiribati, Lao, Liberia, Madagascar, Malawi, Malaysia, Mali, Mauritius, Micronesia, Mozambique, Myanmar, Namibia, Nepal, New Caledonia, Nigeria, Northern Mariana Islands, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Senegal, Seychelles, Sierra Leone, Singapore, Solomon

Islands, Somalia, South Africa, South Sudan, Sri Lanka, Tanzania, Thailand, Timor-Leste, Togo, Uganda, Vietnam, Zambia and Zimbabwe.

31. *Trithemis aurora* (Burmeister, 1839)

Material examined: 1 male (TU/IMG/ODO/0100), 11.vii.2010, 24°07'N & 91°46'E, SP; 1 male (TU/IMG/ODO/0101), 06.vii.2009, 23°48'N & 92°15'E, BC, coll. J. Majumder.

Habitat: Wetlands such as ponds, lakes, marshes, paddy fields, streams and rivers.

Conservation status: Rare; LC.

Distribution: Bangladesh, Brunei Darussalam, Cambodia, China, Hong Kong, Indonesia, India, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Timor-Leste and Vietnam.

32. *Trithemis pallidinervis* (Kirby, 1889)

Material examined: 2 females (TU/IMG/ODO/0014, TU/IMG/ODO/0015), 23.v.2012, 23°51'N & 91°15'E, ICN, coll. J. Majumder.

Habitat: Ponds, lakes and marshes with weed infestation.

Conservation status: Occasional; LC.

Distribution: Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Iran, Laos, Malaysia, Myanmar, Nepal, Oman, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Vietnam.

33. *Urothemis signata* Selys, 1872*

Material examined: 1 male (TU/IMG/ODO/0102), 14.vii.2011, 23°31'N & 91°33'E, DB; 1 female (TU/IMG/ODO/0103), 09.vii.2012, 23°51'N & 91°15'E, ICN, coll. J. Majumder.

Habitat: Ponds and lakes infested with weeds, paddy fields, vegetation-rich marshy habitats.

Conservation status: Rare; LC.

Distribution: Australia, Bangladesh, Brunei Darussalam, Cambodia, China, Hong Kong, Indonesia, India, Laos, Malaysia, Myanmar, Nepal, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

Family: Macromiidae Tillyard, 1917 #

34. *Epophthalmia vittata* Burmeister, 1839*

Material examined: 1 male (TU/Odo/Libe-4429), 16.vii.2012, 23°31'N & 91°33'E, DB, coll. J. Majumder.

Habitat: Edge of a slow stream near a semi-evergreen forest.

Conservation status: Rare; LC.

Distribution: Indonesia, India, Sri Lanka and Vietnam.

Suborder: Zygoptera Selys, 1854

Family: Calopterygidae Selys, 1850

35. *Neurobasis chinensis* (Linnaeus, 1758)*

Material examined: 1 male (TU/Odo/Calop-3206), 1 female (TU/Odo/Calop-3205), 01.viii.2008, 23°25'N & 91°49'E, GWS; 2 male (TU/Odo/Calop-3207, TU/IMG/ODO/0104), 1 female (TU/IMG/ODO/0105), 10.viii.2011, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Edges of slow streams and rivers close to mature secondary moist deciduous and woody forests.

Conservation status: Occasional; LC.

Distribution: Bangladesh, China, Hong Kong, Indonesia, India, Laos, Malaysia, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam.

36. *Vestalis gracilis* (Rambur, 1842)

Material examined: 1 female (TU/IMG/ODO/0106), 01.v.2012, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Slow stream close to a mature secondary mixed moist deciduous forest.

Conservation status: Rare; LC.

Distribution: Cambodia, India, Laos, Malaysia, Myanmar, Nepal, Thailand and Vietnam.

