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## A NEW SPECIES OF THE GENUS *LINUPARUS* (CRUSTACEA, PALINURIDAE) FROM SOUTH-EAST AFRICA

by

**P. F. BERRY**

Oceanographic Research Institute, Durban, Natal, South Africa

and

**R. W. GEORGE**

Western Australian Museum, Perth, Western Australia

With two plates and two text-figures

### INTRODUCTION

The genus *Linuparus* White was recently reviewed by Bruce (1965) who gave an excellent account of two species, the type species *L. trigonus* (Von Siebold) and a previously undescribed species *L. sordidus* Bruce from the South China Sea. George & Main (1967) reviewed the family Palinuridae and suspected that "four geographically isolated species are probably represented within the recorded distribution of *Linuparus*; one in Japan (*trigonus*), one in South China sea (*sordidus*), one off Portuguese East Africa . . . and one off east Australia . . .". During 1970, when one of us (R.W.G.) visited the Oceanographic Research Institute at Durban, the opportunity was taken by us to assemble relevant specimens of *Linuparus* for comparison and review of that suspicion.

On the basis of the examined material, three species of the genus *Linuparus* are recognised: *L. trigonus* (Von Siebold, 1824) in the western Pacific from Japan, South China Sea, Philippines and eastern Australia (81 to 313 m), *L. sordidus* Bruce, 1965, from South China Sea to northwestern Australia (310 to 328 m) and *L. somniosus* sp. nov. in the western Indian Ocean from Moçambique to Natal (216 to 320 m). The three species can be distinguished with the help of the following key:

1. Submarginal posterior groove of carapace as wide medially as laterally. No pleopods on first abdominal segment of female . . . . . 2  
 — Submarginal posterior groove of carapace much wider medially than laterally. Vestigial pleopods present on first abdominal segment of female . . . . .  
 . . . . . *L. somniosus* sp. nov.
2. Epistomal ridges coarsely granulated, without an acute well developed anterior tooth. Chitinous margin of male genital aperture with toothed median border and entire lateral border . . . . . *L. sordidus* Bruce  
 — Epistomal ridges feebly granulated, with an acute well developed anterior tooth. Chitinous margin of male genital aperture toothed throughout its length . . . . .  
 . . . . . *L. trigonus* (Von Siebold)

***Linuparus somniosus* sp. nov.** (text-fig. 1, pls. 1, 2)

*Linuparus trigonus* Barnard 1950: 820-821.

Specimens examined:

O.R.I. number	carapace length (c.l.) (mm)	sex	depth (m)	locality	date collected
Lin. 1	72	F	234	Off the Limpopo River	June 1969
Lin. 2	75	M	239	Off Inhaca Island	June 1969
Lin. 3	85	F	230	N.E. of Bazaruto Island	Oct. 1969
Lin. 4	91	M	324	S.E. of the Bluff, Durban	Oct. 1969
Lin. 5	101	F	216-252	Off the Limpopo River	Oct. 1969
Lin. 6 (holotype)	105	F	234	N.E. of Bazaruto Island	June 1969
Lin. 7	105	F	324	S.E. of the Bluff, Durban	Oct. 1969
Lin. 8	107	M	258	Off the Limpopo River	June 1969
Lin. 9	108	F	234	N.E. of Bazaruto Island	June 1969
Lin. 10	108	M	258	Off the Limpopo River	Oct. 1969
Lin. 11	109	F	239	Off Inhaca Island	June 1969
Lin. 12	112	M	234	N.E. of Bazaruto Island	May 1969
Lin. 13	121	M	243	Off Inhaca Island	June 1969
Lin. 14	127	M	230	N.E. of Bazaruto Island	May 1969
Lin. 15	128	M	234	N.E. of Bazaruto Island	June 1969
Lin. 16	136	M	216-252	Off the Limpopo River	May 1969
Lin. 17	138	M	234	N.E. of Bazaruto Island	May 1969

These specimens were collected by a commercial trawler and exact positions are not available. The abbreviation O.R.I. stands for Oceanographic Research Institute, Durban; F and M indicate female and male, respectively.

The female holotype, Lin. 6 and paratypes Lin. 1 and Lin. 16, are lodged in the British Museum N.H. (now catalogue nos. 1971: 120 and 1971: 121, respectively). Paratypes Lin. 2, Lin. 3, Lin. 5 and Lin. 14 are lodged in the United States National Museum (now catalogue nos. 138240, 138239 and 138237, respectively). Paratypes Lin. 4, Lin. 10, Lin. 11 and Lin. 13 are lodged in the Rijksmuseum van Natuurlijke Historie, Leiden (with catalogue no. Crust. D 27136 to 27139, respectively).

