

A NEW SPECIES OF *BENHAMIPOLYNOE*
(POLYCHAETA: POLYNOIDAE: LEPIDASTHENIINAE)
FROM AUSTRALIA, ASSOCIATED WITH THE
UNATTACHED STYLASTERID CORAL
CONOPORA ADETA

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Abstract.—*Benhamipolynoe cairnsi*, n. sp. from deep-water (398 m) off Queensland, Australia, was found in close symbiotic relationship with the unusual, unattached stylasterid coral *Conopora adeta* Cairns. The coral grows around the polynoid, enclosing it in a coiled tube. The species is compared with the type species of the genus, *B. antipathicola* (Benham), from off New Zealand, found in latticed tunnels formed by the antipatharian coral *Parantipathes tenuispina* (Silberfeld). Both polynoid species are referred to the new subfamily Lepidastheninae.

While working on his description of the new species of stylasterid coral from Australia, the unique unattached *Conopora adeta*, Cairns (1987) noted the presence of a polychaete enclosed in each of his ten coral specimens. He brought them to my attention and allowed me to extract the polynoids from two of the corals, which was no small task, since the coral paratypes had to be cut with the minimum of damage. On examination, the commensal polynoids appeared to belong to an undescribed genus and species (Cairns 1987:143). After further study, they are described below as a new species of *Benhamipolynoe* Pettibone, 1970, with type species *B. antipathicola*, described by Benham (1927, under *Lepidasthenia*) and Pettibone (1970, under the new genus), from off New Zealand, associated with the antipatharian coral *Parantipathes tenuispina*.

The types are deposited in the Northern Territory Museum, Darwin, Australia (NTM) and the National Museum of Natural History, Smithsonian Institution (USNM).

Family Polynoidae
Lepidastheniinae, new subfamily

Types genus: *Lepidasthenia* Malmgren, 1867, with type species *L. elegans* (Grube, 1840), by monotypy.

Diagnosis.—Prostomium bilobed, with 3 antennae and 2 palps; ceratophore of median antenna in anterior notch, lateral antennae inserted terminally on anterior extensions of prostomium, on same level as median antenna (or slightly subterminally); two pairs of eyes on posterior half of prostomium. First or tentacular segment not distinct dorsally; tentaculophores lateral to prostomium, each with aciculum and pair of dorsal and ventral tentacular cirri, without setae. Second or buccal segment with first pair of elytraphores and elytra, setigerous parapodia and ventral or buccal cirri lateral to ventral mouth. Elytra smooth, without fringes of papillae, without tubercles, with or without scattered micropapillae. Parapodia subbiramous, with small notopodium, notoaciculum, and without, or

with very few, notosetae. Neuropodia with anterior and posterior lobes deeply cut dorsally and ventrally, without projecting acicular lobes. Dorsal cirri on non-elytrigerous segments with basal cirrophores and distal styles; dorsal tubercles indistinct. Pharynx with 9–13 pairs of border papillae and 2 pairs of chitinous jaws.

Remarks.—*Lepidasthenia* has been included in the Subfamily Lepidonotinae Willey, 1902, chiefly on the basis of the similarity of the prostomium to *Lepidonotus* Leach, 1816. It is separated herein based on the different types of parapodia and elytra. Also included in Lepidastheniinae are the following polynoid genera: *Perolepis* Ehlers, 1908; *Parahalosydna* Horst, 1915; *Hyperhalosydna* Augener, 1922; *Alentiana* Hartman, 1942; *Telolepidasthenia* Augener & Pettibone, 1970; *Benhamipolynoe* Pettibone, 1970. A new species is described below under the last named genus.

Benhamipolynoe Pettibone, 1970

Type species: *Lepidasthenia antipathicola* Benham, 1927, by original designation.

Diagnosis.—Body elongate, slender, flattened, segments numerous (more than 50, up to 200 or more). Elytra 10 or more pairs, on segments 2, 4, 5, 7, alternate segments to 15, then variable in arrangement, with either long posterior region without elytra or with elytra continuing posteriorly. Elytra without fringes of papillae, smooth except for scattered micropapillae. Prostomium lepidasthenoid, bilobed, with two palps and three antennae; ceratophore of median antenna in anterior notch of prostomium, lateral antennae inserted terminally on anterior extensions of prostomium, lateral to median antenna, with two pairs of eyes on posterior half of prostomium. Tentaculophores of tentacular segment lateral to prostomium, without setae, with two pairs of dorsal and ventral tentacular cirri. Second or buccal segment with first pair of elytra

and long ventral buccal cirri; without nuchal lobe. Parapodia subbiramous, with small conical notopodia on anterodorsal faces of neuropodia, without notosetae. Neuropodia deeply cut dorsally and ventrally, with anterior and posterior subequal rounded lobes, without projecting acicular lobes. Neurosetae relatively few in number (5–12), of single type, rather stout, smooth or with slight indication of spinous rows, with falcate entire tips. Dorsal cirri with short cylindrical cirrophores and long, smooth, tapering styles; dorsal tubercles indistinct. Ventral cirri short, subulate. Pygidium with paired long anal cirri. Nephridial papillae short, cylindrical, beginning on segment 8.

