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SESARMA (SESARMA) CERBERUS, A NEW CAVERNICOLOUS CRAB FROM AMBOINA

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Though the number of species of macrurous Decapoda known from subterranean waters is rather extensive, there are surprisingly few species of crabs that have been found in that habitat. Wolf (1934: 105, 106) listed only four species of Brachyura, three of which are epigeal forms, which had only accidentally entered subterranean waters.

Hartnoll (1964: 79; in press) made it clear that at that time only three species of crabs could be considered to be truly troglobic: *Sesarma jacobsoni* Ihle, 1912, which so far is only known from caves in Central Java, *Sesarma verleyi* Rathbun, 1914, from caves in Jamaica, and *Typhlopseudothelphusa mocinoi* Rioja, 1953, from a cave in Chiapas, S.E. Mexico. The last mentioned species, which belongs to the family Pseudothelphusidae, is a typical troglobiont, being blind, unpigmented and with very long and slender legs. The two *Sesarma* species (family Grapsidae) also are adapted to cave life, but to a lesser degree: the eyes are present, though small, with the cornea reduced but still pigmented, and the legs are conspicuously lengthened; the colour in life of *S. verleyi,* according to Hartnoll (1964; in press), is pale bluish white. The colour of living specimens of *S. jacobsoni* is unknown, but preserved material is quite pale. *S. jacobsoni* and *S. verleyi,* though originating from widely distant localities resemble each other very conspicuously.

In the present paper a third cavernicolous species of *Sesarma* is described. It shows a close resemblance to both *S. verleyi* and *S. jacobsoni,* but is still less typically adapted to subterranean life.

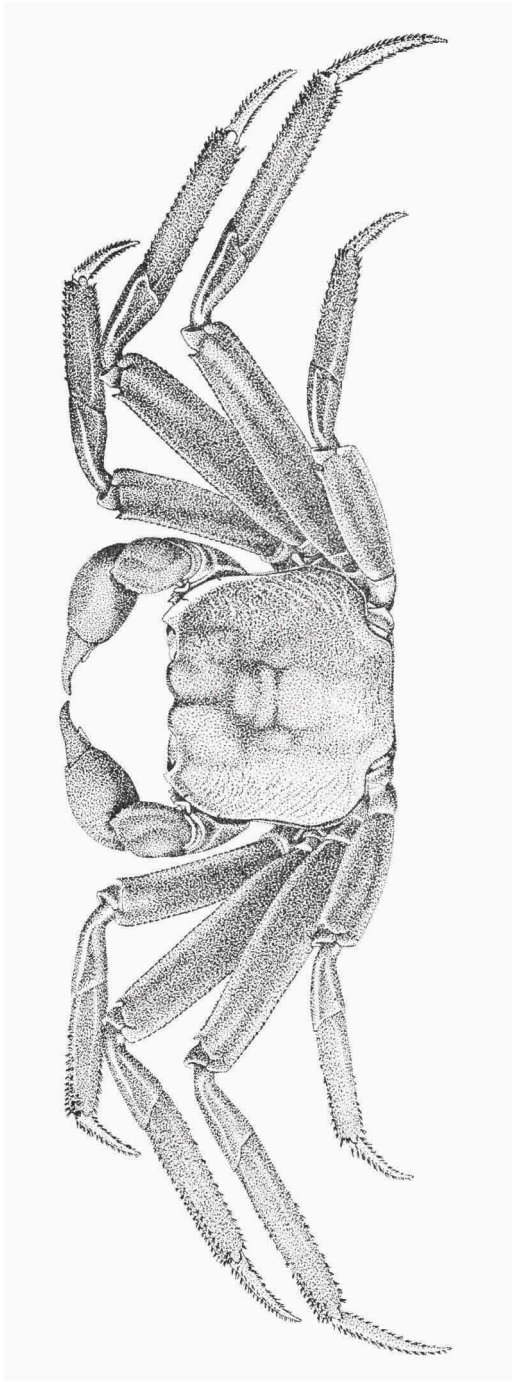

Fig. 1. *Sesarma (Sesarma) cerberus* new species, male holotype, natural size.
W. C. G. Gertenaar del.

