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Short Communication

Pathological manifestations of sponge infestation in *Perna indica* Kuriakose & Nair 1976

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Abstract

Pathological manifestations of bioeroding sponges on the brown mussel, *Perna indica* were studied. The major manifestation was blister formation (46.3%). Nacre erosis was observed in 7.6% of the total infested population. Bifacial porosis was noted in 19.1% of infested shells; discolouration of shell was observed in 19.8 % and melanosis in 13.1 % of the infested population.

Keywords: Blister formation, brown mussel, melanosis, nacre erosis, sponge infestation

Introduction

Bioeroding sponges are considered to be a menace to the molluscan population, both in culture as well as in natural conditions in many parts of the world. In the initial stage of sponge infestation small pores are seen at the outer part of the umbo region of the mussel shell but in advanced stages of infestation the papillae made by the sponge touched the mantle epithelium of the mollusc giving perpetual irritation to the host producing a wide variety of pathological symptoms (Thomas, 1979 a).

According to Warburton (1958), the sponge grows across the border between two shells if they are in close contact. In places where the shells live in greater concentration, this infestation proves to be effective. The presence of minute pores at the surface is so characteristic of any boring sponge and this manifestation is often termed "porosis" (Thomas, 1979 b). When usually the upper side is beset with pores the condition is called monofacial porosis while when both surfaces are beset with pores it is termed bifacial porosis.

When openings made by the sponge inside the shell are repaired by nacreous material of the live mollusc, a black patch is often formed at the site of the original pore (Thomas, 1983). By constant repairs of this type, a blister is formed at this spot and such blisters often contain a pigmented summit (Thomas,1979 b) excavations by the sponge in living shells compromise structural support which reduces shell strength and affects adductor muscle attachment (Wesche *et. al*., 1997) eventually leading to pathological changes in the inner layers of the calcareous shell.

When openings made by the boring sponge are concentrated in the nacreous layer, it is often noted that the nacreous materials becomes less lustrous. In advanced stage of sponge infestation this area becomes very rough due to the poor nacreous coating. The total damage of the nacreous secreting cells of the mantle is the main reason for this condition called nacre erosis. Around 12 different types of diseases were recorded by Thomas (1983) in live molluscs due to damages caused by the infestation of sponges. For the present paper, a detailed study was conducted on the pathological manifestations in sponge infested brown mussel, *Perna indica* population of the southwest coast of India for a period of 2 years from 1998 to 2000.

Material and Methods

A total of 5,600 shells of *Perna indica* were collected from five selected centres, namely,

Vizhinjam, Enayam, Colachel, Kadiyapatnam and Kanyakumari along the southwest coast of India during 1998-2000. The various pathological manifestations studied in detail are nacre erosis, monofacial and bifacial porosis, melanosis and blister formation based on microscopic examination.

Results and Discussion

Out of 5,600 shells examined, 995 (17.8%) were found infested with boring sponge. Blister formation was the major manifestation in the sponge infested brown mussel population. (Fig. 1A). It was also associated with discolouration and melanosis. Nacre erosis recorded in 7.6 % of the infested population which indicates that it is not a severe problem in brown mussel. Infestation percentage of fragility showed that only negligible portion of the brown mussel population was severely infested with boring sponges.

All specimens infested with sponges exhibited monofacial porosis. The concentration of surface pores decreased from umbo region to the marginal zones of the shell. Bifacial porosis was noted in 19.1% of infested shells. All severely infested specimens were fragile (8.2%). Blisters were noted

