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A second species of the genus *Balssia* Kemp, 1922 (Crustacea, Decapoda, Pontoniinae)

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KEY WORDS
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ABSTRACT
A new species of commensal pontoniine shrimp, *Balssia noeli* n.sp., from the vicinity of Banyuls, western Mediterranean, is described and illustrated. The new species is readily distinguished from *B. gasti* (Balss, 1921), the only other species of the genus, by its lack of strong sculpturing on the carapace and abdomen. The species is associated with the gorgonians *Corallium, Eunicella, Gerardia* and *Paramuricella.*

MOTS CLÉS
Balssia noeli,
Crustacea,
Decapoda,
Pontoniinae,
espèce nouvelle,
Méditerranée,
systématique,
commensalisme.

RÉSUMÉ
Une deuxième espèce du genre Balssia *Kemp, 1922 (Crustacea, Decapoda, Pontoniinae).* Une nouvelle espèce de crevette pontoniine, *Balssia noeli* n.sp., provenant de la région de Banyuls, Méditerranée occidentale, est décrite et illustrée. La nouvelle espèce se distingue facilement de *B. gasti*, la seule autre espèce du genre, par la sculpture beaucoup moins accentuée de la carapace et de l'abdomen. L'espèce est associée aux gorgones *Corallium, Eunicella, Gerardia* et *Paramuricella.*

INTRODUCTION

A single specimen of *Amphipalaemon gasti*, a small shrimp associated with the precious coral, *Corallium rubrum* (Linnaeus, 1758) from the Gulf of Naples, was first described and illustrated by Heinrich Balss in 1921. Kemp (1922) recognized that the species was a pontoniine shrimp and did not belong in the genus *Amphipalaemon* Nobili, 1901, now considered a synonym of the genus *Anchistioides* Paulson, 1875 in the family Anchistioididae. The new genus *Balssia* was then designated for its reception. The species has since been reported from a wide range of localities on the European coasts of the western Mediterranean and Adriatic Seas, Corsica, the Canary Islands and some West African localities, and from a variety of host animals (Manconi & Mori 1990). The discovery of a second species in the western Mediterranean suggests that some of the earlier records should be re-examined to confirm that they do all refer to *Balssia gasti* (Balss, 1921). The specimens are deposited in the collection of the Muséum national d'Histoire naturelle, Paris (MNHN), Nationaal Natuurhistorisch Museum, Leiden (NNM), and Queensland Museum, Brisbane (QM).

I am most grateful to Dr Pierre Noël for the opportunity to report upon these specimens.

Carapace length (CL) refers to the post orbital carapace length.

SYSTEMATICS

Family PALAEMONIDAE Rafinesque, 1815
Subfamily PONTONIINAE Kingsley, 1878
Genus *Balssia* Kemp, 1922

Balssia noeli n.sp.
(Figs 1-4)

Balssia sp. – Noël 1992: 64.

MATERIAL EXAMINED. — **Mediterranean Sea.** Vicinity of Banyuls: 7 ovigerous ♀♀, 1 ovigerous ♀, 1 ovigerous ♀ (Laboratoire Arago).
From "ancient collections", details of exact localities, dates, depths and collectors not available.

TYPES. — The ovigerous female holotype is deposited in the collection of the Muséum national d'Histoire naturelle, Paris, catalogue number MNHN-Na 13440, together with the dissected paratype female, MNHN-Na 13441. A paratype is also deposited in the collection of the Nationaal Natuurhistorisch Museum, Leiden, catalogue number RMNH D 47887, and one in the Queensland Museum, Brisbane, number QM W 23107. The remaining specimens are also designated as paratypes.

MEASUREMENTS. — Ovigerous female holotype, carapace length 4.0 mm; carapace and rostrum 6.0 mm; total body length (approx.) 15.5 mm; second pereiopods, major chela 1.6 mm; minor chela 1.6 mm; length of ovum 0.5 mm.

