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Revision of the scaleworm genera *Acholoe* Claparède, *Arctonoella* Buzhinskaja, and *Intoshella* Darboux (Polychaeta: Polynoidae) with the erection of the new subfamily Acholoinae

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Abstract.—Four genera and five species of polynoids are reviewed and revised, including *Acholoe* Claparéde, 1870, for *A. astericola* (Delle Chiaje, 1841), commensal with asteroids; *Arctonoella* Buzhinskaja, 1964, for *A. sinagawaensis* (Izuka, 1912); new genus *Paractonoella,* for *P. indica* (Day, 1973). n. comb., and *P. aphthalma* (Gallardo, 1968), n. comb., with ophiuroid (both as *Intoshella*); and *Intoshella* Darboux, 1900, for *I. euplectellae* (McIntosh, 1885), with glass sponge. All species are referred to the new subfamily Acholoinae, characterized by arctonoid type of prostomium and biramous parapodia with neuropodia deeply notched dorsally and ventrally, shorter rounded postsetal lobes and longer presetal acicular lobes, bifid distally, with longer supraacicular processes.

Covered in this report are five species and three synonyms: *Acholoe* Claparède, 1870, with *A. astericola* (Delle Chiaje, 1841) and synonyms: *Polynoe malleata* Grube, 1855, *Polynoe asterinae* Carrington, 1865, and *Acholoe orbiculata* Treadwell, 1921; *Arctonoella* Buzhinskaja, 1967, with *A. sinagawaensis* (Izuka, 1912); *Pararctonoella,* new genus, with *P. aphthalma* (Gallardo, 1968), n. comb. (as *Intoshella*), *P. indica* (Day, 1973), n. comb. (as *Intoshella*); *Intoshella* Darboux, 1900, with *I. euplectellae* (McIntosh, 1885).

The species have been variously included in Aphroditidae: Polynoinae by Day (1967); in Lepidonotinae by Hartman (1959) and Fauchald (1977); in Harmothoinae by Gallardo (1968), Uschakov (1974), and Fauchald (1977); and "arctonoid" type of prostomium by Uschakov (1982).

Based on the prostomium of the arctonoid type, the species of Acholoinae are more similar to the new subfamily Arctonoinae Hanley, 1989, who also included a detailed review of the subfamilies of Polynoidae. The neuropodia of the parapodia, with deeply notched anterior and posterior rounded lobes, resemble the new subfamily Lepidastheniinae Pettibone, 1989, and also lacking the elongate presetal acicular processes, as in Harmothoinae.

In addition to the collections in the National Museum of Natural History, Smithsonian Institution (USNM), the specimens covered herein are deposited in the following Museums; American Museum of Natural History, New York (AMNH): Natural History Museum, London (BMNH): Natural History Museum of Los Angeles County (LACM-AHF); Rijksmuseum van Natuurlijke Historie, Leiden (RNHL); Zoological Institute Academy of Sciences, Leningrad (ZIASL); and Zoologisches Museum, Berlin (ZMB).

Family Polynoidae Kinberg, 1856
Acholoinae, new subfamily

Diagnosis.—Body elongate, with numerous segments (more than 100) or moderate in number (up to 50). Elytra and bulbous

elytrophores numerous pairs (more than 40) or fewer, on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, 32, then variable in number and arrangement. Elytra orbicular, smooth, without fringes of papillae, with or without some microtubercles or some nodular papillae on surfaces. Dorsal cirri, on non-elytrigerous segments, with cylindrical cirrophores posterodorsal to notopodia, with distal styles; dorsal tubercles, in line with elytrophores, bifurcate, bulbous, or indistinct. Prostomium bilobed, with lobes rounded, without cephalic peaks, with paired palps and three antennae with distinct ceratophores; median antenna with large ceratophore in anterior notch of prostomium, with distal style; lateral antennae with distinct ceratophores inserted terminoventrally, converging midventrally, with short styles; usually two pairs of eyes. First or tentacular segment not visible dorsally; tentaculophores lateral to prostomium, with acicula, achaetous or with few setae, and dorsal and ventral tentacular cirri, similar to median antenna. Second or buccal segment with or without nuchal fold, with first pair of elytra and elytrophores, biramous parapodia, and ventral buccal cirri, longer than following ventral cirri. Parapodia biramous, smaller notopodia subconical with acicular processes on anterodorsal sides of larger neuropodia; neuropodia deeply notched dorsally and ventrally, with rounded postsetal lobes and slightly longer presetal acicular lobes, bifid distally, with variable development of supraacicular and subacicular processes. Notosetae few to numerous, variable. Neurosetae moderate in number to numerous, variable, all with entire tips. Ventral cirri short, subulate. Pygidium with pair of anal cirri. Pharynx with nine pairs of papillae and two pairs of jaws. Commensal with asteroids, ophiuroids, and glass sponges.

Remarks.—Members of the Acholoinae differ from the Lepidonotinae, where some of the newly proposed acholoinin species have previously been referred, by the position of the lateral antennae on the prostomium, where the lateral antennae are attached terminally on anterior extensions of the prostomium and without distinct ceratophores. The Acholoinae differ from the Harmothoinae, where the bilobed prostomium has cephalic peaks and the lateral antennae are inserted ventral to the ceratophore of the median antenna. Members of the Acholoinae have an "arctonoid" type of prostomium, as in the subfamily Arctonoinae, established by Hanley (1989). The bilobed prostomium, without cephalic peaks, has three antennae with distinct ceratophores. The ceratophore of the median antenna is inserted in the anterior notch of the prostomium and the ceratophores of the lateral antennae are inserted terminoventrally and converging midventrally.

The parapodia of the Acholoinae and the subfamilies Lepidastheniinae and Arctonoinae are similar in having subbiramous or biramous parapodia with the neuropodia deeply cut dorsally and ventrally, with anterior and posterior subequal rounded lobes but without projecting presetal acicular lobes, as in Harmothoinae. In the Acholoinae the slightly longer presetal acicular lobes are bifid distally, and with longer supraacicular processes.

Key to the Genera of Acholoinae

1. Segments numerous (more than 100). Elytra and elytrophores numerous pairs, continuing to posterior end of body. Elytra with microtubercles on anterior part (Fig. 1K). Dorsal tubercles on cirrigerous segments forming bifurcate T-shaped ciliated processes (Fig. 1H). Notosetae few (4–9), slender, with spinous rows and rounded tips (Fig. 1G, I). Neuropodium with bilobed presetal acicular lobe with deep notch and projecting aciculum and subequal rounded supraacicular and subacicular processes (Fig. 1G) .... *Acholoe* Claparède

– Segments moderate in number (up to 50). Elytra and elytrophores 16–23 pairs, not continuing to end of body. Elytra without microtubercles (Figs. 2H, 3J, 5F). Dorsal tubercles small, nodular or

