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PYCNOGONIDA OF THE WESTERN PACIFIC ISLANDS VI. *SERICOSURA COCHLEIFOVEA,* A NEW HYDROTHERMAL VENT SPECIES FROM THE MARIANAS BACK-ARC BASIN

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Abstract.—A new species, *Sericosura cochleifovea,* is described from sixteen specimens taken by the Research Submersible *Alvin* in 3660 m at the hydrothermal Snail Pits Vent, Burke Field, in the Marianas Back-Arc Basin. The new species is compared with the two other known species of this genus and their distribution is discussed. The generic diagnosis is emended to include variation in palp segment numbers from seven to nine.

There are only two reports (Child 1987, Turpaeva 1988) on Pycnogonida taken from deep sea hydrothermal vents. With the increasing efforts expended in finding and investigating new vent fields, it is not surprising that additional pycnogonids have been and will be found. The new species described here was found during the exploration and sampling of recently discovered vent fields west of the Marianas Islands. These vent fields are part of a tectonic spreading zone investigated by scientists from Scripps Institution of Oceanography in April and May, 1987. The biological team of the group investigated three active vent sites along part of the spreading zone. Depths of the three sites varied from 3595 to 3660 m and are characterized by pillow basalts, hydrothermal mounds, vent chimneys, and many vent openings of both active and extinct vents. Fauna is dense in and around the vents with "hairy" snails, brachyuran crabs, bresiliid shrimps, and white anemones as the dominant observable fauna (Hessler et al. 1988).

The team collected a total of 17 specimens of a previously unknown pycnogonid from vent sites in the Snail Pits portion of Burke Field (16) and from the Alice Springs Field (1). Burke Field is dominated by dense aggregations of "hairy" snails that clog the vent openings. The temperature of the emerging water was 4–15°C, and the hot water venting from the openings was crystal clear. Water from Anemone Heaven vents nearby was cloudy. Alice Springs vent water was crystal clear.

Family Ammotheidae

Genus *Sericosura* Fry & Hedgpeth, 1969

Sericosura cochleifovea, new species

Fig. 1

Material examined.—Marianas Back-Arc Basin, Burke Hydrothermal Vent Field, Snail Pits vent site, 18°19.9′N, 144°43.2′E, 3660 m, coll. R/V *Alvin,* Dive 1835, 26 Apr 1987 (one male with eggs, holotype, USNM 234505, one male with eggs, one male juvenile, 4 female juveniles, paratypes, USNM 234506).

Other material: Dive 1835 (two males with eggs, four males, two females, one juvenile), Alice Springs Field, 18°12.6′N, 144°42.4′E, 3640 m, coll. R/V *Alvin,* Dive 1843, 4 May 1987 (one male juvenile).

Description.—Size moderately small, leg span 13.1 mm. Trunk moderately slender, fully segmented, posterior rim of anterior three segments flared out in cowl-shape, without dorsomedian tubercles or setae. Neck short, expanded anteriorly at palp in-

