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A NEW INTERSTITIAL SPECIES OF *HETEROPODARKE* (POLYCHAETA: HESIONIDAE) FROM XIAMEN, CHINA

Zhihu Ding, Baoling Wu and **Wilfried Westheide**

ABSTRACT. - *Heteropodarke xiamenensis*, new species, inhabits coarse sandy sediments of intertidal and shallow subtidal coastal areas near Xiamen, People's Republic of China (Taiwan Strait). It is distinguished from previously known species by its lack of moderately stout falcigerous chaetae and of long serrated spinigers, and by the specific shape of the blades of the stout compound chaetae.

KEY WORDS. - *Heteropodarke*, Polychaeta, Hesionidae, new species.

INTRODUCTION

Heteropodarke Hartmann-Schröder, 1962, is one of three meiofaunal taxa in the Hesionidae that is represented by various species in sandy beaches and shallow subtidal sediments; the others are *Microphthalmus* Mecznikow, 1865, and *Hesionides* Friedrich, 1937. Whereas the species of *Microphthalmus* (Westheide, 1977a; Westheide & Rieger, 1987) and *Hesionides* (Westheide, 1977b; Westheide & Rao, 1977) are found almost everywhere, as long as the littoral includes relatively clean, coarse sandy or shelly sediments, *Heteropodarke* is less common and probably absent altogether from some of the world's coasts; for instance, there is no record of the genus in Europe. The species previously described and the locations where they were found are as follows: *H. heteromorpha heteromorpha* Hartmann-Schröder, 1962 in Peru (Hartmann-Schröder, 1962), New Caledonia (Laubier, 1967), California (Dorsey, 1978) and the Gulf of Mexico (Uebelacker, 1984: *H.* cf. *heteromorpha*); *H. heteromorpha africana* Hartmann-Schröder, 1974, in Natal (Hartmann-Schröder, 1974) and China (Wu & Zhao, 1992); *H. lyonsi* Perkins, 1984, and *H. formalis* Perkins, 1984, from the US Atlantic coast and the Gulf of Mexico (Perkins, 1984). The genus has also been found in New Zealand (Prof. N.W. Riser, Nahant, unpublished material in the possession of the third author) and in British Columbia (unpublished observation by the third author). *Heteropodarke* sp. A in Uebelacker (1984) from the Gulf of Mexico probably is *H. formalis*. The present species is the second known to inhabit the Chinese coast. Like

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H. heteromorpha africana (Wu & Zhao, 1992) and many other meiofaunal polychaetes, it was found on one of the small expeditions undertaken as part of a joint project of the University of Osnabrück and the First Institute of Oceanography, Qingdao, carried out between 1987 and 1994 in various regions along the Chinese coastline.

MATERIALS AND METHODS

Animals were extracted from small samples of sand by the $MgCl_2$-method (Westheide, 1990), cursorily sorted and inspected by a dissecting microscope at the Third Institute of Oceanography in Xiamen. For light microscopy preparations, fixed specimens (Bouin's or 10% formalin) were transferred into glycerine. Drawings and measurements were made by means of a LEITZ Diaplan microscope with interference contrast optics and a camera lucida in Osnabrück.

For SEM work, specimens were postfixed in a sea-water-buffered solution of 1% OsO4 for 1 h after rinsing the animals in seawater, cleaned in distilled water, dehydrated in an ethanol series, critical-point dried with CO_2, mounted on aluminium stubs, sputter-coated with gold and examined with a ZEISS DSM 962.

All material examined is deposited in the Senckenberg Museum, Frankfurt (SMF).

SYSTEMATICS

Heteropodarke xiamenensis, new species
(Figs. 1A-E, 2A-N, 3A-D)

Material examined. - East China Sea: Xiamen: (1) Two specimens, one of which is a complete mature female (holotype, SMF No. 6092); intertidal coarse sand near Huangchu (24°27'N, 118°04'E); 25 Sept. 1994: type locality. (2) Two specimens, one of which is a mature female, subtidal Amphioxus sand, 2-3 m, off Huangchu; 29 Sep.1994 (paratypes, SMF No. 6093, 6094). (3) Two specimens, subtidal coarse sand, about 3 m, off Jiyu Island; 6 Oct.1994 (paratype, SMF No. 6095).

