

## Ephemeroptera of Sri Lanka: Ephemeridae

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**ABSTRACT.** Two new species of *Ephemera* are described, *Ephemera supposita* Eaton is redescribed, and *Rhoenanthus posticus* Banks is transferred to *Ephemera* and redescribed. A key to the imagos of *Ephemera* from Sri Lanka is included.

### Introduction

Only one species of the Ephemeridae, *Ephemera supposita* Eaton, has previously been reported from Sri Lanka (cf. Hubbard & Peters, 1978). In this paper I describe two new species of *Ephemera* Linnaeus, 1758, redescribe *Ephemera supposita* Eaton, and transfer to *Ephemera* and redescribe *Rhoenanthus posticus* Banks, 1914. All of these species belong to the subgenus *Ephemera* (*Ephemera*). A key to the imagos of *Ephemera* from Sri Lanka is included.

Although the genus *Eatonigenia* Ulmer, 1939, is known from nearby Tamil Nadu and Orissa in India, *Ephemera* is the only genus of Ephemeridae which has been found in Sri Lanka.

There has always been an obvious lack of consistency in species descriptions of Ephemeridae in general, making species comparisons difficult. In this paper I am attempting to introduce a consistent style of species description which, if continued, will render future comparisons of species more easily possible. This style should be applicable, not only to *Ephemera* itself, but to other genera of the Ephemeridae as well.

Collections and institutions are abbreviated in the text as follows: (ALEF) Akademie der Landwirtschaftswissenschaften der DDR, Institut für Pflanzenschutzforschung, Eberswalde-Finow; (FAMU) Florida A & M University; (MCZ) Museum of Comparative Zoology,

Harvard University; (NMC) National Museum, Colombo; (UP) University of Peradeniya; (USNM) National Museum of Natural History, Washington; (UU) University of Utah; and (ZIMH) Zoologisches Institut und Zoologisches Museum, Universität Hamburg.

This paper is the second in a series of papers on the systematics, phylogeny, biogeography, and ecology of the Ephemeroptera of Sri Lanka (see Hubbard & Peters, 1978).

### Key to imagos of *Ephemera* from Sri Lanka

- 1 Hindwings with small spot at fork of vein Rs; penes blunt, subcylindrical as in Figs. 1 and 2  
*postica*
- Hindwings without small spot at fork of vein Rs; penes acute, or if blunt, apex broader than median portion . . . . . 2
- 2 Forewings with small dark spot at fork of vein MA . . . . . 3
- Forewings without dark spot at fork of vein MA; penes acute, subgenital plate with medial concavity as in Figs. 5 and 6 . . . . . *lankensis*
- 3 Hindwings tinged with reddish brown at outer margin; penes blunt with apex broader than median portion and subgenital plate broadly concave as in Figs. 13 and 14 . . . . . *supposita*
- Hindwings without reddish brown tinge at outer margin; penes acute, apex dentate and subgenital plate deeply emarginate medially as in Figs. 9 and 10 . . . . . *hasalakensis*

In 1914 Banks described a mayfly from Kandy, Ceylon, as *Rhoenanthus posticus*. I have found no specimens of *Rhoenanthus* Eaton, 1881, or other Potamanthidae among

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the collections available to me. Banks' description was not sufficient to confirm generic placement without examination of the type specimen. I was unable to locate the type-specimen until Dr George F. Edmunds, Jr, informed me that he recalled seeing it in the collections of the Museum of Comparative Zoology, Harvard University. I was able to borrow this type-specimen for comparison with other specimens from Sri Lanka.

This specimen (MCZ type no. 11902) is easily associated with numerous other specimens from Sri Lanka on the basis of distinctive abdominal and wing colour patterns and the shape of the penes. In this species there are three caudal filaments, vein  $A_1$  of the forewings is connected to the wing margin by a series of veinlets, and the forceps are four-segmented, all characteristics of the genus *Ephemer* of the Ephemeridae, not of *Rhoenanthus* (Lestage, 1931; Ulmer, 1939; McCafferty & Edmunds, 1973).

***Ephemer* (*Ephemer*) *postica* (Banks) comb.n.**  
(Figs. 1–4)

*Rhoenanthus posticus* Banks, 1914: 613;  
Lestage, 1931: 131; Hafiz, 1937: 369;  
Hubbard & Peters, 1978: 30.

*Rhoenanthus* (sic) *posticus*: Fernando, 1965:  
187.

