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STUDIES OF INDONESIAN PERLIDAE (PLECOPTERA), WITH DESCRIPTIONS OF THREE NEW SPECIES

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ABSTRACT
Records are presented for sixteen perlid stoneflies in Indonesia including three previously unrecognized species from Kalimantan. Most records are from the islands of Sumatra, Java or Borneo, but also included are records of *Neoperla* nymphs from Irian Jaya Province on the island of New Guinea. *Tetropina larvata* Klapálek is placed as a synonym of *T. fulgescens* (Enderlein) and egg descriptions based on scanning electron micrographs are provided for several species.

Keywords: Plecoptera, Perlidae, Indonesia, new species, *Neoperla, Phanoperla*

INTRODUCTION

The known stonefly fauna of Indonesia includes members of Leuctridae, Nemouridae, Peltoperlidae and Perlidae. Of these, Perlidae is thought to be the most widespread and diverse group in Indonesia with five genera (*Chinoperla, Etrocorema, Neoperla, Phanoperla* and *Tetropina*) and potentially as many as 71 species already reported. Twenty five species in four perlid genera are known from Sumatra (Zwick 1982c, 1983; Zwick & Sivec 1985); the Bornean fauna includes five genera and a minimum of 41 species, but virtually all of these are from Sabah and Sarawak with apparently only six species [*N. harina* Navas, *N. multilobata* Zwick, *N. securifera* Zwick, *N. tetrapoda* Zwick, *Tetropina fulgescens* (Enderlein) and *T. larvata* Klapálek] reported from the Indonesian part of the island (Zwick 1984, 1986a, b). Twelve species in two genera, *Neoperla* and *Phanoperla*, are reported from Java but five *Neoperla* are shared with Sumatra and the only *Phanoperla* [*P. flaveola* (Klapálek)] is shared with Borneo (Zwick 1982d, 1983). Collections from other islands appear to be lacking although Zwick (1983) indicates a single female of the *Neoperla primitiva* Geijskes group was collected in 1927 from Lombok, and one of the male paratypes of *N. propinqua* Zwick is from Simalur.

This study is based primarily on collections made in Kalimantan, Sumatra and Java by personnel of the Royal Ontario Museum but also includes nymphal specimens collected in Irian Jaya by D.A. and J.T. Polhemus, and a few specimens from Sabah collected by G.F. and C.H. Edmunds. The material includes two new species of *Phanoperla* and one of *Neoperla* and new records for several additional species. Specimens are deposited in the Royal Ontario Museum, Toronto (ROM), the Museum Zoologicum Bogoriense, Indonesian Institute of Sciences, Bogor (MZB) and the Stark Collection, Clinton (BPS) as indicated in the text.

RESULTS AND DISCUSSION

Etrocorema nigrogeniculatum (Enderlein)

Ochthopetina nigrogeniculata Enderlein, 1909:400. Lectotype ♂, Malaysia

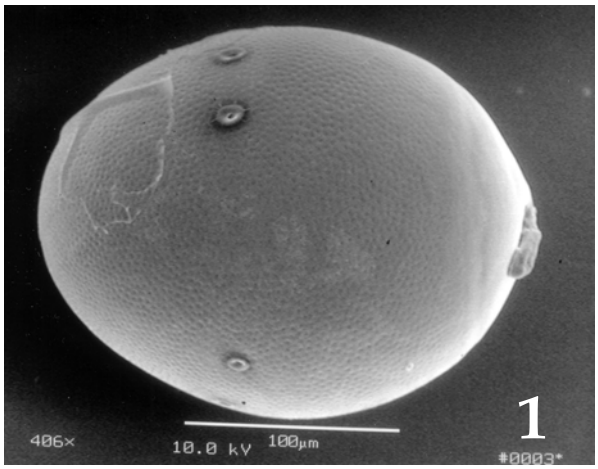
Etrocorema ahenobarba Klapálek, 1909:222. Holotype ♂, Camp Jor, Malaysia. Syn. Klapálek, 1923
Euryplax ochrostoma Klapálek, 1909:225. Holotype ♀, Malaysia. Syn. Zwick, 1982b
Neoperla modiglianina Navas, 1932:952. Holotype ♀, Si-Rambé, Sumatra. Syn. Zwick, 1982a
Neoperla nangina Navas, 1929:80. Holotype ♂, Nanga Obat, Borneo. Syn. Zwick, 1986a

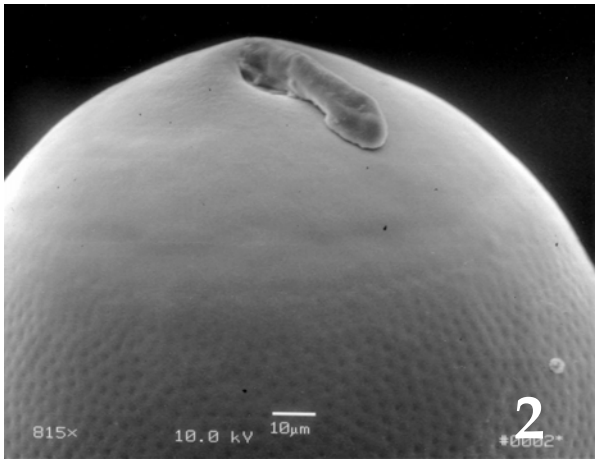
Material examined. Indonesia: East Kalimantan, Kayan-Mentarang Nature Reserve, Lalut Birai, 2° 52′ N, 115° 49′ E, 378 m, 28 March-16 April 1994, IIS 940507, B. Hubley, D.C. Darling, 1 ♂, 4 ♀ pinned (MZB, ROM).
Remarks. Zwick (1982a, b) reported this species from Sumatra and Borneo (Sabah) respectively, Zwick & Sivec (1985) gave additional Sumatran records, and Zwick (1986a) placed *N. nangina*, a species named from Borneo, as a synonym of this species. The Sabah female studied by Zwick (1982b) is reported to be "…dark and very large, the wing is 26 mm long", whereas the females in this sample, also quite dark, have 16-17 mm forewing lengths. Unfortunately no eggs could be extracted from these pinned specimens, but the internal and external male genitalia are consistent with specimens from the Asian mainland except for the atypical absence of anterior sclerite development along the median line of tergum 9.

