

### 3. THE REPRODUCTION OF SOME ECHINODERMS FROM MACQUARIE ISLAND

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#### SUMMARY

Three species of starfish, *Anasterias directa* (Koehler), *Anasterias mawsoni* (Koehler), and *Cycethra macquariensis* Koehler, and one species of holothuroid, *Pseudopsolus macquariensis* (Dendy) were collected over a period of one year from rocky sub-littoral shores at Macquarie Island. Study of preserved collections showed that both *Anasterias* species and the holothuroid have a brooding mode of reproduction and distinct reproductive cycles. For *Cycethra macquariensis* no cyclic reproductive pattern was evident. Ovarian condition in *Cycethra macquariensis* suggested a non-pelagic development; however the mode of this development was not observed. In addition, examination of some specimens of *Pseudocnus laevigatus* (Verrill), *Trachythyone macphersonae* Pawson (holothuroids) and *Pseudechinus novaezealandiae* (Mortensen) (echinoid) showed a brooding habit in *Pseudocnus* and ovarian conditions that suggested non-pelagic larval development for *Trachythyone* and pelagic larval development for *Pseudechinus*.

#### INTRODUCTION

Apart from prerequisite taxonomic studies, collections of marine invertebrates in the sub-Antarctic regions have been examined mainly for zoogeographical interpretation and reports on general ecology. Collections have usually been made in summer months and records of reproduction have been restricted to descriptions of non-pelagic development, especially via brooding or ovoviviparity. Simpson (1977) lists sources for the above studies.

At Macquarie Island, systematic collections were made each month for one year of some echinoderms from littoral and sub-littoral zones on rocky shores, in order to determine reproductive cycles and to categorise the mode of larval development as either pelagic or non-pelagic.

Apart from some nearby rocky outcrops, Macquarie Island (54° 38' S; 158° 53' E; Fig. 1) is isolated in the Southern Ocean. For studies of marine invertebrates, Macquarie Island is important in that (a) it marks the limit of southerly ice-free littoral zones and (b) its oceanic isolation bridges a geographic gap in any comparisons of littoral invertebrates over all southern latitudes in the Australian region.

#### MATERIALS AND METHODS

Specimens of the asteroids *Anasterias mawsoni* (Koehler) and *Anasterias directa* (Koehler), and the holothuroid *Pseudopsolus macquariensis* (Dendy) were collected at approximately monthly intervals between March, 1968 and March, 1969.

Another asteroid, *Cycethra macquariensis* Koehler, was collected monthly over the same period but collections were not obtained in the months of May, June and November. Within the size category designated for each species (see later), the first five specimens of each sex were examined from each monthly collection.

Four specimens of the holothuroid *Pseudocnus laevigatus* (Verrill), ten specimens of