

## Taxonomic remarks on two species of the genus *Synalpheus* from the tropical eastern Pacific (Decapoda, Alpheidae)

by Mary K. WICKSTEN

**Abstract.** — Two former subspecies of *Synalpheus* are elevated to species rank. *Synalpheus sanjosei* Coutière, 1909, differs from *S. apioceros* Coutière, 1909, in having a rostrum longer than the orbital spines, the spine of the scaphocerite shorter than the carpuccerite and the small chela more robust. The spine on the upper surface of the major chela is distinctive. *S. sanjosei* ranges from the northern Gulf of California, Mexico to western Colombia, and lives in intertidal to shallow subtidal habitats. *Synalpheus occidentalis* Coutière, 1909, from the Gulf of California, is found to be distinct from *S. goodei* Coutière, 1909, from the western Atlantic and adjacent regions. The species can be differentiated from related species by the long rostrum and ocular spines, the long stylocerite, absence of a blade on the scaphocerite, the shape of the basicerite, and the numerous small spines on the outer margin of the uropod.

**Résumé.** — Remarques sur la systématique de deux espèces du genre *Synalpheus* (Decapoda, Alpheidae) de la région tropicale du Pacifique Est. Deux anciennes sous-espèces de *Synalpheus* sont élevées au rang d'espèce. *Synalpheus sanjosei* Coutière, 1909, diffère de *S. apioceros* Coutière, 1909, par son rostre plus long que les épines orbitaires, par l'épine du scaphocérîte plus courte que le carpuccérîte ainsi que par la petite pince plus robuste. L'épine sur la face supérieure de la grande pince est marquée. L'habitat de *S. sanjosei* s'étend du nord du Golfe de Californie, Mexique, jusqu'à la côte pacifique de la Colombie ; il vit dans la zone intertidale et infra-littorale. *Synalpheus occidentalis* Coutière, 1909, du Golfe de Californie, s'avère distinct de *S. goodei* Coutière, de l'Atlantique occidentale et des régions avoisinantes. Il s'en distingue par la longueur plus élevée du rostre et des épines orbitaires, par son stylocérîte long, par l'absence de lame sur le scaphocérîte, par la forme du basicérîte et par la présence de nombreuses petites épines sur le bord externe de l'uropode.

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Species of *Synalpheus* are common inhabitants of sponges, rocks, holes, algal mats and other nearshore habitats of the tropical eastern Pacific. Like species of *Alpheus*, they are called "snapping shrimp" due to their ability to make sharp cracking noises by use of the major chela. Despite their abundance, there have been no major studies of the species in the eastern Pacific since the publication of the work of H. COUTIÈRE (1909).

COUTIÈRE (1909) noted the similarity between many eastern Pacific snapping shrimp and species living in the western Atlantic and Caribbean regions. He described many eastern Pacific taxa of *Synalpheus* as subspecies of western Atlantic or Caribbean species. Examination of two of these supposed subspecies, *Synalpheus apioceros sanjosei* Coutière, 1909 and *Synalpheus goodei occidentalis* Coutière, 1909, indicates that there are consistent morphological differences between them and related taxa in the western Atlantic-Caribbean. In this paper, the two taxa are redescribed, elevated to species rank and compared with related species.

***Synalpheus sanjosei* Coutière, 1909**

(Fig. 1)

*Synalpheus apioceros sanjosei* Coutière, 1909 : 29, fig. 10; WICKSTEN, 1983 : 39; WICKSTEN and HENDRICKX, 1992 : 6.

**HOLOTYPE.** — Female, ovigerous, total length 14 mm. San Jose Island (24° 55'N, 110° 35'W), Gulf of California, Mexico. Léon Diguët, collector, 1900. Muséum national d'Histoire naturelle, Paris, catalog number 12099.

