Revision of the genus *Noculacia* Mayer, 1903 (Crustacea: Amphipoda: Caprellidea) with the description of two new species

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Received 3 June 2002 · Accepted 24 September 2002

Abstract

The genus *Noculacia* Mayer, 1903 is reviewed. Two new species, *N. africana* n. sp. and *N. australiensis* n. sp., are described based on material collected from southeast Africa and western-southern Australia, respectively. *Noculacia bullata* Mayer, 1903, the type species of the genus, is redescribed. *Noculacia bogisa* Mayer, 1903 is transferred to the genus *Pseudoprotella* Mayer, 1890 mainly on the basis of the presence of a well developed molar, the structure of pereopods 3 and 4, and the setal formula of the mandibular palp being 2-x-1. The genus *Noculacia* is presently composed of three species: *N. africana* n. sp., *N. australiensis* n. sp. and *N. bullata* Mayer, 1903. The genus *Pseudoprotella* is composed of *P. bogisa* (Mayer, 1903), *P. inermis* Chevreux, 1927, and *P. phasma* (Montagu, 1804). A key to the species of *Noculacia* and *Pseudoprotella* is provided and a detailed morphological comparison among the species is also given.

Key words: taxonomy, Crustacea, Amphipoda, Caprellidea, *Noculacia africana* n. sp., *Noculacia australiensis* n. sp., *Noculacia bullata*, *Pseudoprotella bogisa*, Africa, Australia

Introduction

The genus *Noculacia* was established by Mayer (1903). He described two species of *Noculacia*, *N. bullata* Mayer, 1903 – the type species – collected close to Singapore and Makassar Strait, and *N. bogisa* based on specimens collected in the Arafura Sea and Thailand. So far, the genus *Noculacia* was only composed of these two species (McCain & Steinberg 1970).

During stays at the U.S. National Museum of Natural History, Smithsonian Institution, Washington D.C., and at the Australian Museum, Sydney, the author studied material of *Noculacia* and found specimens differing from *N. bullata* and *N. bogisa*. Taking into consideration that Mayer's description was not complete, the type materials of *N. bullata* and *N. bogisa* were consulted to redescribe both species and to compare them morphologically with the undescribed material. Detailed examination revealed the presence of two new species, *N. africana* n. sp. and *N. australiensis* n. sp., and that *Noculacia bogisa* belongs to the genus *Pseudoprotella* Mayer, 1890. Consequently, the genus *Noculacia* is presently composed of three species (*N. bullata*, *N. africana* and *N. australiensis*), and the new combination *Pseudoprotella bogisa* (Mayer) is established.

The location of the specimens examined is indicated by the following abbreviations: AM = Australian Museum, Sydney; USNM = U.S. National Museum of Natural History, Smithsonian Institution, Washington D.C.; ZMA = Zoological Museum, Amsterdam, The Netherlands; ZMUC = Zoological Museum, University of Copenhagen, Denmark.

Systematics

Family Caprellinoididae Laubitz, 1993

Diagnosis. Antenna 2 flagellum two-articulate. Mandibular molar absent or abnormal; palp three (two)-articulate; setal formula usually 1-x-1; incisor and left lacinia mobilis five- or six-toothed, right lacinia variable. Maxilla 1 with six spiniform setae on outer plate. Maxilliped outer plate larger than inner. Lower lip with inner lobes frequently fused.
Gnathopod 1 propodus triangular; palm defined by paired spines. Two or three pairs of gills. Pereopods 3 and 4 greatly reduced. Abdomen very simple.

**Genus Noculacia Mayer, 1903**

**Diagnosis.** Antenna 2 flagellum two-articulate. Mandibular molar absent; palp three-articulate; setal formula 1-x-1; incisor and left lacinia mobilis five-toothed. Maxilla 1 with six spiniform setae on outer plate. Gills on pereonites 3 and 4. Pereopods 3 and 4 one- or two-articulate, spindle-shaped. Abdomen without appendages.

**Type species. Noculacia bullata Mayer, 1903.**

**Noculacia africana n. sp.** (Figs 1-5)

**Diagnosis.** Head with a dorsal projection in males, smooth in females. Body smooth, without dorsal projections. No lateral projections. Setal formula of mandible palp 1-3-1. Inner lobes of lower lip rectangular and not fused. Propodus of gnathopod 1 with margin smooth. Pereopods 3 and 4 uni-articulate but almost separated in two articles.

