



Review of *Poeobius meseres* Heath, 1930 (Polychaeta: Flabelligeridae)

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Abstract: The taxonomic position of the holopelagic polychaete *Poeobius meseres* Heath, 1930 has shifted from being an independent family or order, towards becoming a member of the Flabelligeridae by using molecular methods. There are a series of problems about the morphological features for the species and genus, and all materials available were studied trying to improve our understanding of their taxonomic placement. There seems to be at least two morphological patterns regarding the arrangement of branchial filaments and in the relative rugosity of the tunic and egg size. The holotype cannot be employed to solve this because it has its anterior end invaginated; consequently, it is suggested to make additional collections and redescriptions based upon better materials to clarify this problem.

Résumé : Révision de *Poeobius meseres* Heath, 1930 (Polychaeta : Flabelligeridae). La position taxinomique du polychète holopélagique *Poeobius meseres* Heath, 1930, initialement le représentant d'une famille et d'un ordre indépendants, est devenu un membre des Flabelligeridae à la suite d'études moléculaires. Il subsiste une série de problèmes au sujet des caractères morphologiques pour l'espèce et le genre : tous les matériels biologiques disponibles ont été étudiés pour tenter d'améliorer notre compréhension de leur position taxinomique. Il semble y avoir au moins deux modèles morphologiques d'arrangement des filaments branchiaux, de rugosité relative de la tunique et de taille des œufs. L'holotype ne permet pas de résoudre ce problème parce qu'il a son extrémité antérieure rétractée; par conséquent, il est suggéré de réaliser des récoltes supplémentaires et de re-décrire à partir d'individus en meilleur état pour résoudre ce problème.

Keywords: Holopelagic polychaetes • Pacific Ocean • *Buskiella*

Introduction

Finding out the best classification for simplified organisms has been always difficult. This situation is more pronounced for pelagic animals with benthic relatives such as *Poeobius*. Heath (1930) proposed *Poeobius meseres* as a monotypic genus, contained in a new family (Poeobiidae),

and as a “connecting link between the Annelida and the Echiuroidea”. The annelid features were the arrangement of anterior end appendages such as two large furrowed palps, branchial filaments arranged either as a single series or as two lateral groups, and a nervous system consisting of a ventral series of 11 ganglia. On the other hand, the echiuroid-related features were a spacious coelom, opening to the outside through large anterior nephridia, and gonad development (developing in the coelomic covers of the genital duct). These latter two features, however, are found

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in flabelligerid polychaetes and were well-understood after Claparède (1869). Heath, however, decided to keep *Poeobius* within the echiurans (Heath, 1930: 244).

Pickford (1947) made a histological and histochemical study of *Poeobius*. She evaluated the position of the group because Fisher (1946: 218) had excluded it from the echiurans despite noticing that “the nerve cord of larval echiurids is segmented, but this is lost in the adult...” Fisher proposed an independent phylum for its inclusion (Poeobioidea) based on the lack of mesodermal segmentation. Pickford paid special attention to both blood and circulatory system, as well as the anal glands; her findings pointed to a closer relationship with polychaetes, and she concluded that *Poeobius* is an aberrant polychaete (p. 312), somehow related to sedentary polychaetes (p. 310).

Although Hartman (1955) regarded *Poeobius* body as laterally compressed (p. 52), she clarified the relative position of the appendages of the anterior end, stressing the resemblance with flabelligerids (p. 53). Thus, she noticed the presence of palp lobes, as well as the fact that branchiae are arranged in a more or less continuous series with 5-7 filaments per side (Pl. 1, Fig. 6). Therefore, she regarded *Poeobius* as closely allied to flabelligerids based on several shared features: gelatinous external membrane or tunic, nephridia reduced to a single anterior pair, reduction of transverse septa and body wall musculature, and the ability to retract the anterior end (Hartman, 1955: 53). However, she retained Poeobiidae as an independent family in her catalogue (Hartman, 1959: 423), and this was followed by Fauchald (1977: 117), and Pettibone (1982: 42-43), who regarded it as an independent order (Poeobiida).

Robbins (1965) made an additional histological study on *Poeobius* and provided some details and clarification on the coelom, nephridia, feeding and digestive system, circulatory system, reproduction, nervous system, and about its classification. About the anterior end, she indicated that palps resemble those found in flabelligerids (p. 209), that nephridiopores open just in the base of the branchial row, that nephridial contents closely resemble those found in some flabelligerids (p. 203), that the coelomic funnels are placed about the same level than the gonad (by nerve ganglion 8), and that they release gametes (p. 203). In the mouth (which she regarded as subterminal), she found a ventral ciliated eversible pad (pp 204-205) and regarded *Poeobius* as a ciliary mucus feeder, feeding on diatoms, radiolarians, foraminiferans, and algae (p. 205). Despite this series of similarities with flabelligerids, dealing with its classification, she concluded (p. 211) that *Poeobius* “undoubtedly arose from the archiannelid type quite early in the history of the Annelida”. The main argument for this was the separation between nephridia and coelomic ducts, and the indication by Dales (1962: 323) that flabelligerids lack muscular buccal pads. The presence

of such buccal pad was confirmed by Orrhage (1973: 164), after the original observations by Schlieper (1927: 356, Figs. 30-31), or the early findings by Jourdan (1887: 26; Pl. 1, Figs. 1-2). Consequently, this was later modified (Dales 1977: 527) such that flabelligerids were regarded as having a buccal organ. In a recent study and by using molecular characters, Burnette et al. (2005) have concluded that *Poeobius* belongs in Flabelligeridae.

