



Nomenclatural changes in a taxonomically complex group (Amphipoda: Gammaridae)

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Abstract

The family Gammaridae is a large monophyletic group with a complicated taxonomy. A nomenclatural review of the taxonomic status of *Pectenogammarus* Reid, 1940 was conducted based on Hou & Sket (2016) and Sket & Hou (2018) phylogenetic proposals. These authors used the name *Homoeogammarus* Schellenberg, 1937 for a set of morphologically diverse taxa previously included mainly within *Echinogammarus* Stebbing, 1899. Unfortunately, the use of the name *Homoeogammarus* Schellenberg, 1937 is problematic. As a result of a detailed bibliographic review, we propose the name *Pectenogammarus* Reid, 1940 (**stat. nov.**) for the “*Homoeogammarus*” clade (Sket & Hou 2018), which results in 20 new combinations. In addition, two genera are here formally synonymised as follows: *Pectenogammarus* Reid, 1940 = *Homoeogammarus* Barnard et Barnard, 1983, **syn. nov.** = *Laurogammarus* G.S. Karaman, 1984, **syn. nov.** A synonymic catalogue is provided.

Key words: Amphipoda, *Homoeogammarus*, *Laurogammarus*, new synonymy, nomenclature, *Pectenogammarus*, taxonomy

Introduction

In a recent series of papers, Hou & Sket (2016) and Sket & Hou (2018) proposed a phylogenetic framework that solved some of the long-standing taxonomic problems within Gammaridae. Some of the taxonomic changes derived from Hou & Sket (2016) and Sket & Hou (2018) phylogenetic proposals, were the restriction of the genus *Echinogammarus* Stebbing, 1899 to the *E. berilloni* (Catta, 1878a) species-group (*sensu* Pinkster 1969, 1973) and the transferring of the other species formerly included in *Echinogammarus* to the genera *Chaetogammarus* Martynov, 1925, *Marinogammarus* Schellenberg, 1937, *Parhomoeogammarus* Schellenberg, 1943, and most of them to *Homoeogammarus* Schellenberg, 1937. By doing so, Hou & Sket (2016) and Sket & Hou (2018) rendered well supported monophyletic genera, showing that many of the morphological characters used for the diagnosis of the former genera are largely homoplastic. In this paper, a nomenclatural review of Hou & Sket (2016) and Sket & Hou (2018) “*Homoeogammarus*” is conducted.

Results

Hou & Sket (2016) and Sket & Hou (2018) used the name *Homoeogammarus* Schellenberg, 1937 for a large clade

that included sets of morphologically diverse taxa, most of them previously included within *Echinogammarus*, as *E. simoni* (Chevreux, 1894), and *E. pungens* (Milne Edwards, 1840) species-groups (*sensu* Stock 1968; Pinkster & Stock 1972). Unfortunately, the use of the name *Homoeogammarus* Schellenberg, 1937, is problematic. Schellenberg (1937) proposed *Homoeogammarus* as a subgenus of *Gammarus* Fabricius, 1775, without designating a type species among the two species he included within it: *Gammarus simoni* Chevreux, 1894 and *G. tacapensis* Chevreux & Gauthier, 1924. Therefore, as previously pointed out by Stock (1968), because of the articles 13.3 and 67.4.1 of the International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature—ICZN, 1999), *Homoeogammarus* Schellenberg, 1937 is not an available name. The name *Homoeogammarus* was later made available by Barnard & Barnard (1983: p. 487) who designated *Gammarus simoni* as its type species.

In addition to *Homoeogammarus* Barnard & Barnard, 1983, four other genera names were applied to species-groups included in Sket and Hou's (2018) "*Homoeogammarus*" clade: *Ostiogammarus* S. Karaman, 1931, *Neogammarus* Ruffo, 1937, *Pectenogammarus* Reid, 1940, and *Laurogammarus* G.S. Karaman, 1984.

Ostiogammarus was described including a large number of species, but none of them was designated as type species; therefore, according to articles 13.3 and 67.4.1 of the International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature—ICZN, 1999) *Ostiogammarus* is also an unavailable name. Stock (1968), followed by Barnard & Barnard (1983) and Pinkster (1993), indicated erroneously that Karaman (1931) selected *G. berilloni* as type species for *Ostiogammarus*; but Karaman (1931) rather said that *G. berilloni* could be the type species of *Echinogammarus*: "Und wenn das ganze Genus *Echinogammarus* auf diesem Merkmal beruht und *E. berilloni* als Typus der Gruppe betrachtet werden sollte (wie dies Chevreux-Fage anführen), müsste die ganze Gruppe *Echinogammarus* als solche gestrichen werden" (Karaman 1931: p. 62). Some of the species included by Karaman (1931) in the original description of *Ostiogammarus* (i.e., *G. olivii* Milne Edwards, 1830, *G. pungens* Milne Edwards, 1840, *G. scutarensis* Schäferna, 1923 and *G. thoni* Schäferna, 1923) are part of Sket & Hou's (2018) "*Homoeogammarus*" clade. Nevertheless, the name *Ostiogammarus* cannot be used for any of these taxa.