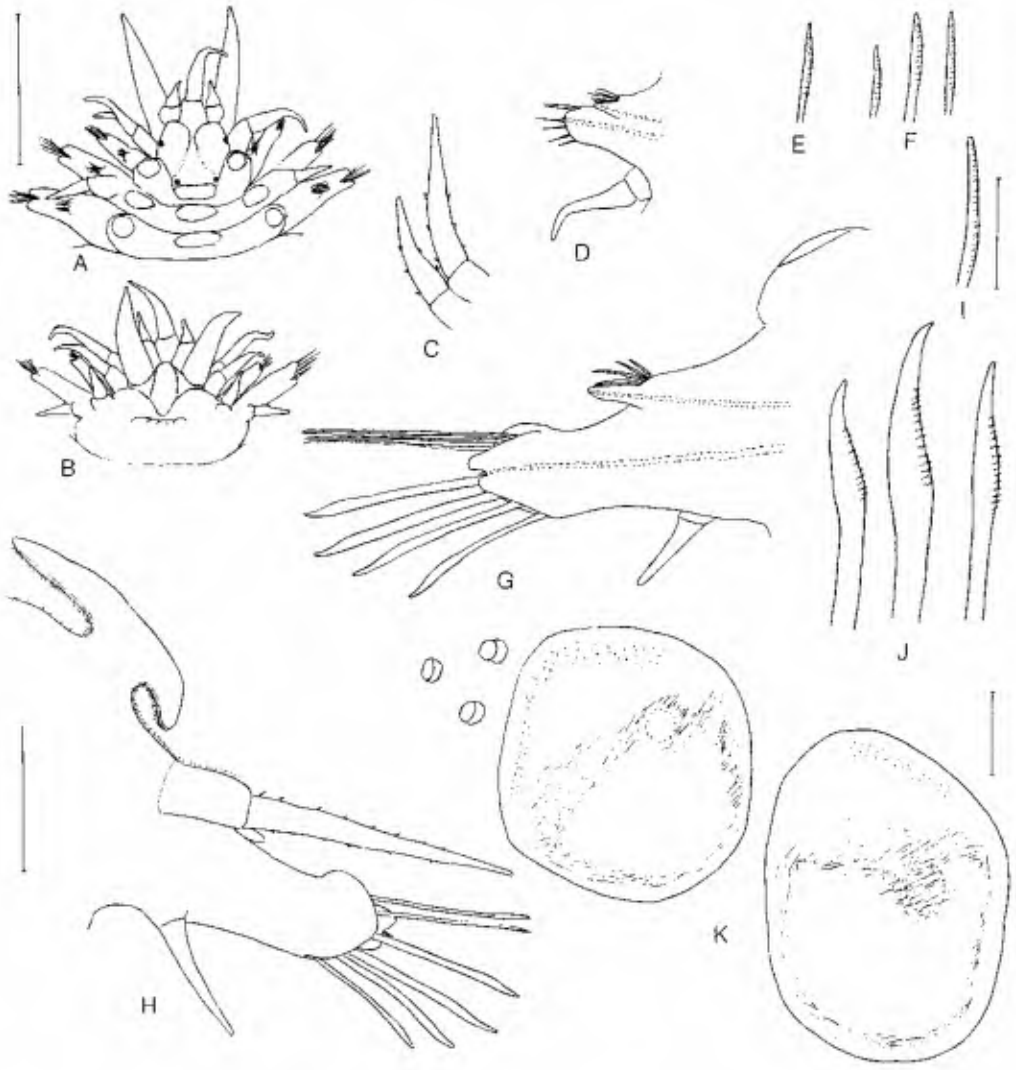

Fig. 1. *Acholoe astericola*, specimen from Naples (USNM 33626): A, Dorsal view of anterior end; B, Ventral view of anterior end; C, Tentaculophore of segment I, inner view; D, Right elytrigerous parapodium of segment II, anterior view, acicula dotted; E, Notoseta from same; F, Lower, middle & upper neurosetae from same; G, Right middle elytrigerous parapodium, anterior view, acicula dotted; H, Right middle cirrigerous parapodium, posterior view, with T-shaped dorsal tubercle; I, Notoseta from same; J, Lower, middle & upper neurosetae from same; K, Two right elytra, with detail of microtubercles. Scales = 1.0 mm for A, B; 0.5 mm for C, D, G, H; 0.1 mm for E, F, I, J; 0.5 mm for K.

bulbous. Notosetae numerous, variable. Neuropodium with bilobed presetal acicular lobe without wide notch, with longer supraacicular process (Figs. 2D, 3E, 4A, 5B) 2

2. Neuropodial presetal acicular lobe with longer subconical supraacicular process and shorter rounded subacicular process (Figs. 2D, 3E, 4A). Notosetae and neurosetae of single kind or of two kinds 3

– Neuropodial presetal acicular lobe with digitiform supraacicular process, without subacicular process (Fig. 5B). Both notosetae (Fig. 5D) and neurosetae (Fig. 5E) of single type, both glassy, with very faint spinous rows .... *Intoshella* Darboux

