

Management of Stored Grain Insects, Part II

Entomology 184

Identification and Sampling of Stored Grain Insects

George Lippert and Randall Higgins

Why Identify Stored Grain Insects?

Farmers are generally aware that an infestation of weevils and lesser grain borers can cause significant quality and monetary loss if left uncontrolled. These insects often are classified as "primary grain pests" because they attack and destroy whole, undamaged grain.

The immature stages occur inside the kernels, thus a "hidden" infestation may develop. "Secondary grain pests," the so-called "bran bug groups," include most other grain-attacking beetles. These insects frequently cause more serious losses where some type of kernel damage precedes their establishment.

Larvae of the Indian meal moth and miscellaneous pests, including psocids and grain mites, should be recognized. They can cause storage problems directly, may indicate that related problems exist, and may be commonly encountered when sampling infested grain.

Significance of infestations depends on the species, density, and ultimate plans for the grain. Insect infestations may indicate a more serious problem than first suspected. For instance, an infestation of foreign grain beetles may not seem important because that beetle is a fungus feeder rather than a grain-feeding insect.

In reality, significant numbers of fungus feeding beetles of any species should be adequate warning that a moisture management problem probably exists in the grain mass—because fungi typically are restricted to higher moisture environments.

Many insects are not able to cause significant direct damage to the grain they live in. But that does not mean they can be ignored. Their fecal material and hard body parts can still contaminate processed foods destined for human consumption. The most seri-

ous fragment contributors are those species that have at least one stage which develops within the grain kernels. Even if every individual is killed with a fumigant, mechanical sieving will not remove these insects.

Overall weight loss on a kernel basis can vary, depending on the species of stored grain insect. Some species riddle each kernel they attack; others feed primarily on the living portion of the seed (embryo or germ). Proper sampling and identification during storage help the manager recognize problems early and thereby prevent further damage.

Selecting the most appropriate curative or preventative action from among available alternatives is not easily accomplished, especially when the type of insect present is not known.

For example, if insects that feed inside the kernels are already present in significant numbers, a surface protectant applied as a dust or spray would not be the best management option. In this situation, the penetrating vapors of a fumigant are needed to stop further damage.

Usually a combination of tactics will provide the most reliable protection. Several types of "insect traps" are available to help in early detection of developing infestations. Dichlorvos-impregnated pest strips (Vapona) may be appropriate, if available, in many situations where Indian meal moth invasions are expected.

Some species are less able to tolerate grain temperatures near freezing than others. Proper aeration as air temperatures drop in the fall could lessen the amount of future damage and may possibly eliminate the infestation entirely. Because insect responses to these management strategies vary, proper identification is very important.

Major Insect and Related Pests Infesting Kansas Stored Grain

At least 60 species of insects and related arthropods can infest stored grain. Less than 14 are typically associated with most of the concern, damage, and resulting economic losses encountered throughout Kansas. The drawings and discussions that follow should aid in identification efforts.

Descriptions are limited in most cases to adults because they are the most obvious and readily observed stages. The characteristically small size of these pests means that magnification is usually necessary before important structures can be viewed. Refer to the stylized insect (Figure 1) for help in locating and interpreting unfamiliar words in the descriptions.

Because positive identification may still be uncertain, the descriptions also review the appearance of damaged grain and other species-specific signs (webbing, odors, etc.) useful in confirming the identification and seriousness of an infestation.

Lesser Grain Borer - Figure 2

Head: downward facing, not visible when insect is viewed from above. Body: polished dark brown to black in color, 1/10 to 1/8 inch long, cylindrical in cross section, about 1/32 inch wide, many small pits on the wing covers. Antennae terminate in a loose three-segmented club. A strong flier, primarily a pest of whole grains.

Eggs: deposited outside the kernel, either singly or in clusters of up to 30, with 300 to 500 eggs laid per female lifetime. The majority of larvae will chew into a kernel to feed and complete their development.

Adults and larvae possess powerful jaws used to riddle the grain, creating large, irregularly-shaped holes.