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INVERTEBRATE ZOOLOGY Crustacea

Lysmata nilita, a new species of prawn (Crustacea Decapoda) from the Western Mediterranean *)

(con una figura nel testo e due tavole fuori testo)

(ricevuto il 18 - VIII - 50)

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The general impression one gets in that *Lysmata nilita* (Plate IX) repeats closely conditions found in *L. seticaudata* RISSO (Plate X), (DOHRN, 1950 § 5), except for the few points summarised in paragraph 6.

Material examined :

Rocky coastal waters, from the western half of the Bay of Naples; May and June 1950. 12 Specimens (9 of which are ovigerous females of 29 - 31 mm length) 28 - 32 mm.

1) - Description of the external features.

The rostrum is straight and reaches to or somewhat beyond the end of the second segment of the antennular peduncle. The upper margin bears 5 or 6 teeth, the proximal three of which are placed on the carapace behind the posterior limit of the orbit. The fourth tooth is placed over or slightly before the posterior orbital margin. The first dorsal tooth lies in about the middle of the posterior length of the carapace (rostrum excluded). The teeth are strong and rather high; they are directed anteriorly and divided regularly over the rostrum and the anterior half of the carapace. The lower margin of the rostrum bears two three distinct teeth in the distal half. The carapace is smooth. A

*) When studying the sexuality of *Lysmata seticaudata* (RISSO) the first author (DOHRN) found among material of this species, rare specimens which differ from the typical *Lysmata s.* in the colour distribution of the body and in the sexual development. He came to the conclusion that this second form belongs to a species distinct from *Lysmata seticaudata* and sent some material to the second author (HOLTHUIS) to be examined from a systematical point of view.

The discovery of this new species thus is entirely due to the first author, who also is responsible for the description of the colour given here. The second author has provided the morphological description and the discussion of the name of the species.

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strong antennal spine is placed on the lower orbital angle. A small but distinct pterygostomian spine is present.

The abdomen is smooth. The pleurae of the first three segments are broadly rounded, that of the fourth ends in a minute tooth, which is generally distinct in the ovigerous females. The pleurae of the fifth abdominal segment end in a distinct posteriorly directed sharp point. The sixth segment is about 1.5 times as long as the fifth, the pleurae are small and pointed, the posterolateral angles too end in an acute point. The telson is about as long as the fifth and the sixth abdominal segments combined. Its dorsal surface bears two pairs of spines which are placed so as to divide the telson into three parts of about equal length. The posterior margin of the telson ends in an acute median point. At each side of this point two spines are present: a long and strong inner spine and a very short outer. The posterior margin and the distal half of the lateral margins are fringed with long hairs.

The eyes are well developed. The cornea is globular, it is distinctly longer and somewhat broader than the eyestalk.

The basal segment of the antennular peduncle has the stylocerite strong and sharply pointed, reaching somewhat beyond the anterior end of the segment. Several small spinules are placed on the external part of the upper surface of the basal segment, just behind the anterior margin. The second segment of the peduncle is somewhat longer than the third; together these two segments are shorter than the first. Some spinules are present on the upper and outer parts of the anterior margin of the second and third segments. The upper antennular flagellum consists of two rami, which are fused for 21 to 27 joints. The free part of the shorter ramus consists of 4 to 7 joints and measures 1/5 to 2/7 of the length of the fused part. A dark spot is visible at the top of the free part of the shorter ramus.

The scaphocerite reaches with almost half its length beyond the antennular peduncle. It is about 3.6 times as long as broad. The outer margin is slightly concave and ends in a final tooth which overreaches the anterior margin of the lamella. Generally the tip of this tooth is curved inwards. The lamella is broadest in the basal part and gradually narrows into the narrowly truncated apex. The antennal peduncle fails to reach the middle of the scaphocerite. A distinct spine is present at the external side of the peduncle near the base and the palp; the molar process is strong and ends in some blunt teeth. The maxillula has the lower endite narrow, the upper is rather broad, the palp ends into two lobes. The maxilla has the upper endite large and deeply incised, the lower endite is reduced; the palp and the scaphognathite are well developed. The maxillipeds all bear a well developed exopod. The first maxilliped has the endites of coxa and basis separated by a distinct notch, the palp is well developed, the caridean lobe is narrow but distinct, and the epipod is bilobed. The second maxilliped is normal in shape, the epipod is well developed and

