

3 A NEW SPECIES OF SERGESTID SHRIMP, ACETES ORIENTALIS
(CRUSTACEA: DECAPODA, SERGESTIDAE) FROM GOA, CENTRAL WEST COAST OF INDIA

1a 1b
C. T. ACHUTHANKUTTY & S. AYYAPPAN NAIR

National Institute of Oceanography, Dona Paula-Goa-403301: India.

Received July 10, 1974

Keywords: Sergestidae. *Acetes orientalis*, taxonomy.

~~LIBRARY~~
~~DIVISION OF CRUSTACEA~~

LIBRARY
Division of Crustacean

Abstract

Acetes orientalis, a new species of sergestid shrimp belonging to the genus *Acetes* H. Milne-Edwards collected from the Mandovi estuary, Goa, Central West Coast of India has affinities to most of the Indo-Pacific species. The petasma of the male has resemblance in shape to *A. sibogae*, *A. vulgaris*, *A. sibogalis*, *A. australis*, *A. erythraeus* and *Acetes* sp. and very much alike in structure to that of *A. sibogae*. The female genital area has a pair of protuberance as in *A. vulgaris* and *A. indicus*. These combinations in characters along with several other important features which justify the creation of this new species are discussed in comparison with those of the other Indo-Pacific species having closest affinities.

Introduction

Genus *Acetes* of the coastal waters of Goa has not been studied extensively. In a collection from Mandovi estuary in Goa, Central West Coast of India on 25-2-1974, specimens of the sergestid shrimp *Acetes* were obtained and were brought live to the laboratory for further studies. A detailed examination of the material revealed that the dominant species in the collection was altogether different from all other species so far recorded in literature (Kemp, 1917; Hansen, 1919; Burkenroad, 1939; Colefax, 1940; Natraj, 1947; Kishinouye, 1953; Pathansali, 1966; Rao, 1968; Achuthankutty & George, 1973). The other species present in the collection were *A. indicus* Milne-Edwards

and *A. sibogalis* Achuthankutty & George. The species showed a combination of characters of other Indo-Pacific species. It is therefore considered new to science and described here in detail. As this new species is exhibiting some of the characters of most other Indo-Pacific species, it has been named *Acetes orientalis*.

Sergestidae Dana
Sergestinae Bate
Acetes H. Milne-Edwards
Acetes orientalis sp. nov.

Material: 26 specimens (9 females and 17 males) collected near fish jetty in Mandovi estuary on 25-2-1974.

Holotype: Male - 14.08 mm. Carapace - 3.04 mm.

Paratype: Females, 9 specimens 18.57 to 22.85 mm and Carapace 4.28 to 5.12 mm respectively. Males 15 specimens 14.00 to 15.80 mm and carapace 2.98 to 3.66 mm respectively.

Type specimens will be deposited at the Indian Ocean Biological Centre, Cochin.

Description

Colour: Live specimens glassy transparent, on formalin preservation turns whitish. Reddish yellow patches on carapace and posterior margins of abdominal segments; antennal flagellum and antennular flagellum brick-red; a large rounded dark reddish spot on the posterior part of 6th abdominal segment, protopodite of uropod and anterior margin of endopodite of uropod; inner margin of exopodite and endopodite of uropod and margins of telson brick-red.

Carapace: Slightly more than 1/4 of total length; posterolateral margins extend backwards and overlap the

lateral margins of the 1st abdominal segment while postero dorsal margin concave. Supraorbital and hepatic spines conspicuous. Anterior margin terminates in a small sharp rostral spine (Fig. 1 & 2), posterior to it two sharp triangular denticles, the proximal one larger.

Eye-stalk stouter and longer, eye ball diameter larger in female reaching to the tip of the 1st segment of antennular peduncle, in male reaching less than that of female.

Antennule: (Fig. 3) Segments of the peduncle in the proportion 5:3:8 in males and 7:3:5 in females. 3rd Segment of male elongated and slender, 12 times as long as broad.

