Stored Grain Insect Pests

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Stored Product Insects
Two Types of Insects

• Beetles

• Moths
Stored Grain Insect Pests

- **Primary Pests or Internal Feeders**
  - Attack whole grains
  - Larvae feed and develop within the kernel

- **Secondary Pests or External Feeders**
  - Feed on grain dust and broken kernels
  - Can not damage whole grain
  - Follow internal feeders, i.e. damaged grain
  - Grain in poor condition, microbial activity.
Primary Pests

• Beetles
  – Granary Weevil
  – Rice Weevil
  – Maize Weevil
  – Lesser Grain Borer

• Moths
  – Angoumois Grain Moth
Primary Feeders
Beetles

- Very small, 1/8 inch
- Dark or reddish-brown color
- Weevils have snout
- Weevil larva is a legless grub
Rice Weevil

- Small pits/punctures on surface of thorax
- Two light colored spots on each wing cover
- Life cycle requires 28 or more days.
- Female can lay up to 300 or 400 eggs.
- Females can live up to 4 or 5 months.
Rice Weevil

- Adult can fly.
- Infest grain in the field
- Adult weevil and grub (larvae) feed on whole grain.
- Adult drills whole in grain and then deposits egg.
- Requires grain moisture > 12%.
Lesser Grain Borer

- Slender, cylindrical form; head pointed downward
- Adult beetle and larvae attack whole grain.
- Adults lay eggs outside of grain kernel and larvae bore in.
- Life cycle is approximately one month.
- Female lays up to 300 to 500 eggs.
- Can tolerate dryer grain, i.e. 8-9%
- Infested grain has a slightly sweet, pungent odor.
Angoumois Grain Moth

- Caterpillar (larvae) is the damaging stage
- Attacks whole grain in the field and in storage
- Bigger problem in crib corn
- Each moth lays about 40 eggs.
- Larvae bore into grain kernels. Grow to ¼ inch.
- Webbing associated with damage.
- Life cycle is about one month.
Secondary Pests

• Broken, damaged grain and dust
• Usually follow primary feeders
  – Beetles
    • Flat and Rusty Grain Beetles
    • Confused and Red Flour Beetles
    • Saw-toothed Grain Beetles
  – Moths
    • Indian Meal Moth
Secondary Feeders
 Beetles

- Very small beetles
  1/12 - 1/7 inch long
- Dark colored beetles
- Light colored larvae
- 1/8 - 1/4 inch long
Secondary Feeders

Moths

- Moths have \( \frac{3}{4} \) inch wing span.
- Larva pale colored
- Prolegs present
- Surface feeder, may web over grain.
Secondary Pests

• High moisture, poorly conditioned grain
  – Foreign grain beetle
  – Hairy fungus beetle
  – Black fungus beetle
Factors Affecting Stored Grain Insect Damage

- **Moisture Content of Grain**: higher moisture results in higher insect populations.
- **Temperature**
- **Time**: the longer grain is held, the higher the probability of an insect problem.
- **Access**: insects move into storage facilities after harvest. Seal and screen.
Stored Grain Insects

• Optimum moisture range: 12 to 16%
  – Exception: Lesser grain borer: 8-9%
• Critical temperature range: 77 to 92 F
  – Below 70 F: insect reproduction reduced
  – Below 50 F: insects dormant
• Insect population growth can be reduced by maintaining grain in a cool, dry condition.
Stored Grain Insects Prevention

• Remove (brush, sweep or vacuum) insect-infested grain and debris from combine, truck beds, transport wagons, augers, grain dumps and other grain handling equipment prior to harvest.

• Remove (brush, sweep or vacuum) grain debris from empty bins.
  – Includes fans, exhaust and aeration ducts.

• Remove all vegetation and debris within 10 feet of the outside of grain bin.

• Spray the inside of the storage bin with a residual insecticide.
Empty Grain Bin Treatment

- Recommended insecticides
  - Tempo
  - Storicide II
  - Malathion (?)

- Spray wall surfaces, floors, braces, ledges
- Spray outside perimeter
Grain Protectant Treatments

• Applied as grain is being augured into grain bin.
• Recommended Insecticides
  – Storicide II: rice, wheat, grain sorghum, oats
  – Actellic: corn and grain sorghum
• High temperatures and high moisture content will shorten residual life of protectant insecticide.
• Do not apply grain protectant before high temperature drying.
Top-Dress or Surface Treatments Prevent Surface Feeders

• Mix into top 4 to 12 inches of grain
  – Actellic
  – Bacillus thuringiensis (moth caterpillars)

• Dichlorvos (vaponna) strips- Indian meal moth
Fumigation

- Infested grain, i.e. weevils and lesser grain borer
- Adding new grain to old grain: fumigate old
- Complicated and potentially hazardous
- Aluminum phosphide (Phostoxin ® and others)
- Highly effective
- No residual
Questions