



New record of riffle bug *Rhagovelia* (*Neorhagovelia*) *nilgiriensis* Thirumalai, 1994 (Hemiptera, Heteroptera, Veliidae) from Kerala, India

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ABSTRACT: The riffle bug, *Rhagovelia* (*Neorhagovelia*) *nilgiriensis* Thirumalai, 1994 is reported for the first time from Kerala. They are very small, black bugs, commonly encountered in streams with moderate to swift flow. The current report of *R. nilgiriensis* from Kerala extends its geographic distribution which was earlier reported only from its type locality Nilgiris, Tamil Nadu, India. The present inventory is crucial, as it is the pioneer report of *R. nilgiriensis* from Kerala and the second record of the same from India. © 2022 Association for Advancement of Entomology

KEYWORDS: First report, water bugs, Gerromorpha

The genus *Rhagovelia* Mayr, 1865 belong to the subfamily Rhagoveliinae, comprises a group of semi-aquatic bugs that are commonly known as riffle bugs, water crickets, small water striders, or broad-shouldered water bugs exclusively seen in lotic freshwater bodies with moderate to strong water current. The genus is the most specialized group among the veliids and also the most speciose in Gerromorpha, with around 400 described species (Polhemus, 1997; Zettel and Laciny, 2021). The members of the genus *Rhagovelia* are characterized by small size; elongated, cylindrical body; the last segment of middle tarsus is deeply cleft and bears a plumose swimming fan and leaf like claws arising from the cleft; mid femur and hind femur modified with several spine-like

structures (Mayr, 1865). *Rhagovelia* have developed a considerable number of morphological modifications for facilitating rapid movements in swift running water (Andersen, 1976). Thirumalai (2002) recorded five species of *Rhagovelia* from India. Recently, several studies have been conducted on the taxonomy of aquatic and semi aquatic bugs in other states of India (Jehamalar *et al.*, 2018, 2019; Jehamalar and Chandra, 2020a, 2020b; Basu *et al.*, 2018; Bal and Hassan, 2021; Lyngdoh *et al.*, 2021). Unlike other states of India, systematic studies on aquatic and semi aquatic bugs from Kerala have been limited. An effort has been made in this investigation to document the aquatic bugs of a rivulet, Killiyar, in Thiruvananthapuram district of Kerala.

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As a part of the study, *Rhagovelia* (*Neorhagovelia*) *nilgiriensis* Thirumalai, 1994 was collected from Killiyar, in Thiruvananthapuram district of Kerala, by using a hand operated D-frame aquatic insect net with a mesh size of 500µm. The collected specimens were preserved in ethanol (70%) in the field and transported to the laboratory for detailed taxonomic studies. Male genital segments and its associated structures of the collected specimens were dissected and kept in potassium hydroxide (10%) for a period of 30 minutes for detailed examination. The photographs and measurements were taken using the Olympus TG- 6 digital camera and the Leica stereo zoom microscope (Leica M205A), using the software Leica application suite (Version 4.12). All measurements were taken in mm. Identification was done using the taxonomic literature (Thirumalai, 1994). The voucher specimens have been deposited in National Zoological Collection, Hemiptera Section, Zoological Survey of India, Kolkata, India.

Systematic account

Order Hemiptera Linnaeus, 1758

Suborder Heteroptera Latreille, 1810

Infraorder Gerromorpha Popov, 1971

Superfamily Gerroidea Reuter, 1910

Family Veliidae Amyot and Serville, 1843

Subfamily Rhagoveliinae China and Usinger, 1949

Genus *Rhagovelia* Mayr, 1865

Subgenus *Neorhagovelia* Matsuda, 1956

Rhagovelia (*Neorhagovelia*) *nilgiriensis* Thirumalai, 1994

1994. *Rhagovelia* (*Neorhagovelia*) *nilgiriensis* Thirumalai, *Rec. zool. Surv. India*, 94 (2-4): 390.

Material examined: Reg. No. 12415/H15, 2 apt.♂, 2 apt.♀, Killiyar, Thiruvananthapuram district, Kerala, 07.iii.2019, 8°32'44.45"N; 76°58'29.90"E, Coll. Jyothylakshmi K.

Diagnosis: Body length: 2.1- 2.8 mm; colour: black; except basal half of femora, yellow; body and legs clothed with minute setae; head and pronotum

wider than long in males, wider in females; eyes black, antenna brownish black except, first segment basally yellow; coxa and trochanter of all legs yellow; fore femur shorter than tibia; mid femur is longer than fore femur and hind femur; hind femora with 1- 2 stout marginal spines in males; connexiva of female apically with short setal tuft reaching subapex of eight abdominal tergum; male paramere falciform sub basally with some scattered setae (Fig. 1 A- C).

Distribution: Known only from the type locality, India: Tamil Nadu.

