

## A NEW *AFRONURUS* (EPHEMEROPTERA: HEPTAGENIIDAE) FROM THE PHILIPPINES

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*Abstract.* A new species of *Afronurus*, *A. philippinensis*, is described from the Philippine Islands. Diagnostic morphological characters of imago, nymph, and eggs are illustrated and discussed.

Lestage (1924) established the genus *Afronurus* from the African species of *Ecdyonurus* based on differences in the legs of the male imagos. Presently, *Afronurus* includes 17 described species: 12 from Africa, 1 from Asia Minor, and 4 from the Oriental Region. *Afronurus philippinensis*, n. sp., is the 5th species of the genus known from the Orient and the 1st to be described from the Philippines. Geographically, *A. philippinensis* represents the farthest extension eastward of the genus. In this report we describe the adult, nymph, and egg of *A. philippinensis*.

### *Afronurus philippinensis* Flowers & Pescador, new species

Fig. 1-12

*♂ imago* (in alcohol). Length: body, 5.1-5.9 mm; fore wing, 5.5-6.8 mm. Eyes gray in upper  $\frac{2}{3}$ , black in lower  $\frac{1}{3}$ . Head tan; base of ocelli and edge of frontal shelf black. Antennae yellow. Thorax yellowish tan; margins of pronotum black, meso- and metanota orange-brown; pleura at base of coxae with small black dots. Legs yellowish tan; fore coxae with transverse black streak on anterior surface, fore femur washed with dark brown on underside and with brown ring at apex, fore tibia orange-brown, darker at apex. Wings hyaline, costal and subcostal membranes of fore wing orange-brown. Abdomen pale orange-tan; terga 1-9 with dark brown posterior transverse lines, sometimes with lateral pale brown shading. Genitalia as in Fig. 7. Cerci yellow, brown on alternate articulations.

*♀ imago* (in alcohol). Length: body, 5.6-7.3 mm; fore wings, 6.1-6.9 mm. Eyes black. Head yellowish, washed with black. Color and markings of thorax, legs, and wings as in *♂ imago*. Color and markings of abdomen as in *♂ imago*. Subanal plate weakly emarginate at apex. Cerci as in *♂ imago*.

*Mature nymph* (in alcohol). Length: 6.0-6.6 mm. Head orange-brown with pale dots on frontal margin and a pale suture lateral to compound eyes. Mouthparts as in Fig. 1-5. Thorax: dorsum orange-brown with pale spots. Pronotum and base of mesonotal wing pad with a pair of dark marks. Sterna pale yellow. Legs: femora orange-brown with pale maculae, a dark brown spot apically on ventral surface. Tibiae yellowish-brown, tarsi pale brown. Abdomen: dorsum orange-brown with pale maculae as in Fig. 6. Sterna pale yellow. Small posterolateral spines on segments 4-9. Gills (Fig. 8-10) hyaline, tracheae and dorsal part of lamellae washed with brown. Caudal filaments brown.

*Egg.* Micropyle tageniform. Coiled threads larger at equator and smaller at poles (Fig. 11-12).

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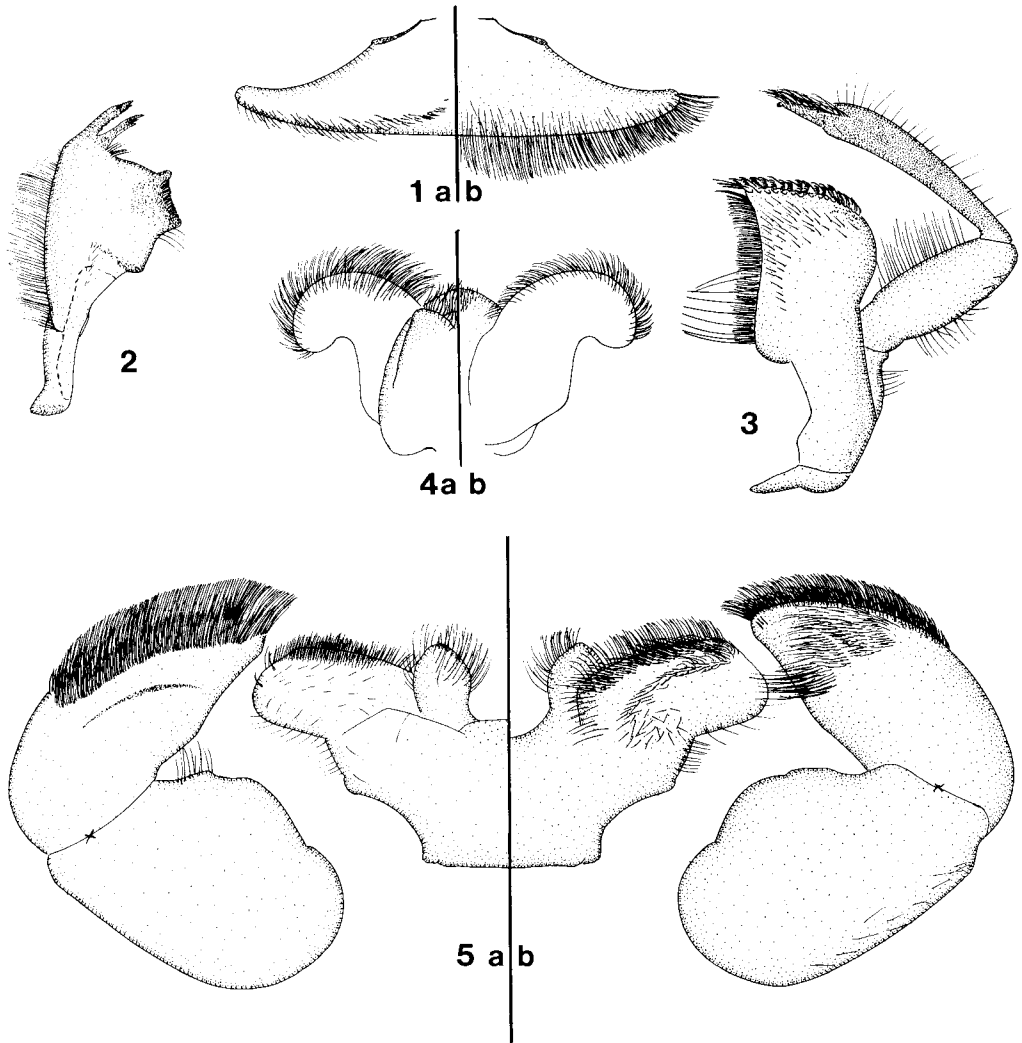