There are at least two morphological features which deserve a deeper insight because there may be more than one species being involved: 1) branchiae and their spatial pattern; 2) presence of coelomic diverticula. The branchiae were originally described as making a more or less continuous series or as arranged in two lateral groups separated mid-dorsally. In the latter case, the filaments were either arranged in a single row with alternating filaments, which could be also regarded as two fused rows.

The mid-dorsal discontinuity between the two branchial groups mentioned above, in turn, may be related to a longer caruncle, which in several flabelligerid genera (*Piromis*) can separate branchial filaments in two lateral groups. The presence of coelomic diverticula, carrying sperm in males or ova in females, may be spermatheca and brooding chambers. Although not noticed in the original description, they were later illustrated by Robbins (1965, Figs 1a & 2a). They may have not been observed by transparency either with the animals alive, after being depressed, or after employing a clarifying agent, like Hoyer's fluid or some other similar reagent. Their presence would confirm the uniqueness of the group because this feature has not been found among the other members of Flabelligeridae.

Poeobius has been especially found in the Eastern and Central regions but it has also been recorded in north-western areas (Yamada, 1954: 370; McGowan, 1960: 132). There are, however, some interesting morphological differences along this distribution area, especially on relative egg size and gonad development, especially in an Arctic-Tropical gradient; thus, egg size tends to be larger towards the tropics although gonads are less well-developed. These findings made him believe that the tropical specimens could be expatriates (McGowan, 1960: 136); the alternative explanation is that these size and reproductive differences might indicate the presence of more than one species along this temperature gradient.

The purpose of this contribution is to suggest that there might be more than a single species in what we call *Poeobius meseres* Heath, 1930, to indicate that a neotype is required since what is being regarded as the type cannot be confirmed as such, and to confirm the position of *Poeobius* within the Flabelligeridae based on morphology.

Methods

All the materials available for the species have been analysed; this included complete specimens or their fragments as well as the Robbins slide collection. It seems that the best specimens were caught with an Isaacs-Kidd mid-water trawl. Specimens were stained with methyl green to have a better understanding of cuticle features. They were photographed and the following plates were prepared by fusing some of the images. The materials are housed in the National Museum of Natural History, Smithsonian Institution, Washington (USNM), and in the Museum of Natural History, Los Angeles, Allan Hancock Foundation Polychaete Collection (LACM-AHF).

Results

Family Flabelligeridae de Saint-Joseph, 1894

Flabelligeridae de Saint-Joseph, 1894: 96; Fauchald, 1977: 115; Rouse, 2001a: 223.

Poebiiidae Heath, 1930: 244; Fauchald, 1977: 117; Rouse, 2001b: 226; Suárez-Morales et al., 2005: 7.

Diagnosis

Anterior end eversible. Prostomium projected dorsally as a caruncle. Palps frontal; palp bases including ciliated slits (nuchal organs). Branchiae cirriform, sessile on branchial plate, arranged in a tongue-shaped lobe, or in two lateral spirals. Nephridial lobes generally placed close to the branchial filaments. Gonopores restricted to 1-2 anterior segments. Chaetae multiarticulated, at least in notochaetae, in most genera. Neurochaetae multiarticulated capillaries, pseudocompound or ankylosed hooks; rarely missing.

Remarks

The delineation of flabelligerids has been recently modified (Salazar-Vallejo et al., 2007; Salazar-Vallejo & Zhadan, 2007), and some genera have been transferred to Acrocirridae. However, using the presence of chaetae as an inclusive feature would leave poebids out, and consequently the diagnosis has to be modified to stress the diagnostic anterior end features. Burnette et al. (2005: 218) made a molecular study and concluded that *Poebius* falls within flabelligerids, and that therefore both family names are synonyms.

Genus *Poebius* Heath, 1930

Poebius Heath, 1930: 243; Fauchald, 1977: 117.

Type species

Poebius meseres Heath, 1930, by monotypy.

Diagnosis

Body depressed, without segmentation, parapodia or chaetae. Cuticle thick, opaque or transparent, with papillae especially over the anterior end. Caruncle short, not reaching the branchial rows. Branchiae arranged in 1-2 rows, with 10 or more branchial filaments. Nephridial lobes lateral, placed lateroventrally to branchiae. Ventral pharyngeal organ with two lateral rounded projections. Ventral nerve chord with 11 ganglia. Pelagic.