Neoperla affinis Zwick
(Figs. 1-2)

Neoperla affinis Zwick, 1983:193. Holotype ♂, Tanangtalu, Sumatra
Neoperla affinis: Zwick & Sivec, 1985:129. New records

Material examined. Indonesia: Sumatra, Aceh, Mt. Leuser National Park, Ketambe Research Station, Alas River, 3° 41′ N, 97° 39′ E, 350 m, 5 September 1989, ROM 893053, W.K. Gall, 1 ♂, 7 ♀ (MZB, ROM).
Remarks. This species is known from about a dozen sites on Sumatra but had not previously been reported from this locality. Present collections are from most months between March and December (Zwick 1983; Zwick & Sivec 1985). Zwick's (1983) description of the egg from light microscopy is supported by our figures from scanning electron microscopy (Figs.1-2). The chorion is covered throughout, except for a bare area surrounding the collar, with closely grouped, fine shallow pits, and the sessile collar consists of a shallow depression from which a long anchor pedicel (broken in our specimen) extends.





Figs. 1-2. *Neoperla affinis* eggs. 1. Entire egg, 2. Collar end.

Neoperla aliqua Zwick

Neoperla aliqua Zwick, 1973a:500. Holotype ♂, Liangaga, Sumatra
Neoperla aliqua: Zwick & Sivec 1985:127. New records

Material examined. Indonesia: Sumatra: Aceh, Mt.Leuser National Park, Ketambe Research Station, Alas River, 3° 41′ N, 97° 39′ E, 350 m, 5 September 1989, ROM 893053, W.K. Gall, 30 ♂ (MZB, ROM, BPS). Same site, 1-9 September 1989, ROM 893022, B.

Hubley, D.C. Darling, 3 ♂ (ROM). Same site, 2-6 September 1989, ROM 893020, B. Hubley, D.C. Darling, W.K. Gall, 11 ♂ pinned (ROM). Aceh, Mt. Leuser National Park, Gurah Recreation Area, Alas River, 3° 41′ N, 97° 39′ E, 350 m, 1 September 1989, ROM 893019, W.K. Gall, 1 ♂ (ROM).

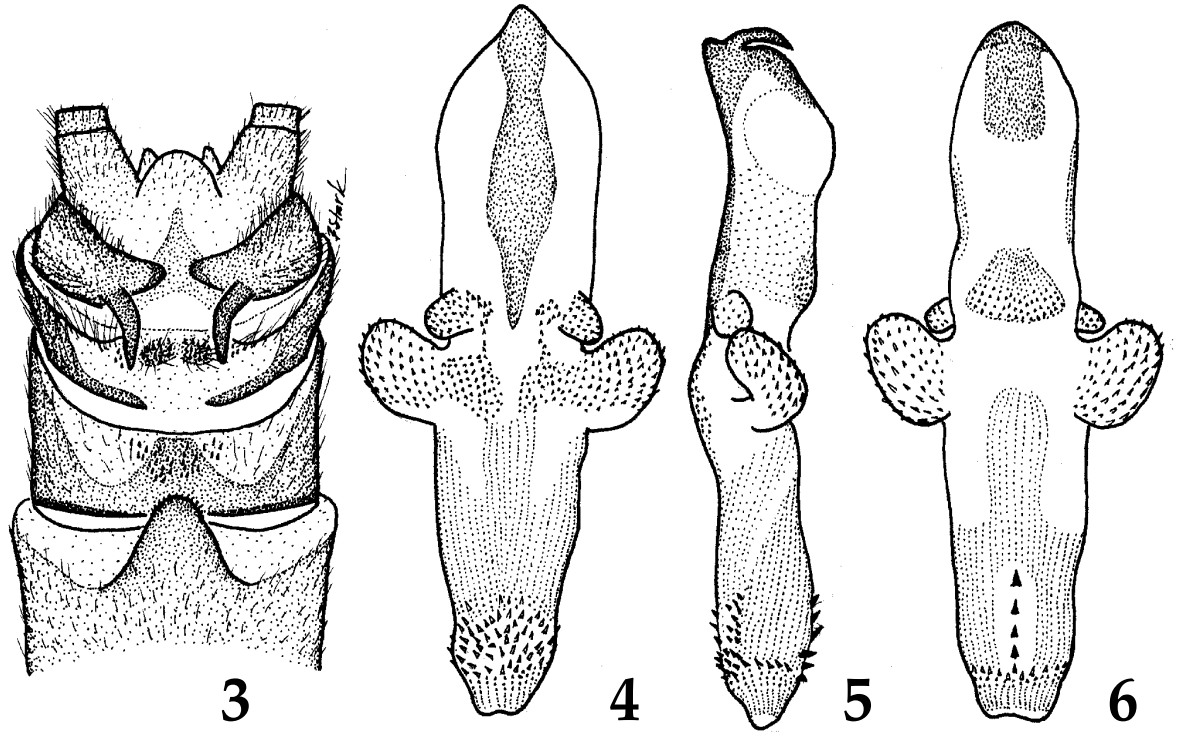
Remarks. Zwick (1983) and Zwick & Sivec (1985) report this species from 19 Sumatran sites including the "Alas Valley" which, presumably, is near the sites listed above. The hemiterga of all specimens in this sample appear intermediate between the male from North Sumatra (Fig. 7c of Zwick 1983) and the one from Sandaranagung (Fig. 7d of Zwick 1983).

Neoperla darlingi sp. n.
(Figs. 3-6)

Material examined. Holotype ♂ from Indonesia, West Kalimantan, Gunung Palung National Park, Cabang Panti Research Station, 1° 15′ S, 100° 05′ E, 100-400 m, June 15-August 15 1991, Malaise trap, IIS 910113, D.C. Darling, Rosichon, Sutrisno (MZB).

Adult habitus. General color yellow brown without distinctive markings. Head uniformly pale brown, antennal bases pale but slightly darker distally. Pronotum pale brown, legs yellow brown. Wing membrane transparent, veins brown.