Male imago (in alcohol). Length: body, 11.0–14.4 mm; forewings, 10.5–11.5 mm. Eyes grey. Dorsal half of ocelli white, basal half black. Antennae whitish, flagellum light brown. Head whitish, washed with black. Pronotum with two dark brown longitudinal submedian stripes connected anteriorly, separated by transparent patch; mesonotum with light brown median stripe; median scutal hump and lateral mesoscutellar humps brown; metanotum washed with brown; prosternum brown; mesosternum and metasternum white, with or without brown marks. Legs: coxae and trochanters whitish, coxae of middle legs marked with brown; femora of forelegs light reddish brown, remainder of forelegs darker; middle and hind legs whitish; coxae of middle legs marked with brown. Forewings: membrane hyaline, except subcostal and distal costal areas translucent reddish brown; dark brown spots at bullae of veins  $Sc$ ,  $R_2$ ,  $R_{4+5}$ , and  $MP_1$ , and at fork of

vein  $MA$ ; longitudinal veins yellowish, fading posteriorly; cross veins dark brown; cross veins in distal costal area anastomosed. Hindwings: membrane hyaline; dark brown spot at fork of vein  $Rs$ ; vein  $R_1$  dark brown; remainder of longitudinal veins yellowish; cross veins dark brown. Abdomen (Figs. 3 and 4): terga whitish; tergum 1 washed with brown except for a white median longitudinal line reaching to brown posterior border and two white submedian spots at anterior border; terga 2–9 with three pairs of brown longitudinal stripes, the outer stripes fading to triangles at the posterior ends of terga 7–9 or 8–9; two short consecutive dark lines at lateral edges of terga 2–7 gradually lengthening and joining as a continuous line in terga 8 and 9; tergum 10 margined with dark brown posteriorly. Abdominal sterna whitish, except dark yellow in posterior portions of sterna 8–9 or 9; dark band across anterior margin of sternum 1, and dark spots at posterolateral corners of sternum 1; sterna 2–9 or 3–9 with a pair of dark longitudinal lines, reduced to spots on sternum 9; a light brown median stripe evident on sterna 7–9, 8–9 or 9; light brown longitudinal stripes at lateral edges of sterna 1–9. Genitalia (Figs. 1 and 2) yellowish; small dark spot at base of forceps segments 1 and 2; apex of segment 2, and segments 3 and 4 dark brown; penes blunt. Caudal filaments yellowish with reddish brown annulations at articulations.

Male subimago (in alcohol). Coloration and markings similar to those of male imago except fore tarsi lighter.

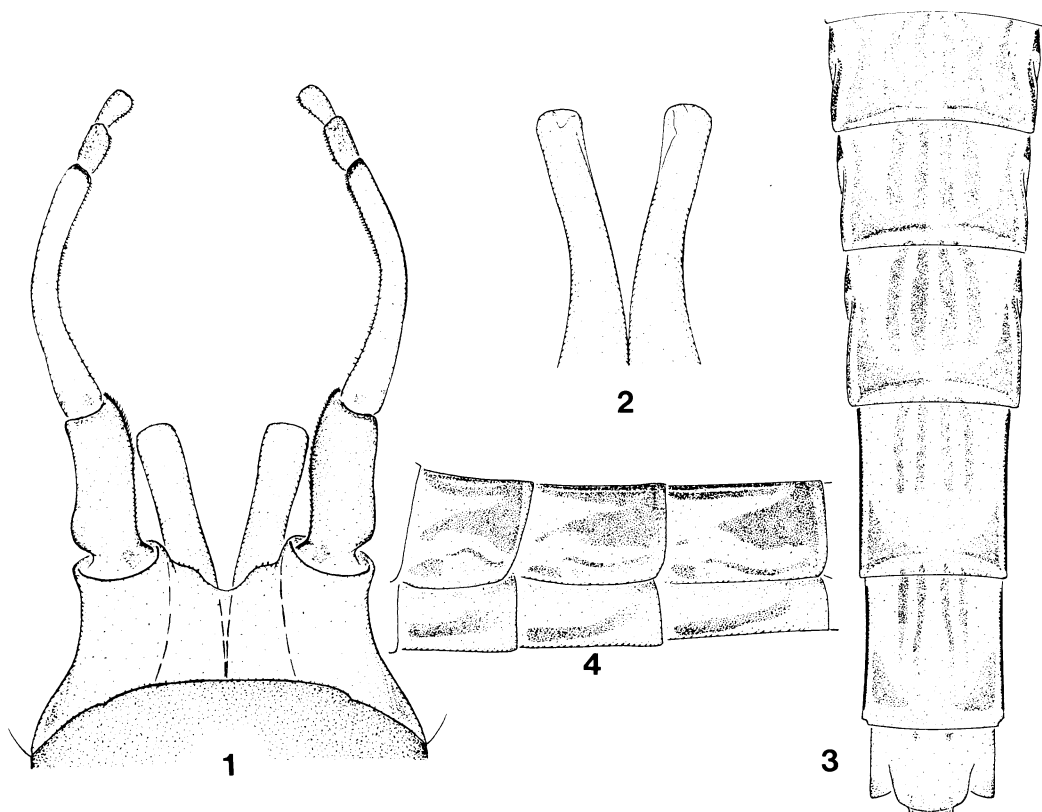
Female imago (in alcohol). Length: body, 13.0–14.5 mm; forewings, 12.5–13.2 mm; hindwings, 4.0–4.75 mm. Coloration and markings similar to those of male imago except tarsi of forelegs lighter than femora, and tibiae and joints marked with red.