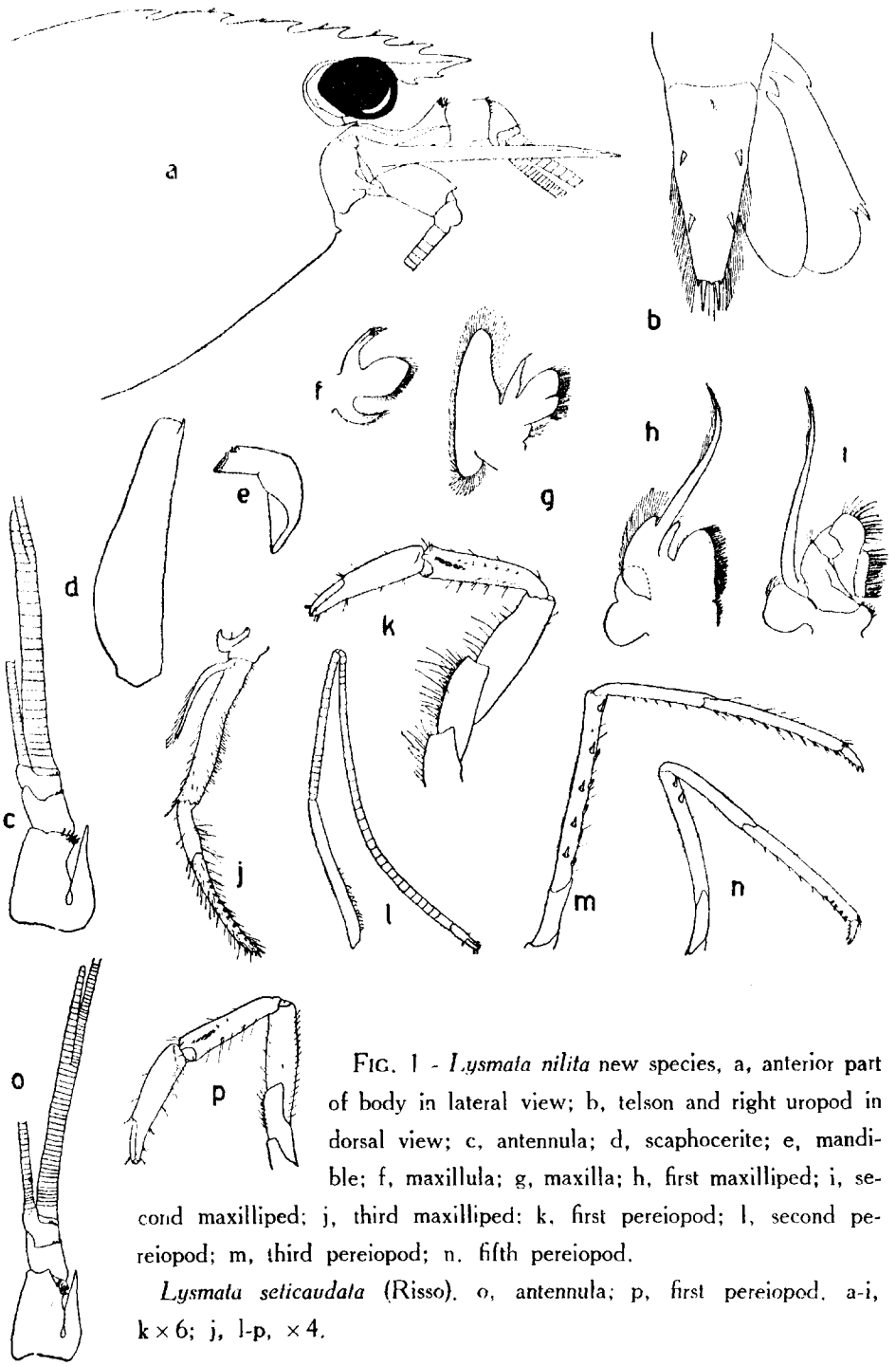


FIG. 1 - *Lysmata nilita* new species, a, anterior part of body in lateral view; b, telson and right uropod in dorsal view; c, antennula; d, scaphocerite; e, mandible; f, maxillula; g, maxilla; h, first maxilliped; i, second maxilliped; j, third maxilliped; k, first pereiopod; l, second pereiopod; m, third pereiopod; n, fifth pereiopod.

