



RECENT REPORT OF ZYGOPTERAN *ISHNURA RUFOSTIGMA RUFOSTIGMA* SELYS FROM UTTARAKHAND

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ABSTRACT

Ruby Dartlet *Ishnura rufostigma rufostigma* (Selys 1876) (Zygoptera: Coenagrionidae) occurs in Central and East India and Nepal. The earlier records of this species are from Assam, Madhya Pradesh, Manipur, Bihar, Meghalaya, Nagaland, West Bengal. This study documents it from Bhimtal, Nainital district, Uttarakhand; which is a recent record for the species from the region after forty years.

Key words: Ruby dartlet, Western Himalaya, Coenagrionidae, recent report, Bhimtal, Uttarakhand, species diagnosis

The order Odonata includes 6212 species globally (Schorr and Paulson, 2020). A total of 588 species of Odonata are reported from occurring in Bangladesh, Bhutan, India (including Andaman and Nicobar Islands), Nepal, Pakistan and Sri Lanka (Kalkaman et al., 2020). Subramanian and Babu (2017) enlisted 488 species and 27 subspecies in 154 genera and 18 families in their checklist of Odonata of India. The species distribution of high altitude Odonata especially in ecologically fragile regions like the Himalaya in general has not been explored. Few genera with closely resembling species and polymorphism, in particular, require focused study.

Ishnura Charpentier is such a genus, with about nine species and subspecies reported from India (Kalkaman et al., 2020). They are small sized and slender build, body rather more robust and abdomen rather shorter than in the genus *Ceriagrion* Selys; colour non-metallic, usually bright reddish-orange marked more or less with black, or blue or green marked with black; females polychromatic but isochromatic in *Ishnura rufostigma* Selys (Fraser, 1933). Out of various species groups present in the genus; the *Ishnura rufostigma* group consist of four taxa viz. *I. rufostigma* Selys, *I. annandalei* Laidlaw, *I. mildredae* Fraser and *I. carpentieri* Fraser differentiated from each other by the pattern on the abdomen and by the shape of anal appendages (Vick, 1986). *Ishnura inarmata* Calvert from Kashmir which was initially included in the species group was considered as a distinct species

(Asahina, 1991; Vick, 1986). Further, Asahina (1991), considered *I. carpentieri* Fraser and *I. mildredae* Fraser as synonyms to *I. annandalei* Laidlaw and suggested two subspecies of *I. rufostigma* Selys viz. *I. rufostigma rufostigma* Selys from Central and East India and Nepal, with males without black dorsally on second abdominal segment (S2) and seventh abdominal segment (S7), and *I. rufostigma annandalei* Laidlaw from East India, Myanmar, Thailand, Laos, South China and Vietnam with black dorsally on S2 and S7. Sanmartin-Villar et al. (2016) who studied in detail the polymorphism in *I. rufostigma* Selys refuted this considering *I. rufostigma rufostigma* Selys and *I. rufostigma annandalei* Laidlaw as separate subspecies based on the blue spot on eighth abdominal segment (S8). However, he had not disagreed on considering them as two subspecies based on other abdominal patterns. The recent checklist of dragonflies and damselflies of Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka also shows *I. rufostigma* Selys as consisting of two subspecies *I. rufostigma rufostigma* Selys and *I. rufostigma annandalei* Laidlaw (Kalkaman et al., 2020). The above complexes make *Ishnura* Charpentier an interesting one especially in unravelling its distribution, in the lesser studied higher altitudes of Himalaya. Keeping this in mind a study was undertaken in the vicinity of an undisturbed forest patch in Bhimtal, Nainital district to find out new distribution records to the state of Uttarakhand.

MATERIALS AND METHODS

The study was done on 17th and 18th September

2015 at Butterfly Research Centre (BRC), Bhimtal, Uttarakhand during the first Annual Butterfly Meet, Bhimtal 2015, organised by BRC, Bhimtal. Bhimtal (29.35°N 79.5667°E) is a town and Nagar panchayat in Nainital district in the state of Uttarakhand, India situated at 1370 masl. BRC, situated 2 km (approx.) from Bhimtal Lake, is surrounded with pine forests, hillocks and meadows and is at the foothills of Himalayas. The study area was in the vicinity of an undisturbed forest patch adjoining the BRC. Field surveys were done in morning between 8.00 and 10.00 hr, focusing on slow flying smaller damselflies which prefers low perches like short grasses and shrubs. Field photographs were captured using Canon EOS 550D DSLR camera mounted with Canon EOS 75-300mm USM Zoom lens. The species identity was established following description by Fraser (1933), Vick (1986) and Sanmartin-Villar et al. (2016). The subspecies identity was confirmed based on Asahina (1991) and Mitra and Babu (2010).

