

The first stage zoea of *Pseudoliomera speciosa* (Dana, 1852) (Crustacea, Decapoda, Brachyura, Xanthidae)

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KEY WORDS

Crustacea,
Decapoda,
Brachyura,
Xanthidae,
Actaeinae,
first stage zoea,
Pseudoliomera speciosa.

Clark P. F. & Galil B. S. 1998. — The first stage zoea of *Pseudoliomera speciosa* (Dana, 1852) (Crustacea, Decapoda, Brachyura, Xanthidae). *Zoosystema* 20 (2) : 193-200.

ABSTRACT

The first zoeal stage of *Pseudoliomera speciosa* (Dana, 1852) is described, illustrated and compared with known first stage zoeas of the Xanthidae MacLeay, 1838 subfamily Actaeinae Alcock, 1898. No first stage zoeal character or combination of characters defining the Actaeinae was found.

RÉSUMÉ

Le premier stade zoé de Pseudoliomera speciosa (Dana, 1852) (Crustacea, Decapoda, Brachyura, Xanthidae). Le premier stade zoé de *Pseudoliomera speciosa* est décrit, illustré et comparé avec les premiers stades zoés des Xanthidae MacLeay, 1838 de la sous-famille Actaeinae Alcock, 1898. Il n'a été trouvé aucun caractère ou combinaison de caractères du premier stade zoé qui puisse définir les Actaeinae.

MOTS CLÉS

Crustacea,
Decapoda,
Xanthidae,
Actaeinae,
premier stade zoé,
Pseudoliomera speciosa.

INTRODUCTION

Of the fourteen genera assigned by Serène (1984: 20) to the Xanthidae MacLeay, 1838 subfamily Actaeinae Alcock, 1898, the first zoea is described for four. Recently an ovigerous crab of a fifth actaeine genus *Pseudoliomera speciosa* (Dana, 1852) was collected from Mauritius and the first stage zoeas were hatched in the laboratory. The purpose of this study is to compare the chaetotaxy of *P. speciosa* with known Actaeinae first stage zoeas.

MATERIALS AND METHODS

The ovigerous *Pseudoliomera speciosa* (Dana, 1852) was collected by SCUBA diving from Albion Rocks, Baie de la Petite Rivière, off Victory Road, Petite Rivière, Albion, Mauritius, ca. 20°12.5'S - 57°23.5'E, 3-7 m, 15 May 1995. The female was held in the Mauritius Fisheries Research Centre Laboratory at about 25 °C until the eggs hatched on eighteenth to nineteenth May 1995. The first stage zoeas were preserved in alcohol and the spent female, together with the remaining undissected zoeas, were deposited in The Natural History Museum, London under the registration number 1997.1.

The first stage zoeas were not stained and dissected appendages were mounted in Polyvinyl lactophenol using a WILD M5 binocular microscope with a supplementary lens ($\times 2$). The cover slips of the slides were sealed with clear Sally Hansen nail varnish and the appendages were drawn using an OLYMPUS BH-2 microscope equipped with Nomarski interference contrast and attached *camera lucida*. Five replicates of each appendage were dissected to complete setal observations. The long plumose natatory setae of the first and second maxilliped are drawn truncated. The sequence of the zoeal description is based on the malacostracan somite plan and described from anterior to posterior. Setal armature on appendages is described from proximal to distal segments and in order of endopod to exopod.

Pseudoliomera speciosa (Dana, 1852)
(Figs 1-4)

DESCRIPTION

Zoea I

Carapace (Fig. 1A, E, F): dorsal spine curved with many small spines, longer than rostral spine; rostral spine shorter than dorsal spine, fractionally longer than antennal protopod, armed with spines; lateral spines present and armed with spines on dorsal margin; one pair of posterodorsal setae; ventral margin without setae; anterodorsal surface of carapace sparsely covered with small spines; eyes sessile.

