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# *CARIDINA LANZANA*, A NEW TROGLOBITIC SHRIMP FROM SOMALIA (CRUSTACEA DECAPODA)

(PUBBLICAZIONI DEL CENTRO DI STUDIO
PER LA FAUNISTICA ED ECOLOGIA TROPICALI DEL C.N.R.: CLXXIX)

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During the 12th Biological Expedition in Somalia (27 July-11 September 1969; see PARDI, 1976), undertaken under the auspices of the Centro di Studio per la Faunistica ed Ecologia Tropicali of the Consiglio Nazionale delle Ricerche, Florence (Director Prof. L. Pardi), some very interesting troglobitic shrimps were collected. These shrimps belong to the family Atyidae and prove to represent an undescribed species of the genus *Caridina*. The strong reduction of the eyes shows that the shrimps are true troglobites; thus far only three troglobitic species of the genus *Caridina* were known.

I wish to thank Prof. L. PARDI for allowing me the opportunity of studying this material and Prof. B. LANZA, Director of the Museo Zoologico of the University of Florence, Italy, and his companions, who collected the first specimens of the new species and provided me with data on the colour and habitat.

The following abbreviations are used:

MF = Museo Zoologico dell'Università di Firenze, Italy;
RMNH = Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands;
SBS = Spedizione Biologica in Somalia del Centro di Studio per la Faunistica ed Ecologia Tropicali del C.N.R.

## CARIDINA LANZANA n.sp. (Figs 1-3)

Small well named Bog Der (or Bug Der), 08°35'54"N-48°46'30"E, Nogal Valley, northern Somalia, leg. SBS, 20 August 1969; 1 adult male (holotype), MF 603; 1 ovigerous female (allotype), MF 604; 70 paratypes, among which 4 ovigerous females, MF 605 and 18 paratypes RMNH Crust.D.32335.

*Description.* — The rostrum is long, reaching somewhat beyond the scaphocerite; it is slightly curved upward and ends in a sharp point. The upper margin bears 17 to 24 movable spines, 3 or 4 of which are placed behind the level of the posterior margin of the orbit, and occupy slightly more than 1/10 of the length of the carapace (rostrum excluded). The distal four dorsal spines are very widely spaced, while those in the proximal half of the rostrum are close together. The rostrum is rather deep at the end of the proximal third and gradually narrows distally. The ventral margin of the rostrum carries 11 to 18 teeth, its proximal third being unarmed. There are no subdistal teeth on the rostrum, neither dorsally nor ventrally, the tip being simply pointed.

The orbital margin of the carapace forms the continuation of the midrib of the rostrum. The lower angle of the orbit is rounded and distinct, and the antennal spine is placed slightly below it. This spine is quite strong. No other spines are present on the carapace. The pterygostomian angle is rectangularly rounded. A transverse groove is present in the median part of the carapace just before the posterior margin.

The abdominal somites are smooth and have the pleura rounded; in the fifth and sixth somites the pleura are rectangular with a rounded top. The sixth somite is twice as long as the fifth and slightly longer than the telson. The postero-lateral angle of the sixth somite is truncate with a sharp dorsal tooth. The preanal carina is low and rounded, without spine or tooth.

The telson tapers regularly towards the posterior. It bears 3 or 4 pairs of dorsal spinules in the distal half. The posterior margin is truncated and blunt, with a row of spines. The outer pair of these spines is short, the following pair is long and very strong; between these strong spines there are 4 or 5 shorter spines. In most specimens examined some or all of the posterior spines are missing.

The eyes are short, bullet-shaped and fail to reach the middle of the basal segment of the antennular peduncle. The cornea is extremely small and short, being visible only as a small round dark spot in the distal part of the outer surface of the eyestalk.

