

Rediscovery of a long lost endemic damselfly *Sinhalestes orientalis* (Hagen *in* Selys, 1862) from Peak Wilderness Sanctuary, Sri Lanka (Zygoptera: Lestidae)

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ABSTRACT

Sinhalestes orientalis (Hagen *in* Selys, 1862) the only representative of its genus, is an endemic and globally critically endangered damselfly in Sri Lanka. It was first collected from Rambodde, Sri Lanka in 1858 and after that no new information on this species has been available. Here, we report on the re-discovery of *Sinhalestes orientalis* from the Peak Wilderness Sanctuary, Sri Lanka after 154 years from its last and only record.

Key words: *Sinhalestes orientalis*, Peak Wilderness Sanctuary, Re-discovery, Lestidae

INTRODUCTION

Dragonfly and damselfly fauna (collectively known as order Odonata) of Sri Lanka currently composed of 120 described species including 57 endemics. They belong to 12 families and 66 genera. Some new endemic species have been described only recently and some are in the process of description (Bedjanič, 2013; Bedjanič *et al.*, 2013; van der Poorten, 2012; van der Poorten and Conniff, 2012). Sri Lankan members of the family Lestidae commonly referred to as Spreadwings, consists of 6 known species in 3 genera namely *Lestes* Leach 1815, *Indolestes* Fraser 1922 and the endemic monotypic genus *Sinhalestes* Fraser 1951. Genus *Sinhalestes* belongs to the subfamily Lestinae. It has been erected by F. C. Fraser placing only already described *Lestes orientalis* under it based on being a large species with abdomen about 50 mm and having entirely metallic green head, thorax, abdomen and yellow swollen pterostigma (Fraser, 1951). Enigmatic *Sinhalestes orientalis* (Hagen *in* Selys, 1862) is thus a Sri Lankan endemic on the genus and species level and the only known representative of its genus in the world.

The species has been first reported from Sri Lanka in 1859 by H. A. Hagen who only published the name *Lestes orientalis* and indicated that the sole female has been collected by plantation owner and famous collector J. Nietner at "Rambodde" (Hagen, 1959). Fraser, 1933 and Fonseca, 2000 mentions that the collection of original specimen was done in 1858. Official description of both sexes, obviously based on additional material, followed in 1862 by H. A. Hagen in famous E. de Selys-Longchamps' Synopsis des Agrionines. Since then, for more than 150 years, there have been no subsequent records or information on the species. Apart of type locality name, absolutely nothing has been known on its exact location, habitat, ecological demands or seasonal phenology of *Sinhalestes orientalis*.

Already several decades ago, F. C. Fraser in his first Fauna of British India volume on Odonata (Fraser, 1933) comments that "...This species, which greatly resembles a *Megalestes*, must be either extremely local or very rare, as it has never been taken since the type was procured in 1858, seventy years ago... It is to be hoped that some one of the entomologists in Ceylon may rediscover this beautiful and interesting insect." Despite targeted search for the species in last decade it remained unsolved enigma and due to the extensive natural habitats degradation in surroundings of Rambodde, concerns have been raised that it might even be extinct. As a consequence *Sinhalestes orientalis* has been included on the global IUCN Red List of Threatened Species and declared as nationally data deficient (van der Poorten and Conniff, 2012) as well as globally (Bedjanič, 2009) critically endangered species.

Peak Wilderness Sanctuary (PWS) is a part of the Central Highlands of Sri Lanka World Heritage Site. It was declared as a sanctuary on 25 October 1940 by the Gazette Notification No. 8,675. The sanctuary is surrounding the Adam's Peak which is located at 6° 48' 33.357" N and 80° 29' 58.3182" E. Total area of the sanctuary is about 24,000 ha and the altitude ranges from 50 m to 2238 m (DWC, 2007). It is one of the largest still preserved continuous natural forests in the country and is home to a rich biodiversity.

MATERIALS AND METHODS

First observation of the re-discovered *Sinhalestes orientalis* was made during a visual encounter survey of odonata in Peak Wilderness Sanctuary, Sri Lanka conducted by the first author.

Further investigations were carried out by himself at the Peak Wilderness Sanctuary and observed individuals belonging to the species were captured using an insect net for close examination and detail photographs

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were made using a DSLR camera with a macro ring. Measurements of abdomen length, body length and fore wing length were obtained using a Spi 2000 dial vernier caliper. Exact locations of the observations were recorded using a Garmin etrex legend GPS receiver. Captured damselflies were released back to the same location after the investigations.

Identification of the species was verified using Fraser, 1933 and Selys, 1862. Obtained pictures were compared with the Paratype female of *Sinhalestes orientalis* from E. de Selys-Longchamps' collection in the Royal Belgian Institute of Natural Sciences in Brussels.

RESULTS

A female individual of *Sinhalestes orientalis* was encountered for the first time on 1st September 2012, at 1135 h to the first author and four of his colleagues (Figure 1) at the road side during an excursion to Peak Wilderness Sanctuary. It was vertically hanging on to a



Figure 1. A male and a female *Sinhalestes orientalis* from PWS, Sri Lanka. (Photos: K. Dayananda and D. Randula).



Figure 2. Distribution of *Sinhalestes orientalis* (Ramboda: Type locality. Thummodara, PWS: recently discovered locality).