Female subimago (in alcohol). Coloration and markings similar to those of female imago.

Nymph. Unknown.

*Type-specimens*. LECTOTYPE ♂ imago, 'Kandy CEYLON, 4 Nov, Green' (MCZ. type 11902, *Rhoenanthus posticus* Banks), pinned, here designated.

*Additional specimens examined*. 16 ♂, 4 ♀ imagos, 7 ♂, 1 ♀ subimago. SRI LANKA: Kandy Dist., Peradeniya, Mahaweli Ganga,



FIGS. 1-4. *Ephemera postica*. 1, ventral view of genitalia of  $\delta$  imago; 2, dorsal view of imaginal penes; 3-4, colour pattern of abdomen (3: dorsal, segments 5-10; 4: lateral, segments 5-7).

12.iii.1978 (Hubbard); 1  $\delta$  imago, Kandy Dist., Mavala-ela, Hantana Hill, 27.iii.1973 (Baumann & Cross); 2  $\delta$ , 5  $\text{f}$  imagos, 1  $\delta$  subimago, Kandy Dist., Nilambe, Nilambe Ella, 13.iii.1978 (Hubbard); 2  $\text{f}$  imagos, Kandy Dist., Hasalaka, Heen Ganga, 14.iii.1978 (Hubbard); 1  $\text{f}$  imago, Kandy Dist., Hasalaka, Gorolupatha Ella, 15.iii.1978 (Hubbard); 1  $\delta$ , 1  $\text{f}$  imago, Kandy Dist., Arappola, 26-28.x.1972 (Karunaratne); 1  $\text{f}$  imago, Ratnapura Dist., Uggalkaltota, 10-14.x.1970 (Flint); 14  $\text{f}$  imagos, Ratnapura Dist., Belihuloya, Belihul Oya, 23.iii.1978 (Hubbard); 5  $\text{f}$  imagos, same locality, 23-24.iii.1978 (Hubbard); 6  $\text{f}$  imagos, same locality, 9.iv.1978 (Hubbard); 2  $\text{f}$  imagos, same locality, 10.iv.1978 (Hubbard). All additional specimens are in alcohol. Association of males and females is by colour pattern and wing markings. These specimens are deposited at FAMU, NMC, UP, USNM, UU.

*Biology.* *Ephemera postica* is known from streams from about 60 m to well over 600 m altitude, over an approximate temperature range of 24-26°C. Adults have been collected in March, April, October and November.

*Discussion.* *Ephemera postica* can be distinguished from other species of *Ephemera* in the imago by the following combination of characters: (1) penes are blunt, subcylindrical, and subgenital plate has medial concavity as figured in Figs. 1 and 2; (2) abdominal colour pattern is as figured in Figs. 3-4; and (3) hindwings lack a spot at the fork of vein Rs.

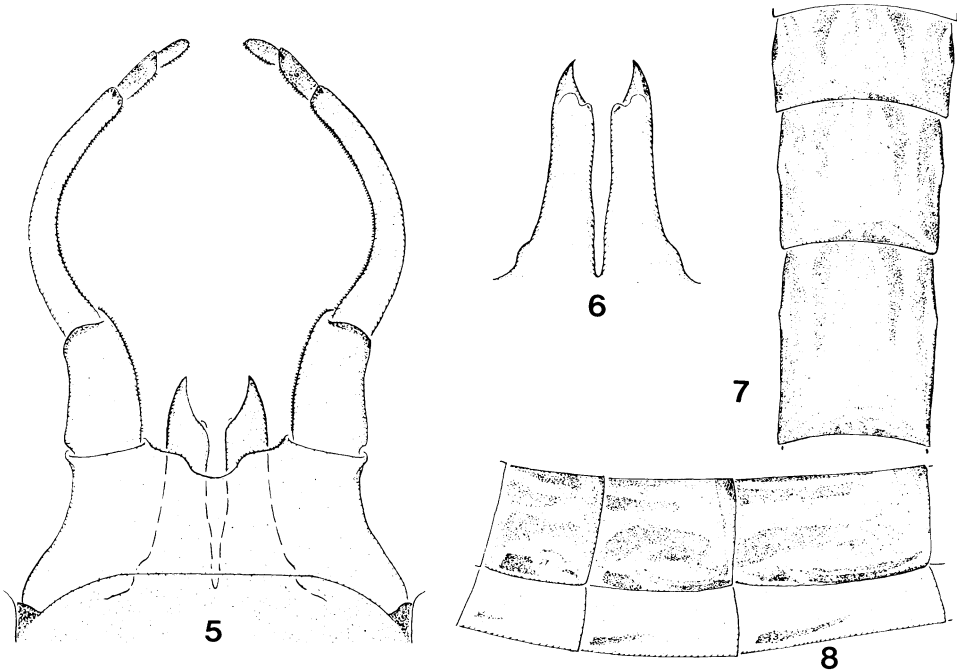
*Ephemera postica* (Banks) was the only species which had been reported as belonging to the Potamanthidae from Sri Lanka. Because I have been unable to locate any specimens of Potamanthidae in collections from Sri Lanka, and Hubbard & Peters in their catalogue of the Ephemeroptera of the Indian Subregion (1978) reported no other Potamanthidae