COLORATION AND HOSTS. — The specimens, all from gorgonacean coelenterates, were annotated as follows: from lot #1, (1) white, on *Eunicella* Verrill, 1869; (2) violet, on *Paramuricella* Kölliker, 1865; (3) yellow, on *Gerardia* Lacaze-Dultriers, 1864 (zoantharian of the family Parazoanthidae); (4) red, on *Corallium* Cuvier, 1826. No data available on colouration or hosts of lots #2-#3.

ETYMOLOGY. — The species is named in honour of Dr. Pierre Y. Noël, who kindly provided the specimens upon which this report is based.

DESCRIPTION (ovigerous females, Fig. 1)
Small stoutly built pontoniine shrimps of generally subcylindrical body form (Fig. 1), cephalothoracic region ventrally flattened.

Rostrum (Fig. 2A, C)
Slender, oval in section; without distinct carinae, about 0.5 of carapace length, reaching to end of intermediate segment or middle of distal segment of antennular peduncle, distally acute, with three small acute teeth dorsally, proximal teeth large, acute, distal tooth small, ventrally unarmed, few median setae proximally only.

Carapace (Fig. 2A)
Swollen, globular, smooth, cervical groove feebly indicated, small cervical and hepatic tubercles usually discernible, with distinct postrostral carina bearing two small teeth, posterior tooth usually obtuse, anterior tooth acute, small epigastric tooth present or absent; orbit well-developed, superior margin carinate with three small acute teeth, posterior margin incomplete, lateral border carinate with two subacute tubercles posteriorly,

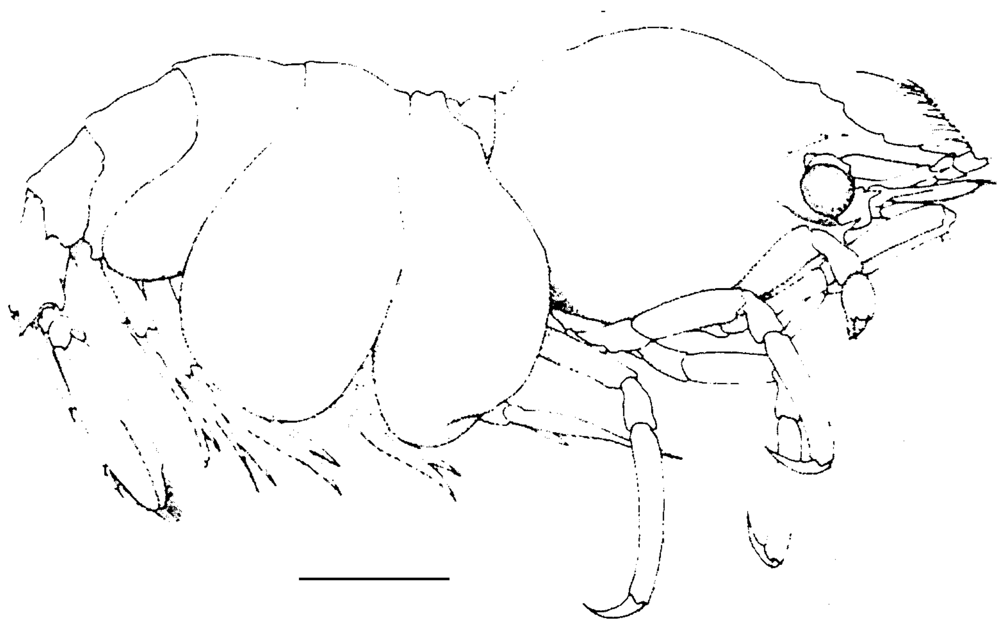

FIG. 1. — *Balssia noeli* n.sp., ovigerous holotype ♀, Banyuls. Scale bar: 2.0 mm.

continuous with large acute dorsolaterally angled antennal spine, branchio-stegal sulcus present below lateral orbital margin, anterolateral margin of branchiostergite slightly produced, rounded, inferior orbital angle broadly triangular.

Abdominal segments (Fig. 2E, I, 4K)
Smooth, third segment not posteriorly produced, non-carinate, first three pleura expanded, broadly rounded, fourth with posterior margin feebly bilobed, centrally feebly carinate laterally, fifth similar with upper lobe acutely produced, sixth segment 1.6 times length of fifth, 2.0 times longer than central depth, posterolateral angle strongly produced, acute, posteroventral angle produced, subacute.

