Cryptohydra thieli n. gen., n. sp.: a meiofaunal marine hydroid (Hydroida, Athecata, Capitata)

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Abstract. Meiofaunal hydroids of an undescribed species were found in coarse shell-hash at two sites along the Atlantic coast near Fort Pierce, Florida, USA, between November 1991 and October 1992. Specimens were examined by light microscopy and by scanning and transmission electron microscopy; the behavior was observed and videorecorded. The motile hydroid, up to 1 mm in length, has an extremely long hypostome separating short capitate oral tentacles from longer aboral tentacles, all used in locomotion. A basal disc, similar to that of some actinulae, is used for more permanent attachment. Based on the cnidome (stenoteles, desmonemes, and microbasic mastigophores of two sizes), location and type of tentacles, organization of the endoderm of the tentacle, presence of a supporting lamella, structure of the basal disc, and mode of asexual reproduction, the species is assigned to the family Acaulidae (Athecata, Capitata). Differences from other members of the family, which are all sessile, are considered adaptations to a motile existence, but significant enough to warrant the establishment of a new genus and species, *Cryptohydra thieli*.

Additional key words: Cnidaria, Hydrozoa, Acaulidae, ultrastructure

Remane described the first truly meiofaunal interstitial hydrozoans, for which he established the genus *Halammohydra*, in 1927. Since that time, eight additional genera have been discovered (for reviews, see Swedmark 1964; Clausen 1971; Clausen & Salvini-Plawen 1986; Salvini-Plawen 1987; Thiel 1988; Giere 1993), including the recently described *Pinushydra* BOUILLON & GROHMANN 1990. Although some interstitial hydrozoans are distributed world-wide, many of the others have been found only in isolated locales and sometimes even there only occasionally.

The mesobenthic meiofauna of a coarse, shell-hash habitat found off the Atlantic coast of Fort Pierce, Florida, has been studied since 1983. Between November 1991 and October 1992, specimens of an undescribed species of hydroid were found. None has been found since, despite continued effort. The purpose of this report is to describe the morphology and internal anatomy of the new mesobenthic hydrozoan and to suggest its taxonomic position.

Methods

Collection of specimens

Specimens were taken from two locations along the Atlantic coast of Florida near Fort Pierce. The habitat in each locality consisted of a coarse shell-hash that offered ample interstitial space and supported a highly diverse mesopsammal assemblage of invertebrates. The two sites from which specimens were collected were (1) "5-mile site," 9.26 km east of Fort Pierce Inlet (27°30.0′ N, 80°12.1′ W) at a depth of 15 m, and (2) Fort Pierce Shoals, southeast of Fort Pierce Inlet (27°21.28′ N, 80°13.06′ W) at a depth of 10 m. Specimens were collected from the first site on 20 Feb 92, 2 Mar 92, 13 May 92, 31 Aug 92, and 30 Oct 92, and from the second site on 18 Nov 91 and 20 Feb 92.

A Higgins anchor dredge was used to obtain shell-hash sediment. Meiofaunal specimens were extracted by placing the sediment in twice its volume of filtered seawater, stirring, and decanting through a sieve of 62-μm mesh. Material contained in the sieve was subsequently sorted with the aid of a stereomicroscope. During this study, 83 specimens were collected. Most were studied while living and several specimens were photographed and videorecorded.

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Preparation of fixed specimens

Four specimens were preserved and stored in 20% ethylene glycol, three were prepared as whole mounts for light microscopy (LM), eight were prepared for transmission electron microscopy (TEM), and three were prepared for scanning electron microscopy (SEM). Specimens to be examined by LM, TEM, and SEM were relaxed by brief immersion in a 1:1 mixture of seawater and isotonic magnesium chloride. They were then fixed in 1% glutaraldehyde and 2.5% paraformaldehyde in 0.1 M HEPES buffer (pH 7.2) plus 10% sucrose, and rinsed in the vehicle. Specimens used for whole mounts were placed in a drop of glycerin between two coverslips, sealed with Murrayite using an HS-slide (Westheide & Purschke 1988; Shirayama et al. 1993), and examined with Zeiss differential interference contrast (DIC) and phase contrast optics. For electron microscopy, fixed specimens were postfixed in 1% osmium tetroxide in 0.1 M Sorensen's phosphate buffer, rinsed in buffer alone, and dehydrated through 100% ethanol. Specimens for TEM were embedded in Spurr's epoxy resin, sectioned, and examined with a Philips 201C; specimens for SEM were critical point dried, coated with gold-palladium, and examined with a Cambridge SEM S4-10.

Analysis of nematocysts

In a modification of the methods of Salleo et al. (1991), a specimen was placed in a drop of seawater on a microscope slide, covered with a coverslip, and frozen and thawed to disrupt soft tissue. The seawater was then replaced with calcium- and magnesium-free seawater to obtain undischarged nematocysts. Discharged nematocysts were obtained by replacing the modified seawater with distilled water and applying mechanical pressure. Nematocysts were observed with phase contrast and DIC microscopy.

Systematic Account

Cryptohydra thieli n. gen., n. sp.
(Figs. 1–7)

Diagnosis

Solitary, slender hydroid polyp; up to 1 mm in length with elongate hypostome separating oral from aboral tentacles; hypostome capable of sharp bending in region of oral tentacles; all tentacles slightly capitate; short oral tentacles either as four tentacles in two alternate pairs at different levels or as a group of three originating from one level; two, occasionally more, whorls of long aboral tentacles with three or four tentacles per whorl; both oral and aboral tentacles chordal

with mesolamella separating tentacular from gastric endoderm; glandular adhesive ectodermal basal disc surrounded by slightly overhanging vacuolated ectodermal cells; no perisarc; asexual reproduction by transverse fission, sexual individuals unknown. Cnidome: stenoteles, desmonemes, and microbasic p-mastigophores of two sizes; nematocytes and nematoblasts restricted to ectoderm.

Description

The slender hydroid (Figs. 1, 2) varies in length from approximately 150 μm (contracted; Fig. 2A-3) to over 1 mm (extended; Fig. 2A-1). The hydroid usually bears two pairs of small, palp-like capitate oral tentacles, oriented at right angles to one another (Figs. 1A, 2A). A long segment of body column, the hypostome, separates the capitate oral tentacles from the much longer aboral ones; the latter appear filiform, but are technically capitate (ectodermal epithelium approximately one-third higher distally than along the length of the tentacle). The aboral tentacles are restricted to the basal one-third to one-half of the body column; they usually occur in two whorls, each whorl usually consisting of alternate and opposite pairs at two levels.

