THE GENUS *CALLIANASSA* (CRUSTACEA, DECAPODA, THALASSINIDEA) FROM THE WEST COAST OF SOUTH AFRICA WITH A KEY TO THE SOUTH AFRICAN SPECIES

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(With 5 figures)

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INTRODUCTION

When two species of *Callianassa* submitted to the South African Museum for identification proved to be problematic, it was decided to re-examine all the available mud-shrimp material from the west coast. As a result of this investigation, where previously three species were recorded from the area, five are now known, two of which have proved to be undescribed. In the accompanying figures, all dimensions are in millimetres.

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DESCRIPTION

Callianassa adamas sp. n.

Figs 1, 2

Description

♂. Front of carapace evenly convex, rostrum a low rounded protuberance. First two abdominal segments more slender than following segments. Abdominal segments three to five with transverse band of short setae on mid-lateral areas. Eyestalks touching only at bases, tapering distally, reaching slightly beyond midpoint of 2nd antennular peduncle segment.

Antennule, peduncle three-segmented, basal segment somewhat shorter than 2nd segment, latter half length of distal segment.

Antenna, peduncle five-segmented, two distal segments subequal, three basal segments together equal in length to fourth segment.

Mandible, palp three-segmented, terminal segment bearing numerous curved spines, grading proximally into slender elongate spine-like setae. Incisor portion bearing nine well-separated teeth, molar portion consisting of single blunt tooth.

First maxilla, exopod shorter than outer endopod lobe, distally flexed.

Second maxilla, scaphognathite broadly oval.

First maxilliped endopod oval in outline, with broad band of densely packed setae on outer face. Exopod distally rounded.

Second maxilliped, dactyl with seven or eight spines on inner distal margin, one-third length of propodus. Latter distally swollen, bearing numerous elongate setae. Carpus very short, carpus and propodus together equal in length to merus, latter curved, with broad setal fringe on inner margin. Exopod leaf-shaped, curved, reaching to end of carpus.

Third maxilliped operculiform, propodus and carpus expanded, latter one-third longer than former, both with strong rounded longitudinal ridge on outer face. Merus and ischium together forming very broad plate-like structure, spines lacking on inner face.

First pereiopod, smaller cheliped, dactyl slightly longer than palm, extending beyond fixed finger, cutting edge entire. Cutting edge of fixed finger with few tiny denticulations proximally. Carpus slightly more than twice longer than wide, merus and ischium narrower than carpus, ischium slightly longer than merus.

First pereiopod, larger cheliped, three distal segments together $2\frac{1}{2}$ times mid-dorsal length of carapace. Dactyl extending beyond tip of propodal fixed finger, slightly more than half length of palm, distally strongly curved, cutting edge with strong rounded tooth proximally, another at about midpoint, inner surface with several scattered granules. Margin of fixed finger entire, with row of very faint granules on inner surface. Propodus ventrally carinate. Carpus a little longer than propodus and dactyl together, disto-ventral corner acute,