Telson (Fig. 2I)
About 1.8 times length of sixth segment, about 3.0 times longer than anterior width, lateral margins straight, posteriorly convergent, with small subequal marginal lateral spines at 0.5 and 0.9 of telson length, posterior margin (Fig. 4K) 0.3 of anterior width, transversely truncate, without median point, lateral posterior spines similar to dorsal spines, intermediate spines about 0.75 of telson length, about 7.5 times longer than basal width, submedian spines slender, setulose, shorter than intermediate spines.
Ophthalmic somite dorsally antero-posteriorly bilobed, without pigment spot.

Antennular peduncle (Fig. 2G)
Normal, with short flagella; proximal segment 1.2 times longer than broad, lateral margin expanded, angular, produced distally with small rounded lobe reaching to middle of intermediate segment length, with large acute slender distolateral tooth, exceeding intermediate segment length, ventromedial margin with strong tooth at 0.5 of length, intermediate and distal segments normal, subequal, combined length about 0.7 of proximal segment length, intermediate segment with small setose lateral lobe, upper flagellum biramous with eight proximal segments fused, shorter free ramus with four segments, with about eighteen groups of aesthetascs, lower ramus short, filiform.

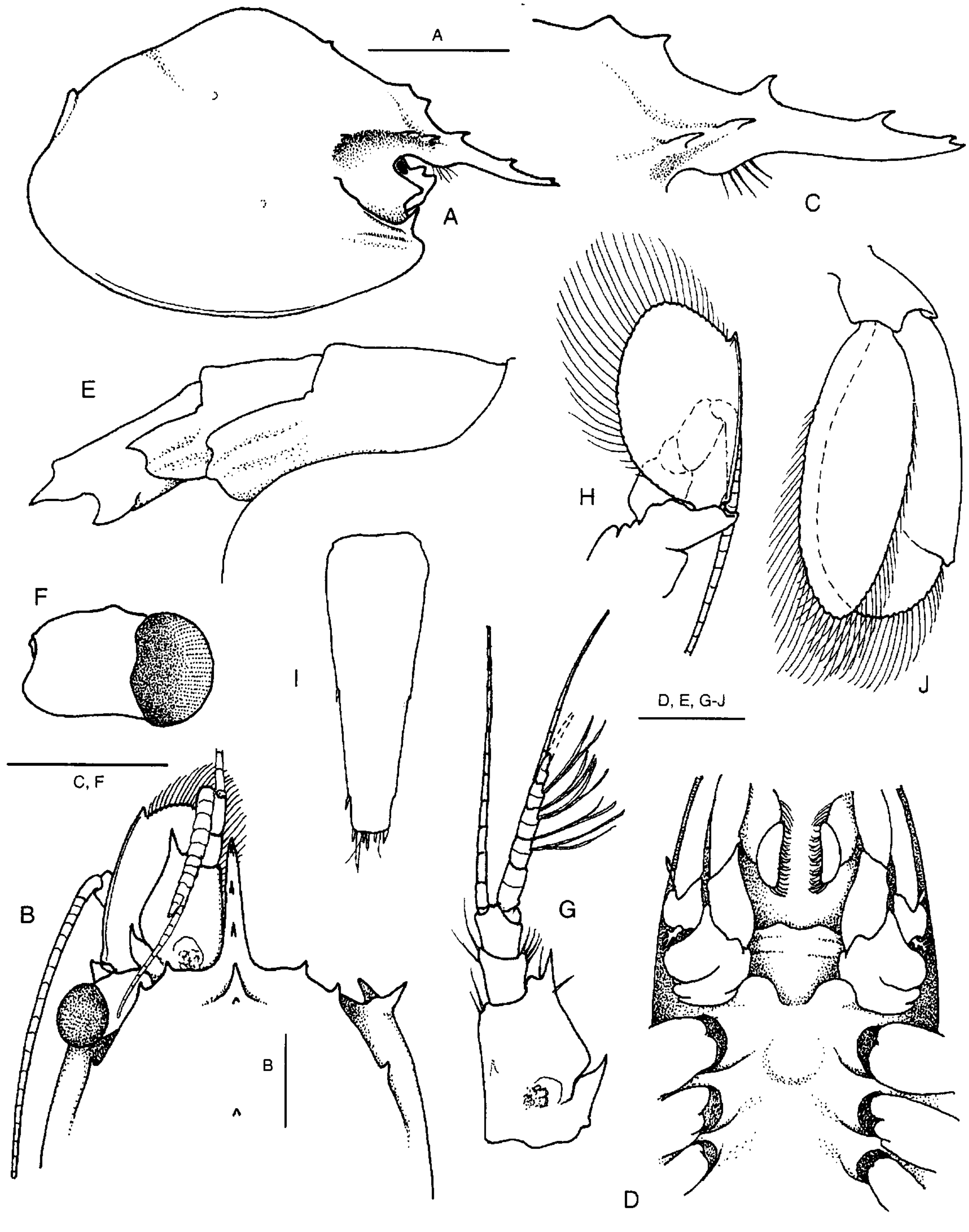

FIG. 2. — *Balssia noeli* n.sp., paratype ovigerous ♀, Banyuls; **A**, carapace and rostrum; **B**, anterior carapace and left appendages, dorsal; **C**, rostrum; **D**, thoracic sternites, ventral; **E**, fourth to sixth abdominal segments, lateral; **F**, eye, dorsal; **G**, antennule; **H**, antenna; **I**, telson; **J**, uropod. Scale bars: A, 2.0 mm; B-J, 1.0 mm.

