

New faunistic records of two species of pygmy backswimmers (Hemiptera, Heteroptera, Pleidae) from Kerala, India

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ABSTRACT: Members of the family Pleidae are commonly referred to as pygmy backswimmers. They are small predatory bugs; usually reside in stagnant or slow moving aquatic habitats with plenty of vegetation. Two species of aquatic insects *Paraplea frontalis* (Fieber, 1844) and *P. liturata* (Fieber, 1844) in the family Pleidae are reported for the first time from Kerala. Both species are relatively common and widespread in India. However, the present faunistic records shall add to the database of geographical distributional range of these species. © 2023 Association for Advancement of Entomology

KEYWORDS: Aquatic bugs, *Paraplea frontalis*, *P. liturata*, nepomorpha, distribution

Pygmy backswimmers or pleids are small globular bugs generally seen in vegetated areas of lentic water bodies (Andersen and Weir, 2004; Chen *et al.*, 2005). As the name indicates, they swim in the inverted or back position. World fauna of the family Pleidae is represented by 37 species under three genera namely, *Plea* Leach, 1815, *Neoplea* Esaki and China 1928 and *Paraplea* Esaki and China 1928. Morphotaxonomic identification of different genera of the family Pleidae is primarily based on the number of tarsal segments. The genus *Paraplea* has two tarsal segments on their fore tarsi and hind tarsi (Cook, 2017; Cook *et al.*, 2020). *Paraplea* is the biggest and extensively distributed genus among pleids (Schuh and Slater, 1995). It is generally worldwide in distribution, but it has not been reported yet from the Palearctic and Antarctic regions (Cook, 2017). Since information on the systematics and detailed bioecology of aquatic bugs

from the state of Kerala is sparse, there is scope for future research regarding the taxonomy and bionomics of true bugs in the family Pleidae. Therefore, an endeavour was made to study water bugs from Sasthamkotta lake, the largest freshwater lake of Kerala. Two species of pygmy backswimmers *Paraplea frontalis* (Fieber, 1844) and *P. liturata* (Fieber, 1844) are hereby reported for the first time from Kerala.

The examined specimens were collected from Sasthamkotta lake, Kollam District, Kerala, by using a D-frame aquatic net with a mesh size of 500µm. The collected samples were sorted, and then preserved in 70 per cent ethanol. The adult specimens were taken for taxonomic study. Observations and measurements were done using Olympus SZ51 stereomicroscope. Photographs of the specimens were taken using Olympus TG- 6

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digital camera and later identified with the help of standard literatures and monograph (Bal and Basu, 2000; Nahar, 2004; Thirumalai, 2004; Nieser *et al.*, 2005; Thirumalai and Suresh Kumar, 2005; Jehamalar and Chandra, 2016; Basu *et al.*, 2018; Mitamura *et al.*, 2018; Cook, 2020).

Order Hemiptera Linnaeus, 1758
Suborder Heteroptera Latreille, 1810
Infraorder Nepomorpha Popov, 1968
Superfamily Pleoidea Fieber, 1851
Family Pleidae Fieber, 1851

Genus *Paraplea* Esaki and China, 1928

1. *Paraplea frontalis* (Fieber, 1844)

1844. *Ploa frontalis* Fieber, *Entomologische Monographien, Leipzig*, 18.

1898. *Plea frontalis* Fieber: Kirkaldy, *Wien. Ent. Zeit.*, 17: 141.

1906. *Plea frontalis* (Fieber): Distant, *Fauna of British India*, 3: 48.

1934. *Plea (Paraplea) frontalis* (Fieber): Lundblad, *Archiv für Hydrobiologie Supplement*, 12:138.

1947. *Plea (Paraplea) frontalis* (Fieber): Hafiz & Pradhan, *Rec. Indian Mus.*, 45: 349

1995. *Paraplea frontalis* (Fieber): Polhemus *et al.*, *Cat. Het. Palaerctic region*, 1: 74.

Materials examined: 2 ♂, 1 ♀, Sasthamkotta Lake; Vettolikadavu, Kollam district, Kerala, 8m amsl., 9°1'56.93" N; 76°37'29.72" E, 18.xii.2022, Coll. K. Jyothylakshmi and S. Nandakumar.

