

## “Antifreeze” in Insects

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**I**T IS INDEED STRANGE that insects survive our cold winters to plague us each summer. One would suppose that our continuous freezing temperatures would kill all forms of insect life. Unlike most birds which migrate southward for the winter, insects are, with few exceptions, permanent residents able to adjust themselves to the surrounding temperature. Just how this adjustment is made is one of nature's marvels, for as freezing weather approaches, they are able to change their body fluids so that cold does not harm them. Our chemists tell us that an insect is able to change the water in its body fluids to “bound water” which is resistant to cold. In other words, a type of “antifreeze” is produced by the insect to protect it from lowering temperatures. As warm weather again approaches, the body fluid is changed to the “free” form and the insect becomes active again.

This change-over is probably gradual, for if we subject certain insects to increasingly cold temperatures, they are apparently able to make enough “antifreeze” to withstand injury; however, if an insect is suddenly exposed to an extremely cold temperature, it will die immediately.

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### White-Footed Mice Feeding Upon Grasshopper Eggs

The white-footed mouse, *Peromyscus maniculatus osgoodi* Mearns, a common rodent occurring in western North Dakota, was recently reported by Mr. Wm. Bauer, a farmer from Sioux County, N.D., as seeking out and feeding upon grasshopper egg pods. Through the courtesy of Mr. Bauer, eleven specimens were trapped and sent to the author. Upon examination of the stomach contents, three specimens contained eggs of the differential grasshopper, *Melanoplus differentialis* Thomas, a species which oviposits in the roots of grass clumps or weeds. The identification of the eggs was ascertained by comparing those ingested with eggs from a typical differential pod collected in the field. The ingested eggs also agreed in every detail with the description and illustrations of the differential egg embodied in the publication “Identification of the Eggs of Mid-western Grasshoppers” Kan. State Exp. Sta. Tech. Bull. no. 48, 1939, 39 pages, by J. B. Tuck and Roger C. Smith. The fact that the mice were collected in April, long before adult gravid female grasshoppers would normally appear, coupled with the absence of grasshopper body fragments in the stomach precluded the possibility of the mice obtaining the eggs by ingesting gravid grasshoppers.

Although these mice are primarily vegetarians, they commonly feed upon insects; however, there is apparently no previously published record of their feeding upon grasshopper egg pods. The author acknowledges the assistance of Dr. H. H. T. Jackson, in Charge, Biological Surveys and Mr. A. L. Nelson, in Charge, Wildlife Research Laboratory, Patuxent Research Refuge, both of the Fish and Wildlife Service, for confirming the author's determination of *Peromyscus* and for data on their food habits.—Horace S. Telford, North Dakota Agricultural College, Fargo, North Dakota. Reprinted from Journal of Mammalogy Vol. 24, No. 3, August, 1943, pp. 440-401.