**OTHER MATERIAL.** — **Mexico** : Off Cholla Bay, Sonora, 6 m, 18 March 1967, Tom and Beatrice BURCH sta. 67040, 2 specimens ; 6 m, 18 March 1967, Tom and Beatrice BURCH sta. 67041, 3 specimens ; 5 m, 28 May 1970, Tom and Beatrice BURCH sta. 67070, 1 specimen ; Cholla Bay, Sonora, no depth given, 7 Nov. 1967, Tom and Beatrice BURCH, 1 specimen. San Nicolas Island, off San Carlos, Sonora, 20 m, rocky rubble, 2 July 1978, Alex KERSTITCH, 3 specimens. Blanca Island, Guaymas, Sonora, 6-9 m, 21 Nov. 1979, Alex KERSTITCH, 1 specimen. Magdalena Bay, Baja California, shore, 3 Nov. 1971, R.V. *Searcher* sta. 291, 4 specimens. Scammon's Lagoon, Baja California, 6-8 m, rocks, 13 Sept. 1953, Jens KNUDSEN and Donn GORSLINE, 1 specimen ; 6-15 m, rocks, 14 Sept. 1953, Jens KNUDSEN and Donn GORSLINE, 1 specimen. Santa Lucia Bay, Acapulco, Guerrero, to 4 m, 13 Sept. 1946, Carl HUBBS, 3 specimens ; 2-7 m, mud, sand and rocks ; 1-2 Feb. 1954, *Velero IV* sta. 2596-54, 45 specimens. San Lorenzo Rocks, Acapulco, Guerrero, 0-4 m, rocks, 30 Jan. 1954, *Velero IV* sta. 2591-54, 33 specimens. — **Costa Rica** : north shore Punta Morales, shore, 21 Feb. 1980, Richard BRUSCA, 4 specimens. Former specimens from collections of Allan Hancock Foundation/Los Angeles County Museum of Natural History. — **Colombia** : Estero de Varas, 24 March 1985, Henry VON PRAHL, 1 specimen, collection of California Academy of Sciences.

**DESCRIPTION**

Rostrum longer than orbital spines, rostrum and these spines shorter than first segment of antennular peduncle. Orbital spines narrow, about as wide as rostrum. First segment of antennular peduncle longer than second or third. Stylocerite longer than first segment of antennular peduncle. Basicerite with large dorsal spine, equal to or longer than length of orbital spine, lateral spine not as long as first segment of antennular peduncle. Scaphocerite with long lateral spine, longer than antennular peduncle but not as long as carpocerite ; blade not as long as third segment of antennular peduncle. Carpocerite longer than antennular peduncle. Carapace with acute pterygostomian angle and posterior notch.

Abdominal pleura of somites 1-3 rounded, pleura of somites 4-6 ending in obtuse-bluntly pointed angles. Telson shorter than uropods, with 2 pair large dorsolateral spines, ending in right angles and rounded apex, with 1 large and 1 small spine at each right angle. Outer uropod with pair sharp distolateral spines.

Third maxilliped slender, longer than carpocerite, with exopod. First (most proximal) segment longest, second very short, third segment slender and sparsely setose, ending in 4-5 sharp spines.

Ischium of minor cheliped short. Merus stout, lower margin convex, small spine at distal end. Carpus less than 0.5X length of palm. Chela with fingers about as long as palm. Fingers ending in coarse setae, but not in "brush" of setae.