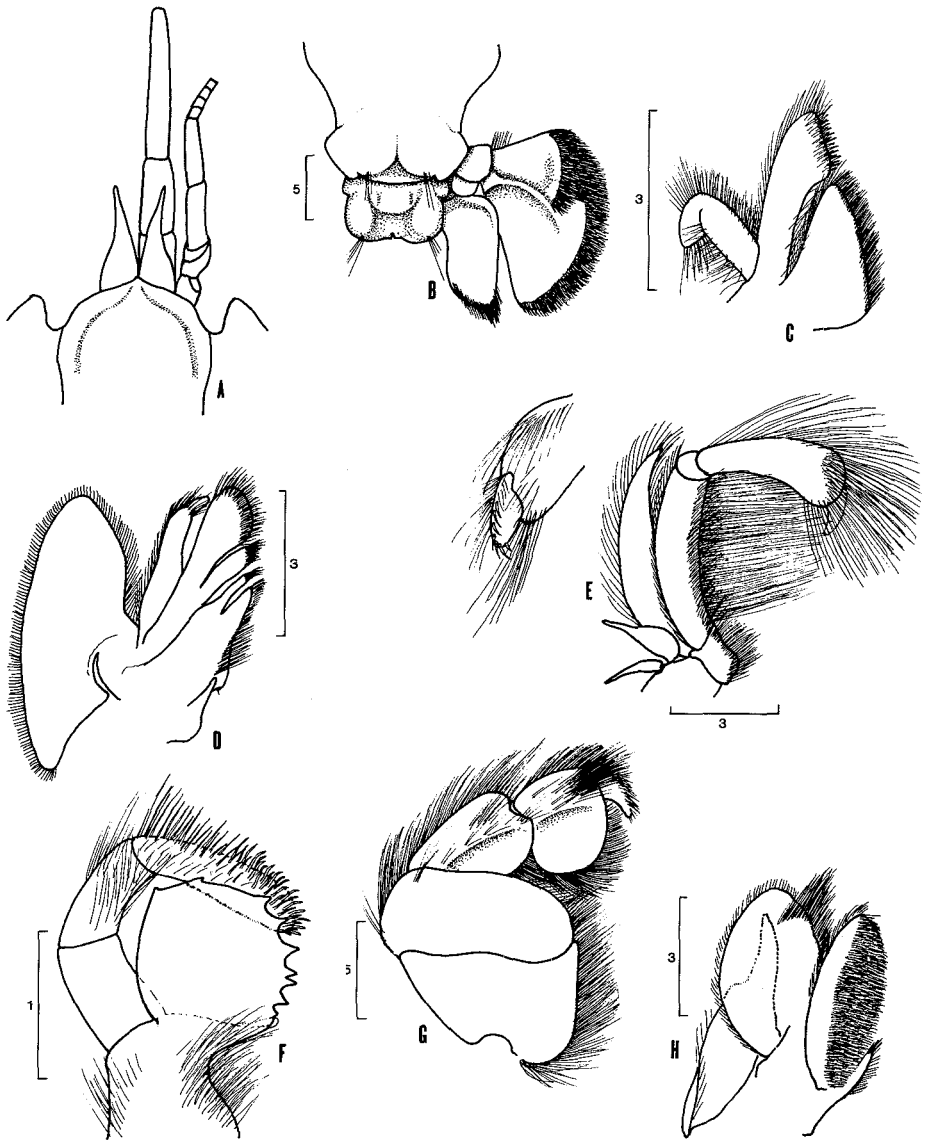

Fig. 1. *Callianassa adamas* sp. n. ♂. Holotype
A. Anterior carapace, antennae, and eyes in dorsal view. B. Telson and right uropod. C. First maxilla. D. Second maxilla. E. Second maxilliped with dactyl further enlarged. F. Mandible. G. Third maxilliped. H. First maxilliped.

