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A NEW SPECIES OF *THALEROSPHYRUS* FROM SOUTH INDIA (EPHEMEROPTERA: HEPTAGENIIDAE)

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EATON¹ named the genus *Thalerosphyrus* from male and female imagos collected in the Philippines and Borneo. Ulmer² described the nymphs. This genus is distributed in the Palearctic, Ethiopian and Oriental Realms. Jensen³ examined nymphs of this genus from Lebanon and Madagascar. Six species viz *T. ciqualatus*⁴, *T. determinatus*⁵, *T. melli*⁶, *T. sinuosus*⁴, *T. sumatranus*² and *T. torridus*⁵ of this genus were described from the Oriental Realm and one *T. ethiopicus*⁷ from the Ethiopian Realm. This genus is zoogeographically significant in the sense that it could have spread via the drifting Indian plate from Madagascar to Southeast Asia⁸. This is the first record of this genus from South India. *Thalerosphyrus flowersi* sp. nov. is described based on the reared material from Kumbakkarai stream in Palni hills and on nymphs from Courtallam and Thirumurthi Hills of Western Ghats. Terminology and procedures used in the description follow those of Sivaramakrishnan⁹.

Thalerosphyrus flowersi sp. nov. (Figures 1-9) (measurements are in mm unless otherwise mentioned).

Male imago (in alcohol).— length: body, 9.5–10.5; forewings, 9.5–10. Head: light brownish-yellow, margin darker. Scape and pedicel of antennae reddish-brown, flagellum pale. Eyes: basal half of ocelli black, apical half white. Thorax: yellowish-brown, carinae darker, sutures lighter; margins of pronotum black. Legs: coxae brown; femora brownish-yellow, apex of all femora blackish-brown; a reddish-brown, narrow, transverse band near middle of femora; tibiae of all legs uniformly washed with yellowish-brown, remainder of legs light yellowish-brown. Wings: base of forewings dark brown; costal, subcostal and radius of forewings yellowish-brown; a dark brown spot near bulla of subcostal vein; other longitudinal and cross veins of fore and hind wings brown; membrane of fore and hind wings hyaline except cells C and Sc of forewings brownish-yellow with two dark brownish-yellow clouds in the pterostigmatic area. Abdomen: tergum 1 dark brown, posterior margin with a narrow, blackish-brown band, lateral edges broader