Antennule (Fig. 1B): uniramous, endopod absent; exopod unsegmented with four terminal aesthetascs (two broad and long, two shorter and slender) plus one small terminal seta.

Antenna (Fig. 1C, D): protopod distally spinulate, fractionally shorter in length than rostral spine; endopod reduced to a small spine; exopod rudimentary, unsegmented, with one long subterminal and two terminal setae unequal in length.

Mandible: palp absent.

Maxillule (Fig. 2A): coxal endite with seven setae; basal endite with five terminal setal processes and two small teeth; endopod 2-segmented, proximal segment with one seta; distal segment with six (2 subterminal + 4 terminal) setae; exopod seta absent.

Maxilla (Fig. 2B): coxal endite bilobed with 4 + 4 setae; basal endite bilobed with 5 + 4 setae; endopod bilobed with 3 + 5 (2 subterminal + 3 terminal) setae; exopod (scaphognathite) margin with four setae and one long distal stout process.

First maxilliped (Fig. 3A): coxa without setae; basis with ten setae arranged 2, 2, 3, 3; endopod 5-segmented with 3, 2, 1, 2, 5 (1 subterminal + 4 terminal) setae respectively; exopod 2-segmented, distal segment with four long terminal plumose natatory setae.

Second maxilliped (Fig. 3B): coxa without setae; basis with four setae; endopod 3-segmented, with 1, 1, 6 (3 subterminal + 3 terminal) setae respectively; exopod 2-segmented, distal segment with four long terminal plumose natatory setae.

Third maxilliped: absent.

Pereiopods: absent.