Description. - Body without any colour pattern; maximum length of a complete specimen about 11.5 mm (not including palps and cirri), 180-200 µm wide (without parapodia) at middle part of the body; with the maximum number of 94 chaetigers. Body somewhat cylindrical, slightly flattened ventrally.

Prostomium (Fig. 1A, B) anteriorly rounded. Three elongate, slender antennae, on long cirrophores; articulated, the median one with ca. 5 articles (ca. 100 µm long), positioned on the anterior margin of the prostomium, lateral antennae with about the same shape and size as the median one, attached ventrolaterally. Palps with almost the same shape and size as antennae; ventroanteriorly attached on palpophores. Two pairs of eye spots positioned laterally on posterior part of prostomium. Nuchal organs as a pair of elongate ciliated grooves, between prostomium and first tentacular segment. Six pairs of tentacular cirri on three indistinctly marked tentacular segments, dorsal ones on long cirrophores; longest dorsal tentacular cirri on segment 2, with 20-25 articles, length 430-500 µm, reaching back to chaetiger 5; dorsal tentacular cirri on segment 1 with 7-12 articles, ca. 200-230 µm long; dorsal cirri on segment 3 with ca. 6 to 9 articles, ca. 160-180 µm long; ventral tentacular cirri all about same length, with ca. 5 articles, 100-110 µm long.

Parapodia elongate, uniramous on anterior chaetigers (notopodial aciculae not detected but may be too fine to be identified by light microscopy), subbiramous on middle and posterior chaetigers. Dorsal cirri all similar, on cirrophores, ca. 160 µm long, with about 6 articles. Ventral cirri all similar, on cirrophores, with about 3 articles, ca. 100 µm long, extending beyond neuropodial lobes.