A second morphotype (Figs. 1B, 2B) is characterized by three oral tentacles, all projecting from the same plane. These specimens usually have three whorls of three or four aboral tentacles each.

Both morphotypes bear an adhesive basal button similar to the adhesive disc of some actinulae.

Type material. The holotype (USNM 94770) is a whole mount; the paratypes (USNM 94771) are two whole mounts and four unmounted specimens preserved in 20% ethylene glycol. Of the unmounted specimens, one is a newly divided individual, one is a non-dividing individual, and two are pre-division individuals. All specimens are deposited in the Cnidaria collection of the Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington. D. C. In addition to these specimens, several living specimens have been documented on videotape. One of these, incorrectly designated as a species of *Psammohydra*, appears in the educational videotape presentation "Cryptic Animals of Marine Sand" (20 minutes, in color), which may be purchased from the American Society of Zoologists (P.O. Box 809292, Chicago, IL 60680-9292). Requests for copies of the complete original research video recordings of *Cryptohydra thieli* may be addressed to Dr. Robert P. Higgins.

The "5-mile site" east of Fort Pierce Inlet is designated type locality for *Cryptohydra thieli*; all type specimens were collected from this site on 2 Mar 92.
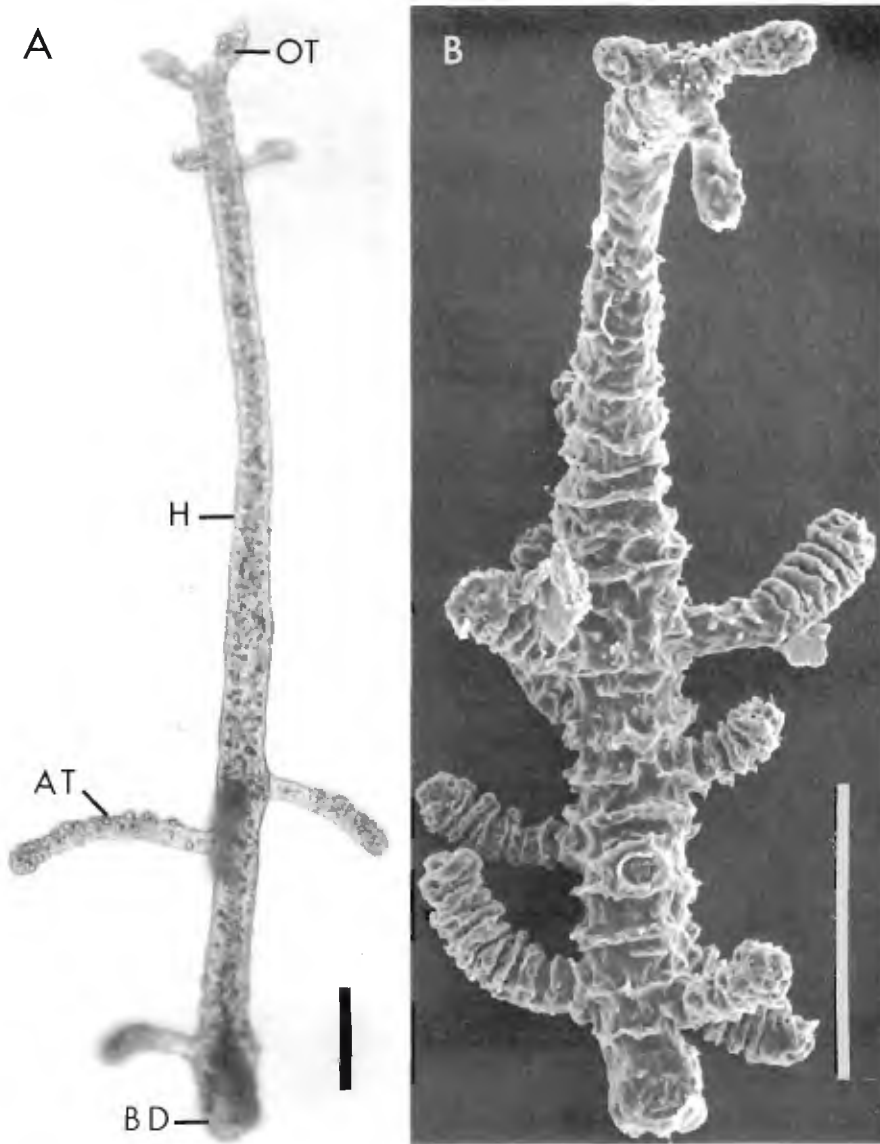
Fig. 1. External morphology of *Cryptohydra thieli*. A. LM of living specimen, extended; morphotype with two pairs of oral tentacles (OT) separated from aboral tentacles (AT) by an elongate hypostome (H). The aboral end forms an adhesive basal disc (BD). B. SEM of contracted specimen; morphotype with three oral tentacles originating from one plane. Scale bars, 0.1 mm.

