BEAUFORTIA

SERIES OF MISCELLANEOUS PUBLICATIONS

INSTITUTE OF TAXONOMIC ZOOLOGY (ZOOLOGICAL MUSEUM)

UNIVERSITY OF AMSTERDAM

No. 277 Volume 21 October 8, 1973

Pycnogonida from Pantelleria and Catania, Sicily

FRANZ KRAPP

ABSTRACT

The paper reports on two small collections from the island of Pantelleria and the vicinity of Catania, Sicily. The former locality (mostly surface samples) yielded 52 specimens of 9 species in 9 samples, the latter 190 specimens of 14 species in 11 samples. One species of *Nymphon* proved to be new to science; it belongs to an uniunguiculate species group with *N. longicoxa* Hoek, 1881, and *N. prolatum* Fage, 1942, as nearest relatives. The question of *Tanystylum* in the Mediterranean is raised again and it is decided that there are two species, *T. conirostrum* (Dohrn, 1881) and *T. orbiculare* Wilson, 1878, respectively. The male of *Ammothella longioculata* Faraggiana, 1940 is figured for the first time in order to compare it with *A. longipes* (Dohrn, 1881). Precisions about external morphological characters of *Ammothella uniunguiculata* (Dohrn, 1881) are given, whereas *Anoplodactylus angulatus* (Dohrn, 1881) is compared with *A. virescens* (Hodge, 1864).

INTRODUCTION

During September 1970 my wife collected Amphipoda on the Island of Pantelleria and in the vicinity of Catania in eastern Sicily. During this fieldwork, the Pycnogonida were kept apart for the present study. At Pantelleria, 9 out of 22 samples of surface algae contained pycnogonids, at Catania 11 out of 13 samples, but in the latter locality 6 samples were collected below 5 m, at Pantelleria only one. The shallow-water origin of the material, as well as the fact that it was taken exclusively from algae or Potamogetonaceae, implies that forms living predominantly on hard substrate (e.g. *Pycnogonum*), in the mesopsammon (e.g. *Rhynchothorax, Nymphonella*), or on soft and muddy bottoms (e.g. *Paranymphon*) are lacking in the present collection.

LIST OF STATIONS AND SAMPLES

In the following list are given respectively: Field number of the sample, name of the locality, nature of the substrate (names of the principal algae), depth, collecting date (day, month, year) and species encountered.

Received: April 24, 1973

4) Pantelleria, Cuddie Rosse, *Cystoseira brachycarpa*, 12 m, 16.9.1970.
Achelia spec., 3 ♀ ♀.
Tanystylum conirostrum, 3 ♂ ♂ (one ovigerous).
Trygaeus communis, 1 ♂ + 1 ♀.
Callipallene spec., 1 juv.
Callipallene phantoma phantoma, 1 ♂ larvigerous.

5) Pantelleria, Cuddie Rosse, *Cystoseira stricta*, 1 — 1.5 m, 16.9.1970.
Callipallene emaciata spectrum, 1 ♂.
Ammothella uniunguiculata, 2 juv.

7) Pantelleria, port, *Posidonia* + *Zostera*, 1 — 2 m, 17.9.1970.
Ammothella uniunguiculata, 1 subad. (still chelate).

8) Pantelleria, port, *Sargassum*, 1 — 2 m, 17.9.1970.
Callipallene emaciata spectrum, 1 ♂ larvigerous.
Ammothella uniunguiculata, 1 ♂, 1 ♀ + ? 1 juv. (with 4th legs bud-shaped).
Anoplodactylus pygmaeus, 1 ♂ immat.

9) Mixed collection from 2 localities; both Pantelleria: Balata dei Turchi and Punta Caruscie, 12. and 11.9.1970, bryozoans and encrusting Rhodophyta, 5 m.
Anoplodactylus virescens, 2 ♂ ♂.
Tanystylum conirostrum, 1 ♂.

10) Pantelleria, Capo Spadillo, coralline algae, 5 m, 17.9.1970.
Tanystylum conirostrum, 1 ♂.

11) Pantelleria, Punta Scauri, *Cystoseira spinosa*, *Posidonia*, 5 m, 17.9.1970.
Tanystylum conirostrum, 10 ♀ ♀, 2 ♂ ♂.
Callipallene emaciata spectrum, 1 ♀.
Achelia echinata 3 ♂ ♂.
Achelia spec., 4 ♀ ♀.

12) Pantelleria, Punta Scauri, Rhodophyta, 0 — 1 m, 17.9.1970.
Tanystylum conirostrum, 2 ♀ ♀, 1 ♂ ovigerous, 1 specimen lacking legs.

22) Pantelleria, port, rhizomes of *Zostera*, 2 m, 19.9.1970.
Ammothella uniunguiculata, 1 juv.

23) Isola Lachea (islet near Catania), beach directed westward, *Halopteris scoparia*, 1 m, 21.9.1970.
Achelia spec., 3 ♀ ♀.
Achelia echinata, 2 ♂ ♂ (ovigerous).
Callipallene emaciata spectrum, 4 ♀ ♀, 1 ♂, subad. (+ 1 juv.).

24) Isola Lachea, *Dictyopteris*, 1 m, 21.9.1970.
Tanystylum conirostrum, 1 ♂ + 1 subad. (still chelate).
Callipallene emaciata spectrum, 2 subad.
Callipallene phantoma phantoma, 34 ♂ ♂, 37 ♀ ♀, 38 subad. (and probably 10 larvae).
Tanystylum orbiculare, 2 ♂ ♂.

25) Isola Lachea; *Padina*, *Jania*, *Cystoseira*; 2 m, 21.9.1970.
Ammothella uniunguiculata, 1 ♀.
Achelia spec., (1 without legs).
Tanystylum conirostrum, 1 ♀.

26) Isola Lachea, old *Sargassum*, 6 m, 21.9.1970.
Achelia echinata, 2 ♂♂ ovigerous.
27) Isola Lachea, *Posidonia*, 12 m, 21.9.1970.
Achelia echinata, 3 ♂♂.
Achelia spec., 2 ♀♀.
Achelia spec., 1 immat.
Ammothella longioculata, 1 ♂.
28) Isola Lachea, *Posidonia*, 20 m, 22.9.1970.
Achelia echinata, 1 ♂.
Achelia spec., 1 ♀.
30) Capo Molini, near Catania, *Dictyopteris*, *Sargassum*, 25 m, 24.9.1970.
Achelia vulgaris, 1 ♂.
Achelia cf. *vulgaris* (see text), 1 juv. (chelate, ovigers budshaped).
31) Capo Molini, Rhodophyta, 35 m, 24.9.1970.
Achelia echinata, 1 ♂.
Achelia vulgaris, 1 ♂.
Achelia spec., 4 ♀♀.
Achelia spec., 1 juv.
Nymphon puellula nov. spec., 1 ♀.
Anoplodactylus angulatus, 1 ♂.
Callipallene emaciata tiberi, 2 ♀♀ immat.
32) Isola Lachea, beach exposed to the open Mediterranean, old *Sargassum* richly encrusted with epiphytes, 7 m, 22.9.1970.
Achelia echinata, 1 ♂.
Achelia spec., (1 specimen without legs, 1 isolated ♂ leg).
Anoplodactylus pygmaeus, 1 ♀.
Callipallene emaciata spectrum, 1 ♂ (+ probably this species: a six-legged post-larva).
33) Isola Lachea, *Cystoseira spicata*, *Halopteris*, 4 m, 22.9.1970.
Achelia echinata, 1 ♂ ovigerous.
Achelia spec., (2 specimens without legs).
Tanystylum conirostrum, (2 specimens lacking legs + 1 ♀).
Anoplodactylus pygmaeus, 1 ♂ subad. (ovigers budshaped).
Anoplodactylus angulatus, 1 ♂ subad. (ovigers budshaped).
Callipallene emaciata spectrum, 1 ♀.
Callipallene spec., 2 ♀♀ + 1 ♂ + 1 juv. (probably belonging to preceding species, but lacking leg, some six-legged postlarvae).
34) Isola Lachea, beach exposed to the open Mediterranean, old *Sargassum* with rich epiphytic flora, 7 m, 22.9.1970.
Achelia echinata, 1 ♂.
Achelia spec. (aff. *echinata*), 1 ♀.
Anoplodactylus angulatus, 2 ♂♂ (one ovigerous).

