

## Current Status of the Odonata of Bhutan: A Checklist with Four New Records

Amit Mitra<sup>1</sup>

### ABSTRACT

*Specimens of dragonflies were collected from Trashiyangtse and Pemagatshel districts of eastern Bhutan during the months of July and September 2003. One specimen of Neurothemis fulvia was collected on 5<sup>th</sup> September 2004 Samdrup Jongkhar district. Altogether 61 specimens of Odonata belonging to 16 species and subspecies under 13 genera and four families were listed during the present study, which revealed four new records of odonates for Bhutan viz., Orthetrum s. sabina, Acisoma p. panorpoides, Brachythemis contaminata and Neurothemis fulvia. An up-to-date checklist of 31 species and subspecies of odonates known till date from Bhutan had also been made. However, since the collection period was too short and didn't spread over the whole year, the above list of odonata from the concerned localities remained incomplete. The survey did not cover the southern, western and central districts of Bhutan and thus does not represent a complete checklist of Odonates of Bhutan. An extensive Odonatological survey needs to be carried out to explore the rich diversity of these elegant insects and come up with a representative checklist of Odonates for Bhutan.*

**KEY WORDS:** Bhutan, checklist, dragonfly, new record, Odonata, Pemagatshel, Samdrup Jongkhar, Trashiyangtse

### INTRODUCTION

The insect order Odonata is divided into three suborders - the more delicate weakly flying damselflies (Zygoptera), the more robust dragonflies (Anisoptera) and a relict group of primitive dragonflies (Anisozygoptera). However, the odonatologists of the recent world commonly use the term "dragonfly" for the members of all the three suborders. According to Silsby, 2001, eight super families, 29 families and some 58 sub-families of dragonflies for approximately 600 genera and 6000 named species have so far been described all over the world.

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<sup>1</sup>Department of Zoology, Sherubtse College, Kanglung, Bhutan.

Dragonflies are predaceous, hemimetabolous and amphibiotic insects, which inhabits all kinds of freshwater habitats either permanent or temporary. Odonata experiences two totally different life styles. In almost all cases, the egg and larval stages are aquatic where as the adults are terrestrial (Silsby, 2001). The prey of the adults consists mostly of the harmful insects of crops, orchards and forests and thus has a regulatory impact on the agro-forestry. Their aquatic larvae constitute a natural biological control over mosquito larvae and thus help to control several epidemic diseases like malaria, dengue, filaria etc. (Mitra, 2002).

Being situated on the southern slopes of the Eastern Himalayas, the Kingdom of Bhutan is landlocked between China in the north and India to the east, south and west. Although quite a lot of work had already been done on the odonata of India and China, Bhutan is significantly little explored as far as the odonata diversity is concerned. Lieftinck (1977) reported only six species of odonates from Bhutan viz., *Caliphaea confusa*, *Megalestes major*, *Lestes (Indolestes) cyaneus*, *Calicnemia mortoni*, *Davidius baronii* and *Cephalaeschna triadica* and those were collected by the members of the “Zoologische Expedition des Naturhistorischen Museums Basel in das Konigreich Bhutan” in 1972. Tsuda (1991), in his distributional list of World Odonata, had enlisted only nine species from Bhutan that had added *Lestes concinnus*, *Aeshna p. petalura* and *Anax nigrofasciatus nigrolineatus* to Lieftinck’s (1977) list. Unfortunately, it was a mere checklist without any locality data or other information. Mitra (2002) had recorded 23 species and subspecies of odonates belonging to 18 genera under 10 families from Trashigang district in Eastern Bhutan that had added 18 new records to the existing list of odonata of Bhutan. During the present study 13 species and subspecies of odonata belonging to 11 genera fewer than four families were collected from the Trashiyangtse district; four species belonging to three genera under a single family were collected from Pemagatshel district and a single specimen of *Neurothemis fulvia* was collected from Samdrupjongkhar district by one of my students. All of these Odonates were maiden records from the localities concerned but four among these were new records for Bhutan as a whole and with this the checklist of Odonates for Bhutan had been extended up to 31 species and subspecies.

