

GRASSLEIA HYDROTHERMALIS, A NEW GENUS AND
SPECIES OF AMPHARETIDAE (ANNELIDA: POLYCHAETA)
FROM THE HYDROTHERMAL VENTS OFF THE
OREGON COAST (U.S.A.), AT GORDA RIDGE

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Abstract. — A new ampharetid genus (*Grassleia hydrothermalis*) from the hydrothermal vents found off the coasts of Oregon is described. It differs from other genera in its unusual abdominal shape: very short (seven setigers) and constricted in the first. Its affinities with close related genera are discussed.

As part of the biological material collected on the June 1988 expedition to the Escanaba Trough region of Gorda Ridge, off the coasts of Oregon and California, with the DSRV *Alvin* (Grassle & Petrecca 1992), J. F. Grassle found some ampharetids which he kindly provided me for study since we were examining the ampharetids from the Guaymas basin expedition of February 1988.

Gorda Ridge is a 300 km segment of volcanically active oceanic ridge extending from the Blanco Fracture zone (43°00'N) to the Mendocino Fracture zone (40°20'N) and is included in the proclaimed U.S. Exclusive Economic Zone (Grassle & Petrecca 1992). The polychaetes were found to dominate in all areas sampled, contributing, in the soft sediment from which the ampharetids were taken, to more than 80% of the fauna.

The ampharetids collected there, in excellent state of preservation, were found to belong to a new genus which is described below.

The family Ampharetidae is well known in deep marine environments (Day 1967), and has been found also to colonize the hydrothermal vents extensively (Desbruyeres et al. 1985), along with members of the closely related Alvinellidae (Desbruyeres & Laubier 1986).

Materials and Methods

Specimens were collected with the submersible DSRV *Alvin* in its dive 2042 of June 12, 1988 (40°56.71'N, 127°29.31'W), in the Escanaba Trough region of Gorda Ridge, 70 nautical miles northward from the intersection of the ridge with the Mendocino Fracture Zone, within 200 nautical miles off the coasts of Oregon and California, U.S.A. (Grassle & Petrecca 1992).

The sample was obtained using a DSRV *Alvin* tube core as a scoop to shovel sediment into a collection box of the DSRV *Alvin* basket. The amount of sediment was the equivalent of at least two steel box cores (225 cm² each) specifically designed for use by the DSRV *Alvin* (Grassle & Petrecca 1992).

At the surface, the material was rinsed over sieves with mesh openings of 300 and 63 μ m. Animals retained in the sieves were fixed in 10% formalin and stored in 80% ethanol (Grassle & Petrecca 1992).

The types are deposited in the following collections: ICML-MEX (Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Mexico); USNM (National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A.); BMNH (The Natural History

Museum, London, England); AM (Australian Museum, Sydney, Australia); HZM (Zoologisches Museum, Hamburg, Germany) and J. F. Grassle, personal collection, Rutgers University, New Jersey, U.S.A.

Results

Family Ampharetidae Malmgren, 1866
Subfamily Ampharetinae Chamberlin
Grassleia, new genus

Type species.—*Grassleia hydrothermalis*, new species.

Diagnosis.—Body short with fifteen thoracic setigerous segments, of which last ten uncinigerous. Abdomen truncate, distinctly constricted in transition zone, seven abdominal uncinigerous segments present. Abdominal notopodia absent. Small paleae present. Four pairs of smooth branchiae present; branchiae fused at base. No mid-dorsal space between branchial groups. Notopodial and neuropodial cirri absent. Anus terminal.

Etymology.—The genus is dedicated to Dr. J. Frederick Grassle in an attempt to show my sincere appreciation for all the unselfish help and friendship provided over the past years in addition to providing the present material for study.

Discussion.—This genus differs from all the other genera in the ampharetids mainly by having a very short and truncate abdomen, only seven setigers long, and by being distinctly constricted in the first abdominal segment. Only the genus *Lysippides* Hessle, 1917 has eight abdominal segments, with the rest of the genera having up to 60 abdominal segments (Holthe 1986b).

Grassleia hydrothermalis, new species
Fig. 1A–D

Material examined.—Escanaba Trough, Gorda Ridge, DSRV *Alvin* dive 2042, 12 Jun 1988, 40°56.71'N, 127°29.31'W, depth 3271 m.

Holotype: USNM (157692), 21 para-

types: (USNM 157693, 10; BMNH-ZB 1993:18–19, 2; HZM P-21748, 2; ICML POH-68001, 7. Additional specimen deposited: J. F. Grassle pers. collection, Rutgers University, 2; AM, 3.

Description.—The description is based on the holotype unless specified otherwise. All the specimens are complete.

Holotype 9.6 mm long, 1.6 mm wide. Color in alcohol white, nearly translucent. Sizes of paratypes from 3.5 to 9.1 mm, with about half of them measuring around 7 mm.

