SIBLING CANNIBALISM IN JUVENILES OF THE MARINE GASTROPOD 
NASSARIUS FESTIVUS (POWYS, 1835)

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INTRODUCTION

Shell-boring predation is well-studied in the prosobranch gastropods, including representatives of the Naticidae (Carriker, 1981; Kabat, 1990), Muricidae (Carriker, 1981), Buccinidae (Peterson & Black, 1995), Marginellidae (Ponder & Taylor, 1992; Taylor, 1998), and Cassidae (Hughes & Hughes, 1981). In contrast, representatives of the Nassariidae had not been found to bore into shells until Morton & Chan (1997) presented the first evidence of shell-boring predation by Nassarius festivus juveniles. Representatives of the Nassariidae are considered to be “the closest attempt of an obligate scavenging life style,” although members, including Bullia digitalis and Ilyanassa obsoleta, eat live prey (Britton & Morton, 1994). The findings of Morton & Chan (1997) were intriguing because the N. festivus adults are not shell borers, but scavengers, which descend readily and speedily on fresh carrion (Morton & Yuen, 2000), whereas the juveniles bore holes and cannibalize their siblings.

Offspring cannibalism of viable siblings in the study of trophic eggs has attracted much attention in such diverse taxa as sharks, non-social insects, frogs, spiders, and prosobranch gastropods (reviewed by Perry & Roitberg, 2006). For example, the sea whelk Hemifusus tuba feeds on trophic eggs, resulting in only a mean of 8.8 emerged as juveniles from a mean of 1,500 eggs laid in each capsule (Morton, 1987). Relatively little information is available on the gastropod juveniles that cannibalize similar-sized siblings. The aim of the present study is to provide empirical evidence of sibling cannibalism in N. festivus juveniles.

The findings of Morton & Chan (1997) were obtained in a wholly accidental manner; some newly metamorphosed N. festivus left over an extended public holiday were dead and had their shells bored. The present study also answers the question of whether cannibalism was invoked by hunger.

MATERIALS AND METHODS

Collection and Maintenance of Experimental Animals

approximately 100 adult Nassarius festivus (mean shell length ± SD: 7 ± 2 mm) were collected from a sandy shore at Lok Wo Sha, Tolo Harbour, Hong Kong (22°20’N, 114°10’E). Upon return to the laboratory, the adult gastropods were kept in a 13 l-fiberglass tank with well-aerated natural seawater of 33‰ salinity. Adults, egg capsules and larvae were maintained at 28°C, the measured temperature at the collection site. The clam Tapes philippinarum was opened and offered as food to the adult gastropods every other day. This food ration was shown to be able to maximize egg production (Cheung & Lam, 1999).

Egg capsules deposited on the aquarium wall were transferred to and maintained in a 1 l-glass beaker with 500 ml seawater. Membrane-filtered (pore size: 0.22 µm) natural seawater (salinity 33‰) was used to maintain egg capsules and larvae and in the experimental procedures. Subsequently, hatched larvae were transferred to a 1 l-glass beaker and reared in seawater on a diet of the alga Thalassiosira pseudonana at 2 x 10⁴ cells ml⁻¹ (Pechenik & Fisher, 1979). The antibiotics streptomycin and penicillin G were added at a concentration of 50 µg ml⁻¹ each to control bacterial growth (Rittschof, 1984). The seawater was changed daily. Larvae that had completed metamorphosis and developed into crawling juveniles (characterized by a pair of tentacles and the resorption of vela) were removed from the glass beaker.

Experiment 1: Starvation

Sixty individuals that had metamorphosed on the same day were used in Experiment 1. Each newly metamorphosed individual was reared in a polystyrene Petri dish with 30 ml seawater