The basal segment of the antennular peduncle has the stylocerite well developed, reaching about 2/3 of the length of the segment, it ends

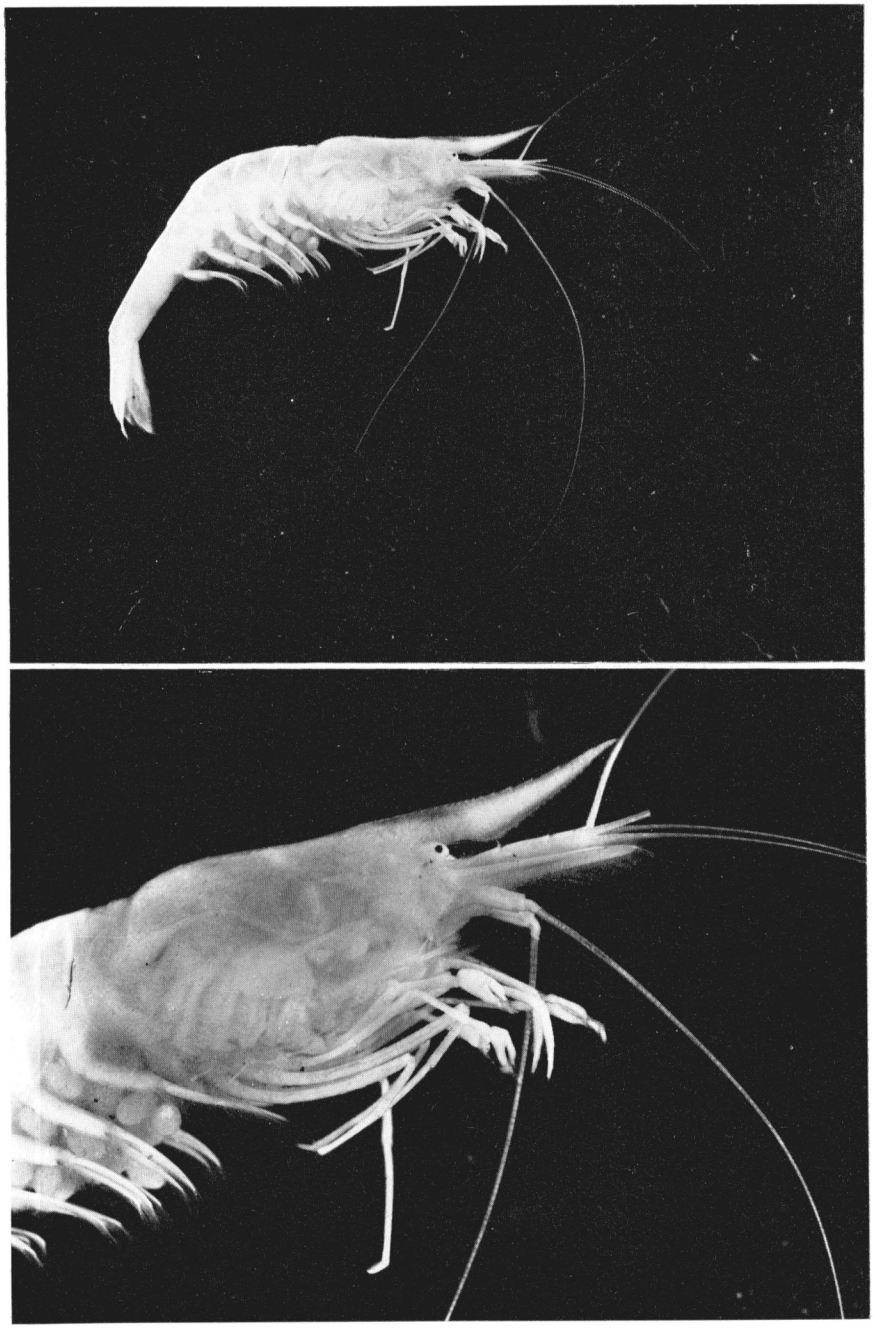

Fig. 1. — *Caridina lanzana* n.sp., ovigerous female from Bog Der well, August 1969.