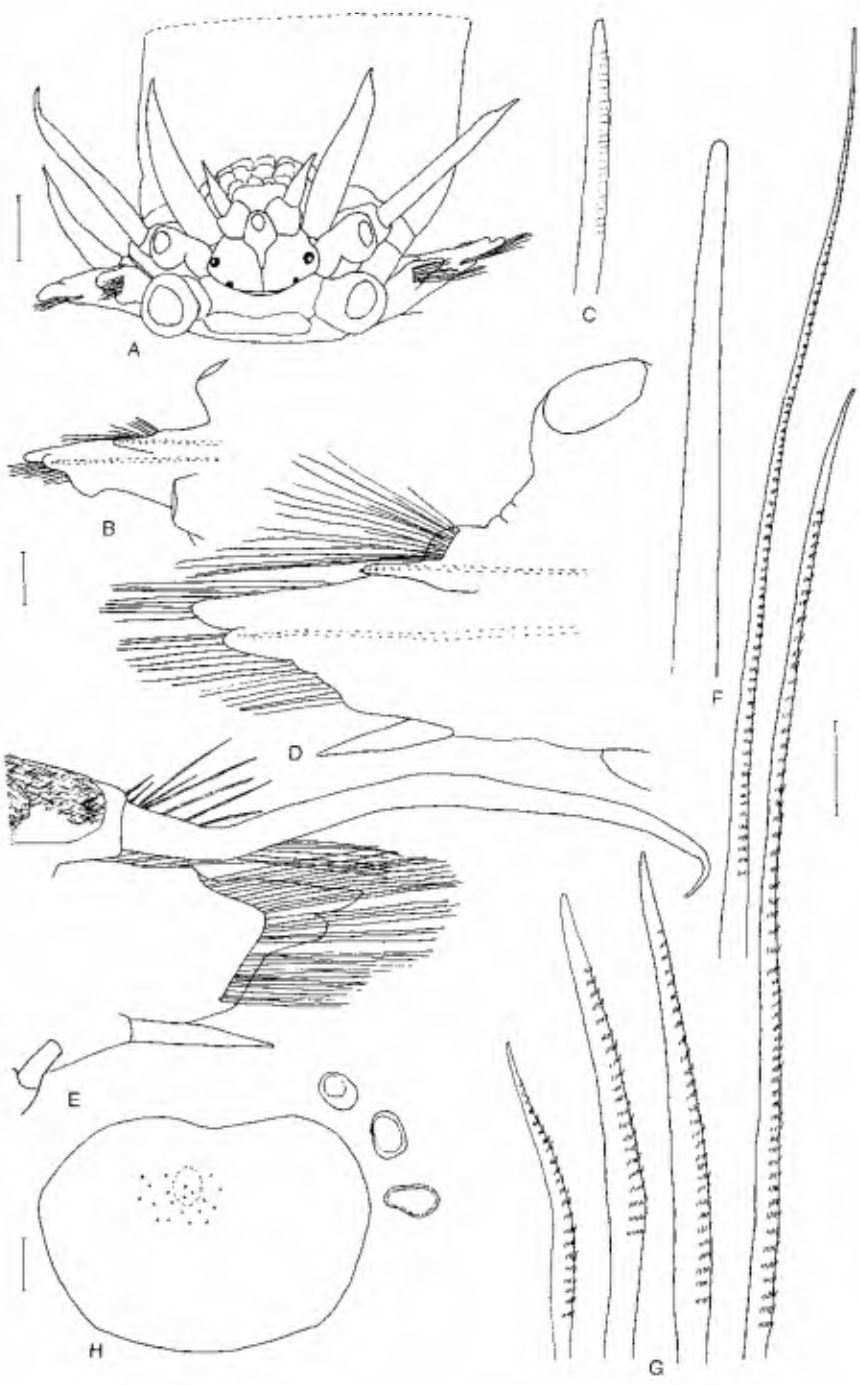

Fig. 2. *Arctonoella sinagawaensis*, specimen from Possjet Bay (ZIASL 17056): A, Dorsal view of anterior end, pharynx completely extended, distal part not shown; styles of median antenna, right and left dorsal tentacular cirri, and elytra missing; B, Right elytrigerous parapodium from segment II, anterior view, acicula dotted, ventral buccal cirrus missing; C, Short notoseta from same; D, Right middle elytrigerous parapodium, anterior view, acicula dotted; E, Right cirrigerous parapodium, posterior view, showing ventral nephridial papilla; F, Upper stout and lower slender notosetae from same; G, Lower, two middle, and upper neurosetae from same; H, Left middle elytron, with detail of central papillae. Scales = 1.0 mm for A; 0.5 mm for B, D, E; 0.1 mm for C, F, G; 1.0 mm for H.

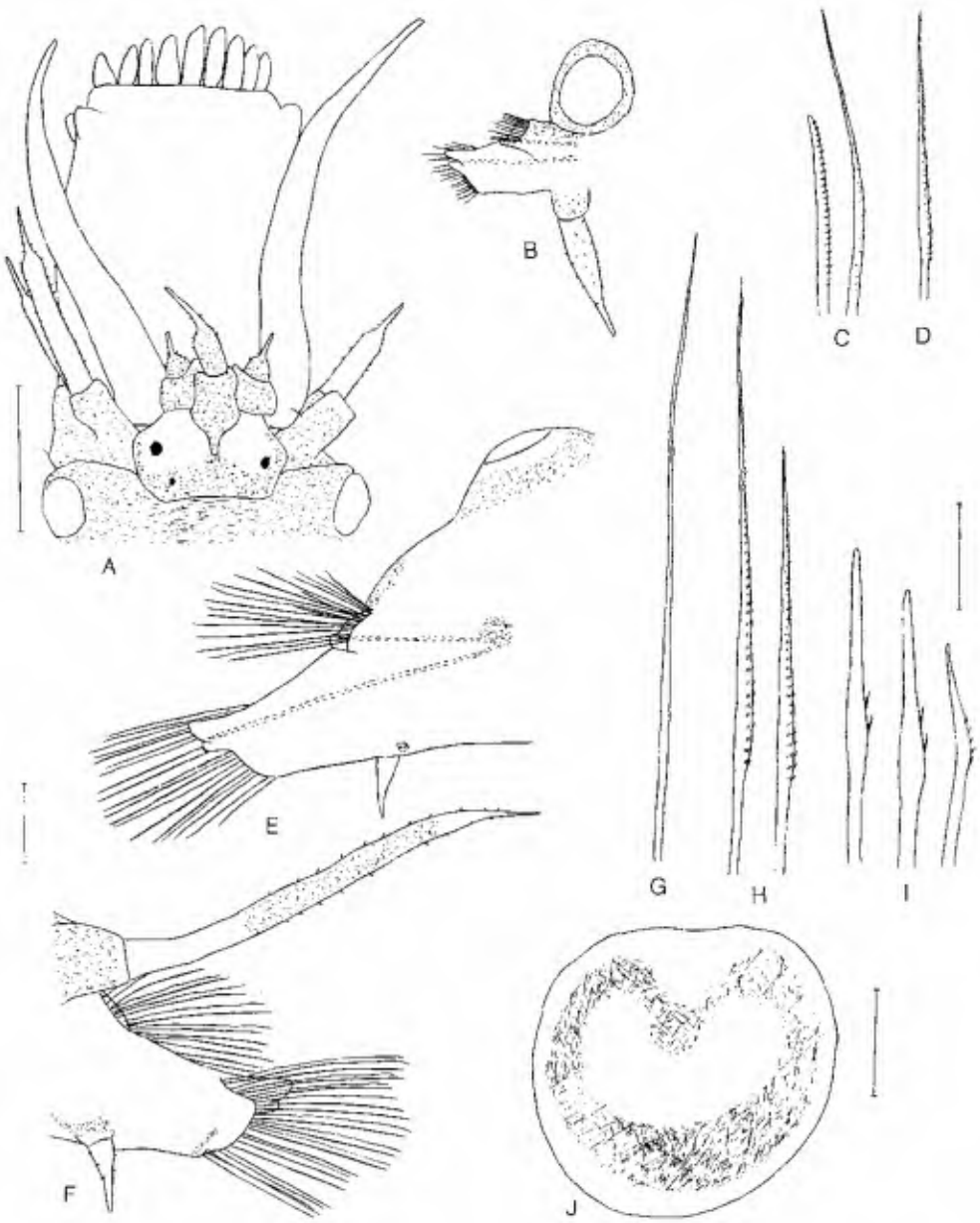

Fig. 3. *Pararctonoella indica,* holotype of *Intoshella indica* (BMNH 1972.51): A, Dorsal view of anterior end, pharynx fully extended, right dorsal tentacular cirrus missing, right eyes defective, only single one present, parapodia of segment II not shown; B, Right elytrigerous parapodium from segment II, anterior view, acicula dotted; C, Short and longer notosetae from same; D, Neuroseta from same; E, Right elytrigerous parapodium, anterior view, acicula dotted; F, Right cirrigerous parapodium, posterior view; G, Notoseta from same; H, Upper and lower supraacicular neurosetae from same; I, Middle and lower subacicular neurosetae from same; J, Left elytron. Scales = 1.0 mm for A; 0.5 mm for B, E, F; 0.1 mm for C, D, G–I; 1.0 mm for J.