Family: Chlorocyphidae Cowley, 1937

37. *Libellago lineata* (Burmeister, 1839)

Material examined: 1 female (TU/Odo/Chloro-2922), 2 males (TU/Odo/Chloro-2921, TU/Odo/Chloro-2924), 08.viii.2009, 23°31'N & 91°33'E, DB; 1 male (TU/Odo/Chloro-2925), 19.vii.2010, 23°48'N & 92°15'E, BC; 2 females (TU/Odo/Chloro-2923, TU/Odo/Chloro-2926), 15.v.2011, 24°29'N & 92°21'E, UK; 1 female (TU/Odo/Chloro-4420), 1 male (TU/Odo/Chloro-4199), 10.viii.2011, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Open areas in the vicinity of slow streams, natural reservoirs close to a mature mixed moist deciduous forest.

Conservation status: Frequent; LC.

Distribution: China, Indonesia, India, Laos, Malaysia, Myanmar, Nepal, Taiwan, Thailand and Vietnam.

38. *Rhinocypha quadrimaculata* Selys, 1853*

Material examined: 2 males (TU/Odo/Chloro-3200, TU/Odo/Chloro-3201), 27.vii.2009, 24°29'N & 92°21'E, UK; 1 female (TU/Odo/Chloro-3202), 11.vii.2010, 24°07'N & 91°46'E, SP; 1 male (TU/Odo/Chloro-4200), 08.vi.2011, 23°48'N & 92°15'E, BC, coll. J. Majumder.

Habitat: Along fast moving as well as slow moving streams in hills and watershed areas.

Conservation status: Frequent; LC.

Distribution: Bangladesh; India, Myanmar, Nepal and

Thailand.

Family: Coenagrionidae Kirby, 1890

39. *Aciagrion pallidum* Selys, 1891

Material examined: 1 male (TU/IMG/ODO/0107), 22.vi.2011, 23°34'N & 91°27'E, KL; 1 male (TU/IMG/ODO/0108), 11.vi.2011, 24°17'N & 24°17'E, RWS, coll. J. Majumder.

Habitat: Scrub jungle and dry deciduous forests with patches of bamboo.

Conservation status: Rare; LC.

Distribution: Bangladesh, Cambodia, China, India, Laos, Myanmar, Nepal, Thailand and Vietnam.

40. *Agriocnemis femina* (Brauer, 1868)*

Material examined: 1 male (TU/IMG/ODO/0109), 24.viii.2011, 23°26'N & 91°28'E, TWS; 2 female (TU/IMG/ODO/0110, TU/IMG/ODO/0111), 14.vi.2009, 23°34'N & 91°27'E, KL; 1 male (TU/IMG/ODO/0112), 21.vii.2010, 23°51'N & 91°15'E, ICN; 1 male (TU/IMG/ODO/0113), 17.v.2010, 24°17'N & 24°17'E, RWS, coll. J. Majumder; 1 female (TU/IMG/ODO/0114), 1 male (TU/IMG/ODO/0115), 24.vi.2010, 23°51'N & 91°15'E, WB, coll. P.P. Bhattacharjee.

Habitat: Shallow weedy marshes, edges of ponds and lakes, grasslands.

Conservation status: Common; LC.

Distribution: Australia, Bangladesh, Brunei Darussalam, China, Guam, Hong Kong, Indonesia, India, Japan, Laos, Malaysia, Micronesia, Myanmar, Northern Mariana Islands, Palau, Philippines, Singapore, Solomon Islands, Sri Lanka, Taiwan, Thailand, Timor-Leste and Vietnam.

41. *Agriocnemis lacteola* Selys, 1877

Material examined: 1 male (TU/IMG/ODO/0116), 03.vi.2011, 23°26'N & 91°28'E, TWS; 1 male (TU/IMG/ODO/0117), 17.v.2010, 24°17'N & 24°17'E, RWS; 1 male (TU/IMG/ODO/0118), 11.vi.2010, 23°34'N & 91°27'E, KL; 1 female (TU/IMG/ODO/0119), 05.v.2008, 23°51'N & 91°15'E, ICN, coll. J. Majumder; 1 male (TU/IMG/ODO/0120), 18.vii.2009, 23°51'N & 91°15'E, WB, coll. P.P. Bhattacharjee.

Habitat: Grassland close to wetlands and thin marshy areas, ponds and paddy fields.

Conservation status: Common; LC.