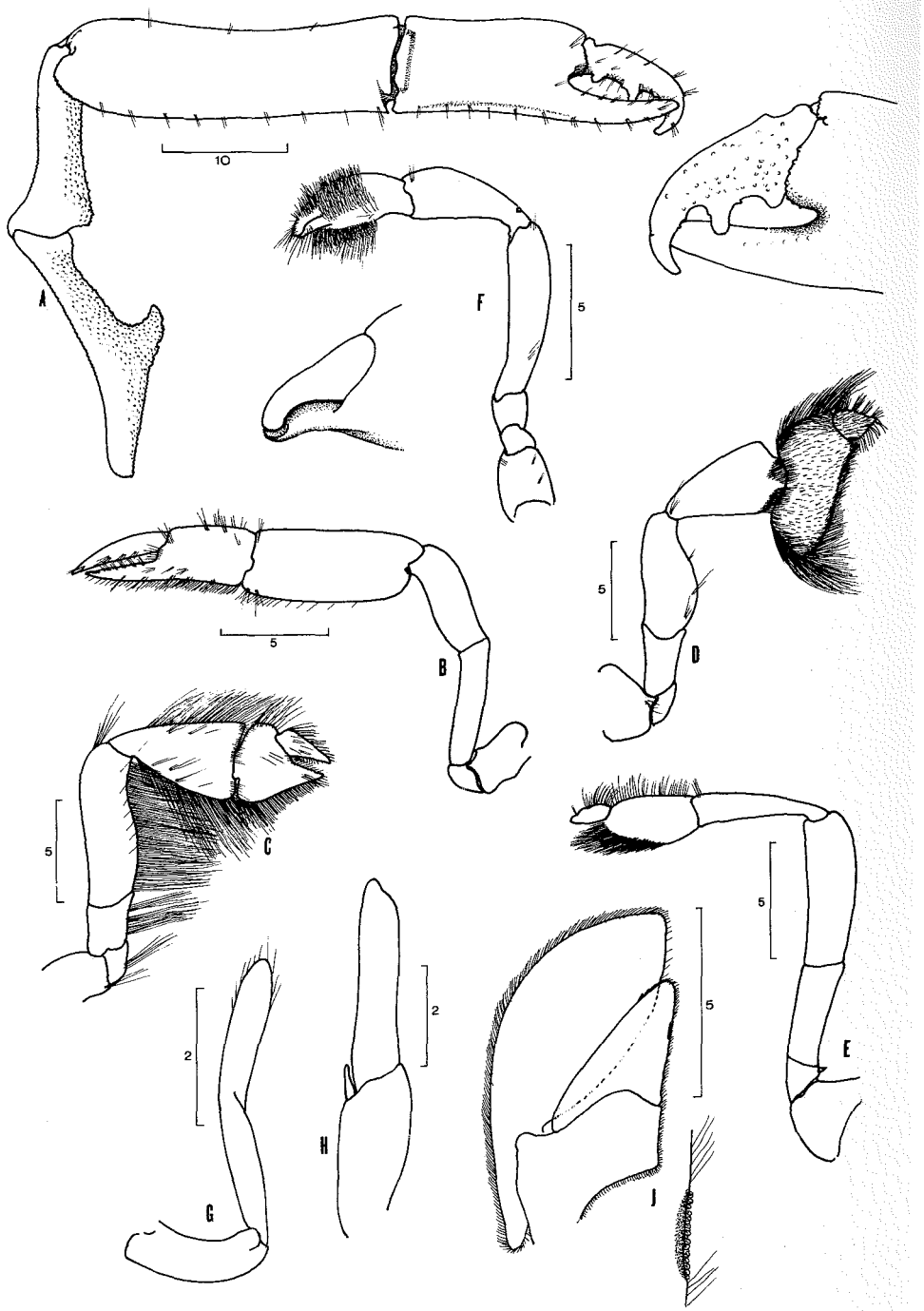

Fig. 2. *Callianassa adamas* sp. n. ♂. Holotype
A. Large cheliped, with chela further enlarged. B. Smaller cheliped. C. Second pereiopod. D. Third pereiopod. E. Fourth pereiopod. F. Fifth pereiopod with chela further enlarged. G. First pleopod. H. Second pleopod. J. Third pleopod, with reduced appendix interna further enlarged.

disto-dorsal corner rounded, proximo-ventral corner evenly rounded, finely denticulate. Merus three-fifths length of carpus, ventral margin and part of outer surface granulate, proximo-ventral corner somewhat expanded into rounded crest. Ischium five-fourths length of merus, with broad hook-like process at midventral margin, most of outer surface grantulate.

Second pereiopod chelate, dactyl two-thirds length of propodus, latter broadly triangular. Carpus distally broadened, about three-quarters length of merus. Ventral margins of merus, carpus and propodus heavily setose.

Third pereiopod dactyl and propodus heavily setose. Propodus produced into rounded-conical posterior lobe. Dactyl triangular. Carpus and merus subequal in length.

Fourth pereiopod non-chelate, dactyl about half length of propodus, latter with dense disto-ventral setal 'brush'. Propodus two-thirds carpus length, carpus slightly shorter than merus.

Fifth pereiopod chelate, dactylus one third total length of propodus. Dactyl and propodus apically spooned, rounded apical areas marked by minute row of denticles. Dactyl and distal portion of propodus heavily setose. Propodus and carpus equal in length, merus somewhat longer.

First pleopod two-segmented, basal segment slightly less than half length of distal segment. Latter flexed at about midpoint, bearing very few setae.

Second pleopod biramous, basopodite slightly less than length of inner ramus. Latter broad, tapering distally, outer ramus small, about one-sixth length of inner.

Third pleopod, inner ramus triangular, appendix interna reduced to a pad of rounded hooks on median margin of segment.

Uropod rami reaching well beyond telsonic apex. Inner ramus $2\frac{1}{2}$ times longer than wide, apically tapering, rounded. Outer ramus distally evenly convex, with broad band of short dense setae, and with median curved ridge.

Telson wider than long, with tiny medio-distal notch, proximally with median convex area, and two lateral convex areas.

♀. First chelipeds similar to smaller cheliped of male.

First and second pleopods as in male.

Material

Holotype	S.A.M.A12103	♂	C.L. 15,8 mm	T.L. 65 mm
	Orange River mouth			
Allotype	S.A.M.A12103	♀	C.L. 14,0 mm	T.L. 58 mm
	Orange River mouth			
Paratype	S.A.M.A10985	♂	C.L. 14,0 mm	T.L. 59 mm
	Olifants River mouth			
Paratype	LBT.77A	♀	C.L. 12,9 mm	T.L. 51 mm
	Lambert's Bay			

Numerous immature specimens with an average total length of 14 mm were obtained off Lambert's Bay. The shape of the eyestalks and telson, and the

appendages generally, indicate that these are probably juveniles of the present species.