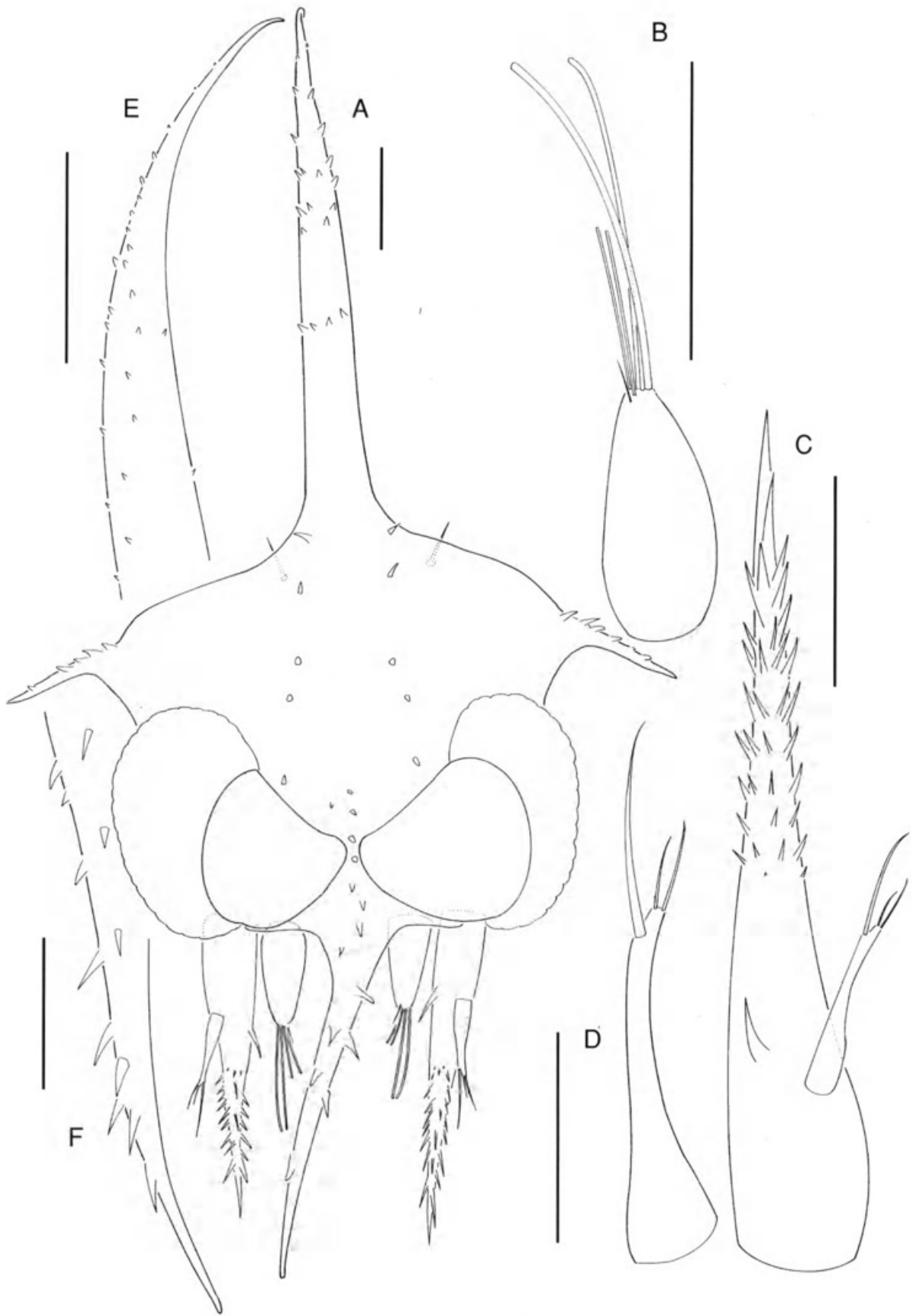


FIG. 1. — *Pseudoliomera speciosa* (Dana, 1852): zoea I. **A**, anterior view of carapace; **B**, antennule; **C**, antenna; **D**, antennal exopod; **E**, dorsal spine; **F**, rostral spine. Scale bars: A-C, E, F, 0.1 mm; D, 0.05 mm.

