

1. INTRODUCTION

Within the last 25 years, large aggregations of Acanthaster planci have been reported on 135 reefs of the Great Barrier Reef from Hilder Reef, north-east of Cooktown to Lady Musgrave Island, east of Gladstone (Great Barrier Reef Marine Park Authority, 1984). Several hundred thousand crown-of-thorns starfish may invade a reef at any one time, resulting in the almost total destruction of living hard corals (Endean, 1982; Moran, 1984). Since the starfish were first observed in abnormally high numbers on Green Island in 1962 (Barnes and Endean, 1964), the threat of A. planci to the reef system has been a constant concern.

The reason(s) for these apparently recent infestations of the crown-of-thorns is not understood. Numerous hypotheses have been put forward to account for these outbreaks. Some authors (for example Dana, 1970; Newman, 1970; Frankel, 1975, 1977, 1978; Vine, 1973; Newman and Dana, 1974; Pearson, 1975; Moore, 1978) believe that fluctuations in A. planci populations are a natural phenomenon which have occurred in the past just as they are occurring at present and are regulated by environmental pressures. Frankel (1977, 1978) estimated, from skeletal debris in sediment, that aggregations occur every 250 to 300 years.

In contrast, another group of authors (for example Fischer, 1969; Chesher, 1970; Brown and Willey, 1972; Randall, 1972; Chesher, 1970; Endean, 1973, 1977, 1982) consider the population explosions to be induced, either directly or indirectly, by the activities of man, for example removal of predators, physical modification of the environment, influx of pollutants and/or nutrients into the water.

An understanding of the causal factors which influence the size and periodicity of starfish outbreaks is fundamental in determining the measures undertaken by governments and government agencies in management of these population explosions. The identification of A. planci skeletal debris in zones within reefal sediment and/or drill cores may reveal aggregations or infestations prior to the arrival of white man in central Queensland and thus help to determine whether these outbreaks are natural or man-induced.

This atlas provides a photographic reference of some of the more common and most likely to be preserved skeletal components of A. planci, as well as higher magnification microstructure studies, so that both whole and fragmentary elements may be identified in sediment cores. The skeletal components of A. planci are briefly compared to those of other sea stars common on the Great Barrier Reef.