

**TAXONOMIC NOTES ON A POTENTIALLY COMMERCIAL DEEP-SEA
PRAWN FROM THE SOUTHWEST COAST OF INDIA**

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ABSTRACT

The identity of a potentially commercial species of aristeid prawn from the southwest coast of India is critically examined. The species hitherto reported as *Aristeus semidentatus* Bate is proved to be *Aristeus alcocki* Ramadan. The material is described and illustrated.

INTRODUCTION

AMONG the penaeoid prawns, species of the family Aristeidae are all deep-sea forms occupying the upper continental slope. In Indian waters as many as fifteen species of this family are known to occur at depths upto 3200 m (Alcock, 1901). One of the species belonging to genus *Aristeus* is potentially of commercial importance along the southwest coast of India (Silas, 1969; Mohamed and Suseelan, 1973). A perusal of literature on the Indian deep-sea prawns shows that there exists doubts and uncertainties about the true identity of this species from Indian waters for want of proper description of the specimens based on which the species has been reported. This has prompted a critical examination of the specimens taken by the deep-sea exploratory fishing vessels during 1965-'70 along the southwest coast of India and the results are presented in this paper.

The measurement of total length (TL) is the distance from the tip of rostrum to the posterior end of telson and that of the carapace is the distance from postorbital margin to the midposterodorsal margin of the carapace.

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FAMILY ARISTEIDAE

***Aristeus Alcocki* Ramadan
(Fig. 1 a-j)**

Aristeus semidentatus Alcock 1901, p. 31; Alcock and Mc Ardle 1901, pl. 49, fig. 3; Kemp and Sewell 1912, p. 19.

Aristeus alcocki Ramadan 1938, p. 40, fig. 1 a-c, 2a, 3a, (Type locality: Gulf of Aden, 270-1051 m); George 1966, p. 340; 1979, p. 27, fig. 2c; Silas 1969, p. 10; Mohamed and Suseelan 1973, p. 619; Kurian and Sebastian 1976, p. 95; Holthuis 1980, p. 9.

Aristeus semidentatus George 1966, p. 339; 1979, p. 26; Mohamed and Suseelan 1968, p. 27; 1973, p. 619; Silas 1969, p. 10; Thomas 1979, p. 41.

Material examined: 82 males, TL 67-110 mm and 823 females, TL 78-188 mm; off Cape Comorin to Kasaragod (Lat. 7°05'N-12°09'N) at 272-430 m depth; August, 1965-November, 1970.

Description: Integument glabrous; rostrum in female long and slender, 0.6-1.1 (usually 0.8-0.9) times as long as carapace, upper margin curved downwards till distal end of 2nd segment of antennular peduncle,

in male much shorter and seldom surpassing tip of antennular peduncle, armed dorsally with three teeth above orbit; postrostral carina extending beyond gastric region; buttress

rounded, no median spine on its posterior edge; telson shorter than inner uropod and provided with 3 movable spines on distal part; endopod of 3rd maxilliped longer than first

