

A NOTE ON THE PREDATION ON PEARL OYSTER
PINCTADA FUCATA (GOULD) BY SOME GASTROPODS

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ABSTRACT

Considerable mortality of young pearl oyster, *Pinctada fucata*, was noticed on the oyster beds in Gulf of Mannar due to predation by gastropods, *Cymatium cingulatum* and *Murex virgineus*. Pearl oysters reared in the farm also suffered mortality, due to accidental transplantation of *C. cingulatum* while stocking.

Survey of the pearl oyster beds in the Gulf of Mannar in November 1981 showed a good population of young pearl oyster in Nagarai and Kurichan paar area at a depth of 11-12 m. They were found attached to the fan shells and coral pieces and majority of them were in the shell height (dorso-ventral measurement) range of 20-30 mm. An unusually large number of shells of recently dead pearl oysters were noticed along with the presence of gastropods, *Cymatium cingulatum* and *Murex virgineus*, at first on 25 January 1982. On that day 6892 oysters were collected of which 1411 (20.47%) were dead, and 129 *C. cingulatum* and 12 *M. virgineus* were present in the collection. On 30 March 1982, of the 7695 oysters collected, 395 (5.13%) were dead, among which 6 *C. cingulatum* and 82 *M. virgineus* were seen. The size ranges of the gastropods *C. cingulatum* and *M. virgineus* were 7.2-47.0 mm (mode 25-35 mm) and 17.0-60 mm (mode 30-40 mm) in length, respectively. In May 1982, there was a reduction in the number of dead oysters as well as predators. By then the oysters had grown to 35-40 mm in DVM, with the mode at 38 mm.

Mortality of pearl oysters in the farm

As the farm at Tuticorin harbour basin was stocked with the pearl oysters collected from the natural beds, the gastropod *C. cingulatum* had accidentally entered the farm along with the oysters and caused heavy mortality of oysters; in 43 days, since transplantation, 17 *C. cingulatum* were found causing mortality to 201 oysters in a culture cage. In another cage, 542 oysters were killed by 12 predators in the same period. It was also noticed that in the farm the oysters of less than 30 mm shell height were the major victims. The length of the predator gastropods ranged from 23.0 to 61.5 mm. It is estimated that, on an average, 25 oysters were killed by each *C. cingulatum* in the farm in a period of 35 to 45 days; mortality accounted for being 18.57%.

While observing the method of predation in the laboratory it was found that *C. cingulatum*, after finding its prey, climbs and attaches itself firmly on top of it. When the oyster opens it inserts its proboscis between the valves and ejects a dull white mucus-like substance. Within 3 h the oyster is narcotised. The soft gonad and hepatopancreas of the oyster become the first target of attack. The entire flesh is eaten within 7 to 10 h, depending on the size of the predator and prey. In some cases, the mantle, foot and part of the adductor muscle are left uneaten. In an experiment, 2 gastropods were found to have eaten 20 oysters in 37 days, during which period the gastropod grew from 26.0 mm to 45.8 mm; the average growth being 0.54 mm in length per day. In another experiment, 2 gastropods of 40.5 mm in length ate 20 oysters in 20 days. The average growth of the predator in this case was 0.26 mm per day. Two larger predators (average length 61.8 mm) fed 20 oysters in 19 days and the average increase in growth per day was 0.18 mm. The gastropods were also found to survive for 57-125 days without feeding.

The mode of attack of *Murex virgineus* on pearl oyster, which was also noticed in the laboratory, is, however, different from that of *C. cingulatum*. The fragile shell-margin of the oyster is broken by *Murex* by moving repeatedly its hard foot muscle, enabling its operculum to grate against the shell, and thus making a gap. When the gap is sufficiently large the gastropod inserts its proboscis and attacks the adductor muscle of the oyster. It took about 24 h for *Murex* to complete the feeding. In the laboratory, two *M. virgineus* (average length 54.0 mm) together took 49 days to complete feeding on 20 pearl oysters.

Herdman (1903) and Hornell, as reported by Herdman (1905), considered predation by the boring molluscs, chiefly *Sistrum spectrum* and *Pinaxia coronata*, along with species of *Nassa*, *Murex*, *Purpurea* and *Turbinella*, as one of the reasons causing widespread mortality of pearl oysters, both young and old. *C. cingulatum* as predator on pearl oyster has been recorded in the present study for the first time. The elephant chank, *Murex ramosus* is also considered as an enemy of oysters (Hornell 1922). Mahadevan and Nayar (1967, 1976), however, did not find any mortality of pearl oysters due to gastropod predation.

Although different species of gastropods, viz., *C. cingulatum*, *C. pileare*, *M. virgineus*, *M. ramosus*, *Bursa rubeta*, *Thais margaritica*, *Gyrineum natator* and *Xancus pyrum* were found distributed on the pearl oyster bed, *C. cingulatum* and *M. virgineus*, as was confirmed in the laboratory, alone caused mortality

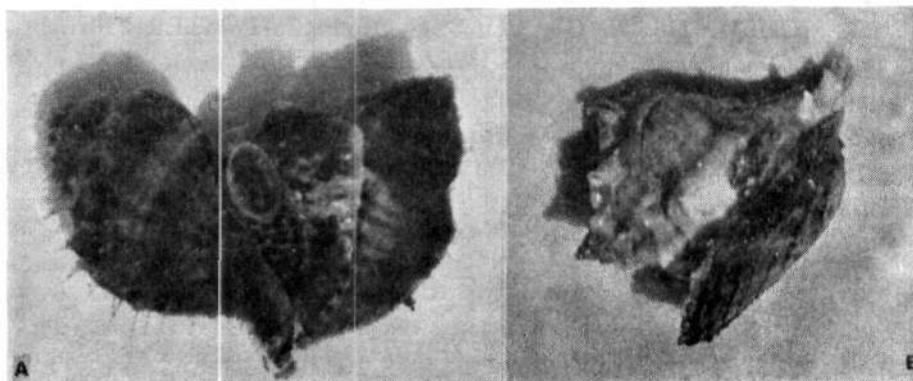


FIG. 1. Gastropods preying on pearl oyster *Pinctada fucata*: A, Two *Cymatium cingulatum* feeding on an oyster; B. *Murex virgineus* feeding on an oyster.

of pearl oysters in the present study. It was also observed in the laboratory that *M. virgineus* would more readily attack the thin-shelled pearl oysters than they would the thick-shelled chank. Predation on pearl oyster by *C. cingulatum* is similar to the observations made on edible oyster *Crassostrea madrasensis* by Thangavelu and Muthiah (1980).

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