The holotype and allotype were collected by the diamond dredge *Emerson-K* off the Orange River mouth in 1962, and were mentioned in a report on the material from the diamond grading grids by Grindley & Kensley (1966:9). The depth of the sampling was between 10 and 35 m. The female paratype and the numerous juveniles were obtained off Lambert's Bay by the Zoology Department of the University of Cape Town, using a suction sampling device. The material came from a depth of about 60 cm in the fine mud/silt substrate, in a water depth of 10–15 m. The male paratype was collected at the mouth of the Olifants River in 1960, but no depth or substrate information was recorded.

Remarks

The most striking feature of the present species is the elongate nature of the large cheliped of the male, quite unlike any species previously recorded from South Africa. Of the numerous species of *Callianassa* described from other parts of the world, only two would seem to have a similar elongate first cheliped. These are *C. major* Say, recorded from the eastern United States of America, especially the southern states where it occurs intertidally, and *C. islagrande* Schmitt, known from Louisiana.

Callianassa major can easily be separated from the present species on the basis of the large cheliped of the male. The dactylus of *C. major* possesses a single blunt tooth proximally on the cutting edge, as opposed to two large rounded teeth in the present species. The merus of the American species has a distinct triangular process on the proximo-ventral margin, whereas, although the merus of the present species is somewhat expanded proximo-ventrally, there is no distinct process. The telson of *C. major* would seem to be more rounded than *C. adamas*, while the eyestalks are relatively shorter in Say's species, reaching to the end of the first antennular peduncle segment. In the present species the eyestalks extend to beyond the middle of the second antennular peduncle segment.

The resemblance of *C. adamas* to *C. islagrande* is much greater; indeed, using both keys to the genus *Callianassa* from Florida provided by Biffar (1971), the species is run down to *C. islagrande*. From Schmitt's description (1935:5), and the rather inadequate photograph, several differences emerge on comparison with the present species. These are given in the following table, and would seem to warrant specific separation, not altogether surprising, the two species being separated by the width of the Atlantic Ocean.

	C. islagrande	*C. adamas*
Eyestalks	Twice as long as broad, contiguous to level of cornea	Three times longer than broad, contiguous only at bases, cornea not distinct

	C. islagrande	*C. adamas*
Antenna	Fourth peduncle segment reaching end of second antennular peduncle segment	Fourth peduncle segment reaching mid-point or slightly beyond, second antennular peduncle segment
Large Cheliped ♂	Merus with low denticulate/granulate tooth at posterior third	Merus widened proximally, no distinct tooth
	Carpus finely denticulate on upper margin for almost whole length, lower margin with widely separate granules or denticles on distal four-sevenths	Carpus weakly granulate on upper margin for proximal third, lower margin smooth
	Dactylus with conspicuous blunt right-angled tooth on upper border of terminal hook	No tooth on upper border of terminal hook
	No strong rounded tooth at mid-point of cutting margin	Strong rounded tooth present at mid-point of cutting margin
	Fixed finger of propodus arises from deep sinus in palm	Sinus at base of fixed finger barely apparent
Third Maxilliped	Inner face of ischium with crescentic row of tiny granulations	No granulations on inner face face of ischium
Uropod	Inner ramus four times longer than wide	Inner ramus $2\frac{1}{2}$ times longer than wide

The specific name '*adamas*' is from the Latin for a diamond, the species having been caught on the Diamond Coast of South Africa.

Callianassa subterranea australis subsp. n.

Figs 3–5

Description

♂. Front with shallow rostrum, sides slightly concave, no lateral projections present.

Eyestalks medially contiguous, reaching almost to midpoint of second antennular peduncle segment. Pigmented area situated centrally. Antennule with two basal peduncular segments together equal in length to distal segment, peduncle reaching to about midpoint of third antennal peduncle segment.

Antennae with first three segments short, third with two squat spines distally, fifth segment about three-quarters length of fourth, both slender.

