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## Odonata survey in Central and Western Bhutan covering eight Dzongkhags (Districts): An annotated species list with nine new records

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**ABSTRACT**

122 specimens have been collected spreading to 46 species under 32 genera and 11 families from different parts of central and western Bhutan during August 13 to 23, 2013. Nine species and subspecies of them are the new records for Bhutan. Geographical position and collection details are provided for each species which are supplemented by abdominal length, hind wing length and some other identifying characters for the new records. After the present study a total of 84 species and subspecies of odonata are known to occur in Bhutan.

**Keywords:** Odonata, Western, Central, Bhutan, New records.

**1. Introduction**

Among the 75 species and subspecies of dragonflies occurring in Bhutan<sup>[1]</sup>, only a few are reported from central and western parts of the country. Present study reveals 46 species and subspecies of odonata from different parts of central and western Bhutan; nine of which are the new records for Bhutan.

**2. Survey Area**

Dragonflies were collected from different parts of central and western Bhutan from 13/07/2013 to 23/07/2013 between an altitudinal range of 347 m and 2680 m. Collections were made by two survey teams from Bumthang, Trongsa, Wangdi, Punakha, Paro, Tshirang, Gelephu (Sarpang), Chhukha and Samtse (Table I).

**3. Methodology**

Collection sites were chosen randomly. Geographical position and elevation of the collection sites were recorded with a Garmin Vista GPS. Only a limited sample of each species were collected and preserved in 70% alcohol. Specimens were identified using odonata identification keys<sup>[2, 3, 4]</sup>, and earlier species descriptions<sup>[1, 5, 6, 7, 8, 9, 10, 11, 12, 13]</sup>. All the specimens were deposited in the 'Zoology Museum' at Sherubtse College, Kanglung, Bhutan.

**4. Annotated List of Collected Species**

Collection details of 122 specimens that have been recorded during the present study spreading to 46 species under 32 genera and 11 families are given below. Length of abdomen, hind-wing and specific characteristics are given only for the nine new records. All scientific names of the different taxa are as per world odonata list<sup>[14]</sup>, except that *Pyrrhosoma tinctipenne* has been reflected as *Huosoma tinctipenne*<sup>[15]</sup> and *Ischnura aurora* of Indian subcontinent as *Ischnura rubilio*<sup>[16]</sup>. '\*' ones are new records for the present study.

**Family – Coenagrionidae****1. *Aciagrion olympicum* Laidlaw, 1919**

Materials: P2, 1♂, 1♀, 16.viii.2013; P4, 2♂, 1♀, 17.viii.2013.

**Table 1:** District-wise survey areas along with survey date, geographical position and altitude.

Dzongkhag	Location	Spot No.	Date	Latitude	Longitude	Elevation
Bumthang	Below Kurjelhakhang	B	13/08/2013	N-27°35.502'	E-90°43.759'	2620m
Paro	Taa-Dzong (museum)	P-1	15/08/2013	NR	NR	NR
	NamiZam	P-2	16/08/2013	N-27°24.694'	E-89°25.103'	2252m
	Lango	P-3	17/08/2013	N-27°26.756'	E-89°22.607'	2325m
	Shaba	P-4	17/08/2013	NR	NR	NR
Chhukha	Sorchen (8 km towards T/phu)	C-1	18/08/2013	N-26°53.801'	E-89°26.717'	1614m
	Tori bari	C-2	18/08/2013	N-26°51.008'	E-89°24.258'	395m
Samtse	Joggiimara	S-1	19/08/2013	NR	NR	NR
	Peljorling	S-2	19/08/2013	N-26°59.512'	E-88°53.258'	347m
	Namgay Choling	S-3	19/08/2013	N-26°59.648'	E-88°54.771'	362m
	Below Peljorling HSS	S-4	20/08/2013	N-26°59.682'	E-88°53.590'	360m
	Samtse lake	S-5	21/08/2013	N-26°58.637'	E-88°56.651'	516m
Sarpang	Umlingchubarthang	G	19/08/2013	NR	NR	NR
Tsirang	RNR	TS-1	18/08/2013	N-27°00.732'	E-90°08.146'	1324m
	Near high school	TS-2	19/08/2013	N-27°01.374'	E-90°07.223'	1414m
	RS	TS-3	19/08/2013	NR	NR	NR
Punakha	Lamperi park	PU-1	22/08/2013	N-27°30.446'	E-89°45.135'	2680m
	Lumitsawa	PU-2	22/08/2013	N-27°30.484'	E-89°47.517'	2026m
	SingayZam	PU-3	22/08/2013	N-27°31.563'	E-89°52.173'	1352m
	Punakha near Dzong	PU-4	22/08/2013	N-27°35.108'	E-89°51.857'	1228m
Trongsa	BjeeZam	T	23/08/2013	N-27°30.770'	E-90°28.298'	1917m

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

Material: S1, 1♂, 19.viii.2013.