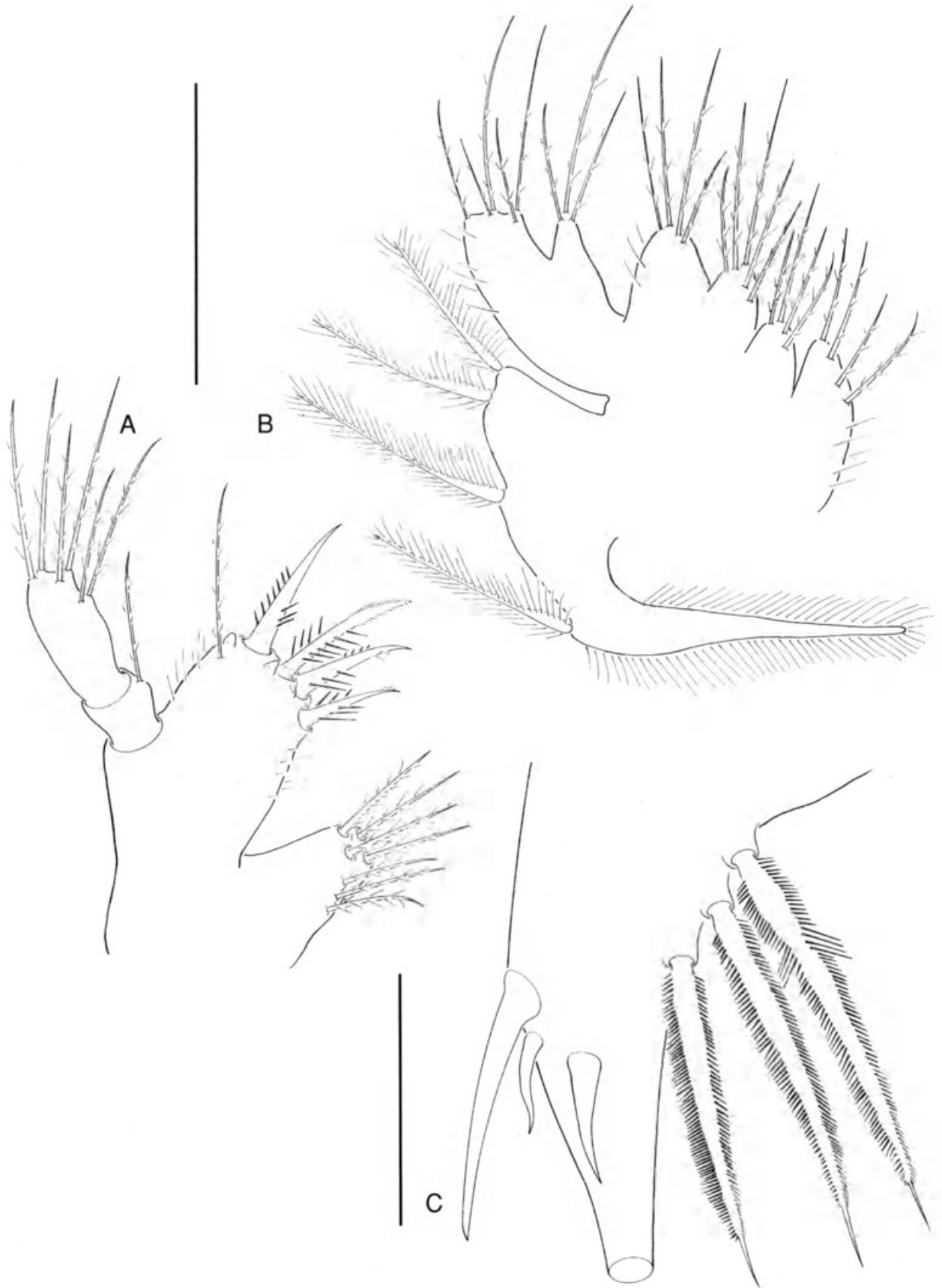


FIG. 2. — *Pseudoliomera speciosa* (Dana, 1852): zoea I. **A**, maxillule; **B**, maxilla; **C**, telson. Scale bars: 0.1 mm.

Abdomen (Fig. 4A, B): five somites; somite 2 with a pair of dorsolateral processes directed anteriorly; somite 3 with a pair of dorsolateral processes directed ventrally; somites 1-2 with rounded posterolateral processes and somites 3-5 with short posterolateral spinous processes; somite 1 without setae; somites 2-5 with one pair of posterodorsal setae; pleopod buds absent.

Telson (Figs 2C, 4A, B): each telson fork long, gradually curved distally; one long and one sigmoid lateral spine; dorsal medial spine present; posterior margin with three pairs of stout spinulate setae.

DISCUSSION

Clark & Ng (1998, table 1) tabulated first stage zoeal characters that, used in combination, might

define the Xanthidae MacLeay, 1838 and the zoea I of *Pseudoliomera speciosa* described in this study is fully in accord with this definition. The first stage zoea of *Pseudoliomera speciosa* exhibits a distinctive spinulation of the anterodorsal carapace surface that separates it from known Actaeinae zoea I larvae.

Clark & Ng (1998) suggest that the carapace spine armature, the antenna and spinulation of the telson forks may provide distinguishing characters for xanthid taxa below the family level, at the first zoea stage. These characters were examined in the first stage zoeas of *Actaea semblatae* Guinot, 1976 [as *Actaea savignyi* (H. Milne Edwards, 1834)] by Terada (1987); *Novactaea pulchella* (A. Milne-Edwards, 1865) by Terada (1990); *Gaillardiiellus orientalis* (Odhner, 1925) by Ng & Clark (1994); *Actaeodes hirsutissimus* (Rüppell, 1830) and *A. tomentosus* (H. Milne