**Etymology.** Named africana alluding to the geographical distribution of the species.

**Type material.** Holotype: male (USNM 1006131), 24*64’ S 35*20’E, 165 m, coll. University of Maine, 18 August 1964, Agassiz trawl. Paratypes: as holotype except: allotype pre-mature female (USNM 1006132), pre-mature female (USNM 1006133).

**Description.** Holotype male body length 3.5 mm. Lateral view. Head with a dorsal projection. Body smooth (Fig. 1A). Pereonite 1 fused with head, suture not present; pereonites 3-5 subequal in length; pereonite 7 the shortest. Gills (Fig. 1A). Rounded, almost as long as wide. Mouthparts. Upper lip (Fig. 2B) bilobed, smooth distally. Mandibles (Fig. 2D, E) with three-articulate palp; distal article with setal formula 1-3-1 without knobs; second article of palp with one simple seta; mandibular molar absent; left mandible (Fig. 2D) with five-toothed incisor, lacinia mobilis five-toothed followed by three plates and a tiny one; incisor of right mandible (Fig. 2E) five-toothed, lacinia mobilis finely denticate, followed by two more plates. Lower lip (Fig. 2A) inner lobes rectangular, not fused; inner and outer lobes smooth apically. Maxilla 1 (Fig. 2G) outer lobe with six spiniform setae; distal article of palp with three robust setae and two teeth; two setae medially. Maxilla 2 (Fig. 2F) inner lobe trapezoidal with four setae; outer lobe rectangular, 1.5 times as long as inner lobe, with seven setae. Maxilliped (Fig. 2C) inner plate small and rectangular with two simple setae; outer plate about 2.5 times as large as inner plate, with three setae; palp four-articulate, dactylus with a row of setae.

Antennae. Antenna 1 (Fig. 3A) somewhat longer than half of body; flagellum seven-articulate. Antenna 2 (Fig. 3B) without swimming setae; proximal article of peduncle with a distal projection; flagellum two-articulate.

Gnathopods. Gnathopod 1 (Fig. 3C) basis as long as ischiium, merus and carpus combined; propodus elongate, length about two times width, palm with two proximal grasping spines, margin smooth; dactylus not serrate. Gnathopod 2 (Fig. 3D) inserted on anterior half of pereonite 2; basis as long as pereonite 2; ischiium rectangular; merus rounded; carpus short and rectangular; propodus about 1.2 times as long as basis; palm with a proximal projection provided with one grasping spine, and two additional projections medially.

Pereopods. Pereopods 3 and 4 (Fig. 4A, B) subequal, spindle-shaped, one-articulate but almost separated in two articles; pereopod 3 (Fig. 4A) with two setae medially, one of them plumose, and two setae distally; pereopod 4 (Fig. 4B) with one plumose seta medially and three setae distally. Pereopod 5 (Fig. 4C) elongate and with long setae. Pereopods 6 and 7 subequal in length but increasing in respective robustness; propodus with two plumose setae proximally.

Penes (Fig. 5A) large, length about two times width.

Abdomen (Fig. 5A) with a pair of lateral lobes and a single dorsal lobe.

Allotype female body length 3.2 mm. Head without dorsal projection (Fig. 1B). Suture between head and pereonite 1 present, but scarcely marked. Oostegites not described since the female is still pre-mature (Fig. 1B).

**Remarks.** Noculacia africana n. sp. is compared with the other two species of the genus, *N. australiensis* n. sp. and *N. bullata*, in Table 1. The distribution of this species (only known from the type locality) is shown in Fig. 6. There are no details available about the ecological characteristics of the bottom where *N. africana* was collected (165 m depth). Other caprellids identified from the same area were: *Fallotritella biscoyensis* McCain, 1968.
Paradeutella bidentata Mayer, 1890 and Protella similis Mayer, 1903.

**Noculacia australiensis** n. sp.  (Figs 7-11)

**Diagnosis.** Head smooth. Body with dorsal projections on pereonites 2-5. A pair of lateral projections proximally on pereonites 3 and 4 (males) or 3 (females). Setal formula of mandible palp 1-4-1. Inner lobes of lower lip completely fused. Propodus of gnathopod 1 with margin denticulate. Pereopods 3 and 4 two-articulate.

