

show that several different thiol reagents have similar effects and that their effects do not reflect non-specific toxicity. In the present study it has been found that CAP and NEM, which are known to be specific -SH inhibitors, have the same effects as CPDS on cell adhesion. It has already been reported¹⁻⁵ that inhibitors of cellular respiration (sodium azide, 2-4-dinitrophenol and rotenone) or of the synthesis of RNA (actinomycin D) do not inhibit cellular adhesiveness. Even non-viable (dye permeating) cells have been found to aggregate just as healthy (dye excluding) cells⁴.

The effect on cellular adhesion of chemicals whose action is known can be interpreted as an indication of the role of the target substances in the process. It is known that CAP is an irreversible thiol binding agent⁸⁻¹². Thus the irreversible inhibition of cell adhesion caused by CAP can be interpreted to mean that -SH groups are essential for the formation of cell-cell contacts. The present study therefore reinforces the earlier conclusion^{4,5} that adhesion of cells in shaking suspensions chiefly depends on their static surface chemistry. Further work on the mode of action of thiol reagents on cell adhesion is in progress.

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SEXUAL ABNORMALITIES IN THE GENUS *ACETES* (SERGESTIDAE, DECAPODA)

WHILE examining a collection of sergestids from Cochin, two abnormal adult females each of *Acetes erythraeus* Nobili and *Acetes sibogalis* Achuthankutty and George with male secondary sexual characters partly developed were obtained. Although protandrous hermaphroditism is common in decapod crustacea especially in pandalid prawns, only one species, the Thalassinid, *Calocaris macandreu* is reported to be a functional hermaphrodite¹. Mere structural abnormalities as regards the external genitalia have already been reported in decapod crustaceans²⁻⁷. However, no such observations have so far been made on sergestid shrimp.

Abnormal females of A. erythraeus

Material: 2 specimens; total length 22.1 mm & 20.7 mm and carapace length 5.6 mm & 4.6 mm respectively.

In all respects except for the presence of a partly developed clasping spine on the lower antennular flagellum, they are fully grown adult females of *A. erythraeus* described by Kemp⁸. The lower antennular flagellae of the two specimens, although resembling that of the male of the species, showed some differences between each other in the number of segments, length of the flagellum and also the spine formula. It is 13-segmented and slightly longer than the 3rd segment of the antennular peduncle in one, whereas 14-segmented in the other. The clasping spine (Fig. 1) is curved and small in proportion to the size of that of an adult male. The spines and projection on the segment anterior to the one carrying the clasping spine of *A. erythraeus* male is absent.

Other secondary male characters such as the petasma, genital coxa and modified endopodite of 2nd pair of pleopod are wanting and all the female characters are very prominent.

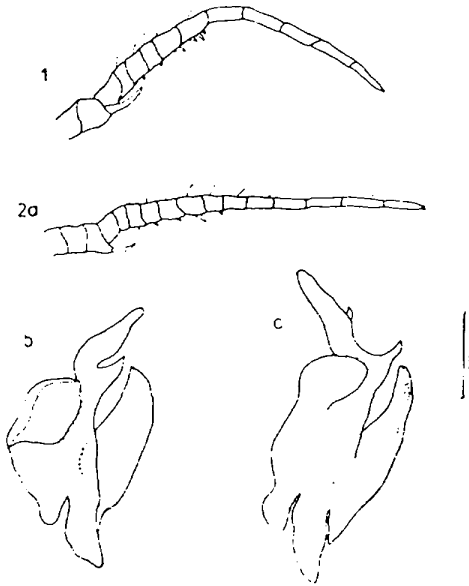
Abnormal females of A. sibogalis

Material: 2 specimens; total length 21.9 mm & 20 mm and carapace length 4.7 mm & 4.2 mm respectively.

These are fully grown adult females of *A. sibogalis* described by Achuthankutty and George⁹. In these specimens in addition to a minute clasping spine, the 1st pair of pleopods bear an undeveloped petasma.

The lower flagellum is 16-segmented as in *A. sibogalis* female. But a single, curved and reduced clasping spine (Fig. 2a) having no dorso-medial groove arise from the distal inferior angle of 3rd segment in one of the specimens. A minute accessory spine and few spinules on other segments

are also present. In the other specimen, the clasping spine being rudimentary is seen only under higher magnification.



FIGS. 1-2. Fig. 1. Lower antennular flagellum of *A. erythraeus* female carrying clasping organ. Fig. 2a. Lower antennular flagellum of *A. sibogalis* female carrying clasping organ. Figs. 2b and c. Left half of petasma of *A. sibogalis* female 1 and 2 respectively.

Petasma (Figs. 2b and c) almost resembling that of *A. sibogalis* male but small in proportion to the size of the animal is seen on the 1st pair of pleopods. Though the 3 primary parts are present, they are neither fully formed nor clearly separated and are not fused together by the pars astringens due to the insufficient coupling hooks. Pars externa is slender and small, pars astringens lacks the natural folding except at the distal end and pars media is not produced at the proximal tip. Capitulum and processes ventralis are small and slender. In one (Fig. 2b), the single falcate spine is also absent. The undeveloped nature of the petasma in comparison with the size of the animal clearly indicates that it is an abnormal development only.

Much work has been done to study the problem of sex interchanges and intersexuality in decapods where the phenomena are frequent. Laboratory experiments have proved that intersexes can be produced successfully¹⁰.

The role of hormones and influence of external factors on sex interchange have been already estab-

lished¹¹⁻¹³. In all these studies it was observed that along with the changes in the secondary sex characters, the internal organs were also affected correspondingly. In the present material the internal female organs are not at all affected and poorly developed external structures of the opposite sex are additionally found. This can only be an abnormality. Such types of structural abnormalities have already been reported in penaeid prawns, *Metapenaeus monoceros*² and *Metapenaeus affinis*², the adult females carrying undeveloped petasma without any change in the internal female structures.

The X-organ sinus gland plays a very important role in controlling the reproductive cycles in crustacea and also the normal sex reversal in protandrous hermaphroditic prawns by controlling the secretion of the sex hormones¹¹. But, the hormone produced by androgenic glands is responsible for affecting the differentiation of primary and secondary male characters in decapod crustacea¹⁻¹¹. As suggested by Suseelan², in the present female specimens the regression of the androgenic glands for some unknown reason probably would have got delayed during the early development resulting in the growth of male secondary characters for some time along with female structures producing the external structural abnormality in adult females.

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