

## THE FAMILY POLYCTENIDAE IN MALAYA (Hemiptera)<sup>1</sup>

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The family Polyctenidae Westwood 1874 (Heteroptera), generally very rare in collections, was heretofore unrecorded from Malaya. The present short paper deals with two species of the genus *Eoctenes* Kirkaldy 1906 collected there by me in 1958 during a trip financed by Bishop Museum. Among the 26 specimens examined, 6 are found to clearly represent three different, post-natal, immature stages. Since earlier authors recognised only two such stages and since the developmental changes in this family are scarcely known, it is deemed worth-while to put these findings on record.

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*Eoctenes spasmae* (Waterhouse), 1879. Fig. 1, A, C, E, F, Figs. 2-4.

♀ Adult: By comparing with Jordan's (1912: 572-573) description and Ferris and Usinger's (1939: 15, fig. 10) illustration, the following points may be noted.

Labrum anteriorly broadly rotund, dorsally with a row of short, stiff setae on posterior margin at each side. Lateral clypeal margins, before joining anterior tentorial pits, running parallel to each other. Rostral apex often extending a little beyond the level of occipital ctenidium. Genal ctenidia a little curved caudad before approaching the median line of head; setae of the oblique row lying behind genal ctenidia virtually, except the hindmost one, of equal length and thickness. Denticles of antennal ctenidia about 2/3 as long as those of genal ctenidia, and sometimes not projecting beyond apical margin of antennal segment 1. Vertex with a row of about 4 or 5 punctures at each side a little before occipital ctenidium. Pronotum with punctures almost as coarse as those on mesonotum, and anteriorly sometimes with 4, instead of 3, very long setae at each side. Prosternal process slender, distinctly longer than in *E. intermedius*. Abdomen rather sparsely setose, for

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instance, tergite 5 only with a single setal row at the center; sternal setae occurring mostly at discal and lateral areas. Body (in balsam) length about 3.65–4.25 mm, average of 10 specimens, 3.90 mm.

♂ Adult: Similar to ♀ adult. Size smaller. Setae fewer and generally a little shorter. Hypostomal region (fig. 1, A) with only 4–12 short, stiff setae arranged in 2 rows (in ♀, 14–18 setae). Abdominal tergites 6, 7 and 8, respectively, with 2–3, 6–12 and 12–15 very long setae (in ♀, 12–18, 12–19 and 12–19); abdominal apex as in fig. 1, c. Body (in balsam) length about 3.30–3.40 mm.

Immature stages. Ferris and Usinger (1.c.) recognised 2 immature instars for the family and designated them as antepenultimate and penultimate instars. The material at hand, however, clearly reveals 3 post-natal, immature instars. For brevity and convenience,

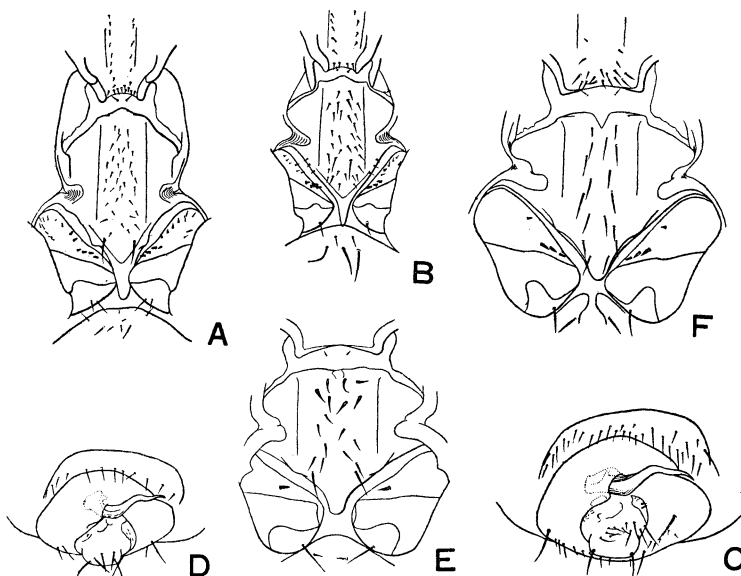


Fig. 1. A, *Eoctenes spasmae*, ♂ adult, hypostomal and prosternal regions. B, *E. intermedius*, ♂ adult, hypostomal and prosternal regions. C, *E. spasmae*, ♂ adult, abdominal apex. D, *E. intermedius*, ♂ adult, abdominal apex. E, *E. spasmae*, 1st instar nymph, hypostomal and prosternal regions. F, *E. spasmae*, 2nd instar nymph, hypostomal and prosternal regions.