Lysmata seticaudata (Risso). o, antennula; p, first pereiopod. a-i, k × 6; j, l-p, × 4.

bears a podobranch. The third maxilliped reaches with about half the distal joint beyond the scaphocerite. This distal joint is provided at the top and in the anterior part of the upper margin with strong spines. The distal joint is twice as long as the penultimate and slightly more than 3/4 of the length of the antepenultimate joint.

The branchial formula runs as follows:	maxillipeds			pereiopods				
	1	2	3	1	2	3	4	5
pleurobranchs	—	—	1	1	1	1	1	1
arthrobranchs	—	—	1	—	—	—	—	—
podobranchs	—	1	—	—	—	—	—	—
epipods	1	1	1	1	1	1	1	—
exopods	1	1	1	—	—	—	—	—

The first pereiopods reach to or somewhat beyond the end of the antennular peduncle. The fingers are 0.6 times as long as the palm. The top of the dactylus ends into two dark coloured ungues, between which the (also dark coloured) apex of the fixed fingers fits when the chela is closed. The carpus is as long as or slightly longer than the chela. The merus is slightly longer than the carpus. The ischium has the anterior end truncated and even shallowly emarginate, forming a sharp or blunt anteroventral tooth, which projects beyond the lower margin of the merus. The second legs are equal in shape, though sometimes somewhat unequal in length. The carpo-meral articulation reaches to or somewhat beyond the end of the antennular peduncle. The chela is very small, the fingers are somewhat shorter than the palm. The carpus is a little longer than the merus and ischius combined, it is subdivided into 30 to 35 joints. The merus is as long as or slightly shorter than the ischium, it consists of 14 to 24 joints, which are less distinct than those of the carpus. Also in the distal part of the ischium some annulations may be seen. The basal part of the ischium is slightly broadened and bears some stiff curved setæ at the inner margin. The third leg reaches with part of the carpus beyond the scaphocerite. The dactylus ends in two teeth and bears on the posterior margin about three spines. The propodus is almost five times as long as the dactylus, its posterior margin bears a row of about 10 spines, some more spines are placed on the inner surface of the propodus in a row close to and parallel with the posterior row. The carpus measures 4/5 of the length of the propodus. The merus is 4/3 as long as the propodus. On the outer surface the merus bears a longitudinal row of five or

six strong spines; while several irregularly arranged spines, three to six in number, are present on the posterior margin, no spines are present on the inner surface of the merus. The ischium is short and unarmed. The fourth leg is very similar to the third, it only is somewhat shorter. The fifth pereiopod reaches about to the end of the scaphocerite or overreaches this scale slightly. The dactylus is similar to that of the two preceding legs. The propodus, which is five times as long as the dactylus, bears about 10 minute spinules on the posterior margin. Furthermore there are transverse rows of hairs in the distal part of the posterior margin extending somewhat on the outer surface. Like in the third leg here too a longitudinal row of spinules is present on the inner surface of the propodus, close to the posterior margin and parallel with it. The carpus measures 3/4 of the length of the propodus. The merus is slightly shorter than the propodus, it bears about two spines in the distal part of the outer surface.

The first pleopod of the female has the endopod narrowly triangular and elongate. An appendix interna is present on the endopods of the second to the fifth pair of pleopods. No males have been seen by the second author (HOLTHUIS).

The uropods are elongate ovate. The outer margin of the exopod is straight and ends into two teeth, between which a movable spine is present.

The eggs are numerous and rather small, their diameter is 0.6 to 0.8 mm.

2) - Colour pattern.

The darkorange chromatophores are distributed in broad ribbons all across the body of each specimen as shown schematically in plate IX. 8 pigmentless regions divide those red stripes from each other. The carapace stripes are irregular in shape, while the abdominal bands surround the whole segments in straight borderlines, of which the anterior one is illdefined while the posterior is darkest at its edge.

This reddish pigment is not the only one present. Though less diffuse, *Lysmata nilita* also shows in summer the same bright yellow pigment which was described as note I on *Lysmata seticaudata* (DOHRN, 1950, in press) distributed only at the internal side of eyestalks and on the medial parts of the different maxillipeds.

Lysmata nilita is more subject to lose its natural colour intensity if exposed to daylight in captivity than is *Lysmata seticaudata*.

3) - Sexuality.