**Etymology.** Named australiensis alluding to the geographical distribution of the species.

**Type material.** Holotype: male (USNM 301728), Great Australian Bight, South Australia, 33º14'30"S 126º20'00"E, 183-192 m, coll. University of Maine, 8 September 1968, Exp. USARP, Vessel Eltanin R/V, Blake trawl. Paratypes: as holotype except: allotype female (USNM 1006129), female (USNM 1006130).

**Other material examined.** 1 pre-mature female AM P62066 (southwest tip of West Lewis Island, Dampier Archipelago, Western Australia, 20º36.249'S 116º35.710'E (GPS), gravel bottom with clumps of soft coral, sponges, isolated clumps of dead hard coral collected by hand on SCUBA, 10 m, P. Hutchings and L. Avery, 27 July 2000); 1 male AM P62067 (2 km west of Rocky Head, Enderby Island, Dampier Archipelago, Western Australia, 20º37.096'S 116º26.721'E (GPS), dead coral substrate covered in sponges and algae, collected by hand on SCUBA, 14 m, P. Hutchings and L. Avery, 3 August 2000; 1 male AM P48878 (south of Carnavon, Seven Mile Beach, Western Australia, 29º11'S, 114º53'3'E); 1 female AM P62064 (Western Australia, 19º56.7'S 117º53.8'E to 19º56.9'S 117º53.6'E (GPS), collected with sled dredge, 42-43 m, 26 August 1983, North-West Shelf project, Vessel Soela R/V); 2 mature females, 1 pre-mature female AM P62062 (Western Australia, 19º43.9'S 117º54.5'E to 19º44.2'S 117º53.8'E (GPS), sled dredge, 52-53 m, 2 September 1983, North-West Shelf project, Vessel Soela R/V).

**Description.** Holotype male body length 4.7 mm. Lateral view. Head smooth. Body with dorsal projections on pereonites 2-5. A pair of lateral projections proximally on pereonites 3 and 4 (Fig. 7A). Pereonite 1 fused with head, suture not present; pereonites 3-5 subequal in length; pereonite 7 the shortest.

Gills (Fig. 7A). Oval, length about 2 times width. Mouthparts. Upper lip (Fig. 8A) bilobed, smooth distally. Mandibles (Fig. 8D, E) with three-articulate palp; distal article with a setal formula 1-4-1 without knobs; first and second articles of palp each with one simple seta; mandibular molar absent; left mandible (Fig. 8E) with incisor five-toothed, lacinia mobilis five-toothed followed by three plates; incisor of right mandible (Fig. 8D) five-toothed, lacinia mobilis transformed into a plate, followed by two more plates. Lower lip (Fig. 8B) inner lobes completely fused; inner and outer lobes smooth apically. Maxilla 1 (Fig. 8F) outer lobe with six spiniform setae; distal article of palp with four robust setae and one seta medially. Maxilla 2 (Fig. 8G) inner lobe triangular, with two setae; outer lobe rectangular, 1.5 times as long as inner lobe, with two setae. Maxilliped (Fig. 8C) inner plate small and rectangular, with two simple setae; outer plate about 2.5 times as large as inner plate, with three setae; palp four-articulate, dactylus with a row of setulae.

Antennae. Antenna 1 (Fig. 9A) about half of body length; flagellum six-articulate. Antenna 2 (Fig. 9B) without swimming setae; proximal article of peduncle with a distal projection; flagellum two-articulate.

Gnathopods. Gnathopod 1 (Fig. 9C) basis as long as ischium, merus and carpus combined; propodus elongate, length about two times width, palm with two proximal grasping spines, margin denticulate; dactylus serrate on distal half. Gnathopod 2 (Fig. 9D) inserted on anterior half of pereonite 2; basis about three fourths the length of pereonite 2; ischium rectangular; merus rounded; carpus short and rectangular; propodus as long as basis; palm with a proximal projection provided with one grasping spine, and another projection medially; dactylus slightly curved distally.

Pereopods. Pereopods 3 and 4 (Fig. 10A, B) subequal, spindle-shaped, two-articulate, proximal article rectangular, with three setae on pereopod 3 (Fig. 10A) and two setae on pereopod 4 (Fig. 10B); distal article conical with a plumose seta distally. Pereopods 5-7 missing in holotype, described from female allotype: pereopod 5 (Fig. 10C) elongate, with long setae. Pereopods 6 and 7 subequal in
length but increasing in respective robustness, propodus with three proximal robust, plumose setae.

