# *Adercodon pleijeli* gen. et sp. nov. (Polychaeta, Ampharetidae) from the Mediterranean Sea

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ABSTRACT

*Adercodon pleijeli* gen. et sp. nov. is described from muddy sediments (32-95 m depth) off Banyuls-sur-Mer, France and the east coast of Sicily, Italy. Characterised by 3 pairs of smooth branchiae, 13 thoracic setigers (paleae lacking), thoracic uncini from setiger 4 and papillose buccal tentacles the new form differs from all known ampharetid genera. Nevertheless, the possession of a ventral row of buccal teeth suggests an affinity with *Gnathampharete* Desbruyères, 1978. The arrangement and position of the teeth along the leading edge of the innermost ventral lip suggests that such teeth are functional and not an evolutionary remnant. Certain aspects of the taxonomy of the Ampharetidae are discussed.

RÉSUMÉ

***Adercodon pleijeli* gen. et sp. nov. (Polychètes Ampharetidae) en mer Méditerranée**

*Adercodon pleijeli* gen. et sp. nov. est décrit des substrats vaseux (32-95 m de profondeur) de Banyuls-sur-Mer, France et de Sicile orientale, Italie. Caractérisée par trois paires de branchies lisses, 13 sétigères thoraciques (pas de palées), des uncini thoraciques à partir du sétigère 4 et des tentacules buccaux pennés, la forme nouvelle se distingue de tous les autres genres d'Ampharétiens. Cependant, l'existence d'une série unique de dents buccales suggère une affinité avec *Gnathampharete* Desbruyères, 1978.

## INTRODUCTION

A small ampharetid worm that could not be assigned to any known genus was first noted during field collecting at Banyuls-sur-Mer, France in October 1991. The same animal was subsequently found in unidentified samples collected in Sicily the previous May. Later microscopical examination of specimens from both localities surprisingly revealed the presence of buccal teeth in addition to papillose tentacles. The new form is described and compared to *Gnathampharete paradoxa* Desbruyères, 1978, the only other ampharetid known to possess teeth.

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## MATERIALS AND METHODS

The specimens used in this study were obtained from dredge, or combined dredge and sledge, samples sieved using a 0.5 mm mesh. The latitude and longitudes of the Sicilian sampling positions were estimated from local landmarks, no position fixing system being available. Most specimens were sorted live and fixed in formalin (20-30 % in seawater), though some were obtained from bulk Mg $Cl_2$ relaxed samples prior to fixation in formalin (NMW.Z.1992.003.8-9) or Bouin's fluid (NMW.Z.1992.003.1-2). In all cases specimens were washed in freshwater prior to preservation in 80 % alcohol. All drawings were prepared with the aid of a camera lucida.

Epidermal glandular regions were highlighted by methyl green staining (NOLTE, 1913; HOFSOMMER, 1913; BANSE, 1970). Specimens were placed in a strong solution of stain, in 80 % alcohol, for about one minute. Excess stain was removed by a quick rinse using clean alcohol. The remaining staining pattern was then noted.

Type material was deposited in the following institutions: National Museum of Wales, Cardiff (NMW); Muséum National d'Histoire Naturelle, Paris (MNHN); Swedish Museum of Natural History, Stockholm (SMNH); United States National Museum of Natural History, Washington, D. C. (USNM); Australian Museum, Sydney (AM).

## SYSTEMATIC ACCOUNT

### *Adercodon* gen. nov.

TYPE SPECIES. — *Adercodon pleijeli* sp. nov.

DIAGNOSIS. — Prostomium trifid, lacking glandular ridges. Buccal cavity with papillose tentacles and single series of pointed teeth arranged along leading edge of innermost lower lip. Three pairs of smooth branchiae, arranged 2: 1 either side; posterior pair followed by pair of short nephridial papillae. Thirteen thoracic setigers from segment IV; paleae and modified notopodia lacking. Ten thoracic uncinigerous segments from setiger 4 (segment VII). Notosetae simple, capillary. Thoracic and abdominal uncini aviculopectinate. Pygidium with eyespots and circlet of anal cirri.

ETYMOLOGY. — The generic name is derived from *Aderkes* (Gr.) -unseen or unexpected, and *odous* (Gr.) -tooth. Gender, masculine.