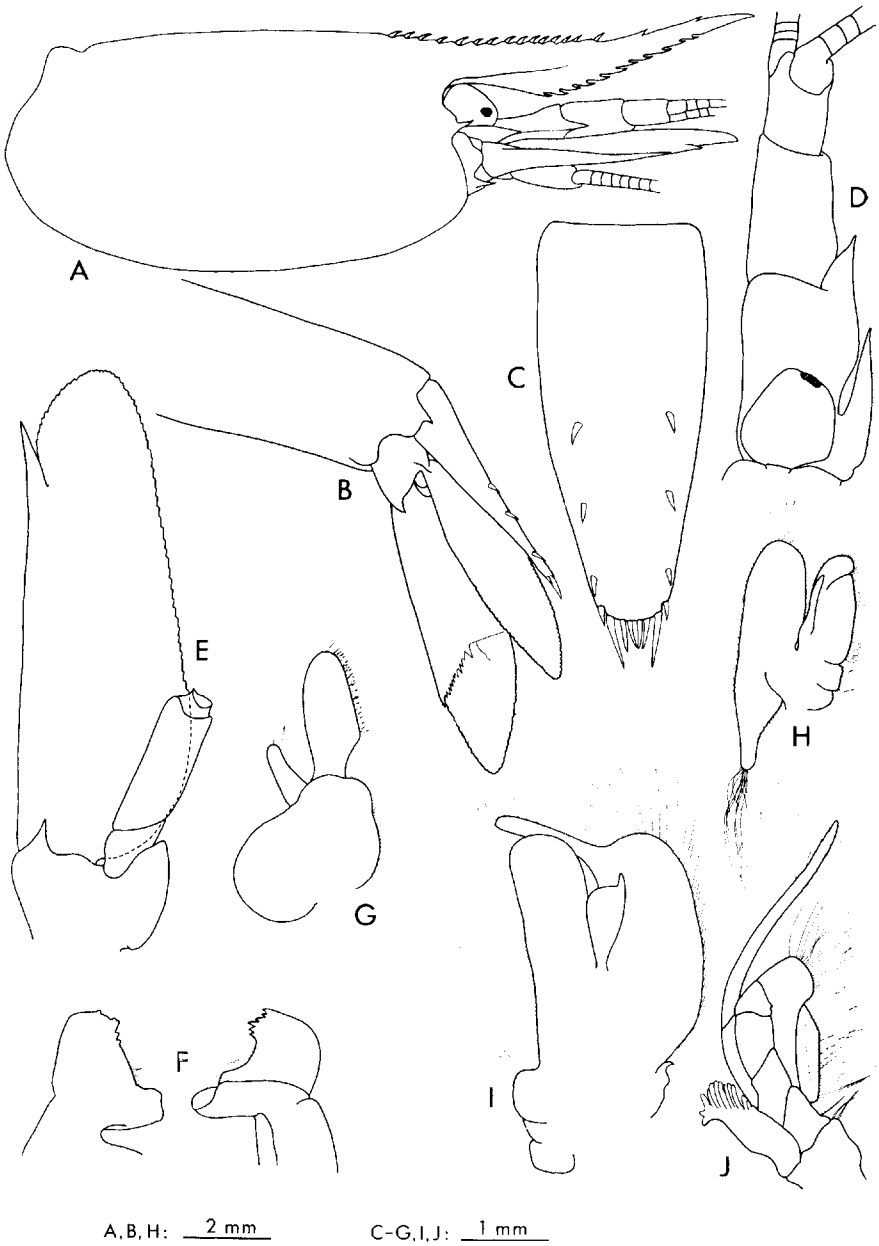


Fig. 2. — *Caridina lanzana* n.sp. A, carapace in lateral view; B, posterior part of abdomen in lateral view; C, telson in dorsal view; D, eye and antennular peduncle in dorsal view; E, scaphocerite and antennal peduncle in ventral view; F, mandibles; G, maxillula; H, maxilla; I, first maxilliped; J, second maxilliped.