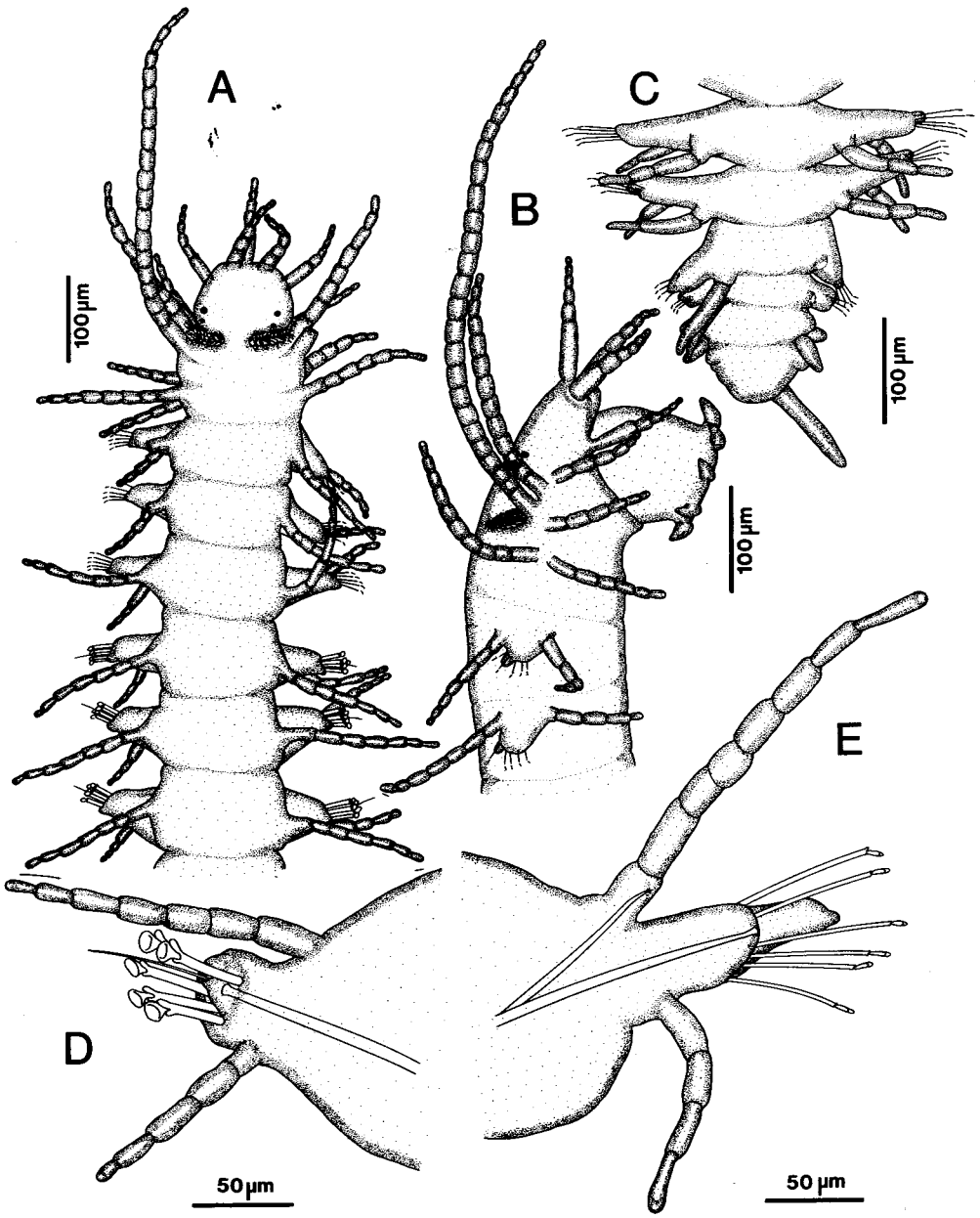

Fig. 1. *Heteropodarke xiamenensis*, new species. A. Anterior end, dorsal view. B. Anterior end, lateral view. C. Posterior end, dorsal view. D. Parapodium of chaetiger 13, anterior view. E. Parapodium of chaetiger 44, anterior view.

Compound chaetae of two types, 4-7, almost always 5 per neuropodium. In chaetiger 1-3 (Fig. 1A) moderately stout falcigers, unusually formed blades with rounded hooded tips, without serrations (Fig. 2G-I); tips of shafts slightly bifid (Fig. 2G, J.).

Conspicuously stout, thick falcigers from chaetiger 4 backwards (Fig. 1A) for a variable number of segments depending on the size of the specimen, to chaetiger 21 on smallest specimen, maximally to chaetiger 31 on largest specimen; with smooth, discoid-shaped blades;

