

4. SEXUAL AND ASEXUAL REPRODUCTION OF *HOLOTHURIA ATRA* JAEGER AT HERON ISLAND REEF, GREAT BARRIER REEF

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SUMMARY

H. atra is the most common epifaunal holothurian on the reef flat at Heron Island. The gonad maturation cycle of *H. atra* was followed using gonad index estimations and histological examination. Gonad samples were taken at intervals of 6 to 8 weeks for 18 months. Mature gonads occurred in most samples, and gonad maturity peaked twice; in early winter and in summer. Sex ratio of female to male animals was not significantly different from a 1:2 ratio. Sex ratio ranged from 1:8.5 in animals weighing less than 100 g, to 1:0.7 in those over 1,000 g. *H. atra* commonly reproduces asexually by transverse binary fission. In 21 samples, each of approximately 50 animals, 6% to 70% of individuals were detectable products of asexual reproduction. Occurrence of frequent asexual reproduction compounds difficulties in estimation of growth parameters from data such as size-frequency distributions and growth increments.

INTRODUCTION

Holothurians are amongst the most common coral reef macro-invertebrates, but little information is available on their reproductive biology (Bakus, 1973). An understanding of reef systems requires data on the population dynamics and patterns of recruitment of these, and many other reef species.

Temperate holothurians, in common with other temperate marine invertebrates, generally spawn for a limited period during spring or summer (Booolootian, 1966). Tropical species, however, exhibit a variety of spawning patterns. Holothurians are also known to reproduce asexually, by transverse binary fission (Hyman, 1955; Bonham and Held, 1963).

Holothuria atra Jaeger is widely distributed in the Indo-West Pacific region, and is the most common epifaunal holothurian on the reef flat at Heron Island. In this habitat, it is generally found on sandy substrata.

Pearse (1968) studied sexual reproduction of *H. atra* at several low latitude sites in the tropical Indo-Pacific. Because individuals with mature gonads were found throughout the year, he concluded that spawning was asynchronous. He predicted that populations distant from the equator would have more restricted spawning periods.

Bonham and Held (1963) reported asexual reproduction by fission in *H. atra* at Rongelap Atoll, Marshall Islands, and suggested that fission occurred commonly. Ebert (1978) interpreted the apparently high rate of asexual reproduction in *H. atra* at Enewetak Atoll, as an adaptation enabling the species to span periods of unsuccessful recruitment from the sexual phase.

The relative frequency of recruitment from sexual and asexual modes of reproduction is a potentially important life history parameter. This paper reports on sexual and asexual reproduction in *H. atra* at different sites on Heron Island reef, in the Capricorn Group, at the southern extremity of the Great Barrier Reef (Lat. 23° 27' S).

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