Distribution

Poebius is apparently restricted to the Pacific Ocean.

Remarks

The nuchal organs are restricted to the palp bases, as in all other flabelligerids. The other ciliated ridges running posteriorly and becoming fused before the branchial row is the caruncle. These two features include ciliated epithelia but they are not continuous (Fig. 3A); thus, the nuchal organs run as a curve along the palp base, the caruncle runs posteriorly along the prostomium. Although there are some references for it elsewhere (Salazar-Vallejo, 2007; Salazar-Vallejo et al., 2007 & 2008), some ideas deserve clarification. The caruncle was originally illustrated by Otto (1821, Pl. 2, lower illustration), who called it "proboscis", although the quality in the illustrated details contrast with the interpretation, as happened on other anatomical features. Mueller (1852: 13, Pl. 2, Fig. 5) made a more detailed schematic figure, but failed to name it, although he called the triangular area between the branchial lateral group and the caruncle, the *lacinia triangularis*.

The caruncle was first characterized by Rathke (1843 : 212-213) when he provided an extensive description of the anterior end of his *Siphonostoma vaginiferum*. So, he wrote: "... die Basis der Cirrenbüschel wird von oben bedeckt durch einen tafelförmigen Fortsatz oder Vorsprung der oberen Seite des Siphos, welcher Fortsatz nur schmal, mässig lang, mit dem grössten Durchmesser quer gelagert, halbmondförmig, mit dem convexen Rande nach vorne gerichtet, und auf seinen Flächen so gekrümmt ist, dass die nach oben gekehrte von links nach rechts ziemlich stark convex erscheint (Figs 6, 7b)." And continued on page 213: "Ferner hat dieser Vorsprung oder Schirm eine ziemlich grosse Dicke, sendet aus der Mitte seines vorderen Randes einen kleinen, fast kegelförmigen Fortsatz ab, und besitzt am vorderen Theile seiner oberen Seite eine solche Verdickung der Epidermis, dass diese hier eine mässig breite, grün gefärbte und ziemlich dicke hornige Platte

bildet, die sich an dem ganzen vorderen Rande des Schirms hinzieht, und auch den kegelförmigen Fortsatz dieses Randes bedeckt.“ This could be translated as: “the basis of the branchial cluster is covered by a tabular elongated keel or projection of the upper side of the Siphon from above, ... with the biggest diameter crosswise camped, crescent, with the convex edge directed to the front, and on its surfaces in a way is bent that appears from the left to the right the upward side rather strongly convex (Figs 6 & 7b).” Which continues in page 213 as: “Furthermore, this projection or shield has a rather big thickness, sends a small, almost conical projection from the middle of its fore edge, and possesses such a thickening of the epidermis at the fore part of its upper side, that one spreads these one here wise, green colored and rather fat horny plate forms, that drags on at the whole fore edge of the shield, and covers also the conical projection of this edge.”

Later, apparently overlooking the careful description by Rathke, Ehlers (1905: 47, Pl. 7 & Fig. 5), rediscovered it, called it unpaired tentacle, and named one species after it (*Flabelligera lingulata*). Some 10 years later, the caruncle was referred again simultaneously by Benham (1915: 164-165, Figs 3 & 4), who called it median dorsal tentacle or lingula, and by McIntosh (1915: 107, 110), who called it tongue-shaped process; both names indicate the same general shape. However, the formal naming of it as a caruncle was made by Binard & Jeener (1928: 188, Fig. 28 & Plate 22), who indicated lateral ciliary bands, as part of their classical study on polychaete prostomia and nervous system.

Further, in a short note to stress the lack of continuity between nuchal organs and caruncle, especially to contradict the earlier conclusions by Racovitza (1896), Rullier (1952: 142) noticed that the caruncle is present in almost all amphinomids, in few phyllococids, syllids and tomopterids, and among sedentarian groups, it is found in spionids, disomids and flabelligerids. He concluded (p. 143), however, that in most cases, the caruncle carries the nuchal organs: “Ainsi, dans la plupart des cas, la caroncule porte des organes nucaux”. In the largest revision on the subject, Rullier (1951) noticed in *Pherusa plumosa*, that nuchal organs consist of a ciliated band that runs from the head to the bases of palps, bending over itself, makes a large cavity, whose cap is placed over the palp bases, making a sort of palp keels. These projections, which could be called palp keels, show a special refracting line due to the density of ciliary cells. The most detailed study on flabelligerid head was made by Spies (1975); he confirmed that the palp keels carry the nuchal organs. However, he could not identify nor study the caruncle and called it the “outer ciliated groove”. A detailed analysis of the flabelligerid caruncle is still required; Rullier (1952: 143) anticipated what could be the general structure: “... une

zone épidermique très riche en terminaisons nerveuses, zone qui s'est souvent dilatée et agrandie, augmentant ainsi sa capacité sensorielle. Or, au contact de ces éléments sensoriels, se trouvent des groupes importants de cellules glandulaires ...”