Penes (Fig. 11A) large, length about two times width.

Abdomen (Fig. 11A) with a pair of lateral lobes with three setae each, and with a single dorsal lobe with two simple setae.

Allotype female body length 4.2 mm. Lateral projections on pereonite 4 lacking (Fig. 7B). Oostegites on pereonites 3 and 4 setose (Fig. 7B).

Remarks. Noculacia australiensis n. sp. is close to N. bullata, the type species of the genus, but can be easily distinguished mainly on the basis of the following characteristics (see Table 1): (1) N. bullata has a dorsal projection on the head, this projection is lacking in N. australiensis; (2) most of the lateral projections present on the body of N. bullata are lacking in N. australiensis; (3) pereopods 3 and 4 are one-articulate in N. bullata, two-articulate in N. australiensis; (4) the margin of the propodus of gnathopod 1 is smooth in N. bullata, denticulate in N. australiensis.

The specimens of N. australiensis collected from South Australia are morphologically similar to those from Western Australia; some adult specimens from Western Australia are slightly larger than the adult specimens from South Australia, showing the maximum length of the examined specimens at 5.4 mm. Noculacia australiensis has been found at depths from 10 to 192 m, living on gravel bottoms and dead corals of shallow waters.

**Noculacia bullata** Mayer, 1903  
(Figs 12-15)

*Noculacia bullata* Mayer, 1903: 51-52; pl. 2, figs 17-20; pl. 7, figs 1-6; pl. 9, fig. 18; McCain & Steinberg (1970: 57).

**Diagnosis.** Body with dorsal projections on head and pereonites 2-5, and lateral projections on pereonites 2-4. Setal formula of mandible palp 1-6-1. Inner lobes of lower lip almost completely fused. Propodus of gnathopod 1 with margin smooth. Pereopods 3 and 4 uni-articulate.

**Type material examined.** 1 male, 1 female syntypes (ZMA Amph. 107218).

**Type locality.** Singapore, off Pasir Ranjjang, from muddy sand; 8°23.5’S 119°04.6’E; and Pulu Sebangkatan, Makassar Strait (Mayer 1903, McCain & Steinberg 1970).

**Redescription.** Syntype male body length 5.7 mm. Lateral view. Head with a round projection distally. Body with dorsal projections on pereonites 2-5, and lateral projections on pereonites 2-4 (Figs 12A, 15A). Pereonite 1 fused with head, suture present; pereonites 3 and 5 subequal in length; pereonite 7 shortest.

Gills (Fig. 12A). Elongate, length about 3 times width.

Mouthparts. Upper lip (Fig. 13B) bilobed, smooth distally. Mandibles (Fig. 13D, E) with three-articulate palp; distal article with setal formula 1-6-1 without knobs; second article of palp with one simple seta on left mandible (Fig. 13D), without setae on right mandible (Fig. 13E); mandibular molar absent; left mandible with five-toothed incisor, lacinia mobilis five-toothed followed by three plates; incisor of right mandible five-toothed, lacinia mobilis transformed into a plate, followed by two more plates; molar flake absent. Lower lip (Fig. 13A) inner lobes almost fused; inner and outer lobes smooth apically. Maxilla 1 (Fig. 13F) outer lobe with six spiniform setae; distal article of palp with three robust setae and four teeth distally, and two setae medially. Maxilla 2 (Fig. 13G) inner lobe triangular with three setae; outer lobe rectangular, 1.5 times as long as inner lobe, with four setae. Maxilliped (Fig. 13C) inner plate small and rectangular, with three simple setae; outer plate about 4.5 times as large as inner plate, with three setae; palp four-articulate, dactylus with a row of setulae.

Antennae. Antenna 1 (Fig. 14A) about half of body length; flagellum ten-articulate. Antenna 2 (Fig. 14B) without swimming setae; proximal article of peduncle with a distal projection; flagellum two-articulate.