This feature of *L. n.* is the most interesting character and a specific difference towards *L. s.*: morphology and histology of the *L. n.* gonads show a true and essential ambisexuality as described for *L. s.* with all peculiarities except observed dimensions of sex reversal; this probably occurs at smaller dimensions in *L. n.* its lower limit being 20 mm. (*L. s.* has it at 31 mm.). Sex biology is thought to be fundamentally identical in both. Males are even more seldom obtain-

ed than females, because of the shortage of small specimens yielded by the usual methods of fishing. Still, some specimen of 22 mm. was found ovigerous in summertime.

4) - Moulting.

It seems to be characterised by a typical rhythm for those dimensions even in *L. s.* It can be observed in captivity when specimens kept single in terra-cottapots are left without food: at 24° C in July their moulting happens to occur every 15 days for a specimen of 28 mm. total length. Fertilised eggs are found on the exuviae of ♀♀ after moult, and in this respect the described migration of larvae of *L. s.* to the deep plankton is neither impossible nor demonstrated for *L. n.* No larval forms are known for *L. n.*

5) - Dimensions.

Compared with *L. s.*, this related species seems smaller in total length the maximum size found being 38 mm for an ovigerous female. Its transverse striping makes it also look broader and shorter than *L. s.*, which has been shown to be partly an optifact by length/width measurements.

6) - Essential features peculiar to *L. nilita*.

The present species is very closely related to *Lysmata seticaudata* Risso. It resembles that species in every respect, except for the following differences found so far by HOLTHUIS (1-6) and DOHRN (7-10):

1. The free portion of the shorter ramus of the upper antennular flagellum in *L. seticaudata* is considerably longer than in *L. nilita*. In the former species the free portion consists of 8 to 15 joints and is 1/2 to 5/8 of the length of the fused portion, which is composed of 20 to 38 joints. While in *Lysmata seticaudata* the free portion of the shorter ramus is half as long as the fused portion or longer, in *L. nilita* it is shorter than 1/3 of the fused portion.

2. In *Lysmata seticaudata* the scaphocerite has the final tooth reaching distinctly beyond the lamella and is directed somewhat outward, following the concave curvature of the outer margin of the scaphocerite. In *L. nilita* this spine is curved inwards and is often poorly developed, in some of my specimens it hardly reaches beyond the lamella.

3. The first legs in *Lysmata seticaudata* have the fingers generally shorter than in *L. nilita*. In the former species the fingers are about half as long as the palm, in the latter they measure 0.6 of the length of the palm.

4. In *Lysmata seticaudata* the carpus of the first legs is shorter than the chela, in *L. nilita* it is as long as or longer than the chela.

5. The ischium of the first leg in *Lysmata nilita* shows at the inner surface a distinct anteroventral angle, the anterior margin of this segment being truncated and somewhat emarginate. In *L. seticaudata* the inner surface of the

ischium shows the anterior margin gradually merging with the ventral margin, the antero-ventral angle being broadly rounded.

6. The last three pereiopods in *L. seticaudata* are exactly like those in *L. nilita*, but for the fact that they are shorter. The third leg in the former species reaches only with part of the propodus beyond the scaphocerite, while the fifth leg generally fails to reach the end of that scale.

7. The best character for the separation of the two species, however, is that afforded by the colour pattern (see Plates IX and X). Unfortunately this character may be used only with living material, since the colour entirely disappears when the material is preserved.

8. The pigments of *L. nilita* are originally less orange-red than the ones of *L. seticaudata*. Also chromatophore contraction in daylight is somewhat speedier in the former species; no exact measurements for comparison have been made though.

9. The most interesting feature is the parallelism to *Lysmata seticaudata* as to the ambisexual gonad, which was c o n s t a n t l y found in all specimens investigated so far, and which closely resembles the one described already for the latter species by several authors (SPITSCHAKOFF, 1912; NOUVEL, 1940; DOHRN, 1950, in press). Morphology and cytology of the gonad are similar in both species — so far as the poor material of *L. nilita* did show. Its essential difference consists in the size at which the male changes its external sex characters to the female type, — a change again running strictly parallel with *L. seticaudata*, — realising thus a sex reversal of the very same type only at smaller dimensions.

The sex change seems constant, and irreversible, and its variability which had to be investigated on statistical basis for the more common species *L. seticaudata*, cannot be definitely confined between certain limits in this species as it was made in the related one.