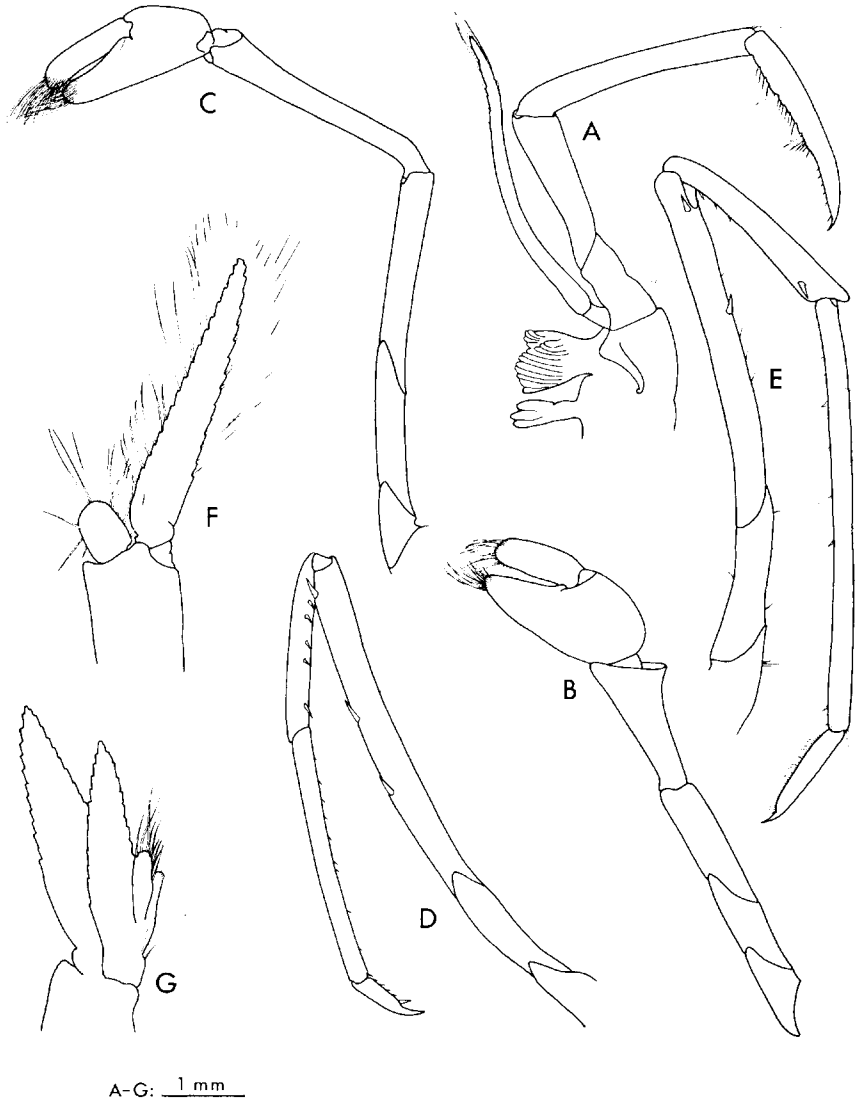


Fig. 3. — *Caridina lanzana* n.sp. A, third maxilliped; B, first pereiopod; C, second pereiopod; D, third pereiopod; E, fifth pereiopod; F, first male pleopod; G, second male pleopod.

in a sharp point. The antero-lateral angle of the basal segment is produced in a long, sharply pointed tooth, which reaches almost to the middle of the second segment. The second segment is somewhat longer than the

third, together the second and third are about as long as the first. No carina is visible on the antennular segment.

The scaphocerite reaches distinctly beyond the antennular peduncle, but fails to reach the end of the rostrum. It is 3 times as long as wide. The outer margin is nearly straight and ends in a strong spine, which, however, is far surpassed by the lamella. A spine is present on the antennal peduncle below the base of the scaphocerite.

