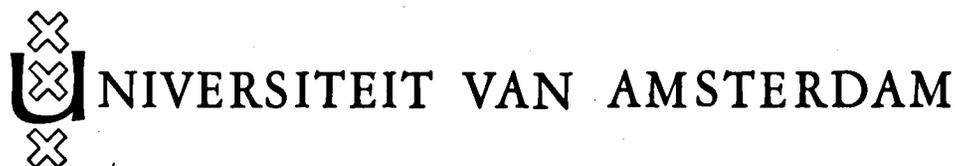


# BULLETIN ZOOLOGISCH MUSEUM



Vol. 1 Nr. 2 September 5, 1966

## WHAT IS GAMMARUS CAMPYLOPS OF SARS, 1894?

J. H. STOCK & P. KANT

### ABSTRACT

A revision of the specimens described by Sars, 1894, as *Gammarus campylops* Leach, 1814, proved that they did not belong to that species, nor to *Gammarus ochlos* Reid, 1945 (= *G. sarsi* Reid, 1943), as Reid believed. Reid's species, of which also original specimens have been re-examined, is identical with *Gammarus zaddachi* Sexton, 1912.

Sars's material is redescribed here in detail, under the name of *Gammarus inaequicauda* Stock, 1966.

### INTRODUCTION

In his Account of the Crustacea of Norway, Sars described and illustrated (1894: 500-502, pl. 176 fig. 2) a species of *Gammarus*, which he thought to be identical with *Gammarus campylops* or *campylops* of Leach (1814 and 1815). Leach's species has been a source of great confusion, as was demonstrated by Sexton & Spooner (1940), who, after a careful revision of all data available in the literature (including two papers by authors having re-examined the types, viz. Bate, 1862, and Walker, 1911) came to the conclusion that "the species remains indeterminate", but that it is possibly a *Marinogammarus* and not a *Gammarus* s.str. We can concur entirely with this, and another conclusion of Sexton & Spooner's authoritative review, that "*Sars's campylops* is not Leach's species". Although Leach's type specimens were re-studied at two occasions, nobody seems to have cared to re-examine Sars's material, at least no published accounts of such study have been published.

Through the courtesy of Dr. Niels Knaben, of the Zoologisk Museum, Oslo, we were able to make a re-examination of some of the samples that served for Sars's work. The material still available came from Moss in the Christiania fjord, and from the Danish coast; Sars mentions

also a sample from "an oyster-bed on our south coast", but this material must, according to Dr. Knaben (in litt., June 4, 1966), be considered as lost. Dr. Knaben informed us that Sars's material of *campylops* was studied in the early thirties by A. Schellenberg, and that the results of this study were used in editing his 1934 paper. Although that paper contains a number of remarks on *G. campylops*, Schellenberg does not mention that he actually studied the material and he concludes only (1934: 139) "*G. campylops* Sars bleibt als Art fraglich". The vials in the Oslo Museum bear labels with Schellenberg's re-identifications: according to these labels the sample from Moss is considered by him as *G. locusta* (L.), the sample from the Danish coast consists of *G. locusta* and of (what he calls) *G. locusta f. zaddachi* Sexton.

Reid (1943) gives again a short summary of the history of *G. campylops*. He had obtained a collection of small gammarids made in Loch of Stenness, Orkney, in brackish water, and he was of opinion that these were identical with Sars's *G. campylops*. He followed a suggestion made earlier by Sexton & Spooner (1940) and gave the Orkney material a new name, for which he chose (in the assumption that his animal was identical with that of Sars) *Gammarus sarsi*. Some new morphological data on *G. sarsi*, which "is the long lost *G. campylops* Sars (not Leach)" were included in Reid's 1944 paper. In 1945, Reid found the name *Gammarus sarsi* pre-occupied by Sowinski. He desired to "change its name to *Gammarus ochlos* to distinguish it for once and for all, and at the same time indicate that it has been a pest to all who have worked with the genus *Gammarus*" (Reid, 1945: 637).