To the characteristic of sample 31) may be added that the substrate is a steeply descending rock, shadowy and richly overgrown by various red algae (*Fauchea repens*, *Lomentaria linearis*, *Sebdenia monardiana*, *Callimenia* sp., *Peyssonnelia rubra*, *P. squamaria*, *Valonia utricularis*, *Halopteris filicina*).

ACKNOWLEDGMENTS

My sincerest thanks are due to Prof. Dr. J. H. Stock from the Instituut voor Taxonomische Zoölogie (= Zoölogisch Museum) of the University of Amsterdam. Twice he offered hospitality and facilities in his laboratory and permitted extensive use of his nearly complete bibliographical resources. He also communicated from his vast experience in the field of Pycnogonida, though for all eventual errors in this paper the present author is entirely responsable.

SYSTEMATIC PART

Under the heading of each species the list of material is given, illustrations whenever opportunate, locality lists in the case of rarer species, as well as some taxonomic notes. About half the number of specimens is in the author's own reference collections, the other half is deposited in the Zoölogisch Museum Amsterdam. This material is designated below with ZMA Pa and the corresponding catalogue numbers.

Achelia echinata Hodge, 1864

Material: 4) 3 ♀ ♀ spec.
11) 3 ♂ ♂ (ZMA Pa: 1 ♀ Pa 2002), 4 ♀ ♀ spec.
23) 2 ♂ ♂ (1 ovigerous), 3 ♀ ♀ spec.
25) 1 specimen without legs, cf. *echinata*
26) 2 ovigerous ♂ ♂
27) 3 ♂ ♂, 2 ♀ ♀ spec., 1 immat.: ZMA Pa 2010
28) 1 ♂, 1 ♀ spec.: ZMA Pa 2011
31) 1 ♂ ad., 4 ♀ ♀ spec., 1 juv. (1 ♂: ZMA Pa 2012)
32) 1 ♂, 1 specimen without legs, 1 male leg
33) 1 ♂ ovigerous, 1 specimen without legs
34) 1 ♂ ad. ZMA Pa 2016

As is currently accepted, there are no morphological features separating females of *A. echinata* and *A. vulgaris*, with the possible exception of size. Here, females were assorted to accompanying males of corresponding size. Although Nogueira (in a key, 1967) distinguishes the species on the shape of the proboscis, it is piriform in the two species of this "complex", as exemplified even by Nogueira's own drawings. The present and all other Mediterranean material studied, does not offer clues in the length of the legs for separation of *vulgaris* (= *franciscana* in Nogueira) from *echinata*. Adult males are differentiated by the classical characters, cf. Bouvier (1923) and Stock (e.g. 1968). The problem will be studied in more detail in forthcoming publications.

Achelia vulgaris (Costa, 1861)

Material: 30) 1 ♂, 1 chelate juv.
31) 2 ♂ ♂

The juvenile from sample 30 is recognizable because of its large size: Though chelate and with still imperfectly segmented ovigers it is nearly as large as the accompanying male. The males in sample 31 agree, according to size criteria, much better with *echinata*. *A. vulgaris* is a characteristic species of the sublittoral, but even in the deepest sample (31 : 35 m) it is accompanied by its eulittoral congener.

Ammothella uniunguiculata (Dohrn, 1881). Fig. 1.

Material: Pantelleria
5) 2 subad.
7) 1 subad.
8) 1 ♂: ZMA Pa 2014 (specimen figured)
11) 1 immat. ZMA Pa 2000

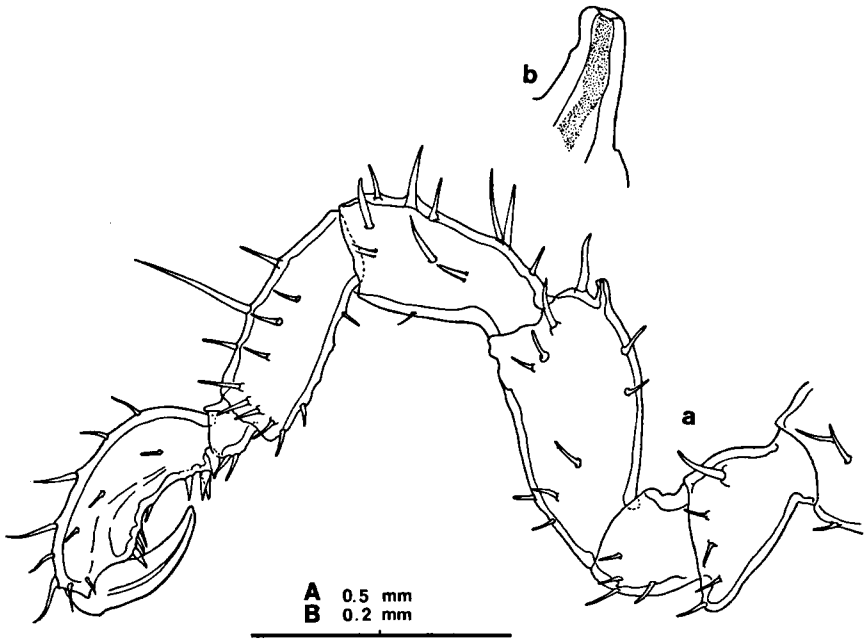

FIG. 1. *Ammothella uniunguiculata* (Dohrn, 1881), ♂ (sample 8) a) Leg 3 to scale A; b) duct of cement gland of same leg to scale B.

It is curious to note that most specimens known of this species are still chelate (in present material 4 out of 5), at least in the Mediterranean. So even Dohrn described the species from still chelate material. This is one of the really rare exceptions in this family where even juveniles are recognizable, but not very young stages (cf. Dohrn, l.c.). As in most species, the ecology is poorly understood; all samples are collected near surface, at least three of them come from ports.

Ammothella longioculata (Farraggiana, 1940). Fig. 2.
Material: 27) 1 ♂

The single specimen found is figured in fig. 2. There remains some doubt about the taxonomic validity of *longioculata*, or the other way round, about its distinctness from *longipes* (Dohrn, 1881). Therefore it was judged opportune to figure this specimen for comparison with Dohrn's excellent drawings. To the best of our knowledge the two species are distinct, although the morphological differences are minor. But in height of eye tubercle, the fully adult material studied shows no intermediates.

Genus *Tanystylum* Miers, 1879

Whereas most taxonomic difficulties during the identification process of Mediterranean Pycnogonida are due to the fact some forms are incompletely known, the situation of the genus *Tanystylum* in the Mediterranean is totally different. Forms of this genus are widely distributed, abundant, and living near surface on algae and on the "trottoirs" (= tidal flat overgrown by calcareous algae), so they are easily collected in great numbers. But confusion seems to have reigned from the very beginning of scientific history: One of the species in European waters, *orbiculare*, to be discussed later on, was assigned by its author, Wilson, to the "newly erected" genus *Tanystylum* of Miers. But unfortunately Wilson's species appeared in print 1878 (to judge from the reprint in Prof. Stock's library), whereas Miers' formal description appeared only 1879. De Haro drew the formally admissible conclusion to make Wilson the author of *Tanystylum*. But I fear this question must await a total revision of the genus *Tanystylum* in order to generate a "first revising author". Historically Dohrn (1881) was the next in studying European material of the genus. Though he was aware of Wilson's new species (as testified by his footnote on p. 161) he created a new genus and species, *Clotenia conirostris*, awaiting more material for comparison. Carpenter (1895) reported this species from the western coast of Ireland (Bundoran), justly referring it to the genus *Tanystylum* (as he did, by the way, for Hoek's *Discoarachne brevipes*). Later on, Norman (1908) synonymized *Clotenia* with *Tanystylum*, as well as *C. conirostre* Dohrn with *Tanystylum orbiculare* Wilson. Now, the first procedure is fully justified, the second is not, as I hope to be able to demonstrate. Early authors uncritically followed Norman's view, except Marcus (1940), who admitted *conirostre* to be valid. Marcus' point of view was partially caused by a curious fact, recognized only by Stock (1951) and substantiated later (1966) for another species, *Trygaeus communis*: Some ammotheids show a considerable variation in the number of palp segments, or more correctly expressed, the reduction of palp segments is more or less advanced intraspecifically. But Marcus believed the palp segmentation to be a very reliable and stable character, so he was induced to call Dohrn's figures, which show palps with 4 or 5 articles "ambiguos". Stock (1951) in the beginning lumped the two forms under the heading *orbiculare*, but later (1958) recognized some differentiating characters. Meanwhile, Bacescu (1953) applied Dohrn's name *conirostre* to Black Sea material.