Etymology. The generic name is derived from the Greek (*kryptos*) hidden plus (*hydra*) a mythological many-headed serpent. The species is named in honor of Hjalmar Thiel, esteemed colleague who has contributed much to the understanding of meiofaunal ecology and mesopsammic cnidarians.
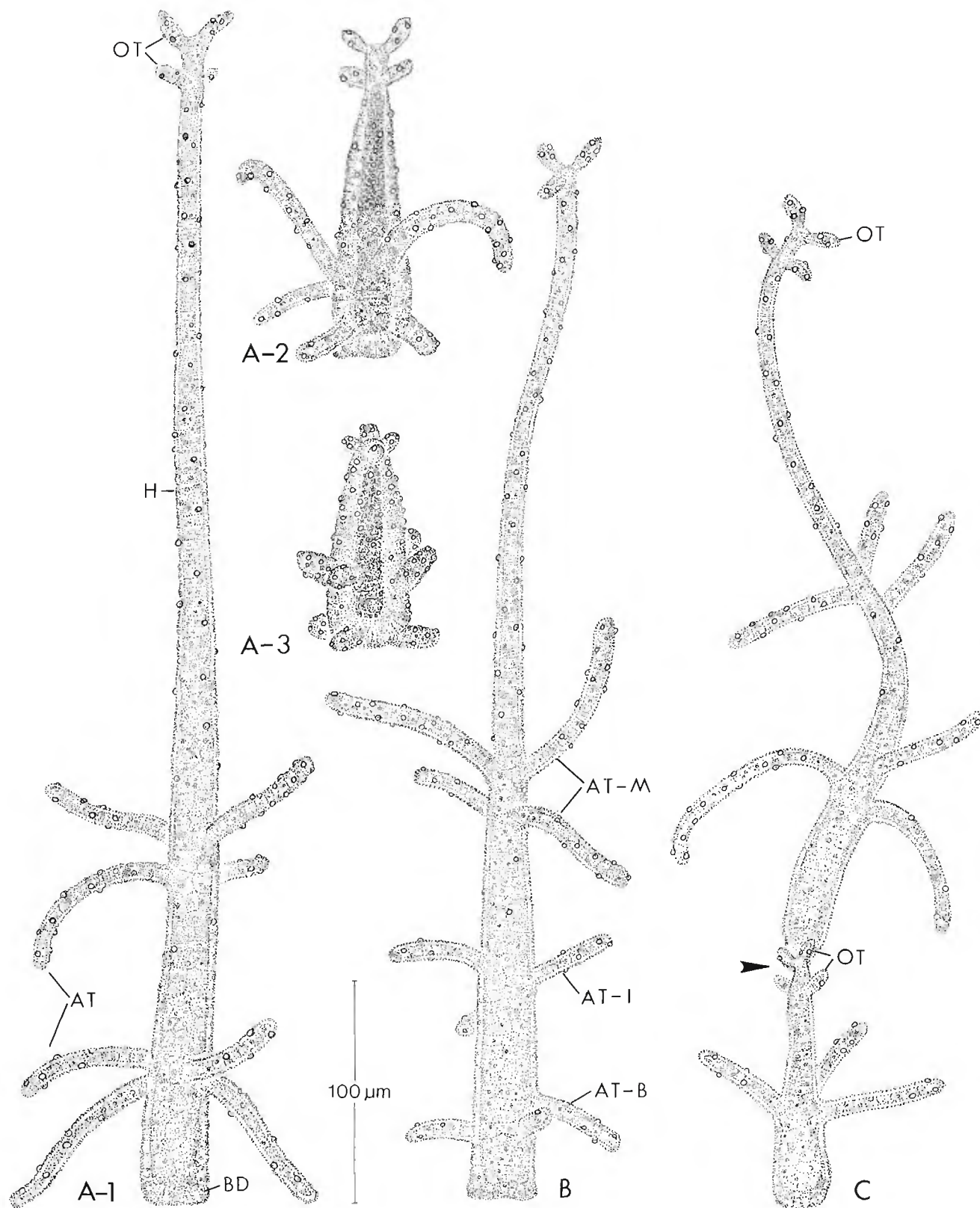
Observations

Fission

Although specimens were collected in February, March, May, August, October, and November, neither gonads nor buds have been observed. The animals reproduce asexually by transverse fission (Fig. 2C). The site of future fission is marked by the appearance of two pairs of oral tentacles just below a constriction of the body column between the first and second whorls of aboral tentacles. At least two days may pass between the appearance of the oral tentacles and separation of the two individual polyps. During this time, the conjoined polyps become independently coordinated.

Animals in the process of transverse fission always had at least three whorls of aboral tentacles (Fig. 2C). The number and position of tentacles were mapped for 19 specimens that were not actively dividing. Of these, 11 had two pairs of oral tentacles and two whorls of aboral tentacles (Fig. 2A) while 6 had three oral tentacles (all arising from the same level) and more than two whorls of aboral tentacles (Fig. 2B). Only 2 specimens with four oral tentacles and three whorls of aboral tentacles were observed. In one of these, the four oral tentacle arose from the same level;

in the other, only three tentacles were present in a subsequent observation. We therefore hypothesize that, in preparation for transverse fission, the morphology changes from the morphotype with two pairs of oral tentacles and two whorls of aboral tentacles to the morphotype with three oral tentacles and three or more whorls of aboral tentacles (Fig. 2B). As fission proceeds, both products come to resemble the first morphotype.

Behavior

When on the bottom of a culture dish or on the sediment-water interface in a culture dish, individuals of *Cryptohydra thieli* attach to the substrate by the basal disc. The entire hypostome executes gentle waving and bending motions, while a region near the distal end of the hypostome carries out more rapid oscillations; the area of bending is between the two pairs of oral tentacles in the first morphotype and just proximal to the oral tentacles in the second morphotype. These distal rhythmic motions sweep the oral tentacles from side to side.

When placed between slide and coverglass, however, the polyps creep by use of the aboral tentacles and by alternate attachment of the oral and aboral tentacles to the substrate. This same locomotory behavior takes place when the animals move through the interstices of sediment particles placed in a culture dish.

Histology

The ectoderm is composed primarily of highly vacuolated epitheliomuscle cells with small ovoid electron-opaque granules located just beneath the apical plasmalemma (Fig. 3A). The granules range in size from approximately 300×180 nm to 450×300 nm. Sensory cells bearing a single recessed cilium are detected occasionally in the ectoderm of the tentacles (Fig. 3B). Nematocytes, which are restricted to the ectoderm, are concentrated in the tentacles and scattered along the body column. Nematoblasts are also limited to the ectoderm, where they occur in large masses in the body column at the base of the aboral (but not the oral) tentacles (Fig. 3C).

The ectoderm at the aboral end of the polyp is spe-

cialized as an adhesive basal disc (Fig. 4A). The ectodermal cells of the basal disc are low columnar cells that curve toward the center of the disc. They are electron-opaque, non-vacuolated cells with a well-developed Golgi apparatus (Fig. 4C) and contain non-homogeneous, electron-opaque secretory granules (Fig. 4C, D). The basal disc proper is surrounded by slightly overhanging, highly vacuolated ectodermal cells (Fig. 4A). The vacuolated cells bear a glycocalyx (periderm) spanning the tips of short microvilli. The periderm stops abruptly at the edge of the basal disc proper.

The endoderm lining the gastric cavity is regionally specialized. The gastrodermis within the long hypostome is composed primarily of mucous cells (Fig. 5A). The gastrodermis in the body column proper contains cells with zymogenic granules and cells packed with phagocytic vacuoles (Fig. 5B). The gastrodermis at the aboral end of the polyp is composed primarily of vacuolated cells.