Distribution: Bangladesh, China, Hong Kong, India, Nepal and Thailand.

42. *Agriocnemis pygmaea* (Rambur, 1842)

Material examined: 1 male (TU/IMG/ODO/0121),

28.vii.2008, 23°26'N & 91°28'E, TWS; 1 male (TU/IMG/ODO/0122), 17.v.2010, 24°17'N & 24°17'E, RWS; 1 male (TU/IMG/ODO/0123), 11.vi.2010, 23°34'N & 91°27'E, KL, coll. J. Majumder; 1 male (TU/IMG/ODO/0124), 17.vi.2011, 23°51'N & 91°15'E, WB, coll. P.P. Bhattacharjee.

Habitat: Weedy natural and man-made wetlands, grasslands in plain areas.

Conservation status: Common; LC.

Distribution: Afghanistan, Australia, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Hong Kong, Indonesia, India, Iran, Japan, Laos, Macao, Malaysia, Myanmar, Nepal, Oman, Pakistan, Papua New Guinea, Philippines, Seychelles, Singapore, Solomon Islands, Sri Lanka, Thailand and Vietnam.

43. *Ceriagrion cerinorubellum* (Brauer, 1865)

Material examined: 1 male (TU/IMG/ODO/0125), 15.v.2008, 24°17'N & 24°17'E, RWS; 1 male (TU/IMG/ODO/0126), 27.vii.2009, 24°29'N & 92°21'E, UK; 1 male (TU/Odo/Coena-4437), 24.vii.2011, 23°34'N & 91°27'E, KL, coll. J. Majumder.

Habitat: Lakes and ponds covered with weeds, marshes close to mature secondary mixed moist deciduous forests.

Conservation status: Occasional; LC.

Distribution: Bangladesh, Brunei Darussalam, Cambodia, Indonesia, India, Laos, Malaysia, Myanmar, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

44. *Ceriagrion coromandelianum* (Fabricius, 1798)

Material examined: 2 males (TU/IMG/ODO/0127, TU/IMG/ODO/0128), 12.v.2010, 23°51'N & 91°15'E, ICN; 1 male (TU/IMG/ODO/0129), 17.v.2010, 24°17'N & 24°17'E, RWS; 1 male (TU/IMG/ODO/0130), 22.vi.2011, 23°34'N & 91°27'E, KL; 1 male (TU/IMG/ODO/0131), 21.v.2009, 23°26'N & 91°28'E, TWS; 1 male (TU/IMG/ODO/0132), 1 male (TU/Odo/Coena-4210), 28.vi.2012, 23°51'N & 91°15'E, SP; 1 male (TU/IMG/ODO/0133), 11.vi.2011, 24°17'N & 24°17'E, RWS, coll. J. Majumder.

Habitat: Edges of ponds, lakes, rice fields, wet grasslands.

Conservation status: Common; LC.

Distribution: India, Nepal, Pakistan and Sri Lanka.

45. *Ischnura aurora* Brauer, 1865

Material examined: 1 female (TU/IMG/ODO/0134), 1 male (TU/IMG/ODO/0135), 08.viii.2009, 23°31'N & 91°33'E, DB; 1 female (TU/IMG/ODO/0136), 1 male (TU/IMG/ODO/0137), 15.v.2011, 24°29'N & 92°21'E, UK;

1 male (TU/IMG/ODO/0138), 15.vii.2008, 23°51'N & 91°15'E, ICN, coll. J. Majumder.

Habitat: Marshlands, ponds and lakes, wet paddy fields, wet meadows, grasslands near water bodies.

Conservation status: Frequent; LC.

Distribution: Australia, Bangladesh, Bhutan, China, Cook Islands, Fiji, French Polynesia, Guam, Indonesia, India, Japan, Kiribati, Laos, Marshall Islands, Micronesia, Myanmar, Nepal, New Caledonia, Northern Mariana Islands, Pakistan, Philippines, Samoa, Solomon Islands, Sri Lanka, Thailand, Tonga and Vanuatu.