In most flabelligerids having an everted anterior end, the ciliated bands running along the caruncular lateral ridges are independent of those present in the palp keels, which hold the true nuchal organs. Therefore, despite being ciliated, these bands are independent, and might have a supplementary and independent sensory role.

The branchiae are apparently arranged in two patterns; they may be mid-dorsally discontinuous, probably arranged in two fused rows with filaments alternating in position, or as a continuous distal (posterior) series with 6 often thicker filaments and a discontinuous proximal (anterior) row with 3 filaments per side. In comparison with other flabelligerids, this dual branchial pattern would be quite bizarre form members of the same genus; so far, there is a single pattern for the topology of the branchial filaments. Thus, for *Poeobius* the branchial filaments must be regarded as arranged in a continuous, single series, and what has been regarded as the accessory or inferior row, would correspond to the nephridial lobes. The presence of a caruncle not reaching the branchial plate or separating the branchial filaments in two lateral groups is present in some flabelligerid genera such as *Diplocirrus* Haase, 1915, *Bradiella* Rullier, 1964, *Pherusa* Oken, 1807 and *Therochaeta* Chamberlin, 1919. The two former genera have branchial filaments of two different types, being the distal ones thicker and laterally fused while the proximal ones are thinner, free from each other. Thus, even if there are two different thickness among the *Poeobius* branchial filaments, which might depend on the individual contraction during preservation, it seems that it must be more closely related to either *Pherusa* or *Therochaeta*. The branchial plate in *Pherusa* contains only 8 filaments while there are more filaments in *Therochaeta*; further, in *Pherusa* the margin of the branchial plate has some rounded projections which do not take methyl green. These are interbranchial cartilage knobs, early documented by Schlieper (1927: 335-336, 345-346), and which he regarded as resembling those present in sabellids, sabellariids, and serpulids. These outgrowths are not present in *Therochaeta*. Consequently, on the basis of the morphology of the anterior end and especially of the caruncle and branchial plate, *Poeobius* is closely allied to *Therochaeta*. This conclusion has been already reached by molecular methods by Burnette et al. (2005), and was modified as indicating a closer affinity with *Pherusa* by using other taxa and molecular markers (Struck et al., 2007), but without including *Therochaeta*. This apparent contradiction must be understood on the grounds of different taxon sampling

since both studies are congruent. It is interesting that on morphological grounds, *Poeobius* is more closely allied to *Therochaeta* than to *Pherusa*.

On the basis of the most external branchia, there are the nephridial lobes (LACM-AHF-102020). They were originally described in this position by Heath (1930: 240), but Robbins (1965: 203, Fig. 2b) indicated that they were located anteriorly to the branchiae. If this alternative position is confirmed, it would be an additional indication of the presence of more than a single species. The ventral pharyngeal organ is eversible and provided with two lateral rounded ciliated lobes. This was not included in the original description, but was illustrated after some living specimens were observed by Robbins (1965: 204-205, Fig. 3f).

The reduction in the number of segments (or ventral nerve chord ganglia) is a feature shared by *Buskiella* but this must be a convergence rather than indication of a common ancestor. Further, there are several differences between them, besides the presence of true segments and chaetae in *Buskiella*, it has trifid organs, which makes this genus differ in other significant features (Salazar-Vallejo & Zhadan, 2007). On the other hand, the only studies on flabelligerid larvae were made by Spies (1977) on *Flabelligera commensalis*, which is an external symbiont of sea-urchins; he recorded that the 7-segment larva has four chaetigers and that the gut is complete by the 9-chaetiger state. Thus, there are no more details on flabelligerid ontogeny or larval development and although a progenetic evolution is possible (Burnette et al., 2005; Struck, 2006; Halanych et al., 2007), more details are required indicating the concordance between the early development in flabelligerids and the morphological features of *Poeobius*.

***Poeobius meseres* Heath, 1930**
(Figs 1-3)

Poeobius meseres Heath, 1930: 243-244, Figs A & B, Pl. 1, Figs 1-4, Pl. 2, Figs 5-16, Pl. 3, Figs 17-28, Monterey Bay, California, 350 m; Pickford, 1947: 290-312, Pl. 1-3; Yamada, 1954: 370-372, Figs 1 & 2; Hartman, 1955: 52-54, Pl. 1 & Fig. 6, Berkeley & Berkeley, 1960: 793-794; McGowan, 1960: 127-138, Figs 1-7; Robbins, 1965: 200-211, Figs 1-5; Thuesen & Childress, 1993: 941-948, Figs 1 & 4; Uttal & Buck, 1996: 335-341, Figs 1-6; Burnette et al., 2005: 213-219, Fig. 1; Halanych et al., 2007, Fig. 1E (same photo).