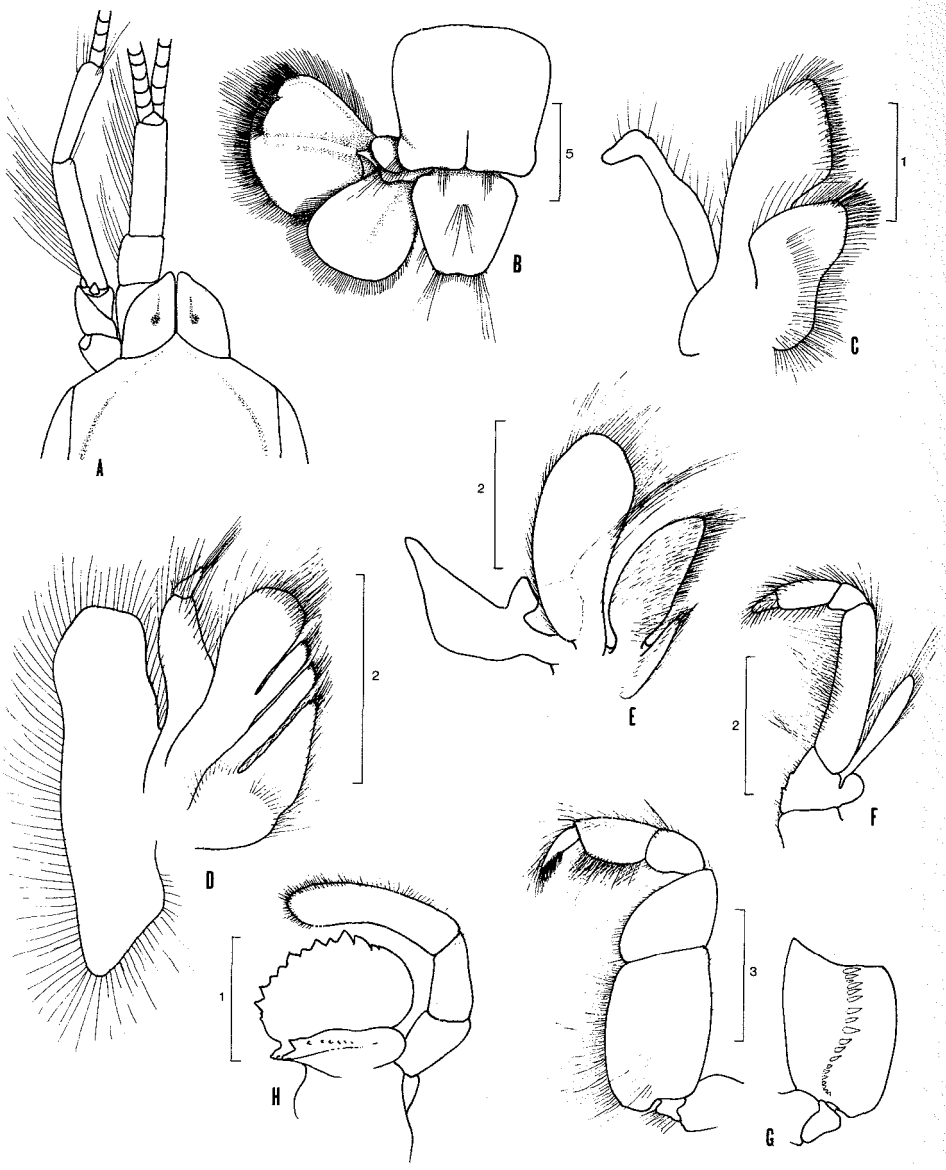

Fig. 3. *Callianassa subterranea australis* subsp. n. ♂. Holotype
A. Anterior carapace, antennae, and eyes in dorsal view. B. Telson and left uropod. C. First maxilla. D. Second maxilla. E. First maxilliped. F. Second maxilliped. G. Third maxilliped, with inner view of ischium. H. Mandible.

Mandible with incisor portion bearing 12–13 strong teeth, molar portion with four strong teeth and row of six tiny denticulations. Palp three-segmented distal segment equal in length to two proximal segments together.

First maxilla, exopod slender, distally bearing flattened portion at right angles to rest of segment. Outer lobe of endopod, median margin bearing numerous short spines. Inner lobe bearing several serrate spines on median (inner) face.

Second maxilla, exopod with short rough triangular distal segment, and elongate proximal segment.

First maxilliped, exopod distally rounded, fringed with setae. Epipod with small median lobe, and larger acute external lobe.

Second maxilliped, merus elongate, four times longer than wide, ischium bearing two small projections on inner margin, exopod three-quarters length of endopod merus.

Third maxilliped, merus and ischium broad, latter with sinuous row of about 15 or 16 strong conical denticles on inner surface.

First pereiopod, smaller cheliped, dactyl and fixed finger of propodus slightly longer than palm, cutting margins entire. Carpus four times longer than wide, only slightly longer than propodus. Merus broad, margins convex. Ischium more slender than merus, slightly longer.

First pereiopod, larger cheliped, dactyl strongly hooked, cutting edge bearing broad proximal very finely denticulate portion, followed by small blunt tooth. Propodus broad, fixed finger evenly curved, cutting edge entire, dorsal margin carinate, ventral margin finely crenulate. Dactyl and propodus together $2\frac{1}{2}$ times length of carpus, latter with proximo-ventral angle evenly and broadly rounded, finely crenulate, dorsally carinate. Merus slightly shorter than dorsal length of carpus. Dorsal margin with five small denticulations proximally. Ventral margin with strong denticulate hook-like process proximally, followed by denticulate convex crest.

