

INCIDENCE OF PSEUDOHERMAPHRODITISM IN THE SPINY LOBSTER *PANULIRUS HOMARUS* (LINNAEUS)

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ABSTRACT

Specimens of the spiny lobster, *Panulirus homarus* ranging in size from 22.3 - 97.5 mm carapace length (67 - 245 mm total length) with well developed male genital system, but with biramous pleopods (as in females) were recorded in 1987, 1988 and 1989 from trammel net catches off Kovalam, near Madras. The probable factors responsible for this sexual abnormality have been discussed.

In March, 1987, while observing the juvenile lobsters caught in the trammel net off Kovalam near Madras, a few lobsters of *Panulirus homarus* of size ranging from 22.3 - 43.6 mm in carapace length (67 - 122 mm in total length) were found to have male genital system but biramous pleopods as in females instead of the normal uniramous pleopods (Fig. 1 A, B & C). In April of the same year, a lobster of same species measuring 97.5 mm in carapace length and 245 mm in total length with similar abnormality was recorded from the same area. In 1987, out of 121 lobsters examined, 14 numbers were found to have this anomaly. Subsequently, in 1988 and 1989 about 10% of the lobsters with abnormal pleopods were recorded. Five of the lobsters with the abnormal pleopods were dissected and the genital system examined. Neither any abnormality in their genital apparatus nor any parasites were noticed. A squash preparation from different parts of the testis did not reveal presence of any ova. Since the animals have morphologically similar genital system as in males, excepting the biramous nature of the pleopods, they were considered as functional males and this phenomenon, as 'pseudohermaphroditism', a type of non-functional hermaphroditism.

Sexual abnormalities like gynandromorphism, bisexuality and hermaphroditism though not common in lobsters, have been described in a few species, including *Jasus frontalis* (Burger, 1902), *Jasus lalandii* (von Bonde, 1918; Hickman, 1945; Bradstock, 1949), *Homarus americanus* (Chace and Moore, 1959) and *Nephrops norvegicus* (Farmer, 1972). However, there are only a few other examples of 'pseudohermaphroditism' in lobsters. von Bonde (1937) described such a phenomenon in *Jasus lalandii* and Gordon (1957) noted the same anomaly in *Homarus gammarus*. This is the first record of such a phenomenon from a tropical Palinurid lobster.

The biramous pleopods of the abnormal specimens are unique in that but for their very much reduced size, they structurally resemble those of normal females. Moreover, the outer segment of the endopod of pseudohermaphrodites are longer, whereas the two segments are almost equal in length in normal females (Fig. 1 B & C). While normal females have setae on both the segments of the endopod, in pseudohermaphrodites, only the outer segment of the endopod has setae. These abnormal specimens have been reared in the laboratory and the

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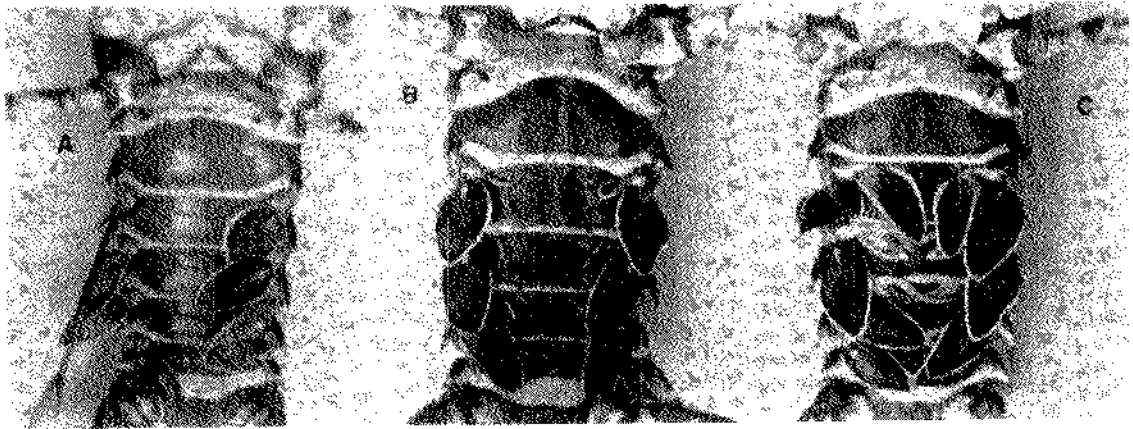


Fig. 1. Ventral view of the abdominal region of *Panulirus homarus* showing the nature of pleopods (A) Normal male of 42.0 mm in carapace length with uniramous pleopods, (B) Pseudohermaphrodite of 45.0 mm in carapace length with the prominent genital opening on the 5th pleopod and biramous pleopods, (C) Normal female of 43.5 mm in carapace length with well developed biramous pleopods.

pleopods were found to grow with each moult. Since these specimens have the full complement of the male genital system, they could be genetic males, and the development of permanent female sexual characteristics (biramous pleopods) may have been probably caused by abnormal functioning of the androgenic gland. The androgenic gland which is situated at the sub-terminal region of the vas deferens is known to determine not only the development of the secondary and behavioural sex characters, but also that of primary ones like the differentiation of testis, spermiduct primordia and normal spermatogenesis (Charniaux-Cotton and Payen, 1985). Moreover, the necessity of the androgenic gland for maintaining the male sexual characteristics has been proved experimentally in the isopod, *Idotea balthica*, where males deprived of their androgenic gland were shown to develop the external female sex characters (Reidenbach, 1967). Further studies on the histological changes in the androgenic gland

and the nature of the hormones secreted by them in normal males and in the pseudohermaphrodites are required for explaining the reasons for this sexual abnormality in the lobster, *Panulirus homarus*.

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