### *Adercodon pleijeli* sp. nov.

Figs 1a-g; 2a-d

MATERIAL EXAMINED. — France. Banyuls-sur-Mer: sample 5, 42°30.17'N, 3°09.48'E, mud with detritus, 40 m, 7.X.91, two paratypes (NMW.Z.1992.003.6-7). — Sample 8, 42°29.75'N, 3°09.00'E, sandy mud, 32 m, 11.X.91, two paratypes (NMW.Z.1992.003.8-9). — Sample 11, 42°30.00'N, 3°16.50'E, muddy sand, 90 m, 14.X.91, one paratype (NMW.Z.1992.003.10), five paratypes (SMNH 4535). — Sample 12, 42°30.00'N, 3°11.75'E, mud, 80 m, 14.X.91, five paratypes (NMW.Z.1992.003.11-13), four paratypes (AM). — Sample 14, 42°29.90'N, 3°10.75'E, coarse sandy mud, 65 m, 15.X.91, one paratype (NMW.Z.1992.003.14). — Sample 15, 42°29.55'N, 3°09.90'E, mud with detritus, 45 m, 15.X.91, holotype (NMW.Z.1992.003.1), five paratypes (NMW.Z.1992.003.2-5), three paratypes (MNHN, UC 793), two paratypes (USNM 157618). — Italy. Sicily : sample T 8/9, off Aci Castello, 37°33.00'N, 15°10.70'E, muddy sand, 65-70 m, 16.V.90, four paratypes (NMW.Z.1992.002.1). — Sample T 15/17, off Aci Castello, 37°32.50'N, 15°10.80'E, muddy sand, 90-95 m, 17.V.90, two paratypes (NMW.Z.1992.002.2), 4 paratypes (SMNH 4536). — Sample T 32, off Castellucio (Brucoli), 37°17.00'N, 15°13.00'E, mud with detritus, 35-45 m, 22.V.90, two paratypes (NMW.Z.1992.002.3), four paratypes (MNHN, UC 794), four paratypes (USNM 157619). — Sample T 34/35, off Castellucio (Brucoli), 37°18.00'N, 15°13.00'E, mud with *Phyllochaetopterus*? tubes, 60-70 m, 23.V.90, one paratype (NMW.Z.1992.002.4).

DESCRIPTION. — Specimens small, 1.5-5.0 mm long (thoracic width 0.15-0.50 mm), with subcylindrical thorax and tapering abdomen. Holotype entire, 4.8 mm long (thoracic width 0.5 mm), with partially extruded upper (tentacular membrane) and lower lips (Fig. 1a) ; branchiae and almost all buccal tentacles missing.