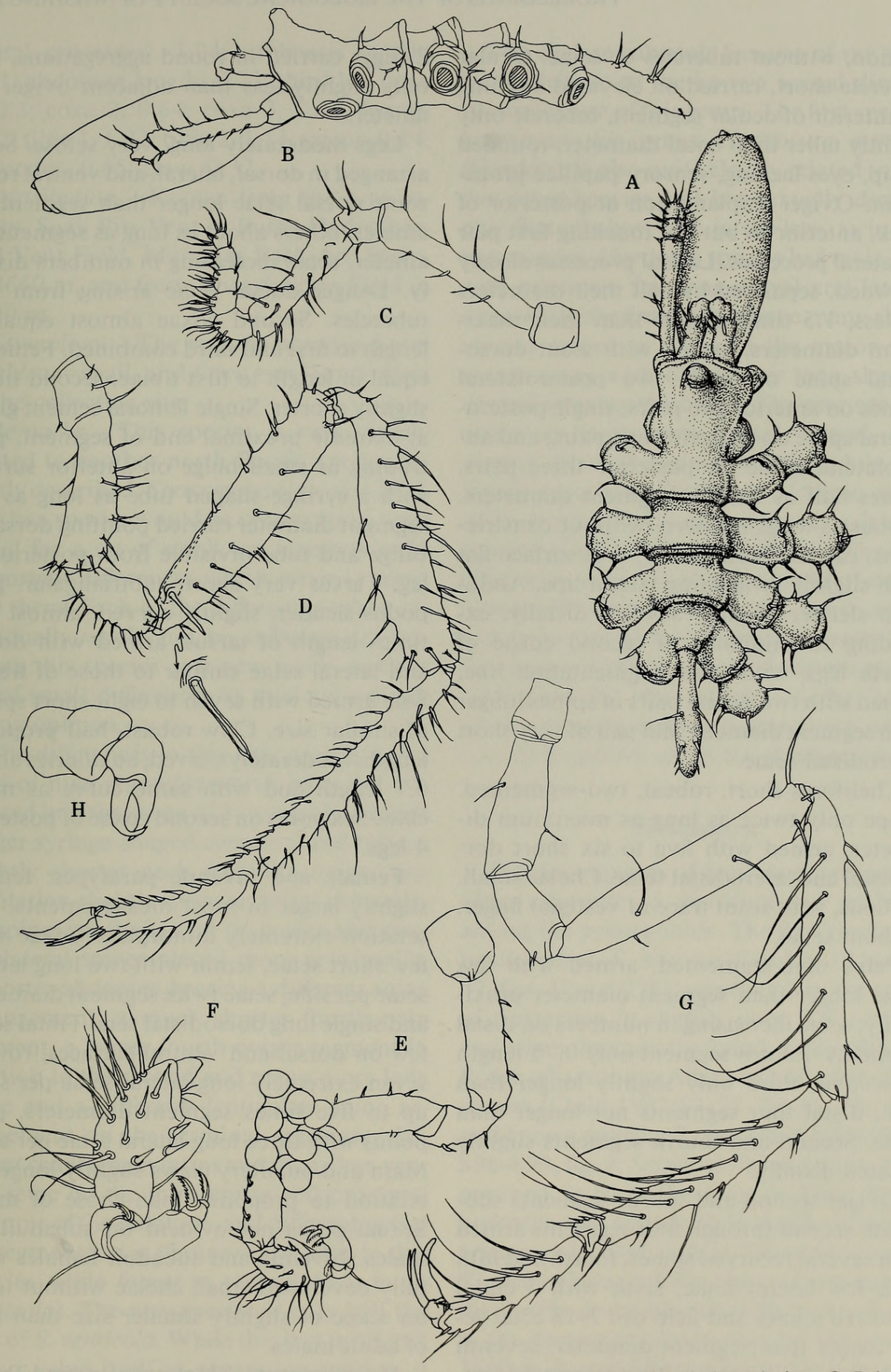

Fig. 1. *Sericosura cochleifovea,* holotype male: A, Trunk, dorsal view; B, Trunk, lateral view; C, Palp; D, Third leg, with cement gland tube enlarged; E, Oviger with several eggs attached; F, Oviger terminal segments, enlarged. Paratype female: G, Third leg. Paratype juvenile: H, Chelifore, enlarged.

sertion, without tubercles or setae. Ocular tubercle short, carried on elevated swelling at anterior of ocular segment, tubercle only slightly taller than basal diameter, rounded at tip, eyes lacking, sensory papillae prominent. Oviger implantation at posterior of neck, anterior to but not touching first pair of lateral processes. Lateral processes closely crowded, separated by half their diameters or less, 1.5 times longer than their maximum diameters, armed with stout dorsodistal spine on each, two posterolateral spines on anterior two pairs, single posterolateral spine on posterior two pairs, and anterolateral spine on posterior three pairs, spines half as long as segment diameters. Proboscis long, massive, without constrictions, carried horizontally, oral surface flat with slightly protruding lateral lips. Abdomen slender, slightly swollen distally, extending to midpoint of second coxae of fourth legs, with basal segmentation line, armed with two dorsal pairs of spines longer than segment diameter and pair of very short laterodistal setae.

