

*ANNINA FUSTIS*, A NEW ISOPOD FROM  
PHANG NGA, THAILAND  
(CRUSTACEA: ISOPODA: CIROLANIDAE)

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*Abstract.*—*Annina fustis*, the fourth known species of *Annina*, is described from a remnant limestone cave near Phang Nga, in peninsular Thailand. It is distinguished by the rounded frontal lamina, and in the male by the long club-shaped horns on pereonite 2 and the fusion of flagellar segments 1 and 2 of antenna 2.

*Annina* Budde-Lund, 1908, is a small genus of 3 species known from springs, ponds, and subterranean lakes, and from mangrove swamps, from burrows either in the mud or in mangrove stumps. The genus is close to *Excirolana* Richardson, 1912, from which it differs in having a non-faceted gap separating dorsal and ventral parts of the eye, in pleonites 1-2 being narrower than pleonites 3-5, and especially in two characters found only in the male: the presence of dorsal horns on pereonite 2 and sometimes also on the head and pereonite 1; the modified antenna 2. A revised diagnosis of *Annina* with a key to the 3 species is given by Jones (1983).

We describe herein a fourth species from Thailand.

Cirolanidae Dana, 1853  
*Annina* Budde-Lund, 1908  
*Annina fustis*, new species  
Figs. 1-3

*Material.*—Thailand, Phang Nga (8°30'N, 98°30'E), Tum Rusee ("Tum" = "cave" in Thai), Iliffe Station 85-094, muddy bottom of stream and pools, depths 0-30 cm, collected with small dip net by Thomas M. Iliffe and Yolanda Iliffe, 4 May 1985, holotype ♂ 7.0 mm, USNM 250558; paratypes, 8 ♀, 4.4-7.0 mm, 8 ♂, 4.4-6.3 mm, USNM 250559.

*Comparative material.*—*Annina meso-*

*potamica* (Ahmed): Iraq, near Basrah, from stream Shatt-Al-Arab, leg. M.M. Ahmed, 19 Sep 1972, 7 ♂ ♀, USNM 213137.

*Description.*—Length up to 7.0 mm, about 4× as long as wide, greatest width at pereonite 5. Head with slightly concave dorsum lacking processes. Pereonite 1 without processes. Pereonite 2 of ♂ with dorsal horns reaching to about anterior 4th of pereonite 1; horns tapering to point in dorsal view, in lateral view expanding apically into rounded tip produced further ventrally than dorsally; minute tubercle sometimes present at midwidth of anterior margin. Pereonite 2 of ♀ without horns.

Pleotelson about 5/6 as long as wide, triangular, apex narrowly rounded. Posterior half of each lateral margin with about 12 notches, each notch bearing a seta. Apex with several submarginal long setae; dorsum with scattered short setae.

Frontal lamina broadly rounded anteriorly, not fused with triangular rostrum. Clypeus produced into acute process (in lateral view).

Antenna 1 reaching slightly posterior to anterior margin of pereonite 3; peduncle segment 3 slightly shorter than combined lengths of peduncle segments 1 and 2; flagellum about 14-segmented, segments 1-3 without esthetes, other segments with 1 or 2 esthetes. Antenna 2 of ♀ reaching pereonite 6; peduncle 5-segmented, segment 1 (Fig. 1G) closely adhering to head and usually

not freed in dissection, segment 5 about as long as segments 3 and 4 combined; flagellum about 11-segmented. Antenna 2 of  $\delta$  with distinctly broader peduncle segments, peduncle segment 5 longer than segments 2–4 combined; segments 1 and 2 of flagellum fused, with expanded posterodistal corner; segment 3 also with expanded posterodistal corner.

Mandible lacinia with 10 teeth; palp segment 2 with 2 long setae at midlength and subapically on medial margin. Maxilla 1 exopod with 12 strong marginal spines and 1 slender spine inserted in gnathal surface. Maxilla 2 with 7 and 9 setae on palp and exopod respectively, exopod with 11 setae and numerous hairs.