Type material

Holotype (USNM 19613), Monterey Bay, Calif., W.K. Fisher coll., no further data.

Additional material

Three specimens (LACM-AHF-unumb.), anterior end retracted, collected during the Northern Holiday cruise, Station 30, 1 Sep. 1951, M.W. Johnson, coll. Four specimens (LACM-AHF-unumb.) with the anterior end exposed, collected by the RV Velero IV, Stat. 10202 (33°15'58"N, 118°51'42"W → 33°15'58"N, 118°35'25"W), Isaacs-Kidd mid-water trawl, 720 fathoms (8-15 mm long, 1.5-2.0 mm wide; two have oocytes, larger ones 150 µm in diameter).

Characteristics

Holotype (USNM-19613) partly dehydrated, corrugated (Fig. 1A). Body 17 mm long, 4 mm wide. Only one palp partly exposed (Fig. 2A & B). Branchial features not observed. Anterior gut broken; its pieces overlap 2 mm, so the organism is much contracted. Since there might be differences regarding the branchial development and the position of the nephridial lobes, this specimen cannot specify these features and is of little use to delineate the species boundaries.

Some additional specimens show some details of the anterior end. Palps and branchiae of about the same size (Fig. 1E & F), or palps might be larger than branchiae (Figs 2D-F & 3A-C). Branchiae in two different sizes, proximal row dorsally continuous with 6 thicker, slightly longer filaments, distal row discontinuous with three smaller thinner filaments per side (Fig. 3). The nephridial lobes are thinner than branchiae and are located in the inner base of the last branchial filament and they are apparently single (Fig. 3D) or double (Fig. 3C).

Remarks

Heath (1930: 224-225) indicated that his specimens were collected in the summer of 1928, or in February, 1929, but the only indication for a type specimen (p. 230), gives no further detail about which branchial pattern it had or about any collecting date or depth he was referring to. Fisher and Heath were probably working together but there is no means to be sure that the holotype was employed in the original description, such that a neotype and a redescription might be required. In fact, in the Robbins slide collection, some of them were labeled as *P. 'profundus'*, which might indicate that they were found in deeper water, differ by having a more corrugated cuticle and smaller eggs.

Some morphological features are markedly modified by contraction during either fixation or while bringing the samples to the surface. Thus, the body was regarded as laterally compressed having terminal (or subterminal) mouth and anus (Heath, 1930, Fig. A, p. 226, p. 243, and Pl. 1 & Figs 1 & 4). At the same time, the hypertrophied outer cuticle or tunic was regarded as carrying a true external