Prostomium slightly pointed, indistinctly trilobed with two longitudinal nuchal slits (Fig. 1A). No glandular ridges present. Oral tentacles not observed in any of the organisms collected. Segment 1 enlarged ventrally to form the lower lip. Buccal aperture large. Segment 2 distinct, achaetous (Fig. 1A).

Thorax with fifteen setigers, the last ten being uncinigerous. Thorax measurements vary from 2.85 to 7.9 mm in length and 0.6 to 1.6 mm in width, the holotype being the largest. Segment 3 laterally enlarged, overlapping segment 2, with small, bristlelike paleae. Segments 3 and 4 fused laterally and hard to differentiate. Branchiae located on segment 4 (Fig. 1A). There are four pairs of branchiae united basally. No gap between the branchial groups. Each branchia has a branchiophore fused to form a basal membrane, and then emerges independently as a finely annulated rounded filament, the longest measuring about 3.4 mm in the holotype (Fig. 1B). The length of the branchiae varies in direct relation to size, the longest per specimen varying from 1.6 to 4.6 mm in the paratypes.

Notosetae start on segment 4. First notopodial lobe reduced, setae arising close to the branchial base (Fig. 1A).

The other notopodial lobes are elongate and remain the same size throughout the thorax. In some paratypes they are somewhat larger towards the posterior thorax, and their setae are distinctly longer. They bear about seven to twelve unilimbate, slightly recurved and distally pointed cap-

illary setae of different lengths. The longest notoseta per specimen varies from 0.2 to 0.7 mm (measuring 0.4 mm in the holotype).

The short, low-ridged neuropodial thoracic lobes (uncinigerous tori) begin at setiger 6 and continue throughout the thorax. Thoracic uncini are located in single transverse rows, 44 to 50 per row. The number of uncini per setiger varies widely according to animal size: the holotype being the largest, has the largest number of uncini per setiger. Others can be as low as from 14 to 17. Each uncinus bears 10 teeth in 4 transverse rows above a rounded basal prow.

The abdomen, consisting of seven uncinigerous segments, is unusually well set off from the thorax, nearly quadrangular when seen from above, narrower and separated from the former by a constriction in the first abdominal setiger (Fig. 1C). It measures 1.7 mm long and 0.8 mm wide in the holotype and varies from 0.6 to 1.85 mm in length and 0.3 to 0.8 mm in width in the paratypes.

The first abdominal torus is located in the constriction separating the thorax from the abdomen and its shape is intermediate between the thoracic and abdominal tori, resembling more closely the thoracic tori, that is: not elongate, although it is a bit higher than the thoracic ones. The 6 following abdominal uncinigerous tori are rounded and elongate. Abdominal uncini are in single rows fringing the edge of each torus numbering 26 to 28 per row in the holotype. Their number varies in direct relation to specimen size and can be as low as from 7 to 9. Each uncinus bears 10 teeth arranged in 4 rows around a large single tooth and above a rounded basal prow (Fig. 1D).

Abdominal notopodia, as well as notopodial, neuropodial and anal cirri absent.

Anus rounded and terminal, surrounded by 2 large and several small papillae.

Tube: Only fragments of a tube could be seen on one of the specimens as a thin translucent membrane almost completely covered with fine sand grains and small debris.

Etymology. — The name refers to the habitat of the species, the hydrothermal vents.

Biological notes. — The organisms were found only in soft sediments (never in hard substrates) at the base of active hydrothermal mounds, or in the surroundings. They were located where hydrothermal fluid percolates to the surface, and were found to dominate there, representing 37% of the fauna collected (Grassle & Petrecca 1992). They are, together with the majority of the polychaete fauna found in the area, surface deposit feeders. A detailed description of the fauna found at this site can be found in Grassle & Petrecca (1992).

Distribution. — Known only from the Gorda Ridge.

Discussion

The species differs from other ampharetid species as indicated in the genus.

Most of the ampharetid genera of both subfamilies: Melinninae and Ampharetinae have either 12 or 14 thoracic uncinigers (Fauchald 1977, Holthe 1986a). One genus has 15 (*Weddellia* Hartman 1967); 6 genera, in addition to the new genus, have 10, and 2 genera have 9 uncinigers. Of the six genera with 10 uncinigers, 2, *Melinnopsis* and *Melinnopsides* belong to the subfamily Melinninae; the other 4, plus the new genus are members of the subfamily Ampharetinae. These four genera include *Decemunciger* Zottoli 1982, *Melinnata* Hartman, 1965, *Mexamage* Fauchald, 1972 and *Muggoides* Hartman, 1965.