Maxilliped (Fig. 3B, C) and pereopods (Fig. 2A–G) typical for the genus *Annina*. Appendix masculina tapering to smooth point, not quite reaching distal margin of pleopod 2 endopod. Uropod very similar to that of *A. kumari* (Bowman 1971); protopod short, distomedial corner strongly produced; endopod subpyriform, about  $2.4\times$  as long as wide, both margins with notches bearing plumose setae; exopod lanceolate, shorter and much narrower than endopod, only medial margin notched and bearing plumose setae.

*Etymology*.—From the Latin noun “fustis,” a club, referring to the flattened club-shape of the horns of pereonite 2 when viewed laterally.

*Sexual dimorphism*.—In the Cirolanidae, sexual dimorphism, aside from the presence of oostegites in females and penes and appendix masculina in males, is usually absent or only slightly developed. Sexual differences may occur in body proportions ( $\delta$  more elongate), in cuticular ornamentation (more prominent in  $\delta$ ), and in the structure of pereopod 1 and the uropods. The striking difference in antenna 2, found in all species of *Annina*, is quite unusual. Furthermore, in 2 of the species, *A. kumari* and *A. fustis*, flagellar segments 1 and 2 of antenna 2 are fused in the fully differentiated  $\delta$ , whereas in the other 2 species, *A. lacustris* Budde-

Lund, 1908, and *A. mesopotamica* (Ahmed 1971),  $\delta$  flagellar segments 1 and 2 remain separate. Fusion of these segments is apomorphic, since in juvenile males as in females of *A. fustis* these segments are distinct (Fig. 1J). Sexual dimorphism of antenna 2 is found also in *Limicolana dinjerra* Bruce (1986), in which the distal segment of the peduncle is swollen in the  $\delta$  but not in the  $\eta$ .

*Comparison*.—The 3 previously known species of *Annina* may be distinguished from *A. fustis* by the following:

*A. lacustris* (East Africa; Zanzibar (Budde-Lund 1908; Monod 1968); Gazi Bay, Kenya (Jones & Icely 1981, as *E. bowmani*); Comoro Islands (Messana 1984)).

—dorsum of  $\delta$  head, pereon, and pleon with numerous tubercles.

—horns of pereonite 2 in lateral view sinuate, not expanding at apex which is produced further dorsally than ventrally.

—telson and endopod of uropod apically truncate.

— $\delta$  antenna 2 flagellar segments 1 and 2 distinct.

*A. kumari* (Port Swettenham, Malaysia (Bowman 1971)).

— $\delta$  with pair of horns on head, pereonite 1, and pereonite 2, those on pereonite 2 very short and apically acute.

—apex of frontal lamina pointed in dorsal view.

*A. mesopotamica* (near Basrah, Iraq (Ahmed 1971)).

—horns of  $\delta$  pereonite 2 very short, blunt (Fig. 1N).

— $\delta$  antenna 2 flagellar segments 1 and 2 distinct.

*Habitat*.—The town of Phang Nga is located at  $8^{\circ}30'N$ ,  $98^{\circ}30'E$  on the northern end of Phang Nga Bay, an estuary on the Andaman Sea in southern Thailand. Between the town and the bay is an extensive area of limestone tower karst situated on a mangrove-forested river flood plain. Tum Rusee is located in a park just east of Phang Nga at the edge of this mangrove forest. It is an inland eroded remnant cave consisting