46. *Onychargia atrocyana* (Selys, 1865)*

Material examined: 1 female (TU/IMG/ODO/0155), 1 male (TU/IMG/ODO/0156), 22.vi.2012, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Edge of a slow flowing stream in a secondary mature mixed moist deciduous forest.

Conservation status: Rare; LC.

Distribution: Bangladesh, Cambodia, Hong Kong, India, Indonesia, Malaysia, Myanmar, Nepal, Phillipines, Singapore, Sri Lanka, Taiwan, Thailand, Yunnan (China) and Vietnam.

47. *Pseudagrion microcephalum* (Rambur, 1842)*

Material examined: 1 male (TU/IMG/ODO/0139), 11.vi.2012, 23°34'N & 91°27'E, KL, coll. J. Majumder.

Habitat: Bank of a polluted pond in a plain area close to a scrub jungle.

Conservation status: Rare; LC

Distribution: Australia, Bangladesh, China, Indonesia, India, Japan, Laos, Malaysia, Myanmar, Sri Lanka, Thailand and Vietnam.

48. *Pseudagrion rubriceps* (Selys, 1876)

Material examined: 1 female (TU/IMG/ODO/0140), 1 male (TU/IMG/ODO/0141), 16.vii.2012, 23°31'N & 91°33'E, DB; 1 female (TU/IMG/ODO/0142), 1 male (TU/IMG/ODO/0143), 24.viii.2011, 23°26'N & 91°28'E, TWS, coll. J. Majumder.

Habitat: Lakes and ponds, edges of rivers, along slow streams in plain areas.

Conservation status: Frequent; LC.

Distribution: Bangladesh, Cambodia, China, Hong Kong, Indonesia, India, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Taiwan, and Thailand.

Family: Euphaeidae Jacobson & Bianchi, 1905 #

49. *Euphaea ochracea* (Selys, 1859)*

Material examined: 1 male (TU/IMG/ODO/0144), 23.v.2011, 24°07'N & 91°46'E, SP; 1 male (TU/IMG/

ODO/0145), 08.vi.2011, 23°48'N & 92°15'E, BC, coll. J. Majumder.

Habitat: Edges of streams in forested areas.

Conservation status: Rare; LC

Distribution: Bangladesh, India, Laos, Malaysia, Myanmar, Nepal, Thailand and Vietnam.

Family: Platycnemididae Tillyard, 1917 (following Dijkstra et al. 2014) #

50. *Calicnemia imitans* (Lieftinck, 1948)*

Material examined: 1 male (TU/IMG/ODO/0146), 22.vi.2012, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Shady margins of slow streams adjacent to secondary mature moist deciduous forests.

Conservation status: Rare; LC

Distribution: India, Laos, Myanmar, Thailand and Vietnam.

51. *Coeliccia didyma* (Sélys, 1863)*

Material examined: 1 male (TU/IMG/ODO/0147), 01.v.2012, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Slow stream in hills having dense woody forest.

Conservation status: Rare; LC

Distribution: India, Laos, Malaysia, Myanmar and Thailand.

52. *Copera marginipes* (Rambur, 1842)*

Material examined: 1 male (TU/IMG/ODO/0148), 11.vii.2010, 24°07'N & 91°46'E, SP; 1 male (TU/IMG/ODO/0152), 24.viii.2011, 23°31'N & 91°33'E, DB; 1 female (TU/IMG/ODO/0150), 1 male (TU/IMG/ODO/0151), 15.v.2011, 24°29'N & 92°21'E, UK; 1 male (TU/IMG/ODO/0149), 19.vii.2010, 23°48'N & 92°15'E, BC, coll. J. Majumder.

Habitat: Ponds, puddles and under storey vegetation of slow flowing streams.

Conservation status: Frequent; LC.

Distribution: Bangladesh, China, Hong Kong, Indonesia, India, Laos, Macao, Malaysia, Myanmar, Nepal, Sri Lanka, Taiwan, Thailand and Vietnam.

53. *Copera vittata* (Selys, 1863)*

Material examined: 1 female (TU/IMG/ODO/0153), 1 male (TU/IMG/ODO/0154), 01.v.2012, 24°07'N & 91°46'E, SP, coll. J. Majumder.