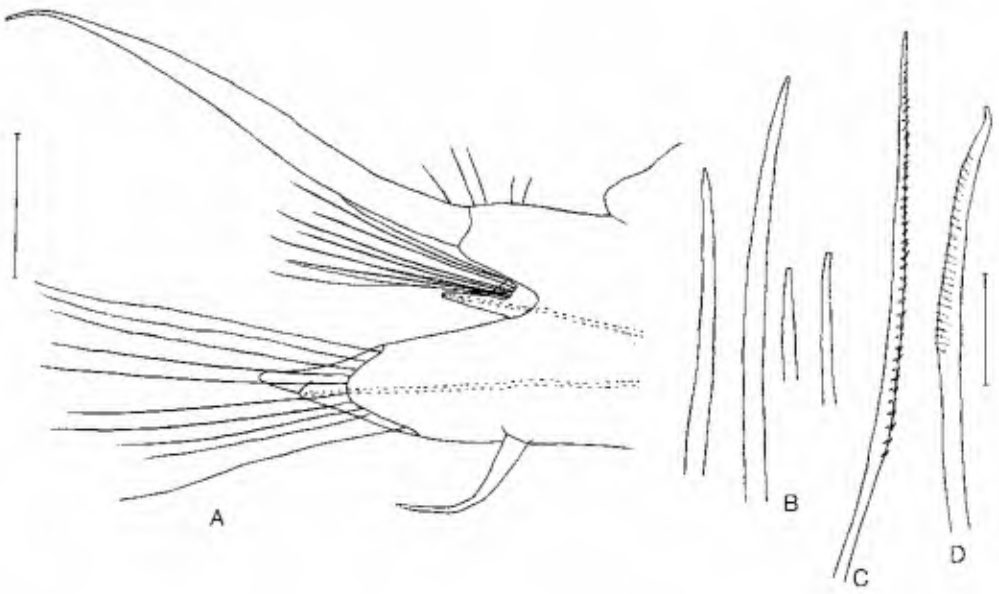

Fig. 4. *Pararctonoella aphthalma,* holotype of *Intoshella aphthalma* (USNM 45565, from LACM-AHF 296): A, Right cirrigerous parapodium, posterior view, acicula dotted; B, Notosetae from same; C, Supraacicular neuroseta from same; D, Subacicular neuroseta from same. Scales = 0.3 mm for A; 0.1 mm for B–D.

3. Elytra with nodular papillae on surface (Fig. 2H). Both notosetae and neurosetae of 2 kinds: notosetae stout, smooth, rodlike and long, spinous, with capillary tips (Fig. 2F); neurosetae shorter, with spinous rows and very long, with spinous rows, both with long bare tips (Fig. 2G) ..... *Arctonella* Buzhinskaya
– Elytra without nodular papillae. Notosetae of single kind, slender, capillary (Fig. 3G) or acicular, clear (Fig. 4B). Neurosetae of 2 kinds: slender, long, with spinous regions, and shorter, stouter, with few spines (Figs. 3H, I; 4C, D) .... *Pararctonella,* new genus

Genus *Acholoe* Claparède, 1870

Type species.—*Polynoe astericola* Delle Chiaje, 1841, by monotypy. Gender: feminine.

Diagnosis.—Body elongate, vermiform, segments numerous (more than 100), tapering posteriorly. Elytra and prominent elytrophores numerous pairs (more than 40), on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, 32, continuing on every third segment to end of body. Elytra orbicular, smooth, without fringes of papillae, with scattered microtubercles on anterior part. Dorsal cirri on non-elytrigerous segments, with cylindrical cirrophores and distal styles; dorsal tubercles forming bifurcated T-shaped ciliated branchial processes. Prostomium bilobed, with 2 palps and 3 antennae with distinct ceratophores; median antenna inserted in anterior notch; ceratophores of lateral antennae inserted terminoventrally, converging midventrally (arctonoid type), with two pairs of eyes. First or tentacular segment not distinct dorsally, with tentaculophores lateral to prostomium, achaetous, with dorsal and ventral tentacular cirri, without conical facial tubercle. Second or buccal segment with subrectangular nuchal lobe, first pair of elytrophores, biramous parapodia, and ventral buccal cirri, longer than following ventral cirri. Parapodia biramous; notopodia short, subconical; neuropodia deeply cut dorsally and ventrally, with slightly longer bifid presetal acicular lobes and rounded postsetal lobes. Notosetae few, slender, short, curved, spinous, with blunt tips. Neurosetae stout,

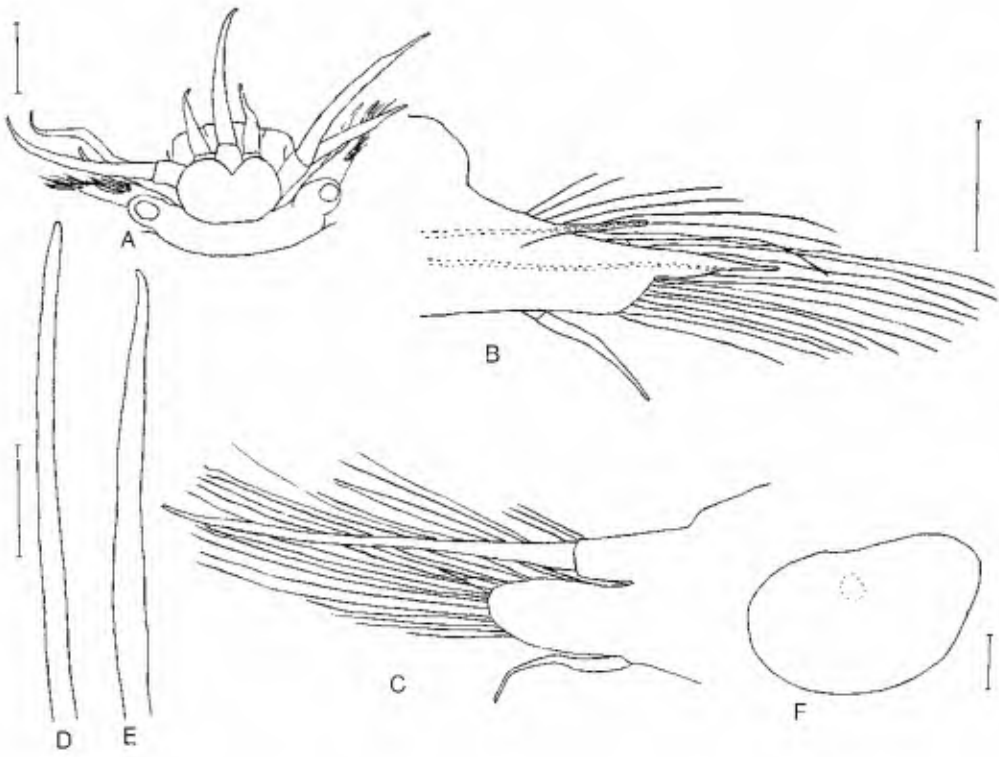

Fig. 5. *Intoshella euplectellae* syntype (BMNH 1921.5.1.548): A, Dorsal view of anterior end, pharynx partially extended, eyes faded, palps and elytra missing; B, Left elytrigerous parapodium, anterior view, acicula dotted; C, Left cirrigerous parapodium, posterior view; D, Notoseta from same, faint serrations not shown; E, Neuroseta from same, faint serrations not shown; F, Left elytron. Scales = 0.5 mm for A; 0.5 mm for B, C; 0.1 mm for D, E; 0.5 mm for F.

falcate, spinous, with entire tips. Ventral cirri short, subulate. Pharynx with nine pairs of papillae and two pairs of jaws. Nephridial papillae inconspicuous. Pygidium with pair of anal cirri. Commensal with asteroids.