Proximal portion of upper flagellum formed of 20-22 segments bearing aesthetes on the inner margin; distal portion many segmented reaching almost the region of flexion of the antennal flagellum, carrying small setae. Lower flagellum of female 18-20 segmented bearing bristles on the outer margin only; slightly less than the length of basal (inner margin of 2nd) segment of antennular peduncle. In male 13-segmented, almost the length of inner margin of 2nd segment of antennular peduncle (Fig. 4); distal outer margin of 3rd segment carries slightly curved clasping spine reaching the 8th segment with 12

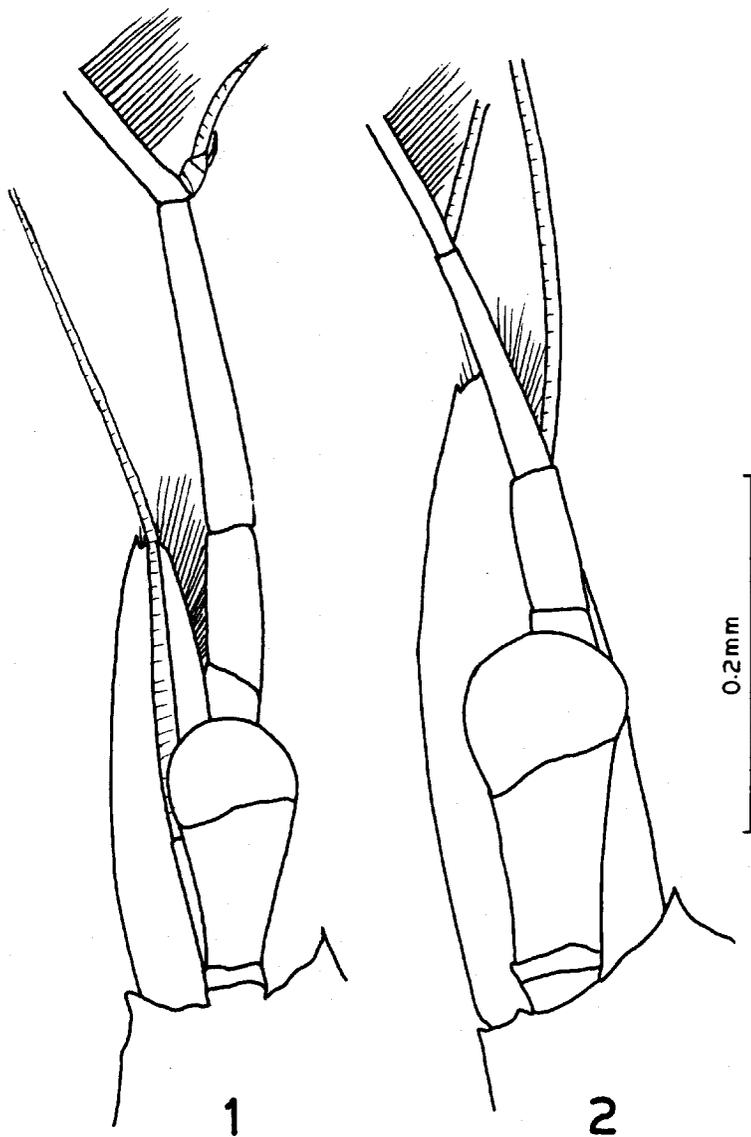


Fig. 1. 1st antenna of male

Fig. 2. 1st antenna of female

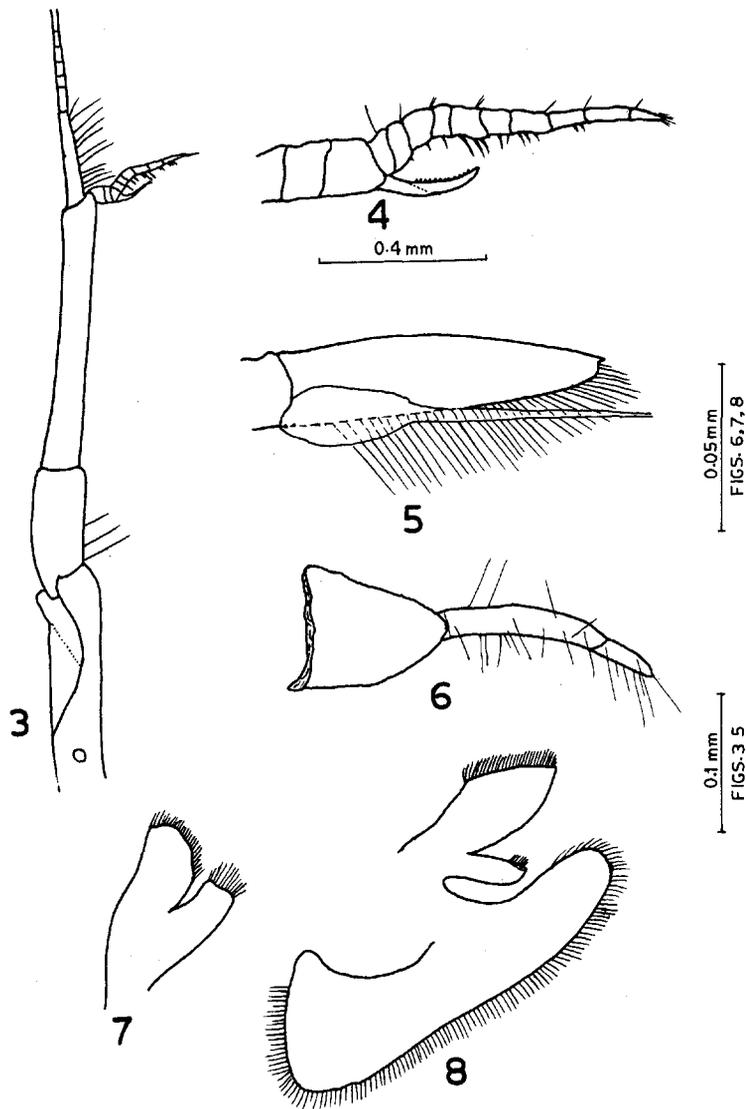


Fig. 3. Lower antennular flagellum of male. Fig. 4. Clasping organ. Fig. 5. Antenna.
Fig. 6. Mandible. Fig. 7. 1st maxilla. Fig. 8. 2nd maxilla.

small triangular teeth arising from a median shallow groove as in *A. sibogae* and *A. sibogalis*. 2 Small accessory spines arise from the same segment and the 4th segment without spines, 5-7 with 1 spine, 8th 3-4 spine, 9th 2 spines, 10th 3 spines, 11th 2 spines, 12 and 13 devoid of spines. The outer margin and the tip carry small bristles.

Antenna: (Fig. 5): Antennal scale in male reaches the posterior margin of 3rd segment of antennular peduncle (Fig. 1) while reaching middle of that segment in female (Fig. 2). Smooth outer margin ends in a sharp spine and

inner margin bears large setae. Flagellum very long with flexion formed of 6-8 segments devoid of setae. Arrangement of hairs and setae beyond the region of flexion as in *A. australis*, *A. cochinchensis* and *A. sibogalis*.

Mandible (Fig. 6): Palp 3 segmented, 2nd segment longest, all segments carrying setae mostly on the inner margin.

First Maxilla (Fig. 7): Bilobed with strong bristles at the tip.