Chelifores short, robust, two-segmented. Scape only twice as long as maximum diameter, armed with five to six short dorsodistal and laterodistal setae. Chelae small, bulbous, with scant trace of vestigial finger, without setae.

Palps nine-segmented, armed with few setae longer than segment diameter proximally, setae increasing in numbers on distal segments. Fourth segment only 0.75 length of second, third only slightly longer than fifth, distal four segments not longer than wide. Second and fourth segments slightly inflated distally.

Oviger second and fourth segments subequal, second through fifth segments armed with several recurved spines, fourth and fifth with few lateral setae, sixth with 3 endal recurved spines and field of 17–18 ectal setae longer than segment diameter, seventh with 3–4 similar setae, 8th with single seta. Short, finely serrate denticulate spines on terminal three segments in the formula 1:1:2. Eggs carried in round aggregations, size only slightly less than adjacent oviger diameter.

Legs moderately long, very setose. Setae arranged in dorsal, lateral, and ventral rows, some dorsal setae longer than segment diameter, others about as long as segment diameter, setae increasing in numbers distally. Longer dorsal setae arising from low tubercles. Second coxae almost equal in length to first and third combined. Femorae equal in length to first tibiae, second tibiae slightly shorter. Single femoral cement gland at extreme proximal end of segment, protruding as small bulge on anterior surface with a syringe-shaped tube as long as the segment diameter carried pointing dorsally. Bulge and tube invisible from posterior of leg. Tarsus very short, subtriangular, propodus slender, slightly curved, almost five times length of tarsus, armed with dorsal and lateral setae similar to those of tibiae. Sole armed with seven to eight short spines of similar size. Claw robust, half propodal length, moderately curved, auxiliaries about 0.7 length and with same curve as main claw. Sex pores on second coxae of posterior 4 legs.

Female and juvenile paratypes: female slightly larger in most measurements. Leg setation extremely dimorphic. Coxae with few short setae, femur with two long lateral setae per side, setae twice segment diameter, and single long dorsodistal seta. Tibial setae few on dorsal and ventral surfaces, row of seven extremely long lateral setae per side, up to five times segment diameters, propodus with three long lateral setae per side. Main and auxiliary claws slightly longer in relation to propodus than those of male. Sexual pores not evident on subadult females. Juvenile and subadult females with fully developed small chelae without teeth on scape of slightly smaller size than that of adult males.

Measurements.—Holotype, in mm: Trunk length (chelifore insertion to tip 4th lateral processes), 1.65; trunk width (across 2nd

lateral processes), 1.04; proboscis length, 1.31; abdomen length, 0.72; third leg, coxa 1, 0.3; coxa 2, 0.64; coxa 3, 0.44; femur, 1.22; tibia 1, 1.22; tibia 2, 1.11; tarsus, 0.14; propodus, 0.65; claw, 0.32.

Distribution.—Known from the type locality, Snail Pits Vent in Burke Hydrothermal Vent Field, Marianas Back-Arc Basin, in 3660 m, and from Alice Springs Field in 3640 m.

Etymology.—The specific name is Latin (*cochlea* = snail, and *fovea* = pit) and refers to the collecting site.

Remarks.—This species is very closely related to another north Pacific species recently described, *Sericosura venticola* Child. The two species would be synonymous were it not for a set of small but taxonomically important differences which serve to separate them. Each of the differences taken individually would not be sufficient to designate this species as a new taxon, but the set of small differences in total are enough in my opinion.

The differences in this new species are: a palp of nine segments which have not coalesced into the seven of *S. venticola,* a much longer syringe-shaped cement gland tube, a slightly shorter neck with the oviger implantation slightly more anterior, dorsodistal spines on the lateral processes and posterolateral spines placed more proximally, a shorter abdomen bearing a different spine arrangement, a much shorter fourth palp segment, a longer fourth oviger segment in relation to the second and many more long setae and a different denticulate spine arrangement on the terminal segments, different coxal length ratios and many less ventral setae on the third coxae and proximal femorae of the holotype, and different major leg segment ratios (femur = first tibia in this species while femur = second tibia in *S. venticola*). The new species is only half the size of *S. venticola.* While this fact is of little or no value itself in separating species, it contributes to the suite of differences which determine this new species.