Male. Forewing length 9 mm. Process of tergum 7 broadly rounded and armed on apex with sensilla basiconica. Median sclerite of tergum 8 flat but with conspicuous patch of sensilla basiconica scattered over sclerite and more sparsely on membranous field. Tergum 9 with a pair of low humps covered with sparse patches of sensilla basiconica. Hemiterga typical, anterior finger lobes bent outward near mid length (Fig. 3). Aedeagal tube plump and poorly sclerotized; sac bearing two pairs of lateral, membranous, spiny lobes; small pair located lateral to apex of dorsal sclerite and larger pair located just beyond (Figs. 4-6). Armature consists of variably sized spines with largest located near apex of sac as a patch on dorsum and a short median row on venter; minute spines cover much of area beyond lobes; armature on lobes more prominent on larger lobe particularly on ventral surfaces; area between lobes connected by irregular rows of moderate sized spines on dorsum and on venter by a low hump covered with minute spinules.



Figs. 3-6. *Neoperla darlingi* male genitalia. 3. Male abdominal segments 7-10, 4. Aedeagus dorsal, 5. Aedeagus lateral, 6. Aedeagus ventral.

Female. Unknown.
Larva Unknown.
Etymology. The patronym honors D.C. Darling, collector of the holotype and other specimens used in our studies.
Diagnosis. This species is a member of the *oculata* complex of the *montivaga* group as defined by Zwick (1986a) but the aedeagus is more similar to *N. flavicincta* Zwick, from Sumatra and *N. flinti* Sivec from the Philippines than to other members of the complex known from Borneo (Sivec 1984; Zwick 1986a; Zwick & Sivec 1985). From the former species it differs in having two pairs of lateral spiny lobes and in details of the apical spine patch; from the latter species it differs in lacking a mid ventrobasal spiny lobe on the aedeagal sac and in having the lateral lobes located adjacent to one another.

Neoperla edmundsi Stark

Neoperla edmundsi Stark, 1983:104. Holotype ♂, 3 mi E Penampung, Moyog, Sabah Sungai, East Malaysia
Neoperla edmundsi: Zwick, 1986a:13. Redescription and new records

Material examined. Indonesia: East Kalimantan, Long Tua, Bahau River, 3° 10′ N, 115° 47′ E, 440 m, 5-9 April 1994, IIS 940526, B. Hubley, D.C. Darling, 2 ♂, 1 ♀ (MZB, ROM). Long Pujungan, 2° 35′ N, 115° 47′ E, 277 m, 26-27 March 1994, IIS 950501, D.C. Darling, B. Hubley, 1 ♀ (ROM).
Remarks. Stark (1983) included six specimens from two localities in the original description and Zwick (1986a) added seven additional sites and fifteen specimens all from East Malaysian regions of Borneo. These specimens are therefore the first Indonesian records for this species. Most collections are from September and October.

Neoperla fallax Klapálek

Neoperla fallax Klapálek, 1909:44. Holotype ♀, Java
Neoperla fallax: Zwick, 1983:191. Redescription and new records
Neoperla fallax: Zwick & Sivec, 1985:129. New records

Material examined. Indonesia: West Java: stream NE side Cibodas Mtn. Garden, 6° 43′ S, 107° 1′ E, 1350 m, 26 August 1989, ROM 893017, W.K. Gall, 3 ♂ pinned (ROM, MZB). Same site except, 1425 m, 24-25 August 1989, ROM 893003, W.K. Gall, 1 ♂ pinned (ROM).
Remarks. This species is currently known from Java, Sumatra and mainland Southeast Asia (Zwick 1983).

Neoperla inutilis Zwick

Neoperla inutilis Zwick, 1973a:499. Holotype ♂, Liangaga, Sumatra
Neoperla primitiva inutilis: Zwick, 1983:182. New status
Neoperla inutilis: Zwick & Sivec, 1985:128. Spec. propr.

Material examined. Indonesia: Sumatra: West Sumatra, Pangkalang Kotabaru, large river N of town, 16-17 September 1989, ROM 893101, B. Hubley, 1 ♂ (ROM).
Remarks. This species was previously known from about 33 specimens collected on Sumatra and a pair of males collected on Java (Zwick 1983; Zwick & Sivec 1985). Samples are scattered from throughout the year.

Neoperla simplicior Navas

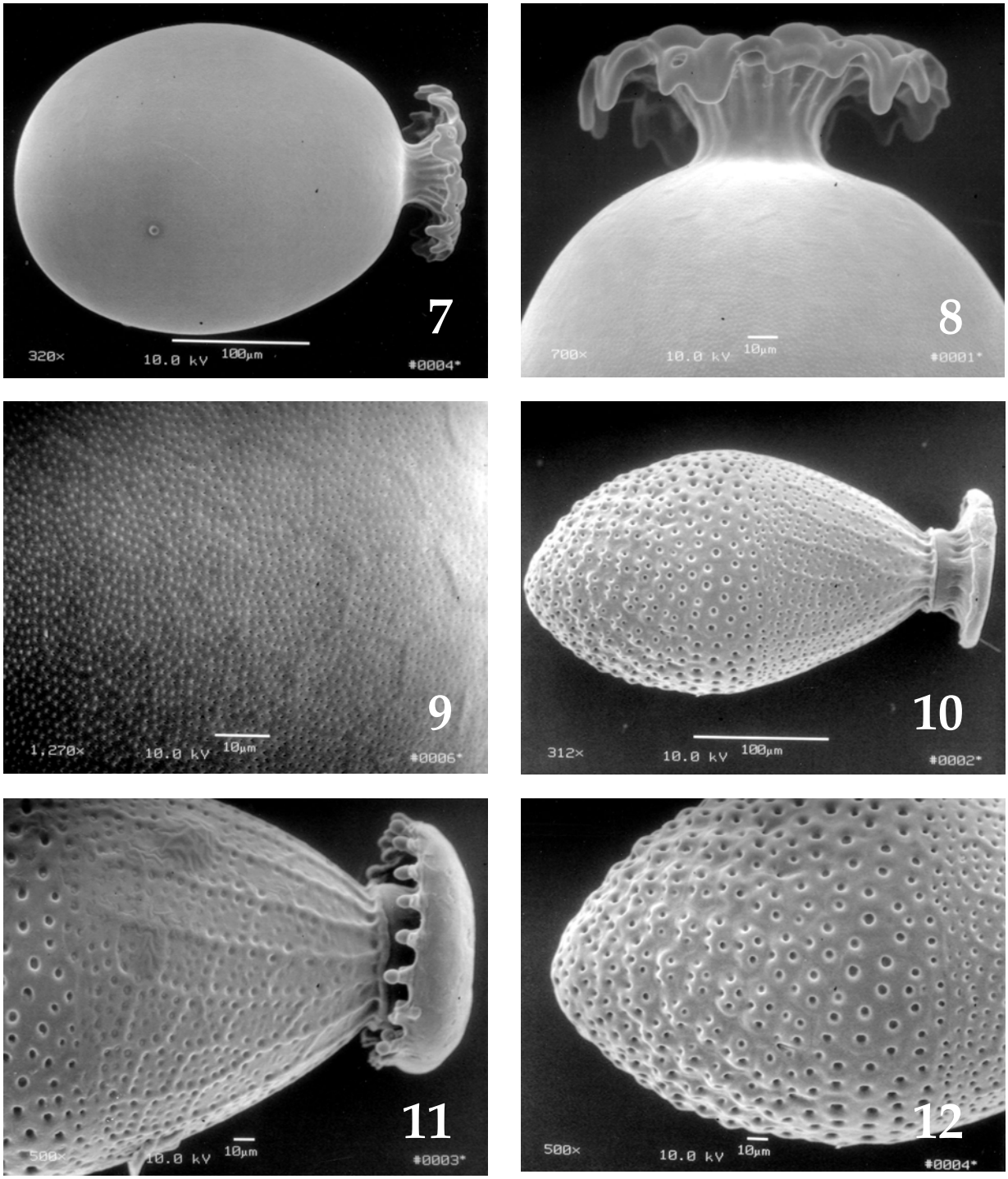
Neoperla simplicior Navas, 1932:953. Holotype ♂, Pangherang-Pisang, Sumatra
Neoperla simplicior: Zwick, 1983:190. Redescription and new records
Neoperla simplicior: Zwick & Sivec, 1985:129. New records