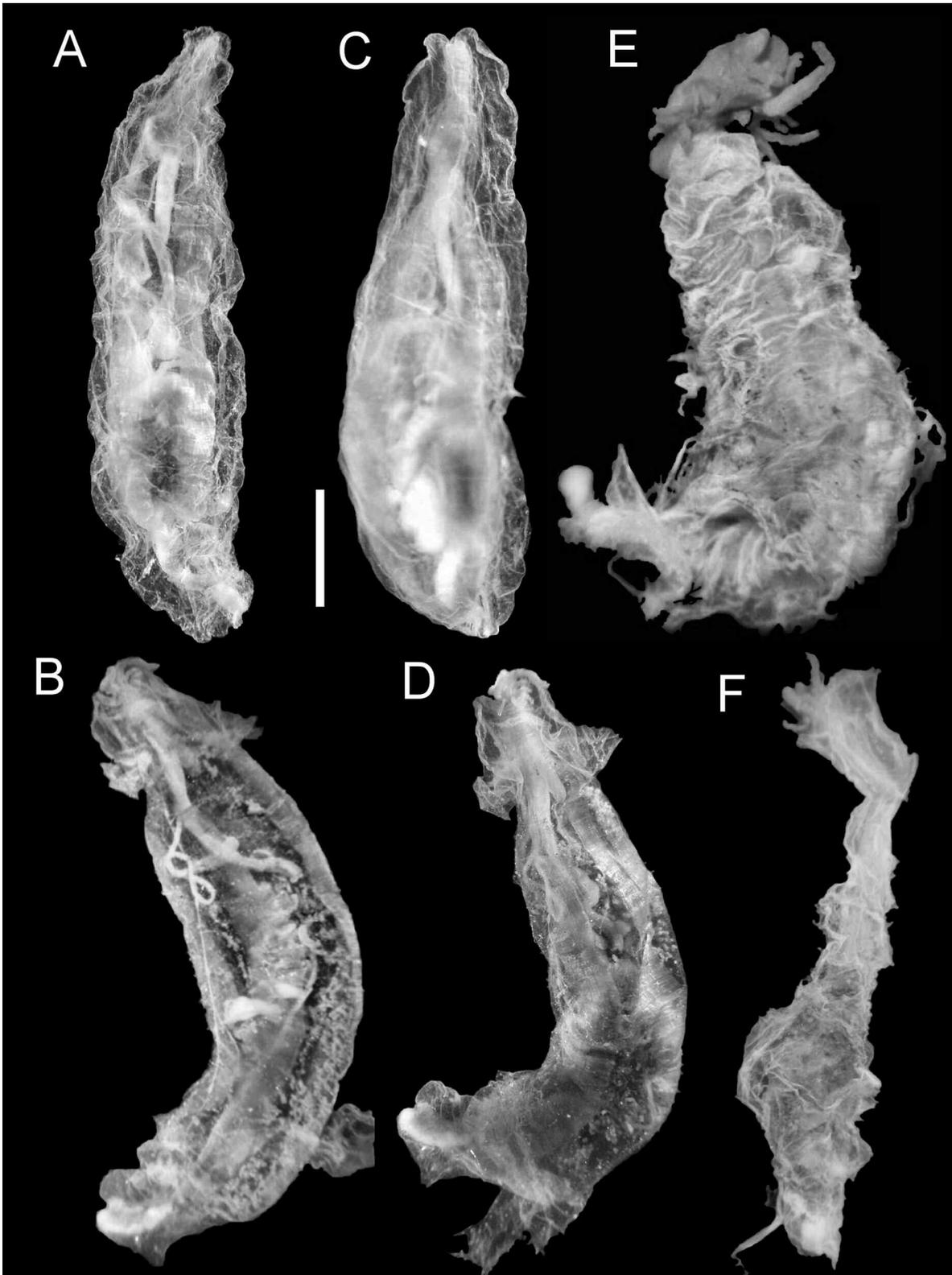


Figure 1. *Poeobius meseres*. Complete specimens. A. USNM 19613. B. USNM s/n. C-D. LACM-AHF 1951. E-F. LACM-AHF-10202. Scale = 3 mm.

Figure 1. *Poeobius meseres*. Spécimens complets. A. USNM 19613. B. USNM s/n. C-D. LACM-AHF 1951. E-F. LACM-AHF-10202. Echelle = 3 mm.