The endoderm of both the oral and aboral tentacles is solid and chordal (Fig. 6A, B). In both types of tentacles, a supporting lamella separates the tentacular endoderm from the gastric endoderm.

Cnidome

Four types of nematocysts occur in *Cryptohydra thieli*: stenoteles, desmonemes, and microbasic p-mastigophores of two sizes (Fig. 7).

1. Stenoteles. The capsules of the undischarged stenoteles (Fig. 7A) are almost spherical and range in length from 13–16 μm and in width from 11–15 μm. The discharged stenoteles (Fig. 7B) are similar to those in *Hydra*, except that in *Cryptohydra thieli* the long spines sometimes curve forward at the tips.

2. Desmonemes. Capsules of desmonemes (Fig. 7C), by far the most numerous type of nematocyst, are 8–11 μm long by 6–8 μm wide. The morphology of the discharged desmonemes (Fig. 7D) is essentially identical to the well-known equivalent in *Hydra*.

3. Microbasic p-mastigophores. The undischarged capsules of microbasic p-mastigophores (Fig. 7E, F) are curved rods, with a sharper curvature in the large than in the small size class. The capsule of the large

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Fig. 2. Diagram of the morphotypes. **A.** Most common morphotype (A-1, extended; A-2, relaxed; A-3, contracted), characterized by two pairs of opposite and alternate oral tentacles (OT) and two whorls of aboral tentacles (AT) with each whorl composed of two opposite and alternate pairs. Hypostome (H) and basal disc (BD) are indicated. **B.** Morphotype characterized by three oral tentacles, all projecting from the same plane, and three sets of aboral tentacles, termed median (AT-M), intermediate (AT-I), and basal (AT-B). **C.** Individual undergoing transverse fission. Oral tentacles (OT) have appeared between the intermediate and basal sets of aboral tentacles.
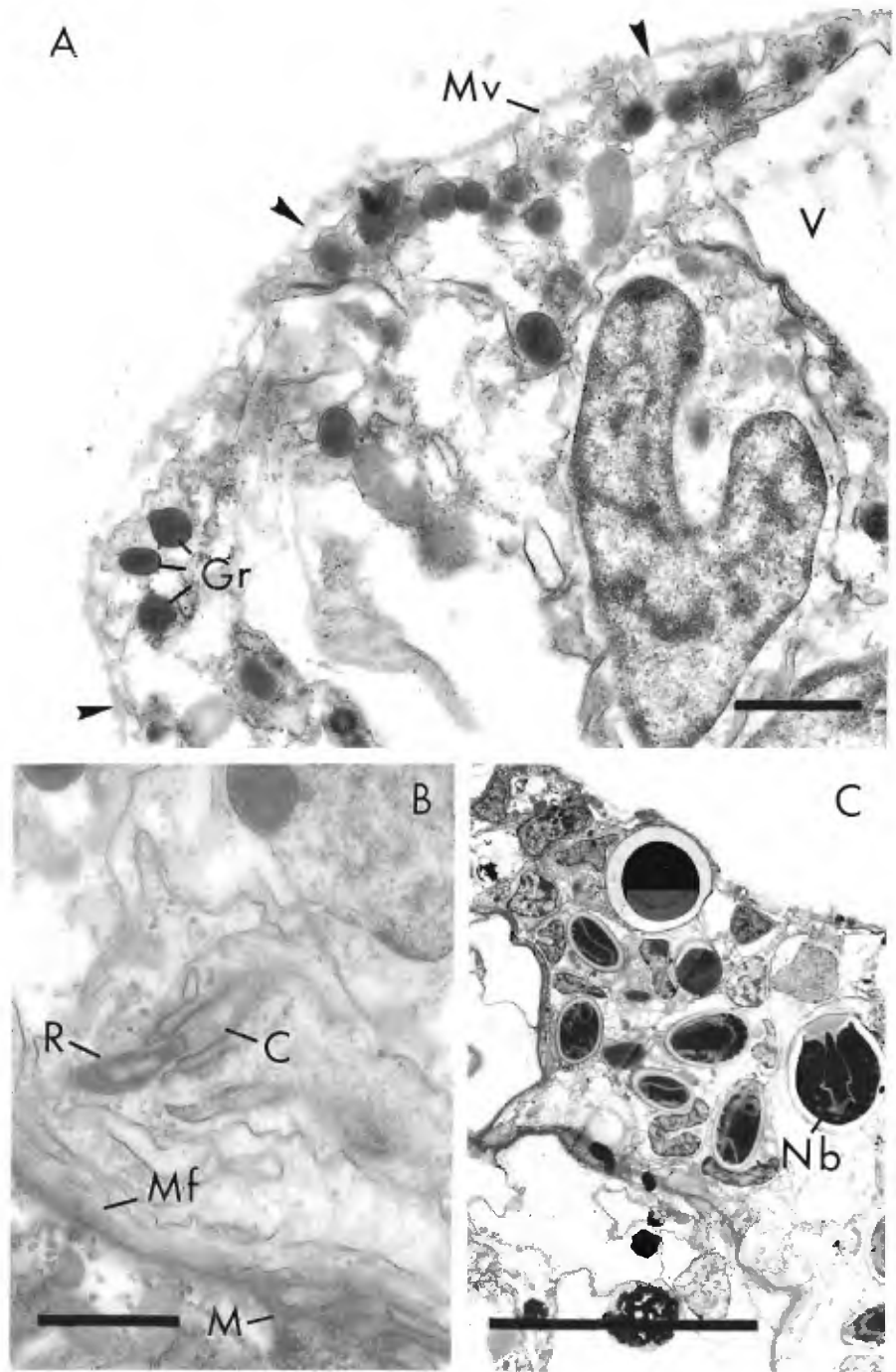
Fig. 3. Ectodermal epithelium. TEM. **A.** Epitheliomuscle cells of body column containing electron-opaque granules (Gr) in the apical cytoplasm and large vacuoles (V). A thin glycocalyx (arrows), which spans the tips of the microvilli (Mv), is equivalent to the periderm seen by light microscopy. Scale bar, 1 μm. **B.** Nerve cell just distal to the mesolamella (M) and the myofilaments (Mf) of an ectodermal epitheliomuscle cell at the base of a tentacle. The nerve cell bears a recessed cilium (C) and a prominent ciliary rootlet (R). Scale bar, 1 μm. **C.** Region of differentiation of nematoblasts (Nb) at the base of an aboral tentacle. Scale bar. 10 μm.

microbasic mastigophore is approximately 16 μm long by 6 μm wide, the smaller form 11 μm long by 4 μm wide. The discharged nematocyst of both types (Fig. 7G) has a shaft that is approximately twice the length of the capsule and is adorned with spines that are longer on distal parts of the shaft than at its base. The shaft bears a long helical thread. at least 5 times the length of the capsule.