**3. \**Agriocnemis clauseni* Fraser, 1922**

Materials: S1, 1♂, G, 1♂, 19.viii.2013; S5, 3♂, 21.viii.2013.

Male: Abdomen: 19 – 20 mm; Hind wing: 11 – 12 mm.

Eyes are black above and greenish below. Post ocular spots are comma-like, azure blue in colour and almost connected by a fine line. There are 6–8 postnodal nervures in forewings, and 5–7 in the hind. Abdomen is azure blue marked with black. Segment 7 is broadly blue with a fine black line on mid-dorsal carina. Segments 8 to 10 are black with blue intersegmental joints.

**4. *C. coromandelianum* (Fabricius, 1798)**

Material: S5, 1♂, 21.viii.2013.

**5. \**Ceriagrion* sp.**

Material: S1, 1♂, 19.viii.2013.

Male: Abdomen: 27 mm; Hind wing: 16.5 mm.

Ground colour is yellow. There are 11 – 12 postnodal nervures in forewings, and 10 in the hind.

**6. \**Himalagrion exclamatione* Fraser, 1919**

Material: TS3, 1♀, 19.viii.2013.

Female: 33 mm; Hind Wing: 26 mm.

Basal side of discoidal cell is equal in length with costal side in forewings. There are 15 – 16 postnodal nervures in forewings, and 14 in the hind.

**7. *Huosoma tinctipenne* (McLachlan, 1894)**

Material: B, 1♂, 13.viii.2013.

**8. *Ischnura rubilio* (Papazian *et al.*, 2007)**

Materials: P4, 1♂, 17.viii.2013; C2, 1♂, 18.viii.2013.

**9. *Pseudagrion r. rubriceps* Selys, 1876**

Materials: S4, 1♂, G, 1♂, 20.viii.2013.

**Family – Platycnemididae****10. *Calicnemia eximia* (Selys, 1863)**

Materials: TS1, 1♂, 18.viii.2013; TS2, 1♂, 19.viii.2013.

**11. *Calicnemia mortoni* (Laidlaw, 1917)**

Material: PU2, 1♂, 22.viii.2013.

**12. *Calicnemia miniata* (Selys, 1886)**

Materials: C1, 1♂, TS1, 1♂, 1♀, 18.viii.2013.

**13. *Coeliccia svihleri* Asahina, 1970**

Material: TS3, 1♂, 19.viii.2013.

**Family – Lestidae****14. *Indolestes cyaneus* (Selys, 1862)**

Materials: P2, 1♂, 16.viii.2013; P4, 2♂, 17.viii.2013.

**15. \**Lestes praemorsus* Laidlaw, 1920**

Materials: S2, 1♂, 19.viii.2013; S5, 1♂, 21.viii.2013.

Male: Abdomen: 31 – 32 mm; Hind wing: 20 – 22 mm.

Eyes are dark blue. Thorax is pale olive green. There are 10 postnodal nervures in forewings, 9 to 10 in the hind. Abdomen is black on dorsum and pale azure-blue laterally. Unicolourous pterostigma, mat black vertex and creamy white anal appendages tipped with black are sufficient enough to distinguish the species in the field.

**Family – Synlestidae****16. *Megalestes major* Selys, 1862**

Materials: P2, 1♂, 16.viii.2013; P3, 1♂, 17.viii.2013; PU4, 1♂,

22.viii.2013; T, 1♂, 23.viii.2013.

**Family – Calopterygidae (Demoiselles)**

17. *Neurobasis chinensis* (Linnaeus, 1758)  
Materials: S3, 1♂, G, 1♂, 19.viii.2013.

18. *Vestalis g. gracilis* (Rambur, 1842)  
Materials: G, 1♂, 1♀, 19.viii.2013; S4, 1♂, 20.viii.2013.