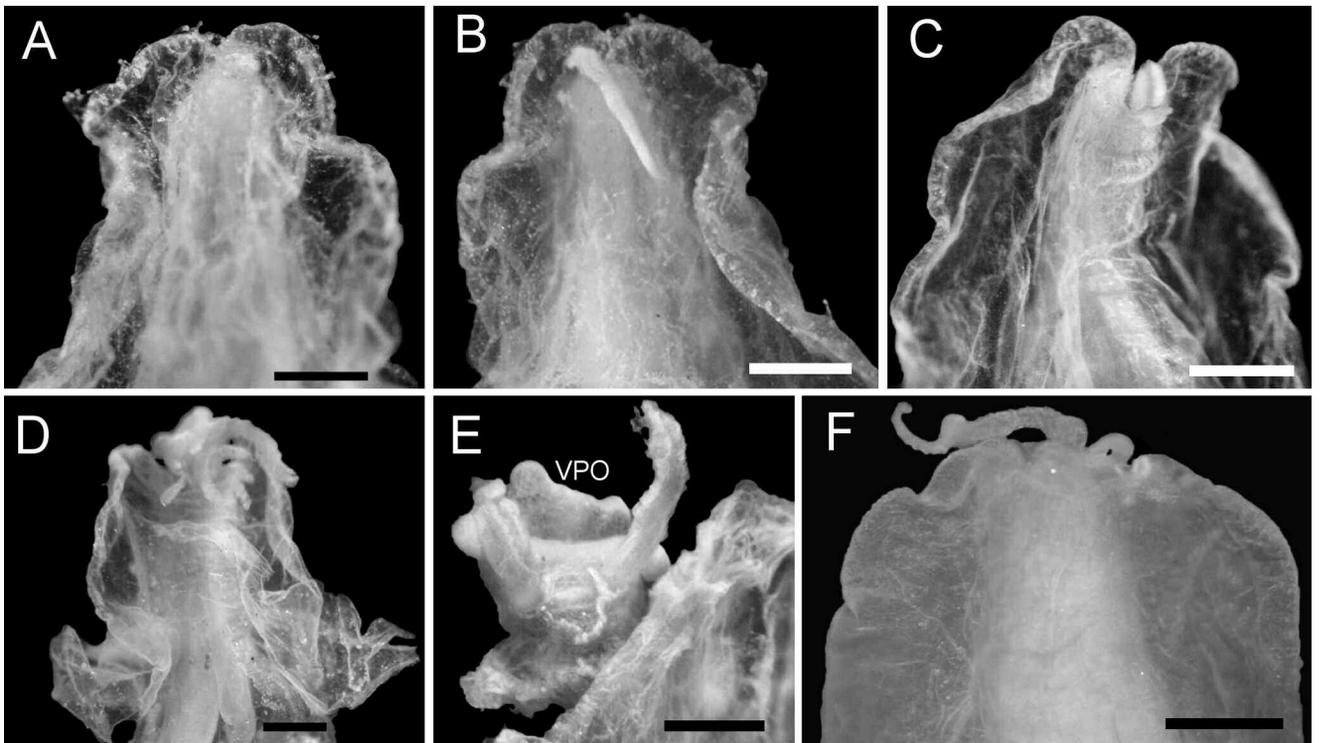


Figure 2. *Poeobius meseres*. Anterior ends. **A.** USNM 19613, dorsal view. **B.** Same, ventral view, a branchia exposed. **C.** LACM-AHF 1951, ventral view, palp partially exposed. **D.** Same lot, another specimen, dorsal view exposing the anterior end. **E.** LACM-AHF-10202, everted anterior end, dorsal view, right palp complete. **F.** USNM-s/n, molecular, dorsal view, branchiae partially exposed. Abbreviations: VPO = Ventral pharyngeal organ. Scales : A-D, F = 0.75 mm, E = 0.5 mm.

Figure 2. *Poeobius meseres*. Extrémités antérieures. **A.** USNM 19613, vue dorsale. **B.** Idem, vue ventrale, une branchie est exposée. **C.** LACM-AHF 1951, vue ventrale, un palpe est exposé partiellement. **D.** Même lot, un autre spécimen, vue dorsale qui expose l'extrémité antérieure. **E.** LACM-AHF-10202, extrémité antérieure exposée, vue dorsale, le palpe droit est complet. **F.** USNM-s/n, moléculaire, vue dorsale, les branchies sont partiellement exposées. Abréviations : VPO = Organe pharyngé ventral. Echelles : A-D, F = 0,75 mm, E = 0,5 mm.

epithelium, so it was regarded as internal (Heath 1930: 228), not external, as is the case in most flabelligerids. Thus, the body is not compressed as has been regarded in the past; it is subcylindrical or rather depressed, at least slightly. The nerve chord is not placed between the muscle bands and lacks any muscle cover; thus, after body contraction, the body becomes flatter and the nerve chord tends to be displaced, giving the false impression of a lateral nerve chord or of a laterally compressed organism (Fig. 3F). The cuticle might include some foreign materials; it has been regarded and illustrated as regularly thick, as confirmed in some specimens (Figs 1E-F & 2F), which also have less papillae, while in some others (Figs 1A-D & 2A-D), it is rather thin provided with abundant papillae, and the slide collections shows that in most parts of the body, it is not markedly detached from the body wall. However, whenever this detachment occurs, it results in the removal of the epidermal layer, over the muscle bands, which together with the foreign materials on the outer layers give the impression that the hyaline layer lies underneath the

epidermis, but it actually is the result of the detachment of the epidermis.

Likewise, the position of branchial filaments was regarded as arranged in two lateral groups (see his Pl. 2, Figs 5-7) and at least on the available specimens, they are apparently arranged in a continuous row. Further, the nuchal organs and caruncle have been barely characterized; the nuchal organ is restricted to the palp base as an evident refrigent band (Fig. 2E), which can be regarded as fused to the caruncle ciliated bands running posteriorly, but they are clearly separated (Fig. 3A). The dorsal and lateral lips are fused and much better developed than the ventral lip (Fig. 3D), although the latter is difficult to detect in other specimens (Fig. 3E). Less frequently, the ventral pharyngeal organ can protrude from the mouth (Fig. 2E).

Distribution

Poeobius meseres Heath, 1930 is apparently widespread along the California current ecosystem in the Northeastern