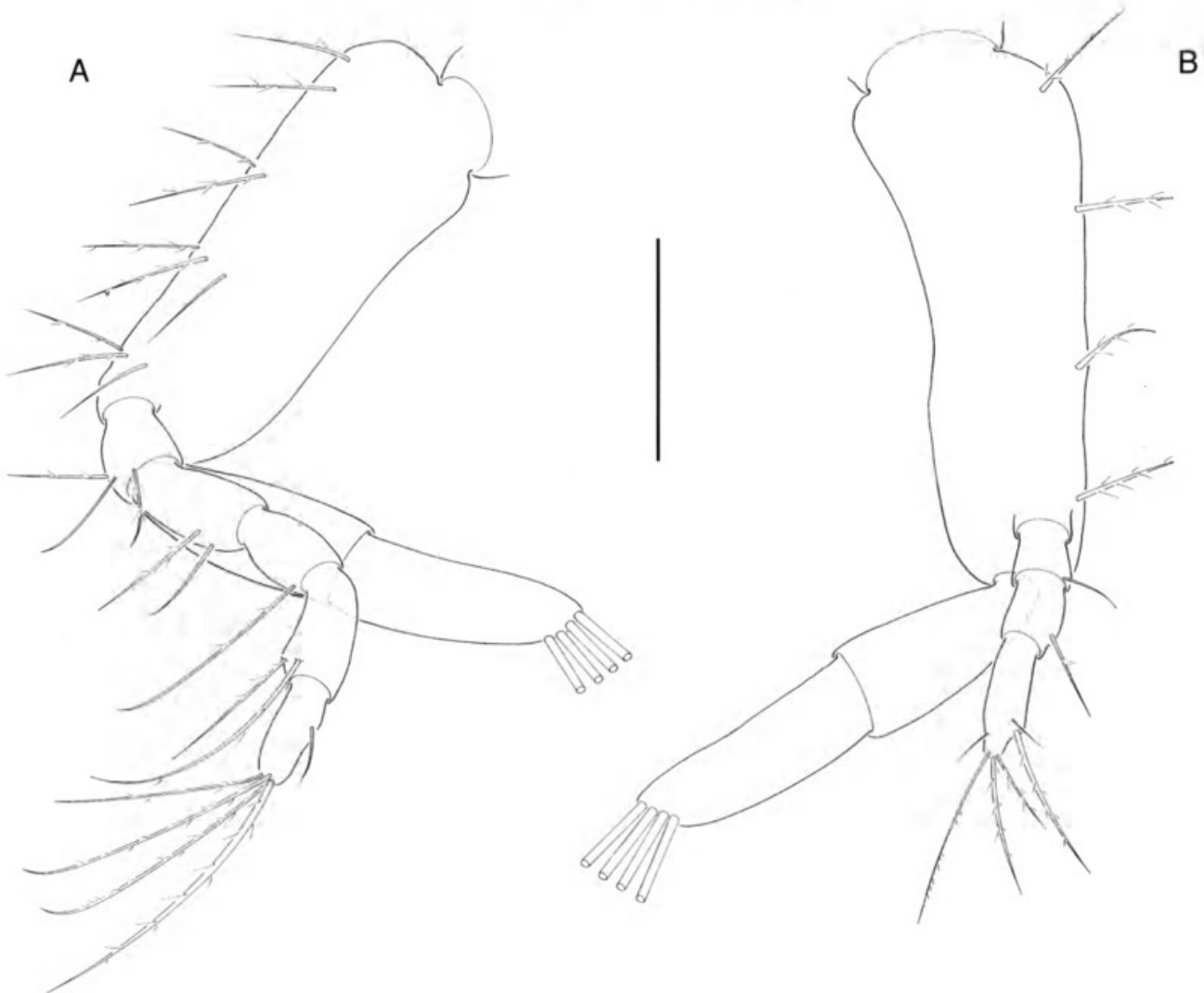


FIG. 3. — *Pseudoliomera speciosa* (Dana, 1852): zoea I. **A**, first maxilliped; **B**, second maxilliped. Scale bar: 0.1 mm.