Second Maxilla: (Fig. 8): Protopodite unsegmented

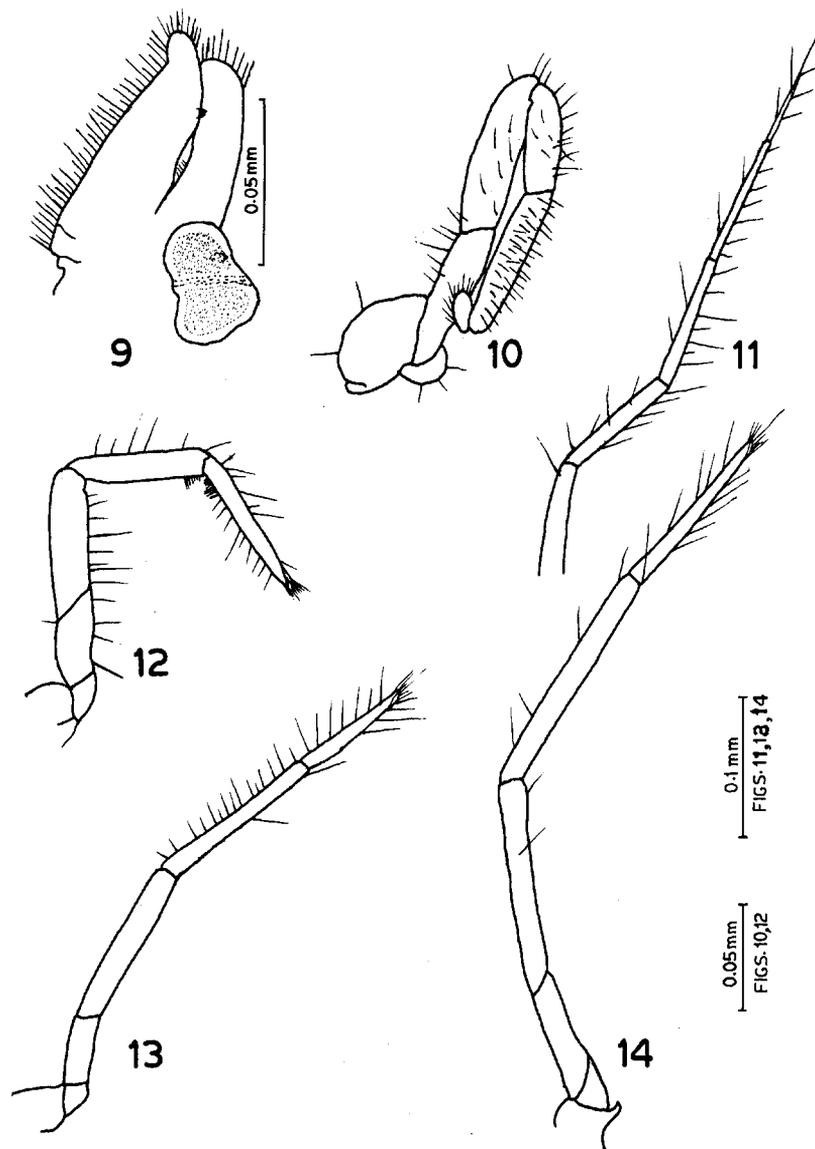


Fig. 9. 1st maxilliped. Fig. 10. 2nd maxilliped. Fig. 11. 3rd maxilliped.
 Fig. 12. 1st pereopod. Fig. 13. 2nd pereopod. Fig. 14. 3rd pereopod.

carrying bristles on the inner margin, endopodite small and undivided bearing few small setae at the distal inner edge as in *A. australis* and *A. sibogalis*, but without the small projection at the base.

First Maxilliped: (Fig. 9): Exopodite and endopodite flattened and undivided, the tip of the latter slightly extending upwards, distal inner margin beset with bristles and inner margin carries few setae, but the projection seen in *A. cochinensis*, *A. australis* and *A. sibogalis* absent.

Second Maxilliped (Fig. 10): Exopodite absent. Endopodite attached to protopodite, 5-segmented, curved and leg-like, dactylus short and bent upwards beset with small setae, propodus bears short setae only on the outer margin and not long and short as in *A. sibogalis*.

Third Maxilliped (Fig. 11): Long and slender; 5 segmented, non-chelate, extending beyond the antennal scale by 1/5 length.

First pereopod (Fig. 12): Comparatively short just

extending beyond the origin of antennal scale, 5-segmented, chelate; junction of carpus and propodus bears short spiny setae forming a sort of clasping organ.

Second pereopod: (Fig. 13): Reaches the tip of antennal scale, 5 segmented and chelate, long setae on last 3 segments and bristles on the tip.

Third pereopod (Fig. 14): Longest of all reaching considerably beyond the tip of antennal scale, 5 segmented and chelate. Basis without tooth or projection as in *A. erythraeus*, *A. japonicus*, *A. cochinensis*, *A. vulgaris*, *A. sibogae* and *A. sibogalis*. Coxa with a curved tooth at the distal inner angle in both males and females as in *A. vulgaris* and *A. australis*. Vestiges of 4th and 5th leg present in male but absent in female.

Abdomen: A small protrusion present on the sternum between the 1st pair of pleopods as in *A. japonicus* and no procurved tooth as in *A. indicus* and *A. erythraeus*. Abdominal segments in the proportion 7 : 6 : 6 : 10 : 5 : 11 in males and 10 : 8 : 10 : 11 : 8 : 18 in females. 6th segment twice as long as the maximum width.