Gnathopods. Gnathopod 1 (Fig. 14C) basis as long as ischium, merus and carpus combined; propodus elongate, length about two times width, palm with two proximal grasping spines, margin smooth; dactylus serrate on distal half. Gnathopod 2 (Fig. 14D) inserted on anterior half of pereonite 2; basis as long as pereonite 2, with a small triangular projection proximally and an acute projection distally; ischium rectangular; merus rounded; carpus short and triangular; propodus elongate, about 1.2 times as long as basis; palm with a proximal projection provided with one grasping spine, and two more triangular projections distally; dactylus without setulae.

Pereopods. Pereopods 3 and 4 (Fig. 15C, D) subequal, spindle-shaped, one-articulate, length about
one third of the gills, with five setae. Pereopods 5-7 missing.

Penes (Fig. 15E) large, situated laterally, length about three times width.

Abdomen (Fig. 15E) with a pair of lateral lobes and a single dorsal lobe.

Syntype female body length 5.3 mm. Lateral projections on pereonite 2 lacking (Figs 12B, 15B). Flagellum of antenna 1 with nine articles (Fig. 12B). Oostegites on pereonites 3 and 4 setose (Fig. 12B).

Remarks. The only record of Noculacia bullata is the original description given by Mayer (1903). Although Mayer reported four males and two females, only two syntypes, one each male and female, have been located in the Zoölogisch Museum, Amsterdam and are redescribed. The general features of the habitus, antenna and appendages are in good agreement with the original description. Figures of mouthparts and abdomen, which were lacking in the original description, are included in this redescription.

Key to the species of Noculacia

1. Body smooth except for a dorsal projection on the head. Gills rounded....N. africana n. sp. (Figs 1-5)
   - Body with dorsal and lateral projections. Gills elongate.................................................................2.

2. Head with a dorsal projection. Many lateral projections on pereonites 2-4. Pereopods 3 and 4 one-articulate............. N. bullata Mayer (Figs 12-15)
   - Head smooth. One pair of lateral projections each on pereonites 3 and 4 (males) or 3 (females). Pereopods 3 and 4 two-articulate.................................
     ..................................................N. australiensis n. sp. (Figs 7-11)

Family Pariambidae Laubitz, 1993

Diagnosis. Antenna 2 flagellum two-articulate. Mandibular molar present; palp three-articulate; setal formula 1-x-1, 2-x-1 or 1 apical seta; incisor and left lacinia mobilis five-toothed, right lacinia variable. Maxilla 1 with five or six spiniform setae on outer plate. Maxilliped outer plate larger than inner. Lower lip with inner lobes demarcated. Two pairs of gills. Pereopods 3 and 4 greatly reduced. Abdominal appendages usually small or absent.

Genus Pseudoprotella Mayer, 1890

Diagnosis. Antenna 2 flagellum two-articulate. Mandibular molar present; palp three-articulate; setal formula 2-x-1; incisor and left lacinia mobilis five-toothed. Gills on pereonites 3 and 4. Pereopods 3 and 4 two-articulate. Abdomen without appendages.

Type species. Pseudoprotella phasma (Montagu, 1804).

Pseudoprotella bogisa (Mayer, 1903) n. comb.

(Figs 16-19)

Noculacia bogisa Mayer, 1903: 52-53; pl. 2, fig. 16; pl. 7, figs 7-8; pl. 9, figs 19, 39, 66; pl. 10, fig. 3. Arimoto (1970: 15); McCain & Steinberg (1970: 57); Arimoto (1971: 63-65, fig. 13); Arimoto (1976: 44-45, fig. 18); Arimoto (1980: 102-104, fig. 4); Takeuchi (1999: 10).


Diagnosis. Head to pereonite 2 with long dorsal projections with the formula 1-1-2-1 in males, 1-1-2 in females. Pereonites 2-4 with a pair of anterolateral projections in male. Pereopods 3 and 4 two-articulate with the distal article shorter than the proximal one.

Type material examined (syntypes). 1 male, 1 pre-mature female, 1 juvenile (ZMA Amph. 107219); 1 juvenile (ZMUC-CRU-3701).


Description. Syntype male body length 8.9 mm. Lateral view. Head to pereonite 2 with long dorsal projections with the formula 1-1-2-1 (Fig. 16A). Pereonite 1 fused with head, suture present. Pereonites 2-4 each with a pair of anterolateral projections. Pereonites 3 and 5 subequal in length. Pereonites 4 and 6 subequal in length. Pereonite 7 the shortest.