Sesarma (Sesarma) cerberus new species (fig. 1, 2, 3a, b)

Material examined. — Cave on the island Nusa Lain, just west of Amboina, Moluccas; in complete darkness; 21 March 1923; F. Kopstein. — 3 ♂, 4 ♀.

Description. — The carapace is quadrangular, it is distinctly widened posteriorly; its anterior width is equal to its length, while its posterior width is 1.2 times the total length. The upper surface is flat in its posterior half, but in the anterior region it curves down towards the front. The regions are well delimited. The frontal margin is distinctly concave in the middle, the lateral halves are convex. The antero-lateral angles of the front are bluntly rectangular. The front is directed obliquely down, its surface is somewhat concave. Near each lateral margin at the level of the basis of the eyes the front shows a conspicuous tubercle. These tubercles evidently represent the lateral post-frontal lobes. The median post-frontal lobes are very distinct and convex, separated by a deep median depression, which continues posteriorly as a conspicuous groove extending towards the meso-gastric region. These median post-frontal lobes fill practically the entire width of the basal portion of the front; as stated above, the lateral post-frontal lobes are reduced to small, but distinct conical tubercles, placed near the lateral margins of the front before the median post-frontal lobes. Obliquely behind the median post-frontal lobes and behind the orbits there is a pair of lobes, which in most other species of *Sesarma* are placed behind the lateral post-frontal lobes; they are somewhat narrower than the median post-frontal lobes. The orbits are wide and rather shallow, they are 0.8 times as wide as the front; their posterior margins are transverse and almost straight; the outer orbital angle is rectangularly rounded. The fronto-orbital width is 3/5 of the total width and distinctly less than the length of the carapace. The antero-lateral margin of the carapace bears two low teeth behind the outer orbital angle, the anterior of these is quite conspicuous, the posterior is very small. The anterior tooth is longer than the outer orbital. The anterior half of the dorsal surface of the carapace bears granules, the posterior half is smooth in the central area, with transverse ridges in the lateral and posterior parts.

The eyes are small, they do not fill the orbit, but they are much better developed than those of *Sesarma jacobsoni*. The cornea is narrower than the eyestalk, but it is quite distinct and well pigmented.

The chelipeds of the male are large and swollen; they are subequal. The fingers are somewhat longer than the palm, they end in simple corneous hoofs. The cutting edges bear three or four larger and several smaller teeth. The base of the cutting edge of the dactylus is pubescent. The upper surface of the dactylus bears many small corneous-tipped conical tubercles,

which are arranged in more or less distinct longitudinal rows; the middle row consists of about eleven such tubercles. The palm, both inside and out, is covered with tubercles. There is no dorsal ridge on the palm, nor oblique ridges, though some of the dorsal tubercles are arranged in indistinct oblique rows. The carpus has a distinct tuberculated ridge to the inside of the upper margin and a U-shaped depression near the upper articulation with the chela; the outer surface is tuberculate. The merus bears a subterminal dorsal tooth, which is separated from the anterior margin by a wide groove, which extends all along the anterior margin of the outer surface. This surface is tuberculate with the lower margin finely serrate. The lower margin of the inner surface bears a distinct flattened serrate lobe anteriorly. In the females the chelipeds are short and very slender. They almost reach the end of the carpus of the second pereiopod. The fingers are elongate and narrow, being about 1.5 times as long as the palm; the tips are pointed and the cutting edges finely denticulate. The carpus is as long as the palm and about half as long as the merus. All segments are tuberculate.