## MATERIALS AND METHODS

Most of the samples were collected during a period of four days survey carried out in Tashiyangtse district of eastern Bhutan in July 2003. A few specimens were collected in September 2003 during a five days field visit to Pemagatshel district. The following localities were surveyed in the two districts of Tashiyangtse and Pemagatshel.

### **Tashiyangtse District:**

Loc. 1: Tashiyangtse proper was surveyed on 19 July 2003. Collections were made from two small streams at an altitude of 1750m and the surrounding paddy fields.

Loc. 2: Bumdeling valley at an altitude of 2000m was surveyed on 20 July 2003. Collections were made from two small marshy ponds, few slow-running marshy streams and the agricultural fields surrounding the river Drangmechhu.

Loc. 3: Chorten kora was surveyed on 21 July 2003. Collections were made from a small pond (altitude: 1745m) situated half km away from the proper Trashiyangtse.

### **Pemagatsel District:**

Only four species of Odonates were collected while going on foot through the hilly terrains from the following localities on respective dates.

Loc. 4: Nangkhor (1300m): 10 September 2003.

Loc. 5: Khar (1200m): 12 September 2003.

Loc. 6: Pemagatsel proper (1800m): 13 September 2003.

A total of 60 Odonata specimens were collected from the above localities using an insect net of 30 cm diameter. A single libellulid had been sent to me by one of my student of the district Samdrup Jongkhar (Loc. 7) that had been collected on 5 September 2004. Collections were made from all the different type of habitats like agricultural fields, weedy ponds, fast flowing streams, slow running marshy streams, riverbanks etc. Identification of the specimens was facilitated with the help of identification key provided by Fraser (1933, '34, '36) and the description given by Lieftinck (1977) in his foremost work on Bhutan odonates. Specimens had been persevered accordingly for their further submission to the museum maintained by the Life Science Departments of Sherubtse College, Kanglung, Bhutan.

### **RESULTS**

A total of 16 species and subspecies of odonates spreading to five zygopterans and 11 anisopterans and belonging to 13 genera under four families that had been collected during the present study are listed below. The list also includes their locality data as well as the number of individual males and females collected.

1. *Ceriagrion fallax cerinomelas* Liefstinck, 1927 – Loc. 1: 3♂, 2♀; Loc. 2: 1♂.
2. *Ischnura a. aurora* (Brauer, 1865) – Loc. 2: 1♂.
3. *I. forcipata* Morton, 1907 – Loc. 1: 1♂; Loc. 2: 2♂, 1♀.
4. *Calicnemia eximia* (Selys, 1863) – Loc. 1: 2♂, 3♀; Loc. 2: 1♂, 1♀.
5. *Indolestes cyaneus* (Selys, 1862) – Loc. 2: 1♂.
6. *Orthetrum t. triangulare* (Selys, 1878) – Loc. 1: 2♂, 3♀; Loc. 6: 1♂, 1♀.
7. \**O. s. sabina* (Drury, 1770) – Loc. 4: 2♀.
8. *O. taeniolum* (Schneider, 1845) – Loc. 1: 1♂, 2♀; Loc. 3: 1♂, 1♀.
9. \**Acisoma p. panorpoides* Rambur, 1842 – Loc. 3: 2♂, 1♀.
10. \**Brachythemis contaminata* (Fabricius, 1793) – Loc. 4: 1♂.
11. *Crocothemis s. servilia* (Drury, 1770) – Loc. 1: 1♂, 1♀; Loc. 2: 3♂, 1♀.
12. *Diplacodes trivialis* (Rambur, 1842) – Loc. 1: 2♂; Loc. 3: 1♂, 1♀.
13. \**Neurothemis fulvia* (Drury, 1773) – Loc. 7: 1♂.
14. *Sympetrum commixtum* (Selys, 1884) – Loc. 2: 3♂, 2♀.
15. *Palpopleura s. sexmaculata* (Fabricius, 1787) – Loc. 1: 1♂, 1♀; Loc. 2: 1♂, 2♀; Loc. 4: 1♂.
16. *Pantala flavescens* (Fabricius, 1798) – Loc. 2: 2♂ (Lot many were seen on wing).