Reid's sincere hope to end the confusion was in vain, however. First of all, there was little need to change the name *G. sarsi*, since Sowinsky's *G. sarsi* is in fact a *Pontogammarus* and not a *Gammarus* s.str. (cf. Barnard, 1958). Secondly, Segerstrale shortly afterwards pointed out that *G. ochlos* = *G. sarsi* is identical with *G. zaddachi*. Segerstrale's conclusion was substantiated by re-examination of material from Orkney provided by Mr. Reid (1947:231, footnote 3). On our request, Dr. Segerstrale kindly forwarded us three specimens, preserved in the collections of the Zoological Institute, Helsinki, and identified by Dr. Reid as *G. ochlos*. We agree with Segerstrale's conclusion that they are small, though mature forms of *G. zaddachi* Sexton.

#### THE ACTUAL MATERIAL

As stated above, we had access to Sars's material. There were 4 different samples available, but three of these probably once were a single sample as all three were labelled "Danish coast" or "Denmark", legit Hansen. One of these three (No. F 10460) is a microscopical slide of an ovigerous female (made by Sars, not re-examined by Schellenberg). Now, females are hardly

identifiable in this genus, but it surely belongs to the *locusta* - group, and we personally believe it is a small specimen of *G. locusta* (L.). The other two Danish samples were studied by Schellenberg, who thought that two specimens (No. F 2641), again females, belonged to *G. locusta* (L.), whereas he identified one small specimen (No. F 2643) as *G. locusta f. zaddachi* Sexton. We agree with the identification, as *G. locusta*, of the Danish sample by the German author, but we think that the specimen identified as *zaddachi* is in fact a *Gammarus salinus* Spooner, 1947.

The fourth sample (No. 2618), from Moss in the Christiania fjord, is the most interesting one. It contains 29 specimens, apparently belonging to two species: 6 specimens are referable to *G. locusta* again, but the others are quite obviously identical with Sars's description and figures of the pretended *G. campylops*. Since the latter is not identical with any of the known *Gammarus* species, and since the name *campylops* should be reserved, as Sexton & Spooner (1940) clearly emphasized, for a *Marinogammarus*, a new name is necessary for this form. Stock, 1966, proposed the name *G. inaequicauda* for it, as one of the most obvious features of the species is the inequality of the two rami of the third uropod.

#### *Gammarus inaequicauda* Stock, 1966

*G. inaequicauda* Stock, 1966: 2.

*G. campylops* Sars (non Leach), 1894: 500-502, pl. 176 fig. 2; Stebbing, 1906: 476-477; Oldenvig, 1933: 199, figs. All other records apply either on the real *G. campylops* (see Sexton & Spooner, 1940) or (Schlienz, 1922; Reid, 1943, 1944, 1945) on *G. zaddachi*.

Material. 1 male (holotype), 5 males, 17 females (paratypes), Moss, Christiania fjord. Ex coll. G.O. Sars, Zoologisk Museum Oslo No. 2618.

Description. A small species: the largest male is about 11 mm long, the largest female 8 mm, most specimens being much smaller. The entire animal is ably depicted by Sars. The shape of the eye is somewhat variable; in some specimens it resembles that of *G. locusta*, but in most it is nearly straight, the upper half is slightly smaller than the lower half, the two halves being separated by a hardly marked constriction (fig. 1a). The lateral lobe is projecting, triangular but not acute; the sinus is shallow.

The mandible palp (fig. 1d) is typical for the members of the *locusta*-group; segment 1 is unarmed; segment 3 bears, in addition to two groups of lateral setae and one group of terminal setae, a ventral row of spinules which decreases gradually and regularly in length from distal to proximal direction.