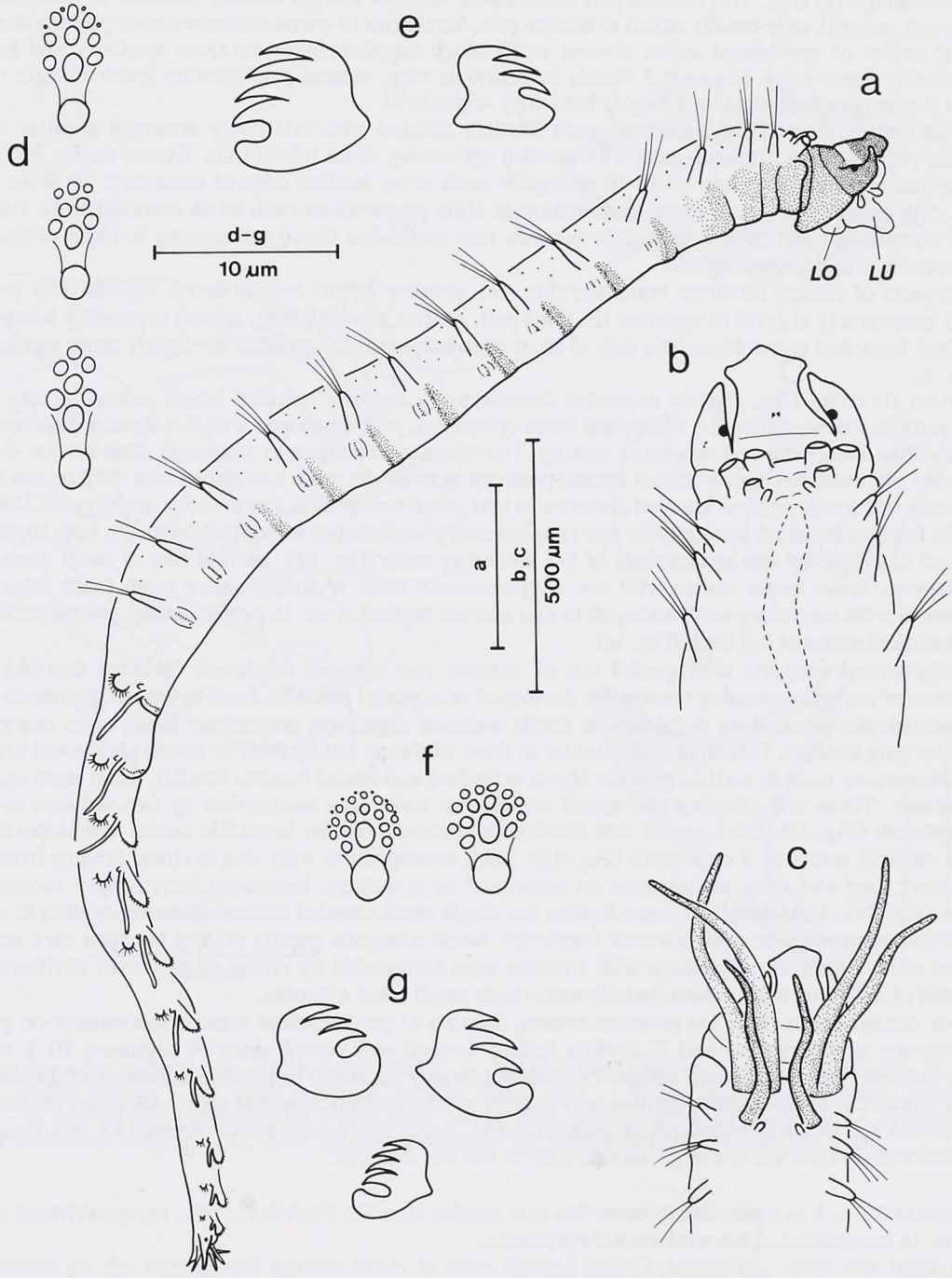


FIG. 1. — *Adercodon pleijeli*. (a, b: holotype; c: NMW.Z.1992.003.6; d-g: NMW.Z.1992.003.4-5): a, whole animal, lateral view (upper and outer lower lips partially extruded); shading represents methyl green staining. — b, head region, dorsal view (branchiae lacking). — c, head region, dorsal view. — d, thoracic uncini, frontal view. — e, thoracic uncini, lateral view.— f, abdominal uncini, frontal view. — g, abdominal uncini, lateral view. Abbreviations: *LO*, outermost lower lip; *LU*, upper lip.

Prostomium trifid (Fig. 1b); median part bell-shaped, anterior margin broadly rounded to triangular; lateral lobes curved, pointed, only basally united to median part. Single pair of round red-brown eyes posterolaterally, near points of fusion of prostomial lobes; several small black supplementary eyespots medially and laterally at approximately same level. Segment I visible as complete ring, ventral part forming lower margin of mouth. Segment II narrower than segment I, largely hidden by segment III.

Buccal tentacles retractile, papillose; each densely ciliated with bilaterally arranged papillae (Fig. 2b). Tentacular papillae long, filiform; each with swollen tip bearing distal tuft of cilia. Buccal cavity ventrally with single curved and unbroken row of 30-40 triangular teeth along leading edge of innermost lip (Figs 2a, c). In profile, teeth appear V-shaped. From examination of slide preparations each tooth revealed to be sub-conical, laterally compressed and hollow (Fig. 2d); superior root somewhat flared terminating in large projecting peg; inferior root long, slender and tapered.

Three pairs of ciliated cirriform branchiae (Fig. 1c); anterior 2 pairs basally fused, separated by medial gap, arranged transversely at level of segment III; third pair, shorter, more slender, arising separately behind anterior pairs. Third branchial pair followed by pair of short rounded nephridial papillae in slightly more medial position (Figs 1b, c).

