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PREVALENCE OF *EIMERIA FUNDULI* (PROTOZOA: EIMERIIDAE) IN THE LONGNOSE KILLIFISH *FUNDULUS SIMILIS* FROM HORN ISLAND, MISSISSIPPI¹

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ABSTRACT *Eimeria funduli* occurred in *Fundulus similis* from Horn Island, Mississippi, during 1980, in contrast with its apparent absence during 1978 and 1979. Prevalence of the parasite appears to be related to the unusually low salinity in Mississippi Sound, and in ponds and off the beaches of Horn Island. The low salinity may have promoted the migration of infective intermediate hosts from inshore waters to the island.

INTRODUCTION

Infections of *Eimeria funduli* Duszynski, Solangi, and Overstreet 1979, a pathogenic hepatic coccidian of killifishes, has reached panzootic proportions in specific areas (Duszynski et al. 1979, Solangi and Overstreet 1980). Even though the parasite commonly infected the Gulf killifish *Fundulus grandis* Baird and Girard, in Ocean Springs, Mississippi, Solangi and Overstreet (1980) reported only a limited occurrence of this coccidian in the longnose killifish *Fundulus similis* (Baird and Girard) caught in the same area. Solangi and Overstreet did not observe any infections in about 75 individuals of *F. similis* collected during 1978-1979 from ponds and beaches of Horn Island, an island about 10 km south of Ocean Springs that separates the estuarine waters of the Mississippi Sound from the high-salinity waters of the Gulf of Mexico. This paper reports the prevalence of the coccidian in *F. similis* collected from Horn Island at least a year later, and discusses the various ecological factors that may have contributed to the spreading of the parasite into that area.

MATERIALS AND METHODS

Using a seine and a cast net, samples of *Fundulus similis* were obtained from a lagoon on the north side of Horn Island. The collection period was from June 3 to August 13, 1980. Fish were measured (total length) and sexed, and livers were examined microscopically for the parasite by fresh squash preparations.

RESULTS

Of the 100 fish examined, only 15 of 56 males and 5 of 44 females were infected with *Eimeria funduli*. When separated into size groups, 65 fish were greater than 87 mm long, and 29% of those were infected. Except for one male, all infected fish had a total length of 88 mm or greater. In all fish that were infected, oocysts had developed sporozoites.

DISCUSSION

The most probable explanation for the presence of *Eimeria funduli* in livers of *Fundulus similis* on Horn Island during 1980, in contrast with its absence during 1979 and earlier, appears to be related to the availability of the infective intermediate host. The grass shrimp *Palaemonetes pugio* Holthuis and possibly other crustaceans serve as intermediate hosts; to complete the life cycle, an infective stage in the intermediate host has to be eaten (see Solangi and Overstreet 1980). Although no individuals of *P. pugio* were collected concurrently with *F. similis* in June through August, numerous infected *Fundulus grandis* occurred in the lagoon during the sampling period, but were not collected from the lagoon during 1977 to 1979. Even though *F. grandis* occurred on the island, Franks (1970) reported that this species constituted only 0.5% of total fish caught on Horn Island and did not occupy the lagoon (station 10) during his 2-year sampling period from 1965 through 1966. The migration of the intermediate host and *F. grandis* from inshore waters to the island probably took place in April when unusually low salinities occurred in Mississippi Sound, and in ponds and off the beaches of Horn Island. Salinity data maintained by the Parasitology and Fisheries sections of the Gulf Coast Research Laboratory show that the salinity during April 1980 in Mississippi Sound and at Horn Island ranged from 0 to 1.0 ppt and 3.5 to 8.0 ppt, respectively. These values are low when compared to those of previous years. During the period from 1977 to 1979, the salinity in Mississippi Sound for April fluctuated from 4.0 to 8.0 ppt, and for Horn Island from 7.0 to 28.0 ppt, with values for Horn Island frequently being above 15.0 ppt.

Because it takes about 60 days for sporozoites to develop at 24°C (see Solangi and Overstreet 1980), the presence of sporulated oocysts in livers of infected *F. similis* also suggests that infections occurred during April or earlier. However, because of the advanced stage of the infection, it is possible that the infected *F. similis* from the island were actually migrants from the inshore stock. The reason why most *F. similis* over 87 mm were infected appears to be the ability of large fish to feed on grass shrimp. Individuals of *F. similis* that ranged in size from 30 to 70 mm and were maintained

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in aquaria refrained from attacking live adult grass shrimp (15 to 25 mm in length) introduced into the tank. However, fish over 80 mm actively fed on such shrimp in the aquarium.

In conclusion, it appears that environmental changes play a major role in the distribution of *E. funduli* and probably contributed to its spread to Horn Island.

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