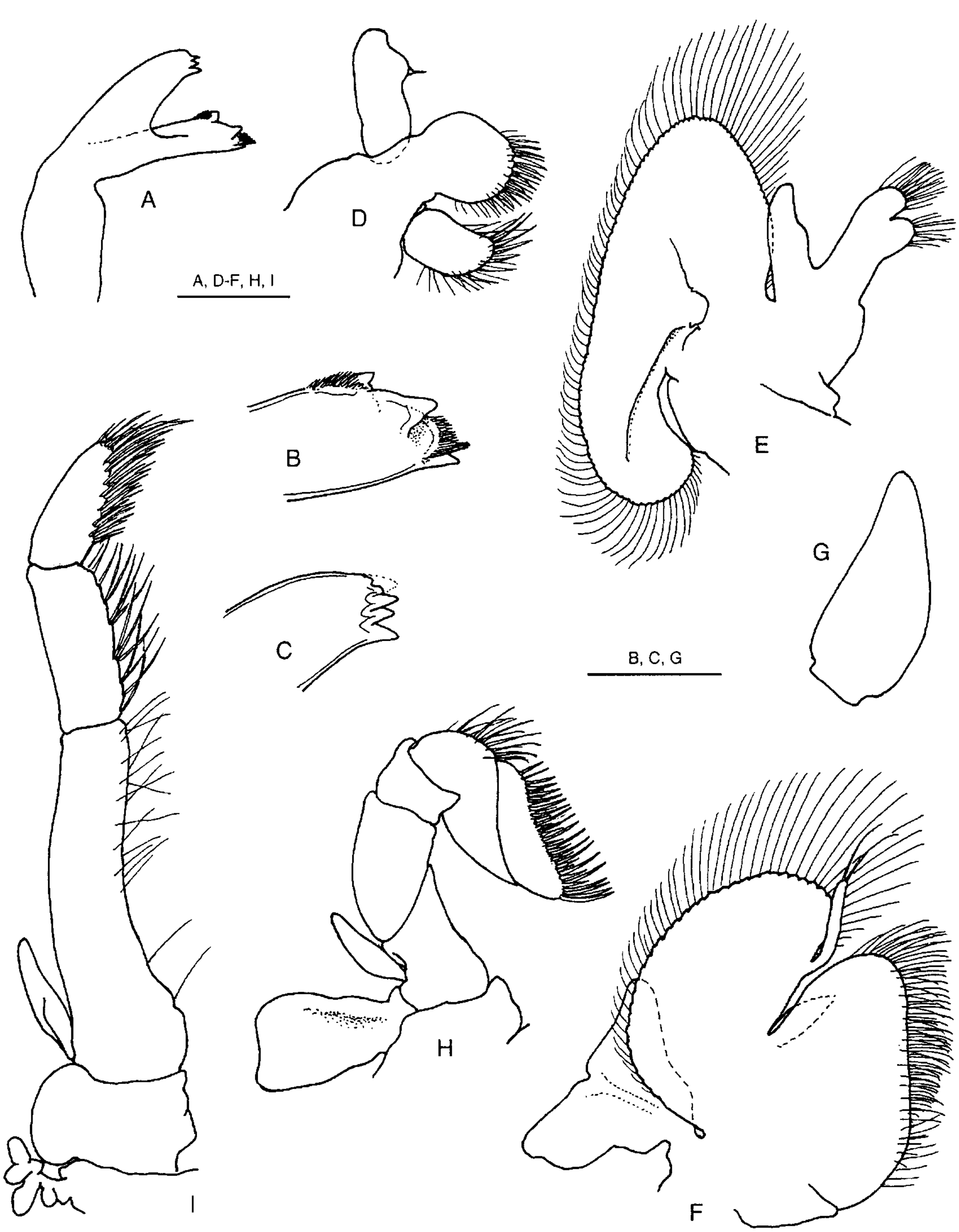

Fig. 3. — *Balssia noeli* n.sp., paratype ovigerous ♀, Banyuls, mouthparts; **A**, mandible; **B**, mandible, molar process; **C**, mandible, incisor process; **D**, maxillula; **E**, maxilla; **F**, first maxilliped; **G**, first maxilliped, palp; **H**, second maxilliped; **I**, third maxilliped. Scale bars: A, D-F, H, I, 0.5 mm; B, C, G, 0.2 mm.

Antenna (Fig. 2H)
With basicerite stout, with small blunt antero-lateral tooth; carpocerite short stout, reaching to about half scaphocerite length, flattened, about 2.0 times longer than wide, flagellum short, about 2.0 times carapace length; scaphocerite broad, about 1.6 times longer than central width, lateral margin feebly convex, with small acute distal tooth, at about 0.8 of lamellar length, falling far short of anterior margin of lamella.

Eye (Fig. 2F)
Stout, with well-pigmented globular cornea, diameter about 0.18 of carapace length, without accessory pigment spot, stalk length subequal to width and corneal diameter, with minute antero-dorsal tubercle.

Mouth parts
Mandible (Fig. 3) slender, without palp; incisor process (Fig. 3C) slender, tapering, with four small acute teeth distally, central pair smaller than outer teeth; molar process (Fig. 3B) slender, obliquely truncate distally, with three small stout, blunt teeth and two bands of setae. Maxillula (Fig. 3D) with feebly bilobed palp, lower lobe with single short seta; upper lacinia short, subcircular, with several short simple spines distally and numerous finely serrulate setae; lower lobe short and broad, with numerous spiniform setae distally and ventrally. Maxilla (Fig. 3E) with short broad, non-setose palp, medial margin sinuous, distal endite feebly bilobed, lobes subequal, upper lobe with about fifteen slender simple setae, lower