Segment III collar-like, slightly expanded dorsolaterally forming rounded lobes; paleae lacking. Thirteen thoracic setigers from segment IV; notopodial lobes cylindrical, well-developed with 4-8 slender sheathed capillary setae; modified notopodia and notosetae lacking. Ten thoracic uncinigerous segments from setiger 4 ; anterior neuropodial tori inconspicuous with 2-5 uncini, posterior neuropodia more noticeable with 9-12 uncini in vertical row (usually one lower uncinus situated posterior to row on all except first few anterior uncinigers). Uncini small with main fang surmounted vertically by one supplementary tooth (latter sometimes lacking), both together being surrounded cowl-like by one or two rows of 5-8 secondary teeth (Fig. 1d) ; second row of small denticles often inconspicuous. Some larger uncini with two supplementary teeth vertically above main fang; others slightly asymmetrical with secondary teeth arranged in two uneven vertical rows. In profile uncini aviculopectinate with apparent vertical series of 3-5 teeth (Fig. 1e).

Ten abdominal setigers; neuropodial tori of anterior two setigers similar to those of thorax (including arrangement of uncini), remaining neuropodia developed as extended pinnules. Each neuropodial pinnule with 6-14 uncini individually situated on distal tips of single series of digitiform projections along outer margin; uncini attached by long tendons. Uncini initially similar to those of thorax but by third or fourth abdominal setiger most lack supplementary teeth in vertical position above main fang and uncini become smaller, more squat and rounded in appearance. These and all other abdominal uncini with main fang surrounded by two obvious rows of 6-9 secondary teeth (Fig. 1f); third row of tiny denticles sometimes visible. In profile uncini aviculopectinate with apparent vertical series of 3 or 4 teeth (Fig. 1g). Each neuropodium with single cirrus arising from superior margin; cirri long and very conspicuous on anterior 5 or 6 setigers, becoming increasingly shorter towards pygidium (Fig. 1a). Abdominal notosetae lacking but single small rounded ciliated tubercles evident in notopodial positions (inconspicuous on posteriormost segments). Small triangular papilla evident between each neuropodial cirrus and ciliated tubercle. Pygidium with terminal anus surrounded by circlet of about six cirriform papillae. Lateral pair of anal cirri more robust, basally with single small black eyespots.

Use of methyl green (Fig. 1a) revealed intense staining of pre-branchial region, particularly on prostomial lobes. Staining of segments I and II slightly lighter. Lateral and ventral parts of segments III-V (setiger 2) similarly stained. Thereafter (until setiger 11) staining largely restricted to presetal lateral/ventral bands. Dorsal region of thorax largely unstained; staining only evident as small widely scattered spots. Abdomen unstained.

Specimens (in alcohol) yellowish or pinkish white. Some specimens with remnants of thin mucous tube. Many specimens ovigerous; ova large, rounded, up to 125 µm diameter.

ETYMOLOGY. — It is a pleasure to name this new species after Dr. Fredrik PLEIJEL, my good friend and fellow researcher, in recognition of his work on the Polychaeta.

HABITAT. — The new species occurs in muddy sediments, with or without terrestrial/seagrass detritus, in shallow shelf depths (< 100 m). The physical and biological characteristics of the type locality off Banyuls have been detailed previously by GOT *et al.* (1968), GUILLE & SOYER (1968, 1970) and GUILLE (1970). The species was found throughout the four subdivisions of the *Amphiura filiformis* community as recognised by GUILLE & SOYER (1970): *Scoloplos armiger* faciès (samples 8 & 15), *Venus ovata* subcommunity (samples 5 & 14), *Nucula sulcata* subcommunity (sample 12) and *Auchenoplax crinata* subcommunity (sample 11). However, in all cases its occurrence was low (one to six per dredge sample).