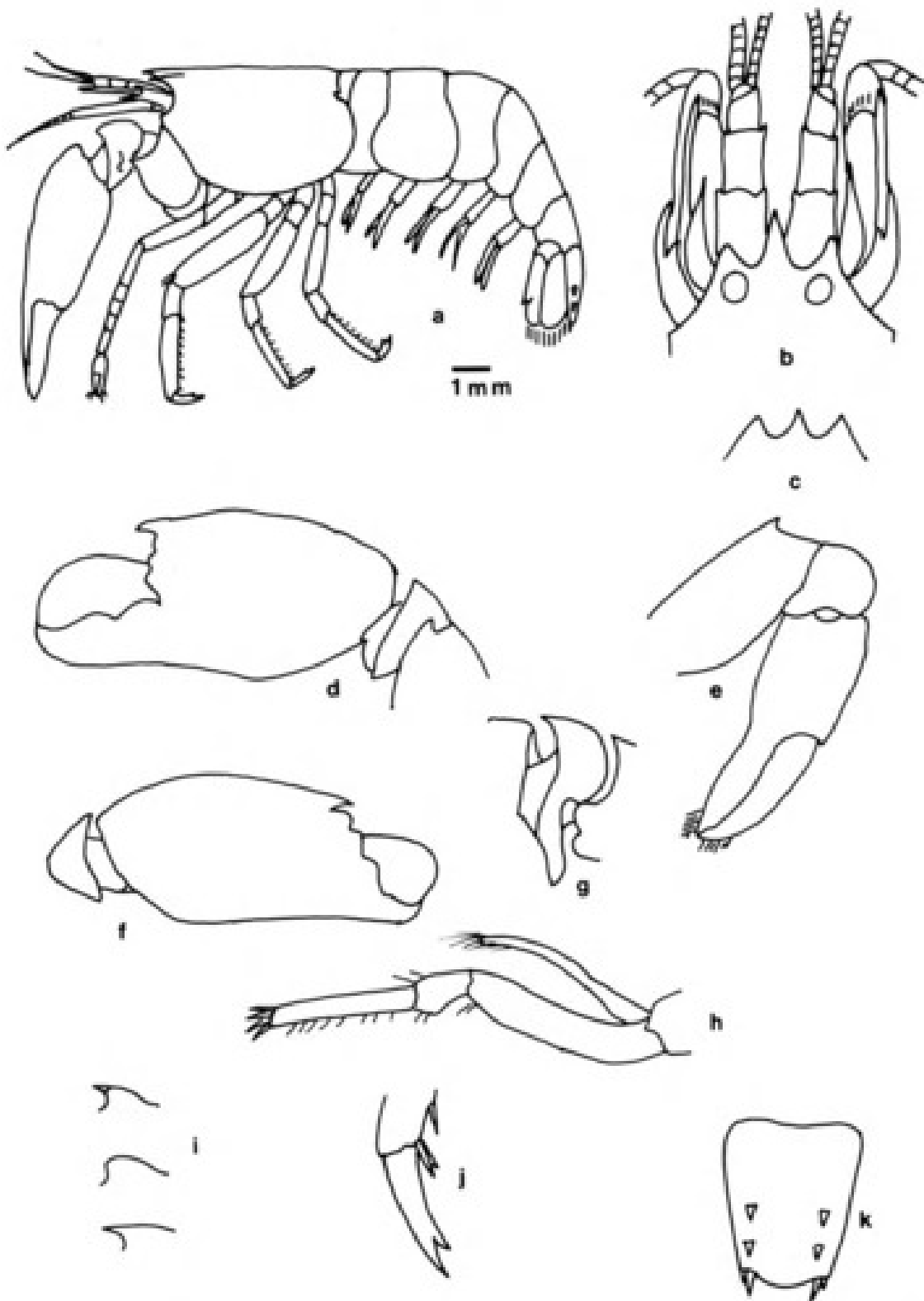


FIG. 1. — *Synalpheus sanjosei* Coutière : a, animal in lateral view ; b, anterior region ; c, rostrum and orbital spines of specimen from Guaymas, showing shorter rostrum ; d, f, major chela ; e, minor chela ; g, carpus of major chela showing point ; h, third maxilliped ; i, three forms of spine of major chela ; j, dactyl of third pereopod ; k, telson. Scale applies to entire animal only.

Major cheliped with ischium short, merus with concave margins and small acute distal point. Carpus short. Chela with hooked spine at distal margin above articulation of dactyl, fingers 0.5X length of palm, with dark tips.

Second pereopod chelate. Merus slightly longer than ischium. Carpus with 5 segments, first of these longest, segments 2-4 about equal in length, ultimate segment slightly longer than segment 4. Fingers of chela about equal to palm, ending in setae.

Third pereopod with ischium without spines. Merus 3.5X-4X long as wide, stout. Carpus overlapping propodus on anterior margin, with spine on inner margin. Propodus with 8 spines, single or in pairs. Dactyl slender, biunguiculate, outer hook longer than inner hook. Pereopods 4-5 similar to third pereopod, but shorter and less robust.

Color in life dark reddish-brown (photograph by Alex KERSTITCH, Tucson, Arizona). Total length to 20 mm.