Material examined. Indonesia: Sumatra: Aceh, Mt. Leuser National Park, Ketambe Research Station, Alas River, 3° 41′ N, 97° 39′ E, 350 m, 2-6 September 1989, ROM 893020, B. Hubley, D.C. Darling, W.K. Gall, 3 ♂ pinned, 1 ♂ alcohol (ROM, MZB).
Remarks. This species was previously reported from about 15 Sumatran sites (Zwick 1983; Zwick & Sivec 1985) including the Alas Valley.

Neoperla theobromae Zwick

Neoperla theobromae Zwick, 1986a:9. Holotype ♂, Cocoa Research Station, Quoin Hill, Tawau, North Borneo

Material examined. Indonesia: East Kalimantan, Long Tua, Bahau River, 3° 10′ N, 115° 47′ E, 440 m, 5-9 April 1994, IIS 940526, B. Hubley, D.C. Darling, 1 ♂ pinned (MZB).
Remarks. This species was reported by Zwick (1986a) from four localities in North Borneo and Sarawak but this is the first Indonesian record.



Figs. 7-12. *Neoperla* BoM (7-9) and *Phanoperla flabellare* (10-12) eggs. 7. Entire egg. 8. Collar end. 9. Chorionic surface. 10. Entire egg. 11. Collar end. 12. Lid.

Neoperla sp. BoM
(Figs. 7-9)

Neoperla BoM Zwick, 1986a:50. Female and egg description

Material examined. Indonesia: East Kalimantan: Kayan-Mentarang Nature Reserve, Lalut Birai, 2° 52′ N, 115° 49′ E, 378 m, 28 March-16 April 1994, IIS 940507, B. Hubley, D.C. Darling, 1 ♀ (MZB).

Remarks. Zwick (1986a) gave this species informal recognition based on a female from Sarawak. The distinctive egg collar and finely punctate egg chorion (Figs. 7-9) of our specimen are consistent with the description and figure provided by Zwick (1986a).

