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ENTOMOLOGICAL NOTES

PREDATION ON THE PUPAE OF SATURNIIDAE (LEPIDOPTERA) BY GRAY SQUIRRELS IN WISCONSIN

Owing to their large body size, the larvae and pupae of giant silkworm moths (Saturniidae) are ideal food for many animals. Winter predation on the pupae of *Hyalophora cecropia* (L.) in Illinois by birds (Waldbauer and Sternburg, Ecology 48:312–315, 1967) is a well known example. This note is the first documentation of predation on the healthy pupae of both endemic and exotic species of saturniid moths in southeastern Wisconsin. In these examples the predator is the Eastern Gray Squirrel, *Sciurus carolinensis* Gmelin, and the prey are *Antherea polyphemus* (Cramer), a common local species, and *Attacus atlas* (L.), an exotic from Southeast Asia.

During the spring of 1980 and 1981 I placed in a yard mixes of cocoons of each species with healthy and dead pupae. Some cocoons were placed on the ground within an approximately 25 m^2 area, and others were pinned to small shrubs scattered along the side of a house. The yard is frequented by squirrels. The purpose of the study was to determine if squirrels differentially attacked the silken cocoons of healthy and dead pupae, and if they would attack those of an exotic species. I tested 19 *A. polyphemus* and 50 *A. atlas*, with the ratio of healthy to dead pupae being about 1:1 in the former, and about 1:2 in favor of dead pupae in the latter. The cocoons were left undisturbed in the yard for about two weeks in both years. In order to distinguish later between cocoons of healthy and dead pupae, I marked those of the healthy ones with a small black dot prior to the tests.

About 90% of the 11 healthy *A. polyphemus* and about 12% of the eight dead ones were found to have clear signs of squirrel damage. For *A. atlas*, 80% of the 15 healthy cocoons and none of the 35 dead had signs of squirrel damage. Cocoons with squirrel damage were ripped open and in the case of live pupae, the pupae were gone. During the study, I saw three instances of squirrels picking up and handling cocoons.

Such data, while preliminary, indicate that squirrels forage for saturniid pupae, and discriminate between cocoons with live and dead or eclosed pupae. Such behavior is apparently generalized to exotic species. There are many reports in the mammalogy literature of the flexible feeding habits of squirrels in the temperate zone, in which diets consist of seeds, fruits, and insects (e.g., Schwartz and Schwartz, The wild mammals of Missouri, Univ. Missouri Press, 1959). The pupae of some saturniid moths are very high in lipid content (e.g., Domroese and Gilbert, J. Expt. Biol. 41:573–590, 1964), making them ideal sources of energetic food stuffs for small omnivorous mammals such as squirrels. Saturniid pupae may provide rich sources of energy at times of the year when other kinds of food required by squirrels are less abundant. How squirrels discriminate between healthy and dead pupae in silken cocoons, as shown by the data here, warrants further study. Possibly the mechanism involves a response to a sequential combination of visual (cocoon size, shape, position), tactile (i.e., information on cocoon weight from handling), and olfactory (issuance of a pupal odor) stimuli.

As the cocoon of *A. atlas* is suspended from a branch in a manner very similar to the phylogenetically allied, endemic North American species *Callosamia promethea* (Drury) (Ferguson, The moths of America north of Mexico, Classey, London, 1972), my observation that squirrels jump up and knock down cocoons suspended in shrubs suggests that other Wisconsin saturniids such as *C. promethea* and *Hyalophora cecropia* (L.) are also attacked by squirrels.

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