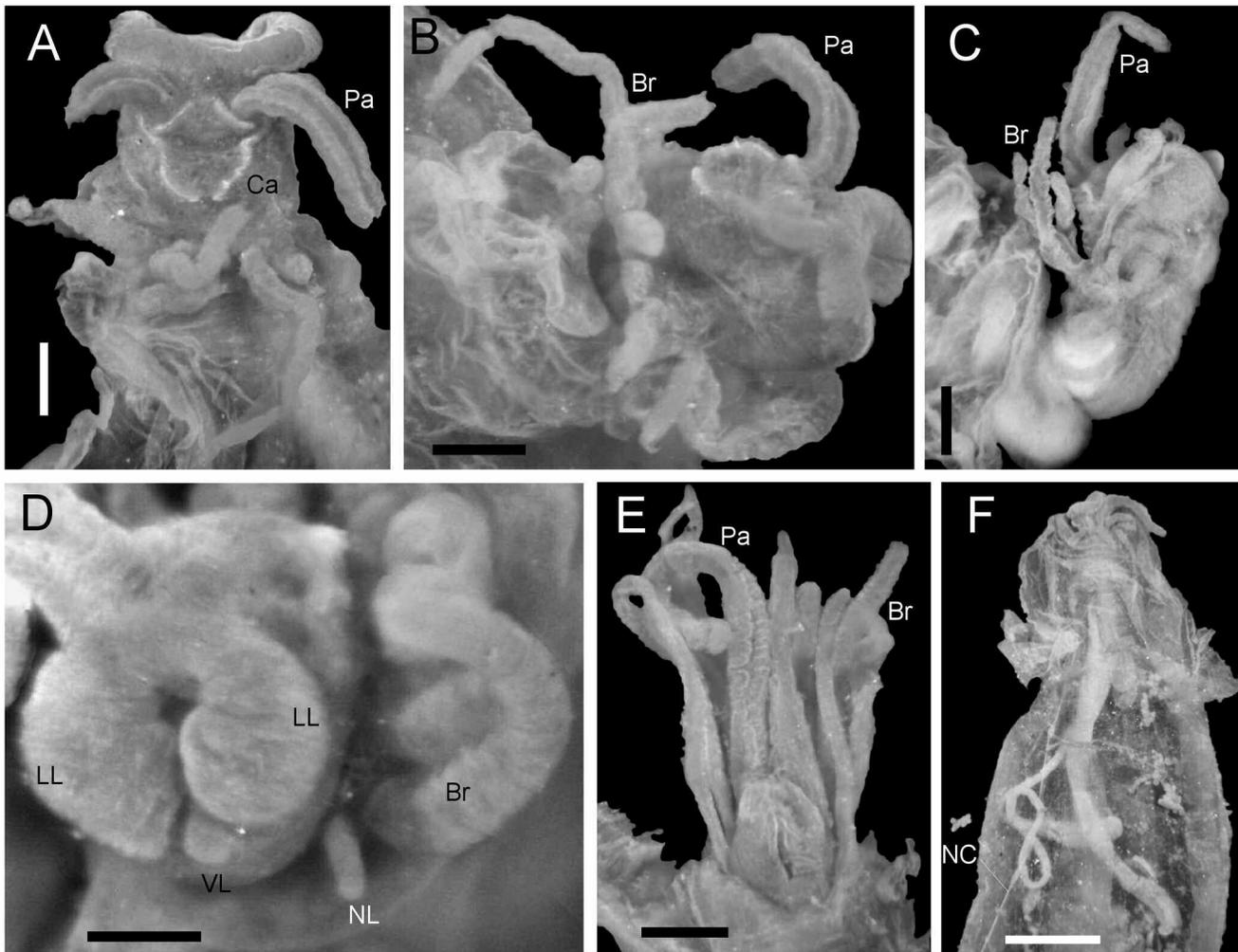


Figure 3. *Poeobius meseres*. **A.** USNM s/n, anterior end in dorsal view. **B.** Same, lateral view. **C.** LACM-AHF-10202, anterior end in lateral view. **D.** USNM s/n, anterior end in frontal view. **E.** Same lot, another specimen, ventral view. **F.** Same lot, another specimen in dorsal view. Abbreviations: Br = Branchia, Ca = Caruncle, LL = Lateral lip, NC = Nerve chord, NL = Nephridial lobe, Pa = Palp, VL = Ventral lip. Scales: A-E = 0.33 mm, F = 2 mm.

Figure 3. *Poeobius meseres*. **A.** USNM s/n, extrémité antérieure en vue dorsale. **B.** Idem, vue latérale. **C.** LACM-AHF-10202, extrémité antérieure en vue latérale. **D.** USNM s/n, extrémité antérieure en vue frontale. **E.** Même lot, un autre spécimen, vue ventrale. **F.** Même lot, un autre spécimen en vue dorsale. Abréviations : Br = Branchie, Ca = Caroncule, LL = Lèvre latérale, NC = Chorde nerveuse, NL = Lobe néphridial, Pa = Palpe, VL = Lèvre ventrale. Echelles : A-E = 0,33 mm, F = 2 mm.

Pacific Ocean. Some other records in the Western Pacific or in subtropical or tropical localities need confirmation.

Conclusion

Poeobius has several features linking it with other flabelligerids such as the anterior end appendages, the branchial pattern, the presence of a single nephridial pair, and the gonad development, and its transfer to the Flabelligeridae is confirmed.

Because of the arrangement of the branchial filaments, *Poeobius* is more closely allied to *Therochaeta*, but due to

the secondary reduction of many morphological features and to the lack of any comparative ontogenetic studies in the flabelligerids, the phylogenetic affinities should be clarified by using a wider taxon sampling and molecular methods.

There is no means to link the material available as the holotype of *P. meseres* as its type material. Further, its anterior end is not everted and its appendages cannot be easily understood and if there is more than one reproductive pattern in the species, the so-called holotype does not clarify the issue either. Therefore, better specimens are needed to redefine the species and to clarify the number of species within the genus.

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