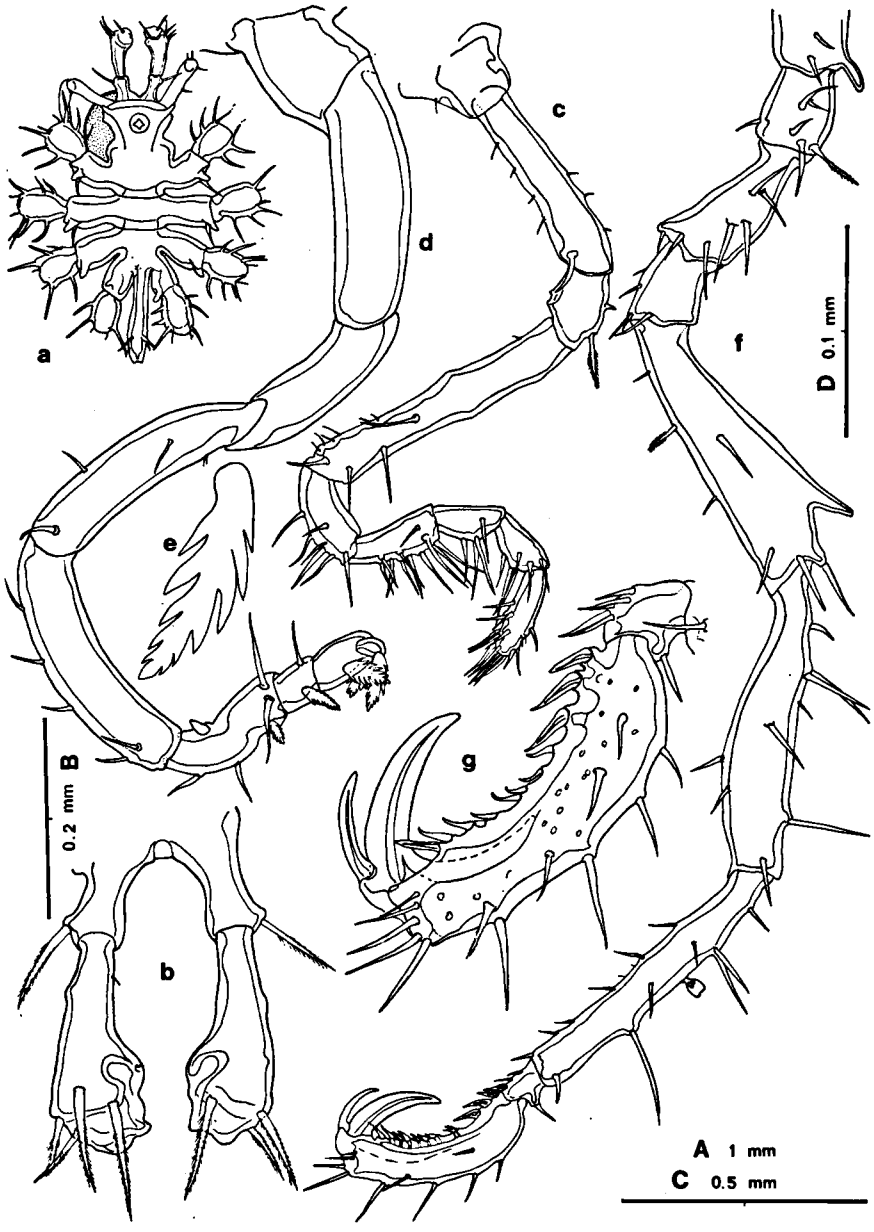

FIG. 2. *Ammothella longioculata* (Faraggiana, 1940), ♂ (sample 27) a) Trunk viewed dorsally, proboscis dotted and tucked under trunk; b) chelifores; c) palpus; d) oviger; e) special spine from segment 10 of same; f) right leg 3; g) last two segments of 1st leg. To scale A: fig. a; to scale B: figs. b, c, d and g; to scale C: fig. f; to scale D: fig. e.

Nogueira (1956, 1967) anew alighted the discussion giving a new key, new descriptions and figures based on Portuguese material of two forms, which she called *conirostre* and *orbiculare*. Regrettably, figures and descriptions contain some obvious imprecisions which forced a new analysis. So, she stated *orbiculare* to have a nearly conical proboscis, *conirostre* to have a nearly cylindrical one. Her figures do substantiate this.

Our material of typical *conirostre* (compare our fig. 3 a, b with Dohrn's plates VIII and IX) clearly demonstrates the specific epithet chosen by Dohrn to be fully justified. *T. orbiculare* on the other hand shows a sausage-shaped, or in Nogueira's terminology, subcylindric ("subcilindrica") outline (fig. 4 a, b). The spinulation of lateral processes is, even under the compound microscope, but certainly under the dissecting microscope, little reliable. The present author is under the impression that at least a part of specimens lack spines, as illustrated in our fig. 3, either being rubbed off or — less likely — never present. The other characters in Nogueira's key appear to be correctly observed, especially the implantation and direction of the abdomen, less so the position of the rudimentary cheliphores. Normally, these structures must be studied under rather high power of a compound microscope, sometimes they are even completely hidden under the fold of the rostral margin of the cephalon, so they do not form a good distinction. The same is true of chaetotaxy on cheliphore stumps. — A nearly complete review of the complicate taxonomic history of the two forms is to be found in Nogueira's last work (1967), with the remarks made above to be added.

List of material of other localities seen in the Zoölogisch Museum Amsterdam.

ZMA Pa 1879: Florida, Dade Co., Miami, Key Biscayne, Bear Cut Bridge, 2 m, 15.7.1966 3 specimens *orbiculare*

ZMA Pa 1078: Woods Hole, Massachusetts, 26.8.1886, 4 ♀ ♀, 4 ♂ ♂ (3 ovigerous) *orbiculare* 6 articles in palp

ZMA Pa 1800: U.S.A., Newport River, Beaufort, N. Carolina ± 5 m, 1.9. 1963, 1 ♀ *orbiculare*

ZMA Pa 1154: St. Barts, S. of Public, near Gustavia (Hummelinck Sta. 1121) 1 juv. chelate, 4.6.1949 *orbiculare*

ZMA Pa 1155: St. Martin, Simson Bay Lagoon, (Hummelinck Stat. 1130) 27.5.1949, 1 juv. chelate *conirostrum*

ZMA Pa 1156: Venezuela, La Pecha, Los Frailes (Hummelinck Stat. 1215) 19.6.1936, depth 1 — 2 m, 3 ♂ ♂ ovigerous, 2 ♀ ♀, 1 juv. *orbiculare*

ZMA Pa 1618 a: Argentine, Mar del Plata, Feb.-March 1964 1 ♂ *orbiculare*

ZMA Pa 1576: Israel, Mikhmoret, up to 1 m depth, Aug.-Oct. 1960 1 ♂ *orbiculare*

ZMA Pa 1577: Israel, Mikhmoret, (date?) 1 ♀ *orbiculare*

In short, this table shows the presence of *conirostrum* on the west coast of the Atlantic, as well as of *orbiculare* in the (eastern) Mediterranean (cf. Stock 1958)

Tanystylum conirostrum (Dohrn, 1881). Fig. 3.