Habitat: Margin of a slow moving stream adjacent to a secondary mature moist deciduous forest.

Conservation status: Occasional; LC.

Distribution: Brunei Darussalam, Indonesia, India, Laos, Malaysia, Myanmar, Nepal, Philippines, Singapore,

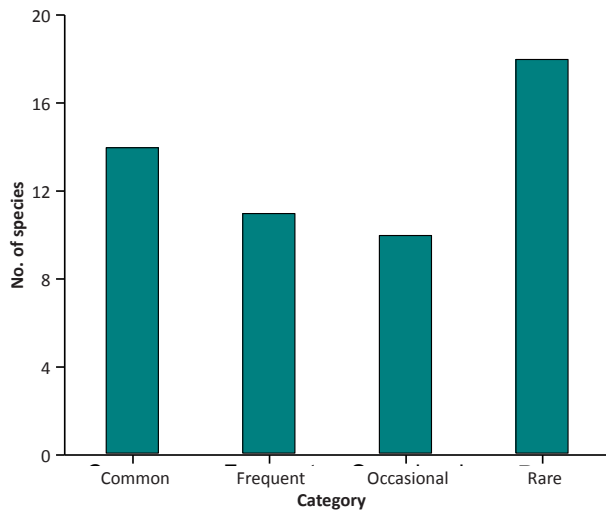


Figure 2. Categories of relative occurrence of species recorded in Tripura.

Thailand and Vietnam.

DISCUSSION AND CONCLUSIONS

Mitra et al. (2010) assessed conservation status and distribution of 367 species of Odonata from six ecoregions of the Eastern Himalaya including two ecoregions viz., the Ganga Delta and Plain freshwater and the Chin Hills-Arakan Coast that extended to Tripura. Previous to this study, quality field data on Odonata was lacking from most of the eastern Himalayan range, particularly from the south and eastern parts including Tripura. The present study is a quantitative as well as qualitative advancement of Odonata diversity of Tripura over the earlier study (Srivastava & Sinha 2000). During the study period, 14 species were recorded as common, 11 frequent, 10 occasional and 18 as rare (Fig. 2). Twenty-five species are new records for the state of Tripura and, therefore, the updated odonate fauna of Tripura State is now represented by 62 species under 39 genera and nine families (Appendix 1). Thirty of these species, representing 48.39% of the Odonata fauna of Tripura, are considered endemic to south-east Asia extending from parts of Nepal on the eastern side to Vietnam on the western side. These include 16 species of dragonflies and 14 species of damselflies (Appendix 1). Ten species or subspecies namely, *Ceriagrion olivaceum* Laidlaw, *Pseudagrion australasiae* Selys, *Enallagma parvum* Selys, *Agriocnemis splendidissima* Laidlaw, *Vestalis smaragdina* (Selys), (Fonscolombe), *Trithemis kirby kirby* Selys, *Neurothemis intermedia alanta* Ris, *Orthetrum brunneum brunneum* (Fonscolombe) and *Orthetrum chrysis* (Selys, 1891) reported in previous works

(Srivastava & Sinha 2000; Majumder et al. 2013a) were not recorded during this study and are data deficient. All the 53 species collected in this study are listed in IUCN Red List of threatened category (IUCN 2013).

Destruction of forested areas, pollution of aquatic habitats and filling of increasing numbers of ponds in urban and rural areas are considered to be the important threats to diversity of animals and plants including odonates in Tripura (Bhattacharjee et al. 2013). Several studies have shown that forest cover and water quality have a positive influence on odonate diversity (Dolny et al. 2011). However, it is difficult to say whether a species is genuinely rare or merely overlooked until adequately sampled and assessed. Evaluating the status of naturally rare species is highly important from a conservation stand point. Occurrence of a high degree of endemism in the recorded species of Odonata from this study is a definite indicator of greater species richness and diversity of these insects in South-east Asia in general and in the study area, in particular.