#### REMARKS

COUTIÈRE (1909) distinguished *S. apioceros sanjosei* from the typical *S. apioceros* on the basis of the following features : in the former, the rostrum is slightly longer than the orbital spines versus being of the same length ; the lateral spine of the scaphocerite is shorter than the carpocerite rather than being about equal in length, and the carpus of the small cheliped " is unarmed above ". The small chela of *S. apioceros sanjosei* " is more massive ". I examined 11 specimens of *S. apioceros* from Cuba, Jamaica, Puerto Rico and Brazil (collections of the U.S. National Museum) and compared them with specimens from the eastern Pacific. The size and shape of the rostrum, orbital spines, carpocerite and scaphocerite agree with those illustrated by COUTIÈRE, and are consistent among the specimens. In neither the eastern Pacific nor the Atlantic-Caribbean specimens, however, is the carpus of the small cheliped " armed ", although some specimens have more of a prolongation of the upper distal margin than others. Except in animals regenerating chelipeds, the proportions of the small cheliped seem to be consistent, with the Atlantic-Caribbean animals having a more narrow chela and more slender, tapering fingers. The lateral margin of the telson of the Atlantic-Caribbean animals is slightly more sinuous than in most eastern Pacific specimens. As now interpreted, *S. apioceros* ranges from southern Florida to Surinam and westward to the Yucatan Peninsula (CHACE, 1972).

BANNER and BANNER (1975) noted that classification of species of *Synalpheus* into species groups for the most part has been unsuccessful. Although COUTIÈRE (1909) designated species groups, there is considerable overlap among the features between and even within species. It is difficult, therefore, to determine the relationships of most species of *Synalpheus*. Of the eastern Pacific species, *S. sanjosei* is most similar to those species having long and slender orbital spines and a rostrum, slender dactyls with similarly-shaped hooks on the third-fifth pereopods and no brush of setae on the fingers of the minor chela. Of these, *S. lockingtoni* Coutière, 1909, and *S. spinifrons* (H. Milne-Edwards, 1837) do not have a spine above the articulation of the dactyl of the major chela. Neither is likely to co-exist with *S. sanjosei*. The former usually is found in California, USA, and the latter lives in Peru and Chile (WICKSTEN, 1984 ; HOLTHUIS, 1952). *Synalpheus townsendi mexicanus* Coutière, 1909, has no dorsal spine on the basicerite. It is subtidal and known from the southern Gulf of California and the Alijos Rocks, Mexico (WICKSTEN and HENDRICKX, 1992). *Synalpheus arostris* Wicksten, 1989, from western Colombia, often lacks a rostrum and has 3 spines on the merus of the minor cheliped.

*Synalpheus sanjosei* resembles the widespread Indo-Pacific species *Synalpheus tumidomanus* (Paulson, 1875). Like *S. sanjosei*, it has a narrow rostrum, longer than the orbital teeth, and narrow orbital teeth, all of which are shorter than the first segment of the antennular peduncle. The spine of the scaphocerite is equal to or shorter than the carpocerite. The merus of the small cheliped ends in a point. The third pereopod does not have a spine on the merus; its dactyl is slender and ends in two nearly equal hooks. Although the major chela usually has a point or knob above the dactyl, however, it does not bear the characteristic sharp tooth or spine of *S. sanjosei*. The dactyl or fixed finger of the major chela of *S. tumidomanus* may lack teeth or have only one large, blunt tooth; *S. sanjosei* usually has 1-2 teeth.

***Synalpheus occidentalis* Coutière, 1909**

(Fig. 2)

*Synalpheus goodei occidentalis* Coutière, 1909 : 59-61, fig. 34; WICKSTEN, 1983 : 37; DARDEAU, 1984 : 45.

MATERIAL EXAMINED. — Six females, San Jose Island, Baja California Sur (Gulf of California), Mexico (approximately 25° N, 111° W), all in collections of Muséum national d'Histoire naturelle, Paris.

DESCRIPTION

Rostrum narrow, equal to or longer than ocular hoods, shallowly convex ventrally; ocular hoods narrowly triangular, with rounded tips. Carapace with pterygostomial angle somewhat pointed and with cardiac notch.

Segments of antennular peduncle rather slender, with points at distolateral margins. First segment longest, second longer than third. Stylocerite extending to distal 1/4 of first segment or exceeding it. Basicerite robust, without dorsal spine; ventral spine reaching beyond first segment of antennular peduncle and at least to midlength of second segment if not longer than it. Scaphocerite nearly as long as or longer than antennular peduncle but shorter than carpocerite, without blade. Carpocerite longer than antennular peduncle.

Third maxilliped slender, with exopod, antepenultimate segment longest of segments. Ultimate segment ending in spines.