Gills (Fig. 16A). Elongate, length about 3 times width.

Mouthparts (lacking in syntype male, therefore described from syntype pre-mature female although these are in poor condition). Upper lip (Fig. 17B) bilobed, smooth distally. Mandibles (Fig. 17D, E) with three-articulate palp; distal article with a setal formula 2-5-1 without knobs; second article of palp with two simple setae; mandibular molar well developed; left mandible with incisor six-toothed, lacinia mobilis five-toothed, followed by two plates;
incisor of right mandible five-toothed, lacinia mobilis transformed into a plate, followed by another plate; molar flake absent. Lower lip (Fig. 17A) inner lobes large, rectangular; inner and outer lobes smooth apically. Maxilla 1 (Fig. 17F) outer lobe with six spiniform setae; distal article of palp with three robust setae and two teeth distally, and two setae medi ally. Maxilla 2 missing in the specimen. Maxilliped (Fig. 17C) in very poor condition, inner and outer plate missing; palp four-articulate, dactylus with a row of setulae distally.

Antennae. Antenna 1 (Fig. 18A) with the flagellum broken, peduncle elongate. Antenna 2 lacking in syntype male, described from syntype pre-mature female (Fig. 18B); without swimming setae; proximal article of peduncle with a distal projection; flag ellum two-articulate.

Gnathopods. Gnathopod 1 lacking in syntype male, described from syntype pre-mature female (Fig. 18C); basis as long as ischi um, merus and carpus combined; propodus triangular, length about 1.5 times width, palm with two proximal grasping spines, margin smooth. Gnathopod 2 (Fig. 18D) inserted on anterior half of pereonite 2; basis 1.2 times as long as pereonite 2, with an acute projection distally; ischi um and merus rectangular; carpus short and triangular; propodus elongate, as long as basis; palm with a proximal grasping spine and two acute projections distally; dactylus without setulae.

Pereopods. Pereopods 3 and 4 (Fig. 19A, B) subequal, two-articulate. Proximal article spindle-shaped; distal article small and conical, length about one fourth of the gills. Pereopods 5-7 missing in syntype male, described from syntype pre-mature female: pereopod 5 elongate, six-articulate; pereopods 6 and 7 increasing in respective robustness. Propodus of pereopod 6 with a pair of proximal robust, plumose setae. Propodus of pereopod 7 with a pair of grasping spines.

Penes (Fig. 19F) large, situated medially, length about three times width, with a suture distally.

Abdomen (Fig. 19F) with a pair of setose lateral lobes and a single dorsal lobe.

Syntype pre-mature female body length 4.8 mm. Head to pereonite 2 with long dorsal projections with the formula 1-1-2 (Fig. 16B). Pereonites 2-4 without anterolateral projections (Fig. 16B). Flagellum of antenna 1 with fourteen articles (Fig. 16B). Oostegites on pereonites 3 and 4 not setose (Fig. 16B). Gnathopod 2 with the two acute projections not marked as in the syntype male.

Remarks. Mayer (1903) described this species as Noculacia bogisa. The present redescription is basically in agreement with the original description, but has revealed the presence of a well-developed molar on the mandible. This character, the features of pereopods 3 and 4, and the setal formula 2-x-1 on the mandibular palp indicate that the species does not belong to the genus Noculacia. Therefore it is here transferred to the genus Pseudoprotella.

The setal formula 2-x-1 in the mandibular palp has also been reported from other genera, e.g. Paraprotella (see description of P. saltatrix in Takeuchi & Guerra-Garcia, in press), N. bogisa Mayer is transferred to Pseudoprotella and not to Paraprotella mainly on the basis of the presence of the two-articulate pereopods 3 and 4 and the abdomen without appendages, since in the genus Paraprotella pereopods 3 and 4 are three-articulate and the male has abdominal appendages (Takeuchi 1993, Laubitz 1991).

Pseudoprotella bogisa (Mayer, 1903) is superficially very similar to some species of Paradeutella. However, pereopods 3 and 4 are uni-articulate in Paradeutella, and the setal formula is 1-x-1 instead of 2-x-1.