Description. — As *L. somniosus* is so closely similar to both *L. trigonus* and *L. sordidus*, Bruce's (1965) comprehensive description of *L. sordidus* and that of Barnard (1950) adequately describe its basic morphology and only a description of the distinguishing characteristics is given below.

Holotype female. The supra-orbital horns are fused and between them is a pair of small submedian spines.

The peduncle of the eye covers the cornea dorsally; there is no constriction in the peduncle.

In the gastric region of the carapace there is a transverse row of three spines, behind which is a single median spine. This is followed by two pairs of submedian spines. On either side of the carapace, level with the supra-orbital horns, is a lateral precervical ridge which bears three spines on the left side and four on the right. Below this ridge and separated by a groove is another ridge, level with the antennae, which bears three spines, the anterior one adjacent to the antennal peduncle being the longest. In the dorsal post-cervical region, the median ridge bears six low, tuberculate teeth. The lateral ridges each bear nine forward directed teeth; the posterior one adjacent to the first abdominal segment is enlarged and hooked. On the anterior half of the dorsum, between the median and lateral carapace ridges, are several randomly scattered, enlarged, projecting tubercles. Posteriorly, there is a deep submarginal transverse groove in the carapace which is much wider in the midline than it is laterally. Adjacent to this groove, the marginal ridge of the carapace bears a large double tooth in the midline. The surface of the carapace is covered with small tubercles and short, stout setae which are not readily visible without magnification.

There is a single, large, median tooth on the first abdominal segment. Segments 2, 3 and 4 each have an anterior and a posterior median tooth, separated by a transverse groove; a single large tooth is present at the base of the pleura. In segment 5 there is a median ridge bearing a few enlarged tubercles, but there are no median teeth and the transverse groove is absent.

The tooth at the base of each pleuron is absent and there are several enlarged tubercles instead. The posterior margin of this segment and that of segment 6 bear a small median tooth each.

The anterior margin of the epistome is concave on either side of a single, large, median tooth. At its antero-lateral extremities the epistome bears a minute tooth. The surface of the epistome is elevated into a pair of submedian ridges; one ridge bears two teeth, the other, which has been damaged, bears three teeth.

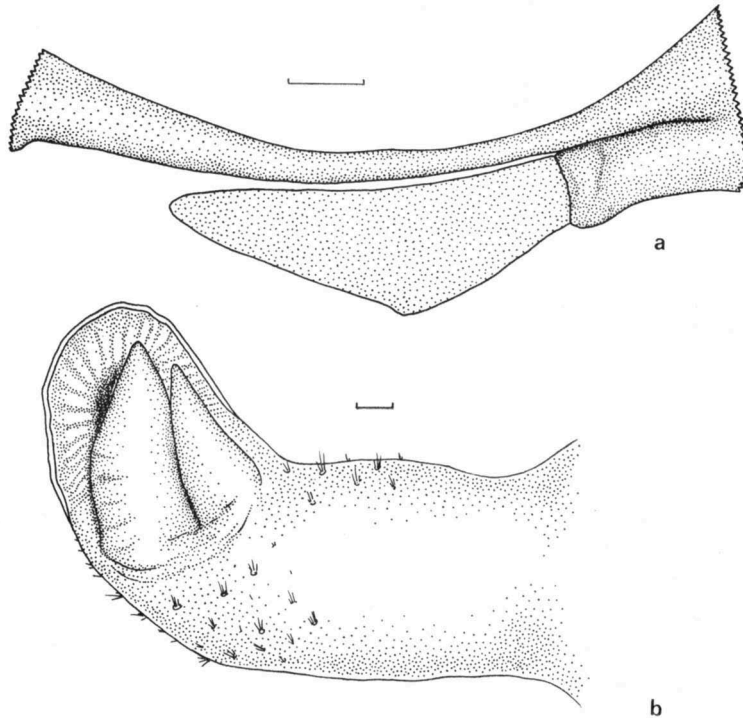


Fig. 1. *Limnyparus somniosus* sp. nov. a, anterior view of left pleopod of first abdominal segment; the dense covering of long setae of this appendage is not shown. The scale represents 2 mm; b, penile process of coxa of left fifth pereopod of paratype no. Lin. 17. The scale represents 1 mm.