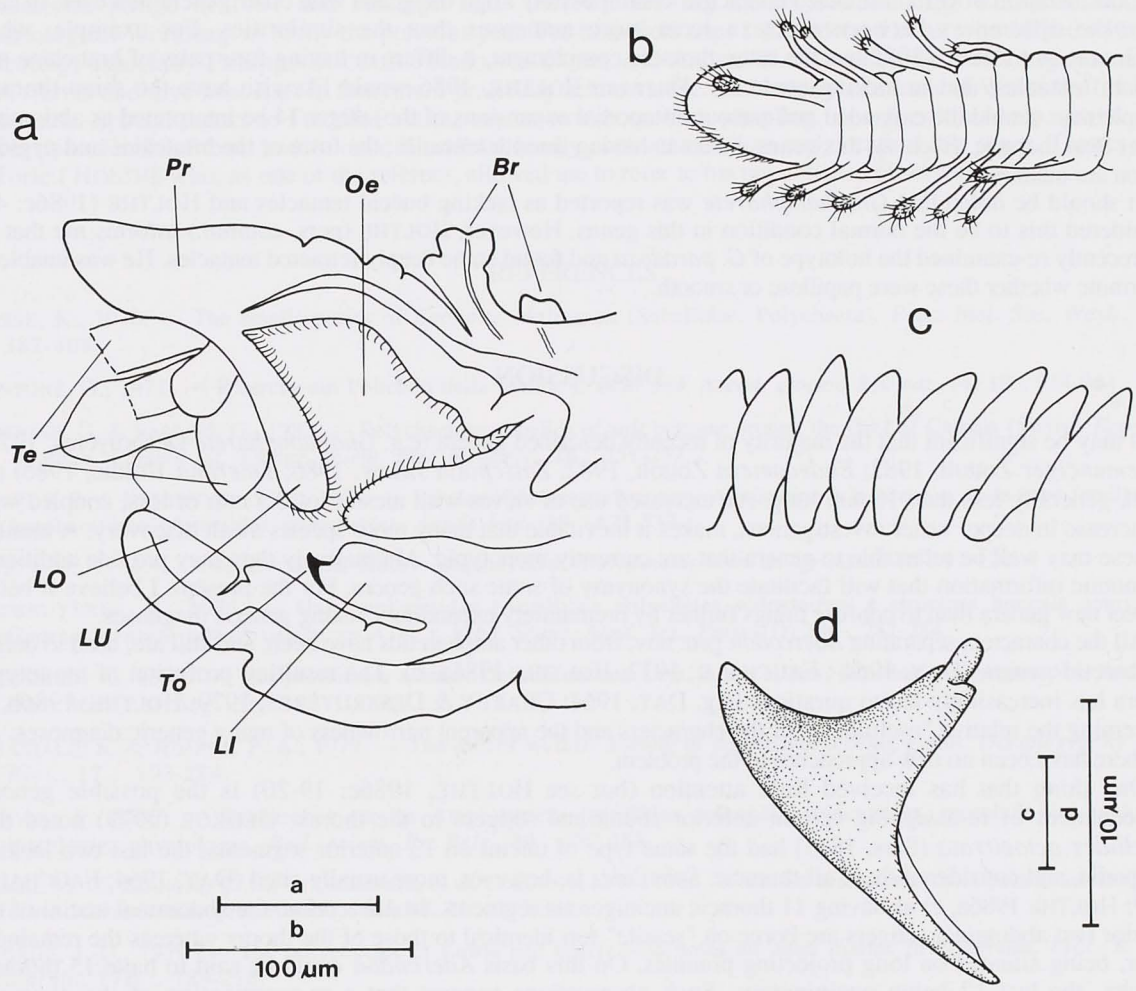


FIG. 2. — *Adercodon pleijeli*. (a: NMW.Z.1992.003.8; b: NMW.Z.1992.003.10; c: NMW.Z.1992.003.7): a, head region, sagittal section. — b, distal region of tentacle, dorsal view. — c, portion of row of buccal teeth, ventral view. — d, derived shape of individual buccal tooth, lateral view. Abbreviations: *Br*, branchia; *LI*, innermost lower lip; *LO*, outermost lower lip; *LU*, upper lip; *Oe*, oesophagus; *Pr*, prostomium; *Te*, tentacle; *To*, tooth.

Information on the benthos off eastern Sicily is more limited (see GAMBI *et al.*, 1985, for bibliography). CANTONE (1970) and CANTONE & FASSARI (1983) provide some information on the polychaetes present in the Gulf of Catania region where *Adercodon* was found.

REMARKS. — According to the literature (e.g. FAUCHALD, 1977; HOLTHE, 1986c), *Muggoides cinctus* Hartman, 1965 is the only other member of the Ampharetinae to possess three pairs of branchiae and 13 thoracic setigers with the last 10 uncinigerous. *Adercodon pleijeli* differs markedly in having buccal teeth and papillose (not smooth) tentacles, and in lacking dorsally displaced notopodia and modified notosetae. The presence of buccal

teeth appears to ally *Adercodon* with *Gnathampharete* Desbruyères, 1978, the only other ampharetid known to have similar structures. *Adercodon* differs notably in having only three pairs of smooth branchiae rather than four pairs of pennate ones, in having 13 thoracic setigers with 10 uncinigerous rather than 14 with 12, and in lacking paleae.