Diagnosis: Body length: 1.8- 2mm; colour: golden brown to dark brown; body prominently punctuate, honeycomb pattern; eyes reddish brown; a small dark reddish-brown longitudinal stripe or light brown bar between the eyes; vertex with two pair of dark blotches or spots, it may be indistinct or absent in some specimens; pronotum wider than long; scutellum with distinct dark punctures; Hemelytra with very fine dark punctures; legs yellowish brown;

thoracic keels differently shaped, with spine like projection; male paramere with tuft of setae; female ovipositor, triangular in shape with numerous spines (Figs. 1A- E).

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Bihar, Chandigarh, Chhattisgarh, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Pondicherry, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal.

Bionomics: The species is very specific to stagnant or slow moving water bodies with considerable vegetation. They are often seen at the interface between water and vegetation mats, sometimes found associated with the emergent macrophytes. Colour polymorphism can be seen among different individuals of the species. Different colour morphs of *Paraplea frontalis* have been collected. The colour ranges from light brown to dark brown and yellowish brown to golden yellow. This difference in colour might be attributed by the habitat and microhabitat conditions. The species have agile movement and predators that feed primarily on mosquito larvae and other small invertebrates.

Remarks: This is the first record of *Paraplea frontalis* (Fieber, 1844) from Kerala. *Paraplea frontalis* was first named as *Ploa frontalis* in the description made by Fieber (1844). The species is relatively wide spread.

2. *Paraplea liturata* (Fieber, 1844)

1844. *Ploa frontalis* Fieber, *Entomologische Monographien, Leipzig*, 19.

1904. *Plea frontalis* Kirkaldy, *Wien. Ent. Zeit.* 23: 129

1906. *Plea liturata* (Fieber), Distant, *Fauna British India*, 3: 47.

1910. *Plea metiadusa* Distant, *Fauna British India*, 5: 337.

1934. *Paraplea liturata* (Fieber): Lunblad. *Arch. Hydrobiol. Suppl.*, 12: 129.

