

**THE DRAGONFLY FAUNA OF THE SHIVAPURI
HILLS, NEPAL (ODONATA: ZYGOPTERA,
ANISOZYGOPTERA, ANISOPTERA)**

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ABSTRACT

26 species of Odonata are placed on record from the Shivapuri mountains, Kathmandu, Nepal.

(Die Libellenfauna der Shivapuri-Berge, Nepal (Odonata: Zygoptera, Anisozygoptera, Anisoptera): 26 Libellenarten werden für die Shivapuri-Berge, nördlich von Kathmandu, Nepal, gemeldet).

INTRODUCTION

The check list of the Nepalese Odonata (Vick, 1989) is now more than 17 years old. Probably, due to civil war over the last 10 years, little information about dragonflies from this country has been published since then (e.g. Mahato, 2000; Kemp & Butler, 2001; Brockhaus, 2003).

The following article provides a list of Odonata recorded from the Shivapuri mountains, an area which is well known because of the relict species *Epiophlebia laidlawii* (Tani & Miyatake, 1979; Asahina, 1982a; Saville, 1990; Mahato, 1993). Other odonate species from this area have been reported by Vick (1985), Mahato (1993) and Brockhaus (2001) (Fig. 1).

SURVEY AREA

The Shivapuri Hills are situated in the northern part of the Kathmandu Valley approx. 15 km north of the capital of Nepal, Kathmandu. The highest point is the Shivapuri peak at 2732 metres. The hills form part of the Mahabharat region with mountains reaching 3000 m. About 50% of the area is covered with forest with both subtropical and temperate vegetation types. In the uninhabited areas, oaks, pines and rhododendron predominate. The lower levels surrounding the mountains have been mainly converted into terraced agricultural land. About 15000 people in the region derive their living from agriculture.

The hottest month is August averaging 25°C. However, even in winter daytime temperatures can reach up to 20°C. During the monsoon, between May to September, approx. 80% of the annual rainfall occurs (3200 mm a year).

Table 1. Four recent visits to the Shivapuri mountains undertaken by the first author

Date	Route	Participants
8 May 2000	climb steeply from the mountains in the south to a height of about 2500 m.	Thomas Brockhaus, Ronald Peusche l, Andreas Trautmann
25 May 2000	climb steeply from the mountains in the south to a height of about 2300 m.	Thomas Brockhaus
14 – 16 February 2002	Bhotechaur – Chisapani - northern brink of the hills between 2000 and 2400 m, back to Bhotechaur	Renate Brockhaus, Thomas Brockhaus, Andreas Hirsch, Ilona Hirsch
10 – 12 April 2005	Sundarijal – Chisapani - northern brink - Shivapuri peak - Naghy monastery - Budhanilkantha	Tanja Brockhaus, Thomas Brockhaus, Frank Kramer

The Shivapuri Hills have been protected since 1975 and were initially referred to as the “Shivapuri-Watershed” but since 1985 have

been known as the "Shivapuri Watershed and Wildlife Reserve". The hills cover an area of about 144 square kilometres. They are the most important drinking water source for the capital Kathmandu (Chaudhary 1998).

There are several different access routes from Kathmandu to the Shivapuris. One can go by bus from Kathmandu to Budhanilkantha and take a trekking path on the south side the mountains. Another way is by car to Bhotechaur and from there trek to Chisapani and take the northern edge of the hills at altitudes between 2000 and 2400 m. The last possibility is by car to Sundarijal and trek from south to north crossing the mountains to Chisapani.

SPECIES RECORDED WITH OBSERVATIONS AND COMMENTS

Zygoptera

Caliphaea confusa (Hagen in Selys, 1859)

During May, 2000, in the southern part of the Shivapuris, we found both sexes of this species inhabiting vegetation close to montane streams. The males appear to be territorial (Fig. 2).

Determination : Fraser (1934).

Habitat : small hill streams in woods.

Altitude : 730-2350 m a.s.l. (Vick, 1989).

Distribution: Bhutan, Burma, China, India, Laos, Nepal, Thailand (Tsuda, 1991).