Material: Pantelleria (17 specimens)
4) 3 ♂♂ ovigerous
9) 1 ♂
10) 1 ♂
11) 10 ♀♀, 2 ♂♂: ZMA Pa 2003
12) 1 ♂ ovigerous, 2 ♀♀, 1 specimen lacking legs

Catania (6 specimens)
24) 1 ♂ + 1 juv. (chelate)
25) 1 ♀
33) 3 specimens, 1 of them without legs

The most convincing feature, and at the same time the most unsuspected one, was the presence of only nine articles in the female oviger in this species (cf. fig. 3 f). This was neither mentioned nor figured by Dohrn and is a character shared only with one species in the genus, viz. *T. geminum* Stock, 1954, as far as known. There are 38 species of *Tanystylum*, but not for all of them complete descriptions and figures are available; this applies to Hilton's species in particular. Even a casual look on the drawings in figs. 3 and 4 reveals numerous differences: All appendages are more slender in *conirostrum*, shorter and robust in *orbiculare*. At first, I must confess, I mistook all my *orbiculare* specimens for juveniles, because of their short and broad legs. But they are adult as is convincingly demonstrated by the functional genital pores on the 2nd coxae of male and female legs (fig. 4 c, d). Another character discernable under stereoscopic magnifications are the propodal soles: In *conirostrum* spines are of equal size and evenly distributed, in *orbiculare* they are of different size (i.e. shortest in the middle of sole, longest near claw and of intermediate size near the propodal heel), and even more important, the spines are unevenly distributed. The bosses on the dorsal surface of legs are more pronounced in our *conirostrum* specimens, but whether this is a reliable character must be investigated, anyway it applies well to Mediterranean material. Nogueira's drawings seem to show the inverse for Portuguese, Atlantic material.

A striking feature of her drawings must be noted: On plate XV she represents a male specimen, fig. c refers to an "ovifero", fig. d to an "ovifero de um ♂". This, apparently is a lapsus. Fig. c clearly depicts a male oviger, to judge from its being twice bent and more heavily spinose than in that represented in fig. d, which contrary to the indication is a female oviger. Maybe the printer simply inverted sex symbols, as the main heading indicated a male. However, figure d shows an appendage bent only once and possessing 10 articles. More important even is plate XVI: Here a male specimen is figured as well, but figure c shows an oviger bent only once, which is moreover sparsely spinose, so corresponding to f in our figures 3 and 4, repre-

senting female ovigers. The point is not an eventual confusion of the sexes, but the position of the ovigeral "knee": Normally it is situated between 4th and 5th article. Here it seems to be between 5th and 6th! The explanation is that Nogueira seems to have mistaken the insertion of the oviger for the first segment; so the "knee" is at its conventional place, between article 4 and 5, and after 5 there are only four little articles more, what brings total number of articles to 9, just as in our fig. 3 f!

Tanystylum orbiculare Wilson, 1878. Fig. 4.

Material: Catania 24) 2 ♂ ♂

As may easily be deduced from the list of material, this species is much rarer, but not only in our little collection, in other localities of the Mediterranean, too. The drawings in this work were completed on the hand of material, especially female specimens, from the gulf of Naples (own material) and from Dr. Stock's collection, ZMA Pa 1879. Since all distinguishing features were listed above, some common traits may be listed: Both species known from the Mediterranean possess normally 4 palp articles, 5 are very rare, 6 are a bit less rare. Material from Florida and the West Indies possesses normally six articles; so probably this character shows a clinal geographic variation. Central and South American material (of both species?) has more palp articles, see for instance Marcus (1940). Without doubt (see list of comparative material) *conirostrum* occurs on the other side of the Atlantic, but there *orbiculare* is the more common species.

Trygaeus communis Dohrn, 1881

Material: Pantelleria 4) 1 ♂, 1 ♀

Banal, polymorphous species (cf. Stock 1966). Seems to prefer quiet waters, so lacking or rare at the rather exposed stations considered here.

Nymphon puellula nova species. Fig. 5.

Material: Catania 31) 1 adult ♀ (holotype ZMA Pa 2001)

Trunk and neck moderately slender, body segments fully separated by segmental lines. Lateral processes separated by nearly 1½ times their own diameter. Neck slender, provided in its distal third with an obvious swelling being the origin of ovigers, which is distinctly separated from the first lateral processes. Ocular tubercle high, clubshaped and mucronated, bearing 4 distinct eyes. Abdomen attaining second coxa of leg 4. Cephalon and body nearly glabrous.

Proboscis slender, nearly cylindrical, slightly increasing in diameter beyond the middle.

Cheliphore with a long scape increasing distad in diameter, with spiny setae. Chela only slightly longer than the scape, bearing slender setae. Im-

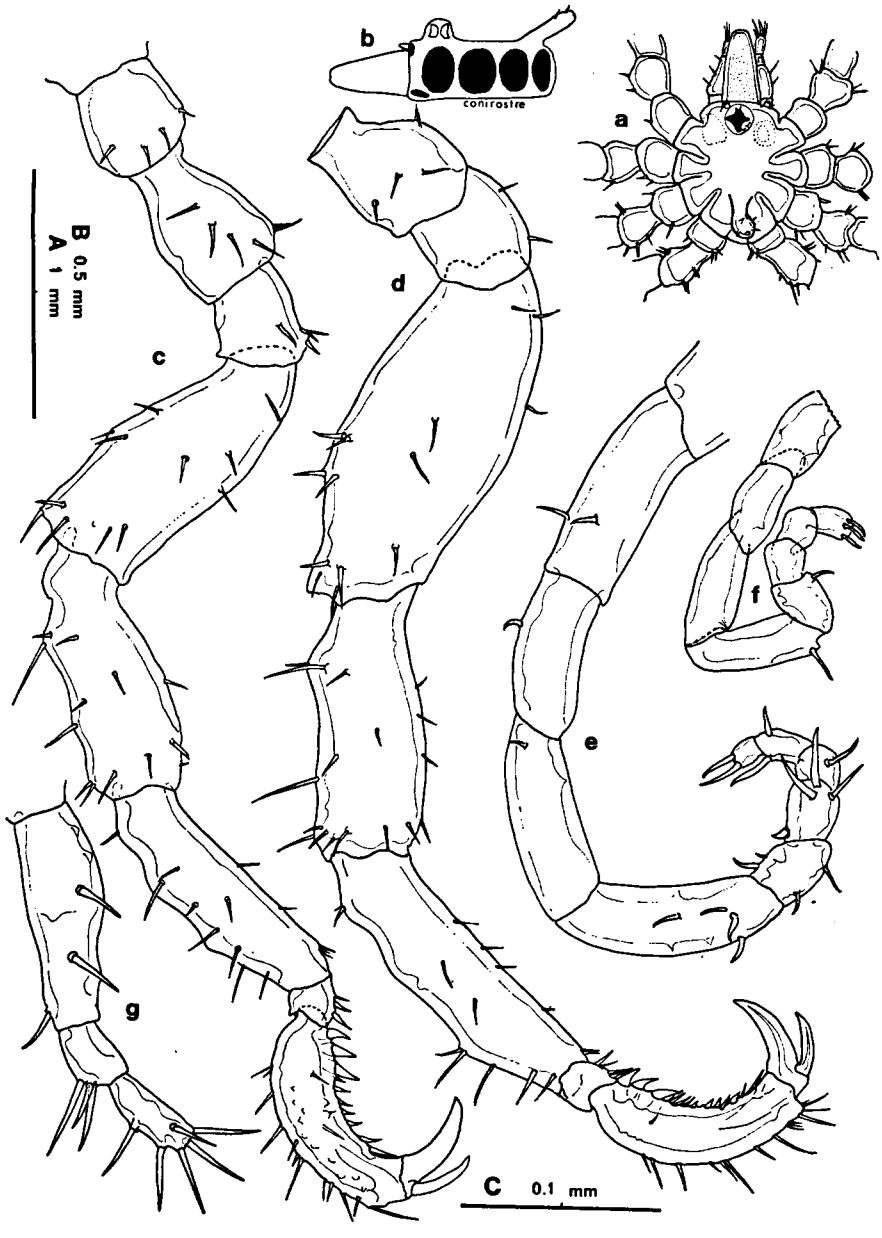

FIG. 3. *Tanystylum conirostrum* (Dohrn, 1881) from samples 4, 9, 10 and 24 and Ischia. a) Trunk, viewed dorsally (♂); b) diagrammatic side view showing outline of proboscis, origin of abdomen, as well as normal number of spines on abdomen; c) leg 3 of ♂; d) leg 3 of ♀; e) oviger of ♂; f) oviger of ♀; g) palp of ♂. To scale A: figs. a and b; to scale B: figs. c and d; to scale C: figs. e, f and g.