The second to fifth pereiopods are very elongate. The fourth is longest, it is about three times as long as the carapace, and is slightly longer than the third. The second leg reaches to the middle of the propodus of the third, while the fifth fails to reach the middle of the propodus of the fourth. The dactylus in these pereiopods is slightly (0.8 to 0.9 times) shorter than the propodus, the difference being most conspicuous in the second and fourth legs, and smallest in the fifth where the dactylus is almost as long as the propodus. The carpus is about 4/5 as long as the dactylus in the second leg, this ratio is about 3/4 in the third, about 2/3 in the fourth and about 3/4 in the fifth. The merus is about twice to more than twice as long as the carpus in legs 2 to 4, becoming relatively longer from the second to the fourth legs; in the fifth it is less than twice as long as the carpus. It is slightly less than three times as long as broad in the second leg, 3 to 3.5 times in the third, almost four times in the fourth, and slightly less than three times in the fifth. The dactylus and the propodus of the second to fifth legs have small tufts of dark coloured bristles with white tips along the anterior and posterior margins; the density of these bristles diminishes in the proximal part of the propodus. In the second pereiopod of the male the basal 2/3 of the posterior margin of the dactylus and the distal half of the posterior margin of the propodus show a dense short and dark pubescence, which is placed between the bristles. In the third pereiopod there is a similar but much less dense and less conspicuous pubescence, while this is entirely absent from the fourth and fifth legs. Both the outer and

the inner surfaces of the propodus of the second to fifth legs show a longitudinal carina, which is most conspicuous in the basal part. The carpus shows a dorsal carina, while its outer surface carries two distinct longitudinal sharp carinae; one such carina is present on the inner surface. The outer surface of the merus bears two low and rather indistinct and broad longitudinal carinae.

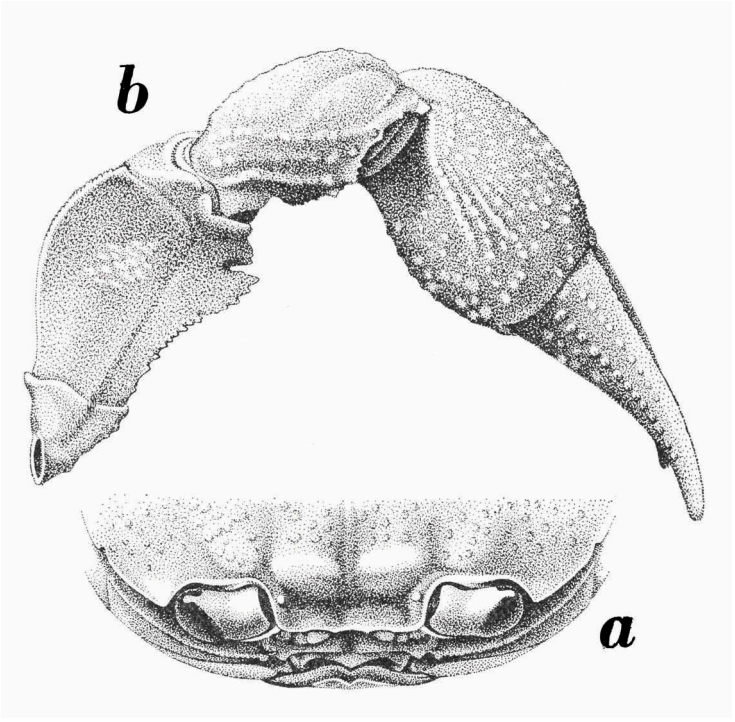

Fig. 2. *Sesarma (Sesarma) cerberus* new species, male. a, frontal region of paratype in oblique view; b, cheliped of holotype in dorsal view. a, b, × 3. W. C. G. Gertenaar del.

The male abdomen is triangular with the greatest width at the third somite. From the third to the sixth somite it regularly narrows, the lateral margin there being slightly concave. The sixth somite rather suddenly narrows in the posterior part where its lateral margins are convex or slightly sinuous. The telson is narrow and ovate with a broadly rounded apex. The abdomen of the female is almost semi-circular with the telson somewhat sunken into the sixth abdominal somite.