Three species of Pseudoprotella have been described so far: P. phasma (Montagu, 1804), recently redescribed by Krapp-Schickel (1993); P. inermis Chevreux, 1927, recently redescribed by Guerra-Garcia & Takeuchi (2000); and P. bogisa (Mayer, 1903), redescribed in the present paper. The morphology of the species is compared in Table 1. P. bogisa is close to P. phasma but can be easily differentiated mainly on the structure of pereopods 3 and 4.

Key to the species of Pseudoprotella

1. Body smooth ............................. P. inermis Chevreux
   - Body with dorsal projections ...................... 2
2. Proximal article of pereopods 3 and 4 clearly shorter than distal article. A pair of lateral projections on pereonites 2 and 3 .......................... P. phasma (Montagu)
   - Proximal article of pereopods 3 and 4 clearly longer than distal article. A pair of lateral projections on pereonites 2 to 4......... P. bogisa (Mayer)

Acknowledgements

The author is very grateful to P. B. Berents and E. Nelson for allowing the study of material, and for their kindness and hospitality at the Australian Museum and the U.S. National Museum of Natural History, Smithsonian Institution, respectively. Thanks
are also due to J. Olesen (Zoological Museum of Copenhagen) and D. Platvoet (Zoological Museum of Amsterdam) for the loans of Noculacia specimens. The work was supported by grant AP 98 28617065 from the Spanish Ministry of Education, Culture and Sport and by a Visiting Collection Fellowship from the Australian Museum.

References


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<td>present, peronite 1 elongate</td>
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<td>Antenna 1 flagellar articles</td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>6</td>
<td>10</td>
<td>14</td>
<td>24</td>
<td>20-25</td>
</tr>
<tr>
<td>Gills</td>
<td>rounded</td>
<td>oval</td>
<td>elongate</td>
<td>elongate</td>
<td>elongate</td>
<td>elongate</td>
</tr>
<tr>
<td>Mandible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molae</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
<td>present</td>
<td>present</td>
<td>present</td>
</tr>
<tr>
<td>Setal formula</td>
<td>1-3, x=1, y=1.5</td>
<td>1-5, x=1.5, y=1.5</td>
<td>1-3, x=1, y=6</td>
<td>2-5, x=3, y=8</td>
<td>2-5, x=15-20</td>
<td></td>
</tr>
<tr>
<td>Left incisor</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
</tr>
<tr>
<td>Right incisor</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
</tr>
<tr>
<td>Left lacina mobilia</td>
<td>serrate</td>
<td>serrate</td>
<td>serrate</td>
<td>serrate</td>
<td>serrate</td>
<td>serrate</td>
</tr>
<tr>
<td>Right lacina mobilia</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
<td>5-toothed</td>
</tr>
<tr>
<td>Molar flake</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
<td>absent</td>
</tr>
<tr>
<td>Lower lip</td>
<td>Inner lobes</td>
<td>rectangular, not fused</td>
<td>completely fused</td>
<td>partially fused</td>
<td>rectangular, not fused</td>
<td>rounded, not fused</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>5</td>
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<tr>
<td>Maxilla 1</td>
<td>Outer lobe distal spines</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
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<td></td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
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</tr>
<tr>
<td>Maxilla 2</td>
<td>Outer lobe setae</td>
<td>4</td>
<td>3</td>
<td>-</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Inner lobe setae</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Maxilliped</td>
<td>Inner plate setae</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
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<td>Outer plate setae</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Giathopod 1</td>
<td>Grasping spines</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Grasping margin</td>
<td>smooth</td>
<td>denticulate</td>
<td>smooth</td>
<td>smooth</td>
<td>smooth</td>
</tr>
<tr>
<td>Pereopods 3 and 4</td>
<td>1-articulate, but almost separated into 2 articles; spindle-shaped</td>
<td>2-articulate; spindle-shaped, distal article conical</td>
<td>1-articulate; spindle-shaped</td>
<td>2-articulate; distal article minute, clearly shorter than proximal one</td>
<td>2-articulate; distal article clearly longer than proximal one</td>
<td>2-articulate; distal article clearly longer than proximal one</td>
</tr>
<tr>
<td></td>
<td>2-times as long as wide; situated laterally</td>
<td>1.5-times as long as wide; situated almost medially</td>
<td>3-times as long as wide; situated medially</td>
<td>3-times as long as wide; situated medially</td>
<td>2-times as long as wide; situated laterally</td>
<td>2-times as long as wide; situated laterally</td>
</tr>
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</table>