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Image 1. *Gynacantha subinterrupta* Male



Image 2. *Ictinogomphus rapax* Male



Image 3. *Paragomphus lineatus* Male



Image 4. *Paragomphus lineatus* Female



Image 5. *Acisoma panorpoides* Female



Image 6. *Acisoma panorpoides* Male



Image 7. *Aethriamanta brevipennis* Male



Image 8. *Aethriamanta brevipennis* Female



Image 9. *Brachydiplax chalebea* Male



Image 10. *Brachydiplax farinosa* Male

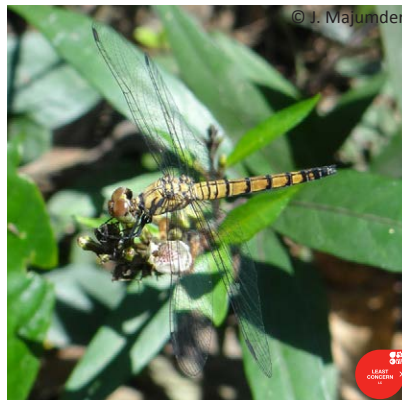


Image 11. *Brachydiplax farinosa* Female



Image 13. *Brachythemis contaminata* Male and Female



Image 12. *Brachydiplax sobrina* Male



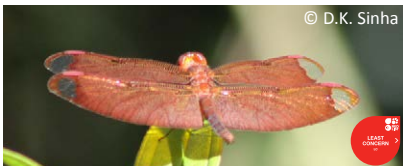
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Image 14. *Camacinia gigantea* Female



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Image 17. *Crocothemis servilia* Female



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Image 20. *Diplacodes trivialis* Male



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Image 23. *Neurothemis fulvia* Male



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Image 26. *Neurothemis tullia* Female



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Image 15. *Cratila lineata* Female



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Image 18. *Diplacodes nebulosa* Female



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Image 21. *Diplacodes trivialis* Male and Female



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Image 24. *Neurothemis fulvia* Female



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Image 27. *Neurothemis tullia* Male



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Image 16. *Crocothemis servilia* Male



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Image 19. *Diplacodes nebulosa* Male



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Image 22. *Lathrecista asiatica* Female



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Image 25. *Neurothemis intermedia* Female



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Image 28. *Onychothemis testacea* Female



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Image 29. *Orthetrum glaucum* Male



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Image 32. *Orthetrum luzonicum teneral* Male



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Image 35. *Orthetrum sabina* Male and Female



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Image 30. *Orthetrum glaucum* Female



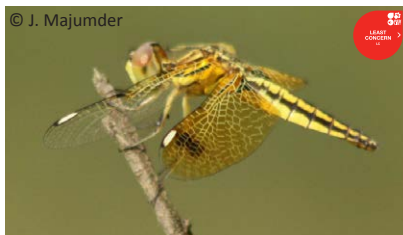
© J. Majumder
Image 33. *Orthetrum luzonicum* Female



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Image 36. *Orthetrum triangulare* Male



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Image 38. *Palpopleura sexmaculata* Male



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Image 39. *Palpopleura sexmaculata* Female



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Image 31. *Orthetrum luzonicum* Female



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Image 34. *Orthetrum pruinosum* Male and Female



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Image 37. *Orthetrum triangulare* Female



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Image 40. *Pantala flavescens* Female