they are provisionally termed 1st, 2nd and 3rd. In body size, they differ very little from one another and from the adult. At least for this species, they may be easily distinguished by the relative length of mesonotum and more correctly, by the number of denticles on the antennal segment 1. By these characters, the 2 nymphs described by Waterhouse (1879: 312, pl. 9, figs. 3, 4) and redescribed by Jordan (1912: 573–574) are to be interpreted as of the 2nd instar, and that described by Speiser (1909: 272–273), 3rd instar. Comparative notes on the 3 instars (fig. 1, E, F, fig. 2, fig. 3) follow.

Lateral labral margin in ventral aspect, in 1st instar, with only 3 setigerous tubercles,

of which the foremost one being triangular and bearing no seta and the hindmost, slenderly kidney-shaped and lying mesad to the corresponding seta; in 2nd instar, with 4 tubercles, the foremost one also triangular, but bearing a very short, fine seta, the hindmost normal; in 3rd instar, similar, but all tubercles almost of same size and shape. Postero-lateral angles of labrum, in 1st instar, bearing no setae; in 2nd and 3rd, respectively, with 2 and 3 setae at each side. Venter of antennal segment 1, in 1st instar (fig. 3, A), with 3 long, lanceolate, stiff setae on anterior margin and a similar stiffer seta near apical margin, and with one very long and 3 or 4 very short setae near the disc; in 2nd and 3rd instars respectively (fig. 3, B, C), the very long, single seta near the disc being replaced by 3 and 4 short, small denticles while the lanceolate, stiff seta near apical margin, by 2 and 4 moderately large denticles. Gena in 1st instar lacking any denticles between antennal insertion and genal ctenidium; in 2nd instar, with a small denticle; in 3rd, with 2 small, obliquely arranged one. Genal ctenidia not extending to postero-lateral angles of head. Hypostomal region in 1st instar (fig. 1, E) very broad and non-setose; in 2nd and 3rd instars (fig. 1, F, fig. 2), normal, and respectively, with about 14 and 15 stiff setae arranged in 2 rows and 4 and 10 fine setae in 2 columns. Pronotum in 1st instar (fig. 3, D, E) a little broader than head and with anterior 1/2 broader than posterior; in the 2 later instars (fig. 2, fig. 4, A), the posterior half successively broadened; pronotal ctenidium in all 3 instars being represented by a single row of setae which are scarcely longer than denticles of occipital ctenidium; and in 1st instar, in line with the 3 ordinary, very long setae near anterior pronotal margin, there being one moderately long seta near lateral margin and a further one near median line; in 2nd and 3rd instars, the extra seta near lateral margin shortened but the submedian one unchanged. Prosternum (fig. 1, E, F, fig. 2) anteriorly truncate, and in 1st and 2nd instars, with about 16-18 irregularly arranged setae; in 3rd, with about 20, and arranged in 2 columns; prosternal process in first 2 instars very poorly developed, and even in 3rd instar, still shorter than in adult. Coxa 1, in 1st, 2nd and 3rd instar, respectively, with 1, 2 and 3 short,