Indolestes cyaneus Selys, 1862

The first record was an individual male, seen in February 2002, on the northern edge of the hills. On 12 April 2005, several males and females were observed close to a cattle pool in the central part of the Shivapuris, situated on a grassy, treeless plateau used for cattle grazing, at approx. 2500 m.

Determination: Fraser (1933, with the synonym *Ceylonlestes cyanea*).

Habitat: grass land, watering place.

Altitude: 670-3870 m a. s.l. (St. Quentin, 1970; Vick, 1989).

Distribution: Bhutan, India, Nepal, Taiwan (Tsuda, 1991).

Anisoptera***Davidius aberrans senchalensis* Fraser, 1926**

In May 2000, the emergence of *Davidius aberrans* was observed at a altitude of 2400 m. The larva was positioned on a large, moss-covered, stone, approx. 30 cm about the water surface. The habitat of the larvae is lithotelms in steep montane streams. With the help of Kiyoshi Inoue the dragonfly was determined by Kazuma Kitagawa as *Davidius aberrans senchalensis*. This subspecies is new for Nepal and very rare, having been only recorded previously from Darjeeling, India.

Determination: Fraser (1934).

Habitat: small strong running streams, Lithotelms, in woods.

Altitude: 2400-2800 m a.s.l.

Distribution: India, Darjeeling (Fraser, 1934; Asahina, 1961), new for Nepal.

***Anotogaster nipalensis* Sélys, 1854**

In May 2000 we observed a mating pair of *Anotogaster nipalensis* in the southern part of the Shivapuris. They were perched in a broad-leaved tree at a height of approximately 3 metres.

Determination: Fraser (1936).

Habitat: small streams.

Altitude: 450-3250 m a.s.l. (Vick, 1989).

Distribution: India, Nepal, China (Tsuda, 1991).

***Neallogaster ornata* Asahina, 1982**

In May 2000, a female of *Neallogaster* was seen in the southern part of the mountains. It flew very low, approx. 30 cm, above the mountain path during moderate rain. In Brockhaus (2001) this species was wrongly determined as *Neallogaster hermionae*. Asahina described *Neallogaster ornata* as new in 1982. It differs from the other species of *Neallogaster* by having yellow spots on the second abdominal segment (Fig. 3).

A teneral specimen was observed in April, 2005 on the northern edge of the mountains.

Determination: Asahina (1982b, 1991).

Habitat: fast-flowing streams, pools.

Altitude: 1550-2710 m a.s.l. (Vick, 1989).

Distribution: India, Nepal, only in the western part of the Himalayas (Asahina, 1982b).

***Chlorogomphus atkinsoni* (Sélys, 1878)**

In 2005, at three sites on the northern edge of the mountains, we recorded both teneral adults and larvae of *Chlorogomphus atkinsoni*. All were associated with steep, mountain streams (Fig. 4).

Determination: Fraser (1936).

Habitat: fast-flowing streams, little pools with detritus.

Altitude: 620–2230 m a.s.l. (Vick, 1989).

Distribution: India (West Bengal, Darjeeling, Sikkim), Nepal (Kumar & Prasad, 1981).

***Orthetrum glaucum* (Brauer, 1865)**

In April 2000, an aged specimen was taken near the Shivapuri peak. In February 2002 we observed 1 male and 1 female of *Orthetrum glaucum* on a small ox-bow formed from a mountain stream on the east side of the Shivapuris.

Determination: Fraser (1936).

Habitat: little ox-bows of hill streams.

Altitude: 240–2600 m a.s.l. (Vick, 1989).

Distribution: everywhere in South East Asia.

***Pantala flavescens* Fabricius, 1798**

Dozens of teneral individuals flew near the trekking path in the northern part of the Shivapuris in April 2005. It is unknown, whether the species breed here.

Determination: Askew (1988).

Habitat: ponds, pools.

Altitude: 130–6300 m a. s.l. (Vick, 1989).

Distribution: circum-equatorial (Belyshev & Haritonov, 1983).