lobe with about ten, proximal endite obsolete, medial margin feebly convex; scaphognathite broad, about 3.4 times longer than central width. First maxilliped (Fig. 3F) with short, non-setose, tapering palp (Fig. 3G), about 2.3 times longer than proximal width, basal and coxal endites completely fused, broad, about 1.9 times longer than wide, broadly rounded distally, medial margin distally straight, proximally concave, fringes with numerous slender, feebly serrulate setae; exopod with flagellum greatly reduced, scarcely exceeding caridean lobe, subcylindrical, with two short plumose setae distally, caridean lobe large, broadly expanded, 2.0 times longer than broad; epipod large, triangular, feebly bilobed. Second maxilliped (Fig. 3H) with endopod of normal form, dactylar segment narrow, medial margin with numerous long serrulate spines, propodal segment not antero-medially produced, ischiomerus and basis normal, with exopod greatly reduced, not exceeding basis, lamellar, non-setose; coxa stout, without medial process, epipod well-developed, triquetral, without podobranch. Third maxilliped (Fig. 3I) reaching to about middle of carpocerite length, ischiomerus and basis completely fused, junction indicated by small medial margin notch, about 3.0 times longer than proximal width, tapering distally, sparsely setose alone distal medial margin, penultimate segment about 0.5 of ischiomerus-basal segment, 2.3 times longer than central width, uniform, with numerous serrulate spiniform setae medially, distal segment about 0.4 of ischiomeral-basal segment length, 2.4 times longer than proximal width, densely spinulose medially and distally, with serrulate spines; exopod as in second maxilliped; coxa with small non-setose medial process, broad rounded lateral plate and rudimentary arthrobranch present.