The first antenna (male) (fig. 1b) has a 3-segmented peduncle, of which segment 3 is just half as long as segment 2; segment 3 is about twice as long as wide. The ventral margin of segment

1 bears 1 spinule and a distal group of some setae; the ventral margin of segment 2 bears 2 groups of minute setules and a distal group of some setae. The accessory flagellum is slightly longer than peduncle segments 2 and 3 combined, but consists of 6 to 8 segments only. The flagellum is long, 25- to 35-segmented.

The second antenna (male) (fig. 1c) has a long cement gland cone; peduncle segments 4 and 5 bear 3 to 4 medial and 3 to 4 ventral groups of numerous, long, straight setae. The dorsal setae are less numerous and much shorter. The flagellum is short, and composed of 10 to 16 segments; several of these segments bear ventrally very long, straight setae; there are no calceoli. The entire appendage is as long as, or even slightly shorter than, the first antenna.

The first leg (male) (fig. 1e) has composed spines on the basis and the carpus. The propodus is elongately elliptical in outline; its ventral margin bears only 3 groups of setae. The oblique palmar edge (fig. 1f) bears, in addition to the usual 5 conical spines on the lateral corner, also a truncate, more or less flask-shaped median palmar spine.

The 2nd leg (male) is remarkable by its elongate propodus (fig. 1g), the palmar edge of which is not placed very obliquely. Ventrally, the propodus is armed with about 6 groups of setae. There are 6 lateral palmar spines, the two largest of which have a slightly swollen base, but not yet the truncate tip typical for "flask-shaped" elements. The median palmar spine is distinctly flask-shaped (fig. 1h).

The 3rd leg (male) (fig. 2a) has an elongately rectangular side plate. While in other species the carpus, and to a lesser extent also the merus, bear curved or curled setae, these articles bear straight setae only in the present species. The side plate of the 4th leg (male) (fig. 2b) is nearly as wide as long; the inferior part of it is sub-rectangular, the posterior notch is shallow. The merus is provided with exceptionally long spines and setae.

The 5th leg (male) (fig. 2c) has a long and slender basal segment, which is distinctly more than  $1\frac{1}{2}$  times as long as wide. Long setae arise on the posterior margins of the carpus and the propodus.

The 6th leg (male) has a very slender basis being about  $1\frac{3}{4}$  times as long as wide; its posterior margin is straight or even slightly convex. Very long setae arise on the posterior margins of carpus and propodus (fig. 2d).

The 7th leg (male) (fig. 2e) has likewise a very slender basal segment, being about  $1\frac{3}{4}$  times as long as wide; its posterior margin is finely crenulated and provided with numerous small spinules. The infero-posterior corner of the basis is indented and bears a few spines. The merus bears mostly spines on both margins; here and there a seta shorter than the spines, is inserted between them. Long setae occur on both margins, particularly on the posterior one, of the carpus and propodus.

The urosome segments 1 to 3 (fig. 1i) have distinct dorsal elevations, but these are not compressed; each segment bears 1 to 2 dorsal spines, accompanied by 1 to 3 short setules (shorter than the spines), and 2 to 3 lateral spines, likewise accompanied by a few short setules. The 2nd and 3rd epimeres (fig. 1j) have both acutely produced infero-posterior corners. The 3rd bears none or only one setule at its posterior margin.

The 3rd uropod (fig. 2f) has a relatively short inner ramus which attains only 75-85% of the length of segment 1 of the outer ramus. Both rami are narrow and slender. The outer ramus bears 5 to 7 groups of lateral elements, each group consisting of 2 to 3 spines and 2 to 3 setae. Most of these lateral setae are smooth or only with an incipient plumosity. The medial setae of the outer ramus and all setae of the inner ramus are plumose.

The telson is rather wide at the basis (fig. 2g). It bears 3 groups of elements: a subbasal group with 2 to 3 spines, and 2 short setae; a subterminal group with 1 or 2 spines and 2 to 3 short setae; and a terminal group of 4 spines and 2 or 3 short setae.