FIG. 1-5. *Afonurus philippinensis*, mouthparts of nymph: 1, labrum (a, ventral, b, dorsal); 2, left mandible; 3, left maxilla, ventral; 4, hypopharynx (a, ventral, b, dorsal); 5, labium (a, ventral, b, dorsal).

*Type specimens.* Holotype ♂ imago, PHILIPPINES: Laguna Prov, Molawin Crk, 18.VI.1967 (M.L. Pescador). Allotype ♀ imago, same locality and collector as holotype, 7.VI.1967. Paratypes: same locality and collector as holotype: 1♂ imago, 3♂ subimagos, 3.VII.1967; 4♂, 2♀ imagos, 18.VI.1967; 12 nymphs, 2.VI.1967; 12 nymphs, 7.VI.1967. Holotype, allotype, 5♂, 2♀ imaginal, 3♂ subimaginal, and 10 nymphal paratypes are deposited at Florida A&M University; 3♂, 2♀ imaginal paratypes at the Bishop Museum, Honolulu; and 2♂, 2♀ imaginal and 7 nymphal paratypes at the University of the Philippines, College, Laguna.

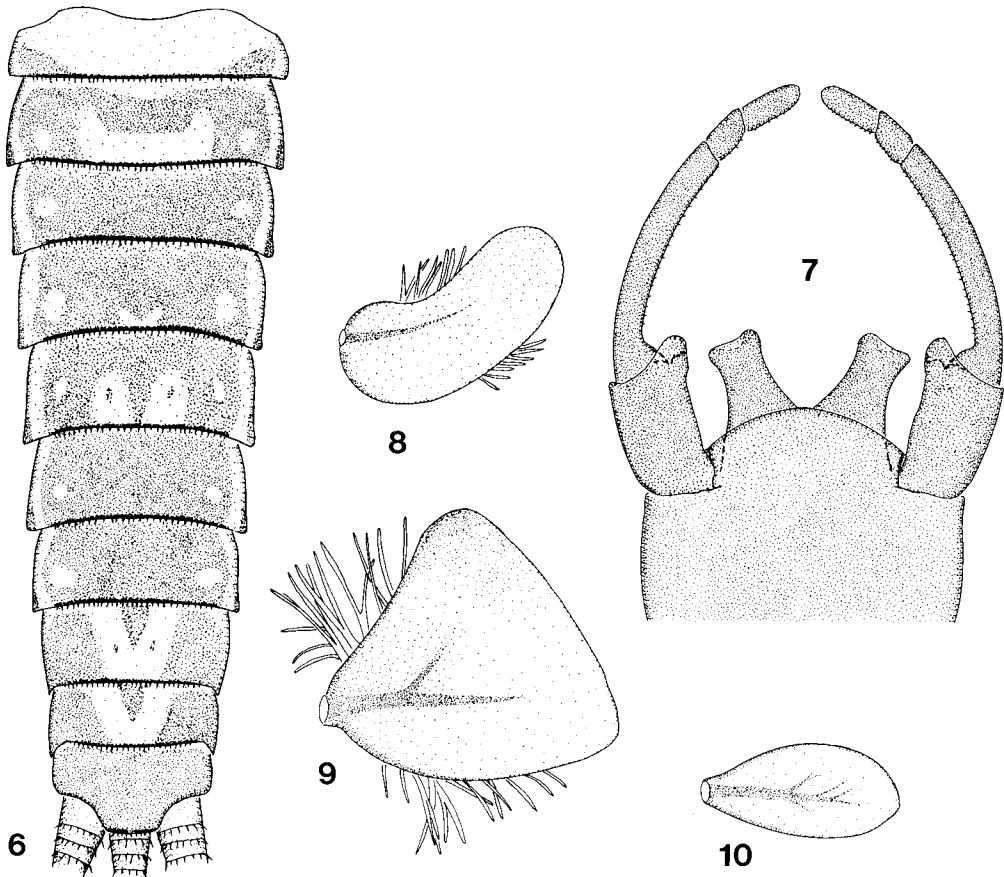


FIG. 6-10. *Afronurus philippinensis*: 6, abdominal terga of nymph; 7, genitalia of  $\delta$  imago; 8-10, gills of nymph: 8, gill I; 9, gill IV; 10, gill VII.

*Etymology.* *philippinensis*, Latin, "from the Philippine Islands."

*Biology.* Nymphs of *Afronurus philippinensis* were collected from underneath stones and trapped debris in moderately flowing sections of Molawin Creek at about 300 m above sea level. The nymphs were found in upper reaches of the creek where the substrate consists of coarse shifting sand, and terrestrial vegetation, as described by Realon (1979), includes stands of Cycadaceae, Gnetaceae, Pandaceae, and Araceae. The imagos were collected in late afternoon by net sweeping of vegetation along the bank of the creek. Association of nymphs and adults is by comparison of color patterns of specimens collected at the same place.