Neogammarus Ruffo, 1937, described as a subgenus of *Gammarus* for the species *G. festai* Ruffo, 1937 and *G. rhipidiophorus* Catta, 1878b, is unavailable because it was described without fixation of type species. Dahl (1958) reserved *Neogammarus* for *G. festai*, but as indicated in article 67.5 of the International Code of Zoological Nomenclature (ICZN 1999) this action does not constitute a designation of type species (contrary to the indication of Stock (1971)), and consequently *Neogammarus* Dahl, 1958 is also an unavailable name. *Neogammarus* was made subsequently available by Karaman (1969: p. 57; 1971: p. 206) who designated *G. rhipidiophorus* Catta, 1878b as its type species. *Gammarus rhipidiophorus* (type species of *Neogammarus* G.S. Karaman, 1969) is not included in Sket & Hou's (2018) "*Homoeogammarus*" clade, and therefore *Neogammarus* cannot be used to name this clade.

Pectenogammarus was described as a subgenus of *Gammarus* for *G. (Pectenogammarus) planicrurus* Reid, 1940 (type species by monotypy). It is an available name and has nomenclatural precedence over *Homoeogammarus* Barnard & Barnard, 1983 and also over *Neogammarus* G.S. Karaman, 1969 according to the principle of priority (Art. 23.1 ICZN, 1999).

Laurogammarus was described for *Carinogammarus scutarensis* Schäferna, 1923 (type species by original designation). It is an available name, and its type species is included in Sket and Hou's (2018) "*Homoeogammarus*" clade, but it does not have priority over *Pectenogammarus* nor *Homoeogammarus* Barnard & Barnard, 1983.

Among the available names, *Pectenogammarus* is the oldest, and thus has nomenclatural priority for Sket & Hou's (2018) "*Homoeogammarus*" clade. The type species of *Pectenogammarus*, *G. (P.) planicrurus*, was included by Sket & Hou's (2018) within their "*Homoeogammarus*" clade. *Pectenogammarus planicrurus* is deeply nested within the "*Homoeogammarus*" clade (as shown in the supplementary material of Sket and Hou (2018)), confirming the applicability of the name *Pectenogammarus* for the entire clade.

Based on this information, the synonymic list of *Pectenogammarus* (including unavailable names) remains as:

***Pectenogammarus* Reid 1940**

Ostiogammarus S. Karaman, 1931: p. 61 (**unavailable name**)

Type species: none designated originally; some of the species included originally by Karaman (1931) are included in Sket & Hou's (2018) "*Homoeogammarus*" clade.

Homoeogammarus Schellenberg, 1937: p. 272 (described as subgenus of *Gammarus*) (**unavailable name**)

Type species: none designated originally; *Gammarus simoni* and *Gammarus tacapensis* were included originally in *Homoeogammarus*, but none of them was designated as type species (Schellenberg 1937). Synonymized with *Echinogammarus* Stebbing, 1899 by Stock (1968 as an invalid name).

Neogammarus Ruffo, 1937: p. 442 (described as a subgenus of *Gammarus*) (**unavailable name**)

Type species: none designated originally. *Gammarus festai* Ruffo, 1937 and *G. rhipidiophorus* Catta, 1878b were included originally in *Neogammarus*, but none of them was designated as type species (Ruffo 1937).

Pectenogammarus Reid, 1940: p. 288 (described as a subgenus of *Gammarus*) (**stat. nov.**)

Type species: *Gammarus (Pectenogammarus) planicrurus* Reid, 1940, by monotypy. Raised to genus by Stock (1982) and retained as such by Duhig & Humphries (1955), Kant *et al.* (1968), Morgan (1970), and Van Maren (1975a, b), among others. Included in the synonymy of *Echinogammarus* Stebbing, 1899 by Karaman (1976) and of *Homoeogammarus* Schellenberg, 1937 by Sket & Hou (2018).