#### DISTINCTION FROM RELATED SPECIES

The species described by Sars as *Gammarus campylops* and rebaptized *G. inaequicauda* by Stock, 1966, clearly belongs to the *locusta*-group. Spooner (1947), Segerstrale (1947) and Kinne (1954) summarized the more important features that separate *G. locusta* from the *zaddachi*-group. So, *G. inaequicauda* shares the following characters with *G. locusta* (and consequently differs by these characters from *G. zaddachi*, *G. salinus* and *G. oceanicus*): (1) third segment of mandible palp with a regular row of "graduate" spinules; (2) peduncle of first antenna very little hairy; (3) side plate 4 with an almost rectangular lower portion; (4) lateral lobes of the head produced, sinus shallow; (5) median palmar spine of 2nd leg (adult male) "flask-shaped".

Two species of the *locusta*-group occur in the temperate Atlantic Ocean of western Europe: *G. locusta* (L.) and the form called *G. plumicornis* by Pirlet, 1939, and Den Hartog, 1964 (this name is erroneous; Stock, 1966, replaced it by the name *G. crinicornis*). *G. inaequicauda* differs from *G. locusta* in the slightly more rounded lateral lobes of the head; in the (sometimes) different shape of the eyes; in the lower number of segments in the accessory flagellum; in the absence, in male, of calceoli on the flagellum of the 2nd antenna; in the very slender propodus of the 2nd leg (male); in the absence of curved or curled setae on the carpus of leg 3 (male); in the long spines and setae on the merus of leg 4; in the slender basal segments of legs 5 to 7; in the shape (without sudden bend) of the posterior margin of the basis of leg 7; in the presence of very long setae on carpus and propodus of legs 5 to 7; in the reduction of the number of setules (to 0 or 1) on the posterior margin of the 3rd epimere; in the absence of

"keels" (laterally compressed dorsal elevations) on the urosome; in the short inner ramus of the 3rd uropod; in the slenderness of the uropod rami; in the virtually absent plumosity of the setae on the lateral side of the uropodal exopod.

From *Gammarus crinicornis* Stock, 1966, *G. inaequicauda* differs in the shape of the lateral lobes and of the eye; in the more slender 3rd peduncle segment of the first antenna; in the somewhat smaller number of segments of the accessory flagellum; in the less dense setation of the peduncle of the second antenna; in the absence of calceoli on the flagellum of the second antenna; in the much more elongate shape of the propodus of the 2nd leg (male); in the absence of curved or curled setae on the 3rd leg (male); in the much more elongate shape of the basal segments of legs 5 to 7; in the shortness of the uropodal endopod and in the lack of plumose setae on the lateral margin of the exopod.

#### DISTRIBUTION

*Gammarus inaequicauda* is only known with certainty from Moss, Norway. It seems to us, however, that the two "variations" of *G. locusta*, recorded by Spooner (1947: 16-17) from the Fleet, Dorset and New England Creek, Essex, show a great resemblance to *inaequicauda*. Attempts to locate this material failed up to now. Margalef, 1951, discussed the characters of the populations from the Fleet and New England Creek, and considered them identical with *G. aequicauda* (Martynov, 1931). This circummediterranean species is chiefly characterized by long setae on urosome and telson and by the shape of the 4th side plate, which is much longer than wide and ventrally rounded. These features do not seem to occur in the two British populations, so their presumed relation to *G. aequicauda* seems untenable.