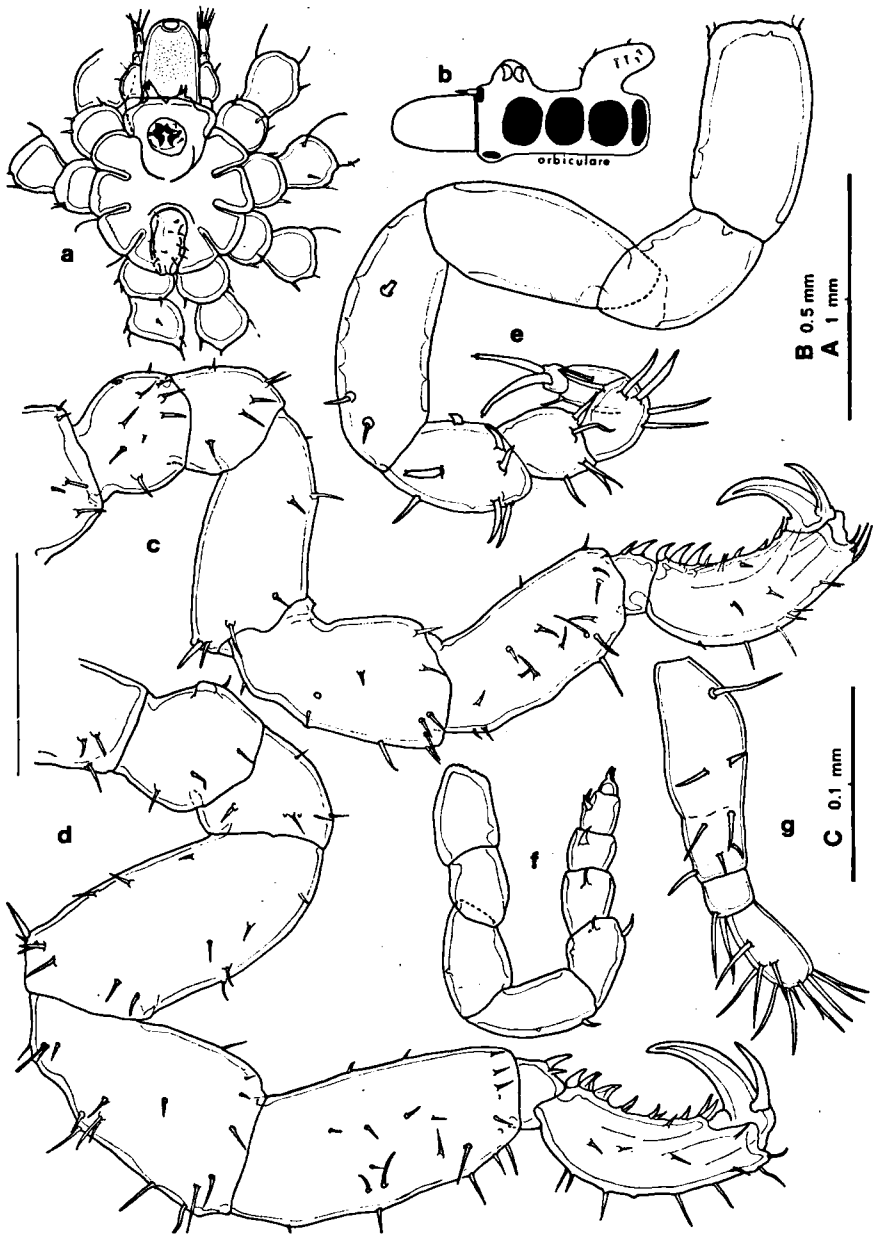

FIG. 4. *Tanystylum orbiculare* Wilson, 1878 from sample 24 and ZMA Pa 1879. a) Trunk viewed dorsally (♀), b) diagrammatic side view showing outline of proboscis, origin of abdomen as well as normal number of spines on abdomen; c) leg 3 of ♂; d) leg 3 of ♀; e) oviger of ♂; f) oviger of ♀; g) palp of ♂. To scale A: figs. a and b; to scale B: figs. c and d; to scale C: figs. e, f, and g.