Thoracic sternites (Fig. 2D)
Broad, first with small transverse, feebly bilobed carina, third widest (so that third maxillipeds are lateral to first pereiopods in ventral view), fourth without median process, with rounded lateral lobes, posterior sternites broad, without special features.

First pereiopods (Fig. 4A, B)
Slender, exceeding carpocerite by chela and carpus, chela (Fig. 4B) slender, palm subcylindrical, tapering slightly distally, about 3.6 times longer than wide, fingers about 0.66 of palm length, slender, with simple acute tips, cutting edges entire, lateral; carpus about 1.25 times longer than chela, 6.5 times longer than distal width, subcylindrical, tapering slightly proximally; merus about 0.9 of carpus length, of similar width, ischium about 0.9 of chela length, basis and coxa normal, coxa with small setose ventro-medial process.

Second pereiopods (Fig. 4C-G)
Feebly developed, subequal, similar; exceeding

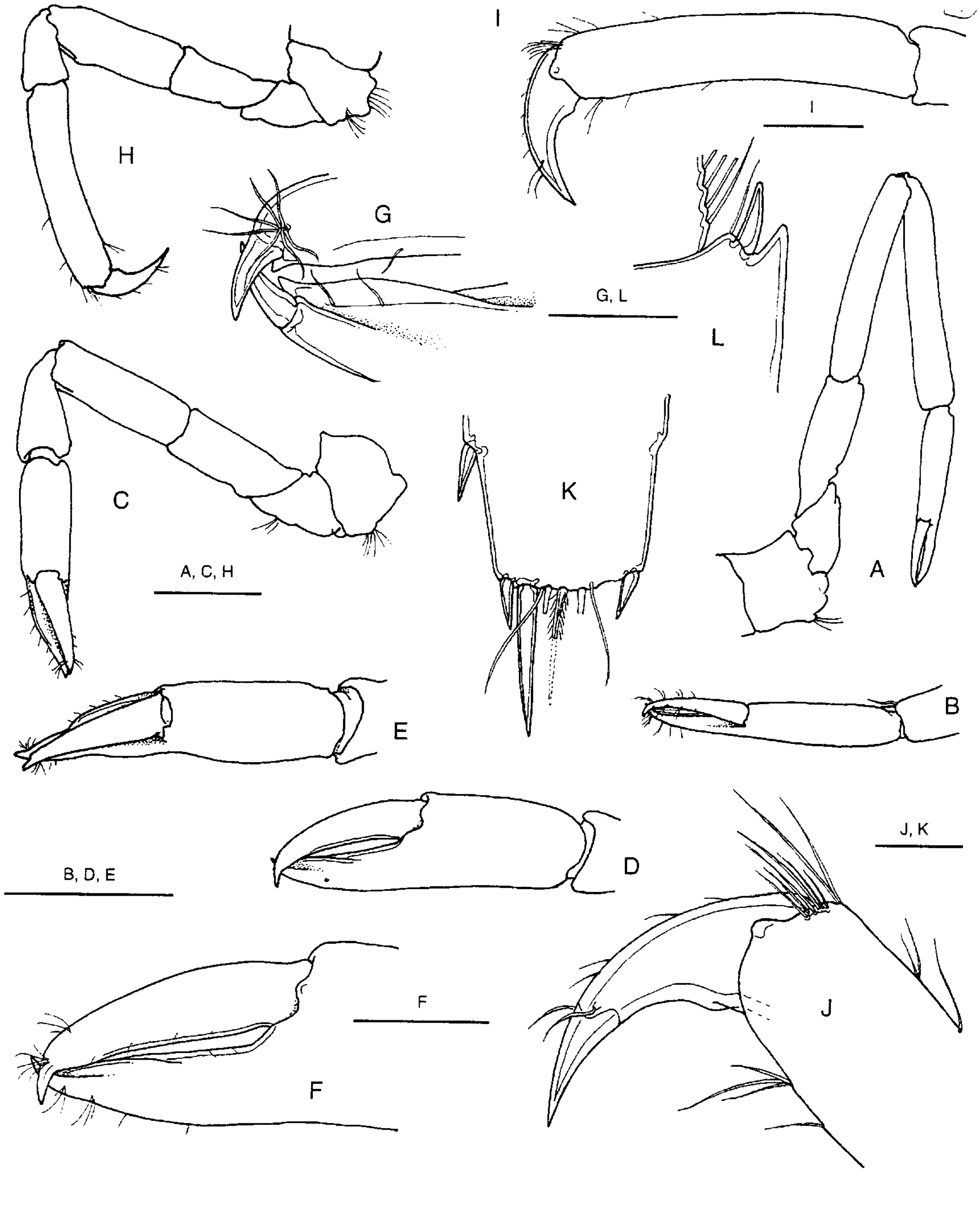

FIG. 4. — *Balssia noeli* n.sp., paratype ovigerous ♀, Banyuls; **A**, first pereiopod; **B**, first pereiopod, chela; **C**, second pereiopod; **D**, second pereiopod, chela, medial; **E**, second pereiopod, dorsal; **F**, second pereiopod, fingers; **G**, second pereiopod, finger tips; **H**, third pereiopod; **I**, third pereiopod, propod and dactyl; **J**, third pereiopod, distal propod and dactyl; **K**, telson, posterior margin; **L**, uropod, posterolateral angle of exopod. Scale bars: A-E, H, 1.0 mm; F, I, 0.5 mm; G, J-L, 0.2 mm.