known from either Sri Lanka or southern India, I must assume that the Potamanthidae do not occur in Sri Lanka.

*Ephemera (Ephemera) lankensis* sp.n. (Figs. 5–8, 17)

Male imago (in alcohol). Length: body, 19.5–20.5 mm; forewings, 17.5–19.0 mm; hindwings, 6.25–6.75 mm. Eyes grey. Dorsal half of ocelli white, basal half black. Antennae yellowish washed with dark brown on scape and pedicel. Head yellowish with dark brown band between lateral ocelli; two dark brown triangular patches at posterior border of vertex. Pronotum dark brown with transparent triangular posteromedian patch; median longitudinal furrow brown; mesonotum yellowish to white; median scutal hump and lateral mysoscutellar humps darker; median margins of mesoscutellar humps marked with brown; metanotum whitish with dark median transverse band. Sternum yellowish to white; mesoepisternum brown. Forelegs yellowish

coxae and trochanters lighter, tarsi darker; dark brown markings at femoral–tibial joint and remainder of joints distally; first tarsal segment and apex of tibiae dark brown. Middle and hind legs whitish, middle coxae washed with brown. Forewings: membrane hyaline except subcostal and pterostigmal areas translucent yellowish; dark spot at bullae of Sc and R, and at fork of Rs; longitudinal veins yellow, cross veins dark brown; cross veins near middle of pterostigma sinuate, anastomosed. Hindwings: membrane hyaline; veins yellow to light brown. Abdomen (Figs. 7 and 8): dorsum yellowish white; tergum 1 brown, terga 2–9 with three pairs of brown longitudinal lines; terga 2–9 or 3–9 with dark lateral spots, gradually lengthening to whole or broken line in posterior segments; tergum 10 yellowish, margined with black posteriorly. Sterna 3–9 or 4–9 with pair of black marks, starting as anterolateral spots and grading to mediolateral lines distally; posterior portion of sternum 9 washed with brown. Genitalia (Figs. 5 and 6) yellowish; forceps marked with black at joints; segments 3 and 4 of



FIGS. 5–8. *Ephemera lankensis*. 5, ventral view of genitalia of  $\delta$  imago; 6, dorsal view of imaginal penes; 7–8, colour pattern of abdominal segments 5–7 (7: dorsal; 8: lateral).

forceps black; penes acute; subgenital plate with medial concavity. Caudal filaments yellowish, with dark brown annulations at articulations.

Male subimago (in alcohol). Coloration and markings similar to male imago.

Female imago (in alcohol). Length: body, 20.5–23.0 mm; forewings, 20.5–21.5 mm; hindwings, 7.25–7.5 mm. Coloration and markings similar to male imago, but generally lighter in colour. Mesoepisternum, median scutal hump and lateral mesoscutellar humps lighter. Abdominal tergal colour pattern slightly less distinct; abdominal sterna may lack markings anteriorly.

Female subimago (in alcohol). Coloration and markings similar to female imago.

Nymph (in alcohol). Eyes black. Head yellowish. Labrum slightly emarginate in median third. Thorax yellowish white; setae whitish to golden. Fore and middle legs yellowish, hindlegs whitish; setae whitish to golden. Abdominal terga light yellowish brown with black colour pattern similar to that of adult. Gill 7 (Fig. 17) uniramous, fringed ventrally. Terminal filament longer than cerci.

*Holotype* ♂ imago, SRI LANKA: Nuwara Eliya Dist., Horton Plains, Hatton Road Stream, 5.iv.1978 (*Hubbard*).

*Paratypes*: 4 ♂, 2 ♀ imagos, 2 ♂, 2 ♀ subimagos, 1 nymph, same data as holotype; 3 nymphs, Centr. Prov., Horton Plains, alt. 6700 ft, 11 miles SSE Nuwara Eliya, 19–20.iii.1962 (*Brink, Andersson & Cederholm*); 26 nymphs, Ohiya, 1980 m, iv.1928. All types are in alcohol. Association of adults and nymphs is by colour pattern. Types are deposited as follows: holotype, 2 ♂, 1 ♀, and 2 nymphal paratypes, USNM; 2 ♂, 2 ♀, and 2 nymphal paratypes, NMC; 1 ♂, 1 ♀, and 16 nymphal paratypes, FAMU; 1 ♂ and 10 nymphal paratypes, UU.