Homoeogammarus Barnard & Barnard, 1983: p. 487 (as a synonym of *Echinogammarus*) (**new synonymy**)

Type species: *Gammarus simoni* Chevreux, 1894, by original designation. Treated as a synonym of *Echinogammarus* Stebbing, 1899 by Barnard & Barnard (1983). Restored as valid by Hou & Sket (2016) and Sket & Hou (2018), but erroneously attributing authorship to Schellenberg, 1937.

Laurogammarus G.S. Karaman, 1984: p. 29 (**new synonymy**)

Type species: *Carinogammarus scutarensis* Schäferna, 1923, by original designation. Treated as an independent genus by Pinkster (1993) and Grabowski *et al.* (2014) among others. Synonymized with *Homoeogammarus* Schellenberg, 1937 by Sket & Hou (2018), because its type species *C. scutarensis* is nested within the clade.

Included species in *Pectenogammarus* based on Hou & Sket (2016) and Sket & Hou (2018) are:

Pectenogammarus antalyae (G.S. Karaman, 1971) **new combination**

Pectenogammarus atlanticus (Dahl, 1958) **new combination**

Pectenogammarus cyrtus (Pinkster & Platvoet, 1986) **new combination**

Pectenogammarus festai (Ruffo, 1937) **new combination**

Pectenogammarus foxi (Schellenberg, 1928) **new combination**

Pectenogammarus monomerus (Stock, 1977) **new combination**

Pectenogammarus nudus (Stock, 1971) **new combination**

Pectenogammarus olivii (Milne Edwards, 1830) **new combination**

Pectenogammarus planicrurus (Reid, 1940) (see Stock (1968); Pinkster (1993)).

Pectenogammarus platvoeti (Pinkster, 1993) **new combination**

Pectenogammarus pungens (Milne Edwards, 1840) **new combination**

Pectenogammarus ruffoi (Pinkster & Stock, 1970) **new combination**

Pectenogammarus simoni (Chevreux, 1894) **new combination**

Pectenogammarus scutarensis (Schäferna, 1923) **new combination**

Pectenogammarus spinulicornis (Pinkster & Stock, 1971) **new combination**

Pectenogammarus stammeri (S. Karaman, 1931) **new combination**

Pectenogammarus stocki (G.S. Karaman, 1970) **new combination**

Pectenogammarus tabu (G.S. Karaman, 1971) **new combination**

Pectenogammarus thoni (Schäferna, 1923) **new combination**

Pectenogammarus tibaldii (Pinkster & Stock, 1970) **new combination**

Pectenogammarus veneris (Heller, 1865) **new combination**

Discussion

According to Hou & Sket (2016) and Sket & Hou (2018) the genus *Echinogammarus* should be restricted to the species formerly included in the *E. berilloni* species-group (*sensu* Pinkster 1973). Since *Echinogammarus* in Sket & Hou (2018) is monophyletic and well characterized morphologically (Pinkster 1973, 1979; Platvoet & Pinkster 1980; Fernández Lop 1987; Hou & Sket 2016; Sket & Hou 2018), all remaining species previously assigned to *Echinogammarus* but not included in the *E. berilloni* species group (see Pinkster 1993) should be transferred to other genera. Hou & Sket (2016) and Sket & Hou (2018) already transferred most of the species previously included in *Echinogammarus* (but not in the *E. berilloni* species group) to *Chaetogammarus*, *Marinogammarus*, *Parhomoeogammarus*, and specially to *Pectenogammarus* (“*Homoeogammarus* Schellenberg, 1937”); nevertheless,

to avoid breaking the well-funded monophyly of *Echinogammarus*, those species of *Echinogammarus* not included in the *E. berilloni* species group, but not yet assigned with molecular information to any particular genus, should be included temporarily in *Pectenogammarus*.

Pectenogammarus as discussed here, remains in need of a deep taxonomic revision based on molecular and morphological data combined. We hope that widely used data bases (e.g., Horton *et al.* 2022) will keep-up with the most recent phylogenetic information and its taxonomic consequences (e.g., Hou & Sket 2016; Sket & Hou 2018), rather than retaining species in non-monophyletic assemblages, most of them based on homoplastic character states. By using the clades resulting from the mentioned phylogenies, the internal taxonomy of proposed monophyletic groups (i.e., *Pectenogammarus sensu nov.*, *Dinarogammarus*, *Echinogammarus*, etc.) can be worked-out at a much closer scale (taxonomic and geographic), facilitating identification of useful morphological taxonomic characters, although homoplastic at other scales, and species recognition.

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