The first abdominal segment bears a pair of vestigial pleopods (text-fig. 1a), a feature which is unique within the genus.

Colour pattern. — In the fresh state the dorsal surface of the antennal peduncles, carapace and abdomen is reddish brown. Laterally, on the antennal peduncles and carapace this colour grades into a dull white. The pleura are dull white. The antennal flagella are dirty white. The entire ventral surface of the animal and its legs are dull white except for some pale reddish brown pigmentation on the antennal peduncles, epistome and sternum.

Variation within the paratype series. — There is little significant variation

in the 17 specimens. In general, small specimens tend to have sharper, better developed spines than large specimens and the number of teeth on the submedian ridges of the epistome ranges from 1 to 4. Males have no pleopods on the first abdominal segment and the male genital opening has an entire chitinous border (text-fig. 1b).

Habitat. — The specimens of *L. somniosus* were obtained occasionally in trawls used for fishing *Palinurus gilchristi* Stebbing on a flat bottom consisting of sand and organic mud. The fact that despite intensive trawling the species was rarely met with and ovigerous females were not found at all, suggests that the present specimens were not obtained in their optimal habitat. The depth range recorded for this species is approximately 216 m to 320 m, the deeper limits of which seem reasonably certain as no specimens are obtained in deeper water where intensive trawling is undertaken. At this stage it remains uncertain whether the occurrence of *L. somniosus* in the southeast African region represents a fringe of a more equatorial distribution or whether perhaps it inhabits rocky areas avoided by trawlers.

Habits. — Several specimens were kept alive for over a year at the Oceanographic Research Institute, Durban, and their extremely sluggish behaviour prompted the choice of the specific name *somniosus*.

Remarks. — Barnard (1950) gave a description of a male specimen of *Linuparus* from off Inhambane, Moçambique, that he examined in the Lourenço Marques Museum and assigned to *L. trigonus*. A dried specimen in the Lourenço Marques Museum was examined by us and found to agree with the other specimens of *L. somniosus*. It was, however, not possible to ascertain whether this was the specimen seen by Barnard.

The presence of vestigial pleopods on the first abdominal segment in the female appears to be a primitive feature within the genus.

### ***Linuparus trigonus* (Von Siebold, 1824)**

Specimens examined:

Japan: Kururi District, Chiba Prefecture, Tokyo Bay, Honshu; April 1894; Mr. Sakumoto; U.S. National Museum No. 18880. — 1 male c.l. 97 mm.

Philippines: Corregidor Light N26°E 25.50 miles, 14°N 120°22'30"E; 118 fms; bottom mud, shells, coarse sand; 14 July 1908; "Albatross" Sta. D. 5272; U.S. National Museum No. 105630 (part). — 1 male c.l. 106 mm, 1 female c.l. 107 mm.

S.E. Australia: Off Mooloobar, 80 miles N. of Brisbane, Queensland; Australian Museum No. P. 15269. — 1 male c.l. 112 mm. Off Botany Bay, New South Wales; Australian Museum no. P. 11863. — 1 female c.l. 84 mm.

Only slight morphological differences were evident between the specimens of *L. trigonus* from Australia, the Philippines and Japan. The preserved Australian specimens were ivory white in contrast to the light brown colour

of the Philippine and Japanese specimens, which might be attributed to differences in the method of preservation. They also appeared to be smoother to the touch than the specimens from the Philippines and Japan. Colour photographs of a fresh specimen trawled off Wallis Lakes, New South Wales, Australia, sent to us from the New South Wales Fisheries Department show a colour pattern very similar to that of *L. trigonus* figured by Kubo (1960). For these reasons we regard all these specimens as conspecific.

### ***Linuparus sordidus* Bruce, 1965**

#### Specimens examined:

South China Sea, 19°40.0'N 113°41.0'E to 19°39.5'N 113°36.0'E; 182-172 fms; bottom coarse sand; Granton trawl; 5 January 1964; "Cape St. Mary" Cr. 1/64 Stn. 16 Trawl T/125; British Museum (Natural History) No. 1965.5.21.1. — 1 female holotype c.l. 71 mm.

N.W. Australia: Mermaid Reef, Rowley Shelf, 17°17'S 119°57'E; 350 m deep; bottom temperature 11.4°C; 20 December 1969; "Umitaku Maru" Sta. UMPT 6905; Western Australian Museum No. 44-71. — 1 female c.l. 78 mm.