Remarks.—There has been some confusion regarding the type species of *Acholoe* Claparède, 1870. In her Catalogue, Hartman (1959:59) listed: "Genotype: *Acholoe squamosa* (Delle Chiaje) 1828. Remarks: *Nereis squamosa* Delle Chiaje, 1828, predates *Polynoe astericola* Delle Chiaje, 1841, and both are here regarded as identical." However, Delle Chiaje (1841:106) lists: 1) *Polynoe squamosa* Savigny; 2) *Polynoe astericola* Delle Chiaje (*Nereis squamosa* Mem.su gli anim.s.vert. II 368, t. XIX 7) [1825:368, pl. 19:fig.7]. Thus *Nereis squamosa* Delle Chiaje (1825) was distinct from *Polynoe squamosa* Savigny and was referred to *Polynoe astericola,* not to be confused with Savigny's name of *squamosa.* This is confirmed by McIntosh (1900) in his synonymy of *Acholoe astericola.* Claparède (1870) chose *Polynoe astericola* as the type species of his new genus *Acholoe,* an appropriate name for the species commensal with asteroids, and has been widely used. Following Hartman (1959), some authors, such as Day (1967), and others, have incorrectly used *Acholoe squamosa* (Delle Chiaje).

Acholoe astericola (Delle Chiaje)
Fig. 1

Nereis squamosa Delle Chiaje, 1825:368. [Referred to *Polynoe astericola* by Delle Chiaje, 1841:106.]

Polynoe astericola Delle Chiaje, 1841:57, 62, pl. 129:fig. 7.

Polynoe malleata Grube, 1855:81, pl. 1: fig. 1.

Polynoe asterinae Carrington, 1865:177.

Acholoe astericola.—Claparède, 1870:382, pl.2:fig. 1, 1A, B.–McIntosh, 1900:397, pl.27:fig. 17, pl. 31:fig.4; pl. 33:fig. 15, pl. 41:figs. 13, 14.—Fauvel, 1923:94, fig. 36d–h.–Tebble, 1955:78.—Hartman, 1956:247, 271.—Cazaux, 1968:520, figs. 12, 13 (Development).

Acholoe orbiculata Treadwell, 1921:1, figs. 1–8.–Lopez-Garcia & San Martin-Peral, 1992:162, fig. 1a–f.

Acholoe squamosa.—Hartman, 1959:60 (Catalogue).—Day, 1967:52, fig. 1.5.g–k.—Barel & Kramers, 1977:49, fig. 9F.—Campoy, 1982:75.—Kirkegaard, 1983: 187.

Material examined.—Mediterranean: Naples, G. Skiasuy, collector, 2 specimens (RNHL 376; USNM 33626). Naples, collector P. Fauvel, 1 specimen (BMNH 1928.4.26.211). Off Camarque, Faraman, Beauduc, 10 m, 3 Jun 1959, H. Zibrowius, collector, 7 specimens (USNM 47171). Gulf of Kassandra, Kassandra Peninsula, North Aegean Sea, in ambulacral groove of sea-star *Astropecten aurantiacus,* 2 m, in sand, H. Lessios, collector, 6 Aug 1971, 1 specimen (USNM 50552).

Adriatic: Trieste, Lesia, Porto Ré, Grube, collector, 5 syntypes of *Polynoe malleata* (ZMB 1149–1151).

West Africa: St. Paul de Loanda, Belgian Congo, 22 Sep 1915, H. Lang & J. Chapin, collectors, holotype and 3 paratypes of *Acholoe orbiculata* (AMNH 1364, 1367). Off Accra, Gold Coast, R. Bassindale, collector, 1 specimen (BMNH 1953.3.1.619–620).

Type material.—The types of Delle Chiaje from Naples are not known to exist. Specimens from Naples (RNHL 376, USNM 33626) were examined and used to supplement the description of the species. Claparède (1870) reported a length of 45 mm and width of 4 mm, with about 120 segments. Syntypes of *Polynoe malleata* Grube (ZMB 1149–1151) from Trieste, Adriatic, were examined. A complete syntype of about 100 segments measured 40 mm in length and 5 mm in width, including setae. The species was referred to *A. astericola* by McIntosh (1900:397). The holotype and paratypes of *Acholoe orbiculata* Treadwell (AMNH 1364, 1367) from the Belgian Congo were examined. The complete holotype of about 145 segments measured 50 mm in length and 5 mm in width, including setae. The types were examined by Hartman (1956:147) and referred to *A. astericola.* No types are known for *Polynoe asterinae* Carrington (1865:177), from Southport Sands, England, commensal with *Asterias aurantiaca.* The latter incompletely described species was referred to *Acholoe squamosa* by Hartman (1959:99; Catalogue).

Description.—Body elongated, depressed, tapering slightly anteriorly and more so posteriorly, with numerous segments (up to 120 or more). Elytra on large bulbous elytrophores covering dorsum. Elytra large, oval, without papillae, with scattered microtubercles on anterior part, and with yellow brown to blackish pigmentation in central part and near external borders (Fig. 1K; McIntosh 1900, pl. 33:fig. 15). Dorsal cirri, on non-elytrigerous segments, with short cylindrical cirrophores and tapering papillate styles extending to tips of neurosetae; dorsal tubercles, in line with elytrophores, modified and forming large, flattened, T-shaped ciliated branchial processes (Fig. 1H; Claparède 1870, pl. 2: fig. 1A; McIntosh 1900, pl. 31:fig. 4).

Bilobed prostomium with lobes rounded, without cephalic peaks; median antenna with large ceratophore in anterior notch of prostomium, with style rather short, with tapering tip; lateral antennae with distinct ceratophores inserted terminoventrally, converging midventrally, with styles short, subulate; palps stout, tapering, longer than median antenna; eyes rather small, larger anterior pair anterolateral, smaller posterior

pair near posterior border; tentaculophores lateral to prostomium, achaetous, with dorsal and ventral tentacular cirri similar to median antenna (Fig. 1A–C; McIntosh 1900, pl. 27:fig. 17).

Segment 2, with rectangular bulbous area or nuchal fold between first pair of elytrophores; similar lobes on segments 3 and 4 (Fig. 1A). Small biramous parapodia with ventral buccal cirri longer than following ventral cirri; notosetae and neurosetae similar to following segments, only more slender (Fig. 1D–F).

Biramous parapodium with smaller notopodium on anterodorsal side of large neuropodium, in form of short, digitiform acicular lobe; well developed neuropodium with presetal bilobed acicular lobe with acicular notch and projecting aciculum, slightly longer than rounded postsetal lobe (Fig. 1G, H; McIntosh 1900, pl. 31:fig. 4). Notosetae few (4–8), forming small bundle, short, extending to tips of notopodial lobe, slender, curved, with spinous rows and blunt bare tips (Fig. 1I). Neurosetae few (7–8), stout, thicker than notosetae, with short spinous regions and entire hooked tips, upper ones slightly more slender (Fig. 1J). Ventral cirri short, tapered (Fig. 1G, H). Pygidium with pair of anal cirri.

Development.—Cazaux (1968:520–524, Figs. XII–XIII) followed the pelagic development of *Acholoe astericola* in Arcachon, France, from the Trochophore to the Nectochaete II stage (30 days), with nine segments and five pairs of elytra.

Habitat.—*Acholoe astericola* has been reported as commensal with various species of star-fish of the genus *Astropecten,* including *A. aurantiacus, A. bispinosus, A. platyacanthus, A. pentacanthus, A. irregularis, A. hupferi,* and the star-fish *Luidia ciliaris.* The polynoids occupy the ambulacral grooves of the asteroids.

Distribution.—Atlantic Ocean, English Channel, France, Spain, Mediterranean, Adriatic, West Africa, in shallow depths.