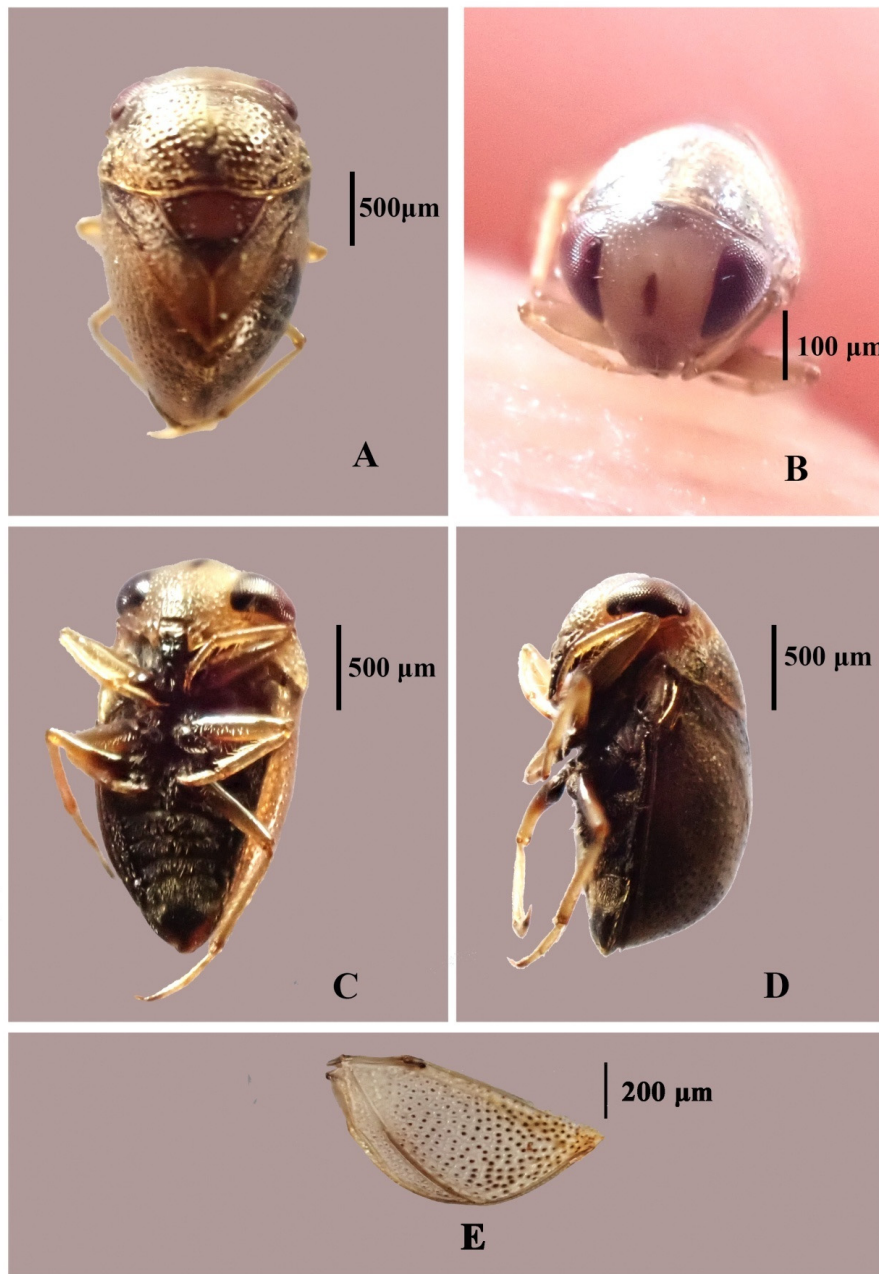


Fig. 1 A - E. *Paraplea frontalis* (Fieber, 1844) A. Dorsal view; B. Frontal view; C. Ventral view; D. Lateral view; E. Hemelytra

1994. *Paraplea liturata* (Fieber): Agarker *et al.*, *Bionature* 14: 78.

Materials examined: 2 ♂, Sasthamkotta Lake; Punnakkadu Kadavu, Kollam district, Kerala, 8m amsl., 9°2' 41.27"N; 76°37' 44.17" E, 24.ii.2022, Coll. K. Jyothylakshmi and S. Nandakumar.

Diagnosis: Body size: 1.2- 1.6mm; colour: yellowish brown to golden brown; dark bands on hemelytra; eyes red coloured; antenna three-segmented, hidden below; punctures spread all over the body; five characteristic dark black spots on the pronotum; legs with numerous setae and tiny spines; thoracic regions clearly separate, anterior thoracic keel