carpocerite by length of fingers; chela (Fig. 4D, E) about 0.4 of carapace length, palm smooth, oval in section, about 1.8 times longer than distal depth, fingers (Fig. 4F) subequal to palm length, sparsely setose, gaping slightly proximally, dactylus slender, curved, slightly compressed, tip (Fig. 4G) with stout acute articulated tooth with small, non-articulated tooth laterally, cutting edge lateral, entire, fixed finger similar but expanded proximally, cutting edge present distally, entire; carpus short, stout, unarmed, 2.0 times longer than distal width, tapered proximally, subequal to palm length; merus 1.2 times palm length, about 3.0 times longer than wide, uniform, unarmed; ischium subequal to palm length, unarmed, basis and coxa normal, without special features.

Ambulatory pereiopods (4H-J)
Robust, third (Fig. 4H) exceeding carpocerite by length of dactylus, dactylus (Fig. 4J) about 0.45 of propod length, stout, simple, acute, strongly curved, with feebly demarcated unguis, about 0.5 of corpus length, 3.0 times longer than basal width, corpus compressed, dorsal margin convex, 2.0 times basal depth, with paired sensory setae distally, sparse setae along dorsal margin; propod (Fig. 4I) about 0.4 of carapace length, 6.0 times longer than depth, uniform, slightly bowed, without spines, sparse setae distally, carpus about 0.3 of propod length, 1.6 times longer than distal width, tapering proximally, unarmed, merus 0.65 of propod length, 2.6 times longer than deep, unarmed, ischium 0.5 of propod length, unarmed, basis and coxa normal, without special features, coxa stout. Fourth and fifth pereiopods similar, fourth with propod 0.8 of third propod length, fifth subequal to third.