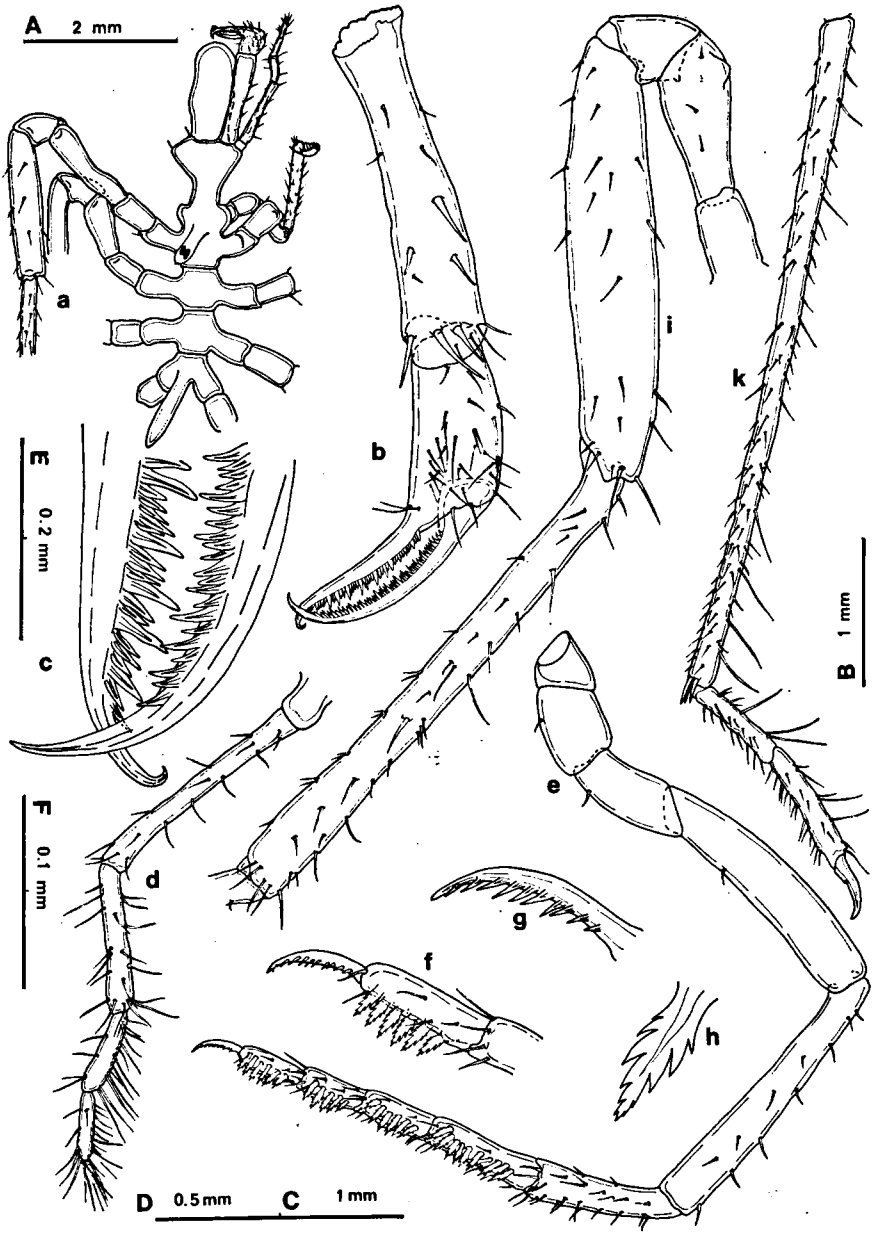

FIG. 5. *Nymphon puellula* spec. nov., ♀, sample 31, holotype ZMA Pa 2001. a) Trunk viewed dorsally; b) chelifore (note joint of scape with palm is inclined 90° in life, cf. a); c) detail of terminal part of cheliphore; d) palp; e) oviger; f) last oviger article and claw; g) oviger claw bearing ten spines; h) compound spine on last oviger segment; i) leg 3: coxae to tibia 1; k) leg 3: tibia 2 to terminal claw. To scale A: fig. a; to scale B: figs. i and k; to scale C: figs. b, d, e; to scale D: fig. f; to scale E: figs. c and g; to scale F: fig. h.

movable finger with 48 spines, 13 of them being taller; movable one with 55, 21 of them being appreciably longer. Extremities of both fingers crossing, immovable finger slightly recurved, similar to the situation in *N. longicoxa*, though not so extreme; and differing from *N. prolatum*, whose fingers terminate in a regular curve. Palp with slender, long segment 2, segments 4 + 5 nearly equal in length to segment 3, segment 4 the longer one (see tabel 1). Palp covered with numerous long setae, especially on segments 4 and 5.

TABLE 1: Measurements of *Nymphon puellula*, holotype, in mm.

Total length (tip of proboscis to insertion of abdomen)	4.42	tibia 1	3.60
proboscis (in dorsal view, extremity to insertion)	1.27	tibia 2	4.60
Trunk segment 1	1.65	tarsus	0.68
„ segment 2	0.54	propodus	0.84
„ segment 3	0.54	claw	0.44
„ segment 4	0.34	Palp article 1	0.21
abdomen	1.17	„ article 2	1.18
Leg 3:		„ article 3	0.75
coxa 1	0.50	„ article 4	0.46
coxa 2	1.08	„ article 5	0.34
coxa 3	0.62	Cheliphore scape	1.66
femur	3.00	„ chela	1.71
		„ movable finger	1.16

Oviger of normal aspect, segment 5 being the longest, segment 4 next longest. Compound spine formula 10 : 6 : 6 : 6, spines rather complicated, bearing 5—7 denticulations on each margin, the middle in the series being the largest. Claw long and slender with 10 teeth.

Legs very long and slender, coxae 1 + 3 as long as coxa 2, coxa 1 measuring only slightly less than ⅔ of coxa 3. Femur moderately swollen, eggs perceptible. Tibia 2 the longest segment. Tarsus about ¾ as long as the propodus, claw about ½ as long as the propodus. Of the coxae only second with some sparse setae, from the femur distad the setae are increasing in length and density. Tarsal and propodal soles nearly straight, spines little differentiated from those on other surfaces, numbering 8 on the tarsus and 14 on the propodus. Terminal claw as long as the propodus. Auxiliary claw lacking.

Remarks: In Stock's (1965) review of the uni-unguiculate forms, this species keys out with *Nymphon longicoxa* Hoek, 1881 and *N. prolatum* Fage, 1942. From the former, an antarctic deep-sea species, it is obviously well distinguished, whereas the new species is somewhat more closely related to the latter. *N. prolatum* was described from a single male specimen from West Africa and found only once afterwards (Stock, 1967), likewise in a single male. It is highly improbable, even when more material was available, that our sicilian specimen should prove to be the unknown female of *prolatum*. In this case the variability would be greater than expected. At the best present knowledge the Mediterranean form seems to differ from *prolatum* by the following characters: Different (higher) spinal formula on oviger and

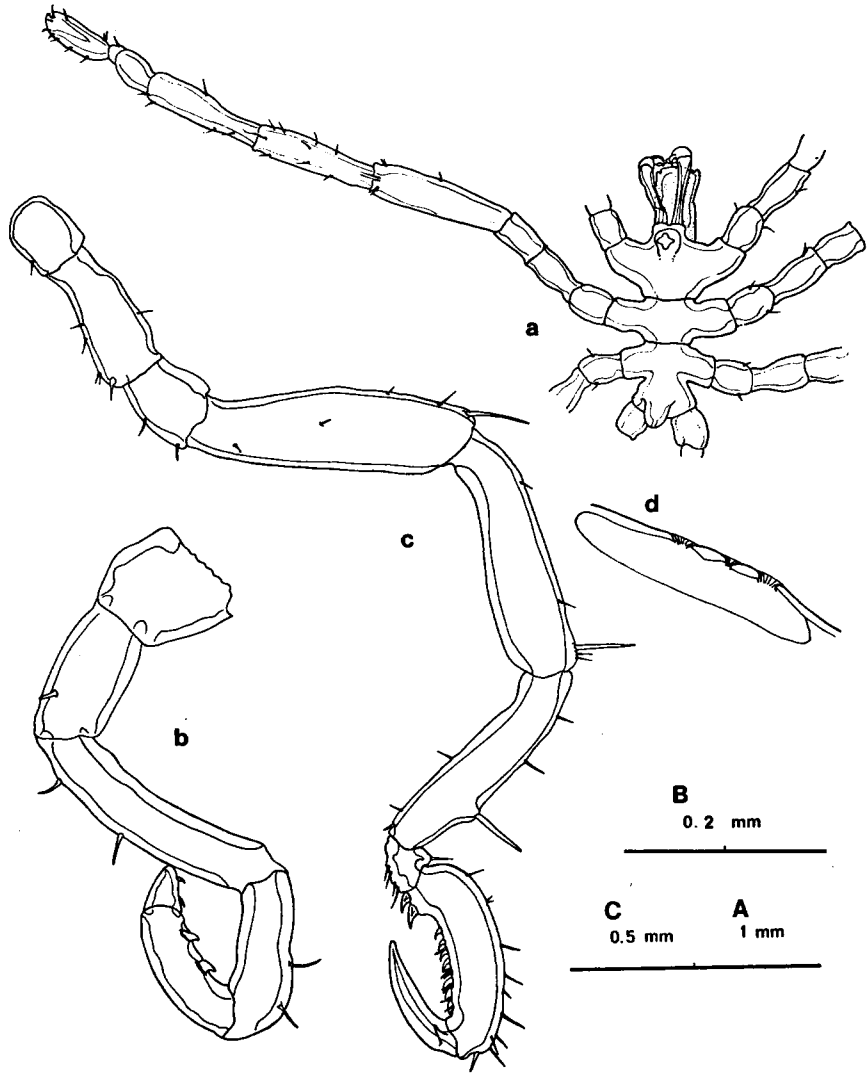

FIG. 6. *Anoplodactylus angulatus* (Dohrn, 1881), ♂ sample 34: a) Trunk viewed dorsally; left leg 2 to show relative leg length, proboscis dotted showing angular ventrolateral excrescences; b) oviger; c) leg 3; d) pores of cement gland of leg 3. To scale A: fig. a; to scale B: figs b and d; to scale C: fig. c.

chela, different relative lengths in palp segments $\left(\frac{5+4}{3}\right)$, relatively (and absolutely) longer second tibia, as well as different ratio claw/propodus. As demonstrated by fig. 5 a, the trunk is much less slender than in *prolatum*, with a less tall eyetubercle, shorter lateral processes and abdomen. Therefore it seems to be sufficiently warranted to found a new species on the single female known.