Table 1. Comparison of selected characteristics in the species of Noculacia Mayer, 1903 and Pseudoproducta Mayer, 1890.
Fig. 1. Noculacia africana n. sp.; lateral views. A. male; B. female. Scale bar: 1 mm.
Fig. 2. *Noculacia africana* n. sp.; male. A. lower lip; B, upper lip; C. maxilliped; D. left mandible; E. right mandible; F. maxilla 2; G. maxilla 1. Scale bars: 0.05 mm.
Fig. 3. Noculacia africana n. sp. A-D. male. A. antenna 1; B. antenna 2; C. gnathopod 1; D. gnathopod 2. E. female, gnathopod 2. Scale bars: A, B: 0.5 mm; C: 0.1 mm; D, E: 0.3 mm.
Fig. 4. *Noculacia africana* n. sp.; male. A. pereopod 3; B. pereopod 4; C. pereopod 5; D. pereopod 6; E. pereopod 7. Scale bars: A, B: 0.1 mm; C-E: 0.5 mm.
Fig. 5. *Noculacia africana* n. sp.; abdomina (ventral views). A. male; B. female. Scale bar: 0.5 mm.

Fig. 6. Map of the distribution of *Noculacia* species.
Fig. 7. *Noculacia australiensis* n. sp.; lateral views. A. male. B. female. Scale bar: 1 mm.
Fig. 8. *Noculacia australiensis* n. sp.; male. A. upper lip; B. lower lip; C. maxilliped; D. right mandible; E. left mandible; F. maxilla 1; G. maxilla 2. Scale bars: 0.05 mm.
Fig. 9. Noculacia australiensis n. sp.; male. A. antenna 1; B. antenna 2; C. gnathopod 1; D. gnathopod 2. Scale bars: 0.3 mm.
Fig. 10. Noculacia australiensis n. sp.; A, B. male; C-E. female. A. pereopod 3; B. pereopod 4; C. pereopod 5; D. pereopod 6; E. pereopod 7. Scale bars: A, B: 0.1 mm; C-E: 0.5 mm.
Fig. 11. *Noculacia australiensis* n. sp.; abdomina (ventral views). A. male; B. female. Scale bar: 0.1 mm.
Fig. 12. Noculacia bullata Mayer; lateral views. A. male; B. female. Scale bar: 1 mm.
Fig. 13. Noculacia bullata Mayer; male. A. lower lip; B. upper lip; C. maxilliped; D. left mandible; E. right mandible; F. maxilla 1; G. maxilla 2. Scale bars: 0.05 mm.
Fig. 14. *Noculacia bullata* Mayer. A-D. male. A. antenna 1; B. antenna 2; C. gnathopod 1; D. gnathopod 2. E. female gnathopod 2. Scale bars: A, D: 0.3 mm, B, E: 0.5 mm, C: 0.1 mm.
Fig. 15. Noculacia bullata Mayer. A. male (dorsal view); B. female (dorsal view); C. male pereopod 3; D. male pereopod 4; E. male abdomen (ventral view); F. female abdomen (ventral view). Scale bars: A, B: 1 mm; C-F: 0.1 mm.
Fig. 16. *Pseudoprotella bogisa* (Mayer); lateral views. A. male; B. female. Scale bar: 1 mm.
Fig. 17. *Pseudoprotella bogisa* (Mayer); pre-mature female (syntype). A. lower lip; B. upper lip; C. maxilliped; D. left mandible; E. right mandible; F. maxilla 1. Scale bars: 0.05 mm.
Fig. 18. *Pseudoprotella bogisa* (Mayer). A. antenna 1 (male); B. antenna 2 (female); C. gnathopod 1 (female); D. male gnathopod 2; E. female gnathopod 2. Scale bars: A, D: 1 mm; B: 0.3 mm; C: 0.2 mm; E: 0.5 mm.
Fig. 19. *Pseudoprotella bogisa* (Mayer): A, B. F. male; C-E. G. female. A. pereopod 3; B. pereopod 4; C. pereopod 5; D. pereopod 6; E. pereopod 7; F. male abdomen (ventral view); G. female abdomen (ventral view). Scale bars: A, B, F, G. 0.1 mm; C-E. 1 mm.