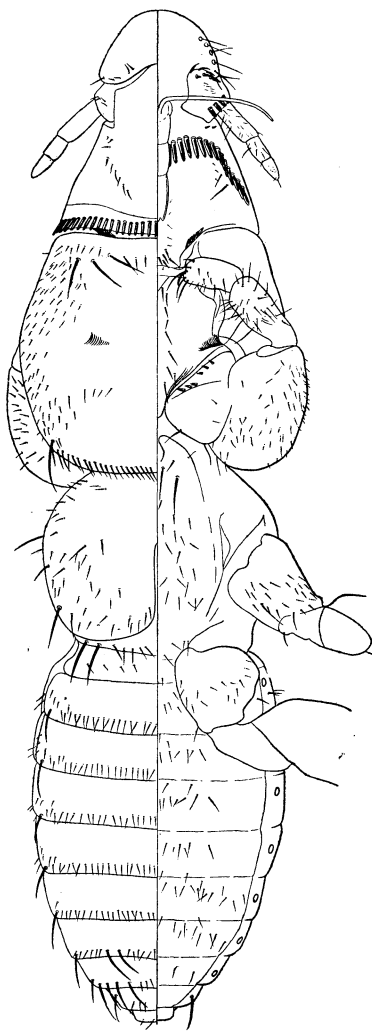


Fig. 2. *Eoctenes spasmae*, 3rd instar nymph, dorsal and ventral aspects. (In consequence of some unavoidable projective error with a camera lucida, the insect shown here is a little too slim, as compared with the actual specimen.)

stiff setae near prosternal process; in addition to these, in 2nd and 3rd instars, respectively, there being 1 and 2 (or 3) fine setae in the anterior portion. Tarsus 1 weakly divided

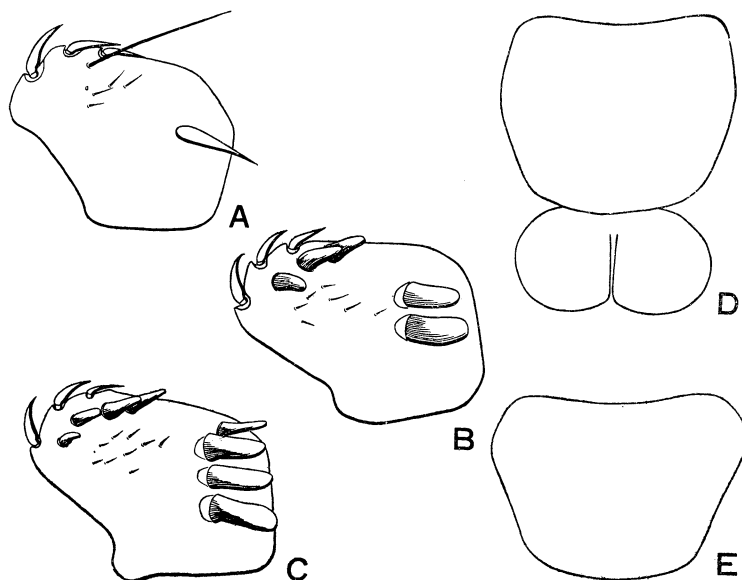


Fig. 3. A, *Eoctenes spasmae*, 1st instar nymph, antennal segment 1, ventral aspect. B, *E. spasmae*, 2nd instar nymph, antennal segment 1, ventral aspect. C, *E. spasmae*, 3rd instar nymph, antennal segment 1, ventral aspect. D, *E. spasmae*, 1st instar nymph, pro- and mesonota. E, *E. spasmae*, 1st instar nymph, pronotum, abnormal.

into 2 segments; claws (fig. 4, B) similar in shape to each other. Mesonotum (fig. 2, fig. 3, D, fig. 4, A) lacking ctenidium, laterally and posteriorly with a few scattered setae, and in 1st instar, only about 1/2 as long as pronotum, but markedly lengthened in later instars. Mesosternum in 1st instar with only 6 long setae; in 2nd instar, with, in addition, some 15 short, fine setae near posterior margin; in 3rd instar, the long setae still unchanged, the short ones becoming more numerous (about 38) and distributed about the median line. Metanotum well exposed, posteriorly with a single row of setae, among which the 2 at each lateral angle being exceptionally long and thick. Tarsi 2 and 3 all 3 segmented; in 1st instar, the 2nd and 3rd segments feebly demarcated and the 3rd segment, in both pairs, suddenly attenuate near apex; in 2nd instar, the tarsi 3, which is also suddenly attenuate near apex, distinctly thicker than tarsi 2; in 3rd instar, normal. Abdominal segments each with a single setal row, on each side of tergites 2 to 6, with a long seta, and near posterior margins of tergites 7, 8 and 9, respectively, with 4 (rarely 5), 10 (12) and 2 very long setae. Body (in balsam) length, 1st instar about 2.33 mm, 2nd instar, 2.70 mm; 3rd instar, 2.80 mm.