Remarks.—A unique feature in *Acholoe astericola* is the development of the dorsal tubercles on the cirrigerous segments, forming bifurcate T-shaped ciliated branchial structures. The more numerous segments and elytra, continuing to the posterior end of the body, differs from the other shorter species of Acholoinae. Middorsal subrectangular bulbous areas, found on segments 2, 3, & 4, of *A. astericola,* are also found on segment 2 of *Arctonoella sinagawaensis.* The neuropodial presetal acicular lobes have wider acicular notches than in the other species of Acholoinae.

Genus *Arctonoella* Buzhinskaja, 1967

Type species.—*Harmothoe sinagawaensis* Izuka, 1912, by original designation and monotypy. Gender: feminine.

Diagnosis.—Body elongate, with segments up to 41, tapering posteriorly. Elytra and prominent elytrophores 16 pairs, on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, 32, 33 (or 35). Elytra orbicular, without fringe of papillae or tubercles, with nodular papillae in central area. Dorsal cirri on non-elytrigerous segments, with cylindrical cirrophores and long distal styles; dorsal tubercles small, nodular. Prostomium bilobed, with two palps and three antennae with distinct ceratophores; median antenna inserted in anterior notch of prostomium; ceratophores of lateral antennae inserted terminoventrally, converging midventrally (arctonoid type), with two pairs of eyes. First or tentacular segment not distinct dorsally, with tentaculophores lateral to prostomium, achaetous, with dorsal and ventral tentacular cirri; without conical facial tubercle. Second or buccal segment without nuchal fold, with first pair of elytrophores, biramous parapodia, and long ventral buccal cirri. Parapodia biramous; shorter notopodia with projecting acicular lobe; larger neuropodia deeply cut dorsally and ventrally, longer presetal acicular lobe bifid distally, with longer supraacicular process and shorter rounded postsetal lobe. Notosetae numerous, of two kinds: upper ones smooth, rod-like, stouter than neurosetae;

lower ones slender, serrated, tapering to fine tips. Neurosetae with long to shorter spinous regions, all with rather long bare entire tips. Ventral cirri short, subulate. Pharynx with nine pairs of papillae and two pairs of jaws. Nephridial papillae prominent, beginning on segment 6. Pygidium with pair of long anal cirri.

Arctonoella sinagawaensis (Izuka)
Fig. 2

Harmothoe sinagawaensis Izuka, 1912:57: pl. 6:figs. 8–12.—Fauvel, 1933:10.

Not ? *Harmothoe sinagawaensis.*—Fauvel, 1932:23; 1953:48 [=*Pararctonoella indica* (Day, 1973), new combination].

Gattyana sinagawaensis.—Hartman, 1959: 71, 78.—Imajima & Hartman, 1964:32.

Hesperonoe (?) *sinagawaensis.*—Uschakov & Wu, 1965:172.

Arctonoella sinagawaensis.—Buzhinskaja, 1967:83, fig. 1A–E.—Uschakov, 1982: 39, pl. 39:1–8.

Material examined.—Sea of Japan: Possjet Bay, A. N. Golikov, collector, Aug 1962, 1 specimen (ZIASL 17056).

Type material.—The types of Izuka from the Gulf of Tokyo, Japan are not known to exist. Fauvel (1933) described two specimens from the Gulf of Pei Tcheu Ly in the Yellow Sea. The specimen from Possjet Bay in the Sea of Japan, deposited in ZIASL, was received on loan from P. V. Uschakov. The specimen was described and figured by G. N. Buzhinskaja (1967) and referred to the new genus *Arctonoella.*

Description.—Body flattened, tapering slightly anteriorly and more so posteriorly. Segments up to 41, length 58 mm, width 18 mm, with setae. Elytra large, oval, covering dorsum, smooth, with or without group of soft rounded papillae in central area (Fig. 2H). Dorsal cirri with short cylindrical cirrophores and bulbous lobe on posterior side; style long, extending far beyond tips of neurosetae; dorsal tubercles small, nodular (Fig. 2E).

Bilobed prostomium with lobes rounded, without cephalic peaks, broader than long; median antenna with large ceratophore in anterior notch, style longer than lateral antennae; lateral antennae with large ceratophores inserted terminoventrally, converging midventrally; styles short subulate; palps stout, long, tapering; larger anterior eyes in region of greatest width of prostomium, smaller posterior eyes near posterior border; tentaculophores large, achaetous, with long dorsal and ventral tentacular cirri (Fig. 2A).

Segment 2 with rectangular raised area between first pair of large elytrophores, biramous parapodia, and long ventral buccal cirri (Fig. 2A, B). Notosetae similar to following, except stout notosetae showing faint indications of spinous rows (Fig. 2C); neurosetae similar to following, all with slender bare tips. Biramous parapodia with smaller notopodia with projecting acicular lobes on lower sides; larger neuropodia with shorter subconical postsetal lobes and longer presetal acicular lobes, bifid distally, with longer subconical supraacicular processes (Fig. 2D, E). Notosetae numerous, of two kinds: upper ones radiating, stout, acicular, smooth, tapering to rounded tips and lower ones slender, very finely denticulate, tapering to fine tips (Fig. 2D, F). Neurosetae numerous, with long (lower ones) to very long (upper ones) spinous regions, all with rather long, bare, entire tapered tips (Fig. 2D, G). Ventral cirri short, smooth, subulate (Fig. 2D, E). Pygidium with pair of long anal cirri. Nephridial papillae beginning on segment 6, small at first, then long, cylindrical (Fig. 2E).

Distribution.—North Pacific, Japan Sea, Yellow Sea, in shallow depths.

Remarks.—*A. sinagwaensis* agrees with *A. astericola* in having segment 2 with rectangular raised areas between the first pair of elytrophores. The notopodia, with two kinds of notosetae: stout, rodlike, smooth, and slender, spinous, with capillary tips, differs from the other members of the Acholoinae, in having notosetae of a single kind.

Paractonoella, new genus

Type species.—*Intoshella indica* Day, 1973. Gender: feminine.

For: *Pararctonoella indica* (Day, 1973), new combination *Pararctonoella aphthalma* (Gallardo, 1968), new combination.

Diagnosis.—Body elongate, with segments up to 48, tapering posteriorly. Elytra and prominent elytrophores 18–20 or more pairs, on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, 32/35, 37, 39 (*P. indica*) or 36, 37, 40, 41 (*P. aphthalma*). Elytra large, oval, smooth, without papillae or tubercles. Dorsal cirri on non-elytrigerous segments, with cylindrical cirrophores and long styles; dorsal tubercles indistinct or bulbous. Prostomium bilobed, with lobes rounded, without cephalic peaks, with two palps and three antennae with distinct ceratophores; median antenna inserted in anterior notch of prostomium; ceratophores of lateral antennae inserted terminoventrally, converging midventrally (arctonoid type); with (*P. indica*) or without (*P. aphthalma*) two pairs of eyes. First or tentacular segment not distinct dorsally; tentaculophores lateral to prostomium, each with single seta and dorsal and ventral tentacular cirri; without conical facial tubercle. Second or buccal segment without nuchal fold, with first pair of elytrophores, biramous parapodia, and long ventral buccal cirri. Parapodia biramous, shorter notopodia with projecting acicular lobes, larger neuropodia deeply cut dorsally and ventrally, with shorter rounded postsetal lobes and longer presetal acicular lobes, bilobed distally, with longer conical supraacicular and shorter rounded subacicular processes. Notosetae of single kind: slender, capillary (*P. indica,* except segment 2), or stouter, acicular (*P. aphthalma*). Neurosetae of two kinds: supraacicular ones with long spinous regions and fine tips; subacicular ones stouter, with fewer spinous rows and long bare tips. Ventral cirri short, subulate. Pharynx with nine pairs of papillae and two pairs of jaws. Nephridial papillae beginning on segment 6. Pygidium with pair of anal cirri. Commensal with ophiuroid (*P. aphthalma*).