Ischium and merus equal in length. Ischium proximally narrow, widening distally, ventral margin with about 10 small denticles, dorsal margin with hook-like process proximally.

Second pereiopod chelate, propodus equal in length to carpus, merus somewhat longer; all three distal segments, and ventral margin of merus fringed with setae.

Third pereiopod, dactyl slightly less than half length of propodus, covered with fine setae, elongate-triangular. Propodus with ventral margin bearing five isolated tufts of setae flanked by broad band of setae; posterior lobe not extending beyond ventral margin of carpus. Carpus about four-fifths length of merus, bearing distal setae.

Fourth pereiopod non-chelate, dactyl about half length of propodus, covered with numerous setae. Propodus with ventral margin and external surface bearing three bands of dense setae.

Fifth pereiopod with propodus, carpus, and merus elongate. Tiny chela formed by small dactyl and even smaller 'thumb' of propodus. Latter with dense pad of setae on distal outer surface.

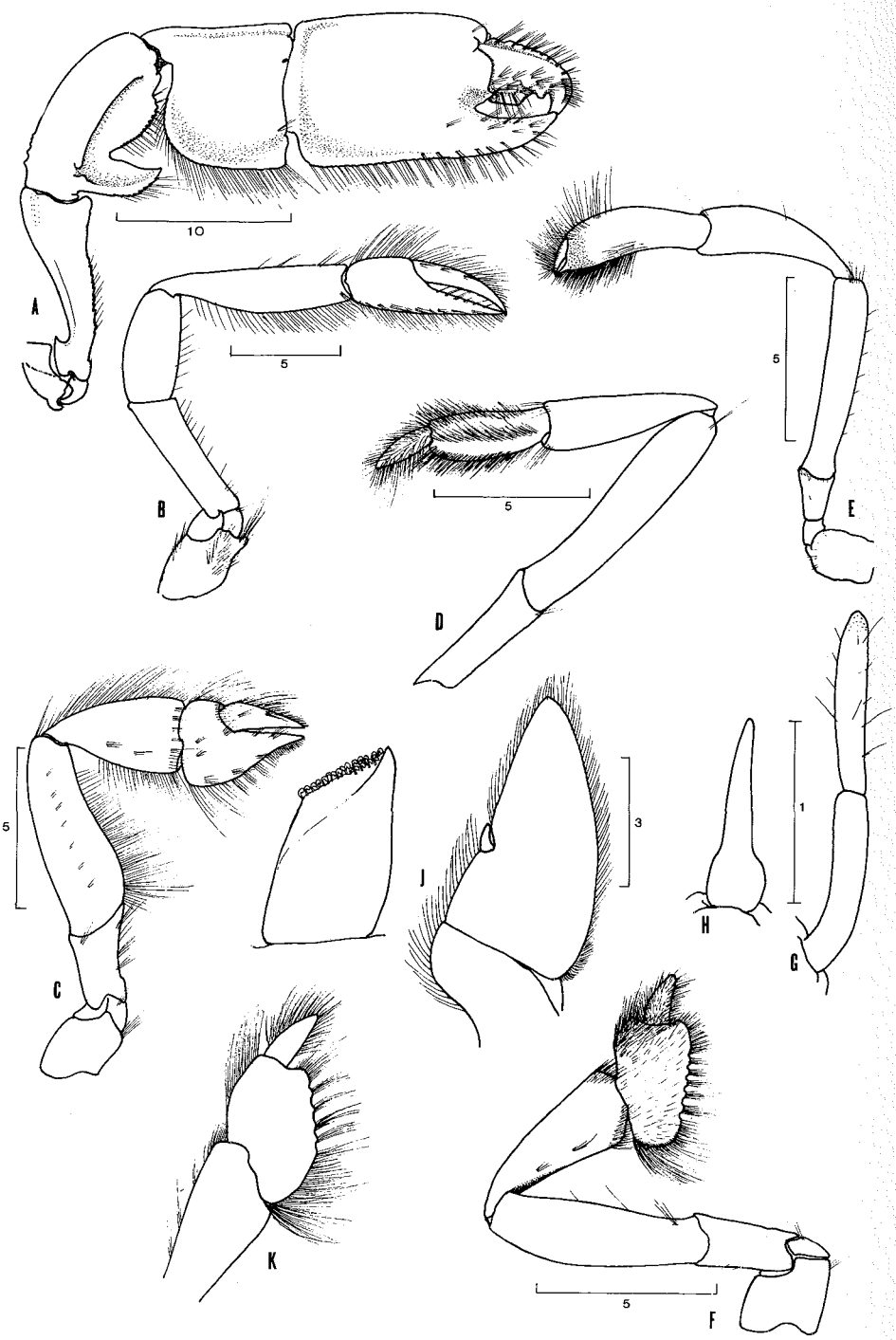

Fig. 4. *Callianassa subterranea australis* subsp. n. ♂. Holotype
A. Larger cheliped. B. Smaller cheliped. C. Second pereiopod. D. Fourth pereiopod. E. Fifth pereiopod. F. Third pereiopod. G. First pleopod. H. Second pleopod. J. Third pleopod, with appendix interna further enlarged. K. *Callianassa subterranea subterranea*, two distal segments of third pereiopod.