Uropod (Fig. 2J, 4L)
With protopodite with small blunt posterolateral lobe; exopod broad, about 2.1 times longer than wide, lateral margin convex, unarmed, with small acute distal tooth (Fig. 4L) with larger mobile spinule medially; endopod reaching to distal end of exopod, about 2.8 times longer than wide.

Ova very numerous, small.

SYSTEMATIC POSITION
A well-illustrated account of *Balssia gasti* was provided by Balss (1921), based on a single ovigerous female specimen, and is therefore fully comparable with the present material. Manconi & Mori (1990) state that, in *B. gasti*, the carapace length ranges from 3.2 to 4.0 mm in ovigerous females so that the two species are of similar size.
The major characters that distinguish *Balssia noeli* from *B. gasti* (Balss), the only other species of the genus, are as follows: shorter rostrum, not well exceeding antennular peduncle, with three smaller dorsal teeth only; a short bidentate postrostral carina, with or without a small epigastric tooth; cervical and hepatic spines reduced to small tubercles; first three abdominal terga without median carinae; fourth pleuron lacking acute tooth posteriorly; anterodorsal eyestalk tubercle minute; anterolateral tooth of proximal segment of antennular peduncle not well exceeding intermediate segment; maxilla with distal endite feebly bilobed; fixed finger of second pereiopod with proximal half only expanded.

REMARKS
In the original description of *Balssia gasti*, Balss noted particularly the strong sculpturing, of the carapace, and abdomen, with a distinct dorsal carina the absence of which most clearly separates his species from *B. noeli*. It is possible that the as yet unknown males of *B. noeli* will show a more strongly sculptured appearance than the females, as is known to occur in some other ornate pontoniine associates of coelenterates such as *Dasycaris zanzibarica* (Bruce, 1973). The differences are not strongly marked in *B. gasti* as is shown by the figures in Zariquiey Alvarez (1946, fig. 111).
Balssia gasti was first found in association with the precious coral *Corallium rubrum* (L., 1758), an alcyonacean host. Most subsequent records have been from this host. There have also been a number of records from other hosts, reviewed by Manconi & Mori (1990), including several from gorgonians, including species of *Eunicella*, *Gerardia*, *Lophogorgia* Milne Edwards, 1857, and *Paramuricella*. Possibly some of these should be referred to *B. noeli*. Mori *et al.* (1994) have confirmed that their material, from Sardinia and associated with the gorgonian host *Paramuricella clavata* (Risso, 1826), belonged to Balss' species

sensu stricto, so there is no doubt that *B. gasti* can occur with both alcyonacean and gorgonian hosts. The associations reported with sponge hosts (Ledoyer 1968) seem likely to have been of accidental origin due to the exigencies of collection methods. However, the possibility of associations with sponges should be further investigated before its exclusion. The selection of host animals of *B. noeli* otherwise overlaps significantly with that of *B. gasti*, but further collections may show that each species has distinctive host preferences.

The specimen illustrated by Noël (1985) shows a marked absence of strong sculpturing on the carapace and may therefore belong to the present species. The live specimen was collected from Banyuls in the late 1960's or early 1970's by Alain Thiriot and photographed by Jean Lecomte. It was a pure yellow colour, associated with a gorgonian host, and may have formed part of the material upon which the present study is based (P. Y. Noël, pers. comm., January 1998).

The status of the various colour patterns and host animals remains mysterious. It is quite possible that colour pattern and host selection are genetically determined and that the various colour "forms" of each "species" actually represent a complex of related sibling species. Shrimp coloration may be under physiological control. There is ample scope for further study in these fields. Knowlton & Keller (1985), and Duffy (1996) have demonstrated that these complexes exist in some commensal Alpheidae and their occurrence in other caridean families seems highly likely. Some of the monospecific commensal shrimp genera that are found in association with a wide variety of different host types may well consist of several sibling species. Knowlton (1993) and Duffy (1996) consider that diversity in the relevant taxa is probably several times greater than presently recognized and that this is correlated with a high degree of host specificity.

Acknowledgements
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