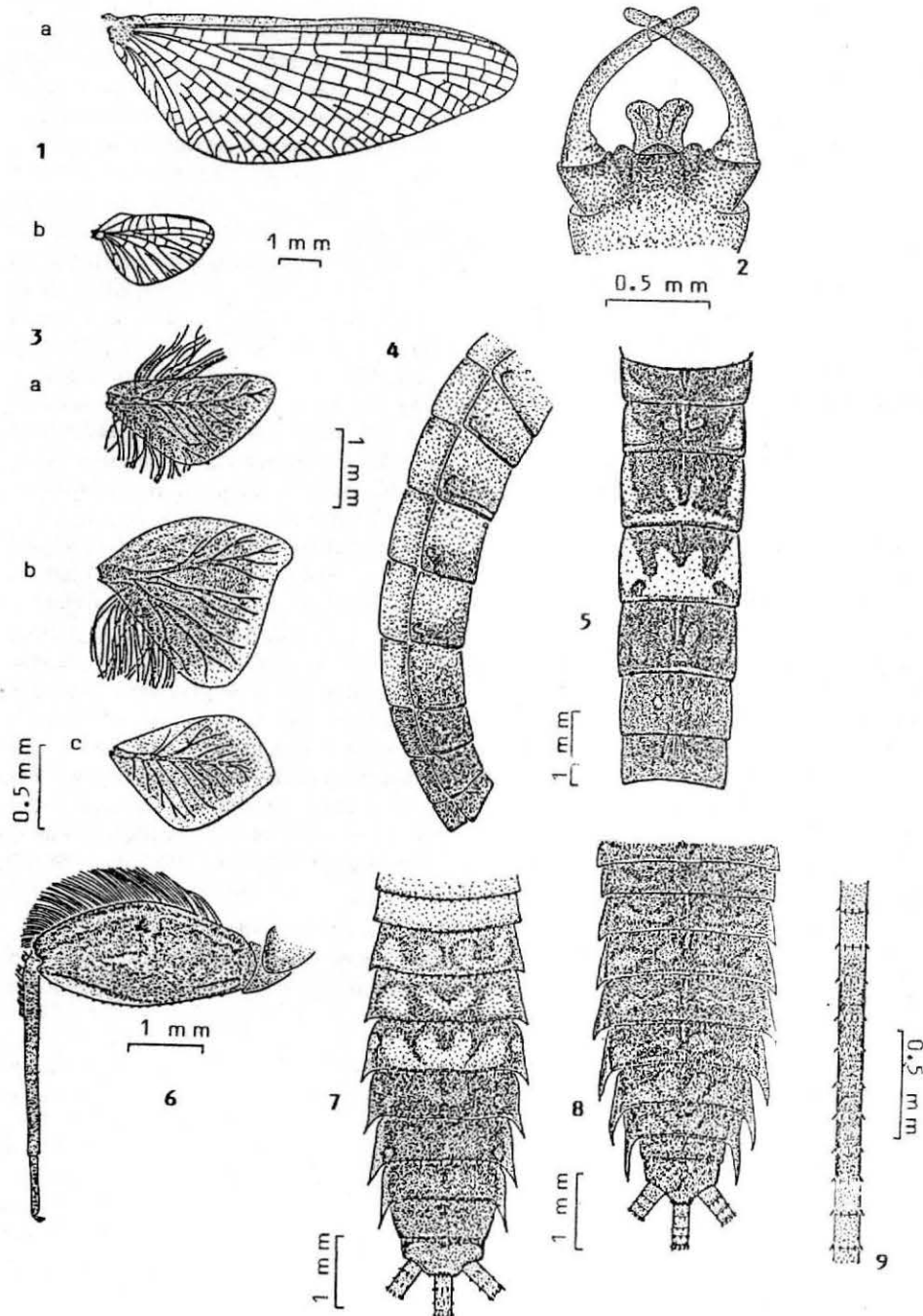
progressively; submedian, slanting, blackish-brown bars on tergum 6; terga 7–9 reddish-brown, posterior margin with narrow, dark brown band; tergum 10 pale yellow; spiracle black on terga 2–6 remainder of spiracles reddish-brown; tracheae hyaline; anterior half of sternum 1 reddish-brown, posterior half hyaline; sterna 2–6 hyaline; sternum 6 washed with light yellowish-brown medially, sterna 7–9 reddish-brown, with blackish-brown posterior edge. Genitalia: yellowish-brown. Cerci yellowish-brown, annulations at articulations reddish-brown.

Female imago (in alcohol).— length: body, 13–15; forewings, 13–15. Eyes whitish grey. Head: light brownish-yellow, margins darker. Colour of ocelli as in ♂ imago. Thorax yellowish-brown, venter pale. Legs: details of coloration as in ♂ imago except reddish-brown median maculae on femora absent. Wings: coloration as in ♂ imago except two blackish-brown prominent patches in the pterostigmatic area; spot near bulla of subcostal vein of forewing and longitudinal and cross veins of fore and hind wings darker. Abdomen: terga 1–2 light reddish-brown, terga 3–9 dark reddish-brown, tergum 10 brownish-yellow; terga 2–8 with brownish-yellow maculae as in figure 5, the maculae on tergum 5 most prominent; posterior margin of all terga with a narrow, blackish-brown band. Sterna 1–5 pale yellow, sternum 6 dark grey, sterna 7–8 pinkish-brown, sternum 9 yellowish-brown. Caudal filaments reddish-brown, annulations at articulations darker.