Consideration of certain selected characters could possibly align the genus with other genera however, in each case, the differences between the taxa seem more numerous than the similarities. For example, while *Decemunciger* Zottoli, 1982 has the same thoracic complement, it differs in having four pairs of branchiae and smooth tentacles, and in lacking anal cirri. *Ymerana* HOLTHE, 1986 would likewise have the same thoracic complement should the expanded and asetous notopodial expansions of the setiger 14 be interpreted as abdominal rather than thoracic. Even so, this genus differs in having smooth tentacles; the form of the branchiae and pygidial region are unknown.

It should be noted that *Gnathampharete* was reported as lacking buccal tentacles and HOLTHE (1986c: 46) considered this to be the normal condition in this genus. However, HOLTHE (pers. commn.) informs me that he has recently re-examined the holotype of *G. paradoxa* and found some deeply retracted tentacles. He was unable to determine whether these were papillose or smooth.

## DISCUSSION

It may be significant that the majority of recently described genera (e.g. *Gnathampharete* Desbruyères, 1978 ; *Decemunciger* Zottoli, 1982; *Endecamera* Zottoli, 1982; *Zatsepinia* Jirkov, 1986; *Ymerana* Holthe, 1986) are small, generally less than 10 mm long. An increased use of sieves with meshes of 0.5 mm or less, coupled with an increase in deeper water investigations, makes it inevitable that many more species await discovery. A number of these may well be referrable to genera that are currently monotypic. Alternatively they may provide additional taxonomic information that will facilitate the synonymy of some such genera. For the present, I believe it better to erect new genera than to confuse things further by prematurely expanding existing generic diagnoses.

All the characters separating *Adercodon* gen. nov. from other ampharetids have been, and still are, used to define ampharetid genera (DAY, 1964 ; FAUCHALD, 1977; HOLTHE, 1986a, c). The resulting profusion of monotypic genera has increasingly led to questions (e.g. DAY, 1964; CHARDY & DESBRUYÈRES, 1979; HOLTHE, 1986b, c) concerning the relative "usefulness" of the characters and the apparent narrowness of many generic diagnoses. As yet there have been no new approaches to the problem.

One thing that has received little attention (but see HOLTHE, 1986c: 19-20) is the possible generic consequences of re-assigning certain anterior abdominal setigers to the thorax. GEORGE (1979) noted that *Sabellides octocirrata* (Sars, 1835) had the same type of uncini on 13 anterior segments, the last two lacking notopodia, and considered these all thoracic. *Sabellides* is, however, more usually cited (DAY, 1964; FAUCHALD, 1977; HOLTHE 1986a, c) as having 11 thoracic uncinigerous segments. In *Adercodon,* the abdominal uncini of the anterior two abdominal setigers are borne on "sessile" tori identical to those of the thorax whereas the remainder differ, being situated on long projecting pinnules. On this basis *Adercodon* could be said to have 15 thoracic setigers, the last 12 being uncinigerous. Such observations suggest that a re-examination of the 'thoracic' complements in all ampharetids could perhaps be a fruitful line of investigation.

The enigmatic presence of buccal teeth in *Gnathampharete* and the possible phylogenetic implications concerning the Ampharetidae and Terebellida as a whole were discussed by DESBRUYÈRES (1978) and HOLTHE (1986c). Both workers considered these to be possible representations of an ancestral condition and the latter postulated that they were probably not functional. The discovery of well-defined teeth in *Adercodon* in addition to papillose tentacles may indicate otherwise. Their position, form and arrangement along the edge of the innermost ventral lip strongly suggests that they are indeed functional. They could be involved in sorting the particles collected by the tentacles; deposit-feeding on the sediment surface being the most common feeding method in the Ampharetidae (FAUCHALD & JUMARS, 1979). On the other hand (though perhaps less likely), it may be that certain ampharetids are, in some way, predatory. Ingestion of larval invertebrates has been noted in a number of ampharetids and other members of the Terebellida (FAUCHALD & JUMARS, 1979; WILSON, 1980; ZOTTOLI, 1982), though it is unclear whether this was an active or passive process.

Although earlier detailed morphological studies on the Ampharetidae (FAUVEL, 1897; HESSLE, 1917) made no mention of buccal teeth, I agree with HOLTHE (1986c) in believing that they may be more common than thought. Further investigation, particularly of the smaller species, could prove rewarding. Certainly the more characters that can be detailed for the Ampharetidae, the more chance we have of re-evaluating the status of the genera and their phylogenetic relationships.

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