(\* represents the new records)

Compiling the results obtained from the present study together with the lists of Liefstinck (1977), Tsuda (1991), Mitra (2002), an updated checklist of dragonflies for Bhutan has been prepared.

### Checklist of Dragonflies for Bhutan Known till Date

- Order – Odonata  
 Suborder – Zygoptera  
 Superfamily – Coenagrionoidea (Closed wings)  
 Family – Coenagrionidae (Pond damselflies)  
 Subfamily – Pseudagrioninae  
 Genus – *Ceriagrion* Selys, 1876  
 1. *Ceriagrion fallax cerinomelas* Liefstinck, 1927  
 Subfamily – Ischnurinae  
 Genus – *Ischnura* Charpentier, 1840  
 2. *Ischnura forcipata* Morton, 1907  
 3. *I. a. aurora* (Brauer, 1865)  
 Family – Platycnemididae (Brook damselflies)  
 Subfamily – Calicnemidinae  
 Genus – *Calicnemia* Strand, 1926

- 4. *Calicnemia eximia* (Selys, 1863)
- 5. *C. mortoni* (Laidlaw, 1917)
- Superfamily – Lestoidea (Open wings)
- Family – Lestidae (Reedlings)
- Subfamily – Sympecmatinae
- Genus – *Indolestes* Fraser, 1922
- 6. *Indolestes cyaneus* (Selys, 1862)
- Subfamily – Lestinae
- Genus – *Lestes* Leach, 1815
- 7. *Lestes concinnus* Hagen in Selys, 1862
- Family – Synlestidae (Sylphs)
- Subfamily – Megalestinae
- Genus – *Megalestes* Selys, 1862
- 8. *Megalestes major* Selys, 1862
- Superfamily – Calopterygoidea (Broad wings)
- Family – Calopterygidae (Demoiselles)
- Subfamily – Caliphaeinae
- Genus – *Caliphaea* Selys, 1859
- 9. *Caliphaea confusa* Hagen in Selys, 1859
- Family – Euphaeidae (Gossamer wings)
- Genus – *Anisopleura* Selys, 1853
- 10. *Anisopleura comes* Hagen, 1880
- Suborder – Anisoptera
- Superfamily – Aeshnoidea (Angle wings)
- Family – Gomphidae (Clubtails)
- Subfamily – Onychogomphinae
- Genus – *Onychogomphus* Selys, 1854
- 11. *Onychogomphus biforceps* (Selys, 1878)
- Subfamily – Gomphinae
- Genus – *Davidius* Selys, 1878
- 12. *Davidius baronii* Lieftinck, 1977
- Family – Aeshnidae (Hawkers)
- Subfamily – Aeshninae
- Genus – *Anax* Leach, 1815
- 13. *Anax nigrofasciatus nigrolineatus* Fraser, 1935
- Genus – *Aeshna* Fabricius, 1775
- 14. *Aeshna p. petalura* Martin, 1906
- Subfamily – Brachytroninae
- Genus – *Cephalaeschna* Selys, 1883

