ISSN 0254-380 X

भाकृअनुप
ICAR

समुद्री मात्स्यिकी सूचना सेवा
MARINE FISHERIES INFORMATION SERVICE

No. 106

OCTOBER, NOVEMBER, DECEMBER 1990

तकनीकी एवं विस्तार अंकावली
TECHNICAL AND EXTENSION SERIES

केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान कोचिन, भारत
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE COCHIN, INDIA

भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

A CASE STUDY OF INFESTATION OF *ACANTHASTER PLANCI* IN ANDAMAN WATERS

D.B. JAMES, C.S. GOPINATHA PILLAI AND G. GOPAKUMAR
Central Marine Fisheries Research Institute, Cochin - 682 031

Introduction

Acanthaster planci, a star fish popularly called the "Crown of Thorns" has become a subject for more than one thousand articles since its first description in 1743. The starfish feeds on coral polyps and often plague of them are observed on many parts of the Indo - Pacific reefs causing mortality to vast areas of reef corals and their subsequent degradation. The starfish has a more or less circular body with 9 to 21 radiating arms bearing sharp and lengthy spines capable of displaying rotary movement. Larger specimens may reach to a greater diameter of 40 cm. The species exhibits a wide range of colour patterns in nature, the common being violet with purplish or blue streaks on the middle of the arms or rusty brown or may be blue. Spines are greenish blue with reddish tips. *A. planci* is widely distributed in the Indo - Pacific from the east coast of East Africa, Red Sea, and then eastward as far as Hawaii. From the central Indian Ocean it is known from the Maldives, the Lakshadweep, the Sri Lanka and the east coast of India.

Record of *A. planci* from Andaman and Nicobar Waters

The species is previously recorded from several localities from Andaman and Nicobar area such as Neil, Havelock, Sir Hugh Ross, Narcodem, Hut Bay, Chidiatop and Nancowry. However, aggregations of the star fish endangering reef corals were never noticed till late eighties. Changsong (1987, *Bull. Mar. Sci.* 41) reported on infestation in Andaman Sea and some divers including Mr.Tomy a tropical marine fish expert, observed 'hundreds' of "Crown of Thorns" along New Wandoor coast in southern Andamans. Subsequently, officials of the Andaman and Nicobar Forest Department and Fisheries have noticed fairly good number of them in the Marine National Park area at Wandoor in southern Andamans. Because of the presence of the starfishes, especially in the Marine National Park area, it was imperative to make a critical assessment of the situation of infestation and a team of scientists from CMFRI was given a mandate to investigate the problem in April - May, 1989.

The survey

The present survey was chiefly carried out with in the National Marine Park at Wandoor which has an extent of 281.5 sq km enclosing 14 small and large uninhabited islands. Intensive study was carried out around the following islands: Grub, Chester, Tarmugili, Red Skin, Malay, Alexandra and Twin Islands. Among these Jollybous is a tourist spot and others are rarely visited by people. In addition to these islands, localities in and around Port Blair such as North Bay, Sisostris Bay, Ross Island, Viper Island, Burmanallah and Chidiatop were also subjected to reconnaissance survey to spot *Acanthaster* if any on reefs.

A glass bottom dinghy with O.B.M. was used to locate the occurrence of the star fishes on coral thickets and on sighting, skindivers went down to count the individuals. The area was approximately estimated with a marked rope wherever significant concentration was observed. In other cases a twenty minutes count by slow swimming by divers was made. The survey was made mostly in shallow areas upto a depth of 4 m. In the last week of April, 1989 the French ship " Calyposo" was anchored in the Marine National Park and the scientists of Calyposo and officials of the Indian Navy made some deep diving to look for *Acanthaster* along Wandoor coast and around Grub Island. Samples were collected with the help of iron spears having backwardly directed hooks.

Observations

Acanthaster planci was observed at Grub Island, Chester Island, Alexandra Island, Red Skin Island and Twin Islands*. Eventhough there has been an earlier report of the occurrence of the star fish in fair numbers at New Wandoor, it could not be located during the present survey.

The reefs of Andaman surveyed are dominated by either *Acropora* spp. or massive *Porites* in different parts. Wherever *Acropora* is dominant *Porites* is scarce and vice versa. The common species of *Acropora* observed were *A. humilis, A. pacifica, A. fflorida, A. assim-*

* See map in MFIS No. 105, Article No. 2 by G. Gopakumar *et al.*

A. palifera, A. nobilis and *A. formosa* along with *Seriatopora* spp. and *Pocillopora* spp. Starfish was more common on *Acropora* thickets than *Porites* community. The maximum concentration of *Acanthaster* was observed in Grub Island, nearly 50 m away from shore, in shallow waters. Survey by 'Calypso' scientists at a depth of 7 m showed that there occurred few starfishes in deeper zones. In an approximate area of 500 sq m we could count 62 specimens, averaging 124 for 1000 sq m But it was a localised breeding aggregation and skin divers counted 20 to 30 specimens in 20 minutes of slow swimming.