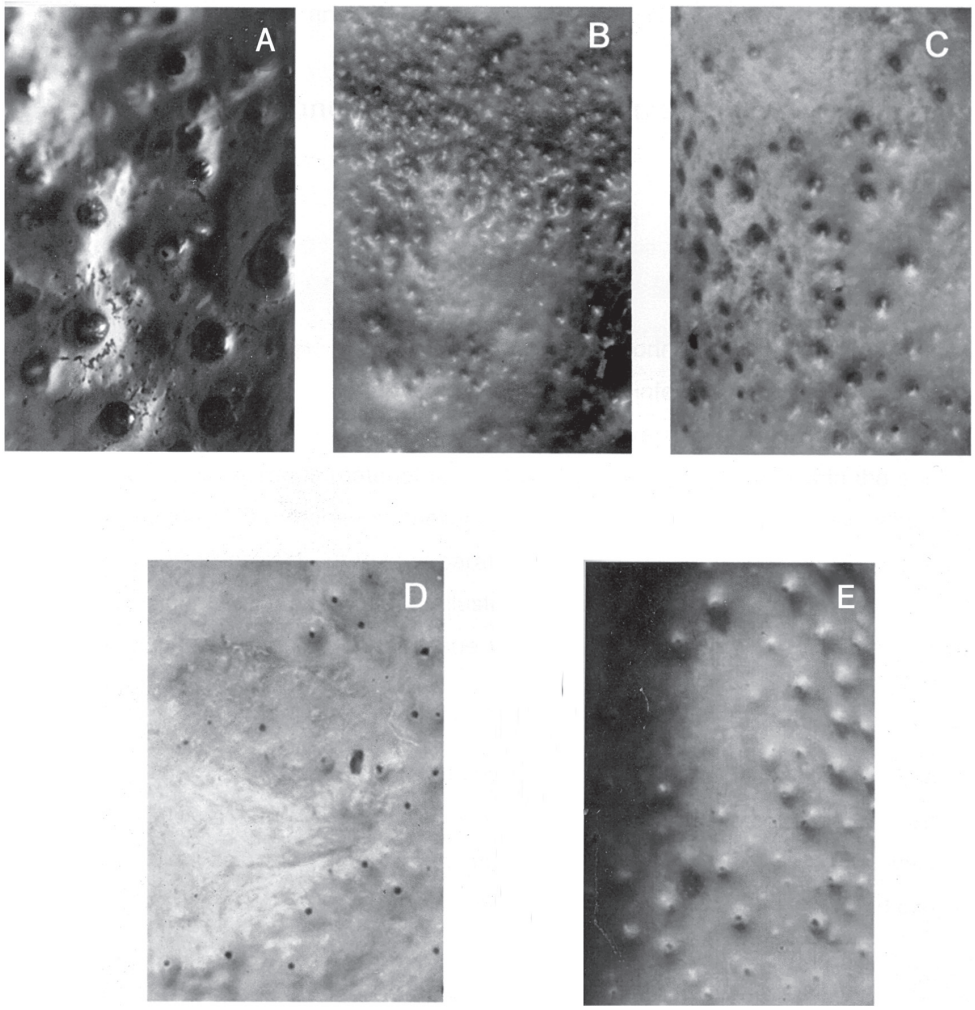

Fig. 1. Pathological manifestations of sponge infested *Perna indica* shells.
A. Blister formation; B. Discolouration; C. Melanosis; D&E. Bifacial porosis

in 46.3% of the infested shells. Discoloration, nacreous erosion and melanosis were noticed in the advanced stages of infestation. Discoloration was observed in 19.8% of the total infested population whereas melanosis in 13.1% of the infested shells (Fig. 1B-E).

Thomas (1979 b) examined 400 shells of the pearl oyster *Pinctada fucata*, out of which 34 were infested with the boring sponges *Cliona vastifica* and *Cliona celata*. *C. celata* affected the thickest part of the shells and caused discoloration and melanosis. In the advanced stage of infestation, blisters became highly crowded. In the present study also *C. vastifica* and *C. celata* caused severe pathological manifestations like porosis, discoloration, blister formation and nacre erosis. The borings were confined to the thickest parts of the shell as is the case of pearl oysters. More damage was caused by *Cliona margaritifera* and *Cliona lobata* and the ramifications made by these species reached up to the margin of the shell (Thomas, *et al*., 1993).

The mussel rarely made attempts to repair the openings of nacreous material. Blister formation was rarely noted in the shells examined. Cavities caused by sponges inside the shell made the shell fragile as well as weak and such shells become susceptible to further damage by secondary invaders like polychaetes, bacteria and fungi. It is often noticed that the mantle of such shells became flabby followed by the formation of dark pigmented areas called pustulosis occurring exactly opposite to the holes made by the sponge at the inner aspects of the shell. The mantle tissue base detached from the shell.

The extent of damage done to the live molluscan shell by a boring sponge cannot be assessed by superficial examination of the shell alone as the surface of the shell shows only minute openings which are distributed sparingly at the surface. Hence sectioning of shells is necessary to assess the magnitude of damage caused. During the present study blister formation was the major pathological manifestation recorded in the infested shells followed by discoloration as well as bifacial porosis.

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References

Thomas, P. A. 1979 a. Studies on sponges of the Mosambique channel-1. Sponges of Inhaca Island. *Ann. Mus. Roy. Afr. Cent. Belgium*, 227: 1-461, Pl. 1-2.

Thomas, P. A. 1979 b. Boring sponges destructive to economically important molluscan beds and coral reefs in Indian seas. *Indian J. Fish*., 26(1-2): 163-200.

Thomas, P. A. 1983. Some pathological aspects akin to sponge boring in molluscan shells. *Proc. Symp. Coastal Aquaculture Mar. Biol. Ass. India.*, 2: 671- 676.

Thomas, P. A., K. Ramadoss and S. G. Vincent. 1993. Invasion of *Cliona margaritifera* Dendy and *Cliona lobata* Hancock on the molluscan beds along the Indian coast. *J. Mar. Biol. Ass. India*, 35(1&2): 145-156.

Warburton, F. E. 1958. Control of the boring sponge on oyster beds. Progress report of the Atlantic coast stations. *Fish. Res. Board Can*., 69: 7-11.

Wesche, S. J., R. D. Adlard and J. N. A. Hooper. 1997. The first incidence of clionid sponges (Porifera) from the Sydney rock oyster *Saccostrea commercialis* (Iredale and Roughly, 1933). *Aquaculture*, 157: 173-180.

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