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Author Affiliation:

Foundation for Ecological Security, Post Box No. 29 Jahangirpura, Hadgud, District –Anand Gujarat, India- 388 370

*Corresponding Author

Foundation for Ecological Security, Post Box No. 29 Jahangirpura, Hadgud, District –Anand Gujarat, India- 388 370
Email: manohar.pawar@fes.org.in

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First Record of *Elattoneura nigerrima* (Laidlaw, 1917) (Odonata: Platycnemididae) from Rajasthan, India: Habitat Insights and Morphological Observations

Anil Sarsavan¹, Manohar Pawar^{1*}, Rahul Talegaonkar¹, Himani Sharma¹, Shivlal Kumawat¹

ABSTRACT

Elattoneura nigerrima, a new addition to Odonata fauna of Bhilwara, Rajasthan. Previously, this species was known only from a few states in peninsular, central, and western Indian regions. This discovery represents the first record of *E. nigerrima* in Rajasthan, expanding its known distribution range.

Keywords: *Elattoneura nigerrima*, Damselfly, Odonata, Habitat, Rajasthan, India

1. INTRODUCTION

Dragonflies and damselflies (Odonata) are essential biological indicators of aquatic ecosystem health, playing a crucial role in aquatic and terrestrial food webs (Subramanian, 2009). Odonata inhabits in range of aquatic habitats, including rivers, streams, marshes, paddy fields, ponds, lakes, and temporary water bodies, Field surveys were carried out across a watershed spanning 5,000 hectares to assess the effects of habitat restoration efforts through public-private partnerships and community initiatives at the watershed level in southern Bhilwara district, Rajasthan.

2. MATERIAL AND METHODS

Kalyanpura watershed (25°17' N-25°24'N, 75°9'E- 75°15'E) is part of the convergence of Aravallis and Vindhyan ranges and situated in the southern part of Bhilwara city in Mandalgarh Tehsil. The study area experiences a semi-arid climate with distinct seasons; Summers (March to mid-July), monsoon (mid-July to mid-September) and post-monsoon (mid-September to late November) and winters (December to February) with temperatures range 4-42°C. The area received rainfall 500-650 mm annually. The vegetation falls under the Northern Tropical Dry Deciduous forests subgroup includes *Anogeissus pendula* (Now *Terminalia pendula*) scrub (5/E1/DS1) and *Butea* forests (5/E5) (Champion and Seth, 1968). The survey was done between 1000

hour and 1400 from July 20-30, 2023 (Subramanian, 2009). A fixed route transect survey method was employed Córdoba-Aguilar and Rocha-Ortega, (2019), along with the sweep-net method for capturing specimens (Oertli, 2008).



Figure (A-E) A- Lateral view of an adult male with transparent wings, B- Lateral view of an adult female with transparent wings, C- Male; eye divided in the middle by two narrow black equatorial stripes, D- Female; eye divided in the middle by two narrow brown equatorial stripes, E- Mating pair; The female is laying eggs on submerged leaves of *Cyperus* species and the male is holding the female behind the head.

3. RESULTS

During the survey on 27th July, 2023 an species was observed in a fast flowing seasonal stream (25°19'N, 75°12'E) near Deogarh village, Mandalgrah block, Bhilwara district. Seven breeding pairs recorded in narrower channels of stream. Males are seen actively defending their territories along the stream, while females perched on small grass blades of Cypress sp. and other vegetation, positioned 2–6 meters away from the water. Detailed observations, photographs and measurements recorded for identification and comparing the specimens to known species within the genus *Elattonneura* using the identification keys (Koparde et al., 2021).

A further detail examination done for identification to two species within the genus: *Elattonneura nigerrima* and *Elattonneura tetrica*. While *E. nigerrima* and *E. tetrica* share similar appearances, key morphological differences allow for their accurate identification. Koparde et al., (2021) highlighted a significant distinguishing feature the wing coloration. In studied specimens, both male and female individuals exhibit fully transparent wings (Figures A & B). Male of *E. tetrica* displays a smoky top wing edge, while females present a less pronounced smoky hue. Eye patterns provide another differentiating characteristic of *E. nigerrima* possess two thin black equatorial stripes on their eyes (Figures C & D).

The female prefers to lay eggs on submerged leaves of Cyperus species. During this process male holds the female behind the head (Figure E). Another key distinguishing feature between the two species is the number of Cuii cells in the wings: *E. nigerrima* has five Cuii cells in the forewings and six in the hind wings, while *E. tetrica* has only three Cuii cells in the forewings and four in the hind wings. Based on the morphological characteristics, the species has identified as *E. Nigerrima* and confirmed as a first record of *E. nigerrima* in Rajasthan, as it has not been previously documented in the state (Sharma, 2024).

4. DISCUSSION

The habitat of *E. nigerrima* is described as shallow forest streams with shaded canopy cover (Payra et al., 2020). However, its presence in a scrubland stream with minimal canopy cover suggests broader habitat adaptability. The stream bank is partially shaded by small, thorny trees of White Bark Acacia (*Vachellia leucophloea*) and Mesquite (*Prosopis juliflora*). Community involvement in conserving and protecting this endemic species will be crucial and add a valuable fauna in the state fauna list.

This finding in Rajasthan extends its known geographic range beyond Madhya Pradesh, Gujarat, Maharashtra, Karnataka, Goa, and Telangana (Mishra, 2007; Babu and Nandy, 2010; Tiple et al., 2022; Rathod et al., 2016; Payra et al., 2020; Koparde et al., 2021). Currently *E. nigerrima* listed as Data Deficient by the IUCN Red List and present record of this endemic species shows wider geographic range and diverse habitats. This new information may help a revision of its IUCN conservation status.

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Authors Contribution

Anil Sarsavan prepared the draft of the manuscript and conducted the fieldwork. Manohar Pawar provided support in further editing and finalizing the manuscript. Rahul Talegaonkar and Himani Sharma contributed editing support, while Shivilal Kumawat assisted during the fieldwork.

Ethical approval & declaration

In this article, as per the animal regulations followed in Foundation for Ecological Security, Anand, Gujarat, India, the authors present the first Record of *Elattonneura nigerrima* (Laidlaw, 1917) (Odonata: Platycnemididae) from Rajasthan, India. Animal ethical guidelines are followed in the study for species observation, identification & experimentation.

Informed consent

Not applicable.

Conflicts of interests:

The authors declare that there are no conflicts of interests.

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The study has not received any external funding.

Data and materials availability

All data associated with this study are present in the paper.

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