First pleopod cylindrical, two-segmented, segments subequal.
Second pleopod consisting of single segment, basally swollen.
Third pleopod, endopod two-segmented, triangular, with appendix interna on median margin of distal segment, fringed with plumose setae.
Uropod with inner ramus distally rounded, only slightly longer than telson, longer than wide. Outer ramus with broad rounded ridge, distally rounded, bearing fringe of dense slender spines in addition to fringe of setae.
Telson distally truncate, with minute median and two lateral spinules, as long as wide, sides straight, converging distally.
♀. First pereiopod, larger cheliped, dactyl about equal to palm in length, slightly longer than fixed finger of propodus, evenly serrate on cutting edge. Fixed finger with cutting edge entire, distally slightly upturned. Lower margin of propodus finely serrulate, upper margin entire, carinate. Carpus slightly shorter than palm of propodus, proximo-ventral corner broadly rounded, margin finely serrulate. Merus equal in length to dorsal length of carpus, with four or five small denticulations on proximo-dorsal edge, ventral margin with broad hook-like process, ventrally denticulate, and with convex denticulate crest. Ischium longer than merus, ventral margin finely serrulate, distally broader than proximally.
First pleopod uniramous, two-segmented basal segment about half length of distal segment, slightly curved. Distal segment becoming leaf-like for slightly less than distal half, with rounded setae-bearing bulge at base.

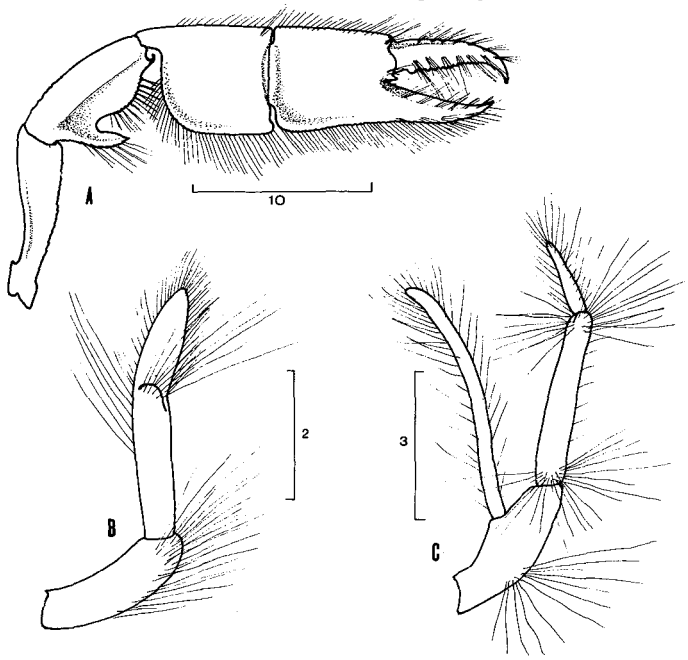

Fig. 5. *Callianassa subterranea australis* subsp. n. ♀. Allotype
A. Large cheliped. B. First pleopod. C. Second pleopod.

Second pleopod biramous. Basopodite broader than rami. Inner ramus of one segment elongate and slender. Outer ramus of two segments, basal segment twice length of distal, with rounded bulge distally, bearing elongate setae.

Material

Holotype	S.A.M.A13531	♂	C.L. 14,9mm T.L.	Lüderitzbucht
Allotype	S.A.M.A13532	♀	C.L. 13,8mm T.L. 50mm	Lüderitzbucht
Paratype	S.A.M.A13533	♂	C.L. 9,9mm T.L. 32mm	Lüderitzbucht
Paratype	S.A.M.A13534	♀	C.L. 12,3mm T.L. 41mm	Lüderitzbucht
Paratype	S.A.M.A12103	♀	C.L. 13,0mm T.L. 53mm	Orange River mouth

In addition, the following paratypes from Lüderitzbucht, in the collection of the Zoology Department, University of Cape Town, catalogue number SWD.5U: 7 ♂♂ T.L. range 34–48mm, 8 ♀♀ T.L. range 43–48mm
The Lüderitzbucht material was dredged from a depth of 18om by the *John D. Gilchrist* of the University of Cape Town, from a bottom of fine gravel and rock. The total length of the holotype cannot be given as the abdomen is detached.