Relative Measurements: All measurements are taken from cleared specimens in balsam and all in the same scale, viz., 114 units make one millimeter.

	Immature Instar			Male Adult (5 ex.)		Female Adult (10 ex.)	
	1st (2 ex.)	2nd (1 ex.)	3rd (1 ex.)	Range	Mean	Range	Mean
Antenna, length	41.5	45	47	38- 47	43.2	43- 49	46.4
Pronotum, length	61.0	73	78	90- 92	91.2	97- 99	98.0
Mesonotum, length	32.5	48	61	93- 96	94.4	104-111	106.3
Tibia 2, length	38.0	49	60	80- 91	84.8	92- 99	95.6
Tibia 3, length	48.0	64	73	92- 98	94.4	114-120	116.4
Head, breadth	65.5	70	66	60- 64	62.2	59- 67	64.9
Pronotum, breadth	75.0*	83	85	94- 99	96.6	101-107	103.9
Mesonotum, breadth	61.5	73	67	88- 94	90.4	100-104	101.5
Abdomen, breadth	68.5	80	80	95-107	101.0	112-145	126.7

\* Taken from one specimen only. In another one, the pronotum is abnormal (fig. 3, E) and is 81 units wide.

Previous Records: Totally 2 ♂, 5 ♀ adults and 5 nymphs are recorded in literature, from Malaysian and Cinghalese subregions, ex bats of the genera *Megaderma* (Nycteridiidae) and *Cynopterus* (Pteropidae):

- 2 nymphs (2nd instar), types of the species, in British Mus., from "Java", ex *Meg. spasma* Linn. (Waterhouse 1879: 312, pl. 9, figs. 3, 4).
- 2 adults (almost certainly ♀, as judging from the body length, 3.80 mm, given by the author), types of *Polycetes talpa*, in Goettingen Zool. Institute and Speiser coll., from Nias (nr. Sumatra), ex the same host (Speiser 1898: 614-615, fig.).
- 1 nymph (3rd instar), in Indian Mus., from Travancore: Trivandrum, ex *Cyn. marginatus* Geoffr. (Speiser 1909: 272-273).
- 1 ♂ adult, 2 nymphs (? instar), in Stanford Univ., from Karimata Is.: Tanjong Karimata Tua, ex *Meg. carimatae* Miller (Ferris 1919: 262).
- 1 ♀ adult, in Stanford Univ., from Borneo S. W.: Mankol, ex *Cyn. brachyotis brachyotis* Mueller (Ferris, loc. cit.)
- 1 ♂, 1 ♀ adult, in British Mus., from "Sumatra", ex *Meg. spasma* (Jordan 1912: 572-574).
- 1 ♀, in Hawaiian Sugar Pl. Ass., from Ceylon: Matugama Kaluteira, ex *Meg. spasma ceylonense* Andersen (Ferris & Usinger 1939: 15, fig. 10).

Material Examined: 3 ♂, 9 ♀ adults, and 2 first, 1 second and 1 third instar nymphs, Gua 'che Manan Cave No. 1, alt. 150 m, Pahang State, Malaya, 14. xii. 1958, ex *Meg. spasma medium* Andersen, T. C. Maa leg., in Bishop Mus. and Maa coll. Further 6 specimens of the same lot in the U. S. Army Medical Research Unit at Kuala Lumpur. 1 ♀ adult, bearing the same data, but from Cave No. 2, in Bishop Mus. 2 ♂, ex the same host, "Malaya", from the collection of the Institute for Medical Research of Malaya, in Bishop Museum.