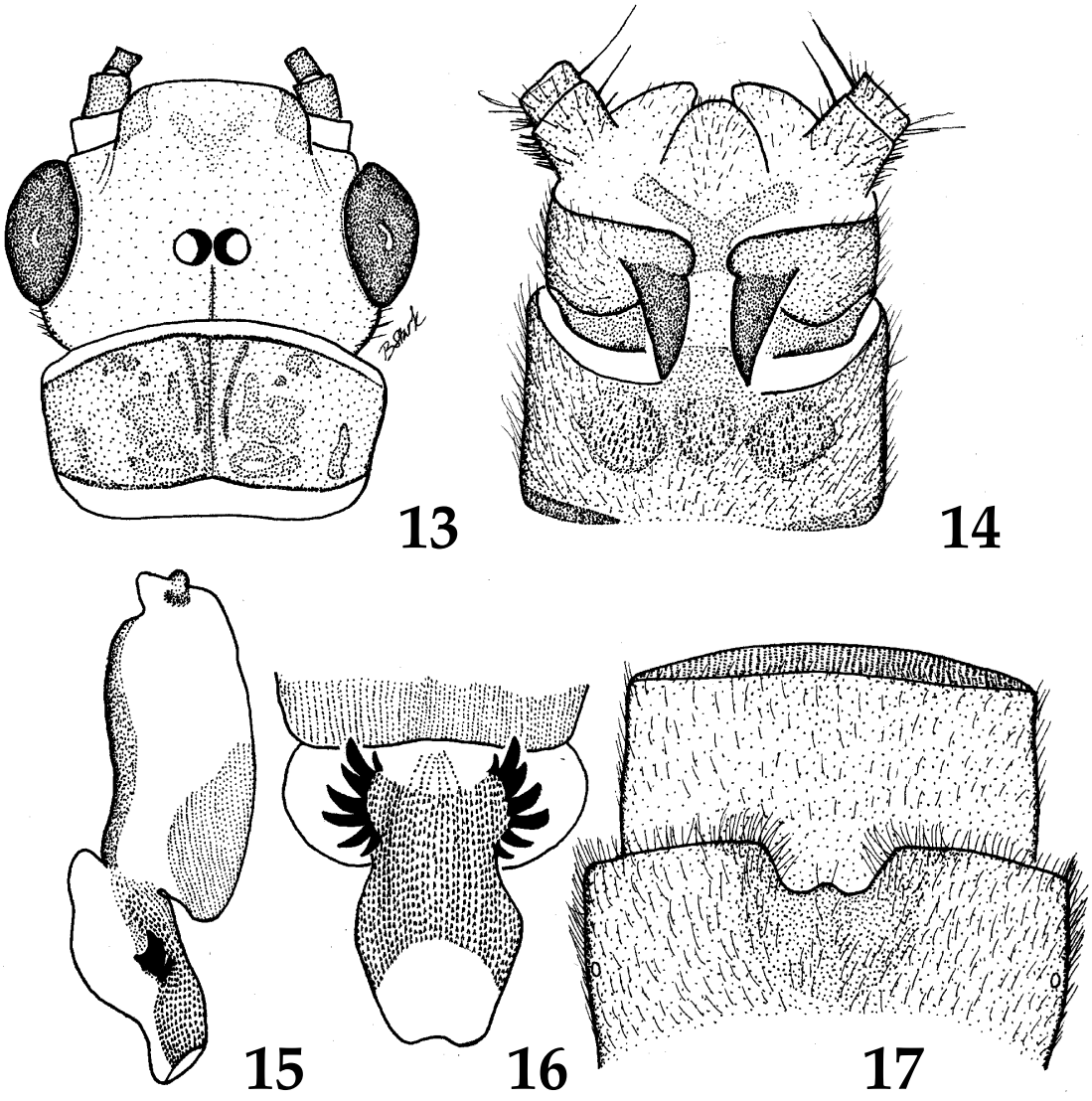
Neoperla sp. IJ-1

Material examined. Indonesia: Irian Jaya Province, small rocky stream and spring above Sentani, Cyclops Mountains, 325 m, 25 September 1991, CL 2618, D.A. Polhemus, J.T. Polhemus, 10 nymphs (BPS).

Remarks. These nymphs may represent the *Neoperla* Zwick (1973b, 1986a) referred to as an "…undescribed species in New Guinea." The discovery of a population with fairly precise locality data should assist in the collection of suitable material for further studies.

Phanoperla flabellare sp. n.
(Figs. 10-12, 13-17)

Material examined. Holotype ♂ and 2 ♀ paratypes from Indonesia, East Kalimantan, Kayan-Mentarang Nature Reserve, Lalut Birai, 2° 52′ N, 115° 49′ E, 378 m, IIS 940507, B. Hubley, D.C. Darling (Holotype MZB, paratypes ROM).



Figs. 13-17. *Phanoperla flabellare* structures. 13. Head and pronotum, 14. Male terminalia, 15. Aedeagus lateral, 16. Aedeagal apex ventral, 17. Female terminalia.

Adult habitus. General color pale yellow brown. Head pale without distinct marking except dark stem suture behind ocelli (Fig. 13); basal eight antennal segments pale brown, rest darker; palpi pale brown. Pronotum pale brown with slightly darker rugosities; margins almost completely ringed with narrow, dark suture lines. Wings pale amber, veins slightly darker; Rs with two branches. Femora pale, tibiae and tarsi slightly darker.

Male. Forewing length 8 mm. Tergum 9 bearing three narrowly separated sensilla basiconica patches; posterior margin produced as a narrow, truncate mesal lobe. Hemitergal lobes rather broad at base and more or less triangular in outline (Fig. 14). Aedeagal tube sclerite narrow, outline of sclerite a slender, prolonged rhomboid; sac shorter than tube and armed with lateral groups of 6 or 7 large, black spines in fan shaped clusters on either side of apical cylindrical lobe (Figs. 15-16); surface of apical cylinder very densely armed with black, scale-like spines; ventroapical tube surface armed with large patch of minute spinules.

Female. Forewing length 10 mm. Subgenital plate slightly produced over base of sternum 9 and notched; midpoint of notch bearing a small projection (Fig. 17). Posterior intersegmental membrane of sternum 9 with microtrichia patch.

Egg. Length ca. 0.31 mm, equatorial width ca. 0.18 mm. Collar short, wide with slightly flanged rim; collar width ca. 0.07 mm. Anchor mushroom shaped with marginal row of globular bodies on short lobes (Figs. 10-11). Chorionic surface with inconspicuous striations extending from collar rim, area between striae divided into irregular, more or less rhomboid cells with punctate floors; ca. eight striae visible in lateral aspect. Equatorial zone with a narrow belt of larger punctations; lid coarsely punctate with groups of 3-5 pits per cluster, each cluster associated with an irregular serpentine ridge (Fig. 12).

Larva. Unknown.

Etymology. The species name refers to the fan shaped clusters of spines on the aedeagal sac.

Diagnosis. The aedeagus of this species is generally similar to that of *P. flaveola*, a species known from Java, Borneo and the Philippines (Zwick 1982d). It differs from that species in lacking the two secondary rows of large spines on the ventrobasal area of the sac and in having a slender dorsal sclerite. It is also similar to *P. tuberosa* in having several large, black spines clustered in circumlinear row around the base of an apical, spinous lobe. However in *P. tuberosa* the apex is strongly curved ventrad and the ventroapical projection of the tube is bilobed with the armature separated into patches on each lobe. The female subgenital plate resembles those of *P. flaveola* and *P. pumilio* in having a prominent, almost quadrate median notch, but in *P. flabellare* there is a distinctive median projection. The egg is of the general *P. flaveola* or *P. malayana* Zwick type but differs from both as well as those known from Borneo in specific, but subtle detail. The egg of *P. flaveola*, for example also has multiple zones of chorionic pits but in that species the "equatorial zone" consists of smaller rather than larger pits and it is shifted distinctly above the equator and onto the lid of the egg (Zwick 1982d).

Phanoperla flaveola (Klapálek)

Neoperla flaveola Klapálek, 1910:34. Lectotype ♂, Java
Ochthopetina clarissa Banks, 1913:204. Holotype ♀, Los Baños, Luzon, Philippines. Syn. Zwick, 1982d
Neoperla hageni Banks, 1920:320. Lectotype ♂, Mindai, Borneo. Syn. Zwick, 1982d
Neoperla consimilis Banks, 1924:427. Holotype ♀, Mindanao, Philippines
Neoperla flaveola: Zwick, 1982d:105. Redescription

Material examined. Indonesia: East Kalimantan, Long Tua, Bahau River, 3° 10′ N, 115° 47′ E, 440 m, 5-9 April 1994, IIS 940526, B. Hubley, D.C. Darling, 1 ♂ (MZB).