Minor first pereopod more slender than major first pereopod. Merus without spines, carpus somewhat triangular in shape and shorter than palm, overlapping propodus on superior margin. Palm of chela rectangular, fixed finger ending in tuft of setae. Movable finger with sinuous margin or tooth near middle, with brush of setae on superior margin.

Major first pereopod stout. Merus with small spinule at superior distal margin. Palm with stout spine above articulation with dactyl.

Second pereopod slender and chelate. Carpus with 5 articles. Third pereopod stout, without spines on merus, basis or ischium. Propodus with row of spinules on flexor margin. Dactyl very short, biunguiculate. Fourth and fifth pereopods similar to third, but more slender.

Abdominal pleura of female rounded. Telson broader at base than at apex, with 2 pair dorsolateral spines near middle and 2 pair posterior spines. Outer uropod with 2 stout spines and 9-12 spinules, inner uropod without spines. Total length 16 mm.

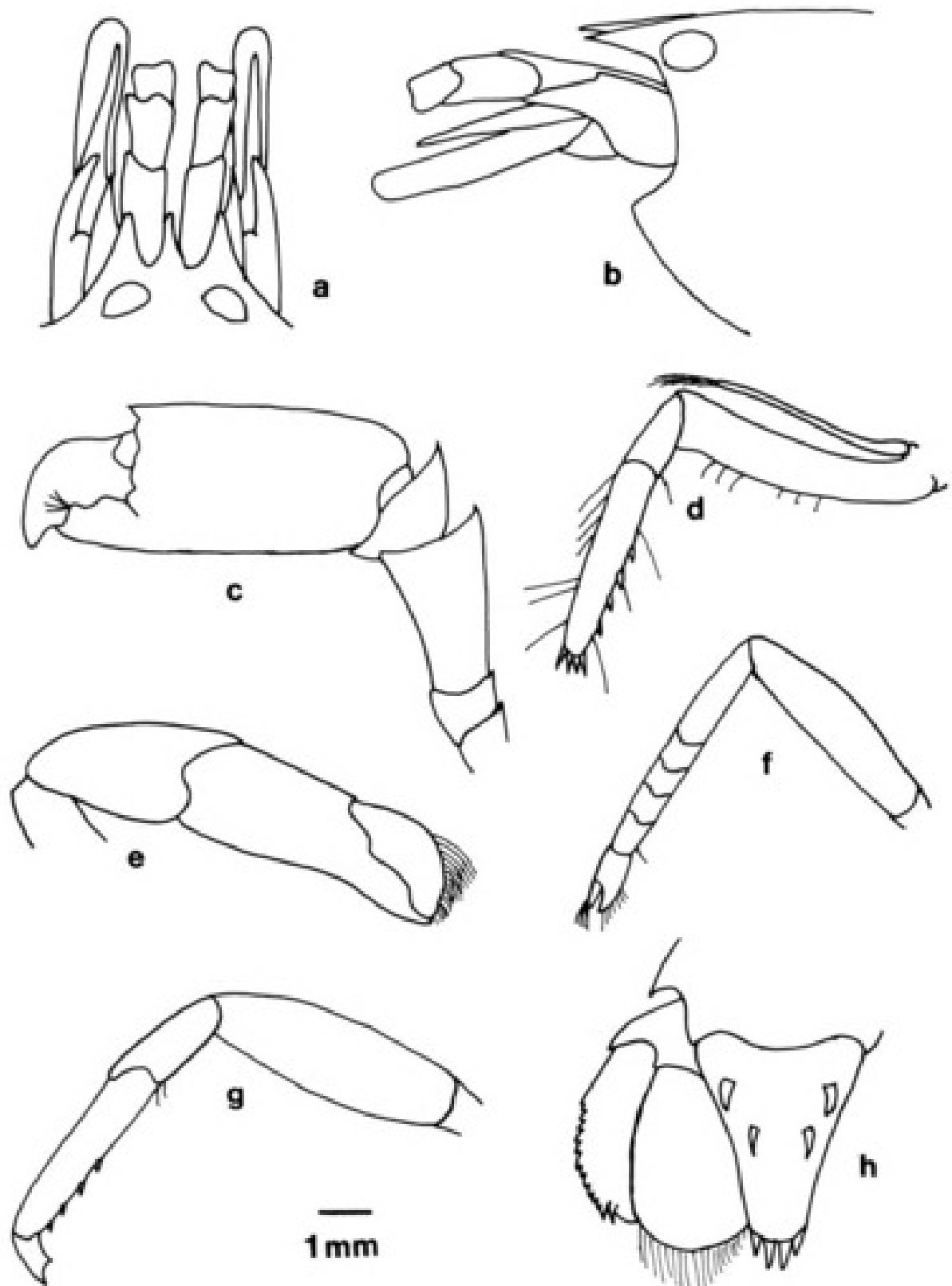


FIG. 2. — *Synalpheus occidentalis* Coutière, female, ovigerous : a, frontal region in dorsal view ; b, frontal region in lateral view ; c, major chela ; d, third maxilliped ; e, minor chela ; f, second pereopod ; g, third pereopod ; h, telson and uropod.

## REMARKS

*Synalpheus occidentalis* belongs to the Gambarelloides group of *Synalpheus* species, characterized by a dense fringe of curved setae on the extensor surface of the dactyl of the minor chela. Species of this group in the western Atlantic have been reviewed by DARDEAU (1984); however, except for descriptions given by COUTIÈRE (1909), little work has been done on classification of these species in the eastern Pacific.

The type material of *S. goodei occidentalis* could not be located at the Muséum national d'Histoire naturelle de Paris. However, the material examined is in good accord with the brief description and illustration given by COUTIÈRE (1909 : 59-61, fig. 34). COUTIÈRE examined a female specimen that had a "rudiment" of an antennal scale, a male that had only five teeth on the outer surface of the uropod and a specimen in which the stylocerite exceeded the first segment of the antennular peduncle. In the specimens examined in this study, none had an antennal scale, the females had 5-12 teeth on the outer surface of the uropod, and the stylocerite did not exceed the first segment of the antennular peduncle. However, these features have been reported previously to be variable in related species (DARDEAU, 1984). The slender rostrum, slightly longer than the ocular hoods and separated from them by deep indentations, is characteristic, as is the spine above the articulation of the dactyl of the major chela.