Pleopods (Fig. 15) 1st pair uniramous which in male carries petasma and others biramous, protopodite decreases in length and increases in width posteriorly, margins of exopodite and endopodite beset with long setae. 2nd pair of pleopod in male modified having at its base a flat lamella carrying 4 large curved spines at its tip (Fig. 15a) which in *A. sibogalis* bears 2 and in *A. australis* 4-5.

Urpod (Fig. 16): Non-ciliated and ciliated outer margin of exopodite separated by a small spine, endopodite slightly less than 3/4 of exopodite carrying long plumed setae on either margins.

Telson (Fig. 17): Reaches almost 3/4 length of endopodite of uropod; almost triangular, tip bluntly pointed and distal narrow region provided with movable setae; lateral spine absent, but blunt projection present in very few males.

Genital Coxae in male situated immediately behind 3rd pair of legs; slightly longer than broad; terminate at 3rd sternite region, as a sharp pointed process.

Petasma: (Fig. 18): Resembles very much that of *A.*

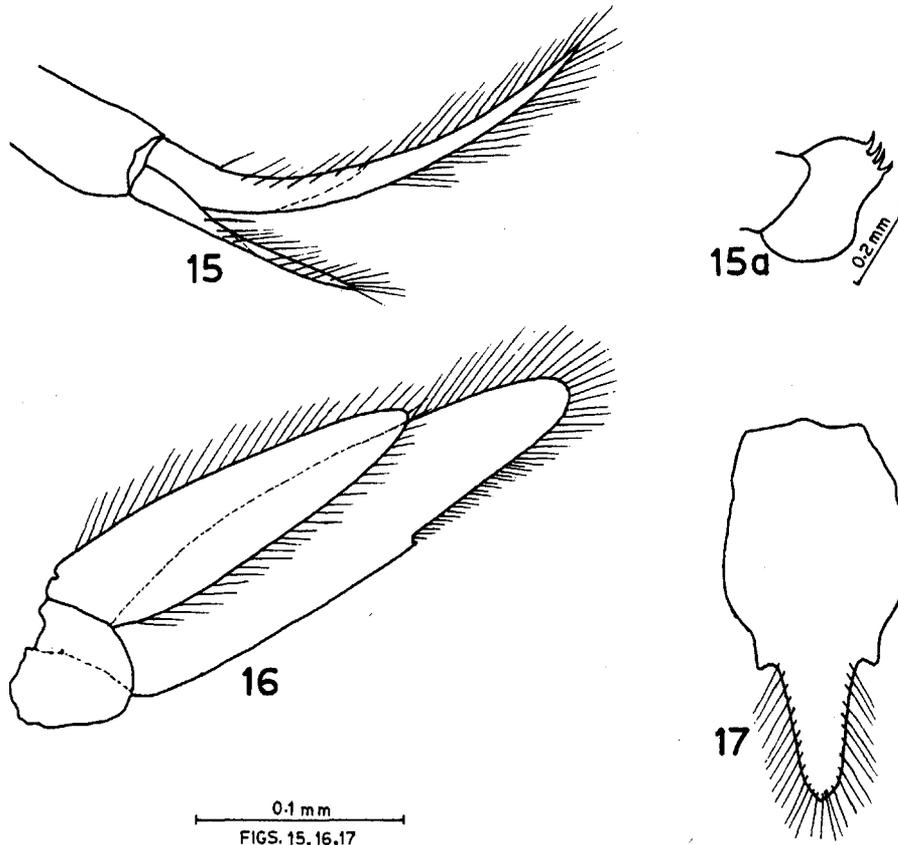


Fig. 15. Pleopod. Fig. 15a. Lamella of endopodite of 2nd pleopod of male.
 Fig. 16. Uropod. Fig. 17. Telson.