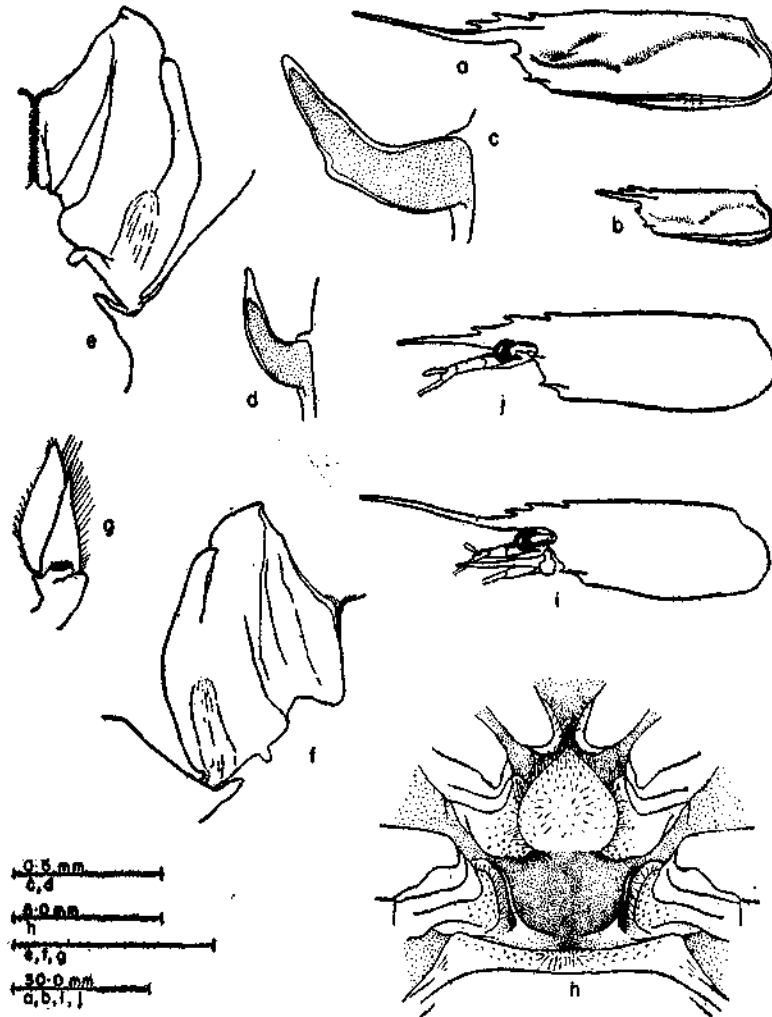


FIG. 1. *Aristeus alcocki* Ramadan : a. Carapace with rostrum of adult female ; b. Same of adult male ; c. Pleurobranchia of XI thoracic segment ; d. Pleurobranchia of XII thoracic segment ; e. Right half of petasma of adult male, dorsal view ; f. Same, ventral view ; g. Appendix masculina and appendix interna ; h. Thelycum of adult female ; i, j. Anterior part of two adult females showing variations in the length of rostrum in relation to that of carapace.

of pterygostomial spine moderately long ; branchiohepatic groove placed well above the level of pterygostomial spine and its anterior part slightly curved ; 3rd abdominal tergum

pereopod by at least half of its dactylus ; 1st pereopod reaching a little beyond middle of scaphocerite, its chela about 0.14-0.33 times longer than carpus and in male the inner edge

of merus straight; 2nd pereopod extending almost to distal end of scaphocerite, its chela being as long as carpus; 3rd pereopod overreaching scaphocerite at least by half of dactylus, its carpus 0.25-0.35 times longer than chela; 4th and 5th pereopods slender, surpassing tip of scaphocerite by dactylus length; merus of 1st and 2nd pereopods with a movable spine on distal part; pleurobranchia on segments X-XIII in the form of minute papillae (0.3-1.0 mm) without pinnules (Fig. 1 c, d).

Petasma simple, membranous, right and left halves united with each other along the whole length of dorsomedian lobule and folded longitudinally; distal margin of dorsolateral lobule bluntly pointed and bent, its proximal border provided with a papilla-like projection directed posteromedially.

Appendix masculina leaf-like, narrower distally and fringed with setae on most part of periphery; appendix internal thin, acutely produced, hidden entirely by appendix masculina and carrying long setae on outer margin.

Thelycum represented by a shield shaped plate directed anteroventrally between 4th pereopods, its distal end pointed; sternite between 5th pereopods highly depressed, membranous and bordered by an oblique ridge on either side.

Colour: Fresh specimens pink with reddish bands on the posterior border of all abdominal segments.

Distribution: Indian Ocean: Gulf of Aden, Arabian Sea and Bay of Bengal, 270-1086 m depth.

DISCUSSION

Based on the collections of 'Investigator', Alcock (1901) and Kemp and Sewell (1912) recorded *A. semidentatus* Bate from Bay of Bengal and Arabian Sea, indicating that the pleurobranchiae in advance of somite XIV of

their specimens were 'mere little papillae' with no trace of pinnules. On re-examining this material and comparing it with the specimens of Bate (1881, 1888) and de Man (1911) and also with his own collections Ramadan (1938) noticed a number of differences sufficient enough to separate the Indian form from Bate's species. Thus, for the material described from the Indian region and the one collected by the John Murray Expedition, he (Ramadan, 1938) established this new species as a close ally of *A. semidentatus* Bate.