Remarks

Of the four species of *Callianassa* recorded from South Africa only *C. rotundicaudata* does not possess a well-developed lobe on the propodus of the third pereiopod, as is the case in the present species. The shape and relative size of the telson, and the character of the larger cheliped of the male easily serve to separate these species.

The resemblance between the present species and *C. subterranea* (Montagu) known from the coasts of Great Britain, the Mediterranean, the North Sea, and the Atlantic coasts of Western Europe and North Africa (Poulsen 1940; De Man 1928) is unmistakable. From the full description of this species given by De Man (1928) and from comparison with material from Plymouth, England, only two differences emerge in the South African material. These are in the shape of the propodus of the third pereiopod, and in the larger chela of the male.

The propodus of the third pereiopod in *C. subterranea* has a posterior lobe somewhat rounded and tapered, while in the present material, the posterior lobe is relatively broader and squarer.

The larger chela in the male of the European species has the cutting edges of both the dactyl and the fixed finger unarmed except for some fine denticulations. This resembles very closely the larger cheliped of the female of the present material. In the male, however, the cutting edge of the dactyl in the larger chela possesses a strong flat-topped proximal tooth and a smaller rounded distal tooth.

With only these two differences, and with the almost identical structure of the body and all the other appendages, the close affinity between the European

and the South African species cannot be denied. With no records of *C. subterranea* between that in North Africa and the present South African records, it may be postulated that this is a case of antitropical distribution, with the southern form beginning to diverge from its (presumably) northern stock. With no further information available, it is perhaps best to designate the South African material as a different subspecies from the European form. Thus the latter is *Callianassa subterranea subterranea*, while the form here described is *Callianassa subterranea australis*.

KEY TO THE SOUTH AFRICAN SPECIES OF *CALLIANASSA*

1. Third pereiopod with propodus produced into well-developed T-shaped or hammer-headed posterior lobe 2
– Third pereiopod with posterior portion of propodus not produced 4
2. Inner ramus of uropod oval, extending well beyond telsonic apex 3
– Inner ramus of uropod distally square, not extending beyond telsonic apex *natalensis*
3. Third, fourth, and sixth segments of third maxilliped expanded
Large chela with strong blunt proximal tooth on dactyl . . . . . *kraussi*
– Third, fourth, and sixth segments of third maxilliped not expanded
No strong blunt proximal tooth on dactyl of large chela . . . . . *gilchristi*
4. Uropods extending well beyond telsonic apex
Dactyl of large chela in male lacking broad flat-topped proximal tooth . . . 5
– Uropods not extending well beyond telsonic apex
Dactyl of large chela in male with broad flat-topped proximal tooth *subterranea australis*
5. Telson distally evenly rounded
Ischium of larger cheliped in male lacking ventral hook-like spine . . *rotundicaudata*
– Telson distally broadly bilobed
Ischium of larger cheliped in male with broad ventral hook-like process . . *adamas*

DISTRIBUTION OF THE SOUTH AFRICAN SPECIES OF *CALLIANASSA*

C. adamas sp. n.	Orange River mouth, Olifants River mouth, Lambert's Bay, 10–35m depth
C. gilchristi Barnard	Saldanha Bay, False Bay to Durban, 36 m depth
C. kraussi Stebbing	Saldanha Bay, False Bay to Zululand
C. natalensis Barnard	off Natal
C. rotundicaudata Stebbing	Orange River mouth, Saldanha Bay, False Bay, Algoa Bay, 10–35m depth
C. subterranea australis subsp. n.	Lüderitzbucht, Orange River mouth, 10–180m depth

SUMMARY

A new species and a new subspecies of the mud-shrimp genus *Callianassa* is described from the west coast of South Africa. The six southern African species of *Callianassa* are reviewed, and a key to the species is provided.

ACKNOWLEDGEMENTS

I am grateful to Dr R. W. Ingle of the British Museum (Natural History) for making specimens of *Callianassa subterranea* available for comparison, and for his critical reading of the manuscript, and to Professor J. H. Day and Mr N. Christie of the Department of Zoology of the University of Cape Town for providing material of both the new species and new subspecies here described.

GAZETTEER

Algoa Bay	33.58S., 25.36E.
Durban	29.53S., 31.00E.
False Bay	34.12S., 18.56E.
Lambert's Bay	32.04S., 18.20E.
Lüderitzbucht	26.38S., 15.10E.
Olifants River mouth	31.42S., 18.13E.
Orange River mouth	28.38S., 16.27E.
Saldanha Bay	33.00S., 17.56E.

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