Etymologie: Scientifically spoken, the specific epithet refers to the type being a young female with ova still ripening. Furthermore I have my own private reasons to dedicate this species to a young human female, who is aware of meriting it.

Anoplodactylus virescens (Hodge, 1864). Fig. 7.

Material: Pantelleria 9) 2♂ ♀ (one ZMA Pa 2005)

Faraggiana (1940), recording a male specimen of *virescens* from Levanto, was originally of a certain tendency to unite *A. virescens* with *A. angulatus*, referring to a drawing of Hoek (1881) showing an angular outline to the proboscis of *A. virescens*. Lebour (1945) did not recognize this to be a misidentification and gave a key with both proboscis forms as possible. Bourdillon was the first to attribute clearly all *Anoplodactylus* species known to him from the Mediterranean to three groups, clearly isolating *virescens* from the better known *angulatus*. Afterwards, De Haro (1967) repeated Hoek's error: his fig. 3 (loc. cit.) does not depict *virescens*, but probably *angulatus*. His highly schematical figures 3 and 4 fail to show appreciable differences, a variation of 7—10 spines on propodal sole, with only 1 ♂ and 1 ♀ "*virescens*" and 1 ♀ "*angulatus*" involved, is by no means statistically sound. If De Haro's 3 specimens should belong to two different species, these may be *robustus* and *angulatus* as far as we can judge from his fig. 3. *A. robustus*, anyway, is easily recognized by its 1st coxae having distinct distal angles in all legs, cf. Dohrn's pl. XII figs. 13-14. In order to aid in clarifying the pending problem, drawings of male specimens (figs. 6 and 7) of both species are given, as is a list of Mediterranean localities of *virescens*. Salient characters which permit to differentiate the two species are: Habitus, proboscis (angulate projections at ventrolateral edges in *angulatus*, sausage-shaped outline in *virescens*), dimensions and slenderness of legs, and above all the number of oviger articles (6 in *angulatus*, only 5 in *virescens*). The last mentioned species possesses only one robust recurved spine on last article; *angulatus* bears two such spines on 5th segment and two much more slender ones on segment 6. Incidentally, it may be mentioned that our *virescens* bears 9, our *angulatus* only 7 spines on the propodal soles, respectively.

List of Mediterranean localities:

Bouvier (1923 a), 120 : Sète, dans le vieux port, 1 ex. ("observation un peu douteuse")
Faraggiana (1940), 150—151: Levanto, 1 ♂
Bourdillon (1952), entirely, as in Bourdillon, 1954
Bourdillon (1954); 150: Marseille, "commun sur des *Coryne*" (Calanque de Sourmiou)
Soyer (1966), 3: "Environs de Sori", 1 ♂
de Haro (1966) 663: Blanes, Gerona, on *Posidonia oceanica*, 4—15 m, 2 ex.

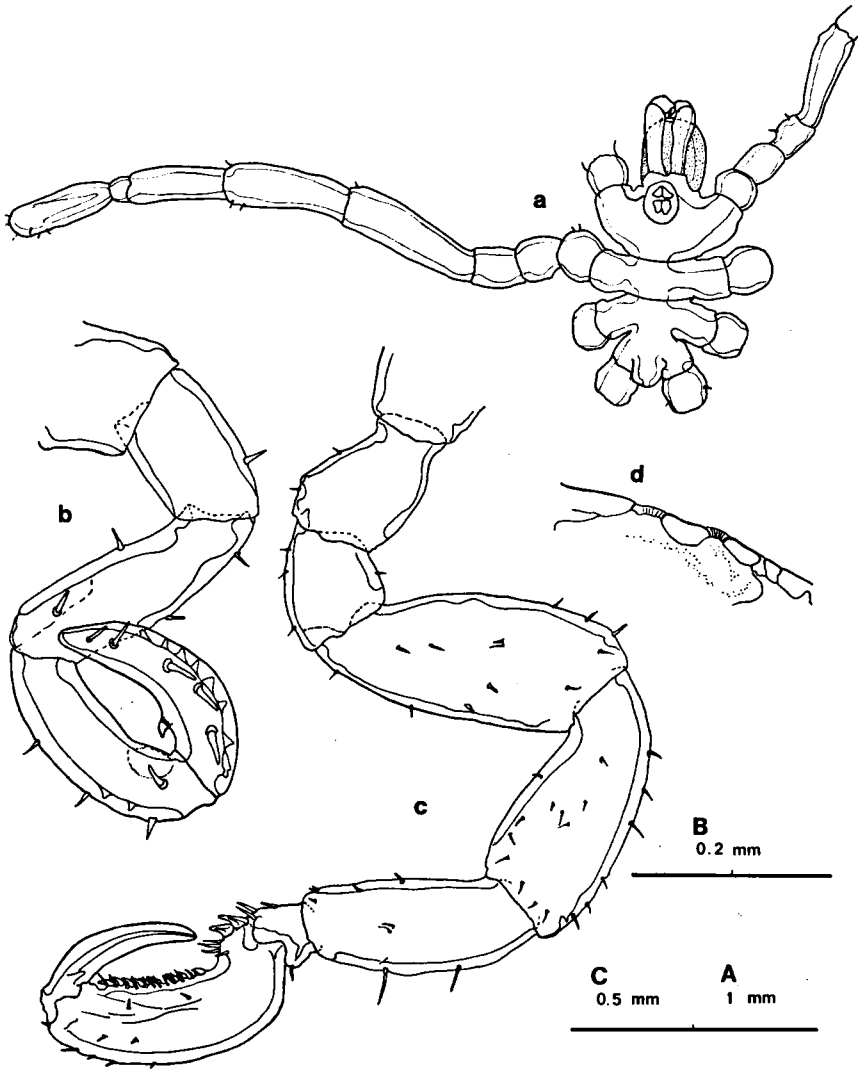

FIG. 7. *Anoplodactylus virescens* (Hodge, 1864), ♂ sample 9: a) Trunk viewed dorsally, left leg 2 showing relative leg length; proboscis dotted, showing rounded outline; b) oviger; c) leg 3; d) pores of cement gland on femur of leg 3. To scale A: fig. a; to scale B: figs. b and d; to scale C: fig. c.

de Haro (1967 a): 302, la Falconera, the same specimens as in his 1966 paper
de Haro (1967 b), 107, 109—111 (figs. 3—4): la Falconera, the same specimens as in his 1966 paper
Stock (1968), 29: Grotte de Béar (Banyuls), 1 ex. on littoral algae
Bellan-Santini (1969): 290; région de Marseille.

Anoplodactylus angulatus (Dohrn, 1881). Fig. 6

Material Catania (4 specimens)
31) 1 ♂
33) 1 ♂ subadult (ovigers bud-shaped) ZMA Pa 2015
34) 1 ♂ ovigerous, 1 ♂ (this ZMA Pa 2016)

For a systematic discussion, see preceding species.

Anoplodactylus petiolatus (Krøyer, 1844)

Material Catania:
27) 1 ♂, 1 ♀

Common, sublittoral species, having, in comparison to *A. pygmaeus*, the same type of ecological distribution as *Achelia vulgaris* in comparison to *A. echinata*.

Anoplodactylus pygmaeus (Hodge, 1864)

Material: 8) 1 ♂ immat. (ovigers bud-shaped) ZMA Pa 2009
Catania:
32) 1 ♀
33) 1 ♂ subad. (ovigers mere buds)

Common species living near surface.

Endeis spinosa (Montagu, 1808)

Material Pantelleria 4) 1 ♂

One of the two common species in the Mediterranean. This specimen has 17 cement gland pores on the left and right 3rd femora and conforms to the distinguishing criteria given by Stock & Soyer (1966), Soyer (1966), and Stock (1968).