According to Ramadan (1938), *A. alcocki* is distinguished from *A. semidentatus* mainly by the nature of the branchiae, the position of the anterior part of the branchiohepatic groove and the relative length measurements of the legs. In the 'Challenger' and 'Siboga' specimens (*A. semidentatus* Bate) the pleurobranchiae on segments X-XIII are not mere papillae, but are distinct filaments provided with pinnules, while in *A. alcocki* these branchiae are very minute papillae seen only with a lens and possessing no pinnules at all. In *A. semidentatus*, the buttress of the pterygostomian spine is long and the anterior part of the branchiohepatic groove is straight and lies close to the buttress of the pterygostomian spine. In *A. alcocki* the buttress of the pterygostomian spine is short, but well developed, the branchiohepatic groove is at a higher level than in the former species so that there is a wide gap between it and the buttress of the pterygostomian spine and its anterior part is not straight. The chelae of the first 3 pairs of pereopods of *A. alcocki* are relatively longer in proportion to the carpus than in *A. semidentatus*.

The present material closely agrees with the description of *A. alcocki* of Ramadan (1938) in all the above mentioned features. The length of rostrum varies considerably among adult females (Fig. 1 a, i, j), the usual size range being 0.8-0.9 times the length of carapace. Alcock (1901) and Ramadan

(1938) noticed in their specimens the rostrum measuring longer than carapace, which is rather a rare incidence in the present collection. The pleurobranchiae on segments X-XIII are represented by microscopic papillae with no pinnules and in most cases they are acutely produced and curved (Fig. 1 d). The chelae of the pereopods are conspicuously longer in proportion to the carpus than in

A. semidentatus. Table 1 shows the length measurements of the distal articles of anterior three pairs of pereopods of *A. semidentatus* and *A. alcocki* recorded by Ramadan and of the present study for comparison. It can be seen from the Table 1 that the variation between the two species is more pronounced in the case of the relative sizes of the chelae and carpus of 1st and 2nd pereopods.

TABLE 1. *Relative measurements of the distal articles of anterior pereopods of A. semidentatus Bate and A. alcocki Ramadan*

Species	Sex	Author	Length in mm		
			Carapace	Carpus	Chela
<i>First pereopod</i>					
<i>A. semidentatus</i>	(F)	Ramadan (1938)	50.0	14.0	15.0
<i>A. alcocki</i>	(F)	"	35.0	8.0	11.0
"	"	Present Report	50.0	12.0	14.0
"	"	"	47.0	11.0	13.5
"	"	"	42.0	10.0	13.0
"	"	"	37.0	9.0	10.6
"	"	"	34.5	8.5	10.5
"	"	"	25.0	6.0	8.0
"	(M)	"	25.0	5.6	8.0
<i>Second pereopod</i>					
<i>A. semidentatus</i>	(F)	Ramadan (1938)	50.0	19.0	16.0
<i>A. alcocki</i>	(F)	"	35.0	13.0	13.0
"	"	Present Report	50.0	17.0	16.5
"	"	"	47.0	16.5	16.5
"	"	"	42.0	15.0	15.5
"	"	"	37.0	13.0	13.0
"	"	"	34.5	12.2	12.2
"	"	"	25.0	9.0	9.0
"	(M)	"	25.0	9.5	9.5
<i>Third pereopod</i>					
<i>A. semidentatus</i>	(F)	Ramadan (1938)	50.0	25.0	18.0
<i>A. alcocki</i>	(F)	"	35.0	18.0	14.0
"	"	Present Report	50.0	25.0	18.5
"	"	"	47.0	23.0	18.0
"	"	"	42.0	21.5	17.0
"	"	"	37.0	18.0	14.0
"	"	"	34.5	17.5	13.0
"	"	"	25.0	12.0	9.0
"	(M)	"	25.0	12.5	10.0