Image 41. *Pantala flavescens* Male



Image 42. *Potamarcha congener* Male



Image 43. *Potamarcha congener* Female



Image 44. *Rhodothemis rufa* Female



Image 45. *Rhodothemis rufa* Male



Image 46. *Rhyothemis variegata* Female



Image 47. *Rhyothemis variegata* Male



Image 48. *Tholymis tillarga* Female



Image 49. *Trithemis aurora teneral* Male



Image 50. *Trithemis aurora* Male



Image 52. *Urothemis signata* Female

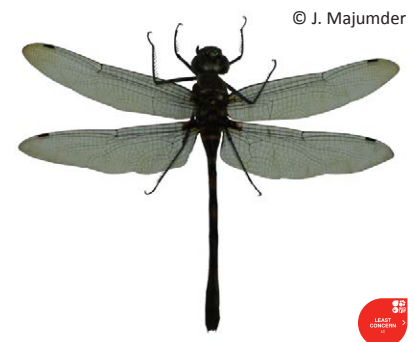


Image 54. *Epoptalmia vitata* Male



Image 51. *Trithemis pallidinervis* Female



Image 53. *Urothemis signata* Male



Image 55. *Neurobasis chinensis* Male and Female



Image 58. *Libellago lineata* Male



Image 61. *Aciagrion pallidum* Male



Image 64. *Agriocnemis lacteola* Female



Image 56. *Vestalis gracilis* Female



Image 59. *Rhinocypha quadrimaculata* Female



Image 62. *Agriocnemis femina* Female



Image 65. *Agriocnemis lacteola* Male



Image 66. *Agriocnemis pygmaea* Male



Image 57. *Libellago lineata* Female

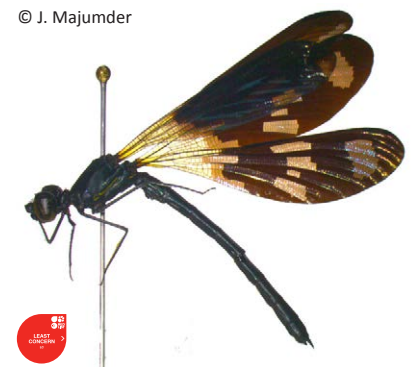


Image 60. *Rinochypha quadrimaculata* Male



Image 63. *Agriocnemis femina* Male



Image 67. *Agriocnemis pygmaea* Female



Image 68. *Ceriagrion cerinorubellum* Male



Image 69. *Ceriagrion coromandelianum* Male



Image 70. *Ischnura aurora* Male



Image 71. *Ischnura aurora* Female



Image 72. *Onychargia atrocyana* Male and Female



Image 73. *Pseudagrion microcephalum* Male



Image 75. *Euphaea ochracea* Male

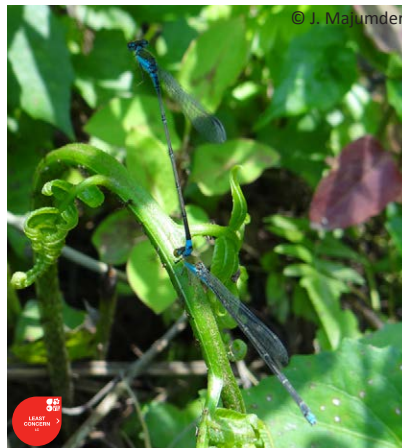


Image 74. *Pseudagrion rubriceps* Male and Female



Image 77. *Coeliccia didyma* Male



Image 78. *Copera marginipes* Male



Image 76. *Calicnemia imitans* Male

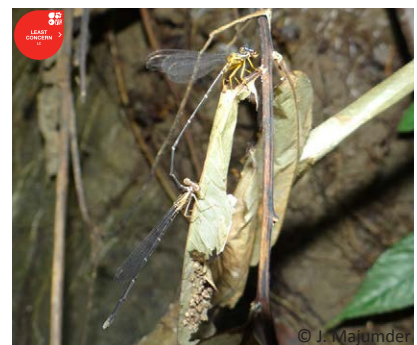


Image 80. *Copera vittata* Male and Female



Image 79. *Copera marginipes* Female

Appendix 1. Checklist of species of Odonata recorded from Tripura. ° denotes species endemic to South-east Asia.