**Family – Chlorocyphidae (Jewels)**

19. *Rhinocypha cuneata* Selys, 1853  
Materials: TS1, 1♂, 18.viii.2013; TS2, 1♂, TS3, 1♂, 19.viii.2013.

20. *Rhinocypha quadrimaculata* Selys, 1853  
Materials: C2, 2♂, 18.viii.2013; S3, 1♂, 19.viii.2013.

**Family – Euphaeidae (Gossamer wings)**

21. *Anisopleura bella* Mitra & Thinley, 2006  
Material: TS1, 1♂, 18.viii.2013.

22. *Euphaea ochracea brunnea* Selys, 1879  
Material: S4, 1♂, 20.viii.2013.

**Family – Gomphidae (Clubtails)**

23. *Paragomphus lineatus* (Selys, 1850)  
Material: S4, 1♂, 1♀, 20.viii.2013.

24. \**Perissogomphus stevensi* Laidlaw, 1922  
Material: T, 1♀, 23.viii.2013.  
Female: Abdomen: 40 mm; Hind wing: 37 mm.  
Frons is glass-green in colour and deeply notched at centre. Vertex and occiput are black. Eyes are dull green. Thorax is black on dorsum with an inverted 'M' of glass-green when viewed from head side. Sides are broadly glass-green with two blackish-brown streaks. There are 17 – 18 antenodal nervures and 12 – 14 postnodals in forewings whereas, 13 antenodals and 14 – 15 postnodals in the hind. Abdomen is blackish-brown with black rings on the apices of segments 1 to 7 with mid dorsal greenish-yellow stripe. Sides of segment 1 and 2 are broadly green on the lower two-third. Dorsum of, apical half of segment 7 and whole of segment 8 and 9 are black.

**Family – Aeshnidae (Hawkers)**

25. *Anax nigrofasciatus nigrolineatus* Fraser, 1935  
Materials: P2, 1♂, 16.viii.2013; PU4, 1♂, 1♀, 22.viii.2013.

26. \**Anax indicus* Lieftinck, 1942  
Materials: S2, 1♂, 19.viii.2013; PU4, 1♂, 22.viii.2013.  
Male: Abdomen: 60 mm; Hind wing: 50 mm.  
Eyes are greenish with some black reflections. Thorax is broadly green with two poorly defined brown stripes on sutures. Wings are hyaline with a broad yellow fascia in the middle of hind-wings. There are 16 antenodal nervures and 8 postnodals in forewings whereas, 11 antenodals and 11 postnodals in the hind. Abdomen is blackish brown marked with green, blue and yellow. Segment one is green. Segment two is green basally and blue apically. Segment 3 is blue basolaterally and below that area is white; the basal blue is

followed by two yellow spots laterally. Remaining abdominal segments are having three yellow spots laterally and these become confluent in the posterior segments.

**Family – Cordulegastridae**

27. *Anotogaster nipalensis* (Selys, 1854)  
Materials: P3, 1♂, 17.viii.2013; TS1, 1♂, 18.viii.2013.

**Family – Libellulidae (Perchers)**

28. *Acisoma p. panorpoides* Rambur, 1842  
Material: PU4, 1♀, 22.viii.2013.

29. \**Brachydiplax sobrina* (Rambur, 1842)  
Material: PU4, 1♂, 22.viii.2013.  
Male: Abdomen: 22 mm; Hind wing: 27 mm.  
Face and frons are creamy-white, the latter metallic blue above. Eyes are dark brown, with a ventro-lateral interruption of bluish-white. Thorax is olivaceous brown, with black markings more or less obscured by a thin pruinescence, denser on dorsum; three yellow stripes on each side more or less covered by the pruinescence. There are 6–7 antenodal nervures and 5–6 postnodals in forewings whereas, 5 antenodals and 5–6 postnodals in the hind. Abdomen is black, pruinose blue in old adults, more prominently up to 6<sup>th</sup> abdominal segment. Lateral yellow spots of 7<sup>th</sup> segment are usually visible in older adults.

30. *Crocothemis s. servilia* (Drury, 1770)  
Materials: P2, 1♂, 16.viii.2013.