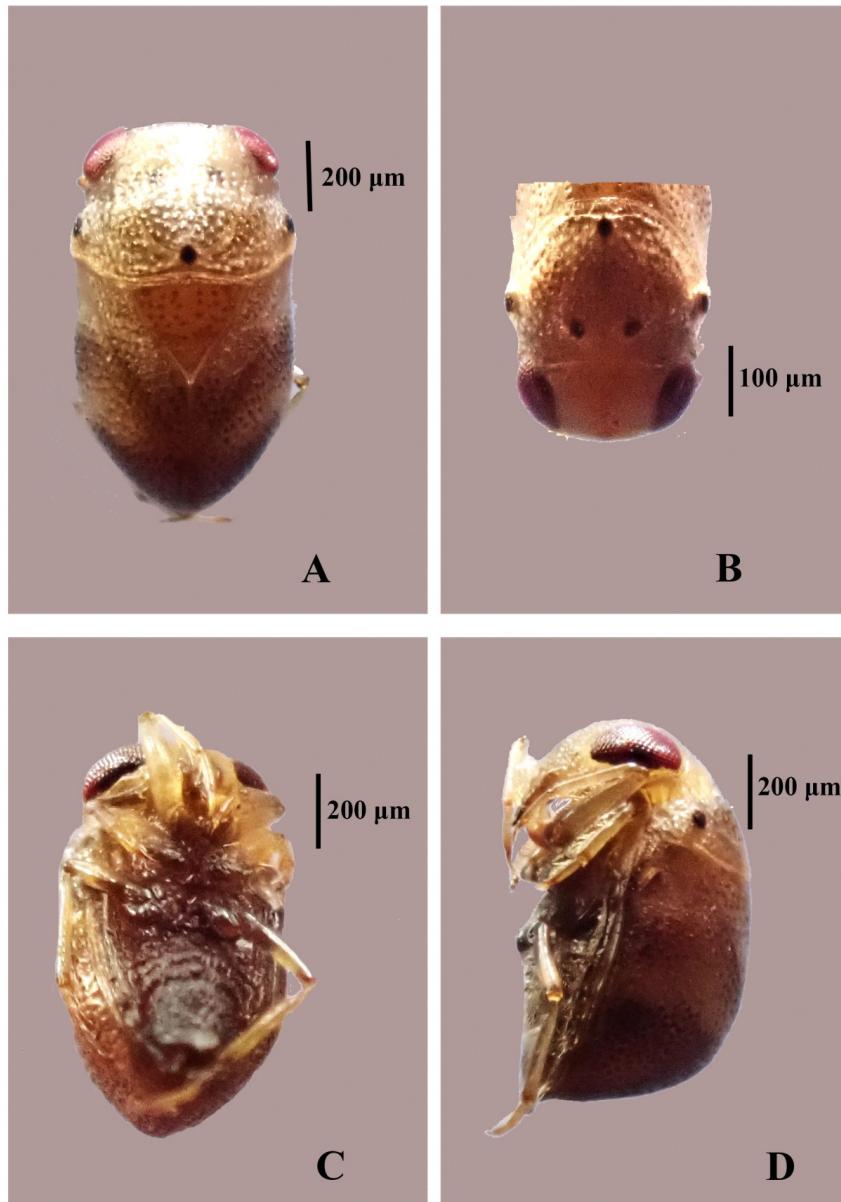


Fig. 2 A- D. *Paraplea liturata* (Fieber, 1844) A. Dorsal view; B. Head and Pronotum; C. Ventral view; D. Lateral view

rounded; two posterior thoracic segments serrated; abdominal keel with anterior two segments conjoined; male subgenital plate almost pentagon shaped, longer than wide, surface slightly corrugated; female ovipositor rectangle shaped with spines (Figs. 2A- D).

Distribution: India: Bihar, Delhi, Madhya Pradesh, Tripura and West Bengal

Bionomics: They were found crawling on the lake vegetation. Like other pleids, they prey on mosquito larvae and small invertebrates. The area in which the species was collected had a substantial amount of aquatic vegetation. The species is usually overlooked and rarely collected due to its minute size and swift movement. More comprehensive observations are needed to reveal their bioecology in detail, since only limited specimens have been

obtained during the present investigation.

Remarks: This is the first record of *Paraplea liturata* (Fieber, 1844) from Kerala. It can be easily separated from the closely resembling species, *Paraplea lateromaculata* Cook, 2020 by the presence of five distinct dark spots on pronotum.

A total of four species under the genus *Paraplea* such as *Paraplea buenoi* Kirkaldy, 1904, *Paraplea frontalis* (Fieber, 1844), *Paraplea indistinguenda* (Matsumura, 1905) and *Paraplea liturata* (Fieber, 1844) have been so far reported from India (Thirumalai, 2007). *Paraplea indistinguenda* (Matsumura, 1905) has been the only known species of *Paraplea* reported from Kerala so far (Thirumalai, 2007). The current record of *Paraplea frontalis* (Fieber, 1844) and *Paraplea liturata* (Fieber, 1844) is pivotal, since it is the pioneer report from Kerala and the records of the same from a wetland of international significance. The present faunistic records of the pygmy backswimmers are from Sasthamkotta lake, the largest freshwater lake of Kerala, and one among the top Ramsar sites of India. Macrophytes influence the diversity, abundance and distribution pattern of pleids by providing diverse ecological niches. Sasthamkotta Lake is infested with several native and non native macrophyte species. Therefore, it is imperative to conduct ample research activities on the taxonomy and faunistic of pygmy backswimmers of the lake, so that knowledge regarding this group can be utilized as baseline data for further research and conservation planning. *P. frontalis* (Fieber, 1844) was earlier reported from other states of India by Thirumalai (2004), Nieser *et al.* (2005), Thirumalai and Suresh Kumar (2005), Jehamalar and Chandra (2016) and Basu *et al.* (2018). Previous reports of *Paraplea liturata* (Fieber, 1844) were also made by Bal and Basu (2000) and Nahar (2004). Hence, keeping in view the scarcity of knowledge regarding the pygmy backswimmers of the State, intensive surveys in the unexplored ecosystems of Kerala are required. The present work could direct attention towards the necessity of faunistic study of pygmy backswimmers from other wetlands of Kerala to reinforce knowledge on its distribution.

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