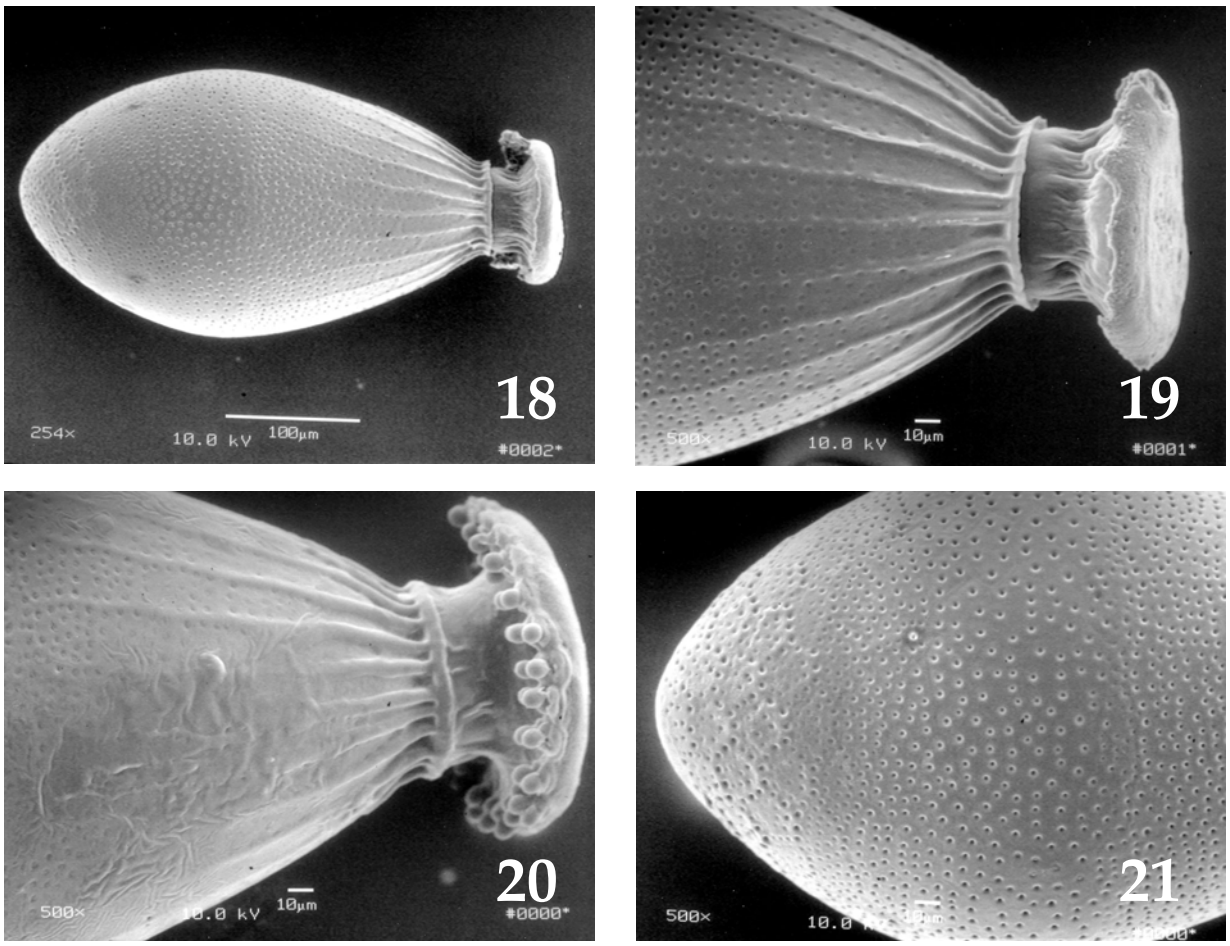
Remarks. This species was previously reported from Java, Borneo and the Philippines (Zwick 1982d) but this is the first record from Kalimantan.

Phanoperla pumilio (Klapálek)
(Figs. 18-21)

Neoperla pumilio Klapálek, 1921:320. Lectotype ♂, Sebroang, Borneo
Phanoperla pumilio: Zwick, 1982d:111. Redescription

Material examined. Indonesia: East Kalimantan, Long Tua, Bahau River, 3° 10′ N, 115° 47′ E, 440 m, 5-9 April 1994, IIS 940526, B. Hubley, D.C. Darling, 1 ♂, 5 ♀ (MZB, ROM).

Remarks. Zwick (1982d) redescribed this species but eggs were unavailable at that time. Eggs from our specimens are ca. 0.35 mm long and ca. 0.20 mm



Figs. 18-21. *Phanoperla pumilio* eggs. 18. Entire egg, 19. Collar end, 20. Intact collar, 21. Lid.

wide in the equatorial zone. The collar is short, wide and the narrow rim is slightly flanged (Figs. 18-19); collar width ca. 0.07 mm. Anchor mushroom shaped with marginal double row of globular bodies on small lobes (Fig. 20). Chorion with obscure, narrow striae extending from collar rim, ca. 12 visible in lateral aspect; area immediately adjacent to collar impunctate, but punctations become progressively more distinct distal to collar. Equatorial zone with slightly larger punctations than those on either side; lid completely punctate but most pits outline follicle cell impression walls and floors of most cells have few pits (Fig. 21). These eggs are similar to those of *P. flaveola* and *P. flabellare* (described above). They differ from the former in having more prominent striae, less conspicuous punctations on the lid and the equatorial zone has larger rather than smaller pits than the adjacent chorionic areas; they differ from eggs of the latter species in having more and slightly more prominent striae and in having much less conspicuous punctuation on the lid.