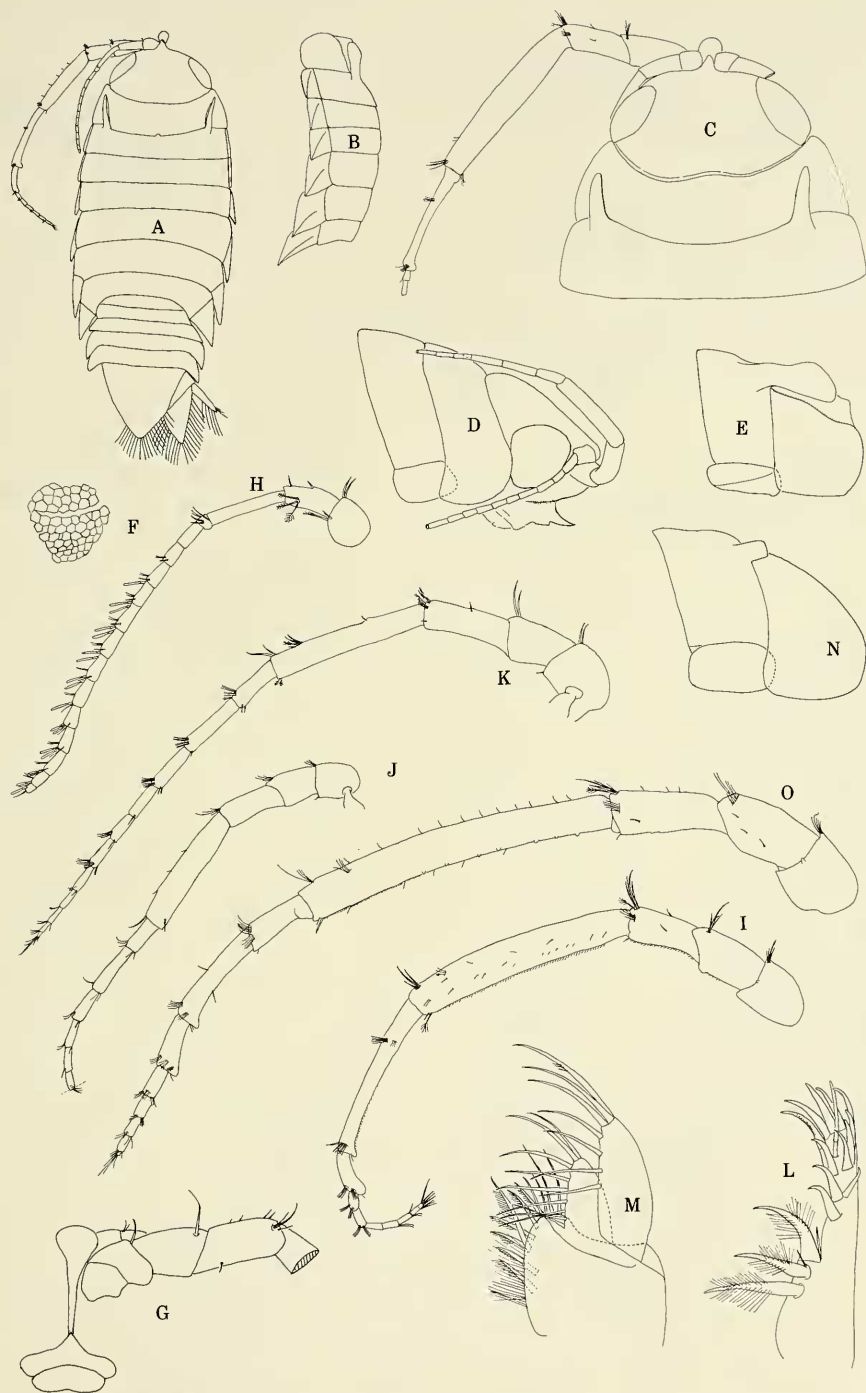


Fig. 1. A-M, *Annina fustis*: A, ♂ habitus, dorsal; B, ♂ pereon, lateral; C, ♂ head and pereonites 1-2, dorsal; D, ♀ head and pereonites 1-2, lateral; E, ♂ pereonites 1-2, lateral; F, Right eye, lateral; G, Buccal area, ventral; H, ♂ left antenna 1, dorsal; I, ♂ left antenna 2, dorsal; J, Left antenna 2, dorsal, 4.4 mm ♂; K, ♀ left antenna 2, dorsal; L, Maxilla 1; M, Maxilla 2. N-O, *Annina mesopotamica*: N, ♂ pereonites 1-2, lateral; O, ♂ left antenna 2, dorsal. (Segment 1 of peduncle not shown in I and O).