The mandible has the incisor process with several (about 6) small, rather irregular teeth. The molar process is truncated and shows no distinct teeth. The maxillula has the upper lacinia high and provided with numerous short spinules on the inner margin; the lower lacinia is rounded and protrudes very little, it is broad and has a setose margin; the palp has a broadly rounded top with two spines. The maxilla has the two endites both bilobed through a rather deep incision, the third lobe being the highest; the palp is slender and often obscured by the upper lobe of the upper endite; the scaphognathite is large and ends posteriorly in a narrow point which bears a cluster of long wavy hairs. The first maxilliped has the upper endite elongate and rounded at the top, the lower endite is produced beyond the upper; the palp is broad and ends abruptly in a short and narrow point; the exopod has the caridean lobe broad, the flagellum is distinct but rather short and not articulated. The second maxilliped is of the usual shape; the exopod has a long flagellum; an epipod and a podobranch are present. The third maxilliped reaches about to the end of the antennular peduncle. The distal segment ends in a sharp point, just behind which a short but strong spinule is placed on the posterior margin; behind this spinule there is a row of less strong spinules in the distal third of the posterior margin, the rest of the margin shows strong setae and spinules. The penultimate segment is longer than the ultimate, and the antepenultimate segment is shorter than it. A distinct exopod is present, as well as two arthrobranchs and an epipod.

The branchial formula is as follows:

| | maxillipeds | | | pereiopods | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 5 |
| pleurobranchs | — | — | — | 1 | 1 | 1 | 1 | 1 |
| arthrobranchs | — | — | 2 | 1 | — | — | — | — |
| podobranchs | — | 1 | — | — | — | — | — | — |
| epipods | rud. | 1 | 1 | 1 | 1 | 1 | 1 | — |
| exopods | 1 | 1 | 1 | — | — | — | — | — |

The first pereiopod is short and robust. It reaches almost to the end of the basal segment of the antennular peduncle. The fingers are short and stubby, and are slightly longer than the palm; they carry the usual dense distal brushes of long setae. The carpus is only slightly excavated distally, it is slightly shorter than the chela and widens anteriorly, being twice as wide distally as basally. The merus is about as long as or slightly shorter than the carpus. The ischium is shorter. Next to the epipod and pleurobranch there is a distinct arthrobranch at the base of the first pereiopod. The second pereiopod is much more slender than the first; it reaches with the fingers beyond the antennal peduncle. The fingers are longer and more slender than those of the first leg, but are likewise blunt-topped and provided with hair-brushes. The palm is about 5/6 the length of the fingers. The carpus is long and slender, about as little excavated anteriorly as in the first leg; it is 1.5 times as long as the chela, basally it measures about 2/3 of the distal width. The merus is about 4/5 as long as the carpus and distinctly longer than the ischium. The third leg reaches to the end of the scaphocerite. The dactylus ends in a sharply pointed apex behind which the posterior margin bears a strong tooth, on the rest of the margin there are about 4 shorter and narrower spinules. The propodus is 3 times as long as the dactylus and bears about 10 very small spinules, which are irregularly arranged over the entire posterior margin. The carpus measures about 2/3 of the length of the propodus and bears several stronger movable spines on the posterior surface; one of these spines, the strongest, is placed distally, the others, about 4 in number, are found in the proximal 2/3. The merus is strong, about twice as long as the carpus, and bears three strong movable spines on the posterior surface. The ischium is short and unarmed. The fourth leg reaches the end of the antennular peduncle, and is very similar to the third leg. The fifth leg almost attains the end of the antennular peduncle. Its dactylus is slender, more so than that of the preceding legs; it ends in a strong slightly curved apex and bears about 40 comb-like arranged spinules on the posterior margin. The propodus is about 3.5 times as long as the dactylus; it is slender and bears some three very small spinules on the posterior margin. The carpus is half as long as the propodus; it bears a strong movable spine in the distal part of the posterior surface, and a few spinules in the proximal part. The merus is distinctly shorter than the propodus (about 4/5); it bears two movable spines on the posterior surface: one in the distal part and one slightly distally of the middle. The ischium is less than half as long as the propodus and shows no spines.

The endopod of the first pleopod of the male is short and rounded, with a few rather long hairs, but without a trace of an appendix interna.

The second pleopod of the male has the appendix masculina longer and stronger than the appendix interna, and provided with long spines.