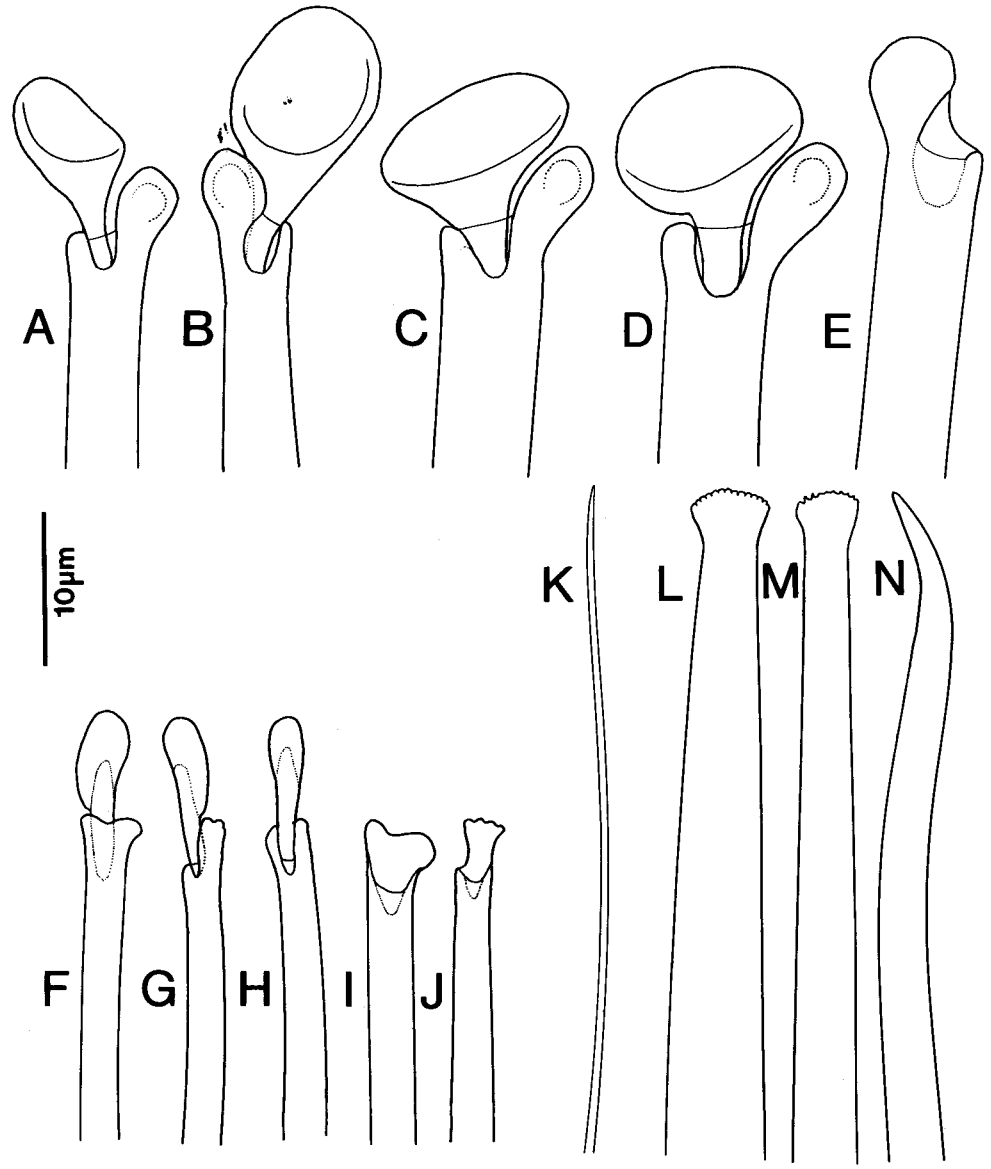

Fig. 2. *Heteropodarke xiamenensis*, new species. A. Compound chaeta, chaetiger 4. B. Compound chaeta, chaetiger 11. C. Compound chaeta, chaetiger 11. D. Compound chaeta, chaetiger 11. E. Tip of shaft of compound chaeta, chaetiger 11. F. Compound chaeta, chaetiger 3. G. Compound chaeta, chaetiger 36. H. Compound chaeta, chaetiger 36. I. Shaft of compound chaeta, chaetiger 1. J. Shaft of compound chaeta, chaetiger 36. K. Capillary chaeta, chaetiger 11. L. Neuroacicula, chaetiger 11. M. Neuroacicula, chaetiger 36. N. Notoacicula, chaetiger 36.

blades on chaetiger 4 (Fig. 2A) smaller than those on following chaetigers (Fig. 2B-E); tips of shafts of very stout compound chaetae with broadly rounded somewhat bilobed tips, with diameter greatest near tips (Fig. 2B-F). One, rarely two, very fine slightly curved capillary chaetae, present in the middle of each parapodium in chaetigers possessing the very stout compound chaetae (Figs. 1A, D, 2K).

Falcigers of middle and posterior part of the body with short moderately stout blades, similar to those on chaetiger 1-3, but with few serrations on the tips (Fig. 2J).

Notoaciculae solitary, slightly curved, with pointed tip; present in the middle and posterior chaetigers, near dorsal cirrophoral base, largest in the posterior segments (Figs. 1E, 2N). Neuroaciculae solitary, very stout in parapodia possessing the very stout falcigers (Fig. 1D, 2M), knobbed, slightly constricted near tip, margin irregularly serrated (Fig. 2L, M).

Eversible tubular muscular pharynx, with 10 soft papillae surrounding anterior margin (Fig. 1B); extending from anterior region of chaetiger 1 to anterior border of chaetiger 28, ca. 2.7 mm long.