Clidemia hirta fruit which was about 1.2 m above the ground. Further investigations carried out were resulted in several more observations of the same species.

Table 1. Recent observations of *Sinhalestes orientalis* at PWS, Sri Lanka

Date	Location	Altitude	Number of individuals and sex
01.09.2012	100 m to E from Thummodara, PWS	1080 m	♀ 1
14.10.2012	550 m NW from Thummodara, PWS	1070 m	♂ 2, ♀ 1
21.03.2013	200m to NW from Thummodara, PWS	1073 m	♂ 1
22.02.2013	550 m NW from Thummodara, PWS	1070 m	♀ 1
17.03.2013	200m to NW from Thummodara, PWS	1073 m	♂ 1

(E= East, NW= North West)

The observed animals almost completely agree with the original description of *Sinhalestes orientalis* given in French by H. A. Hagen in Selys-Longchamps (1862) and with almost identical F. C. Fraser's English description, published in his first volume of Fauna of British India on Odonata (Appendix 1; Fraser, 1933). Small differences observed in living animals include coppery bronze or yellowish mid-dorsal line on thorax and antehumeral stripe, metallic green eyes above and greenish yellow or brownish yellow below, as well as pale yellow stripes in middle of lateral and ventral surfaces in abdominal segments.



Figure 3. Paratype female of *Sinhalestes orientalis* from E. de Selys-Longchamps' collection in the Royal Belgian Institute of Natural Sciences in Brussels (Photo: M. Bedjanič).

According to the observations, the usual habitat of *Sinhalestes orientalis* at Peak Wilderness Sanctuary were sun lit pools of the slow flowing streams. The average depth of these pools was around 0.3 m and the bottom substrate consisted mainly of rocks and pebbles and with some leaf litter at the margins. The observed individuals were usually found perched on sticks and leaf tips hanging down vertically or keeping the body in a close angle with the vertical. Mostly it was observed in forest edges where the forest meets a stream and between 1.2-4 m above the

ground level. It has a slow flight and was observed to fly to a higher perch upon any disturbance. It keeps its wings wide open when at rest.

DISCUSSION

When the slight differences between the observed live specimens and the descriptions by previous authors are compared, Fraser (1933) reports nothing on a mid-dorsal stripe or any stripes along the abdominal segments in *Sinhalestes orientalis* though such patterns are clearly visible in the still well preserved paratype of a female *Sinhalestes orientalis* housed in the Royal Belgian Institute of Natural Sciences in Brussels (Figure 3). Considering the eye colour and the colour of antehumeral stripe, Fraser (1933) has mentioned them to be brown and pale yellow respectively.

The differences of colours given in the available description and the observed living specimens may be due to the fact that the previous authors could only observe the colours of the preserved specimens. Additionally, being the case in our observations, the colour of some markings might also vary according to the age and maturity of living animals. As the external morphology and measurements of the observed specimens mostly agree with the available descriptions of *Sinhalestes orientalis* excluding for the above discussed few features, a conclusion can be made that the damselfly in concern is none other than the long lost and globally critically endangered damselfly *Sinhalestes orientalis*. Thus, the present records represent rediscovery of *Sinhalestes orientalis* from Peak Wilderness Sanctuary in Sri Lanka after 154 years of its last and only record.

Additional observations of *Sinhalestes orientalis* has been done by the second author and his colleagues at two different localities in the eastern part of PWS during an independent study. Records on these observations will be published in the upcoming Distribution Atlas of the Dragonflies of Sri Lanka.

Further studies on morphology, distribution, phenology and ecology of *Sinhalestes orientalis* conducted by the first author are currently in the process under the permission of Department of Wildlife Conservation, Sri Lanka.

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APPENDIX- I

Description of *Sinhalestes orientalis* from Fraser (1933)

[Fraser, F. C., 1933. *The Fauna of British India including Ceylon and Burma. Odonata. Volume 1.* Taylor and Francis, London. pp. 48-49.]

***Lestes orientalis*, Hagen**

Male: Abdomen 52 mm. Hind-wing 38 mm. Head: Labium yellow; labrum, cheeks, and base of mandibles pale yellow, rest of head coppery-bronze or metallic green, eyes brown; behind head pale yellow. Prothorax and thorax metallic green-bronze on dorsum, with antehumeral stripe pale yellow on the latter; laterally and beneath pale yellow, with two brown spots on each side of the chest. Legs black, bases of

femora paler, especially on flexor surface. Wings hyaline, fore-wings with 18 to 20 postnodal nervures; *IRiii* not zigzagged; pterostigma dark yellow, framed in black nervures, covering from 2 to 2½ cells. Abdomen metallic green on dorsum and sides. Anal appendages black, superiors forcipate, apices curving towards each other and terminating in a point, furnished near the base with a blunt spine, and at about the middle a small tubercle below; inferiors rudimentary, conical, very short.

Female: Abdomen 49 mm. Hind-wing 40 mm. Closely similar to the male, differing only in sexual characters; segment 10 brown, notches at its apical border. Anal appendages conical, pointed at apex; vulvar scale yellow, extending to end of abdomen, with serrate border.

Distribution: Ramboda Pass, Ceylon.
Type in the Hagen collection.