Remarks.—*Benhamipolynoe* differs from *Lepidasthenia* Malmgren in regard to the number and arrangement of the elytra and the types of neurosetae. In *Lepidasthenia*, the neurosetae have well-developed short and wide spinous regions and bifurcate tips; in *Benhamipolynoe*, the neurosetae have spinous regions scarcely developed or lacking and entire falcate tips.

Benhamipolynoe antipathicola (Benham, 1927), originally described as *Lepidasthenia*, from off New Zealand in 128 meters, was associated with *Parantipathes tenuispina* (Silberfeld), where it was found in latticed tunnels formed by the serrated branchlets of the antipatharian. Additional specimens referred to *B. antipathicola* by Pettibone (1970) include one from the Gulf Stream off Key West, Florida, in 237 meters, associated with *Antipathes columnaris* Duchassaing, and one from Indonesia, in 520 meters, found in an empty tube of a eunicid polychaete.

Benhamipolynoe cairnsi, new species

Figs. 1, 2

Material.—Queensland, Australia, Marion Plateau off MacKay, 20°46.2'S, 152°51.8'E, 398–399 m, F.R.V. *Soela* sta 25, 22 Nov 1985, A. Bruce, collector, removed from coiled galleries in stylasterid

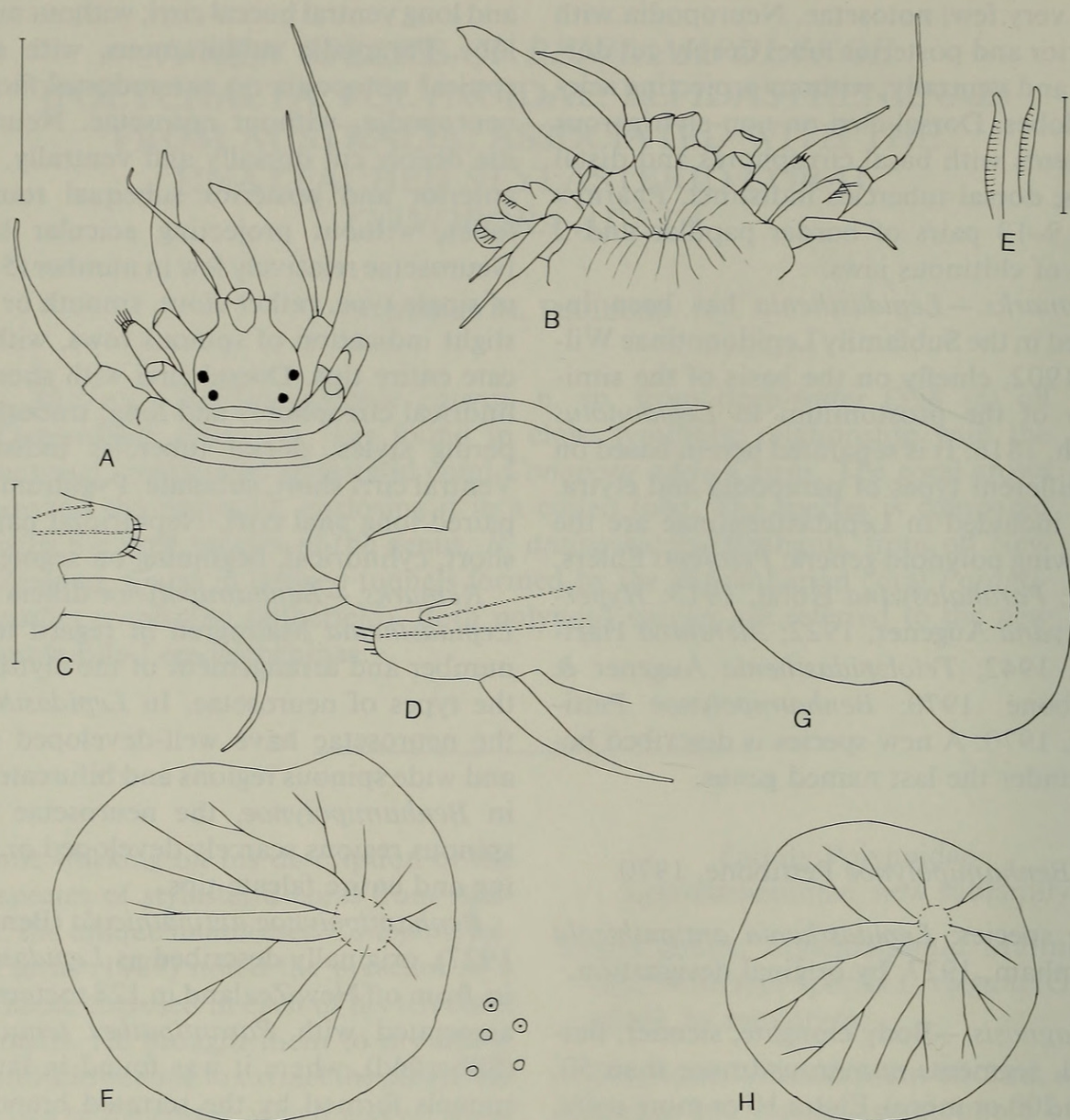


Fig. 1. *Benhamipolynoe cairnsi*, A, C–H, Holotype, NTM W4900; B, Paratype, USNM 118373: A, Dorsal view of anterior end, styles of median and right lateral antennae, left dorsal and ventral tentacular cirri all missing; right parapodium and dorsal cirrus of segment 3 not shown; B, Ventral view of anterior end, styles of median and left lateral antennae, left palp, and all tentacular cirri missing; C, Right elytrigerous parapodium of segment 2, posterior view, acicula and small notopodium dotted, elyrophore not shown; D, Right cirriferous parapodium of segment 3, anterior view, acicula dotted; E, Neurosetae from same; F, Right 1st elytron from segment 2, with few micropapillae (not to scale); G, Right 2nd elytron from segment 4; H, Right 9th elytron from segment 19. Scales = 1.0 mm for A, B; 0.5 mm for C, D, F–H; 0.1 mm for E.

coral *Conopora adeta* Cairns, holotype (NTM W4900) and paratype (USNM 118373).

Description.—Holotype (in two pieces, incomplete posteriorly) with 38 segments, 16 mm long, 2 mm wide; paratype (in three pieces, complete) with 63 segments, 33 mm long, 3 mm wide; both specimens females, full of large yolky eggs.

Body elongate, flattened ventrally, arched dorsally, widest in anterior half, tapering gradually posteriorly; without color except for black eyes. Prostomium oval, bilobed; ceratophore of median antenna large, oval, in anterior notch, style missing; lateral antennae inserted terminally on anterior continuations of prostomium, lateral to median antenna, with long styles about equal to stout