The female from the Rowley Shelf, N.W. Australia, which we have tentatively assigned to *L. sordidus*, is similar to the female holotype of that species and the differences are tabulated below:

N.W. Australian specimen (c.l. 78 mm)	<i>L. sordidus</i> holotype (c.l. 70 mm)
1. Abdominal segment 2 with one indistinct median tooth on the anterior division of the segment only.	Abdominal segment 2 with one indistinct tooth on both divisions of the segment.
2. Abdominal segment 3 without median spines.	Abdominal segment 3 with indistinct median spines.
3. Sterna of abdominal segments 2 to 5 without submedian spines.	Sterna of abdominal segments 2 to 5 with pairs of minute submedian spines.
4. Third maxilliped reaches epistome margin.	Third maxilliped extends beyond epistome by half the length of the dactylus.
5. The setae covering the carapace and abdomen of the N.W. Australian specimen are slightly longer and more dense than in the holotype.	

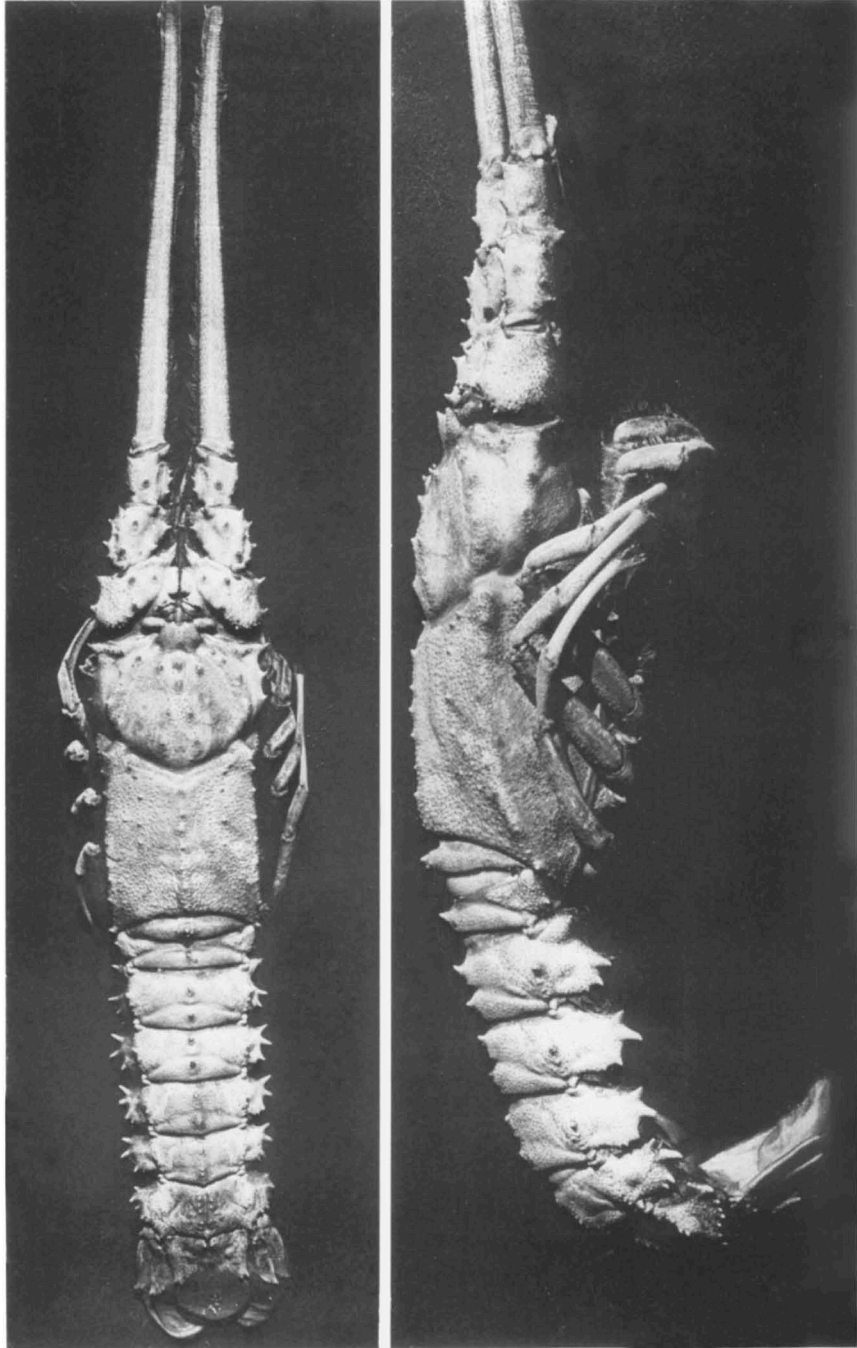
Since these differences are based on observations of only two specimens, it is considered unwarranted to suggest that the N.W. Australian specimen represents a separate species.

