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THE SPAWN AND EARLY LIFE HISTORY OF *CACOZELIANA GRANARIA* (KIENER 1842) (GASTROPODA: CERITHIIDAE)

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Abstract

The spawn of *C. granaria* is described, recording for the first time that of an Australian cerithid. It resembles the egg masses of the N. hemisphere species so far recorded in consisting of a gelatinous thread containing encapsulated eggs which hatch as planktotrophic veligers. It follows the pattern of *Bittium reticulatum* in being deposited as a flat coil but differs from it in being coiled in a clockwise direction.

Introduction

Although many members of the Cerithiidae inhabit Australian waters there are no known records of their reproduction or early life histories (Anderson 1960). Some N. hemisphere species have been examined, namely the Hawaiian *Clava obeliscus* (Ostergaard 1950), the Bermudian *Cerithium ferruginum* (Lebour 1945), the Jamaican *Cerithium algicola* (Davis 1967), the Mediterranean *C. vulgatum* (Lo Bianco 1888) and the British *Bittium reticulatum* (Lebour 1936) all of which lay their eggs in gelatinous tubes, or strings, attached to a substratum, either as a tangled mass or a flat coil. The eggs of all five species hatch as planktotrophic veligers.

The present study was undertaken as part of a project designed to discover whether this mode of reproduction pertains to Australian species and is perhaps indicative of a typical pattern for the family.

Genus **Cacozeliana** Strand

Cacozeliana granaria (Kiener)

Cerithium granarium Kiener, 1842. *Coq. Viv.*, p. 72, Pl. 19, fig. 5.

The 'Granulated Creeper', *Cacozeliana granaria*, is a small but common cerithid occurring along the coasts of New South Wales, Victoria, Tasmania, S. Australia and S. Western Australia. The shell is elongated with many whorls, a short, wide anterior canal and a brown, horny, paucispiral operculum. The whorls are ornamented with spiral, tuberculate ribs, and the colour varies through brown, red-brown, and cream with or without maculations. It may reach up to 20 mm in length.

The body of the animal is basically translucent scattered with opaque white flecks; dark markings occur on the 'snout', tentacles and upper part of the foot, and there is a black eyespot at the base of each tentacle.

The species lives mostly in shallow water on sand banks where there is a growth of algae, or in rock pools on reefs in the intertidal zone. As far as is known they are general detritus feeders.

Material and Methods

Three specimens, averaging 12 mm in length, were collected from rock pools

on the ocean reef at Flinders, Victoria, in November 1964, and transferred to a four-gallon glass home aquarium equipped with a filter and containing sand, stones, sea-bed debris, 'lettuce weed', (*Ulva lactuca*), and some other molluscs whose spawning habits were known.

Five days later (1/12/64) one of the specimens crawled up the front wall of the aquarium and began to spawn. The animal worked continuously for six hours extruding a gelatinous, egg-packed thread which it attached to the glass in a flat

Fig. 1—*C. granaria*. Apex of juvenile specimen showing the smooth, rounded whorls of the larval shell.

coil. Progressing in a clockwise direction it placed the thread closely beside that already laid down, constantly changing the position of its foot and body generally in order to maintain the spiral pattern. Throughout the whole procedure the animal's radula could be seen rasping the glass as it pushed forward presumably preparing the surface (substratum) for the attachment of the thread.

The Spawn

The egg-mass (Pl. 17) when completed, was roughly circular in shape and measured 20 mm at its widest diameter. The gelatinous thread composing it was wound in a tight, flat spiral attached to the substratum and was packed with irregu-

larly spaced encapsulated eggs. It was transparent, with an average diameter of 0·5 mm, and was coiled in a clockwise direction thus providing an interesting contrast to the anti-clockwise spiral described by Lebour for *Bittium reticulatum*.

An examination of the contents of the aquarium (stones, old shells etc.) revealed a similarly coiled gelatinous egg-mass on the inner surface of an empty mussel valve, and a specimen collected in April 1966 spawned in the same manner in a glass dish. In each case the egg mass was similar in detail to that described above. The eggs were white, spherical and averaged 0·085 mm across, each being contained within a spherical, transparent covering, or envelope, 0·100-0·125 mm in diameter.

Development

Within a few hours, at a water temperature of 15·5°C (60°F), the eggs began to cleave, those in the centre of the coil reaching the 4-cell stage before those towards the outside had commenced to divide. A solid gastrula was formed in 48 hours and within another 48 hours an early veliger was rotating within the egg envelope. After 8 or 9 days the veliger emerged from the envelope and dissolving gelatinous thread, and entered the water. Except for two black eye spots the veliger is colourless with small rounded velum lobes. Its shell is horn-coloured and averages 0·125 mm across. Some of the veligers were maintained in a small jar of sea-water and many continued to swim for up to 10 weeks, during which no apparent changes in growth were detected.

An examination of the apex of adult shells indicates that the embryonic shell grows during its planktonic life to 2½ whorls before settling and changing to the adult type of shell sculpture. Figure 1 shows the early whorls to be transparent and smooth (presumably the larval shell) followed by the sculptured whorls of the post-larval shell, with a definite line of demarcation between the two. From this it may be assumed that the free-swimming veliger of *C. granaria* spends a considerable time as a constituent of the plankton, and that this may be a contributory factor to the widespread distribution of the species.

Three juvenile specimens showing larval whorls have been placed in the National Museum collection (F26387); also sample of veliger shell (F26388).

References

ANDERSON, D. T., 1960. The life histories of marine prosobranch gastropods. *J. malac. Soc. Aust.* 4: 16-29.

DAVIS, CHARLES C., 1967. Emergence of veliger larvae from eggs in gelatinous masses laid by some Jamaican gastropods. *Malacologia* 5: 299-309.

LEBOUR, M. V., 1936. Notes on the eggs and larvae of some Plymouth prosobranchs. *J. Mar. biol. Ass.* U.K. 20: 547-565.

————, 1945. The eggs and larvae of some prosobranchs from Bermuda. *Proc. Zool. Soc. Lond.* 114: 462-489.

LO BIANCO, S., 1888. Notizie biologiche riguardente specialmente il periodo di maturita sessuale degli animale de Golfo di Napoli. *Mitt. zool. Sta. Neapel.* 8: 385-440.

OSTERGAARD, J. M., 1950. Spawning and development of some Hawaiian marine gastropods. *Pacific Sci.* 4: 75-115.

PLATE 17

C. granaria depositing an egg-ribbon on the glass wall of an aquarium. The displacement of the thread was caused by a nassarid which crawled on to the egg mass and disturbed the spawning cerithid, x 5.