Etymology. Adj., from Sri Lanka.

*Biology*. *Ephemerella lankensis* has been collected from temperatures of about 14–17°C, in streams ranging in altitude from about 1800 to 2050 m. The adults have been collected in March and April.

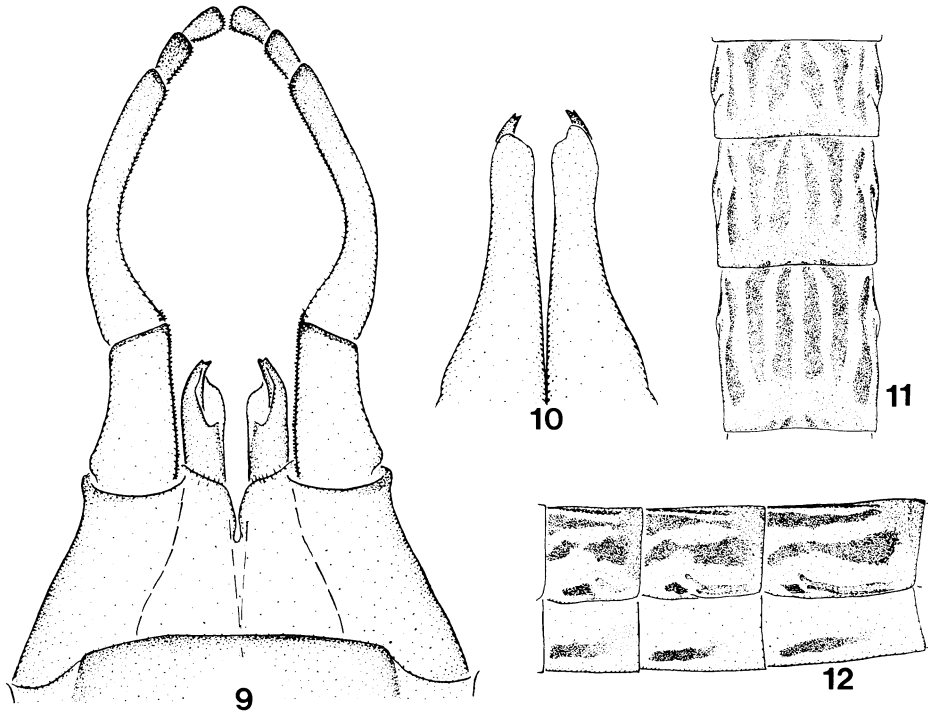
*Discussion*. *Ephemerella lankensis* can be distinguished from other species of *Ephemerella* by the following combinations of characters.

In the imago: (1) penes are acute and subgenital plate has medial concavity as illustrated in Figs. 5 and 6; (2) abdominal colour pattern is as figured in Figs. 7 and 8; and (3) forewings lack a spot at the fork of vein MA. In the nymph: (1) thorax is yellowish; (2) gill 7 is uniramous; and (3) abdominal colour pattern is similar to that of the adult (Figs. 7 and 8).

*Ephemerella (Ephemerella) hasalakensis* sp.n.

(Figs. 9–12)

Male imago (in alcohol). Length: body, 13.2–15.5 mm; forewings, 11.5–13.5 mm; hindwings, 4.0–5.1 mm. Eyes grey. Dorsal half of ocelli white, basal half black. Antennae white, flagellum grey. Head whitish, with black specks; pair of black dots at posterior margin. Pronotum dark brown with transparent median longitudinal stripe, posterior margin black; mesonotum white, median scutal hump and lateral scutellar humps brown, posterior half of scutum washed with brown. Sternum whitish. Pleura whitish, marked with brown. Forelegs: coxae and trochanters whitish; femora whitish darkening to yellow distally; tibiae and tarsi brownish, darker at joints. Middle and hind legs whitish; hind coxae marked with brown; claws marked with brown. Forewings: membrane hyaline except distal half of costal and subcostal membrane translucent white, proximal portion of subcostal area faintly translucent; dark spot at bullae of R<sub>2</sub> and R<sub>4+5</sub>, and at fork of MA; longitudinal veins brownish, fading to white posteriorly; cross veins dark brown; cross veins in pterostigmal area of costal space anastomosed. Hindwings: membrane hyaline; longitudinal veins light brown, fading posteriorly; cross veins darker. Abdomen (Figs. 11 and 12): terga whitish; tergum 1 brown laterally; pair of longitudinal brown stripes paralleling mid-line, joining lateral brown spots at posterior border; terga 2–9 with three pairs of longitudinal brown stripes; dark spot at lateral edge, gradually lengthening to whole or broken line on posterior segments; tergum 10 yellowish, margined in dark brown posteriorly. Sterna whitish; sternum 1 with pair of brown marks, starting perpendicular to posterolateral edge and then turning anteriorly



