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EFFECTS OF STORMS ON RICE RATS INHABITING COASTAL MARSHES

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ABSTRACT During 1979, three storms with winds in excess of 73 km/hr and tides up to 1.5 m above normal struck a section of the Mississippi coast where a population study of the rice rat, *Oryzomys palustris*, was in progress. There were no noticeable effects on population levels, and many individual animals survived the storms.

INTRODUCTION

The rice rat, *Oryzomys palustris*, is a semiaquatic mammal that occurs in wetland habitats throughout the southeastern United States. Throughout most of its range, *O. palustris* is the most abundant small mammal in coastal marshes. It is also the most common mammal on many offshore islands in the northern Gulf of Mexico (Negus et al. 1961; personal observation). The tidal marsh and insular habitats of rice rats are occasionally subjected to devastating storms; and yet the rats appear either to survive these storms or to rapidly recolonize immediately following them.

MATERIALS AND METHODS

Since January 1979 I have been monitoring a rice rat population on the northern shore of St. Louis Bay in Harrison County, Mississippi. Two study grids about 1 km apart have been live-trapped quarterly. These grids have trapping stations placed at 15-m intervals. A 300-mm square floating platform that rises and falls with the tides is placed at each station. Each sampling session consists of one day of prebaiting the platforms with a mixture of oatflakes, peanut butter and sardines followed by four or five days of live-trapping. One Sherman live-trap is used on each platform. All animals captured are weighed, sexed, checked for reproductive condition, marked by toe clipping, and released. The westernmost grid is 12 stations long and 4 stations deep. Its long axis parallels shore. Water depth on its southern edge is about 400 mm at normal high tide. The northern edge parallels the marsh-forest ecotone and it is dry at normal high tide. The other grid consists of 100 stations in a 10 x 10 pattern. It extends from the forest-marsh ecotone for 135 m out into the marsh. Although the grid is about 0.5 km from shore, the southern half is flooded to a depth of about 300 mm daily by overflow from tidal creeks in the area.

In the spring and summer of 1979 three storms had an impact on the area. A storm in mid-April produced a tide of 1 m above normal and winds gusting to about 40 knots.

Hurricane Bob struck the area on July 11 with a storm tide of 1.5 m and winds up to 64 knots. On August 12, the western edge of Hurricane Frederick passed through with 74-knot winds but no storm tides, as the winds were from the north.

The April storm and Hurricane Bob completely inundated both grids with a tidal surge that swept away all the trapping platforms and deposited them in the forest, 50-100 m to the north. The duration of these storm tides was 2-4 hrs.

RESULTS

Trapping results from sessions preceding and following the 1979 storms are given in Table 1. Data from both grids are combined. No significant weather events occurred during the same segment of 1980, and data from this period are provided for comparison. Since many factors other than storms affect survival between sampling periods, this comparison is of limited use, and no specific statistical tests are attempted. Populations were generally higher in 1980, especially toward the end of the year. It is clear, however, that the impact of these storms on the rice rat population was not devastating, and probably not significant. Population levels showed little if any decrease following

TABLE 1.
Effects of storms during 1979 on rice rat populations in a tidal marsh at Bay St. Louis, Mississippi.

Months of Trapping	Days Between Storm and Trapping	Major Storms		Captures ³	
		Tide ¹	Wind ²	Total	% Recaptures ⁴
Jan.	—	—	—	33(52)	N/A(67)
May	30	1.0	73	20(19)	18(12)
Aug.	34	1.5	117	23(35)	10(16)
Oct.	35	0	135	15(45)	9(31)

¹Tides are given as meters above normal high tide.

²Winds are in km/hr.

³Comparable data from 1980, when no storms occurred, are given in parentheses.

⁴Recaptures are percent of population marked in previous trapping session.

the storms. The number of marked individuals surviving periods with storms was similar to the number surviving the same interval the following year when no storms occurred.

DISCUSSION

Rice rats are known to be adept swimmers and divers (Esher et al. 1978). A dense shrub zone of *Baccharis halimifolia*, *Myrica cerifera* and *Ilex* sp., in the marsh-forest ecotone of the study areas, could have provided refuge, even though the two tidal surges reported swept completely through and beyond these areas. Homing behavior of rice rats has not been studied but may be an important behavioral adaptation for animals displaced

by storms. Birkenholz (1963) reported that high water in inland marshes gave rice rats a competitive edge over cotton rats. While details of the behavioral mechanisms for surviving storms are largely unknown, it appears that these are an important component of the species' adaptation to the coastal marsh environment.

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