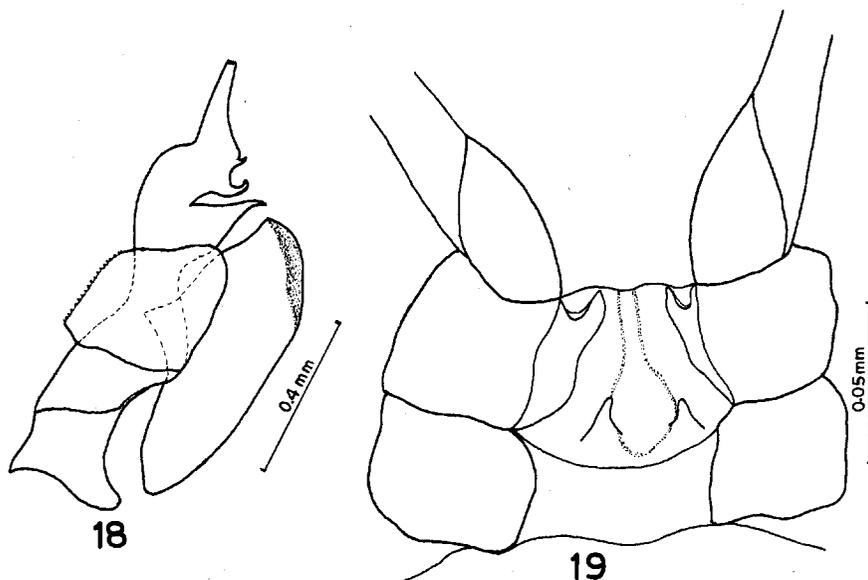


Fig. 18. Petasma. Fig. 19. 3rd thoracic Sternite of female.

erythraeus and *A. sibogae* in structure. Pars externa, pars media and pars astringens well formed. Pars externa broad; antero-lateral margin thickened. Pars astringens thin and flat, folded on itself; minute clasping hooks at the distal outer margin. Proximal outer corner of pars media produced and inner corner sharp. Capitulum, broad at the base and tubular at the end; on the outer margin two curved spines as in *A. erythraeus* and *A. sibogae*, the bottom one bigger in size, tip carry a row of 6 minute spines. Processus ventralis $1/2$ length of capitulum, narrowing at the tip bending slightly outwards; without any spine.

Female genital area (Fig. 19): Coxae of 3rd pair of legs as long as broad; from the inner fleshy lamella at its distal end arises a large curved coxal tooth. At the base of the sternite a pair of large conical protuberances, one on either side of the proximal inner angle of coxal lamella as in *A. indicus* and *A. vulgaris*. A shallow median longitudinal groove widens at the proximal half runs just above the posterior margin of 4th sternite. Posterior margin of 3rd sternite overlaps $1/4$ of anterior margin of 4th sternite.

Discussion

The present species, although sharing some of the characters of most of the Indo-Pacific species of the genus *Acetes*, such as *A. japonicus*, *A. cochinchensis*, *A. indicus*,

A. erythraeus, *A. vulgaris*, *A. sibogae*, *A. australis* and *A. sibogalis*, differs from them in some important features which are unique to *A. orientalis* sp. nov. The presence of 2 clasping spines in the lower antennular flagellum of the males of *A. japonicus* and *A. cochinchensis* clearly separates *A. orientalis* from them. The absence of a procurved tooth on the sternum between the 1st pair of pleopods is a differentiating character from *A. erythraeus* and *A. indicus*. The lack of a coxal tooth on 3rd pereopod in the males of *A. sibogae* and *A. sibogalis* and the presence of a single spine on the capitulum of petasma in *A. australis* and in *A. sibogalis* at once separates them from the present species. The elongated 3rd segment of the antennular peduncle, characteristic of dimorphic males, is seen in this species but absent in *A. vulgaris*. Thus it becomes clear that *A. orientalis* Achuthankutty & Nair, although having affinities to other Indo-Pacific species, is a species new to science.

As per the table for diagnostic features of different species of the genus *Acetes* (Achuthankutty & George, 1973), *A. orientalis* differs from the other Indo-Pacific species carrying a single clasping spine in having 16-18 segmented lower antennular flagellum in the female and 13 segmented in the male with different spine formula on other segments.

The petasma of *A. orientalis* sp. nov. resembles very much in shape that of *A. erythraeus*, *A. vulgaris*, *A. sibogae*, *A. australis* and *A. sibogalis* in having all the parts

such as pars externa, pars astringens, capitulum and processus ventralis, but in structure it shows closest affinities to *A. erythraeus* and *A. sibogae* in having two large curved spines on the capitulum. In *A. vulgaris*, in addition to the 2 large spines on the capitulum there is a distinct small hook distally and a few minute spines at the tip and more over all the other parts are relatively larger. In *A. sibogae* there are only 2-3 minute hooks at the tip of the capitulum which in *A. orientalis* has 6 hooks. In *A. australis* and *A. sibogalis*, there is only a single large spine on the capitulum. The tip of the capitulum in *A. erythraeus* is devoid of spines. In addition the shape of capitulum and processus ventralis of the present species is also different from that of the above mentioned species.