Etymology.—*Para,* near, plus *Arctonella,* indicating the similarity of the two genera.

Remarks.—Day (1973) assigned his new species of *indica* to *Intoshella* "with considerable hesitation". The same could be said for Gallardo (1968) when he assigned his new species of *aphthalma* to *Intoshella.* Both species are referred herein to the new genus *Pararctonella.* The new genus differs from *Arctonella* Buzhinskaya by having notosetae of one kind: slender, capillary (*P. indica*) or acicular (aphthalma), instead of two kinds, as in *A. sinagawaensis. Arctonella* has 16 pairs of elytra; *Pararctonella,* with 18–20 or more pairs.

Pararctonoella indica (Day), new combination
Fig. 3

??*Harmothoe sinagawaensis.*—Fauvel, 1932:23, pl. 1:figs. 1, 2, text-fig. 3a–d. Not Izuka, 1912.

?*Harmothoe sinagawensis* [sic].—Fauvel, 1953:48, fig. 21a, b (Incertae sedis]. Not Izuka, 1912.

Intoshella indica Day, 1973:338, fig. 1A–F (genus doubtful).—Uschakov, 1982:140 (Key).

Material examined.—Indian Ocean: Mirkar wada, Ratnagiri, South of Bombay, India, muddy stones, 4 Jul 1969, U. D. Gaikwad, collector, holotype (BMNH 1972.51).

Description.—Body flattened ventrally, slightly arched dorsally, tapering anteriorly and posteriorly, with 40 segments, last one minute, 24 mm long, 8 mm wide with setae. Elytra and elytrophores 18 pairs (not 16, as indicated by Day), on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, 32, 35, 37, 39. Elytra large, oval, smooth, without papillae or tubercles, with blackish pigmentation concentrated on places of attachment to elytrophores and outer circular areas (Fig. 3J; Fauvel 1932, pl. 1:fig. 1; Day 1973, fig. 1A). Dorsal cirri with thick cy-

lindrical cirrophores and long styles, extending far beyond neurosetae, with short papillae, pigmented on middle part and on cirrophores; dorsal tubercles inflated, indistinct (Fig. 3F; Day 1973, fig. 1F).

Bilobed prostomium with lobes rounded, without cephalic peaks; median antenna with large inflated ceratophore in anterior notch, with short style and long filamentous tip; lateral antennae with large inflated ceratophores inserted terminoventrally and converging midventrally, with styles similar to median antenna but smaller, both with few micropapillae; palps very long, tapered, smooth; eyes rather small, anterior dorsolateral pair larger than posterior pair (right side defective on holotype, only one eye in intermediate position); tentaculophores (segment 1) lateral to prostomium, each with single stout seta and dorsal and ventral tentacular cirri, similar to but longer than median antenna (Fig. 3A; Day 1973, fig. 1B).

Segment 2 without nuchal fold, with first pair of large elytrophores, biramous parapodia, and long ventral buccal cirri, similar to tentacular cirri (Fig. 3A, B); notosetae differing from following segments, of two kinds; shorter, with distinct spinous rows and blunt tips and longer, with indistinct spinous rows and fine tips (Fig. 3C); neurosetae similar to lower supraacicular neurosetae of following segments (Fig. 3D). Biramous parapodia with notopodia short, subconical, with short rounded acicular processes on anterodorsal faces of larger neuropodia; neuropodia with shorter rounded postsetal lobes and longer presetal acicular lobes, bilobed distally, with longer conical supraacicular and shorter rounded subacicular processes (Fig. 3E, F; Fauvel 1932, pl. 1:fig. 2; Day 1973, fig. 1F). Notosetae numerous, forming fan-shaped bundle, extending to near distal tips of neuropodia, finer than neurosetae, finely serrated and appearing smooth, with fine hairlike tips (Fig. 3E, G); Fauvel 1932, fig. 3a; Day 1973, fig. 1C). Neurosetae numerous, of two kinds: supraacicular long, slender, with numerous spinous rows and tapering to fine capillary tips (Fig. 3H; Fauvel 1932, fig. 2B; Day 1973, fig. 1D); subacicular shorter, stouter, with 2 (upper) to 5 (lower) large spines on enlarged basal parts and long, bare, blunt tips (Fig. 3I; Fauvel 1932, fig. 3c, d; Day 1973, fig. 1E). Ventral cirri short, subulate, with few micropapillae (Fig. 3E, F). Pharynx (extended) with nine pairs of papillae and two pairs of jaws (Fig. 3A). Nephridial papillae minute. Pygidium with anus medial to parapodia of segment 39, with pair of anal cirri.

Distribution.—Indian Ocean, off Bombay, India, intertidal.

Remarks.—As Uschakov (1982:190) pointed out, Day's species of *indica* is distinguished from *Arctonella* by the absence of large acicular notosetae and replaced by slender notosetae with hairlike tips. In *P. indica,* the neurosetae are of two kinds: slender, with long spinous regions, tapered capillary tips, and shorter, stouter, with few spines (2–5) and long bare tips. Eyes are present (absent in *P. aphthalma*).

Paractonoella aphthalma (Gallardo), new combination
Fig. 4

Intoshella aphthalma Gallardo, 1968:47, pl. 2:figs. 1–6, pl. 3:figs. 1, 2.—Uschakov, 1982:141, pl. 46:1–8 (after Gallardo).

Material examined.—South China Sea: South Viet Nam, Bay of Nha Trang, NAGA Exped. Sta 285, 23 Mar 1960, 19 m, mud, on ophiuroid, holotype (LACM-AHF 296; parapodium, USNM 45565).

Description.—Body long, narrow, flattened, tapering posteriorly, with 44 segments (incomplete), 11+ mm long, and 4 mm wide with setae. Elytra and elytrophores 20+ pairs, on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, 32, 36, 37, 40, 41, 44. Elytra large, oval, smooth, without papillae or tubercles (Gallardo 1968, pl. 2:fig. 2) Dorsal cirri with cylindrical cirrophores and long, smooth, tapering styles, extending about to tips of neurosetae; dor-

sal tubercles bulbous (Fig. 4A; Gallardo 1968, pl. 2:fig. 4).

Prostomium bilobed, slightly longer than wide, lobes rounded, without cephalic peaks, with scattered pigmentation; median antenna with bulbous ceratophore in anterior notch of prostomium, style slightly longer than prostomium; lateral antennae with bulbous ceratophores inserted terminoventrally and converging midventrally, with styles half as long as median antenna; palps stout, tapered, longer than median antenna; eyes absent (faded or hidden by pigmentation?); tentaculophores (segment I) lateral to prostomium, each with small acicular lobe, slender seta, and dorsal and ventral tentacular cirri longer than palps (Gallardo 1968, pl. 2:fig. 1).