| | Zoological Name |
|----|---|
| | Aeshnidae |
| 1 | <i>Gynacantha subinterrupta</i> Rambur° |
| | Gomphidae |
| 2 | <i>Ictinogomphus rapax</i> Rambur° |
| 3 | <i>Paragomphus lineatus</i> (Selys) |
| | Libellulidae |
| 4 | <i>Acisoma panorpoides</i> Rambur |
| 5 | <i>Aethriamanta brevipennis</i> (Rambur)° |
| 6 | <i>Brachydiplax chalybea</i> Brauer |
| 7 | <i>Brachydiplax farinosa</i> Krüger |
| 8 | <i>Brachydiplax sobrina</i> (Rambur)° |
| 9 | <i>Brachythemis contaminata</i> (Fabricius)° |
| 10 | <i>Camacinia gigantea</i> (Brauer)° |
| 11 | <i>Cratilla lineata</i> (Brauer)° |
| 12 | <i>Crocothemis servilia</i> (Drury) |
| 13 | <i>Diplacodes nebulosa</i> (Fabricius) |
| 14 | <i>Diplacodes trivialis</i> (Rambur) |
| 15 | <i>Lathrecista asiatica</i> (Fabricius) |
| 16 | <i>Neurothemis intermedia alanta</i> Ris |
| 17 | <i>Neurothemis fulvia</i> (Drury)° |
| 18 | <i>Neurothemis intermedia</i> (Rambur)° |
| 19 | <i>Neurothemis tullia</i> (Drury)° |
| 20 | <i>Onychothemis testacea</i> Laidlaw° |
| 21 | <i>Orthetrum brunneum</i> (Fonscolombe) |
| 22 | <i>Orthetrum chrysis</i> (Selys) |
| 23 | <i>Orthetrum glaucum</i> (Brauer) |
| 24 | <i>Orthetrum luzonicum</i> (Brauer) |
| 25 | <i>Orthetrum pruinosum</i> (Burmeister) |
| 26 | <i>Orthetrum sabina</i> (Drury) |
| 27 | <i>Orthetrum triangulare</i> (Selys) |
| 28 | <i>Palpopleura sexmaculata</i> (Fabricius) |
| 29 | <i>Pantala flavescens</i> (Fabricius) |
| 30 | <i>Potamarcha congener</i> (Rambur) |
| 31 | <i>Rhodothemis rufa</i> (Rambur)° |
| 32 | <i>Rhyothemis variegata</i> (Linnaeus)° |
| 33 | <i>Tholymis tillarga</i> (Fabricius) |
| 34 | <i>Trithemis aurora</i> (Burmeister)° |
| 35 | <i>Trithemis kirby</i> Selys |
| 36 | <i>Trithemis pallidinervis</i> (Kirby) |
| 37 | <i>Urothemis signata</i> Selys° |
| | Macromiidae |
| 38 | <i>Epophthalmia vittata</i> Burmeister° |
| | Calopterygidae |
| 39 | <i>Neurobasis chinensis</i> (Linnaeus)° |
| 40 | <i>Vestalis gracilis</i> (Rambur)° |
| 41 | <i>Vestalis smaragdina</i> (Selys) |
| | Chlorocyphidae |
| 42 | <i>Libellago lineata</i> (Burmeister)° |
| 43 | <i>Rhinocypha quadrimaculata</i> Selys° |
| | Coenagrionidae |
| 44 | <i>Aciagrion pallidum</i> Selys° |
| 45 | <i>Agriocnemis femina</i> (Brauer) |
| 46 | <i>Agriocnemis lacteola</i> Selys° |
| 47 | <i>Agriocnemis pygmaea</i> (Rambur) |
| 48 | <i>Agriocnemis splendidissima</i> Laidlaw |
| 49 | <i>Ceriagrion cerinorubellum</i> (Brauer)° |
| 50 | <i>Ceriagrion coromandelianum</i> (Fabricius) |
| 51 | <i>Ceriagrion olivaceum</i> Laidlaw |
| 52 | <i>Enallagma parvum</i> Selys |
| 53 | <i>Ischnura aurora</i> Brauer |
| 54 | <i>Onychargia atrocyana</i> (Selys)* |
| 55 | <i>Pseudagrion australasiae</i> (Selys) |
| 56 | <i>Pseudagrion microcephalum</i> (Rambur) |
| 57 | <i>Pseudagrion rubriceps</i> (Selys)° |
| | Euphaeidae |
| 58 | <i>Euphaea ochracea</i> (Selys)° |
| | Platycnemididae |
| 59 | <i>Calicnemia imitans</i> (Lieftinck)° |
| 60 | <i>Coeliccia didyma</i> (Selys)° |
| 61 | <i>Copera marginipes</i> (Rambur)° |
| 62 | <i>Copera vittata</i> (Selys)° |