RESULTS AND DISCUSSION

The survey resulted in the recent confirmed report of *I. rufostigma rufostigma* Selys from Uttarakhand after 40 years. On 17th September 2015, 8.30 hr a single male damselfly belonging to genus *Ishnura* Charpentier was seen perching on a small shrub (Fig. 1a) in the lawn in front of Butterfly Research Centre. On 18th September 2015 morning 9.50 hr in the same spot a similar male individual was again observed resting on a grass (Fig. 1b). Based on the key characters furnished by Fraser (1933) viz. orange-red ground colour and black colouration of abdominal segments 8-10 the species identity was confirmed as *I. rufostigma* Selys. Labrum pale blue without any black base, postclypeus glossy steely black, beneath of head bluish, shallow posterior lobe of thorax, antehumeral stripes pale blue; laterally pale blue, pale yellow beneath; a minute black spot on

upper part of postero-lateral suture. Legs pale yellow with black spines. The pterostigma of the forewing very narrow, elongated diamond shaped, its outer angle very acute, bright brick red; the pterostigma of hind wing much smaller but the same shape dirty yellow. Arc distinctly distal to the level of outer antenodal nervure. Abdomen bright reddish-orange, with a quadrate dorso-basal black spot on first segment, and broadly black on dorsum of segments 8 to 10, the intervening segments unmarked. Anal appendages ochreous, the inferiors tipped with black and about half the length of segment; superiors very short, rounded, deeply excavate on the inner under-sides, ending in a robust spine directed in and slightly down (Fraser, 1933).

Asahina (1991) suggested two subspecies of *I. rufostigma* Selys i.e. *I. rufostigma rufostigma* Selys from Central and East India and Nepal, with males without black dorsally on second abdominal segment (S2) and seventh abdominal segment (S7), and *I. rufostigma annandalei* Laidlaw from East India, Myanmar, Thailand, Laos, South China and Vietnam with black dorsally on S2 and S7. The subspecies level identity of the specimen found from BRC was confirmed as *I. rufostigma rufostigma* Selys based on key characters furnished by Asahina (1991) and Mitra and Babu (2010) viz. brick red pterostigma of forewing and absence of black dorsally on S2 and S7 (Fig. 1 a, b). These two characters differentiated it from the closest subspecies *I. rufostigma annandalei* Laidlaw. Also the anal appendages of *I. rufostigma rufostigma* Selys are slightly robust and inferiors are longer as compared to that of *I. rufostigma annandalei* Laidlaw.

Mitra and Babu (2010) had furnished distribution of *I. rufostigma rufostigma* Selys from India as from Assam, Madhya Pradesh, Manipur, Bihar, Meghalaya, Nagaland, West Bengal. The check list presented by Prasad and Varshney (1995) also furnishes the



Fig. 1a, b: male *Ishnura rufostigma rufostigma* Selys (Butterfly Research Centre, Bhimtal, Uttarakhand)

distribution of *I. rufostigma rufostigma* Selys as Assam, Bihar, Madhya Pradesh, Manipur, Meghalaya, West Bengal and Western Himalayas; and does not specify the presence in Uttarakhand part of Western Himalayas. Only the range assigned by Asahina (1991) i.e. Central and East India and Nepal, is being considered in the recent check list of dragonflies and damselflies of Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka by Kalkaman et al. (2020). Prasad and Mondal (2010) records four species/subspecies of *Ishnura* from the Uttarakhand which includes *I. rufostigma rufostigma* Selys. This report of *I. rufostigma rufostigma* Selys by Prasad and Mondal (2010) is based on a study by Kumar and Prasad (1981) wherein they have mentioned it as *I. rufostigma* Selys reported from Nainital; which is the latest known report of the subspecies from Uttarakhand.

Thus the present sighting of *I. rufostigma rufostigma* Selys from the premises of BRC, Bhimtal, Uttarakhand is the recent record of this species from Uttarakhand State, nearly after forty years. Uttarakhand is bestowed with many high altitude lakes, streams, pine forests, hillocks and meadows which are ideal habitats for many rare odonates. Their status in these ecosystems are indicators of the level of purity and health of aquatic ecosystems. Hence there need to be further surveys in the Western Himalayan region and also the Eastern India (where both the subspecies coexist) of this particular odonate species and their subspecies to get a complete picture of the distribution status.

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