The protopod of the uropods has a sharp tooth over the base of the exopod. The exopod has the outer naked margin straight and ending in a distinct tooth. The diaeresis bears about 10, sometimes irregularly placed, spinules.

*Size.* — The carapace length (including the rostrum) of the non-ovigerous specimens varied between 6 and 11 mm, that of the ovigerous females between 10 and 11 mm. The eggs are numerous and measure $0.6 \times 1.0$ mm.

*Colour.* — The living animals are whitish and rather transparent; the only pigment is the small black spot in the eye. The eggs are yellow.

*Habitat.* — The well named Bog Der is situated in the so-called Taleh evaporites of the Lower to Middle Eocene (MERLA et al., 1979), in the desert area of the Nogal Valley, about 100 km from the nearest sea coast. It is about 2 m wide and 4 m deep; the bottom still receives some sunlight. The water, about 40 cm deep, is clear, with a low $O_2$ content and rather high salinity. It was analyzed by Drs L. Chelazzi and G. Messana, who obtained the following data: temperature 30°C; $CO_2$, 40 mg/l; $H_2S$, absent; $O_2$, 2 mg/l; salinity, 1050 mg/l; pH, 7.2; hardness (calcium), 3100 mg ($CaCO_3$)/l; hardness (total), 5000 mg ($CaCO_3$)/l.

*Etymology.* — It is a great pleasure to name this new and interesting species after one of its discoverers, Prof. Benedetto Lanza of Florence, who in 1962 began the first researches on the East African subterranean Crustacea.

*Remarks.* — The species shows all the characteristics of the genus *Caridina*. Within the genus it shows most resemblance to *Caridina nilotica* (P. Roux, 1830), resembling that species in the long upturned rostrum, the presence of a suborbital angle above the antennal spine, the spination of the posterior border of the telson, the low and unarmed preanal ridge, the shape of the pereiopods, the size of the eggs, etc. The two most important characters which distinguish *C. lanzana* immediately from *C. nilotica* are (i) the degenerated eyes in which the cornea is reduced to a tiny pigment spot, and (ii) the absence of an appendix interna on the endopod of the first pleopod of the male.

Although the family Atyidae is rather rich in troglobitic genera and species, the genus *Caridina* is almost exclusively epigean. So far only three troglobitic *Caridina* species have been described. The first species of the genus reported from subterranean water is *Caridina lovoensis* Roth-

Woltereck, 1955, from West Africa, where it was found in fresh water in limestone caves of Lovo near Thysville, Bas-Congo, Zaire. This species, like *C. lanzana*, has reduced eyes, but it can immediately be distinguished from *C. lanzana* by its very short rostrum, which reaches approximately to the end of the basal antennular segment and has only 3 or 4 dorsal and 1 ventral tooth; *C. lovoensis* is closer to *C. weberi* De Man, 1892, than to *C. nilotica*. *Caridina nilotica* itself has also been reported from a cave, namely from the Ambovonomby Cave in Majunga Province, Madagascar (HOLTHUIS, 1956, p. 64 and 1965, p. 15), but this record probably pertains to a stray specimen, as it was quite normal in its features and did not show any adaptation to subterranean life. More recently two more true troglobitic species of *Caridina* have been described: *C. rubella* Fujino & Shokita, 1975, from the Ryukyu islands and *C. troglodytes* Holthuis, 1978, from New Ireland. Both these species show reduced eyes, and both are more closely related to *C. serratirostris* De Man, 1892, than to *C. nilotica*. The discovery of *Caridina lanzana* thus raises the number of known troglobitic *Caridina* species to four.

SUMMARY

Description of a new shrimp, depigmented and with degenerated eyes, from the subterranean waters of Nogal Valley (northern Somalia): *Caridina lanzana* n.sp. (Crustacea Decapoda).

RIASSUNTO

Descrizione di un nuovo gambero a occhi degenerati e depigmentato proprio delle acque sotterranee della Valle del Nogal (Somalia settentrionale): *Caridina lanzana* n.sp. (Crustacea Decapoda).

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