The gonopod of the male is short and robust, the corneous tip is truncate and directed outwards. For comparison the gonopods both of the present species and of *Sesarma jacobsoni* are figured here.

Size. — The male specimens have a carapace breadth of 24 to 34 mm, and a carapace length of 21 to 30 mm, these figures for the females are respectively 18 to 29 mm and 15 to 25 mm. None of the females is ovigerous.

Colour. — Due to the long preservation of the specimens in alcohol, most of the original colour has disappeared, the specimens having assumed a uniform pale brownish yellow colour. Only the larger specimens still show a purplish colour on the dorsal surface of the carapace. It is certain therefore that this species is not colourless our bluish white as some of the other cavernicolous crabs.

Habitat. — The specimens were taken in a cave in complete darkness. The fact that the eyes are not or not much reduced and that the animals (at least some) show a purple colour indicates that the adaptation to subterranean life has not very far advanced and is much less than in *Sesarma verleyi* and *S. jacobsoni*. Actually the very long legs seem to be the only noteworthy adaptation to cave life.

I do not know anything about the nature of the cave. It is situated on Nusa Lain, the southernmost of the three islets of the Nusa Telu group, which lies just off Tanjong Wairole, the westernmost cape of Hitu peninsula, the western peninsula of the island of Amboina. Lain is the second in size of the Telu Islands. The three islets are separated from each other and from the coast of Amboina by deep channels.

Types. — Holotype of *Sesarma cerberus* is the largest male (cl. 30 mm, cb. 34 mm), it forms part of the collection of the Rijksmuseum van Natuurlijke Historie under Reg. No. Crust. D. 19488. The other specimens are paratypes (Reg. No. Crust. D. 19489). The type material of *Sesarma jacobsoni* Ihle is also preserved in the Leiden Museum. A large male (cl. 21 mm, cb. 24 mm) from Guwå Djumblang, Gunung Sewu, Jogjakarta, Central Java (August 1911, E. Jacobson) is here selected to be the lectotype; it bears the Reg. No. Crust. D. 19487. The other specimens from the same locality (February and August 1911, E. Jacobson; Reg. No. Crust. D. 1815) and from Guwå Ningrong, Gunung Sewu, Jogjakarta, Central Java (February 1911; E. Jacobson; Reg. No. Crust. D. 1814) become thereby paralectotypes.

Remarks. — The fact that the carapace has antero-lateral teeth behind the extra-orbital angle and that there are no oblique crests on the upper surface of the palm, makes it clear that the present species belongs to the typical subgenus of the genus *Sesarma*. In this subgenus it comes closest to *S. verleyi* Rathbun and *S. jacobsoni* Ihle, which two species it resembles in the shape of the carapace which widens posteriorly and in the very long and slender legs.

Sesarma cerberus differs from *S. jacobsoni* Ihle (see Ihle, 1912: 178, pl. 9), with the types of which it could be compared, in the following points:

1. The size and the place of the lateral post-frontal lobes; in *S. jacobsoni* these are distinct, broad and placed laterally of the median post-frontal lobes, between these lobes and the orbit.

2. The front is more vertical in *S. jacobsoni.*

3. The antero-lateral margin in *Sesarma cerberus* is more strongly curved inward in its anterior part than in *S. jacobsoni,* whereby the fronto-orbital width becomes relatively smaller.

4. The second antero-lateral tooth in *S. jacobsoni* is inconspicuous; in the new species, though it is very small, it is well visible.

5. The eyes in *S. jacobsoni* are smaller, especially the corneal part is strongly reduced, while the stalk carries an anterodorsal oblique carina, which is absent in *S. cerberus.*

6. The legs, though of the same general shape, are shorter and less slender in *S. jacobsoni.*

7. The male abdomen is relatively narrower in the new species. The differences in the gonopods are shown in fig. 3 b and c.