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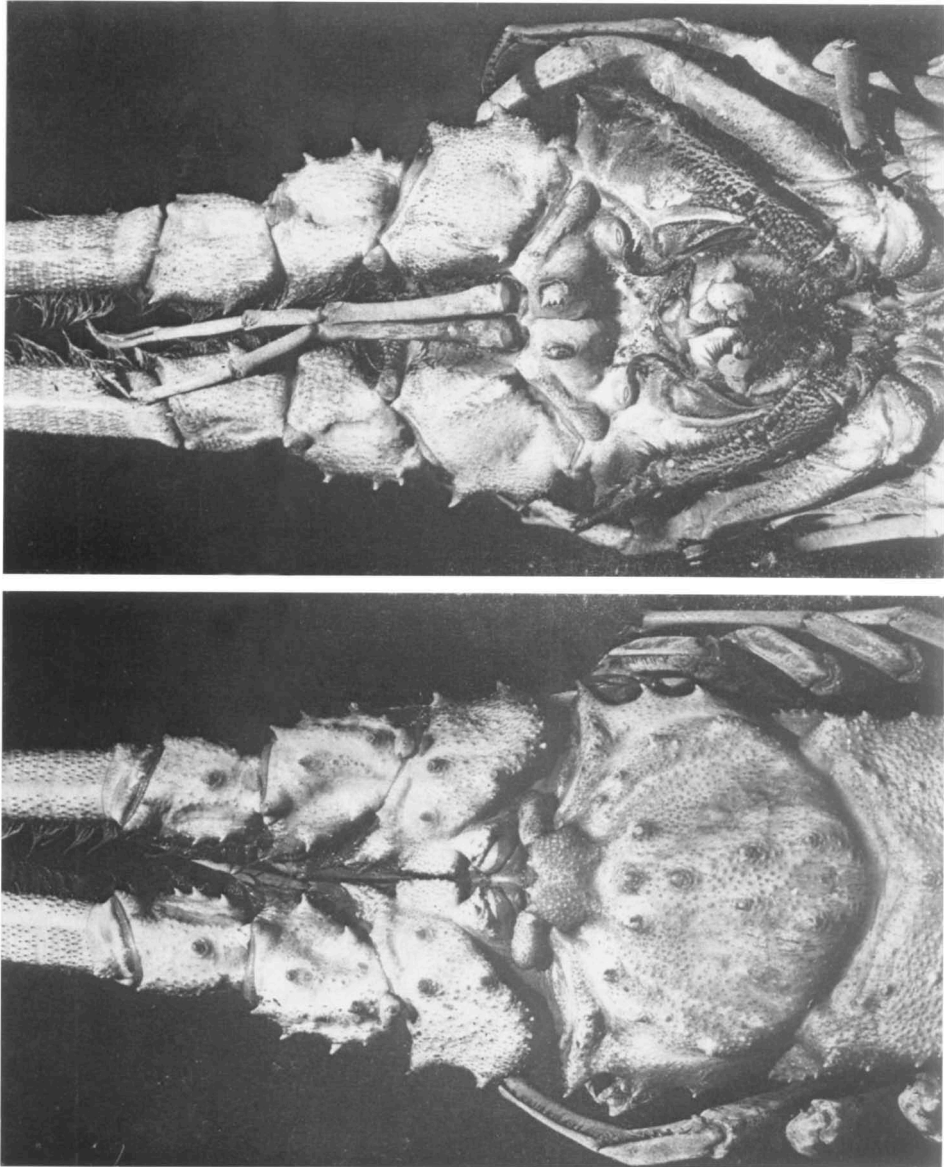
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*Linuparus somniosus* sp. nov., holotype in dorsal and lateral view.





*Linuobius somniosus* sp. nov., holotype. Left, dorsal view of the frontal region of the cephalothorax. Right, ventral view of the epistomal region, in which the teeth of the left submedian ridge are broken and viewed laterally.