

Diurnal Burial Rhythm and Distribution of Early Juvenile Queen Conch

Progress Report

VERONIQUE J. SANDT and ALLAN W. STONER
*Caribbean Marine Research Center
100 E 17th Street
Riviera Beach, FL 33404 U.S.A.*

INTRODUCTION

Hatcheries, such as those in the Turks and Caicos Island, have become very proficient in producing large numbers of early juvenile conch for seeding into the wild. A remaining obstacle, however, is to determine the characteristics of habitats that are appropriate for early stage (< 40 mm) juveniles. The smaller classes are poorly understood, in part, because they have rarely been seen in the field. Some authors such as Brownell (1977) or Iversen *et al.* (1986) have suggested that the early juveniles are buried during the day.

In January 1989, we discovered a population of early juvenile conch on a beach north of Lee Stocking Island, Exuma Cays, Bahamas. Here we describe the habitat association of the population and experiments with their burial rhythm.

HABITAT AND DISTRIBUTION

Large numbers of 30 – 50 mm queen conch were discovered in shallow subtidal sand on the leeward side of Neighbor Cay. A quantitative survey was made in 12 transects running from the intertidal zone to 2.0 m depth. Both along shore and cross shore variation were found with most conch found in sediments with mean grain size between 0.8 and 1.0 mm. Organic content was low and cohesiveness was low in the area of highest conch density - the steeply sloped face of the berm (20 to 60 cm depth at low water). Ninety percent of the animals were found in areas devoid of seagrass in the shallow subtidal. None were intertidal. Densities were as high as 2.2 per m².

BURIAL RHYTHMS

Over 100 conch were tagged such that the animals could be found whether or not buried. Observations made over the course of 6 weeks at all times of day and night revealed that the small conch have a strong diurnal rhythm of burial (Figure 1), actively feeding on the surface at night. No more than 30% were on the surface in the daytime, and 100% were on the surface at night. There was no tidal pattern in emergence.

The endogeny of burial rhythm was tested in the laboratory using hatchery-reared animals. After establishing natural rhythms of burial with a

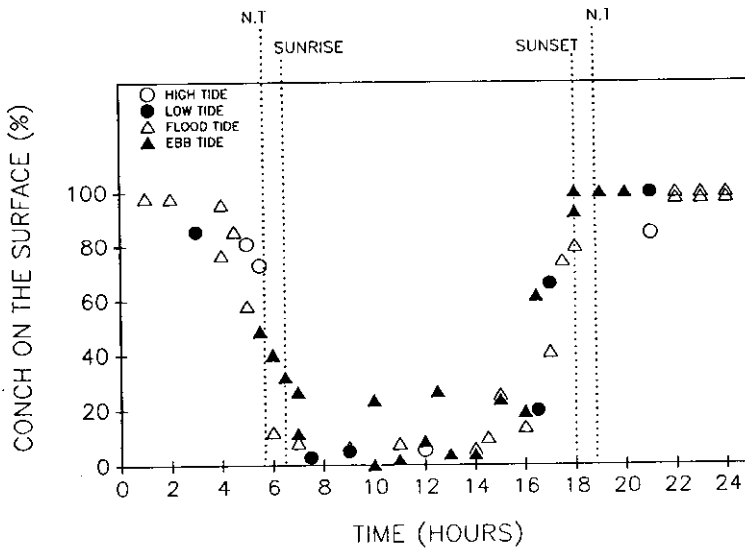


Figure 1. Percentage of early juvenile conch on the sediment surface, shown as a function of time of day.

12:12 light:dark photoperiod, the animals were subjected to three different treatments: a natural light cycle (12:12), constant darkness, and constant light. As expected, the animals exposed to natural cycles of light continued to emerge from the sediment in darkness hours. Conch held in constant darkness showed inconsistent patterns of emergence, but animals held in constant light continued to show natural rhythms of activity on the surface of the sediment synchronous to the 12:12 hour natural cycle in the control aquaria. It was concluded that the rhythms of burial and emergence are under endogenous control with light as the stimulus of entrainment.

CONCLUSIONS

Early juvenile stages of the queen conch have not been found in significant numbers in the past. This may relate to the fact that most conch smaller than 50 mm are buried during the daytime hours and are not necessarily found in habitats similar to those of larger size (seagrass meadows). The rhythmicity of burial is endogenous. Ontogenetic shifts in habitat by juvenile conch may be a function of size specific differences in mortality, habitat requirements, and food preferences. Information on these subjects will be critical for successful

Non-Peer Reviewed Section

outplanting of small hatchery-reared juveniles. Habitat associations and preferences for 0+ year class conch are now an important line of research at the Caribbean Marine Research Center.

LITERATURE CITED

- Brownell, W.N. 1977. Reproduction, laboratory culture, and growth of *Strombus gigas*, *S. costatus*, and *S. pugilus* in Los Roques, Venezuela. *Bull. Mar. Sci.* 27:668-680.
- Iversen, E.S., D.E. Jory, and S.P. Bannerot. 1986. Predation on queen conch, *Strombus gigas*, in the Bahamas. *Bull. Mar. Sci.* 39:61-75.