Discussion

Hydroids, particularly the meiofaunal species, present few characters useful for determining taxonomic and phylogenetic position. The cnidome is widely accepted as an important indicator (see, for example, Rees 1957; Werner 1965; Bouillon 1985; Gravier-Bonnet 1987; Östman 1987). Surely the most important
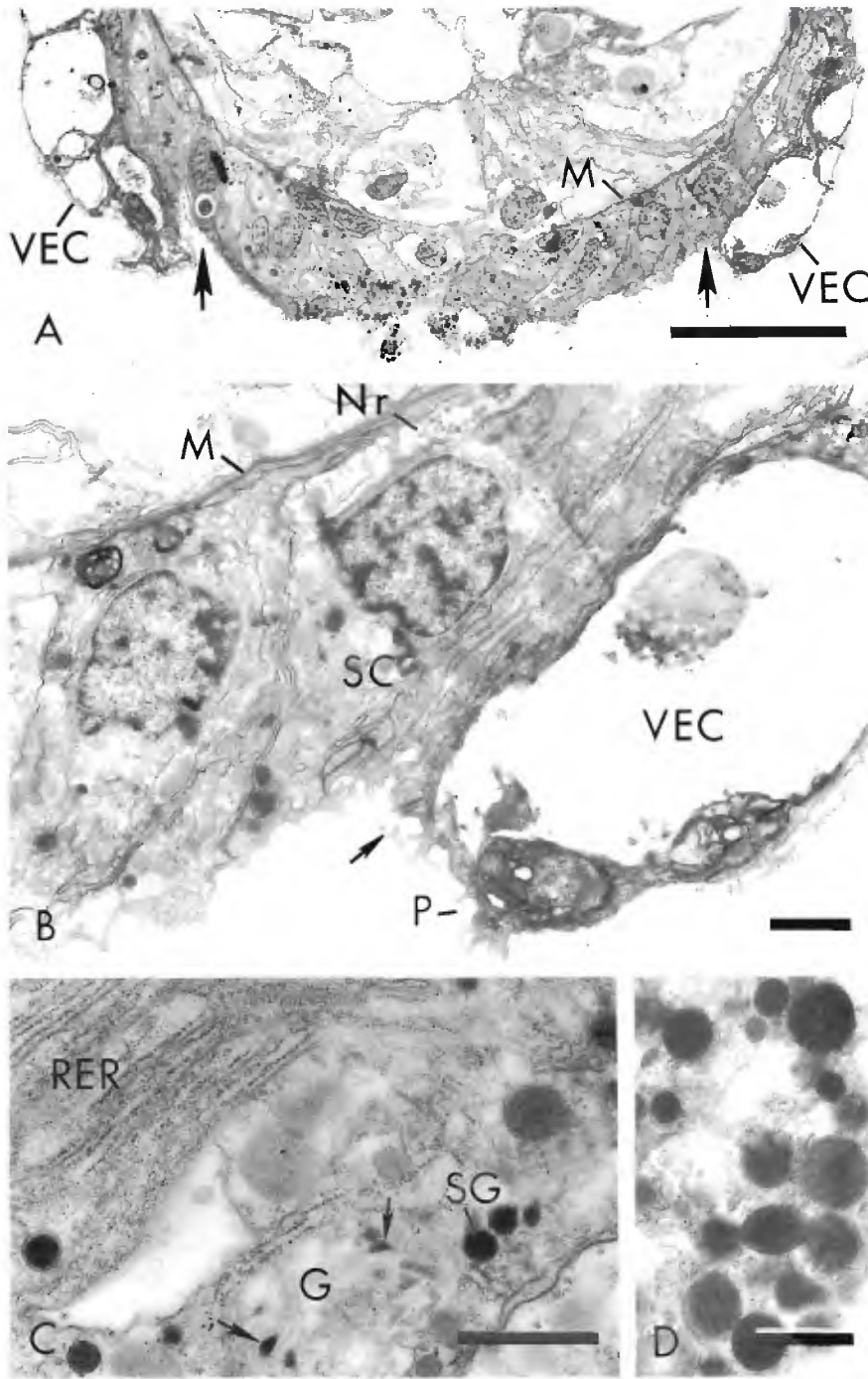
Fig. 4. Basal (adhesive) disc. TEM. **A.** Median longitudinal section through basal end of polyp. The button of electron-opaque secretory cells (between arrows) is delimited by overhanging vacuolated ectodermal cells (VEC). The mesolamella (M) is very thin near the center of the disc. Scale bar, 10 μm. **B.** Junction between secretory cells (SC) and vacuolated ectodermal cells (VEC). Arrow indicates termination of periderm (P), which surrounds all parts of the polyp except the basal disc. A neurite (Nr) occurs close to the mesolamella (M). Scale bar, 1 μm. **C.** Portion of a secretory cell with rough endoplasmic reticulum (RER), Golgi apparatus (G) with dilated cisternae containing electron-opaque material (arrows), and electron-opaque secretory granules (SG). Scale bar, 0.5 μm. **D.** Secretory granules of cells of the basal disc. Scale bar, 0.5 μm.

contribution to the taxonomic use of the cnidome since the original classification of cnidocysts by Weill (1931, 1934), extended by Mariscal (1974), is the treatise by Bouillon (1985), which summarizes, in tabular form, the cnidome for many species of Hydroida. This compendium greatly facilitates the identification of the taxon for a new species as discussed below.

Brinckmann-Voss (1970) stressed that the cnidome must be used in conjunction with other morphological characters in determining taxonomic affinities of capitate hydroids. Petersen (1990) in his cladistic analysis of the Capitata, reviewed additional characters, including location and types of tentacles, organization of the tentacular endoderm, presence or absence of mesolamella across the base of the tentacles, and (for solitary hydroids) structure of the aboral end of the polyp.