Genus *Callipallene* Flynn, 1929

The European forms of this genus were revised in 1952 by Stock. He united 7 forms in 3 species, as he believed then some of the forms to be vertical races. Meanwhile it is realized all seven forms should be raised to specific rank, representing 3 species groups. Provisionally, awaiting a revision of the whole family Callipallenidae, Stock's nomenclature is retained in the form he gave it last time in 1968, although under the explicit limitation that the trinomina do not refer to subspecies.

Callipallene emaciata (Dohrn, 1881) **spectrum** (Dohrn, 1881)

Material Pantelleria: 5) 1 ♂ ZMA Pa 2006
8) 1 ♂ larvigerous, 1 ♀, ? 1 juv.
11) 1 ♀ ZMA Pa 2007
Material Catania: 23) 4 ♀ ♀, 1 ♂, 1 subad. (? 1 juv.) ZMA Pa 2008
24) 2 subad.
25) 1 specimen

Callipallene emaciata (Dohrn, 1881) **tiberi** (Dohrn, 1881)

Material Catania 31) 2 juv.

The specimens are easily identified by the marked angulosity of their rostrums, among other characters.

Callipallene phantoma phantoma (Dohrn, 1881)

Material Pantelleria 4) 1 ♂ larvigerous, (5 larvae on left, 6 on right oviger)
1 ♂ ad., 1 ♀, 1 subad., 1 ♂ ovigerous
Catania 24) 109 specimens (and probably referable to this species: 10 post-larvae): 34 ♂ ♂, 37 ♀ ♀, 38 subad. ZMA Pa 2004.

This is only one example of a series demonstrating that Pantopoda are not always found in small numbers. Certainly this is not a mating community, as there are 38 subadults in the sample. Unfortunately the big number had the disadvantage the specimens were treated a bit roughly when trying to disentangle them when sorting the sample. As a result, nearly two thirds had the legs torn or broken off.

REFERENCES

BACESCU, M.
1953 Contribuiti la cunoasterea picnogonidelor marii negre. — Bull. Sti. Sect. Sti. Biol. Agron. Geol. Geogr., **5** (2) : 263—270.

BELLAN-SANTINI, DENISE
1969 Contribution à l'étude des peuplements infralittoraux sur substrats rocheux (Etude qualitative et quantitative de la frange supérieure). — Rec. Trav. Stat. marine Endoume, **63** (Bull. 47) : 1—294.

BOURDILLON, A.
1952 Note préliminaire sur diverses réactions parasitaires d'un hydroide aux larves de Pycnogonides. — Rec. Trav. Stat. marine Endoume, **6** : 19—26, pls. 2—3.
1954 Les Pycnogonides de Marseille et ses environs. — Rec. Trav. Stat. marine Endoume, **12** : 145—158.

BOUVIER, E. L.
1923a Quelques notes sur les Pycnogonides des côtes de France. — Ann. Sci. nat., (Bot. Zool.) (10) **6** : 117—124.
1923b Pycnogonides. — Faune de France, **7** : 1—71.

CARPENTER, G. H.
1895 A new British pantopod, Tanystylum conirostre (Dohrn). — Irish Natural. 1895 : 297—302, pl. 6.

DOHRN, A.
1881 Die Pantopoden des Golfes von Neapel und der angrenzenden Meeresabschnitte. — Fauna und Flora des Golfes von Neapel und der angrenzenden Meeresabschnitte, **3** : 1—252, 18 pls.

FAGE, L.
1942 Pycnogonides de la côte occidentale de l'Afrique. — Arch. Zool. Expér. Génér., **82** : 75—90.
1956 Les Pycnogonides du genre Nymphon — Galathea Rep., **2** : 159—164.

FARAGGIANA, ROMILDE
1940 Pantopodi del Mare Ligure. — Boll. Mus. Zool. Anat. Comp., Torino, (3) **48** (112) : 145—158.

GORDON, ISABELLA
1932a Redescription of some Type-specimens of Pycnogonida of the genus Nymphon. — Ann. Mag. Natur. Hist., (10) **11**: 97—120.
1932b Pycnogonida. — Discovery Rep., **6** : 1—138.

HARO, A. DE
1967a Relaciones entre Picnogònidos e Hidroidos en el medio posidonìcola. — Bol. R. Soc. española Hist. Natur., Biol. **65** : 301—303.
1967b Picnogonidos de la fauna española. Picnogonidos de las posidonias de Blanes (Gerona). — Publ. Inst. Biol. Apl., **43** : 103—123.

HODGSON, T. V.
1909 The Pycnogonida of the Scottish National Antarctic Expedition. — Trans. roy. Soc. Edinburgh, **46** : 159—188.

HOEK, P. P. C.
1881 Nouvelles études sur les Pycnogonides. — Arch. Zool. Expér. Génér., **9**: 445—542, pls 23—30.
LEBOUR, MARIE V.
1945 Notes on the Pycnogonida of Plymouth. — J. Marine Biol. Assoc., **26**: 139—165.
MARCUS, E.
1940 Os Pantopoda brasileiros e os demais sul-americanos. — Bol. Fac. Fil., Ci. Letras, **19** (Zool. 4): 3—144, 17 est.
NOGUEIRA, MARIA
1956 Contribuiçao para o estudo dos Pantópodos das costas de Portugal. — Arq. Mus. Bocage, **27**: 65—106.
1967 Bases para a determinaçao dos Pantópodos das costas portuguesas. — Arq. Mus. Bocage (2a ser.), **1** (5): 283—341.
NORMAN, A. M.
1908 The Podosomata (= Pycnogonida) of the Temperate Atlantic and Arctic Ocean. — J. Linnean Soc. London, (Zool.) **30**: 198—238.
SOYER, F.
1966 Sur quelques Pycnogonides du Golfe de Gênes. — Doriana (Suppl. Ann. Mus. Civ. Stor. Natur. G. Doria, Genova), **47** (174): 1—5.
STOCK, J. H.
1951 Résultats scientifiques du Navire-école Belge „Mercator". V. Pantopoda. — Mém. Inst. roy. sci. natur. Belgique, (2e sér.) **43**: 1—23.
1952a Revision of the European representatives of the genus Callipallene Flynn, 1929 (Pycnogonida). — Beaufortia, **1** (13): 1—14.
1952b The Pycnogonids of the Lagoon of Venice. — Boll. Soc. Veneziana Stor. Natur. Mus. Civ. Stor. Natur., **6** (2): 179—186.
1958 Pycnogonida from the Mediterranean Coast of Israel. — Bull. Res. Counc. Israel, **7B** (3—4): 137—142.
1965 Pycnogonida from the Southwestern Indian Ocean. — Beaufortia, **13** (151): 13—33.
1966 Résultats scientifiques des Campagnes de la „Calypso". VII. Campagnes de la „Calypso" au large des côtes atlantiques de l'Amérique du Sud (1961-1962). I. 4. Pycnogonida. — Ann. Inst. Océanogr., **44**: 385—406.
1967 Pycnogonida from West Africa. — Atlantide Rep., **9**: 45—57.
1968 Pycnogonides. Fauna marine des Pyrénées-Orientales 6. — Suppl. Vie Milieu, **19** (1A): 1—38.
1972 A new deep-sea Nymphon (Pycnogonida) collected by the „Galathea" off Kenya. — Zool. Meded., **47**: 257—260.
STOCK, J. H. & J. SOYER
1966 Sur quelques Pycnogonides rares de Banyuls-sur-Mer. — Vie Milieu, **16** (1—B): 415—422.
UTINOMI, HUZIO
1971 Nymphon chaetochir n. sp., a New Deepsea Pycnogonid from Chatham Rise, East of New Zealand. — J. roy. Soc. New Zealand, **1**: 197—202.
WILSON, E. B.
1878 1880 Report on the Pycnogonida of New England and Adjacent Waters. — Rep. Comm. Fish and Fisheries for 1878: 463—506.

Dr FRANZ KRAPP
Zoologisches Forschungsinstitut und Museum Alexander Koenig
Adenauerallee 150-164
D-5300 Bonn — Bundesrepublik Deutschland

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