Remarks: As a summation of the above descriptions, the numeral differences of the three immature instars and the adult may be put in a tabular form:

	1st instar	2nd instar	3rd instar	Adult
Labrum, ventro-marginal tubercles	2 (1)	3 (1)	4	5
do., postero-lateral angles, setae	0	2	3	2-3
Antennal segment 1, apical ctenidium, denticles	(1)	2	4	5
do., anterior ctenidium, denticles	(1)	2	4	4
Hypostomal region, stiff setae	0	14	15	7-18
Gena, small denticles	0	1	2	3-4
Coxa 1, small denticles	1	2	3	4

The length of body and antennae, the extent of genal ctenidia and prosternal process, the shape of hypostomal region, pronotum and claws, the breadth of mesonotum and the

segmentation of tarsi do not much differ with the instars. The mesonotum, on the other hand, is markedly lengthened following each moult. The pro- and mesonotal ctenidia are lacking in all immature instars, while the long setae on metanotum (concealed in the adult) are characteristic for the nymphs only.

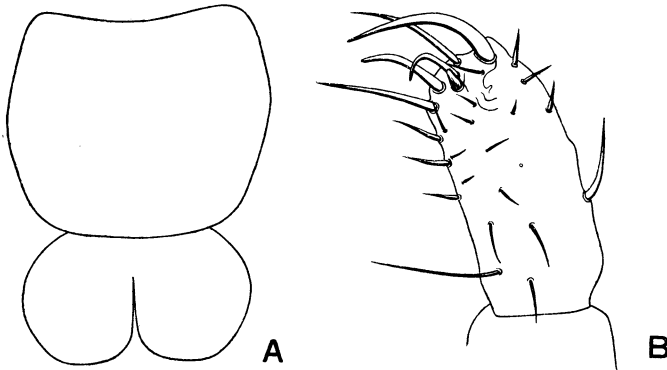


Fig. 4. A, *Eoctenes spasmae*, 2nd instar nymph, pro- and mesonota. B, *E. spasmae*, 2nd instar nymph, fore tarsus, left-hand, ventral aspect.

In his description of the (3rd instar) nymph from S. India, Speiser (1909: 274) mentioned that "They

bear at the posterior angles of the tergites on each side one longer bristle which is *not* present in the imago." So far the writer can see from his own material, this longer bristle is *always* present in both male and female adults, and on all visible tergites. Among the adult specimens examined, the tergite 5 of 3 females bears one additional such longer bristle near left or right angle, and that of one other female bears 3 additional (one near left angle and two right).

In this connection, attention may be called to the fact that the nymphs of *E. nycteridis* Horváth 1910 (the only *Eoctenes* species, other than the two dealt with in this paper) recorded and illustrated by Ferris and Usinger (1939: 14-15, fig. 9) and by Jordan (1912: 576, text-fig. 1, pl. 13, fig. 8) respectively are certainly of the 2nd and 3rd instars. The former differs from *E. spasmae*, 2nd instar, perhaps only by the possession of only 3 (not 4) ventral labral tubercles, only 5 (not 8) "pseudo-segments" in tibiae 3 and more abdominal sternal setae, by the lack of long setae on mesosternum and on lateral margins of abdominal tergites 2-9, by the non-setose and poorly defined hypostomal region, and by the

simple tarsal claws 2 and 3. The 3rd instar nymph of *nycteridis*, however, possesses a well developed mesonotal ctenidium—A case unique in the family. By weighing this and some adult characters, viz., the 3 (not 4) segmented rostrum, the shorter genal ctenidia, the short, obtuse prosternal process, the poorly developed pronotal ctenidium, the fewer tibial “pseudo segments”, etc., the genus *Ctenoplax* Horváth 1910 (haplotype: *C. nycteridis* Horv.) probably should be revived. The above mentioned three authors (1. c.) synonymised *Ctenoplax* with *Eoctenes* on the ground that it embodies only one described species and that the adult characters are of too little significance. At any rate, *nycteridis* appears to be the most highly specialized species of the family.