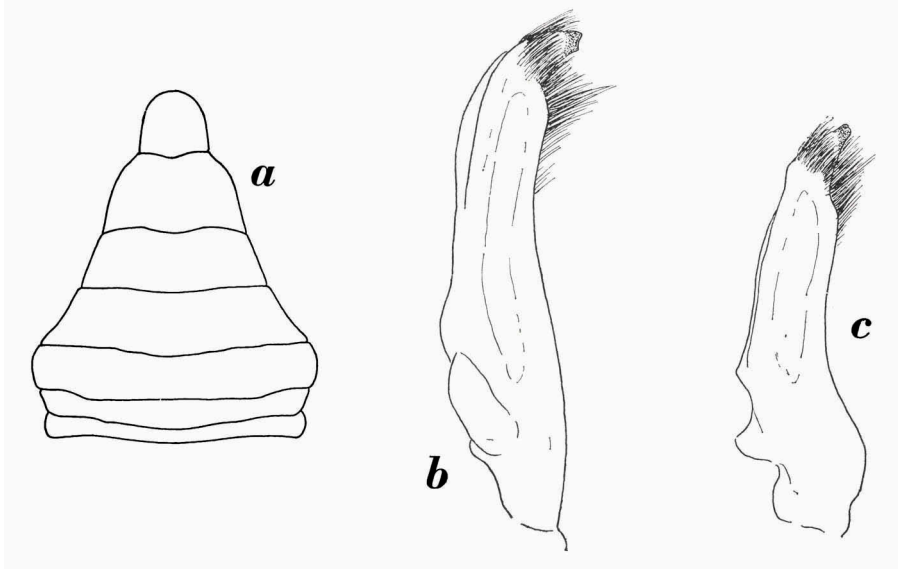

Fig. 3. a, b, *Sesarma* (*Sesarma*) *cerberus* new species, male. a, abdomen of holotype; b, gonopod of paratype. c, *Sesarma* (*Sesarma*) *jacobsoni* Ihle, male paratype, gonopod. a, × 2.5; b, c, × 8. W. C. G. Gertenaar del.

8. The chelipeds in the two species are similar, only in *S. jacobsoni* the median dorsal row of tubercles of the dactylus is more distinct since

the secondary tubercles are fewer and smaller. In that species the tubercles on the carpus are furthermore more distinctly arranged in rows.

Sesarma verleyi has been described by Rathbun (1914: 123, pl. 6; 1918: 288, pl. 76) and Hartnoll (in press: fig. 14B). Thanks to the kindness of Dr. R. G. Hartnoll of the Queen's University, Belfast, I received some material of *S. verleyi* from a cave at Worthy Park, St. Catherine, Jamaica, so that I could directly compare that species with *S. cerberus*. The two species differ in the following points:

1. In *S. verleyi* the lateral post-frontal lobes are only a little narrower than the median lobes and placed next to them, the four lobes forming a single transverse row over the base of the front.

2. In *S. verleyi* the second antero-lateral tooth of the carapace is entirely absent, the first sometimes even being obsolete.

3. The eyes are smaller in *S. verleyi* than in *S. cerberus* and have the cornea much narrower than the stalk.

4. The chelipeds of the largest male specimen (cl. 17 mm) of *S. verleyi* examined by me, are more slender, but of essentially the same shape as those of juvenile males of *S. cerberus*. The lobe at the distal end of the lower inner margin of the merus is inconspicuous or absent in *S. verleyi*.

5. In *S. verleyi* the walking legs are of the same general shape as in *S. cerberus*, being perhaps somewhat more slender. The bristles on the dactylus in *S. verleyi* are placed much closer together, forming three distinct and even rows on the dorsal and three such rows on the ventral surface of the dactylus; in the distal part of the propodus those rows are also present, though less distinct. The additional pubescence found on the ventral proximal part of the dactylus and the ventral distal part of the propodus of the second and third legs of the male of *S. cerberus*, is also present in *S. verleyi*, being most conspicuous in the propodus of the second pereiopod and rather obscure in the third leg.

6. The telson of the males of *S. verleyi* is relatively broader than in *S. cerberus*.

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