Two genera, *Melinnata* and *Muggoides*, have 3 pairs of branchiae rather than 4, in addition to other important characters like a dorsal ridge across the dorsum on anterior thoracic segments and the last thoracic notopodia elevated with modified notosetae in the case of *Muggoides*. The other 3 genera *Decemunciger*, *Grassleia* and *Mexamage* have 4 pairs of branchiae. The branchiae are arranged in a longitudinal series in *Mexamage* and in transverse rows in *Decemunciger* and *Grassleia*. In *Mexamage*, the

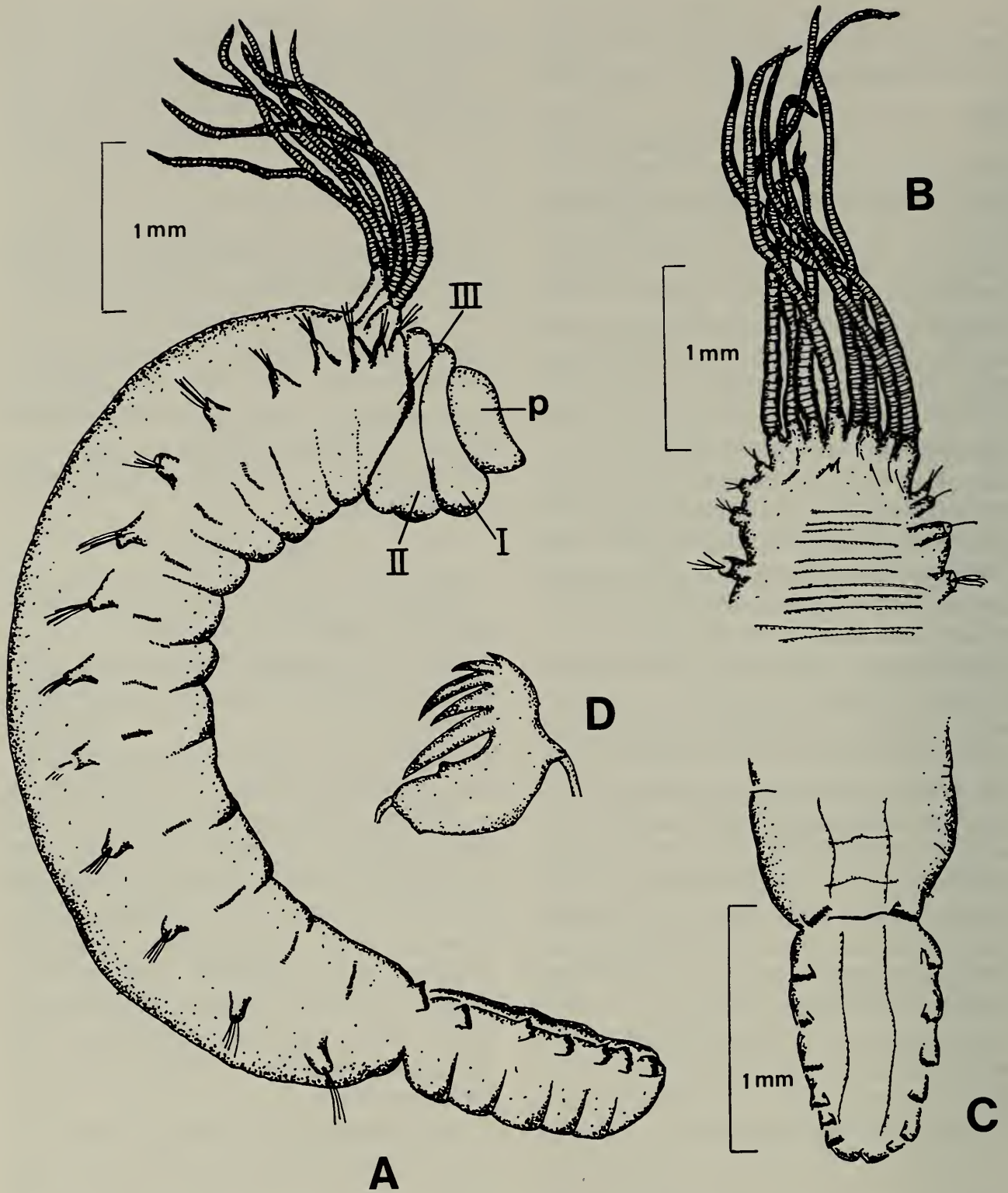


Fig. 1. *Grasseia hydrothermalis*: A, Lateral view of entire worm; B, anterior end, dorsal view; C, posterior end, dorsal view; D, mid-abdominal uncinus, lateral view. A–C: holotype (USNM 157692) D: paratype (POH-68001). Abbreviations: I, II & III = segments 1, 2 & 3; p = prostomium.

branchiae are each clearly related to a consecutive segment; moreover, there is a wide gap between the branchiae, in addition to a "complex branchial membrane." Unfortunately, the abdominal segments were absent

in all 4 specimens observed by Fauchald (1972), so that no comparison can be made regarding this character. In *Melinnata*, the number of abdominal segments is also unknown, and in *Muggoides* there are 13 ab-

dominal segments. *Decemunciger* Zottoli, 1982, consists of 13 thoracic segments and has 14 abdominal uncinigers. *Grassleia* consists of 15 thoracic setigers and has 7 abdominal uncinigers.

It is interesting to note that all 5 genera of Melinninae come from deep waters (Fauchald 1972, Hartman 1965, Zottoli 1982).

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