A. orientalis may be distinguished from its closely allied species *A. sibogae* by characters like the endopodite of the 2nd maxilla having no projection at its base, exopodite of 1st maxilliped with few setae on its inner margin without projection, coxal tooth present on 3rd leg both in female and male, 3rd thoracic sternite of female possessing a pair of large conical protuberances, capitulum of petasma with 6 hooks.

Although the characters of presence of coxal tooth on the 3rd pair of legs both in male and female is shared by *A. australis* and *A. orientalis*, the differences in the lower antennular flagellae and the petasma, as well as features such as the endopodite of the 2nd maxilla possessing a conical projection with short bristles at its base, the exopodite of the 1st maxilliped having a spiny projection on its inner margin, the basis of the 3rd leg with a projection, 3rd thoracic sternite of female with 2 pairs of protuberances separate the two species distinctly. The differences for *A. australis* and *A. orientalis* hold good for *A. sibogalis* also, except in that the basis of the 3rd pair of leg is without projection or tooth in males, but with projection in females.

The female genital area of *A. orientalis* shows some resemblance to that of *A. vulgaris* and *A. indicus* in the presence of a single pair of protuberances. But as mentioned earlier, the presence of a procurved spine on the sternum between the 1st pair of pleopods and the tooth on the basis of the 3rd leg are important differences from *A. indicus*. As far as *A. vulgaris* is concerned, the differences in the lower antennular flagellae and the petasma mentioned elsewhere, the absence of an elongated 3rd segment of the antennular peduncle in male along with the differences mentioned for *A. sibogae* are differentiating features from that of the present species. Moreover, the pair of protuberances in the female genital area are

rounded in *A. vulgaris* whereas in *A. orientalis* the protuberances are large and conical.

Acknowledgements

The authors wish to express their thanks to Dr. S. Z. Qasim, Director, NIO for his interest and help. They are indebted to Dr. S. N. Dwivedi, Head of B.O.D., NIO for his encouragements and suggestions and to Dr. M. J. George, Scientist, Regional Centre of NIO, Cochin for critically reading the manuscript and offering helpful suggestions.

References

- Achuthankutty, C. T. & George M. J. - 1973. *Acetes sibogalis* sp. nov. (Crustacea; Decapoda, Sergestidae) from Cochin backwaters with a note on its impregnation. *Indian J. mar. Sci.*, 2(2): 139-144.
- Burkenroad, M. D. 1934. The Penaeidae of Louisiana, with a discussion of their world relationships. *Bull. Amer. Mus. Nat. Hist.*, 68: 126-132.
- Colefax, A. N. 1940. An Australian species of *Acetes* (Crustacea, Macrura, Sergestidae), with remarks on the distribution and literature of the genus. *Rec. Australian Mus.*, 20: 341-353.
- Hansen, H. J. 1919. The Sergestidae of the Siboga Expedition. *Siboga Exped.*, 38: 31-48.
- Kemp, S. 1917. Notes on Crustacea Decapoda in the Indian Museum. The genus *Acetes*. *Rec. Indian Mus.*, 13: 43-58.
- Kishinouye, K. 1953. On Life-history of *Acetes japonicus* Kishinouye, in Ariaka Sea: Wateru Ikematsu. *Bull. Jap. Sci. Soc.*, 19(6): 771-780.
- Nataraj, S. 1947. On some species of *Acetes* (Crustacea, Sergestidae) from Travancore. *Rec. Indian Mus.*, 45 (243): 139-148.
- Pathansali, D. 1966. *Acetes* (Sergestidae) from Malay Peninsula. *Bull. Nat. Mus. Singapore.*, 33(8): 59-63.
- Rao, P. Vedavyasa. 1968. A new species of shrimp, *Acetes cochinchensis* (Crustacea: Decapoda, Sergestidae) from South-West coast of India with an account of its larval development. *J. Mar. biol. Ass. India.*, 10(2): 298-320.