*Discussion.* *Afronurus philippinensis* differs from other known *Afronurus* in having the penis lobes widely separated in the apical  $\frac{1}{2}$ . However, it shows a close relationship to other *Afronurus* by the following characters: 1) the penes lack median titilators

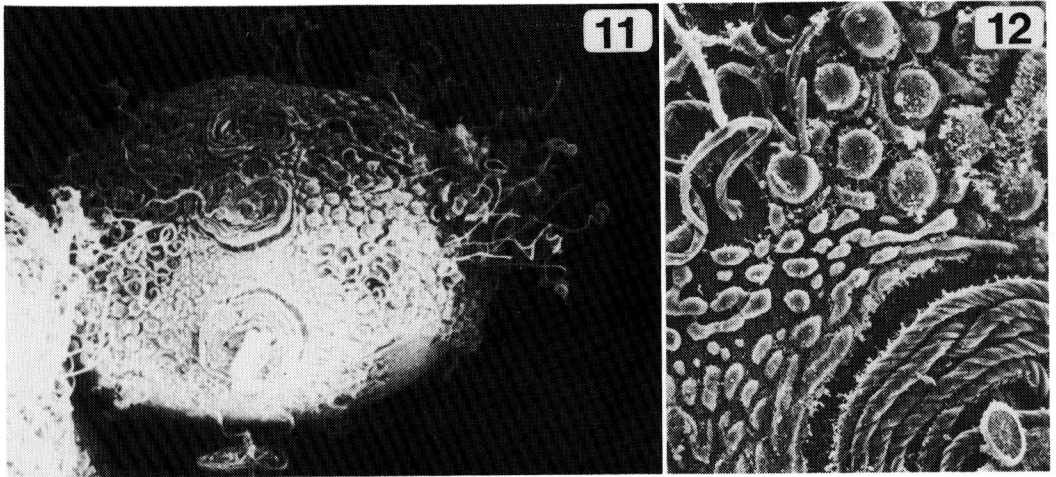


FIG. 11-12. Egg of *Afronurus philippinensis*: 11, egg (480 $\times$ ); 12, details of large and small coiled threads (1505 $\times$ ).

(Fig. 7); 2) the subgenital plate of the  $\delta$  imago is excavated between the forceps (Fig. 7); 3) the egg (Fig. 11-12) has a unique arrangement of large and small coiled threads, which is characteristic of *Afronurus* and the Indian genus *Cinygmina* (Koss & Edmunds 1974). We place *A. philippinensis* in *Afronurus* because the penes lack titilators and expanded lateral lobes, both of which occur in *Cinygmina* (Braasch 1981).

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#### LITERATURE CITED

- Braasch, D.** 1981. Beitrag zur Kenntnis der Heptageniidae des Himalaya. *Reichenbachia* **19**: 127-32.
- Koss, R.W. & G.F. Edmunds, Jr.** 1974. Ephemeroptera eggs and their contribution to phylogenetic studies of the order. *Zool. J. Linn. Soc.* **55**: 267-349.
- Lestage, J.A.** 1924. Les éphémères de l'Afrique du Sud. Catalogue critique et systématique des espèces connues et description de trois genres nouveaux et de sept espèces nouvelles. *Rev. Zool. Afr.* **12**: 316-52.
- Realon, C.B.R.** 1979. An ecological study of mayfly nymphs in Molawin Creek, Mt Makiling, Laguna. *Philipp. Entomol.* **4**: 233-91.