Segment 2 without nuchal fold, with first pair of large elytrophores, biramous parapodia, and long ventral buccal cirri on distinct cirrophores and extending to tips of neurosetae; notosetae and neurosetae similar to following segments (Gallardo 1968, pl. 2:figs. 1, 3). Biramous parapodia with notopodia short, subconical, with projecting acicular processes on anterodorsal faces of larger neuropodia; neuropodia with shorter rounded postsetal lobes and longer presetal acicular lobes, bilobed distally, with longer conical supraacicular and shorter rounded subconical processes (Fig. 4A; Gallardo 1968, pl. 2:fig. 4). Notosetae numerous, forming fan-shaped bundles, extending to distal tips of neuropodia, about equal in thickness to neurosetae, slightly curved, smooth, with or without very fine denticulations, tapering to rounded tips (Fig. 4B; Gallardo 1968, pl. 2:fig. 5). Neurosetae numerous, of two kinds; supraacicular ones long, slender, with long spinous regions, tapering to slender bare tips (Fig. 4C; Gallardo 1968, pl. 3:fig. 1); subacicular ones stouter, with shorter spinous regions and slightly hooked bare tips (Fig. 4D; Gallardo 1968, pl. 2:fig. 6, pl.3:fig. 2). Ventral cirri short, subulate, smooth (Gallardo 1968, pl. 2:fig. 4). Nephridial papillae cylindrical, turned dorsally between parapodia, beginning on segment 6. Pharynx (?, not extended). Pygidium (?, incomplete).

Distribution.—North Pacific Ocean, South China Sea, South Viet Nam, 19 meters, on ophiuroid.

Remarks.—In *P. aphthalma,* the single available specimen was incomplete posteriorly, with 44+ segments and 20+ pairs of elytrophores. There is the possibility that the elytra continue to the posterior end of a longer body. Eyes were absent, as the species name indicates, with the possibility that they were just faded. The neurosetae are of two kinds, as in *P. indica.* Here they are long, slender, with numerous spinous rows, tapering to slender tips, and stouter, with fewer spinous rows and slightly hooked bare tips.

Genus *Intoshella* Darboux

Type species.—*Polynoe* (*Langerhansia*) *euplectellae* McIntosh, 1885 by monotypy.

Intoshella Darboux, 1900, new name for *Langerhansia* McIntosh, 1885, preoccupied by Czerniavsky, 1881, in Syllidae.

Diagnosis.—Body long, slender, flattened, tapering posteriorly. Segments up to 50. Elytra up to 23 pairs, on segments 2, 4, 5, 7, alternate segments to 23, 26, 29, 32, 33, 36, 38, alternate segments to end of body. Elytra large, covering dorsum, without fringes of papillae or tubercles. Dorsal cirri with cylindrical cirrophores and long styles; dorsal tubercles bulbous. Prostomium bilobed, rounded anteriorly, without cephalic peaks, with pair of palps and three antennae with distinct ceratophores; median antenna with ceratophore in anterior notch, lateral antennae with ceratophores inserted terminoventrally, with two pairs of eyes; tentaculophores of segment I lateral to prostomium, each with seta and dorsal and ventral tentacular cirri; without facial tubercle. Buccal segment (2) without nuchal lobe, with first pair of elytrophores, biramous parapodia, and long ventral buccal cirri. Biramous parapodium with small subconical notopodium with long digitiform

acicular process; larger neuropodium with shorter, rounded postsetal lobe and larger, subconical presetal acicular lobe with long digitiform supraacicular extension. Both notosetae and neurosetae of about equal width, transparent, with faint serrations, notosetae tapering to blunt tips, neurosetae with tips slightly falcate. Ventral cirri short, tapered. Pygidium (?, incomplete). Pharynx (?, not extended). Nephridial papillae inconspicuous. Commensal with glass sponges.

Intoshella euplectellae (McIntosh)
Fig. 5

Polynoe (*Langerhansia*) *euplectellae* McIntosh, 1885:108, pl. 15:fig. 6, pl. 19:fig. 7, pl. 9A:figs. 8, 9.

Intoshella euplectellae.—Hartman, 1959:82 (Catalogue).—Uschakov, 1982:140 (Key).

Material examined.—Pacific Ocean, off Philippines, *Challenger* sta, 183 meters, with glass sponge, *Euplectella,* syntype, female with eggs (BMNH 1921.5.1.548).

Description.—Body long, slender, flattened, tapering slightly anteriorly and more so posteriorly, very fragile, delicate, translucent, with two dorsal ciliated bands per segment, extending on to dorsal tubercles and elytrophores. Length about 21 mm, width 7 mm, segments up to 50. Elytra large, oval, covering dorsum, up to 23 pairs, on segments 2, 4, 5, 7 alternate segments to 23, 26, 29, 32, 33, 36, 38, alternate segments to end of body. Elytra delicate, translucent, smooth, without tubercles or fringes of papillae, with or without translucent micropapillae near posterior borders (Fig. 5F; McIntosh 1885, pl. 19:fig. 7). Dorsal cirri on non-elytrigerous segments with short cylindrical cirrophores and long smooth styles, tapering to slender tips and extending beyond tips of neurosetae; dorsal tubercles bulbous (Fig. 5C; McIntosh 1885, pl. 15:fig. 6).

Bilobed prostomium with rounded lobes, without cephalic peaks; median antenna with ceratophore in anterior notch, style tapered, small, longer than prostomium; lateral antennae with distinct ceratophores inserted terminoventrally, with short tapered styles; palps stout, tapered, as long as median antenna; 2 pairs of small eyes on posterior half of prostomium, closely approximated on each side of prostomium; tentaculophores lateral to prostomium, each with single seta and dorsal and ventral tentacular cirri, longer than median antenna (Fig. 5A; McIntosh 1885, pl. 15:fig. 6). Without facial tubercle.

Segment 2 without nuchal fold, with first pair of large elytrophores, biramous parapodia and long ventral buccal cirri, extending anteriorly (Fig. 5A; McIntosh 1885, pl. 15:fig. 6). Biramous parapodia long, translucent; notopodia small lobes on anterodorsal sides of larger neuropodia, with long digitiform acicular processes; larger neuropodia with shorter, rounded postsetal lobes and longer, subconical presetal acicular lobes with digitiform supraacicular extensions (Fig. 5B, C). Notosetae moderate in number (ca. 15), pale, translucent, short to longer, some extending beyond tips of neuropodia, similar to neurosetae in width and appearance, smooth or with faint transverse striations, slightly curved and tapering to blunt tips (Fig. 5B, D; McIntosh 1885, pl. 9A:fig. 8). Neurosetae moderate in number (ca. 30), extra long, fragile, similar to notosetae in width and appearance, with tips slightly falcate (Fig. 5B, E; McIntosh 1885, pl. 9A:fig. 9). Ventral cirri short, tapering to slender tips and extending beyond basal tips of neuropodia (Fig. 5B, C). Pharynx (?, not extended). Pygidium (?).

Distribution.—Pacific Ocean, off Philippines, 184 meters, commensal with glass sponge *Euplectella asperigillum*

Remarks.—The type species of *Intoshella* Darboux, 1900, *Polynoe* (*Langerhansia*) *euplectella,* was incompletely described and figured by McIntosh (1885) and Darboux (1990). Even though a questionable genus, it was incorrectly used for a number of species, including the two species covered herein: *I. aphthalma* Gallardo, 1968, and *I.*

indica Day, 1973, and referred to the new genus *Pararctonella.* At present, *Intoshella* should be considered to be monotypic.

In *I. euplectella,* the neuropodial subconical presetal acicular lobes have digitiform supraacicular extensions and lack subacicular extensions, as found on the other genera of Acholoinae.

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