FIGS. 9–12. *Ephemera hasalakensis*. 9, ventral view of genitalia of ♂ imago; 10, dorsal view of imagnal penes; 11–12, colour pattern of abdominal segments 5–7 (11: dorsal; 12: lateral).

at a chevron-like angle; sterna 2–8 with pair of dark spots, changing from very faint on sternum 2 to chevron-like lines posteriorly; sternum 9 with pair of dark spots and faintly margined with brown posteriorly. Genitalia (Figs. 9 and 10) whitish, forceps marked with brown at joints; forceps segments 3 and 4 and apex of segment 2 brown; apex of penes acute, dentate; subgenital plate deeply emarginate. Caudal filaments yellowish, with faint brown annulations at articulations.

Male subimago (in alcohol). Coloration and markings similar to male imago except generally lighter in colour. Abdominal sternal markings reduced or absent on segments 1 and 2. Wing membranes translucent yellowish; longitudinal veins yellowish; cross veins brown.

Female imago (in alcohol). Length: body, 16.5–17.3 mm; forewings, 14.4–14.75 mm; hindwings, 4.5–5.25 mm. Coloration and markings similar to male imago. Forelegs whitish, femora turning yellow and darkening distally, tibiae yellow, tarsi brown. Sternum 1

lacks posterolateral markings; sternum 9 with marks more like lines than spots, no dark posterior margination.

Female subimago (in alcohol). Coloration and markings similar to female imago except generally lighter, wing membranes translucent yellowish, longitudinal veins yellowish; cross veins brown.

*Holotype* ♂ imago, SRI LANKA: Kandy Dist., Hasalaka, Gorulupatha Oya, 15.iii.1978 (*Hubbard*).

*Paratypes*: 3 ♀ imagos, same data as holotype: 2 ♀ imagos, 1 ♀ subimago, Ratnapura Dist., Gilimale, Kalu Ganga, 27.ii.1978 (*Hubbard*); 9 ♂, 6 ♀ subimagos, Ratnapura Dist., Belihul Oya, 2000 ft, 12.x.1970 (*Flint*); 1 ♂ imago, same locality, 9.iv.1978 (*Hubbard*); 3 ♂ imagos, Ratnapura Dist., Sooriyakanda, 19.iv.1978 (*Baumann & Cross*); 3 ♂, 1 ♀ subimago, Ratnapura Dist., Evaporu Ganga 2 miles NW Kolonne, 1000 ft, 16.x.1970 (*Flint*); 2 ♀ subimagos, Sabaragamuwa

Prov., Allerton 1 mile SW Rakwana, 28.ii.1962 (*Brink, Andersson & Cederholm*); 1 ♂, 1 ♀ subimago, Mate. Dist., Elkaduwa, Hunas Falls, 3000 ft, 5.iv.1973 (*Baumann & Cross*); 2 ♂, 1 ♀ subimago, Kan. Dist., Maskeliya Oya, Norton Bridge, 3000 ft, 13.iii.1973 (*Baumann & Cross*); 6 ♀ imagos, Uva Diyaluma Falls, Koslanda, 19.iii.1973 (*Baumann & Cross*); 1 ♂ subimago, Sabaragamuwa Prov., Bopathella Falls 9 miles NNW Ratnapura, 19.ii.1962 (*Brink, Andersson & Cederholm*); 1 ♂ imago, exact locality unknown, 1978 (*Hubbard*). All types are in alcohol. Association of males and females is by colour pattern and wing markings. Types are deposited as follows: holotype, 11 ♂ and 12 ♀ paratypes, USNM; 2 ♂ and 2 ♀ paratypes, NMC; 6 ♂ and 7 ♀ paratypes, FAMU; 2 ♂ and 2 ♀ paratypes, UU.

**Etymology.** Adj., named for Hasalaka, the type-locality.

**Biology.** *Ephemera hasalakensis* has been collected from over 900 m down to about 50 m in altitude, a temperature range of approximately 21–26.5°C. The adults have been collected in February, March, April and October.

**Discussion.** *Ephemera hasalakensis* can be distinguished from other species of *Ephemera* in the imagos by the following combination of characters: (1) dark spot at fork of vein MA in the forewings; (2) fore and hindwings lack a reddish tinge in the outer margin; (3) hindwings lack spot at fork of vein Rs; (4) penes are acute, dentate, and the subgenital plate is deeply emarginate as figured in Figs. 9 and 10; and (5) the abdominal colour pattern is as illustrated in Figs. 11 and 12.