***Sympetrum decoloratum* Sélys, 1884**

We observed several individuals in February 2002 on a pond which irrigated rice fields. This species is new for Nepal this record is a confirmation of the entry in Vick, 1989 which is listed with a question mark.

Determination: Fraser (1936), Askew (1988).

Habitat: little ponds near the terrace fields.

Altitude: no informations.

Distribution: North Africa, Asia Minor, Middle Asia, India new for Nepal.

Table 2. Additional Odonata records from the Sivapuri Hills

Species	Date	Altitude m above sea-level	Stage, number	Source
Zygoptera				
Calopterygidae				
<i>Caliphaea confusa</i>	14.7.1984	1800	1xmale	Vick (1985)
(Hagen in Selys, 1859)	3.6.1987	2350	1xmale	C. Smith (Vick det.)
	10.-13.6.87	2100	3xmale	C. Smith (Vick det.)
	8.5.2000	2150	males, females, abundant	Brockhaus (2001)
	-	-	-	Bahadur B. (2005)
Chlorocyphidae				
	10.7.1984	1800	1xmale	Vick (1985)
<i>Rhinocypha unimaculata</i>	-	-	-	Bahadur B. (2005)
Selys, 1853				
Amphipterygidae				
	1985	-	-	C. Smith (Vick det.)
	15.2.2002	2600	1xmale	Brockhaus
<i>Philoganga montana</i>	12.4.2005	2400	males, females, abundant	Brockhaus
(Hagen in Selys, 1859)				
Lestidae				
	14.7.1984	1800	1xmale	Vick (1985)
<i>Indolestes cyaneus</i> Selys,	28.5.2000	2000	1xmale	Kemp & Butler
1862				
	13.6.1987	1950	2xmale 2xfemale	C. Smith (Vick det.)
Synlestidae				
	3.5.1979	2732	1xfemale	Tani & Miyatake (1979)
<i>Megalestes major</i> Selys,	3.5.1979	2400	1xfemale	Ibidem
1862	3.5.1979	2520	1xexuviae	Ibidem
	3.5.1979	2300	several males	Ibidem
	-	-	several larvae	Asahina (1982a)
	-	-	-	Bahadur B. (2005)
Platycnemididae				
	6/7.12.1988	2240	"abundant"	Saville (1990)
<i>Calicnemia pulverulans</i>	13.12.1988	2070	"three found"	Ibidem
Selys 1886		1940	"abundant"	Ibidem
		1860	"abundant"	Ibidem
Anisozygoptera				
Epiophlebiidae	14.12.1988	2380	"two found"	Ibidem
<i>Epiophlebia laidlawi</i>	28.5.2000	2000	all larvae	Butler & Kemp
Tillyard 1921	30.5.2000		larvae	



Fig. 1. Larvae of *Epiophlebia laidlawi* (Photo: BOB KEMP)



Fig. 2. *Caliphaea confusa*, male (8.5.2000, Photo: T. Brockhaus)



Fig. 3. *Neallogaster ornata*, male (11.4.2005, Photo: T. Brockhaus)



Fig. 4. *Chlorogomphus atkinsoni*, young male (11.4.2005, Photo: T. Brockhaus)