In other places the number varied from 20 to 40 in 1000 sq m wherever there was fairly good concentration. In many localities, stary and isolated specimens were observed. The survey was conducted during day time and no efforts were made to examine the underside and crevices of *Acropora* thickets. Fairly rich concentration of *Acanthaster* was also noticed at Twin Islands. The coral growth at this place was between 5 to 7 m deep and at the western side of the larger island 85 specimens were accounted in a thirty minute search covering approximately 2500 sq m.

All the specimens collected were adults. Small and young ones were not seen for the reasons mentioned above during April - May, 1989 when the survey was carried out. The number of arms varied from 14 to 19 and R. varied from 125 to 155 mm. Majority of the specimens were violet in colour with light purplish blue streaks on the middle of the arm. A few were rusty brown. In some reef environs there was large - scale damage to corals as in Red Skin, New Wandoor and Chester Islands. In New Wandoor, opposite to the helipad, vast areas of corals were found to be dead and buried by silt. On many occasions, grazing marks on corals were observed but we could not locate great

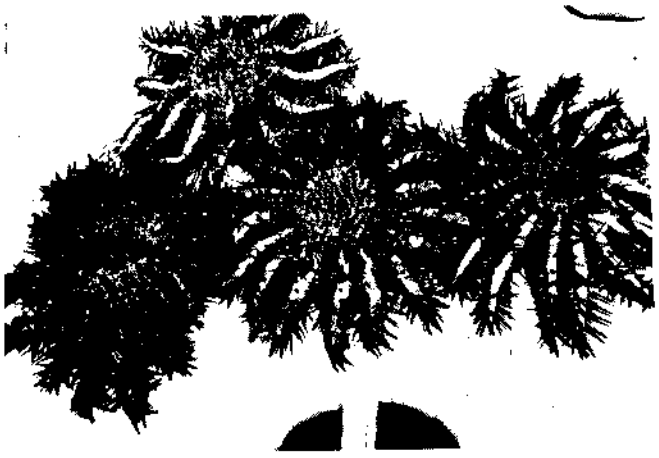

Fig. 1. *Acanthaster planei*, the Crown of Thorns.

Fig. 2. White patches on *Acropora* sp. due to predation by *Acanthaster planci*.

patches of white corals indicating predation even at places like Grub Island where good concentration of *Acanthaster* was noticed. According to Serano (Cousteau Foundation, Paris, 1989) *Acanthaster* was present in almost all reefs he surveyed in Andamans but the star fish population was normal. The mass mortality of corals observed at sites in the National Marine Park cannot be attributed to predation by *Acanthaster*. At New Wandoor siltation seems to be the prime factor that kills corals in the nearshore area. In deeper waters also mass mortality to corals was observed which might be due to many natural causes. Predation by *Acanthaster* might have played some role in the death of corals but this is not of an alarming state at present.

Outbreaks of *Acanthaster planci* and control measures

Instances of outbreaks of *Acanthaster planci* and consequent destruction to reefs have been reported from several places in the Indo - Pacific during the last 30 years. Several theories have been proposed as possible cause for the sudden plague of this starfish such as

Fig. 3. *Acanthaster planci* being removed from the reef with the help of an iron spear by a skin diver.

overfishing, environmental pollution, removal of predators of *Acanthaster* from reef environs, terrestrial run off due to human interference such as deforestation intensive agricultural operation etc. But none of these seem to be a perfectly satisfactory explanation. As far as south Andaman is concerned especially near the Wandoor coast soil erosion and terrestrial run off seem to be of high order due to removal of sand from the nearshore area causing mortality to corals. However, in far off islands like Twins where fairly rich concentration of *Acanthaster* was noticed; terrestrial run off cannot be identified as a possible reason for the starfish outbreak. It is true that the exploitation of molluscs from the Andaman reefs have assumed alarming proportion in the recent past. However, the predator prey relationship is not assessed. Suggested control measures in literature include manual removal, toxic fencing, electrical barriers, chemical control such as application of formalin on the reefs and biological control using gastropods like *Charonia* that feeds on the star fish. However, control of *Acanthaster* becomes virtually impossible when population reaches millions and in such cases natural death due to starvation when coral poplyps become unavailable is the ultimate fate resulting in vast destruction to reefs.

The present situation in Andamans seems to be not of any alarming proportion. The survey revealed only certain localised areas with any significant number of starfishes. However, complasence may lead to catastrohic effects, since a single adult individual can produce as many as 20 million eggs in a spawning season. If conditions are favourable, hundreds of thousands of them can settle on the reefs. Breeding aggregations were noticed at Grub Island during the present survey. The existing population from the shallow waters could easily be removed mannually by using spears. However, it is imperative that constant watch should be kept on the reefs in and around Andaman and Nicobar Islands for possible outbreaks It is also necessary that local people should be educated on the problem and should be encouraged to report on sighting of *Acanthaster* to the administration so that control measures could be effected.