*Synalpheus goodei* Coutière, 1909, from the western Atlantic, has a distinct sharp angle on the superior surface of the basicerite. The scaphocerite bears a rudimentary scale; its spine is nearly as long as the carpocerite. The eastern Pacific specimens have a basicerite without such an angle. The scaphocerite has almost no scale if any at all; the spine reaches the distal 1/4 of the carpocerite. The dorsolateral spines of the telson of *S. goodei* are much longer than those of *S. occidentalis*.

The six females examined in this study originally were labelled as *Synalpheus longicarpus sanjosei* by Henri COUTIÈRE, but apparently, he never published a description of such a subspecies. *S. occidentalis* does resemble *S. longicarpus* Coutière, 1909. The frontal region of the carapace (orbital hoods and rostrum) is distinct from the rest of the anterior carapace margin in *S. longicarpus* instead of merging gradually as in *S. occidentalis*. The stylocerite is shorter and wider in *S. longicarpus* than in *S. occidentalis*. The basicerite of *S. longicarpus* has a more or less angular inferior margin in lateral view; that of *S. occidentalis* is rounded. The dactyl of the minor chela is less inflated in *S. longicarpus* than in *S. occidentalis*. The outer branch of the uropod of *S. longicarpus* bears 4-7 spinules anterior to the larger two spines of the posterolateral margin, instead of 5-12. The two species are not sympatric, *S. longicarpus* inhabiting the western Atlantic and adjacent areas and *S. occidentalis* living in the Gulf of California.

At least one other species of the Gambarelloides group lives in the eastern Pacific. *Synalpheus mulegensis* Rios, 1991, has a very short rostrum, as long as and as wide as the ocular hoods. The ultimate segment of its third maxilliped is blunt and ends in setae, not spines. This species recently was described as distinct from *S. herricki* Coutière, 1909, a western Atlantic species. Re-examination of material identified by CHACE (1937) as *S. herricki* from the Gulf of California indicates that these specimens belong to *S. mulegensis*, as suggested by Rios (1991).

Considering the differences between *S. goodei occidentalis* and related species, I propose to elevate it to species rank as *S. occidentalis* Coutière, 1909. The type locality given by COUTIÈRE is the " Gulf of San Jose, Lower California ", Mexico.

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