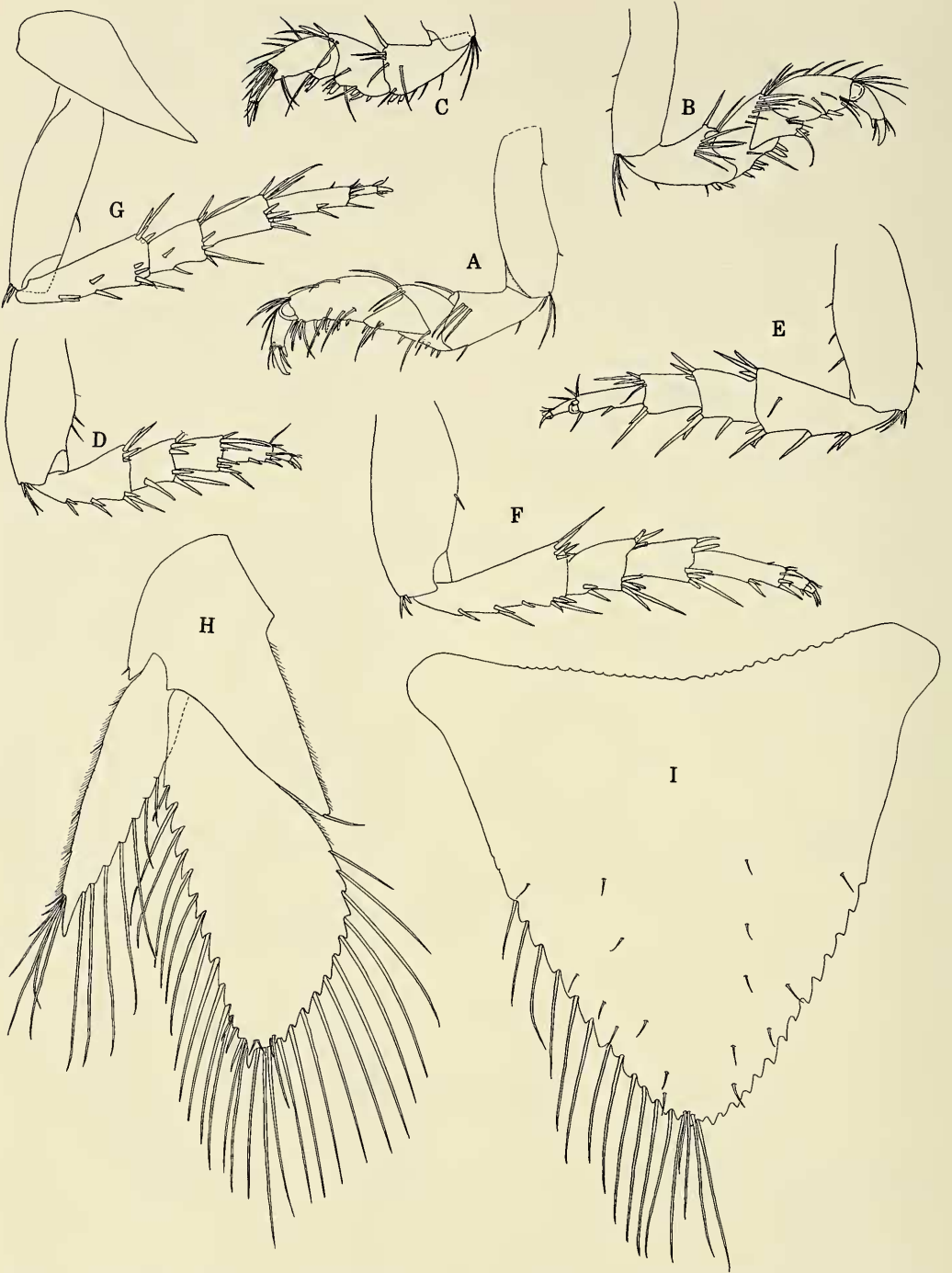


Fig. 2. *Annina fustis* ♂: A-G, Pereopods 1-7; H, Uropod, dorsal; I, Pleotelson, dorsal.