The chelate subadult females of the type lot contribute to the known sexual dimorphism feature of this genus. The first species known in this genus, *Sericosura mitrata* (Gordon), is also quite closely related to the two other species and has sexually dimorphic features best seen in the legs, as in the new species. Gordon's species has male legs with relatively few long dorsal and lateral setae while the female legs have many short ventral spines or setae on the major segments along with many very long slender ventral setae on the tibiae. The new species male legs have many dorsal, lateral, and ventral setae of various lengths while the female legs have far fewer of these setae while having many extremely long lateral setae not found on legs of the male. The legs of *S. venticola* have a ventral field of many moderately long setae on the third coxae and these extend to the proximoventral femur opposite the dorsolateral cement gland. Unfortunately, the female of the latter species remains unknown along with whatever dimorphism exists for this species.

Discussion

The three species of *Sericosura* present an often encountered distributional problem among the pycnogonids. The first species to be described, *S. mitrata* (Gordon 1944:54–57, figs. 19a–e, 22b), was found on the coast of Antarctica in slightly over 200 meters, and was subsequently found on the Walvis Ridge off southern Africa in well over 2000 meters (Child 1982:19–21, fig. 6). The second known species, *S. venticola* Child (1987: 896–899, fig. 2; *Scipiolus thermophilus* Turpaeva=), is from the Juan de Fuca Ridge hydrothermal vent fields in depths of slightly more than 2200 meters. This new species, *S. cochleifovea,* is from the opposite side of the Pacific at the Marianas Back-Arc Basin in the deepest waters known for the genus, 3660 m. It would be convenient to state that the genus is hydrothermal vent-related except that we know nothing about the two

collecting localities for *S. mitrata*. No hydrothermal activity is known for the Walvis Ridge locality but it would be surprising to find hydrothermal vent activity in less than 300 meters of depth off the coast of Antarctica. The three known species are found in widely disparate localities suggesting that the genus is worldwide in distribution but the species undoubtedly are much more restricted, as with almost all pycnogonids, to specific areas and are in most cases associated with zones of tectonic spreading having hydrothermal vent fields.

The other anomaly among the three species is the discovery of this new species bearing nine palp segments. The other two species have seven with the three distal segments now appearing to have coalesced from a larger number, presumably nine. Other genera such as *Achelia, Tanystylum, Ammothea,* and others, have groups of species with palp segments varying in segment numbers, so the feature is not a new discovery except in this genus. The generic diagnosis therefore needs to be revised to include palps having seven or nine segments instead of the previously diagnosed seven.

The genus *Ammothea,* from which this genus presumably split, has palps of eight or nine segments. This seven and nine palp segment character of *Sericosura* places it nearer the diagnosis of *Ammothea*. The only remaining major differences between these genera are the lack of a row of dorsomedian tubercles on the trunk of *Sericosura* species and the shape and placement of the cement glands and tubes. Most of the species of *Ammothea* have conspicuous dorsomedian tubercles on the posterior trunk segment ridges while none of the three *Sericosura* species are known to have these. The cement glands and tubes in *Ammothea,* where known, are placed at the dorsodistal tip, or nearly so, of the femorae and are inconspicuous. The fact that the cement gland and its conspicuous bulge and tube is placed proximally on the anterior of the femorae in *Sericosura* is probably a sufficient reason to maintain the genus as separate from *Ammothea*. The leg setae dimorphism and other lesser characters only reinforce the separation of this genus from the closely related *Ammothea*.

Acknowledgments

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Seven type specimens are deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, under the catalog numbers of the old U.S. National Museum. The other specimens have been returned to the Scripps Institution of Oceanography, deposited in the Los Angeles County Museum, California, the National Museum, Paris, and several added to the non-type collections at the National Museum of Natural History, Washington, D.C.

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