Still, females found with eggs at 22 mm total length make it certain that the lower limit of this sex reversal is about 10 mm below the limit statistically made out for *L. seticaudata*, (31 mm total length).

10. While *Lysmata seticaudata* during summer shows yellow pigment all over its skin as described elsewhere (DOHRN, l. c.). *Lysmata nilita* shows the same pigment in the same period only on the medial part of ophtalmopods and around its mouth, those chromatophores thus being absent on the back and on the sides of the carapace as well as of the abdominal segments. It might be interesting for later to point out here that the disposition of this yellow pigment on each ophthalmopod is at the edge of the cornea of the eye, and shows a clearcut window of about 1 mm diameter constantly free of this pigment, located always immediately attached to the basis of the cornea.

It is desirable that more materiale of *Lysmata nilita* be examined to find

out more about the variability of the various characters. The species, however, seems to be very rare.

Discussion of the name.

Though no description of the present species has been published up till now, its name has been found three times by us (HOLTHUIS) in literature and the species was already known (even if not published) to Antoine RISSO, the well known carcinologist of Nice, France, who published his works on Crustacea of southern France in the first half of the previous century. HOPE (1851), who must have had access to RISSO's unpublished manuscripts, mentioned in his list of Mediterranean Crustacea the species *Lysmata nilita* Risso from Nice, giving just the name of this species. *Lysmata nilita* was mentioned for the second time by MONOD (1931) in his inventory of the manuscripts of RISSO, which are present in the library of the Musée d'Histoire Naturelle in Paris. MONOD reports the presence of a figure of *Lysmata nilita* among RISSO's manuscripts. In June 1950 the second author of the present paper (HOLTHUIS) was able to examine this figure in the library of the Paris Museum. It proved to be coloured and left no doubt whatsoever that it represented the *Lysmata* species, which lacks the longitudinal white lines over the body.

Though the present authors are free to use whatever trivial name they think fit for this new species, it only seems proper to adopt here the name given to it by its first discoverer, A. RISSO, who unfortunately had not the opportunity to publish a description and a figure of this species himself.

Summary

A species named *Lysmata nilita* in an old manuscript of A. RISSO and not described further than by a simple drawing of its shape and colour pattern was found at Naples Zoological Station while investigations on another very similar type of Decapod were being carried out. The material collected being very rare, here is a short account of all pecularities distinctive for this new species as compared with its closely related *Lysmata seticaudata*, a description of which is in print (DOHRN, this volume).

Fundamentally this new species is important for its constantly ambisexual gonad, which shows functional sex reversal irreversibly constant in every specimen, just as is the case with *Lysmata seticaudata* (RISSO). It shows though a slightly different range of variability for this sexreversal, some special colour pattern differences, and several definite skinskeleton peculiarities.

Although it would have been possible to rename this species, the authors have chosen the name given to his drawing by A. RISSO, who obviously had not the opportunity to publish a description in full of this finding 140 years ago.

Riassunto

Si descrive una specie nuova di Decapode, la *Lysmata nilita*, di cui esiste un solo disegno (e questo nome) in un vecchio manoscritto di A. RISSO. Tale decapode fu trovato a Napoli durante ricerche su un decapode affine, la *Lysmata seticaudata* RISSO, eseguite dall'uno degli Autori. Essendo molto raro, un po' per volta riuscì

raccogliere materiale e un gruppo di 12 esemplari fu inviato da Napoli all'altro autore perchè ne indagasse le eventuali differenze morfologiche. Qui vengono comunicate le poche notizie generali che si son raccolte su questo gambero, e un elenco, probabilmente suscettibile di completamento ove si avesse materiale più abbondante in futuro, dei caratteri dermascheletrici distintivi a paragone con *Lysmata seticaudata* RISSO.

L'interesse precipuo che offre questa specie riscoperta sta nella gonade costantemente ambosessuale che ciascun individuo presenta, alla stessa stregua come *L. seticaudata*. Ne differisce solo — a quanto si può dire per adesso — per un diverso ambito di variabilità della inversione sessuale, delimitato solo per le misure inferiori (20 mm.) come più ridotto della parallela misura minima di *L. s.* (31 mm.). Si enumerano inoltre varie differenze a carico del dermascheletro, della distribuzione dei pigmenti rosso-arancio e giallo (v. DOHRN, questo volume).

