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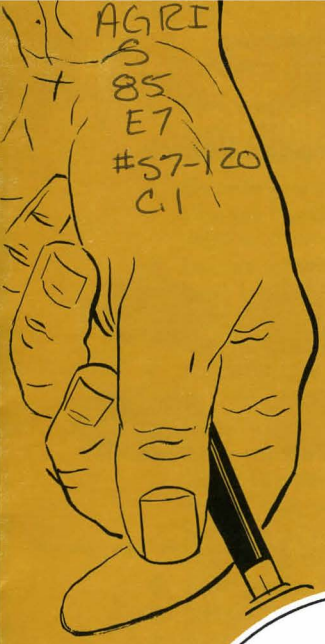
EC 57-120



STORED GRAIN INSECTS

RECEIVED
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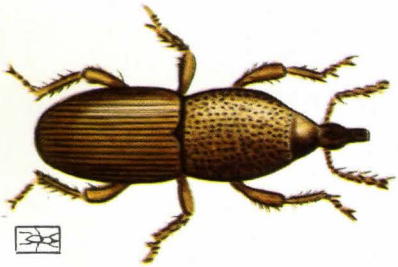
and the clean grain program

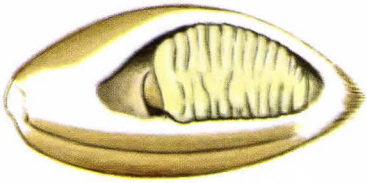
PRINCIPAL

Adult Stage | Larval Stage | Damaged Kernels

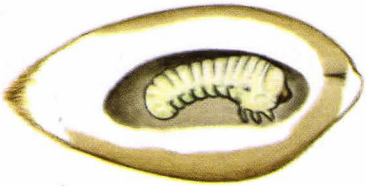
RICE WEEVIL

GRANARY WEEVIL

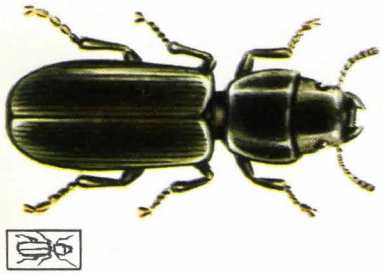


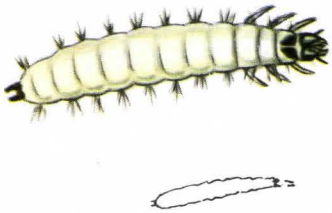


LESSER GRAIN BORER



CADELLE OR FLOUR WORM

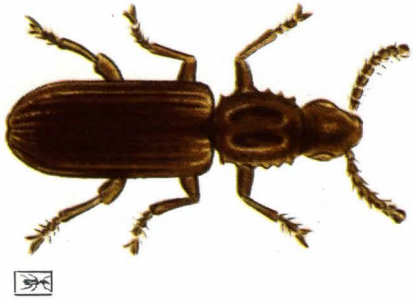


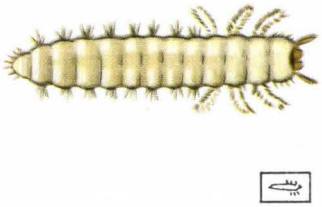


STORED GRAI

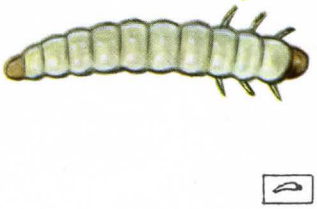
Adult Stage | Larval Stage | Damaged Kernels