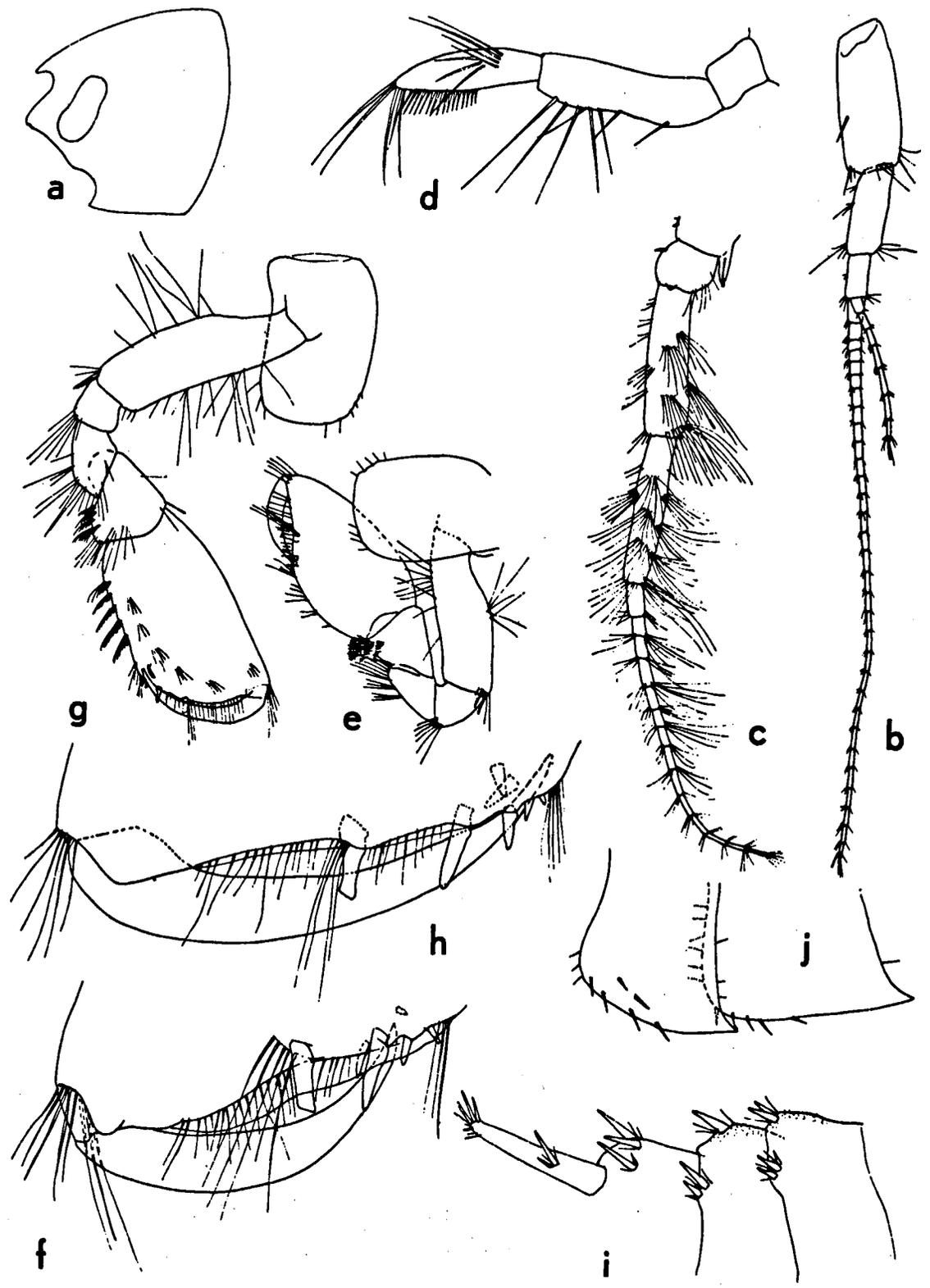
#### REFERENCES

- BARNARD, J. Laurens, 1958. Index to the families, genera and species of the Gammaridean Amphipoda (Crustacea). Occ. Pap. Allan Hancock Found., 19: 1-145.
- BATE, C. Spence, 1862. Catalogue of the specimens of amphipodous Crustacea in the collection of the British Museum: i-iv, 1-399, pls. I-LVIII (Brit. Mus., London).
- HARTOG, C. den, 1964. The amphipods of the deltaic region of the rivers Rhine, Meuse and Scheldt.....III. The Gammaridae. Neth. J. Sea Res., 2 (3): 407-457.
- KINNE, O., 1954. Die Gammarus-Arten der Kieler Bucht. Zool. Jahrb. (Syst.), 82: 405-424.
- LEACH, W. E., 1814. Edinburgh Encyclopedia, 7: 403.
- , 1815. A tabular view of the external characters of four classes of animals, etc. Trans. Linn. Soc. London, 11: 306-400.
- MARGALEF, R., 1951. Sobre Gammarus interesantes de Espana. Publ. Ins. Biol. apl., 9: 255-269.
- OLDEVIG, H., 1933. Sveriges Amphipoder. Göteborg Kungl. Vet.-Vitterh.-Samh., (B) 3 (4): 1-282.

- PIRLOT, J. M., 1939. Amphipoda, in: Rés. sci. Crois. Navire-Ecole Belge "Mercator", 2: 47-80 (= Mém. Mus. Roy. Hist. nat. Belg., (2) 15).
- REID, D. M., 1943. *Gammarus sarsi*, sp.n. (Crustacea, Amphipoda). Ann. Mag. nat. Hist., (11) 10: 281-285.
- , 1944. Gammaridae (Amphipoda); with key to the families of British Gammaridea. Synopses Brit. Fauna, 3: 1-33 (Linn. Soc., London).
- , 1945. *Gammarus ochlos* (nom. nov.), Crustacea, Amphipoda. Ann. Mag. nat. Hist., (11) 12: 637-638.
- SARŚ, G. O., 1894. An account of the Crustacea of Norway, 1. Amphipoda, 22-23: 473-516, pls. 169-184. (Cammermeyers, Christiania, Copenhagen).