Gli AA. non hanno voluto far uso del diritto di dare un nuovo nome a questa specie, per rendere con ciò giustizia a A. RISSO, il quale oltre un secolo fa disegnò e denominò questa specie senza poi pubblicare i suoi appunti oggi esistenti in manoscritto.

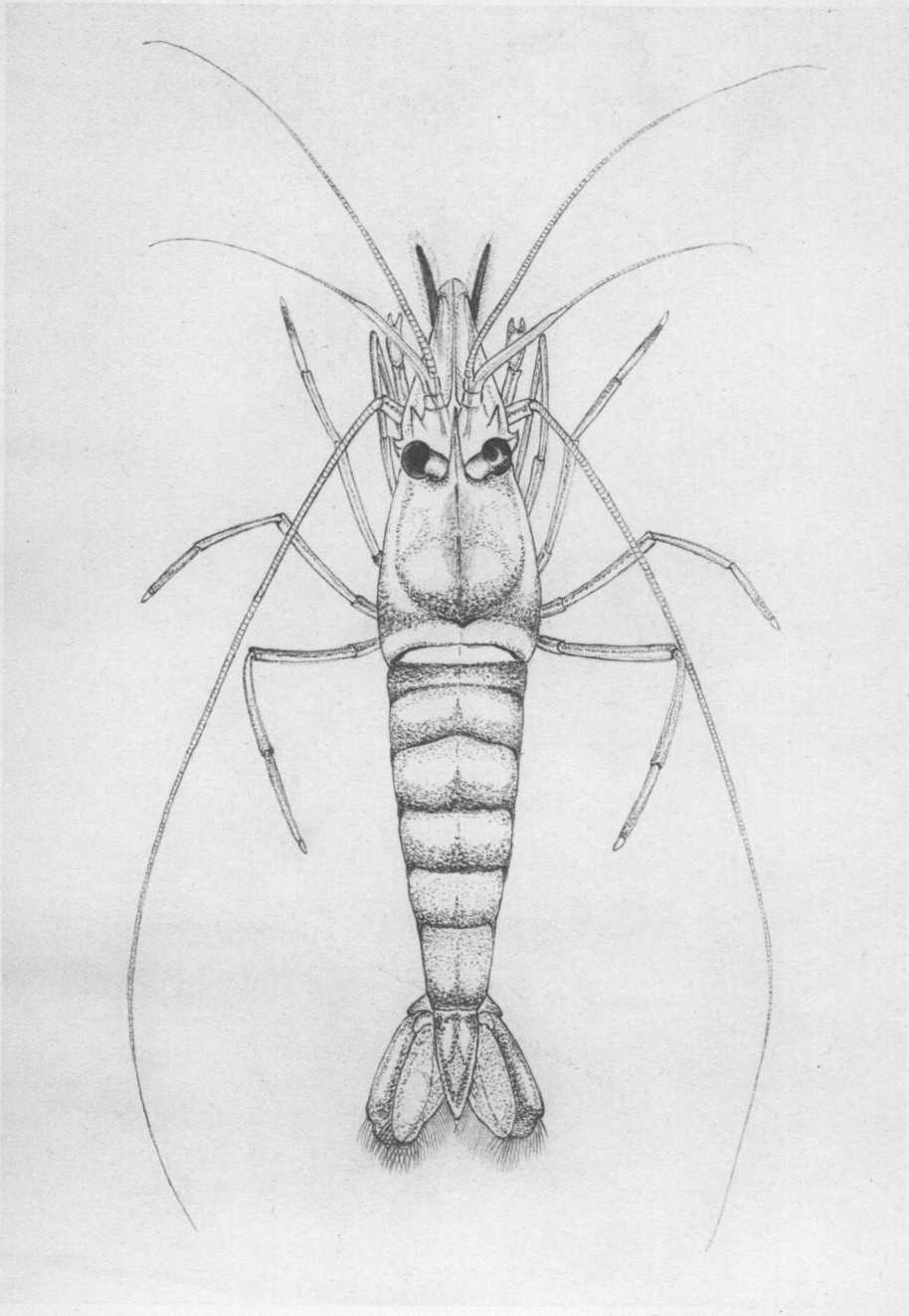
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(See this note for further references on the subject).