***Ephemera (Ephemera) supposita* Eaton (Figs. 13–16)**

*Potamanthus fasciatus* (partim) Hagen, 1858: 476 (non *Kimminsula fasciata* (Hagen)).

*Ephemera supposita* Eaton, 1883: 72; Eaton, 1892: 409; Hafiz, 1937: 366; Kimmins, 1960: 309; Fernando, 1965: 186.

(non) *Ephemera supposita*: Ulmer 1912: 369; Lestage, 1927: 97; Uéno, 1928: 22; 1931: 212; 1931: 215.

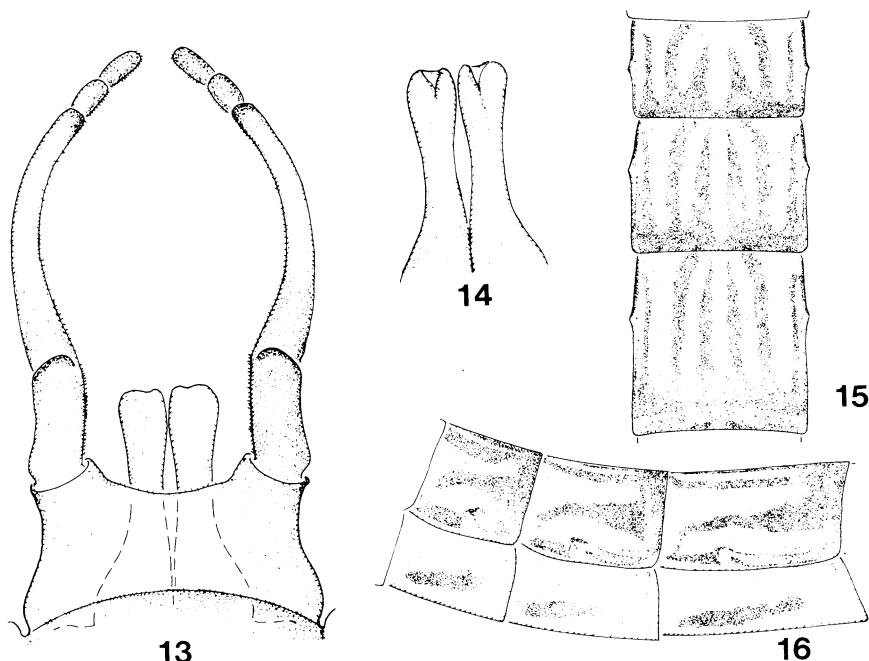
*Ephemera (Ephemera) supposita*: Hubbard & Peters, 1978: 17.

Male imago (in alcohol). Length: body, 12.5–14.75 mm; forewings, 10.0–11.0 mm; hindwings, 3.25–4.25 mm. Eyes grey. Dorsal half of ocelli white, basal half dark brown. Antennae grey. Head whitish, washed with brown. Pronotum brown with transparent median longitudinal line dilating posteriorly, brownish band across posterior margin; mesonotum brown, darker at median scutal hump and lateral mesoscutellar humps; mesonotum margined with dark brown; lateral mesoscutellar humps edged with dark brown along medial lateral borders; lateral areas posterior to median scutal hump lighter; metanotum brown with dark brown markings. Sternum heavily marked with brown. Pleura white, heavily marked with brown. Forelegs dark brown. Middle and hind legs whitish, tarsi darker. Forewings: membrane hyaline; subcostal area and pterostigmal area of costal space translucent reddish; dark spots at bullae of R<sub>2</sub>, R<sub>4+5</sub> and MP<sub>1</sub>, at fork of MA and small spots at intersections of Rs and MA, and MP<sub>2</sub> and CuA; veins brown. Abdomen (Figs. 15 and 16) yellowish white; tergum 1 brown with white anterolateral mark, irregular transverse posterior white band, terga 2–9 with three pairs of longitudinal brown stripes joining posterior transverse brown band; tergum 10 yellowish, margined with dark brown posteriorly. Abdominal sterna whitish; sternum 1 with anterior dark brown band, posterior corners with a pair of brown spots extending anteriorly as chevron-like marks; sterna 2–8 with pair of longitudinal brown stripes converging slightly anteriorly in each segment; sternum 9 darker yellow, with pair of smaller marks and margined with dark brown posteriorly. Genitalia (Figs. 13 and 14); forceps yellow; dark marks at joints, segment 3 and apex of segment 2 dark brown; penes blunt, apex broader than median portion; subgenital plate broadly concave with posterior end margined with dark brown. Caudal filament yellowish brown, with darker brown annulations at articulations.

Male subimago. Unknown.

Female imago. Unknown.