- SHELLENBERG, A., 1934. Zur Amphipodenfauna der Kieler Bucht. Schr. naturwiss. Ver. Schleswig-Holstein, 20 (2): 129-144.
- SCHLIENZ, W., 1922. Systematische Bemerkungen zu den Gammarus-Arten aus norddeutschen Flussgeschwellen. Zool. Anz., 54: 215-217.
- SEGERSTRALE, S.G., 1947. New observations on the distribution and morphology of the amphipod, *Gammarus zaddachi* Sexton, with notes on related species. J. mar. biol. Ass. U.K., 27: 219-244.
- SEXTON, E. W. & G. M. SPOONER, 1940. An account of *Marinogammarus* (Schellenberg) gen. nov. (Amphipoda), with a description of a new species, *M. pirloti*. J. mar. biol. Ass. U.K., 24: 633-682.
- SPOONER, G. M., 1947. The distribution of *Gammarus* species in estuaries, 1. J. mar. biol. Ass. U.K., 27: 1-52.
- STEBBING, T. R. R., 1906. Amphipoda, 1. Gammaridea. Tierreich, 21: i-xxxix, 1-806.
- STOCK, J. H., 1966. A key to the species of the locusta-group of the amphipod genus *Gammarus*, with notes on their nomenclature. Bull. zool. Mus. Univ. Amsterdam, 1 (1): 1-6.
- WALKER, A. O., 1911. On *Gammarus campylops* Leach. Ann. Mag. nat. Hist., (8) 7: 397-399.

Dr. J.H. STOCK & Mr. P. KANT  
Zoological Museum of the  
University of Amsterdam  
Plantage Middenlaan 53  
Amsterdam-The Netherlands

**Fig. 1. *Gammarus inaequicauda* Stock, 1966; male.**  
**a, head, from the left; b, first antenna; c, second antenna;**  
**d, mandible palp; e, first leg; f, palm of first leg; g, sec-**  
**ond leg; h, palm of second leg; i, dorsal contour of urosome,**  
**from the right; j, second and third epimeres.**



**Fig. 2. Gammarus inaequicauda Stock, 1966; male.**  
**a, third leg; b, fourth leg; c, fifth leg; d, sixth leg; e, seventh leg; f, third uropod; g, telson, left half.**