As mentioned in the introduction, the Polyctenids are generally very rare in collections. For the 3 species of the genus *Eoctenes*, including *nycteridis*, Speiser (1909) listed only 8 specimens then known; and Jordan (1912), 20. These bugs are also believed to be rare in nature because they practise “pseudo-placento-viviparity”. My collections are so exceptionally rich that it may be advisable to reproduce a part of the field notes: “In Gua 'che Manan and Gua 'che Yatim limestone hills, situated well interior in the primary forest, there are about 15 bat caves. Two caves in Manan and 3 in Yatim were visited. The 41 bats collected at Yatim are all of *Rhinolophus* (one or two species) and harboured no Polyctenids, but 8 winged Streblid specimens, 23 ♀ *Ascodipteron* (attaching wing-membrane of the host), and 10 Nycteribiids. Of the 17 Manan bats, 13 are *Cynopterus lucasi* Dobson and another 4, *Megaderma spasma medium* Andersen. They altogether revealed 22 Polyctenid specimens, 59 winged Streblid and 222 Nycteribiid, but no ♀ *Ascodipteron*. Although these two bat genera live in the same caves, all the Polyctenids were found on *Megaderma* only, and as many as 5 and 14 such bugs, respectively, were yielded by two of the four *Megaderma* bats. The Manan caves are far drier and higher inside than the Yatim ones. The distribution of the Polyctenids is however probably determined by the host bats, and the bats themselves in turn, by the caves. Beyond doubt, *Megaderma* is the much preferred, if not the sole, host for *E. spasmae* and presumably the earlier records as from *Cynopterus* merely pertain to “stragglers.”

***Eoctenes intermedius*** (Speiser), 1904. Fig. 1, B, D.

♂ Adult: The following notes are to be supplementary to the illustration for ♀ by Ferris and Usinger (1939: 14, fig. 7): Labrum rather broadly rounded anteriorly, and with 5 (not 6) setigerous tubercles on lateral margin of venter. Hypostomal region with only 4 setae for the transverse series and 4 or 5 for each longitudinal. Prothorax a little broader than mesothorax (107: 101); prosternal process (fig. 1, B) rather long. Punctures on mesonotum markedly coarser than those on pronotum. Abdominal tergites each with a single setal row, and near the corresponding latero-tergite, with 6–10 additional setae; tergites 7 and 8 lacking very long setae; abdominal sternites 5–8 inclusive also with a single setal row, but 5 and 6 with indication of an additional, medially interrupted, anterior setal row. Paramere (fig. 1, D) more slender than in the preceding species. Body (in balsam) length about 2.35 mm.

Previous Records: Totally 5 ♂ and 3 ♀ adults are recorded in literature, from Africa and Sumatra, ex bats of the genus *Taphazous* (Molossidae); the immature stages are still unknown:

- 1 ♂, 1 ♀ Adult, types of the species, in Koenigsberg Mus., from "Egypt" ex *Taph. perforatus* Geoffr. (Speiser 1904: 373-375, pl. 20, figs. 1, 2).
- 2 ♂, 1 ♀, types of *E. eknomius*; in British Mus. and Stanford Univ., from Sudan: Khartoum, ex an unnamed bat (Kellogg & Paine 1910: 402-403, pl. 13).
- 2 ♂, in British Mus., of the same lot as, but not constituting types of *eknomius* (Jordan 1912: 574-575, pl. 13, fig. 9).
- 1 ♀, in Stanford Univ., from Sumatra: Tarussan Bay, ex *Taph. cavaticus* Hollister (Ferris 1919: 262-263).

Material Examined: 1 ♂, Pulu Tikus near Penang, alt. 5 m, Malaya, 24. xii. 1958, ex *Taph. melanopogon*, T. C. Maa leg., in Bishop Mus., one further specimen of the same lot in the U. S. Army Medical Res. Unit at Kuala Lumpur.

Remarks: Besides the morphological differences noted by Jordan (1912) and Ferris and Usinger (1939), this and the preceding species can be separated by the body size and the shape of ♂ genitalia.

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