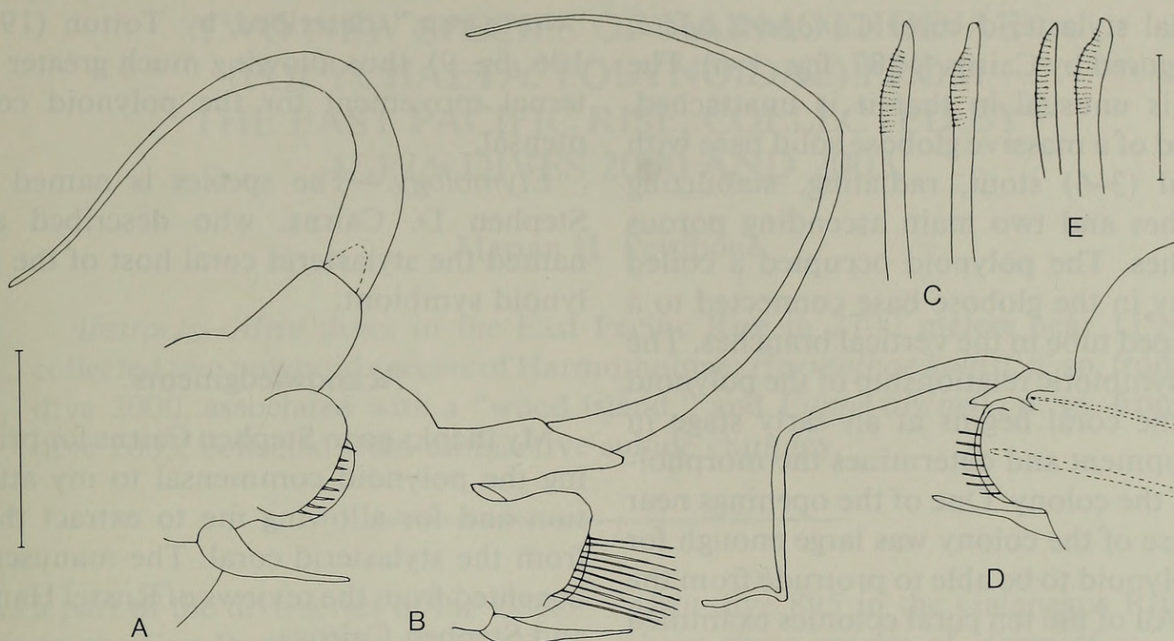


Fig. 2. *Benhamipolynoe cairnsi*, Holotype, NTM W4900: A, Right cirriferous parapodium from segment 12, posterior view, extension on anterior side of cirrophore dotted; B, Right cirriferous parapodium from segment 21, posterior view; C, Upper and middle neurosetae from same, latter with tip worn; D, Right cirriferous parapodium from segment 35, anterior view, acicula dotted; E, Upper and middle neurosetae from same. Scales = 0.5 mm for A, B, D; 0.1 mm for C, E.

tapering palps; two pairs of subequal black eyes on posterior half of prostomium (Fig. 1A, B). First or tentacular segment not visible dorsally; tentaculophores lateral to prostomium, without setae, each with pair of tentacular cirri, ventral one about as long as lateral antennae, dorsal one longer than palps; ventrally with bulbous facial tubercle (Fig. 1A, B). Second or buccal segment with slightly developed nuchal lobe, first pair of elytraphores, subbiramous parapodia with few neurosetae, and ventrally with long buccal cirri lateral to ventral mouth (Fig. 1A–C). Segment 3 with first pair of dorsal cirri; cirrophores longer than neuropodia, cylindrical with distal bulbous extension and long style; ventral cirri almost as long as buccal cirri of segment 2 (Fig. 1A, B, D).

Elytra and elytraphores 10 pairs on segments 2–4, 5–7–9–11–13–15–19–23, with dorsal cirri on all segments from 24 on. Elytra oval, attached eccentrically near lateral side, delicate, with “veins” and scattered round micropapillae on surface (Fig. 1F–H).

Parapodia subbiramous; notopodia in form of small conical acicular lobes on

anterodorsal faces of larger neuropodia, without notosetae; neuropodia rather deeply cut dorsally and ventrally, forming rounded presetal and postsetal lobes, with row of 5–10 short neurosetae (Figs. 1C, 2A, B, D). Neurosetae stout, with faint spinous rows and slightly hooked entire tips, sometimes slightly worn (Figs. 1E, 2C, E). Cirrophores of dorsal cirri cylindrical, extending beyond neuropodia, with triangular extension on lower side, with long, smooth styles tapering to slender tips and extending far beyond parapodia; ventral cirri wider basally, with long slender tips, extending slightly beyond tips of neuropodia (Fig. 2A, B, D).