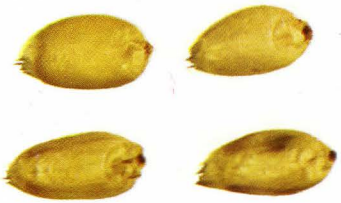
SAW-TOOTHED GRAIN BEETLE



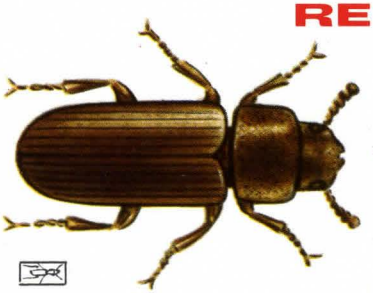


FLAT GRAIN BEETLE

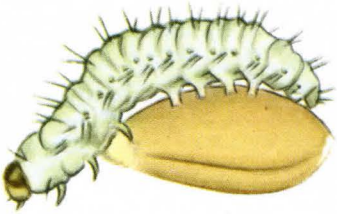




RED FLOUR BEETLE



INDIAN-MEAL MOTH

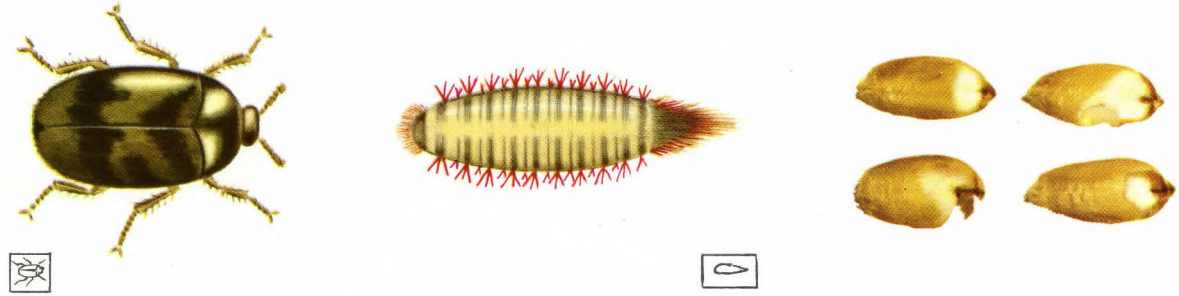


N INSECTS

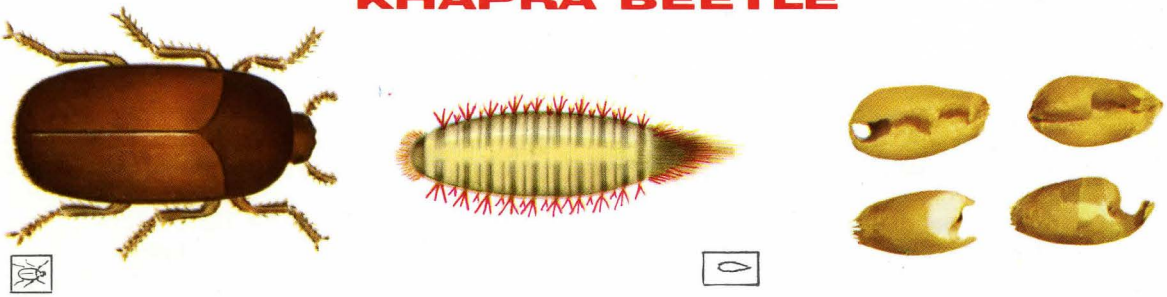
Adult Stage | Larval Stage | Damaged Kernels

ANGOUMOIS GRAIN MOTH

LARGER CABINET BEETLE



KHAPRA BEETLE



WHEAT KERNEL DAMAGE IN THE FIELD

GRASSHOPPER

WHEAT-HEAD ARMY WORM

1. **Rice weevil** adults travel by wings and legs. Eggs are placed inside kernel. Both larvae and adults destroy grain.
2. **Granary weevil** cannot fly. Eggs are placed inside kernel. Both larvae and adults destroy grain.
3. **Lesser grain borers** travel by wings and legs. Eggs are placed on kernel and larvae bore into kernel. Both larvae and adults destroy grain.
4. **Cadelle** larvae hibernate within cells in wood. Both larvae and adults destroy grain.
5. **Saw-toothed grain beetles** are tiny and dark brown in color. Plate behind the head has saw-tooth points on both sides. Larvae and adults migrate by crawling from grain to grain.
6. **Flat grain beetle larvae** cut flap in kernel germ and destroy germ.
7. **Red flour beetles** and the **confused flour beetles** feed on high moisture whole kernels and on broken grain and grain dust.
8. **Indian-meal moths** fly from infested grain or old sacks to infest surfaces of grain in bins. Larvae spin webs around several kernels and feed within webbing.
9. **Angoumois grain moths** are small buff moths which fly readily from infested grain to any part of the farmstead or to corn fields in late summer. Larvae develop inside grain as the rice or granary weevil.
10. **Larger cabinet beetles** and several closely related dermestids feed on low moisture content grain.
11. **Khapra beetles** resemble the larger cabinet beetle so closely that specimens must be sent to an expert for identification. This insect was recently introduced into the United States and has not been found in Kansas. Khapra beetles could be our most serious stored insect pest if they become established.
12. **Grasshoppers, wheat-head army worm, or cowpea curculio** sometimes damage wheat kernels in the field. A microscope will show that feeding is from outside rather than the internal feeding which shows frass, cast skins and excreta of the internal feeders.