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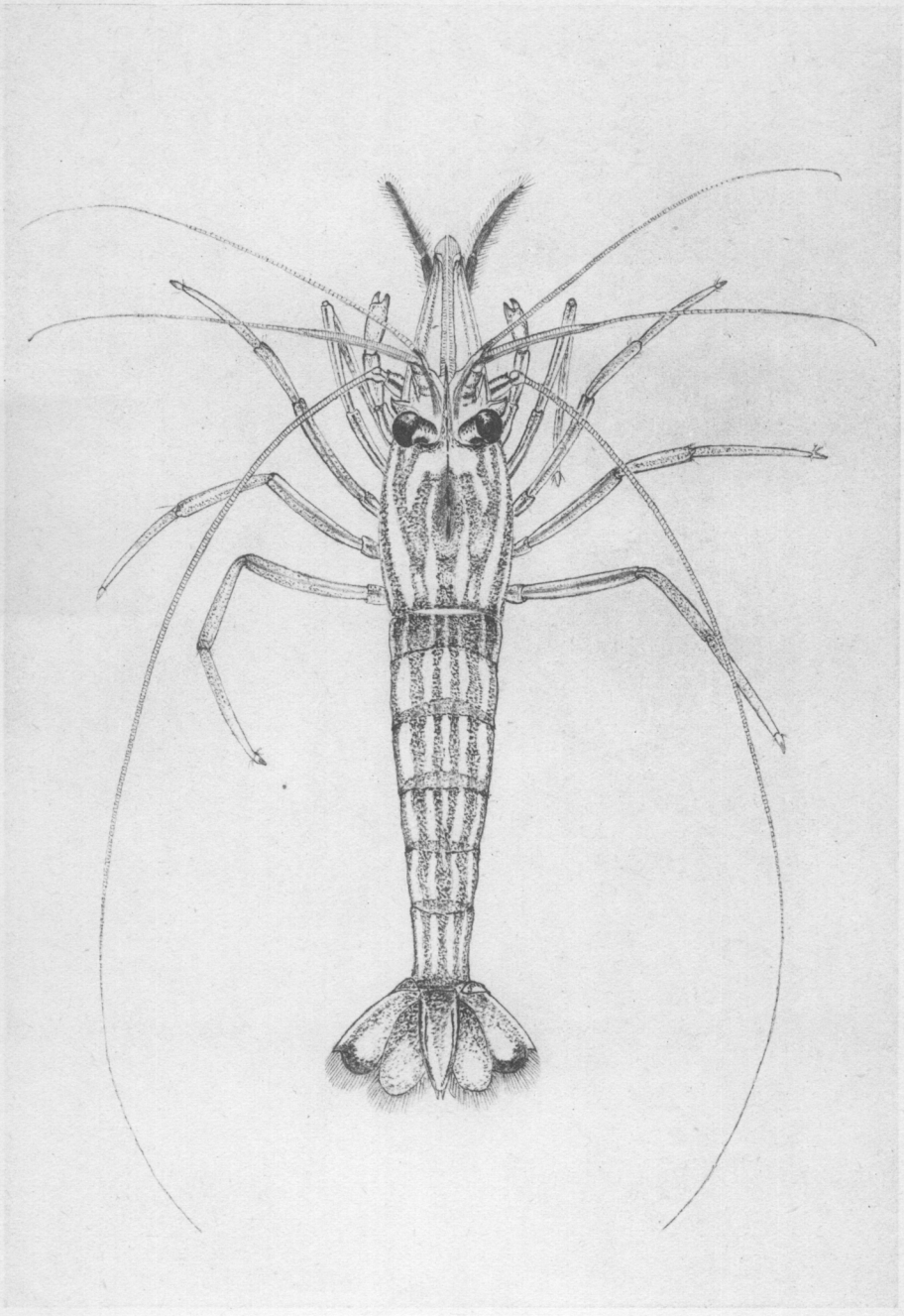
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N. BERGHAUS delineavit.

Lysmata nilita new species.
Lysmata nilita (RISSO Mss) HOPE, 1851, *Catal. Crost. Ital., p. 17 (nomen nudum).*
Lysmata nilita (RISSO Mss) MONOD, 1931, *Arch. Mus. Hist. Nat. Paris, sér. 6, vol. 7, p. 123 (nomen nudum).*
Lysmata nilita (RISSO Mss) HOLTHUIS, 1947, *Siboga Eped., mon. 39a 8, p. 24 (nomen nudum).*



N. BERGHAUS delineavit.

Lysmata seticaudata RISSO.