Cnidome. The presence of stenoteles, desmonemes, and microbasic mastigophores suggests that the spe-
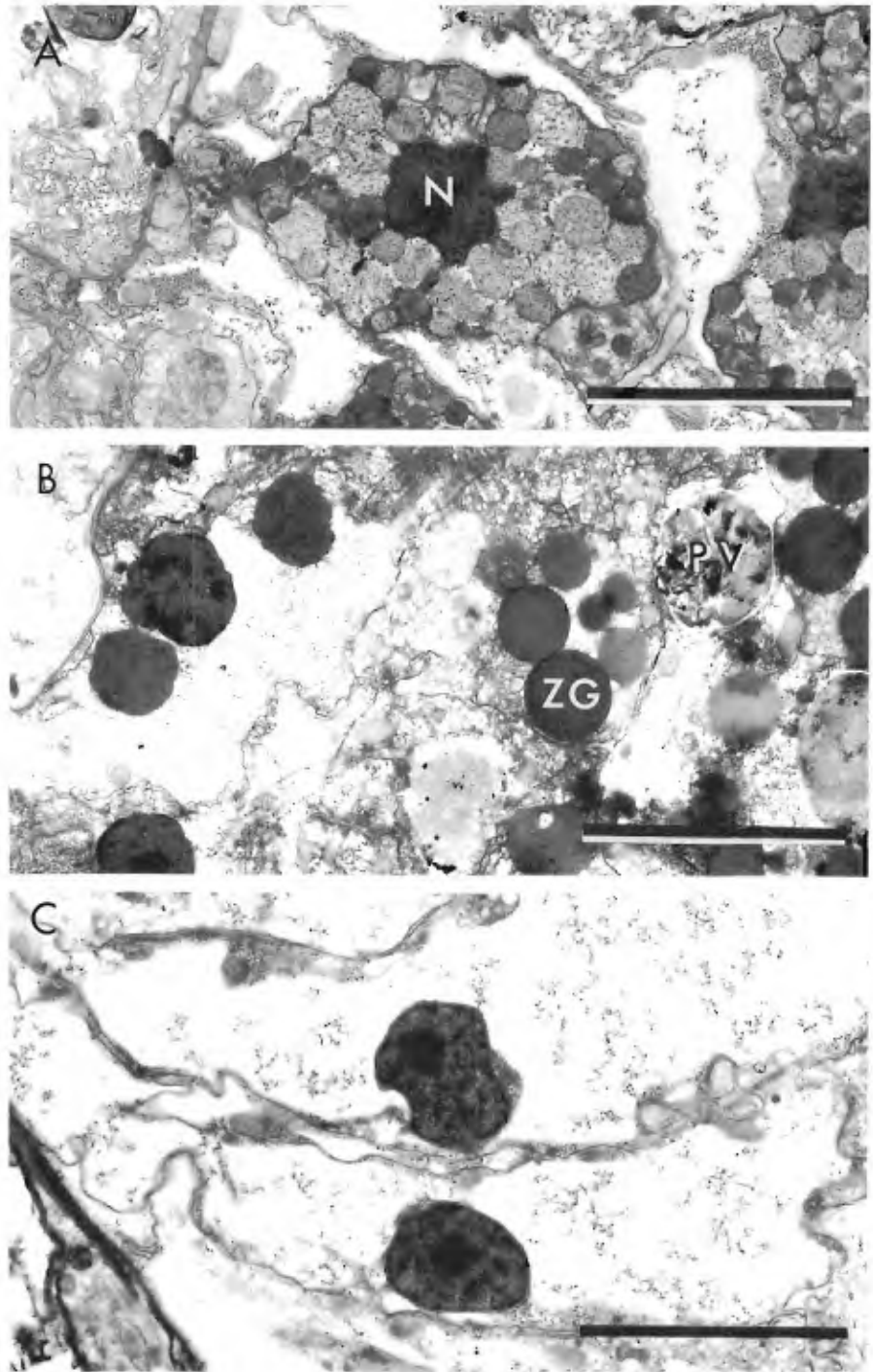
Fig. 5. Regional distribution of cells of the gastrodermis. **A.** The gastrodermis of the hypostome is composed primarily of mucous cells. The nucleus (N) of the mucous cells is electron-opaque. Mucous droplets become increasingly larger and more electron-lucent as they mature. **B.** In the mid-region of the body column, gastrodermal cells contain zymogen granules (ZG) and phagocytic vacuoles (PV), which appear to occur in different cell types. **C.** The gastrodermis near the base of the polyp is made up of highly vacuolated cells. Scale bars. 5 μm.

cies described here should be assigned either to the order Capitata or to the order Halammohydrida. Although halammohydrids are meiofaunal, *Cryptohydra thieli* lacks the ciliated ectodermal epithelium and the statocysts that characterize *Halammohydra* and *Otohydra*, the two halammohydrid genera (Bouillon 1985). These differences indicate a lack of affinity of *C. thieli* with the Halammohydrida.

Within the Capitata, the other order with the requisite cnidome, only two families are known to exhibit the combination of nematocysts seen in this species: the Polyorchidae and the Acaulidae. The family Polyorchidae is known only from its medusae. The family Acaulidae, by contrast, is composed of species with solitary hydroids and no known free medusae.