31. *Diplacodes trivialis* (Rambur, 1842)  
Materials: P2, 1♂, 16.viii.2013; P3, 1♂, 17.viii.2013; TS1, 1♂, C2, 1♀, 18.viii.2013; TS2, 1♂, G, 2♂, 1♀, 19.viii.2013.

32. *Neurothemis fulvia* (Drury, 1773)  
Materials: S2, 1♂, G, 1♂, 19.viii.2013.

33. \**Neurothemis intermedia atalanta* Ris, 1916  
Material: S4, 1♂, 20.viii.2013.  
Male: Abdomen: 17 mm; Hind wing: 20 mm.  
Smallest among all the known subspecies. Face and frons are bright crimson. Eyes are capped with dark reddish-brown and laterally pale greenish-brown. Hyaline wings are with broad basal amber-yellow markings. There are 10½ antenodal nervures and 8 postnodals in forewings whereas, 8 antenodals and 9 postnodals in the hind. Abdomen bright reddish-orange with brown ventro-lateral stripes extending whole length of abdomen. Segments 8 to 10 are with some shade of black on dorsum and more so on segment 9.

34. *Orthetrum glaucum* (Brauer, 1865)  
Material: B, 1♂, 13.viii.2013.

35. *Orthetrum japonicum internum* MacLachlan, 1894  
Material: P3, 1♂, 17.viii.2013.

36. *Orthetrum t. triangulare* (Selys, 1878)  
Materials: C2, 1♂, 18.viii.2013; TS2, 2♂, TS3, 1♂, 19.viii.2013.

**37. *Orthetrum s. sabina* (Drury, 1770)**

Materials: P3, 2♀, 17.viii.2013; S2, 1♀, G, 1♂, 1♀, 19.viii.2013.

**38. *Orthetrum pruinosum neglectum* (Rambur, 1842)**

Materials: P4, 1♂, 17.viii.2013; TS2, 1♂, G, 2♂, 19.viii.2013.

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

Materials: TS2, 1♂, G, 1♂, 19.viii.2013; PU3, 1♂, 22.viii.2013.

**40. *Palpopleura s. sexmaculata* (Fabricius, 1787)**

Materials: TS1, 1♂, 18.viii.2013; TS2, 3♂, 1♀, G, 4♂, 19.viii.2013.

**41. *Pantala flavescens* (Fabricius, 1798)**

Materials: P3, 1♂, P4, 1♀, 17.viii.2013; TS1, 1♂, C2, 1♂, 18.viii.2013; G, 1♂, 2♀, TS2, 2♀, 19.viii.2013.

**42. *Sympetrum hypomelas* (Selys, 1884)**

Material: B, 1♂, 13.viii.2013.

**43. *Sympetrum commixtum* (Selys, 1884)**

Materials: P2, 2♂, 16.viii.2013; PU1, 1♂, 22.viii.2013.

**44. *Trithemis aurora* (Burmeister, 1839)**

Materials: C2, 1♂, 18.viii.2013; S2, 1♂, G, 4♂, 19.viii.2013.

**45. *Trithemis festiva* (Rambur, 1842)**

Material: G, 1♂, 19.viii.2013.

**46. \**Tramea basilaris* (Palisot de Beauvois, 1805)**

Materials: G, 1♂, 19.viii.2013; PU3, 1♀, PU4, 1♂, 22.viii.2013.

Male: Abdomen: 34 mm; Hind wing: 42 – 44 mm.

The species can be easily identified with the two large black spots at the base of hind wings, narrowly confluent in males near the discoidal cells, and surrounded by a golden-yellow areola. There are 11½ antenodal nervures and 9 postnodals in forewings whereas, 7 antenodals and 11 postnodals in the hind.

Female: Abdomen: 35 mm; Hind wing: 44 mm.

**5. Conclusion**

During the present survey, *Coelliccia svihleri* [17] and *Rhinocypha cuneata* [18], two of the IUCN designated 'Data Deficient' species have again been reported from southwest Bhutan. Recently these two species have also been reported from southeast Bhutan [1] which depicts that their populations are well maintained along this range. The present study recommends their inclusion in 'Least Concern' red list category of IUCN. The study period being restricted to the month of August, 2013 remains fairly incomplete as far as the odonata diversity of the region is concerned. Incorporating the nine new records those have been made during the present study, a total of 84 species and subspecies of odonata, so far, are known to occur in Bhutan.

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