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15. *Cephalaeschna triadica* Lieftinck, 1977
- Superfamily – Libelluloidea (Dippers)  
 Family – Corduliidae (Emeralds)  
 Subfamily – Macromiinae  
 Genus – *Macromia* Rambur, 1842
16. *Macromia moorei* Selys, 1874
- Family – Libellulidae (Perchers)  
 Subfamily – Libellulinae  
 Genus – *Orthetrum* Newman, 1833
17. *Orthetrum t. triangulare* (Selys, 1878)  
 18. *O. s. sabina* (Drury, 1770)  
 19. *O. taeniolatum* (Schneider, 1845)  
 20. *O. pruinatum neglectum* (Rambur, 1842)  
 21. *O. luzonicum* (Brauer, 1868)
- Subfamily – Sympetrinae  
 Genus – *Acisoma* Rambur, 1842
22. *Acisoma p. panoroides* Rambur, 1842
- Genus – *Brachythemis* Brauer, 1868
23. *Brachythemis contaminata* (Fabricius, 1793)
- Genus – *Crocothemis* Brauer, 1868
24. *Crocothemis s. servilia* (Drury, 1770)
- Genus – *Diplacodes* Kirby, 1889
25. *Diplacodes trivialis* (Rambur, 1842)
- Genus – *Neurothemis* Brauer, 1867
26. *Neurothemis fulvia* (Drury, 1773)
- Genus – *Sympetrum* Newman, 1833
27. *Sympetrum commixtum* (Selys, 1884)
- Subfamily – Trithemistinae  
 Genus – *Trithemis* Brauer, 1868
28. *Trithemis aurora* (Burmeister, 1839)  
 29. *T. festiva* (Rambur, 1842)
- Subfamily – Palpopleurinae  
 Genus – *Palpopleura* Rambur, 1842
30. *Palpopleura s. sexmaculata* (Fabricius, 1787)
- Subfamily – Trameinae  
 Genus – *Pantala* Hagen, 1861
31. *Pantala flavescens* (Fabricius, 1798)

Note: All the scientific and common names of the different taxa are as per Fraser (1933, 34, 36), Prasad and Varshney (1995) & Silsby (2001).

## DISCUSSION

Earlier 23 species of Odonates have been recorded from the Trashigang district (Mitra 2002) of eastern Bhutan. During the present study four species and subspecies of Odonata consisting of four anisopterans viz., *Orthetrum s. sabina*, *Acisoma p. panorpoides*, *Brachythemis contaminata* and *Neurothemis fulvia*, have been recorded for the first time from Bhutan. However, due to the short study period and the lack of seasonal coverage, the present list of Odonates from the concerned localities is still incomplete. Moreover, the present study only included certain parts of three eastern districts and places in western, southern and central districts have not been Odonatologically explored. The number of Odonata species known from Bhutan (31) till date is very little in respect to Nepal (172), Bangladesh (114), Srilanka (111) and India (499) (Prasad and Varshney 1995). Being one of the global hotspots of biodiversity and remaining sandwiched between India and China, Bhutan needs an extensive survey to explore its rich Odonate diversity, which will certainly contribute to the list of the world Odonata. Until this is done, the list of Odonates for Bhutan will remain incomplete.

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## REFERENCES

- Fraser, F.C. (1933). The Fauna of British- India including Ceylon and Burma, Odonata. Vol. I. Taylor and Francis Ltd., London.
- Fraser, F.C. (1934). The Fauna of British- India including Ceylon and Burma, Odonata. Vol. II. Taylor and Francis Ltd., London.
- Fraser, F.C. (1936). The fauna of British- India including Ceylon and Burma, Odonata. Vol. III. Taylor and Francis Ltd., London.

Lieftinck, M.A. (1977). Ergebnisse der Bhutan-expedition 1972 des naturhistorischen museums in Basel: Odonata. Entomologica Basiliensia 2: 11-37.

Mitra, A. (2002). Dragonfly (Odonata: Insecta) Fauna of Trashigang Dzongkhag, Eastern Bhutan. In: Gyeltshen, T. & Sadruddin (ed.) "Environment and Life Support Systems of the Bhutan Himalaya, Vol. I", Sherubtse College, Kanglung, Bhutan: 40-70.

Prasad, M. & Varshney R.K. (1995). A checklist of the Odonata of India including Data on larval studies. Oriental Insects 29: 385-428.

Silby, J. (2001). Dragonflies of the world. Natural History Museum in association with CSIRO Publishing, UK and Europe.

Tsuda, S. (1991). A distributional list of world Odonata. Tsuda, Osaka.