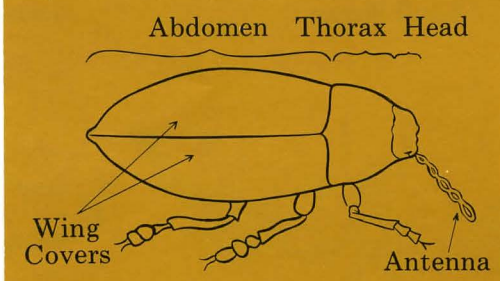


Diagram of Beetle
Showing parts and appendages

WHY CONTROL STORED GRAIN INSECTS?

Control of stored grain insects is necessary to prevent contamination of wheat which is a major source of human food. The regulations on grain in interstate shipment are more rigid than they have been at any other time. If wheat is found to contain one per cent by weight of weevil damaged kernels, the wheat is considered unfit for human consumption and must be classified as livestock feed. Insects in stored grain reduce the weight of infested grain and may lower the grade.

HOW STORED GRAIN INSECTS MULTIPLY

Stored grain insects are so tiny that they are not noticed unless you look carefully for them. Fifty rice weevils can be placed on the surface of a penny. Stored grain insect populations are dependent upon stored grain. The beetles can survive in any part of the grain mass. Temperature and moisture content of the grain play an important part in the speed with which stored grain insect populations increase. To prevent high moisture spots, wait until the moisture content of the grain is below 13 per cent for harvesting and make sure your bins are tight against rain or snow. Wheat frequently retains summer heat in the grain mass so that temperatures are above 70° until October or Novem-

ber. Many of the stored grain insects produce a new generation every month.

HOW TO CONTROL STORED GRAIN INSECTS

Clean Up Infestation and Spray

Stored grain insects may be found wherever there is grain or grain products. Sources of infestation are seed grains, stored grains, milled feeds, chicken feed, hog feeders, empty combines, feed rooms, trucks that have been hauling grain, grinding equipment, used sacks, under granaries or bins, within double walls of bins, driveways in granaries, and alleys in barns.

Sweep all infested areas and spray the surfaces with a residual insecticide six weeks before grain is harvested. Feed the infested grain to livestock or destroy it so the populations do not migrate back into the bin. Spray the floor and wall surfaces of all bins and feed rooms with a 2½% solution of methoxychlor. One quart of 25% emulsifiable concentrate or ¾ pound of 50% wettable powder makes a 2½% solution when added to three gallons of water. Pyrethrin plus a synergist can be used as a residual bin spray applied as recommended on the container.

Grain Protectants

Add grain protectants to grain to protect it from stored grain insects for at least one storage season. These materials are available as powders, oil solutions, or as water solutions. Add the protectants to clean grain as it comes from the field in the truck, in the combine bin, at the elevator hopper, or as the grain goes from the elevator into the bin. Follow the instructions on the protectant label.

Fumigation

Infested grain can be fumigated to destroy stored grain insects. Level the grain to permit even penetration of the fumigant gases. Fumigants are poisonous to warm blooded animals as well as insects. Wear a gas mask with a fresh canister for the type of fumigant that you are using. Have the bin as air tight as possible. Use air pressure to force the fumigant to the far side of the grain bin. While standing on a truck or ladder outside the bin, use a three-gallon sprayer with an enlarged nozzle to apply the fumigant. Apply the liquid as a coarse spray evenly over the surface of the bin. Avoid entering the bin or smoking until the bin has been ventilated.

Surface Sprays for Moth Infestations

Spray the top surface of the grain bin with light oil or pyrethrin spray to destroy Indian meal moth or Angoumois grain moth infestations.

Prepared by Dell E. Gates, Extension Entomologist, and Norman V. Whitehair, Extension Economist in Grain Marketing, Kansas State College in cooperation with James R. Enix, Regional Wheat Marketing Specialist, Federal Extension Service, USDA.

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EC 57-120 **March, 1957**

EXTENSION SERVICE — UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE and U. S. DEPARTMENT OF AGRICULTURE COOPERATING, W. V. Lambert, Director

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