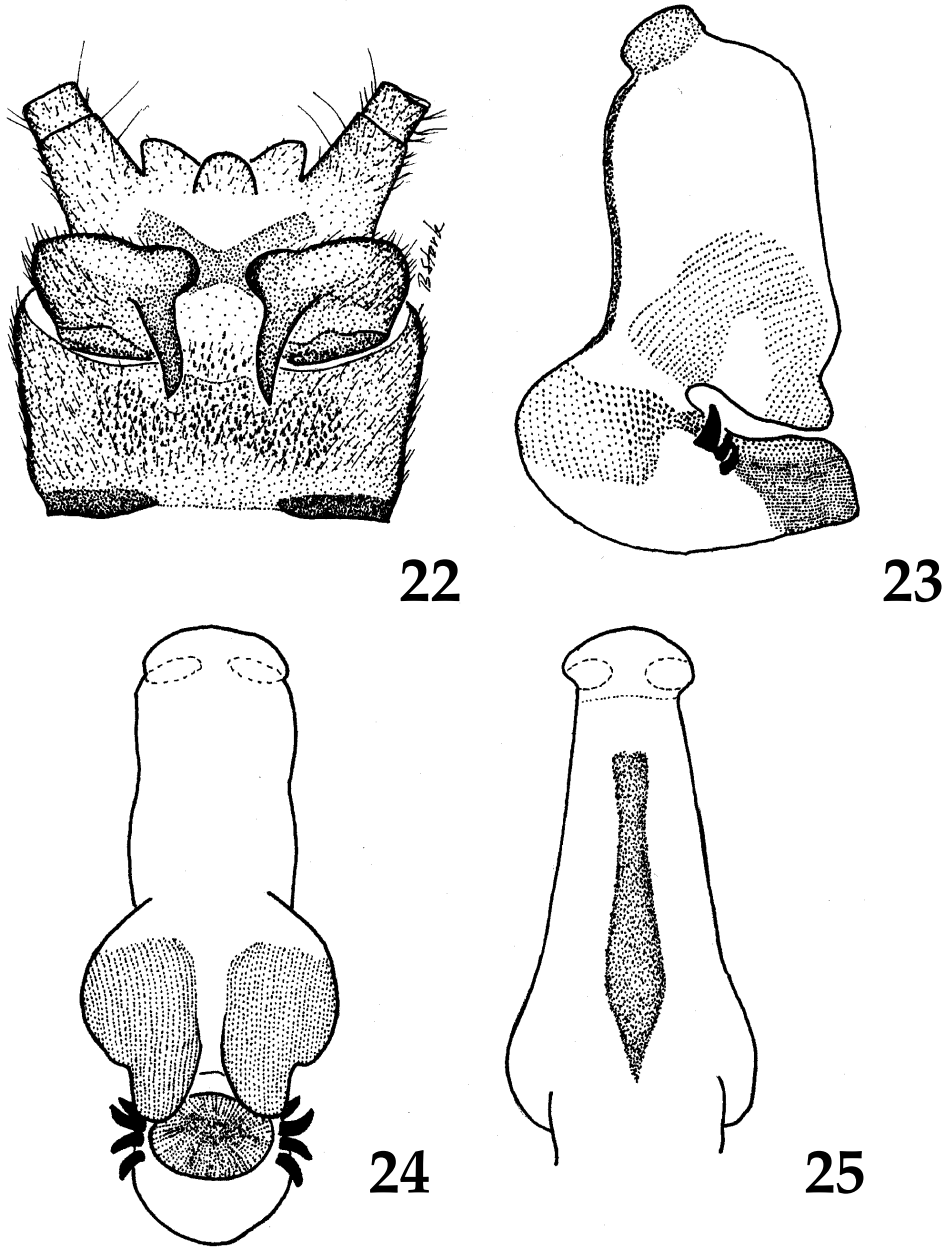
Phanoperla tuberosa sp. n.
(Figs. 22-25)

Material examined. Holotype ♂ and 1 ♂ paratype from Indonesia, East Kalimantan, Long Tua, Bahau River, 3° 10′ N, 115° 47′ E, 440 m, 5-9 April 1994, IIS 940526, B. Hubley, D.C. Darling (Holotype MZB, paratype ROM).

Adult habitus. Frons pale brown, pronotum with pale brown rugosities; pronotal margins dark except for short section at anterolateral angles; median pronotal suture dark. Wings tinted pale amber, veins brown except for pale costal area. Femora pale brown, tibiae slightly darker.

Male. Forewing length 7 mm. Tergum 8 unmodified, tergum 9 with lateral and median sensilla basiconica

patches fused into a single large trilobed patch. Hemitergal processes wide basally and tapered to point (Fig. 22). Sterna 6-7 with weak hair brushes. Aedeagal tube short and plump with pair of prominent, ventrolateral, spinous tuberosities; dorsal aedeagal sclerite hastate (Fig. 25); sac curved strongly ventrad and about as long as tube; sac armed at midlength with short lateral rows of 3-4 large, black, cultriform spines (Figs. 23-24); apical and basal areas of sac densely armed with patches of fine spines.



Figs. 22-25. *Phanoperla tuberosa* male genitalia. 22. Male terminalia, 23. Aedeagus lateral, 24. Aedeagus ventral, 25. Aedeagus dorsal sclerite.

Female. Unknown.
Larva. Unknown.
Etymology. The species name is based on the large ventrolateral tuberosities of the aedeagus.

Diagnosis. The aedeagus of this species is somewhat similar to that of *P. cornuta* Zwick, but the ventrolateral lobes of that species are smaller and lack spines (Zwick 1982d). In addition, that species

has a small lobe on male tergum 8 and the median patch of tergum 9 consists of only a few scattered sensilla. It is also similar to *P. flabellare* (described above) but differs in several respects outlined in the diagnosis of that species.

Tetropina fulgescens (Enderlein)
(Figs. 26-31)

Ochthopetina fulgescens Enderlein, 1909:337. Holotype ♀, Kina Balu, North Borneo
Ochthopetina (?) *fulgescens*: Zwick, 1973a:498. Redescription
Tetropina fulgescens: Zwick, 1984:171. Redescription
Tetropina larvata Klapálek, 1909:223. New synonymy

Material examined. Indonesia: East Kalimantan: Kac. Pujungan, Kayan-Mentarang Nature Reserve, Long Alango, Bahau River, 2° 52′ N, 115° 49′ E, 1-3 March 1993, IIS 930030, D.C. Darling, 4 ♂, 2 ♀ (ROM, BPS). Same site, IIS 930031, D.C. Darling, 1 ♂ (MZB). Same site, IIS 930000, 20 February-4 March 1993, D.C. Darling, 1 ♂ (MZB). Long Tua, Bahau River, 3° 10′ N, 115° 47′ E, 440 m, 8 April 1994, IIS 940550, B. Hubley, 21 ♂ pinned (MZB, ROM). Same site, 8 April 1994, IIS 940547, B. Hubley, 16 nymphs (MZB, ROM). Same site, 5-9 April 1994, IIS 940526, B. Hubley, D.C. Darling, 1 ♂ (ROM). Kayan-Mentarang Nature Reserve, Lalut Birai, 2° 52′ N, 115° 49′ E, 378 m, 28 March-16 April 1994, IIS 940507, B. Hubley, D.C. Darling, 11 ♂ (ROM, MZB). Same site, March 1994, IIS 940026, D.C. Darling, 1 ♂ pinned (ROM). Same site, January 1994, IIS 940003, D.C. Darling, 1 ♂ (MZB). Same site, 20 February-4 March 1993, IIS 930003, D.C. Darling, 1 nymph (ROM). Apau Ping, 3° 6′ N, 115° 49′ E, 438 m, 3 April 1994, IIS 940527, B. Hubley, D.C. Darling, 1 ♂ (ROM). East Malaysia: Sabah: tributary of Sungai Moyog, 11 mi E Panampung, mile 17, 29 October 1978, G.F. Edmunds, C.H. Edmunds, 24 ♀ (BPS).

