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Effects of Light on Feeding and Egestion Time of Striped Bass Fry

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ABSTRACT: Fry of striped bass (*Morone saxatilis*) 9 to 19 days old remained active and continued to feed at night. We observed no significant difference in egestion time between fish held in light and those held in darkness. At 20°C the gastrointestinal tracts of all 15- and 19-day-old fish were emptied of marked brine shrimp in 11-12 h. None of the 9-day-old fish held at 25°C contained marked brine shrimp after 9 h.

Traditionally, fingerlings of warm and temperate water game fishes have been produced in ponds where they subsist on natural foods; however, there is rapidly developing interest in producing these species in tanks and raceways. One of the principal problems encountered in this type of culture has been feeding of the larval fish. A significant question is whether the larvae of certain species require night feeding. Laurence (1971) concluded that in darkness the metabolic rate of young largemouth bass (*Micropterus salmoides*) is reduced, energy is conserved, and feeding at night is therefore not required. The present study was designed to determine whether feeding and egestion occur in larval striped bass (*Morone saxatilis*) when the larvae are held in total darkness.

Materials and Methods

The effect of light on feeding and egestion time of 9-, 15-, and 19-day-old striped bass was determined in a series of experiments similar to those conducted by Laurence (1971) for largemouth bass. In the present study, the gastrointestinal tracts of live brine shrimp were stained by holding the shrimp for several hours in 750 ml of water in which 1 g of trypan blue had been dissolved. Marked brine shrimp were then fed to 300 striped bass of each age. After the larvae had been in the presence of the marked brine shrimp for 30 min, 10 of the fish were placed in each of 30 jars (750 ml) which contained unmarked brine shrimp. Since striped bass of the age range used in this experiment are nearly trans-

parent, it is possible to see the marked brine shrimp in their gastrointestinal tracts. Gross examination indicated that essentially all of the striped bass had consumed marked brine shrimp. Fifteen of the jars were placed in darkness and 15 were left in a lighted room. After 1 h, and thereafter at hourly intervals, the fish from one jar which had been in light and one which had been in darkness were examined to determine how many fish contained marked brine shrimp. The 9-day-old fish were held at 25°C, and the 15- and 19-day old fish at 20°C.

To further investigate night feeding, we placed 10 19-day-old fish that had not been fed for 24 h in each of four jars. Unmarked brine shrimp were introduced into each of the four jars, after these fish had been in total darkness for 1, 2, 4, or 8 h. One hour later, the gastrointestinal tracts of the fish were examined for brine shrimp.

Results

For a given temperature, there was no significant difference in egestion time between fish held in light and those held in darkness (Fig. 1). For 15- and 19-day-old fish held at 20°C the time of total egestion of marked brine shrimp was 11-12 h. None of the 9-day-old fish held at 25°C contained marked brine shrimp after 9 h. Since about 10% of the striped bass in all trials contained unmarked brine shrimp, it is evident that they fed in darkness.

Striped bass initiated feeding after being held in darkness for 1, 2, 4, or 8 h. After the brine shrimp had been available to the striped bass for 1 h after the 1, 2, 4, or 8 h of darkness, 7, 7, 10, and 6 fish, of the four groups of 10, contained brine shrimp.

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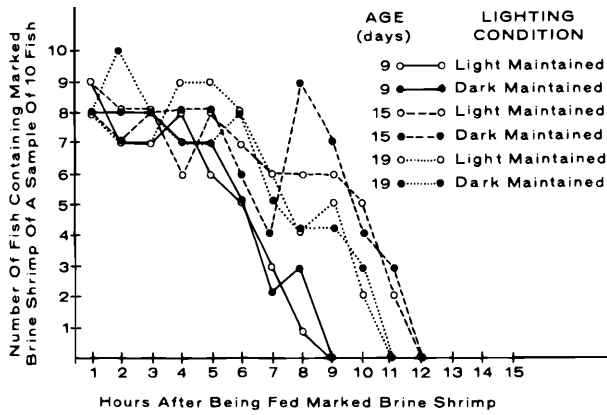


Fig. 1. Egestion time of striped bass maintained on a light-and-dark regime. Trial with 9-day-old fish conducted at 25°C; trials with 15- and 19-day-old fish conducted at 20°C.

Discussion

The results of light-vs.-dark feeding and egestion experiments indicate that striped bass larvae remain active and continue to feed at night. To the authors' knowledge, this fact is unreported in the literature and is contradictory to the results of studies on the larvae of some other fish species (Quasim 1955; Davies 1966; Laurence 1971).

Since larval fishes have little or no energy reserve, it is likely that striped bass 9 to 19 days old, that are being

cultured at temperatures of 20-25°C, should be fed at night as well as during the day. Food should be offered at least every 4 h, and probably every 2 h. This day-and-night feeding regime is supported by another study in which striped bass maintained in tanks and routinely fed on a 24-h schedule had significantly higher survival to 12 days of age than did fish fed during only a 12-h period each day (McHugh 1975).

Acknowledgments

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