Mature nymph (in alcohol) .— Head: dorsum brownish-yellow, carinae darker, sutures paler, area around ocelli darker. Antennae dark brown. Eyes whitish-grey. Venter pale. Thorax: dorsum yellowish-brown, margin of pronotum black, venter pale. Legs: femora yellowish-brown with a median, zig-zag pale yellow band as in figure 6; spines on surface of femora distally rounded; an irregular dark brown macula on the postero-median edge of all femora in ♂, maculae absent in ♀. Abdomen: terga of ♂ 1–5 light brownish-yellow, terga 6–9 dark brownish-yellow, tergum 10 brownish-yellow, terga 1–5 with pale yellow maculae as in figure 7, terga 6–10 irregularly washed with brownish-brown as in figure 7. Terga of ♀ 1–9 dark brownish-yellow, tergum 10 light brownish-yellow, terga 2–6 with two paired brownish-yellow maculae as in figure 8, terga 7–9 irregularly washed with brownish-yellow maculae as in figure 8. Sterna of ♂ 1–5 pale, sterna 6–9 brownish-yellow. Sterna of ♀ pale. Gill 1 asymmetrical and ovoid as in figure 3a, 1.5 times as long as

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flowersi
♂ ♀



Figures 1-9. *Thalerosphyrus floweri* n. sp. 1a. Forewing of ♂ imago; 1b. Hindwing of ♂ imago; 2. Genitalia, ventral view of ♂ imago; 3a-c. Nymphal abdominal gills; 3a. Gill 1; 3b. Gill 4; 3c. Gill 7; 4. Abdominal segments I-IX (lateral view) of ♂ imago; 5. Abdominal terga II-VIII of ♀ imago; 6. Foreleg of nymph; 7. Abdominal terga I-X of ♂ nymph; 8. Abdominal terga I-X of ♀ nymph; 9. Caudal filament of nymph.

wide; gills 2-6 triangular, produced into a blunt protuberance; gill 7 suboval, asymmetrical; lamellae of gills pale, tracheae and filaments smoky black. Median caudal filament hyaline, lateral cerci yellowish-brown, caudal filament and cerci interspersed with blackish-brown segments as in figure 9.

Material: Holotype ♂ imago, India: Tamil Nadu, Palni hills, Kumbakkarai stream, 10 km west of Periakulam, 400 m, 19.11.1982. Venkataraman & Sivaramakrishnan. Allotype ♀ imago, same data as for holotype. Paratopotypes: 2 nymphs, same data as for holotype, 21.12.1983. Paratypes: 2 nymphs, Palani hills, Silver Cascade, Kodaikanal, 1525 m, 22.8.1986. 2 nymphs, Thirumurthy hills, 15 km from Udumalpet, Tamil Nadu, India, 400 m, 27.2.1983. 2 nymphs, Honey Falls, Courtallam, 4 km southwest of Tenkasi, Tamil Nadu, India 600 m, 4.9.1983. (type material in the collections of the Entomology Research Institute, Loyola College, Madras, India).

Etymology, *flowersi*, named for Dr R. W. Flowers for having initiated and guided the senior author in the study of Heptageniidae.

Differential diagnosis. *Thalerosphyrus flowersi* appears to be closely related to *T. ethiopicus* but it can be differentiated from *T. ethiopicus* by the following combination of characters in the nymph: (i) gill 1 is asymmetrical and ovoid as in figure 3a, 1.5 times as long as wide; (ii) femora of all legs are yellowish-brown with a median, zig-zag pale yellow band as in figure 6, and (iii) median caudal filament is hyaline, lateral cerci are yellowish-brown; caudal filament and cerci are interspersed with blackish-brown segments (figure 9).

Biology. The nymphs cling to the underside of boulders in perennial streams where water flow is moderate. They feed on algae, detritus and plant

tissues. Algae formed by far the greatest proportion of the total volume of food ingested by *T. flowersi* in Kumbakkarai stream. The availability of a particular food item rather than food preference appears to be the reason for greater ingestion of algae. The life cycle pattern of *T. flowersi* in Kumbakkarai stream appears to be basically multivoltine with asynchronous, overlapping generations and continuous emergence. Fecundity of *T. flowersi* in Kumbakkarai stream is around 2650 eggs per last instar nymph (an average of 10 nymphs).

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