



# Entomological Notes

Department of Entomology

## SAWTOOTHED AND MERCHANT GRAIN BEETLES

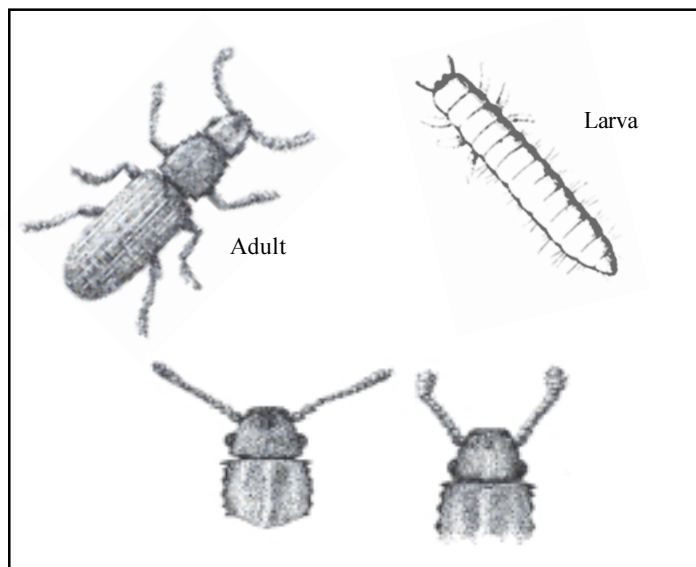
The sawtoothed grain beetle, *Oryzaephilus surinamensis* (L.), is a widely distributed species commonly found in stored grain. It is often confused with a closely related species, the less common merchant grain beetle, *Oryzaephilus mercator* (Fauvel). In Pennsylvania, the sawtoothed grain beetle is not a major problem in stored grains, but can be found coexisting with other insects in contaminated grains. Both the larval and adult stages of the merchant grain beetle attack all foods of vegetable origin; their preferred foods are oilseed products such as nuts and sunflower seeds.

### THE PROBLEM IN PENNSYLVANIA

On-farm grain storage, particularly of corn, is increasing in Pennsylvania. Stored grains offer ample food sources for a number of insect pests. Good storage management practices are aimed at excluding grain feeding insects while maintaining grain quality. The longer grain is held in storage, the greater the need to maintain good management practices, such as sanitation and residual sprays. When proper management is ignored, populations of insects which have been feeding and reproducing in grain residues are free to infest new grain. Once in the new grain, the insects continue to eat and reproduce. Substantial numbers of grain-infesting insects can reduce the value of grain or render it unfit for processing or feeding. Results of feeding by sawtoothed and merchant grain beetles can reduce grain weight and quality. The presence of live insects can result in dockage or rejection of the grain.

### LIFE CYCLE

The habits and development of the two species are similar. The merchant grain beetle, however, is less cold tolerant and lays only about one-half to two-thirds as many eggs as does the sawtoothed grain beetle. The adult merchant grain beetles are strong fliers and may originate from other areas; they also are introduced into new grain from contaminated grain. The adults of the sawtoothed grain beetle, on the other hand, cannot fly and must be introduced from contaminated grain.



Adults live an average of six to ten months, but can live as long as three years. The females lay between 43 and 285 eggs during their lifetime. Eggs are dropped loosely among grain kernels or tucked into a crevice in a kernel. The tiny eggs are slender and white, and hatch in three to five days when environmental conditions are optimal (80° to 85° F).

The larvae emerge and crawl freely about the grain to feed on broken kernels. Larger larvae may tunnel into kernels to feed. Larvae mature in about two weeks, and construct cocoon-like coverings by joining together small grains or pieces of grain. Within these structures the larvae pupate. The pupal stage lasts about a week. Total development from egg to adult requires about three to four weeks.

### DESCRIPTION OF LIFE STAGES

The egg and larval stages of both insects cannot be distinguished without special training. The adults of both species, however, can be distinguished by head shape, eye and body size, and color. In the merchant grain beetle, the eye diameter is larger than the temple region behind the eye, and the head is rectangular. The sawtoothed grain beetle, in contrast, has smaller eyes and a more triangular shaped head. The merchant grain beetle is somewhat larger and darker brown. Because both species are approximately one-

tenth inch long, the larger size of the merchant grain beetle is difficult to assess in the grain bin. The most descriptive characteristic of both species is the six saw-like teeth found on either edge of the pronotum.

## **DAMAGE**

Although broken kernels are the preferred food of both species, sound kernels will sometimes be penetrated and fed on. The dry weight of grain may be reduced, but total weight may increase because of water absorption caused by the metabolic processes of insect populations. Molds may begin to grow on the grain, further reducing grain quality and value. The presence of live insects and/or insect parts can also result in reduction of grain value. In some cases, grain can be rejected at the terminal.

## **MANAGEMENT**

Prevention is the best strategy to avoid insect problems in stored grains. Proper bin sanitation before introduction of new grain minimizes the need for pesticides. Good sanitation involves the removal of old grain and dust in and around the grain bin. This includes removal of old grain from corners, floors, and walls. Any grain remaining when a bin is emptied can harbor insect infestations which will move into the new grain. Grain that is to be stored for longer than six months may need a protective application of an approved insecticide.

Grain placed in a clean bin should be checked at two week intervals during warm months and at one month intervals during cooler months for the presence of hotspots, moldy areas, and live insects. If any of these conditions exist, the grain should be aerated to lower the moisture level and temperature.

Fumigation should only be used as a last resort. Because of the high toxicity of registered fumigants and technical knowledge needed for their proper use, a qualified pesticide applicator should be contacted if fumigation is required.

## **WARNING**

Pesticides are poisonous. Read and follow directions and safety precautions on labels. Handle carefully and store in original labeled containers out of the reach of children, pets, and livestock. Dispose of empty containers right away, in a safe manner and place. Do not contaminate forage, streams, or ponds.

Dennis Calvin  
Associate Professor  
Dept. of Entomology  
May 1990

SG-12

© The Pennsylvania State University 2001

This publication is available in alternative media on request.

Where trade names are used, no discrimination is intended and no endorsement by The Pennsylvania State University or Pennsylvania Department of Agriculture is implied.

Pest Sheets are intended to serve as a quick reference guide and should not be used as a substitute for product label information. Although every attempt is made to produce Pest Sheets that are complete, timely, and accurate, the pesticide user bears the responsibility of consulting the pesticide label and adhering to those directions.

Issued in furtherance of Cooperative Extension Works, Acts of Congress May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture and the Pennsylvania Legislature. T.R. Alter, Director of Cooperative Extension, The Pennsylvania State University.

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission, and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination and harassment against any person because of age, ancestry, color, disability or handicap, national origin, race, religious creed, sex, sexual orientation, or veteran status. Discrimination or harassment against faculty, staff, or students will not be tolerated at The Pennsylvania State University. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Director, The Pennsylvania State University, 201 Willard Building, University Park, PA 16802-2801, Tel 814-865-4700/V, 814-863-1150/TTY.