Tillyard 1921	11.6.1987	1555	3xmale	C. Smith (Vick det.)
Anisoptera	30.5.2000	2100	4xmale	Kemp & Butler
Gomphidae	10.7.1984	1800	1xmale	Vick (1985)
<i>Anisogomphus bivittatus</i>	8.5.2000	2400	1 exuviae	Brockhaus (2001)
Selys, 1854			1 male hatched	
<i>Anisogomphus occipitalis</i>	11.6.1987	1555	1xmale	C. Smith (Vick det.)
Selys, 1854	8.5.2000	2200	1xmale 1 x female mating 3 x male	Brockhaus (2001)
<i>Davidius abberans</i> <i>senchalensis</i> Fraser 1926	30.5.2000	2100	exuviae emergence seen	Kemp & Butler
Cordulegasteridae	14.5.1980	2732	1xmale	Asahina (1982b)
<i>Anotogaster nipalensis</i>	13.6.1987	2710	1xmale	C. Smith (Vick det.)
Selys 1854	25.5.2000	2200	1xfemale	Brockhaus (2001)
<i>Neallogaster hermionae</i> Fraser, 1927				(wrong determined as <i>N. hermionae</i>)
	30.5.2000	2100	1xmale	Kemp & Butler
<i>Neallogaster ornata</i> Asahina, 1982	11.4.2005	2350	several males and females, all teneral	Brockhaus
Corduliidae	1986	1620	1xmale	C. Smith (Vick det.)
<i>Macromia moorei</i> Selys, 1874	13.6.1987	1980	1xmale 1 x female	C. Smith (Vick det.)
<i>Idionyx stevensi</i> Fraser, 1924	28.5.2000	2100	numerous males 1xfemale larvae/ emergence	Kemp & Butler
Chlorogomphidae				
<i>Chlorogomphus atkinsoni</i> (Selys, 1878)	30.5.2000	2100	1xmale	Kemp & Butler
<i>Chlorogomphus selysi</i> Fraser, 1929	11., 12.4.2005	2350	several males, all teneral, larvae	Brockhaus
Libellulidae	1987	-	1xmale	C. Smith (Vick det.)
<i>Crocothemis servilia</i> (Drury, 1770)	10.7.1984	1480	1xmale	Vick (1985)
<i>Orthetrum glaucum</i> (Brauer 1865)	8.5.2000	2732	1xmale, teneral	Brockhaus (2001)
<i>Orthetrum sabina</i> (Drury, 1770)	14.2.2002	1600	1xmale 1x female	Brockhaus
<i>Orthetrum taeniolum</i> (Schneider, 1845)	10.7.1984	1480	1xmale	Vick (1985)
<i>Orthetrum triangulare</i> (Selys, 1878)	14.7.1984	1800	1xmale	Vick (1985)
<i>Neurothemis fulvia</i> (Drury, 1773)	10.7.1984	1480	1xmale	Vick (1985)
<i>Pantala flavescens</i>	14.7.2000	1480	1xmale	Vick (1985)
	11., 12.4.2005	2200	Several males	Brockhaus

Fabricius 1798	14.2.2002	1700	Several males and females, all teneral	Brockhaus
<i>Sympetrum decoloratum</i>				
Selys 1884				
<i>Tritemis festiva</i> (Rambur, 1842)	10.7.1984	1480	1xmale	Vick (1985)

SOME NOTES ON LARVAL COLLECTIONS BY S.G. BUTLER

1992

Larvae of *C. atkinsoni* were found in coarse sandy stretches of fast-flowing streams, these showed markedly different colouration from larvae collected elsewhere and from the description in Fraser (1936).

The larva of *I. stevensi* is typical of the genus, but more robust than other species so far (description in preparation by S.G. Butler).

1996 and 2000

The larvae of *E. laidlawi* were found in a stream which passed under the forest track at approx 1800m on the south side above the Kathmandu valley. Other similar streams were searched, but no larvae were found, probably due to human pollution (Subodh Sharma *pers. comm.*). A larva of *Davidius* sp. (det G.S. Vick) was also observed emerging on the same stream as *E. laidlawi* (1.6.96. S.G.B. collection)

Aeshnid larvae were collected in 1996 and exuviae in 2000 of two species which unfortunately died before emergence. Both species show affinities to Brachytronini, one of which appears close to *Cephalaeschna*.

DISCUSSION

Currently, 26 odonates are known from the Shivapuri hills and they include several scarce and taxonomically important species. The most notable species is *Epiophlebia laidlawi*, an insect considered threatened (IUCN, 2006, Red Data Book) and endemic to the Himalayan foothills. Other notable species include *Davidius aberrans senchalensis*, *Neallogaster ornata* and *Chlorogomphus atkinsoni* which appear to be rare with restricted ranges.

Apart from *Indolestes cyaneus* and the Libellulids recorded, all are specialists, typical of fast-flowing, montane streams. Their ecology and behaviour remain largely unknown and would well repay further investigation.

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