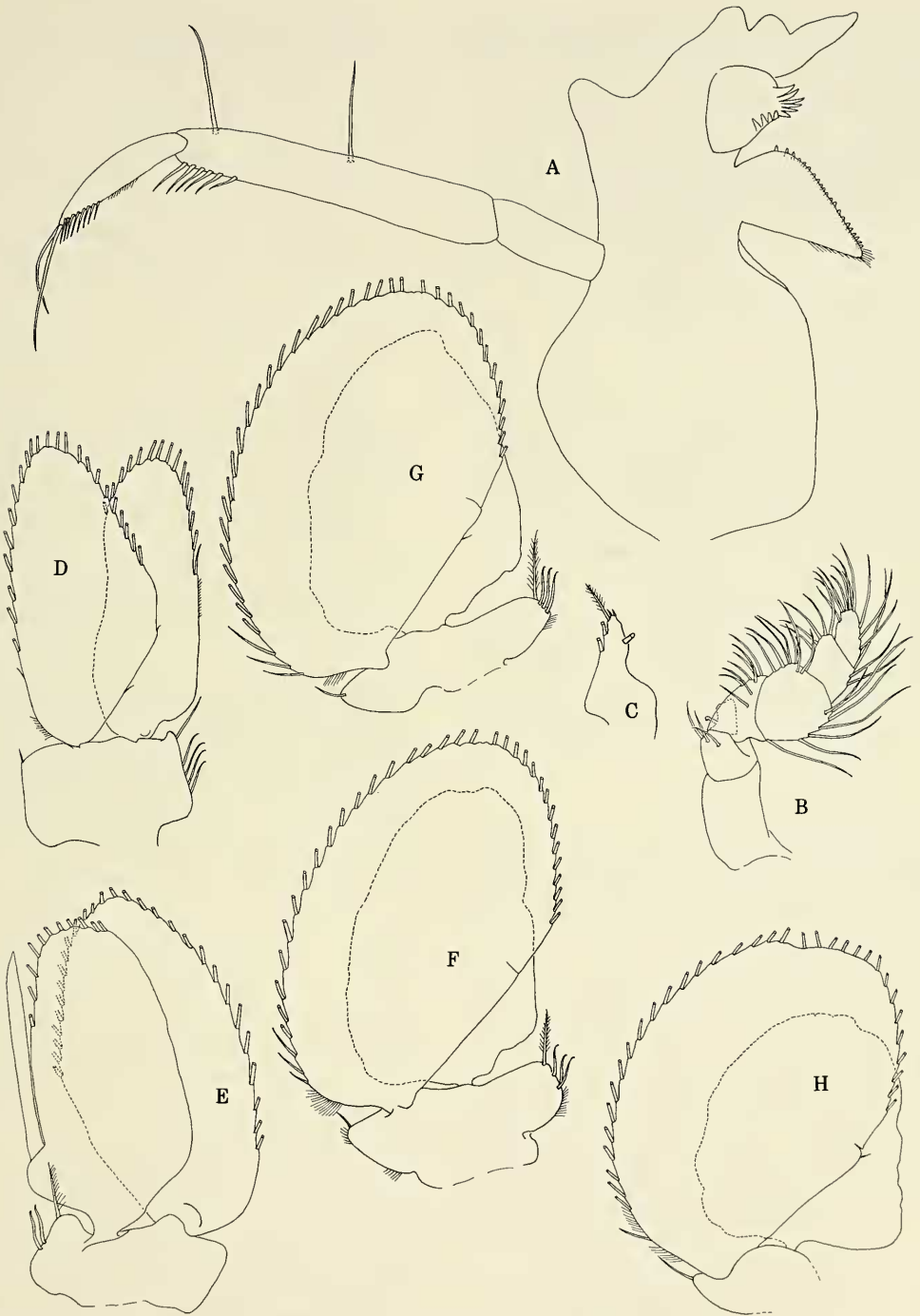


Fig. 3. *Annina fustis* ♂: A, Left mandible; B, Maxilliped; C, Endite of maxilliped; D-H, Pleopods 1-5.

of a small shallow stream flowing through natural archways. In addition to the *Annina fustis*, shrimps and crabs still under study were collected from the Tum Rusee stream. Dr. Niel L. Bruce (in litt. 17 Oct 1990) has generously suggested that I mention here his 2 samples of what is almost certainly *Annina fustis* from mangroves in Singapore.

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