Remarks. Although there are two apparent Bornean *Tetropina* species, the small number of specimens available and the fact that the type specimens of *T. fulgescens* and *T. larvata* are opposite sexes led Zwick (1984) to suggest the possibility that the two names might represent only one species. We are able to formally establish this synonymy on the basis of the long series of males listed above which share hemiterga of the "*T. larvata*" type (*sensu* Zwick 1984) and are associated with females (and mature egg bearing nymphs) of the *T. fulgescens* type. Zwick's (1984) figure of an egg taken from the holotype shows the chorionic surface to be coarsely punctate with shallow, widely spaced pits, and a distinct operculum is present. This figure is in agreement with scanning electron micrographs prepared from eggs taken from the females listed above (Figs. 26-27) and from mature nymphs (Figs. 28-29) from the same sites. Eggs taken from females of a Sabah population are also shown to indicate variation in chorionic morphology for this species (Figs. 30-31). Zwick (1984) suggested the anchor might be mushroom shaped but these figures clearly show the medusoid character of the structure which Zwick (2000) discovered.

A consequence of this synonymy is the female specimen of "*T. larvata*" from "Midden, O. Borneo, 24.VIII.1925 (Siebers; ML)" in Zwick 1984, and the three male specimens of *T. fulgescens* (Zwick 1984) are left without a name. We are not proposing a new name (or names) at this time, however, since we have not studied these specimens.

ACKNOWLEDGMENTS

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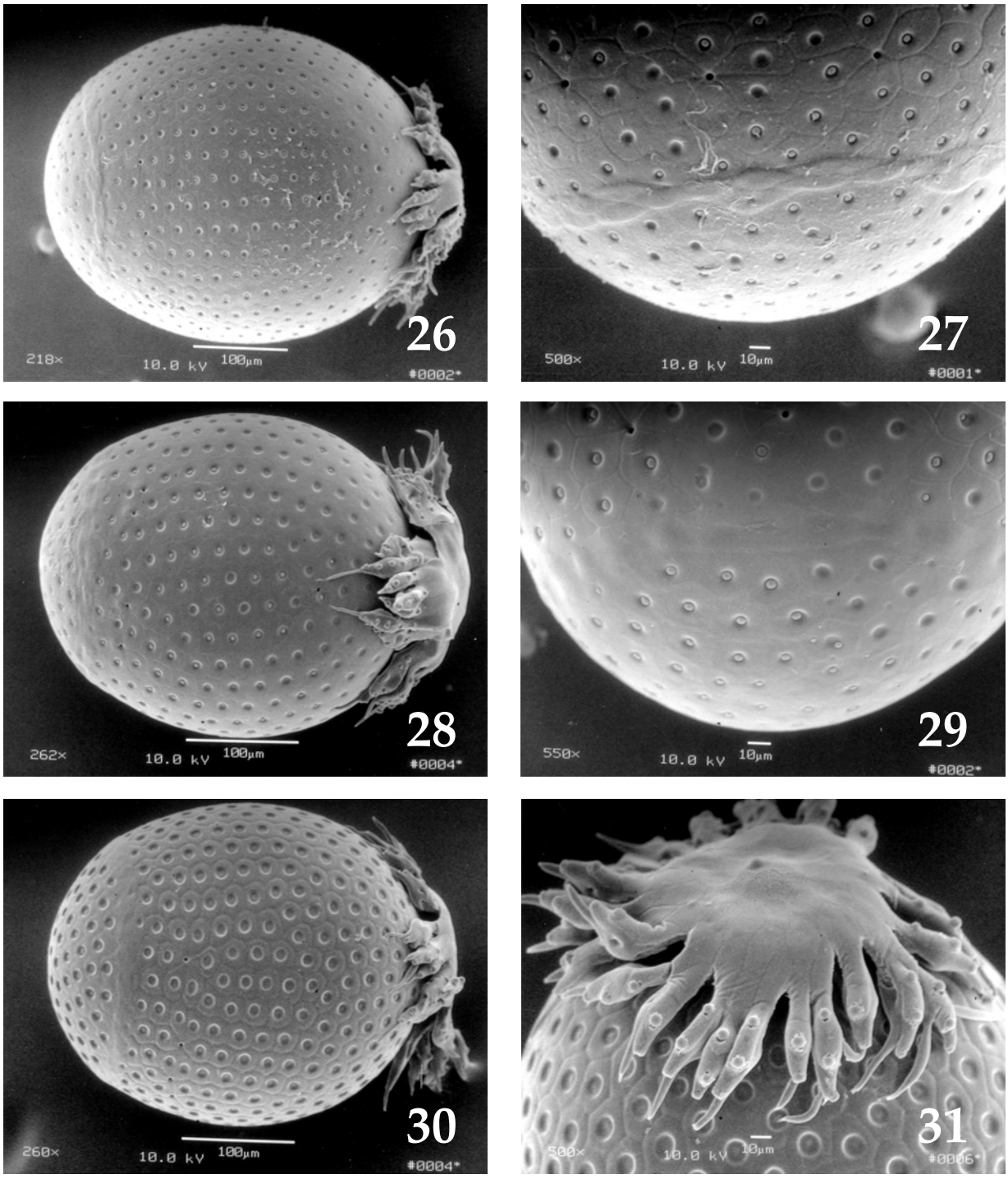

Figs. 26-31. *Tetropina fulgescens* eggs. 26. Entire egg from Kalimantan female, 27. Lid from Kalimantan female, 28. Entire egg from pre-emergent Kalimantan nymph, 29. Lid from pre-emergent Kalimantan nymph, 30. Entire egg from Sabah female, 31. Anchor from Sabah female.

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