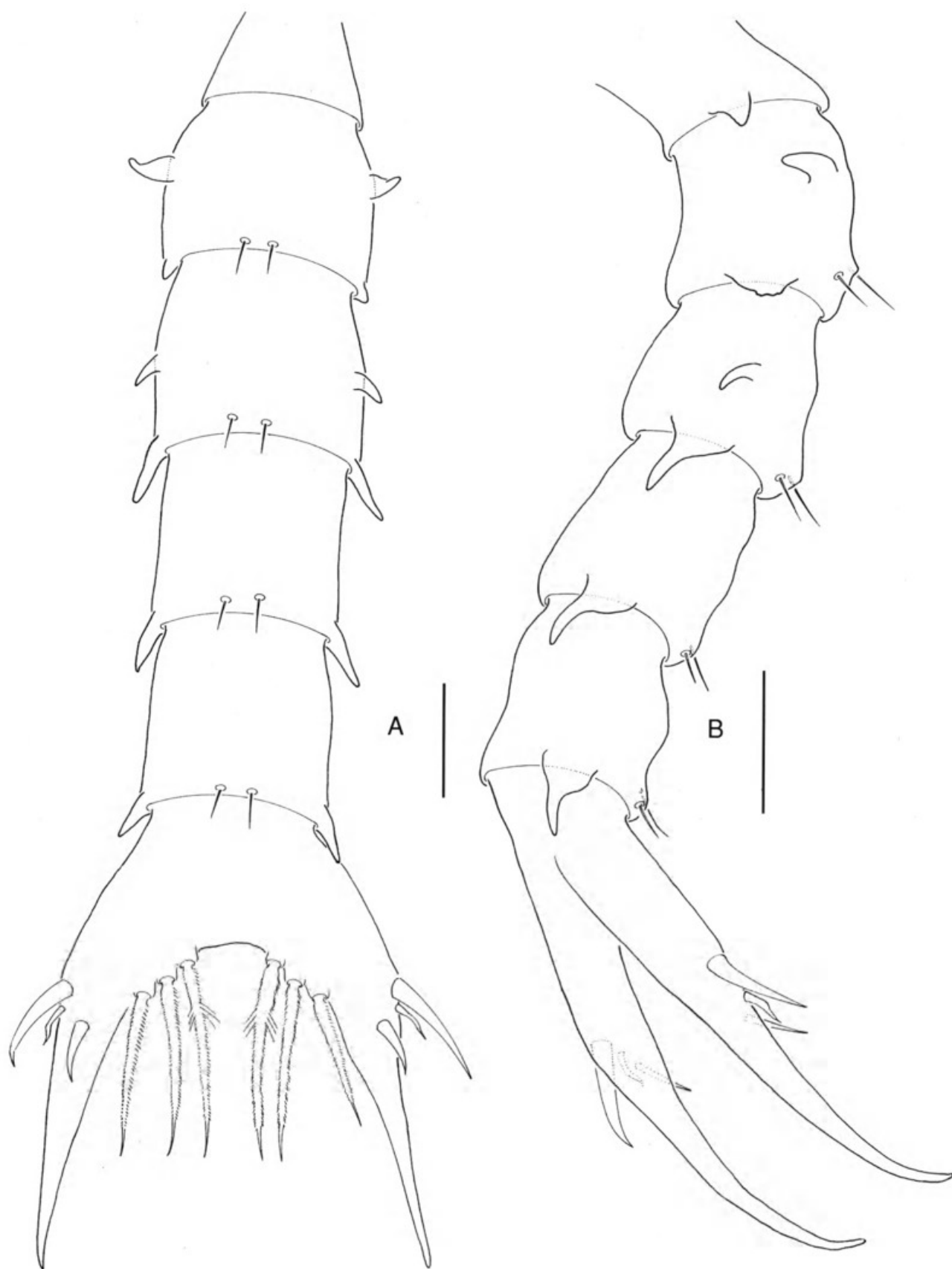


FIG. 4. — *Pseudoliomera speciosa* (Dana, 1852): zoea I abdomen. **A**, dorsal view; **B**, lateral view. Scale bars: 0.1 mm.