George (1966) recorded both *A. alcocki* Ramadan and *A. semidentatus* Bate from the southwest coast of India, indicating that the latter forms an abundant species in the deep water catches of the area. While the description given by him for the single female specimen of *A. alcocki* undoubtedly applies to that of Ramadan (1938), the characters indicated in respect of Bate's species is confusing. Though his specimens resemble the 'Challenger' material in some of the characters (George, 1966) the proportion between the lengths of the distal articles of 1st and 2nd pereopods (George, 1979) makes them more close to *A. alcocki* than to *A. semidentatus*. In the latter species the author observes that the carpus is 1/5 shorter than the chela in the 1st pereopod and almost the same length as the chela in the 2nd pereopod. A perusal of Table I would indicate that this is truly the characteristic of *A. alcocki* and is applicable

to both the sexes. Unfortunately the female specimens of *A. semidentatus* described by George (1966, 1979) are no longer available for comparison. However, a re-examination of the male specimens of the species deposited at the CMFR Institute reveals that they possess the characters of *A. alcocki*. It is therefore possible that what George (1966, 1979) recorded as *A. semidentatus* Bate from the Indian region is referable to *A. alcocki* Ramadan.

A re-examination of the material studied by Mohamed and Suseelan (1968, 1973) during the present investigation proved to be only *A. alcocki*. In recent years several others have also reported the occurrence of *A. semidentatus* from the Indian Coast (Silas, 1969; Kurian and Sebastian, 1976; Thomas, 1979; Oommen, 1980), but from the above description it is inferred that the specimens of all of them would refer to *A. alcocki*.

REFERENCES

- ALCOCK, A. 1901. *A descriptive Catalogue of the Indian Deep-sea Crustacea Decapoda, Macrura and Anomala in the Indian Museum*, Calcutta, pp. 1-286.
- AND A. F. MCARDLE 1901. Illustrations of the zoology of the Royal Indian Marine Survey ship 'Investigator'. *Crustacea*, pt. 9, pl. 49-55.
- BATE, C. S. 1881. On the Penaeidae. *Ann. Mag. nat. Hist.*, Ser. 5, 8: 169-196.
- 1888. Report on the Crustaceae Macrura collected by H.M.S. 'Challenger' during the years 1873-'76. *Rep. Voy. Challenger, Zool.*, 24: 1-942.
- DE, MAN, J. G. 1911. The Decapoda of the Siboga Expedition. Part I. Family Penaeidae. *Siboga Exped. Monogr.*, 39 a: 1-131.
- GEORGE, M. J. 1966. On a collection of penaeid prawns from the offshore waters of the southwest coast of India. *Proc. Symposium on Crustacea*, Marine Biological Association of India, Part 1: 337-346.
- 1979. Taxonomy of Indian prawns (Penaeidae, Crustacea, Decapoda). *Contributions to Marine Sciences dedicated to Dr. C. V. Kurian*, pp. 21-59.
- HOLTHUIS, L. B. 1980. FAO species catalogue, Vol. 1. Shrimps and prawns of the world. An annotated catalogue of species of interest to fisheries. *FAO Fish. Synop.*, (125) 1: 1-271.
- KEMP, S. AND R. B. S. SEWELL 1912. Notes on decapoda in the Indian Museum. III. Species obtained by R.I.M.S. 'Investigator' during the survey season 1910-11. *Rec. Indian Mus.*, 7: 15-32.
- KURIAN, C. V. AND V. O. SEBASTIAN 1976. *Prawns and prawn fisheries of India*. Hindustan Publishing Corporation, Delhi, 280 p.
- MOHAMED, K. H. AND C. SUSELAN 1968. Deep-sea prawn resources off the southwest coast of India. *Abstracts, Symp. Living Resources of the Seas around India*, CMFRI, India, p. 27.
- AND ——— 1973. Deep-sea prawn resources off the southwest coast of India. *Proc. Symp. Living Resources of the Seas around India*, Spl. pub. CMFRI, India, pp. 614-633.
- OOMMEN, P. VARGHESE 1980. Results of the exploratory fishing in Quilon Bank and Gulf of Mannar. *IFP Bulletin*, 4: 1-49.
- RAMADAN, M. M. 1938. Crustacea: Penaeidae. *John Murray Exped. Sci. Rep.*, 5(3): 35-76.
- SILAS, E. G. 1969. Exploratory fishing by R.V. Varuna. *Bull. cent. mar. Fish. Res. Inst.*, 12: 1-86.
- THOMAS, M. M. 1979. On a collection of deep-sea decapod crustaceans from the Gulf of Mannar. *J. mar. biol. Ass. India*, 21 (1 & 2): 41-44.