Nephridial papillae beginning on segment 8, small at first, becoming longer about segment 15, cylindrical, directed dorsally between parapodia. Pharynx not extended and not examined. Pygidium forming small lobe with dorsal anus between last pair of small parapodia and pair of long anal cirri, similar to dorsal cirri.

Biology.—The two symbiont polynoids were removed from two paratypes of the

colonial stylasterid coral *Conopora adeta*, well figured by Cairns (1987, figs. 1–6). The coral is unusual in that it is unattached, formed of a massive globose solid base with several (3–6) stout, radiating, stabilizing branches and two main ascending porous branches. The polynoid occupied a coiled runway in the globose base connected to a U-shaped tube in the vertical branches. The close symbiotic relationship of the polynoid with the coral begins at an early stage in development and determines the morphology of the colony. One of the openings near the base of the colony was large enough for the polynoid to be able to protrude from the tube. All of the ten coral colonies examined by Cairns contained a polynoid symbiont. Both specimens of *Benhamipolynoe cairnsi* were females, full of large yolky eggs.

Remarks.—*Benhamipolynoe cairnsi* differs from *B. antipathicola* in having only 10 pairs of elytra and only dorsal cirri from segment 24 on, compared to numerous pairs of elytra continuing to the posterior end. In *B. cairnsi*, the cirrophores of the dorsal cirri have unique extra extensions: bulbous on segment 3 and triangular on the following cirrophores; this condition was not found on *B. antipathicola* and has not been noted previously on other polynoids. The two species differ in their positions with their respective coral hosts. As indicated above, the coiled runway of *B. cairnsi* is enclosed in the stylasterid coral *Conopora adeta*, allowing only limited movement to the exterior. For *B. antipathicola*, the antipatharian coral host, *Parantipathes tenuispina*, is a bottle-brush shaped colony where the interlacing branchlets form a complicated lattice-work tube that serves as an elongated

“worm-run,” described by Totton (1923: 106, fig. 9), thus allowing much greater external movement for the polynoid commensal.

Etymology.—The species is named for Stephen D. Cairns, who described and named the stylasterid coral host of the polynoid symbiont.

Acknowledgments

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