Edwards, 1834) both by Clark & Al-Aidaros (1996)] and from *Pseudoliomera speciosa* described in the present study in order to establish subfamilial characters diagnostic of first stage Actaeinae zoea. All these first stage zoeas conform with the Xanthidae characters listed by Clark & Ng (1998, table 1).

Carapace spine armature

The carapace spines of *Pseudoliomera speciosa* (this study, Fig. 1A, E, F) are spinulate, the dorsal has numerous minute spines, the rostral has a number of well-developed spines distally and the lateral are spinulate on the dorsal margin. In comparison only the rostral spine of *Actaeodes tomentosus* and *A. hirsutissimus* first stage zoeas, as described by Clark & Al-Aidaros (1996, fig. 1A-C), is spinulate, and the dorsal and lateral spines are smooth. The dorsal and rostral spines of *Novactea pulchella* appear proportionately longer (Terada 1990, fig. 5A1) when compared with *Actaeodes*, and the rostral spine is smooth. The carapace spines of *Gaillardiellus orientalis* (Ng & Clark 1994, fig. 1A) are naked but distinctive with rounded swollen tips on the dorsal and lateral spines. All the carapace spines of *Actaea semblatae*, as described by Terada (1987, fig. 11, A1), are devoid of spinulation and have pointed tips.

Antenna

The antenna of *P. speciosa* (see this study Fig. 1D) is identical to that of *Actaeodes tomentosus* (Clark & Al-Aidaros 1996, fig. 1F, G) and is differentiated from *A. hirsutissimus* (Clark & Al-Aidaros 1996, fig. 1E, H) by the exopod setation, instead of one long subterminal and two unequal setae, the latter species possesses only one terminal seta. An endopod reduced to a small spine is characteristic of these three species. In *N. pulchella*, the antennal exopod (Terada 1990, fig. 5C1) is similar to *P. speciosa*, but the protopod is naked and the endopod well-developed. Ng & Clark (1994, fig. 1C, D) illustrated a smooth protopod for *G. orientalis* with a distinctive swollen tip that is devoid of an endopod, although the exopod is similar to *P. speciosa* and *A. tomentosus*. The antenna of *Actaea semblatae* figured by Terada (1987, fig. 11, A1) depicts a

smooth protopod without a swollen tip, the endopod is present and the exopod is reduced to a single seta.

Spinulation of telson forks

All the telson fork spines of *P. speciosa* are prominent, with the distal lateral spine sigmoid in shape (this study, Fig. 2C). The proximal lateral and the dorsal telson spines of *Actaeodes tomentosus* are prominent with a slightly smaller distal lateral spine (Clark & Al-Aidaros 1996, fig. 3E). By comparison, the telson armature of *A. hirsutissimus* (Clark & Al-Aidaros 1996, fig. 3D) and *N. pulchella* (Terada 1990, fig. 3H1) is similar except that the distal lateral spine is considerably reduced. The telson armature of *G. orientalis* (Ng & Clark 1994, fig. 2C) and *Actaea semblatae* (Terada 1987, fig. 11, II) comprises setae, not spines as described for the other species.

From the existing descriptions of known actaeine first stage zoeas and this study, no single character or suite of characters appears to define the Actaeinae.

Acknowledgements

We wish Alain Crosnier a happy retirement and thank him for his support. This study could not have been undertaken without the help of the Fishery Officers at the Albion Fisheries Research Centre, Ministry of Fisheries and Marine Resources, Petite Rivière, Albion, Mauritius and the logistical support provided by the Smithsonian Institution.

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