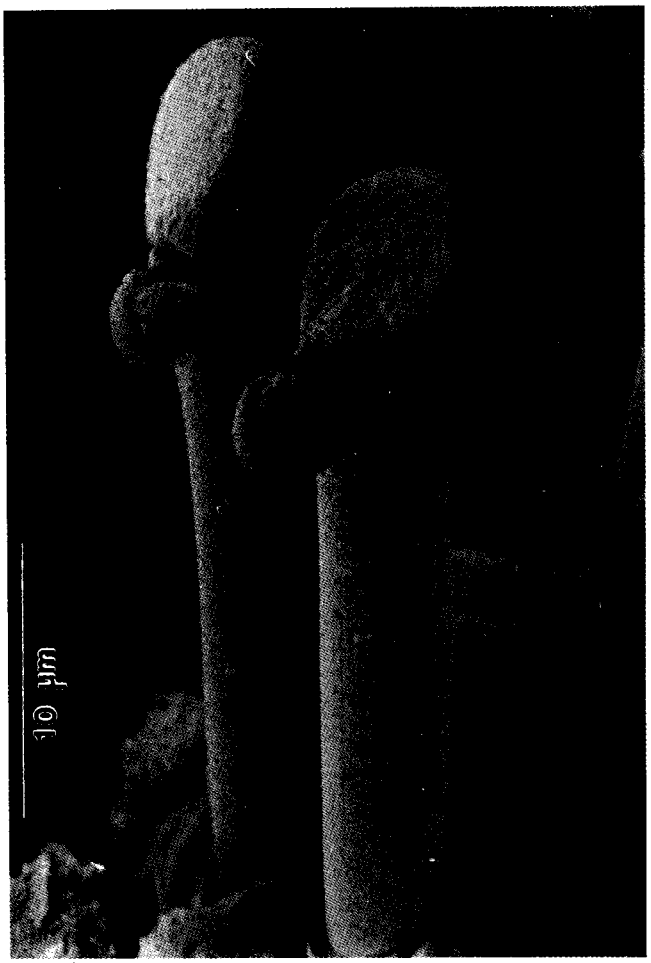

Fig. 3. *Heteropodarke xiamenensis*, new species. SEM-micrograph. Very stout compound chaetae with disc-shaped blades, chaetiger 10.

Two specimens mature with eggs (diameter 50-60 µm) beginning from chaetiger 38.

Etymology. - The new species is named after its type locality near the city of Xiamen.

DISCUSSION

A characteristic of the taxon *Heteropodarke* is that relatively late in development the anterior chaetigers are successively converted to tentacular, cirrus-bearing segments—a process that in other hesionid taxa is completed in the early juvenile stages (Haaland & Schram, 1982, 1983). Hence in most *Heteropodarke* populations even relatively large individuals differ in the number of pairs of tentacular cirri. Only in *H. heteromorpha africana* have specimens with 8 pairs of tentacular cirri been observed (Hartmann-Schröder, 1974); in all other species, including the new one described here, maximally 6 pairs have been found. In view of the fact that two of the present animals were sexually mature, it is assumed that 6 pairs represent the full complement in the new species.

The individuals found on the northern Chinese coast and identified as *H. heteromorpha africana* by Wu & Zhao (1992) also have no more than 6 pairs of tentacular cirri, but they can be clearly distinguished from the present species by their possession of true serrated falcigers in the middle and posterior chaetigers. This character also distinguishes *H. xiamenensis,* new species, from the other species: typical moderately stout falcigerous chaetae are lacking; instead, the short blades of its compound chaetae have unusual, diverse shapes. They appear "hooded", as though they consisted of an inner rodlike and an outer hoodlike structure. Long serrated spinigers also seem to be completely absent in the new species.

It is characteristic of all *Heteropodarke* species that a relatively large number of anterior segments bear enlarged, stout compound chaetae. Heteromorphic chaetation of this sort is also found in other taxa, e.g. certain species of the syllid taxon *Streptosyllis* Webster & Benedict, 1884, that live in the same habitat (Ding & Westheide, 1994); unfortunately, nothing is known about the functional significance of these larger chaetae, whether in *Heteropodarke* or *Streptosyllis*. With the exception of *H. formalis* the shafts and blades of these chaetae are basically similar in all species of *Heteropodarke*, but by size and specific shape they can probably serve to accurately discriminate species. However, these differences are hard to discern in the light microscope, and it is also difficult to reproduce them in three-dimensional drawings, so that for the present their taxonomic value is limited. Once these structures have been adequately represented by SEM, the taxonomic evaluation of the group is likely to be considerably improved and simplified.

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