PREDATION ON APPLE SNAIL EGGS (*POMACEA*)

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ABSTRACT

Observations confirm Snyder and Snyder's (1971) conclusion that the conspicuous eggs of Pomacea paludosa *are distastful to vertebrates. However certain invertebrates eat* Pomacea *eggs. This complicates the strategies faced by the snail in producing conspicuous eggs that may be aposematic to vertebrate but not to invertebrate predators.*

Many ampullarid snails of the genus *Pomacea* have colored or otherwise noncryptic eggs. The apple snail, *P. paludosa* (Say) lays clusters of conspicuous white eggs on emergent vegetation. Snyder and Snyder (1971) found that the eggs are distasteful in their early stages of development. Although simple palatability tests on a wide variety of animals were inconsistant, Snyder and Snyder found that the eggs were generally distasteful and that some animals may learn to avoid them. They suggested that egg conspicuousness functions as warning coloration. Orians and Janzen (1974) showed that egg palatability is usual among animals. They cited the *Pomacea* findings as one of their few examples of toxicity among animals eggs. The occurrence of natural predation on *Pomacea* eggs bears upon the functional and strategic implications of producing conspicuous, distasteful eggs. This present note discusses instances of natural predation on *Pomacea* eggs.

RESULTS AND DISCUSSION

The apple snail is abundant in the freshwater wetlands of southern Florida (Kushlan 1975) and therby provides many opportunities for observation. Many of my field observations of apple snail eggs parallel those of Snyder and Snyder (1971). Eggs are conspicuous but are apparently ignored by many suitable predators. Snyder and Snyder (1971) found that some captive vertebrates ate proffered eggs, at least at a single offering, including the White Ibis (*Eudocimus albus*). Apple snails comprise over 5% of the ibis' diet in southern Florida, but no snail eggs were found in 199 food samples from wild birds (Kushlan and Kushlan 1975). The attraction of this species to eggs in Snyder and Snyder's study was probably an artifact of confinement, where ibises often eat unusual food items (Kushlan and Kushlan 1975). Other captive vertebrates tested by the Snyders were probably similarly affected. In my experience, wild sunfish, expecially bluegill (*Lepomis macrochirus*), will eat offered eggs initially, but their reaction often wanes with time.

I believe the situation in invertebrate predators may be different than with vertebrate predators. I have seen a coneheaded grasshopper (*Neoconocephalus triops*) eating snail eggs. Coneheaded grasshoppers belong to the family Tettigoniidae in which both predatory behavior and cannabilism occur. I have not seen the grasshopper break open eggs although they have strong jaws and may be capable of doing so. It is possible that the eggs must sustain mechanical damage prior to predation. Regardless, the grasshopper did consume the egg contents that were in the early, and therfore noxious stage of development.

Thus it would appear that *Pomacea* eggs are distasteful to vertebrates and that avoidance-learning occurs which enables conspicuousness to serve an aposematic function. This may not be true for invertebrates. Several types of invertebrates may prey on *Pomacea* eggs. Snyder and Snyder (1971) reported natural predation by a milliped and found that gyrinid beetles (*Dineustes* sp.) and crayfish (*Procambarus* sp.) would eat eggs, although crayfish subsequently rejected them. If a

vertebrate-invertebrate dichotomy in the effectiveness of apostasis exists, it would complicate selection pressures for avoiding egg predation. Laying eggs out of water would successfully thwart both vertebrate and invertebrate aquatic predators. Apostasis would reduce losses to terrestrial vertebrates. Protection from terrestrial invertebrates may result from there being relatively few terrestrial predatory invertebrates large enough to eat *Pomacea* eggs in the marsh habitat in which the snails live. Further information on the extent of natural predation on *Pomacea* eggs may shed light on the mechanisms used to reduce such losses.

LITERATURE CITED

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