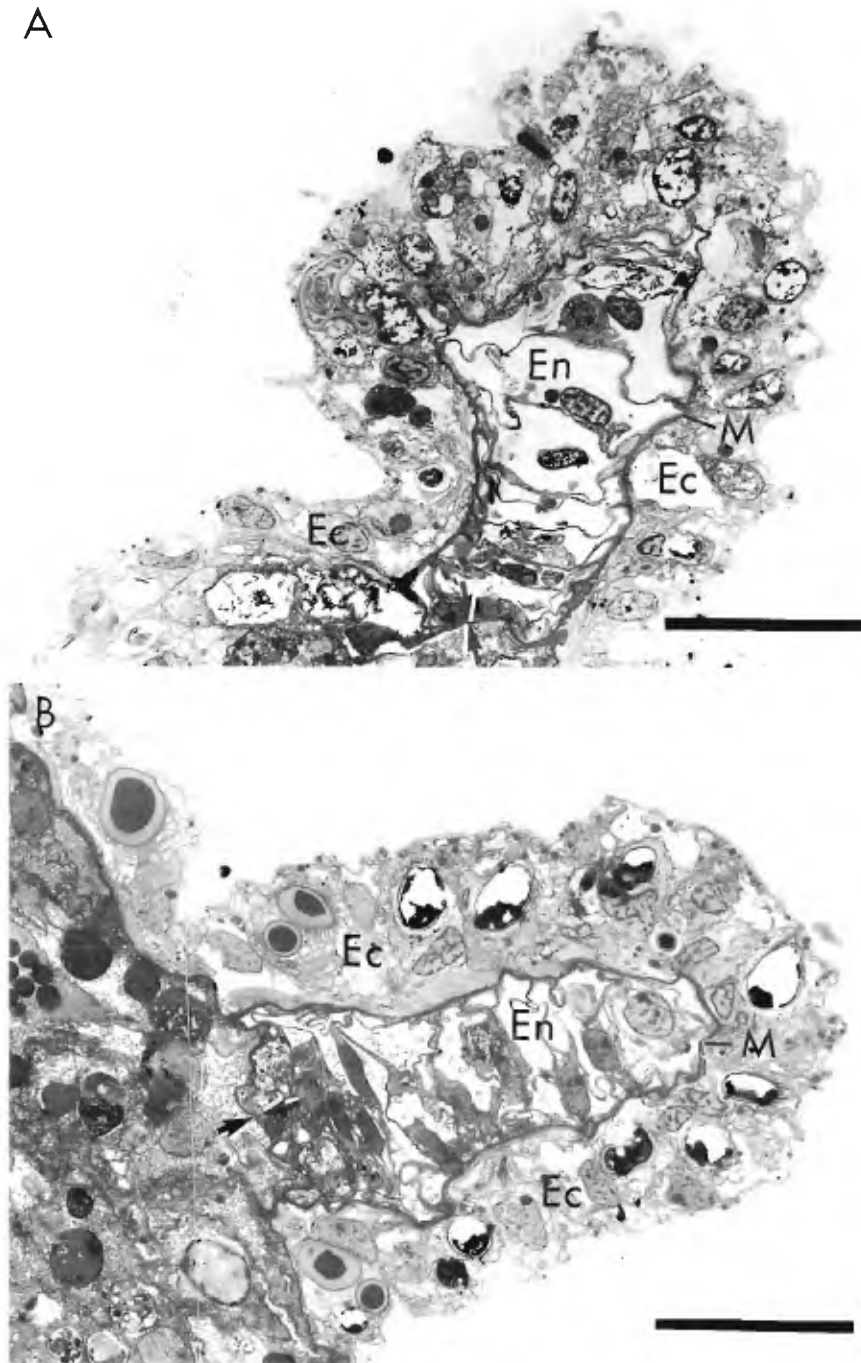Within the Acaulidae, both the cnidome (Bouillon

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Fig. 6. Tentacles. **A.** Oral tentacle. **B.** Aboral tentacle. In both types of tentacles, the endoderm (En) is chordal. Mesolamella (M) not only separates endoderm from ectoderm (Ec), but also forms a supporting lamella (between arrows), which separates the endoderm of the tentacles from the gastric endoderm. Scale bars, 10 μm.

1971, 1985) and the other morphological characters detailed by Petersen (1990) point to a strong affinity of *C. thieli* with the interstitial species *Acauloides ammisatum* BOUILLON 1965, as discussed below.

Location of tentacles. Location of tentacles in hydroids is a taxonomic character stressed by many authors and is widely used in descriptions of species. According to Petersen (1990), oral (distal) tentacles occur apical to the zone from which medusae or fixed sporosacs are budded, whereas aboral (proximal) tentacles are basal to this zone. Although *C. thieli* has not been observed to produce medusae or fixed sporosacs, it has two widely separated sets of tentacles, which we identify as oral and aboral. *A. ammisatum* also has distinct oral and aboral tentacles.

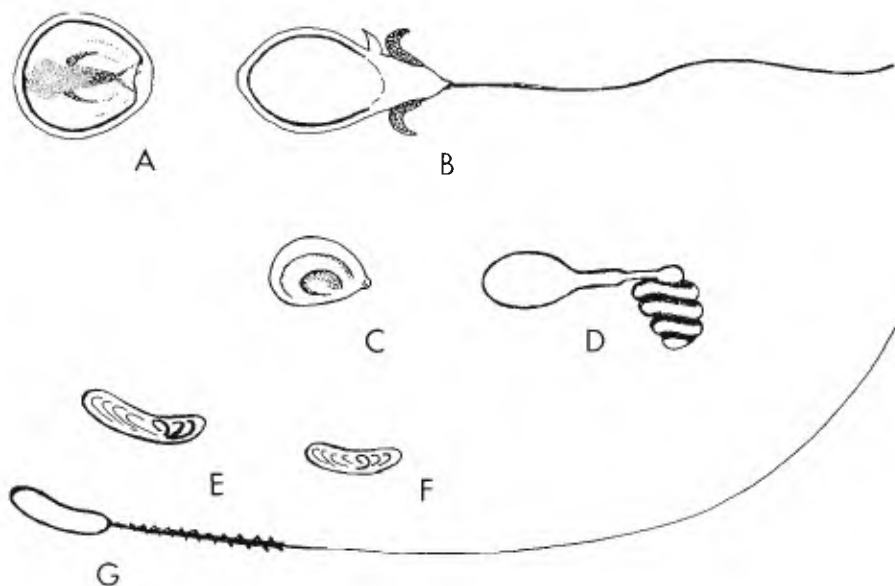**Types of tentacles.** Tentacle types include capitate

Fig. 7. Diagram of cnidome (not to scale). **A.** Undischarged stenotele. **B.** Discharged stenotele. **C.** Undischarged desmoneme. **D.** Discharged desmoneme. **E.** Undischarged large microbasic mastigophore. **F.** Undischarged small microbasic mastigophore. **G.** Discharged small microbasic mastigophore.

(nematocysts concentrated in high columnar epithelium at the tip of the tentacle), moniliform (terminal capitation and rings of nematocysts along the tentacle), and filiform (nematocysts distributed evenly along and around the tentacle). Modifications of the three basic morphologies also exist (see Prévot 1959). The oral tentacles of *C. thieli* are clearly capitate; the aboral tentacles appear superficially filiform or semifiliform, but measurement of the height of the ectodermal epithelium at the tip and along the length of the tentacles reveals that the tentacles are technically capitate. All tentacles of *A. ammisatum* are strongly capitate.