Bionomics: *R. nilgiriensis* shows habitat and microhabitat specificity, restricted to rapidly flowing streams, cascades and riffles with sandy bottom. The species have morphological modifications such narrow; cylindrical body, modified legs; tuft of setae arranged in the form of a fan like structure in the last segment of the middle tarsus to facilitate swift movement in relatively fast-flowing streams. They are capable of avoiding capture by natural enemies by their swift movement. They were mostly collected from the cascade region of the stream. An interesting aspect of this species is the occurrence of macropterous and apterous adult morphs during different seasons. Most of the collected specimens were apterous and a single macropterous morph of female was obtained during the study. Furthermore, niche partitioning has been found, more males were commonly seen in swift flowing sections of the stream, while the females were mostly found in riffles near the shore. Like most other bugs, they are predacious in nature. More extensive observations are needed to reveal their life cycle and diet preferences.

Remarks: This is the first record of *R. (Neorhagovelia) nilgiriensis* Thirumalai, 1994 from Kerala. The species was so far exclusively documented from Tamil Nadu. This species can easily be separated from the other closely resembling species, *R. (Neorhagovelia) sumatrensis* Lundbald, 1936 by the presence of 1- 2 marginal spines in the hind femora of males and by the shape of male paramere. The macropterous specimen was damaged and it has not been registered.

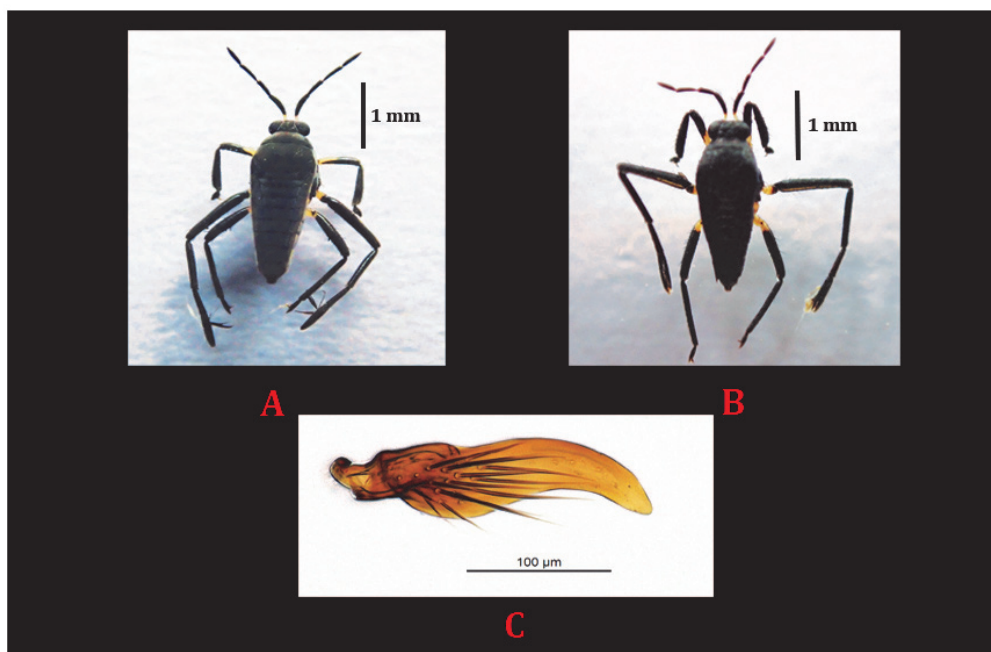


Fig. 1 *Rhagovelia* (*Neorhagovelia*) *nilgiriensis* Thirumalai, 1994 - A. Apterous male; B. Apterous female; C. Dorsolateral view of male paramere

The genus *Rhagovelia* Mayr, 1865 is the first most diverse genus among the semi aquatic bugs. Due to their poor dispersal abilities many *Rhagovelia* species are endemic to certain areas (Polhemus, 1995). The knowledge on the distribution of *R. (Neorhagovelia) nilgiriensis* is very poor. Thirumalai, 1994 described *R. (Neorhagovelia) nilgiriensis* from Tamil Nadu, India. The present inventory would be leading to fill the gap of information on its distribution data since it was not recorded from anywhere else in India after its first description by Thirumalai, 1994. Though the closely related species *R. sumatrensis* Lundbald, 1936 have several resemblances with *R. nilgiriensis*, the latter can easily be distinguished from the other by the narrow, falciform male paramere in contrast to subapically narrow male paramere of *R. (Neorhagovelia) sumatrensis* (Polhemus, 1990). *R. (Rhagovelia) tibialis* Lundbald, 1936 was the only known species of *Rhagovelia* in Kerala so far (Thirumalai, 1994; 2002). It can also be distinguished from the other species of *Rhagovelia* by the presence of parameres with blunt apex and short setae.

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