Female subimago (dried). 'Wings fawn-colour, the stronger of the longitudinal nervules yellowish, the cross veinlets of the forewings black; the submarginal area of the forewings is tinged with yellowish, and some



FIGS. 13–16. *Ephemera supposita*. 13, ventral view of genitalia of ♂ imago; 14, dorsal view of imaginal penes; 15–16, colour pattern of abdominal segments 5–7 (15: dorsal; 16: lateral).

of the cross veinlets in the marginal area are edged with darker towards the subcosta' (Eaton, 1883).

Nymph. Unknown.

*Type-specimens.* LECTOTYPE ♀ subimago, 'CEYLON' (MCZ, type 11211. *Ephemera supposita*), pinned, here designated.

*Additional specimens examined.* 3 ♂ imagos, SRI LANKA: Galle Dist., Kanneliya Circuit Bungalow, Kanneli Ella, 6.iii.1978 (Hubbard); 1 ♂ imago, Ratnapura Dist., Weddagala, Weddagala Ganga, 1.iii.1978 (Hubbard). All additional specimens are in alcohol. I have been able to locate only one type of *E. supposita*, the pinned female subimago in the MCZ collection. Although the wings are damaged making the pattern of markings difficult to determine, even for a subimago, the abdominal colour pattern is fairly distinct. This allows definite association with the males redescribed above, which also agree quite closely with Eaton's (1883) description of the males of this species. These additional specimens are deposited in FAMU, NMC, UP, USNM.

*Biology.* I have seen specimens of *E. supposita* from below 100 m altitude, and it has

been reported from 500–600 m. This is an approximate temperature range of about 24.5–26.5°C. The adults have been collected during March.

*Discussion.* *Ephemera supposita* has also been reported from two other localities in Sri Lanka, Rambodde (cf. Eaton, 1883) and Peradeniya (Hafiz, 1937). Ulmer (1912) reported several specimens of *E. supposita* from Formosa, a record that was repeated by Uéno (1928, 1931). I have examined specimens from Formosa (currently in ALEF and ZIMH) identified by Ulmer as *E. supposita*. They are not *E. supposita* but are a different species of *Ephemera* altogether. I must conclude that Ulmer was mistaken in reporting *E. supposita* from Formosa.

Lestage's (1927) key to the *Ephemera* of the Orient, which reports *E. supposita* from Formosa and questionably from the 'Indes', deprives *E. supposita* of the wing spots clearly described by Eaton (1883) ('Ailes I et II sans taches foncées'), and so must refer to a different species entirely. Hafiz (1937) reported that Chopra had seen specimens of *E. supposita* from Malabar, Talimparamba, and the Palni Hills of India. I have seen no specimens from India which belong to *E. supposita* and



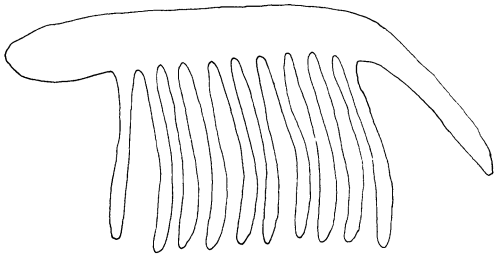


FIG. 17. *Ephemera lankensis*. Abdominal gill 7.

for the present must consider it endemic to Sri Lanka.

*Ephemera supposita* can be distinguished from other species of *Ephemera* by the following combination of characters in the imago: (1) forewings have a dark spot at the fork of vein MA; (2) hindwings lack spot at fork of vein Rs; (3) fore and hindwings are tinged with reddish brown at the outer margin; (4) penes are blunt, apex broader than median portion and subgenital plate is broadly concave as illustrated in Figs. 13 and 14; and (5) abdominal colour pattern is as figured in Figs. 15 and 16.

## Discussion

The exact taxonomic placement of most Asian *Ephemera* remains enigmatic. The majority of the Asian species of *Ephemera* are known only from the adult. The subgenus *Aethephemera* McCafferty & Edmunds is known only from nymphs. Consequently we do not know whether any of the Asian species which are known only from adults belong to this subgenus. The nymphal characters of the one species from Sri Lanka for which this stage is known, *E. lankensis* sp.n., indicate that this species belongs in the subgenus *Ephemera* (*Ephemera*). I have also examined a number of unassociated *Ephemera* nymphs from Sri Lanka which are deposited at FAMU. These nymphs all belong in the subgenus *Ephemera* (*Ephemera*).

The ecological distribution of the Sri Lankan *Ephemera* is typical of the genus as discussed by McCafferty & Gillies (1979). In Sri Lanka, *Ephemera* is restricted to non-lowland areas where the water temperature is not perennially warm, and generally comes

from areas where sand-based substrates predominate. *Ephemera* has been collected in Sri Lanka from about 2050 m altitude in the hill country down to about 60 m in the wet lowlands. Adults are known from February, March, April, October and November, and nymphs have been collected in February, March, April and November.

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