Organization of the tentacular endoderm. Prévot (1959) demonstrated that the tentacular endoderm may be organized in several ways. Tentacles may be hollow (a lumen lined by endodermal cells) or solid; solid tentacles may be chordal (cells stacked to fill the endodermal compartment) or parenchymatic (cells irregularly distributed within the endodermal compartment). Both the oral and aboral tentacles of *C. thieli* are chordal, as in *A. ammisatum* (Bouillon 1971).

Supporting lamella. Whether hollow or solid, the tentacular endoderm may be continuous with the gastric endoderm or separated from it by a continuation of the mesolamella across the base of the tentacles, the so-called "supporting lamella." Kramp (1949) stressed the taxonomic importance of the presence or absence of a supporting lamella. Although Rees (1957) questioned its significance in classification, Prévot's (1959) comprehensive analysis of tentacular structure documented its validity, and Petersen (1990) accepted it as a taxonomic character. *C. thieli* has a supporting lamella at the base of both the oral and aboral tentacles.

Bouillon (1971), in his histological description of *A. ammisatum*, did not mention the presence of a supporting lamella, but clearly illustrated it (Bouillon 1971, fig. VII, p. 340) for both oral and aboral tentacles.

Basal adhesive structures. Petersen (1990) emphasized also the structure of the base of the hydrocaulus of solitary species as a defining taxonomic character. Alternative aboral structures include a pedal disc, an attachment disc similar to the larval disc, a central pore unique to the family Hydridae, and a root-like structure. Within the family Acaulidae, *Acaulis primarius* STIMPSON 1854 and *Acauloides ilionae* BRINCKMANN-VOSS 1966 are clay- or mud-dwellers in which the hydrocaulus is modified totally or in part to a prominent root-like structure ("foot" or "peduncle") that secretes a gelatinous sheath (Berrill 1952; Brinckmann-Voss 1970; Bouillon 1971). In *Acauloides ammisatum*, however, the hydrocaulus is substantially reduced, occupying less than one-third of the length of the animal, and produces no gelatinous sheath (Bouillon 1971).

In *A. ammisatum*, the superior end of the reduced hydrocaulus is marked by an ectodermal fold (Bouillon 1971). Below this, the ectoderm becomes thinner and devoid of nematocytes, and the thin mucoprotein periderm that surrounds the rest of the polyp is absent. The ectodermal cells of the adhesive structure are dense and filled with secretory granules. Bouillon (1971) noted the similarity of the secretory cells to those of the adhesive buttons of actinulae.

Compared to that described for *A. ammisatum*, the basal adhesive structure of *C. thieli* is much smaller,

forming an adhesive button occupying only the extreme aboral tip of the polyp. It is, however, delimited by an ectodermal fold. The periderm ends abruptly at the fold, and the secretory cells are cytologically identical to those of the adhesive structure of *A. ammisatum*. In addition, both the general morphology and the cytology of the adhesive button of *C. thieli* are identical to that of the actinula of *Myriothela cocksi* HARDY 1891 (=*Candelabrum phrygium* FABRICIUS 1780) (see Van de Vyver 1968).

Reproduction. Both *Acaulis primarius* and *Acauloides ilionae* reproduce sexually, with gametes produced in fixed gonophores. *A. ilionae* reproduces asexually by transverse fission (Brinckmann-Voss 1970), as does *C. thieli*. Neither sexual nor asexual reproduction has been described for *A. ammisatum*.

Taxonomic designation. In its cnidome, in most of the characters detailed by Petersen (1990), and in its asexual reproduction, *Cryptohydra thieli* is similar to species in the family Acaulidae, especially *Acauloides ammisatum*. In general body form, however, the two species bear little resemblance. Compared to the corresponding structures in *A. ammisatum*, the body column of *C. thieli* is much more elongate, with the portion between the oral and aboral tentacles long and mobile; the aboral tentacles are much longer; the adhesive button is much smaller; and the oral tentacles are fewer (4 to 6 in *A. ammisatum*, only 3 or 4 in *C. thieli*).

The two species also differ in life style. *A. ammisatum* leads a sessile existence attached by its hydrocaulus to a sand grain (Bouillon 1971). *C. thieli*, although it can attach to the substrate by its adhesive button, is quite motile. Based on these differences from *Acauloides* in both structure and behavior, we propose the erection of a new genus, *Cryptohydra*.

The differences between *Cryptohydra thieli* and other members of the family Acaulidae can be viewed as adaptations to a life style in which the hydroid moves through interstitial spaces. The slender body column and elongate hypostome of *C. thieli*, like those seen in other interstitial hydroids such as *Psammohydra nanna* SCHULZ 1950 (where the hypostome is designated a "proboscis") and *Pinushydra chiquitata* BOUILLON & GROHMANN 1990, facilitate the looping movement described above and probably ease movement through interstitial spaces. Reduction in *C. thieli* of the number of tentacles, scattered over the hydranth of the larger sessile acaulids, results in additional streamlining of the body. The long, slender, slightly capitate aboral tentacles of *C. thieli*, in contrast to the short capitate or large fleshy filiform tentacles of the other species of Acaulidae, appear to be an adaptation for locomotion. The adaptive plasticity of the hydrocaulus is illustrated by the presence of a long, root-like structure with a gelatinous sheath in the large clay- or mud-dwelling species; a shorter, mucus-secreting hydrocaulus in the sessile interstitial species; and the far smaller mucus-secreting adhesive disc in the motile species.

Emended diagnosis. Inclusion of *Cryptohydra thieli* in the family Acaulidae requires slight modification of the diagnosis of this family. The new diagnosis, modified from Bouillon (1971, p. 345) is presented below (underscoring indicates changes) and incorporates the mode of asexual reproduction observed not only for this species, but also for *Acauloides ilionae* (Brinckmann-Voss 1970).

Family Acaulidae FRASER 1924

Hydroid with a gelatinous tube, or with anchoring filaments, or fixed with a mucous secretion. Three to six in one or two whorls or many scattered capitate tentacles distal to the aboral whorl of large fleshy filiform tentacles; the latter may be absent in some species or replaced with thin capitate tentacles.

Gonophores fixed (where known); asexual reproduction by transverse fission in some species.

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