

# **Stored Grain Insect Pests**

**by**

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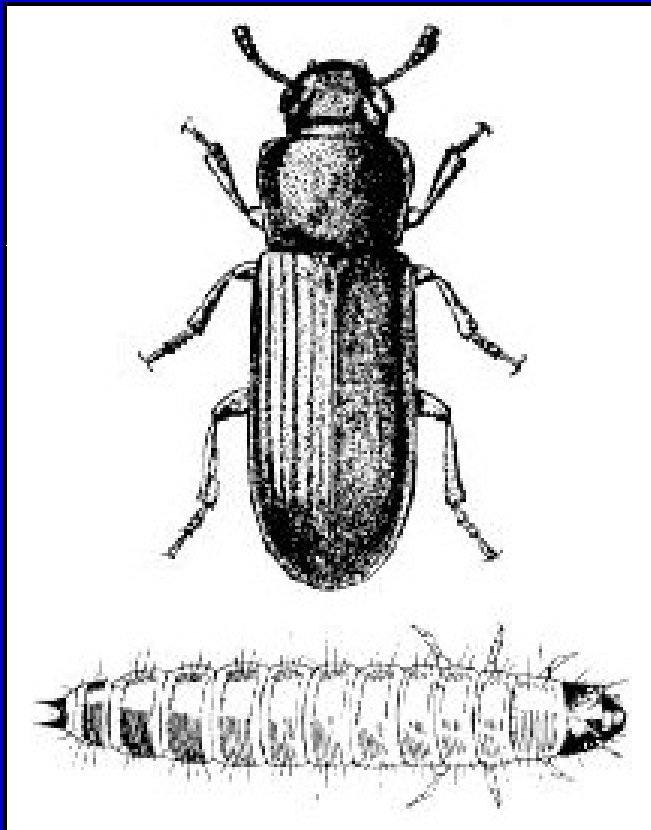
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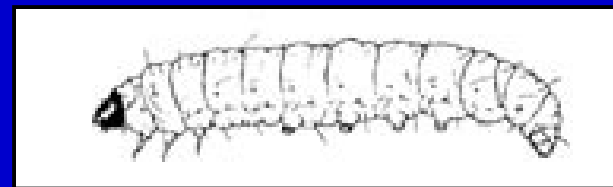
# Stored Product Insects

## 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**

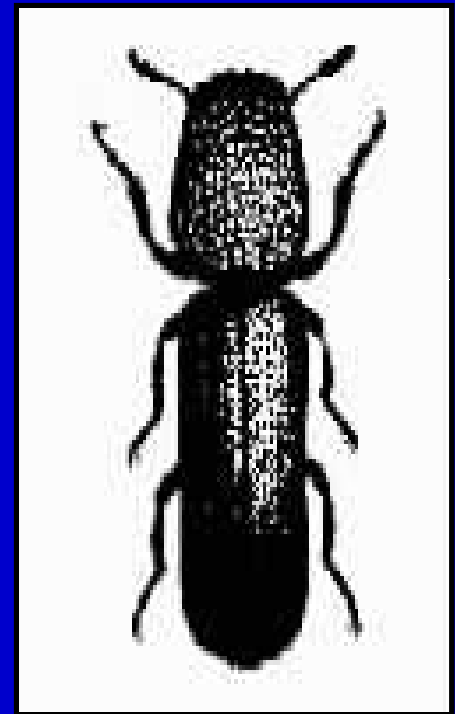
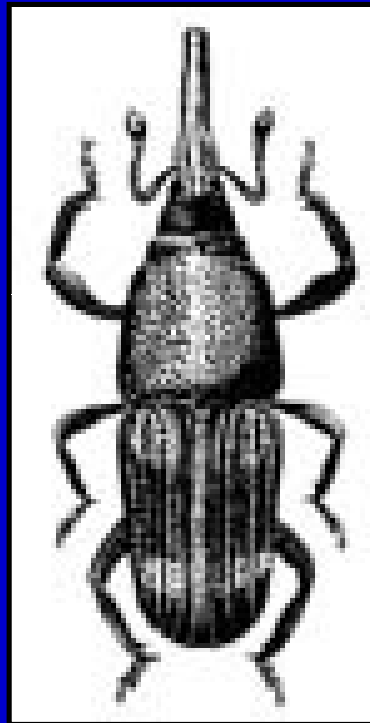
- Granary Weevil
- Rice Weevil
- Maize Weevil
- Lesser Grain Borer

- **Moths**

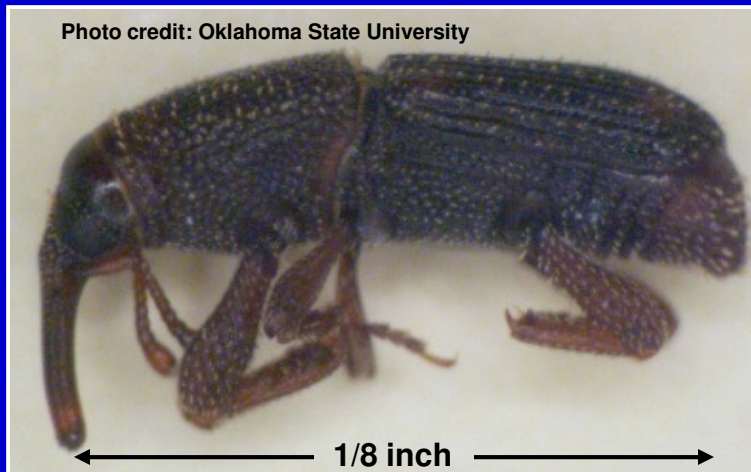
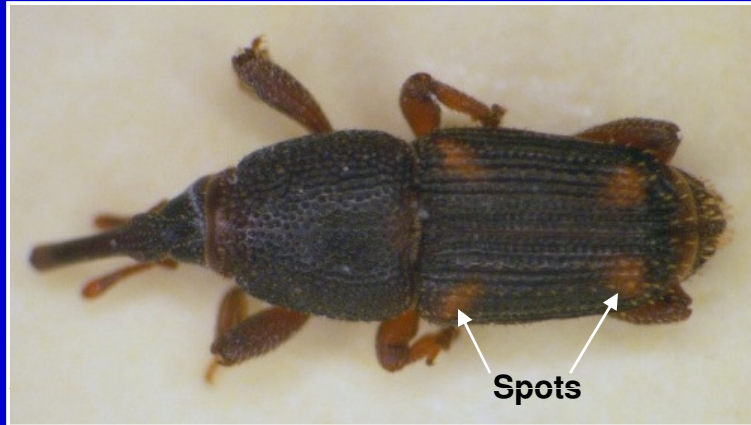
- Angoumois Grain Moth

# 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.

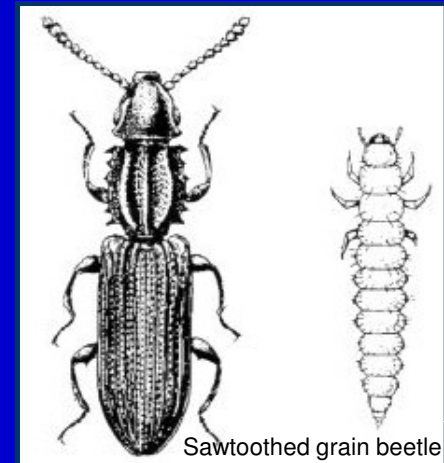
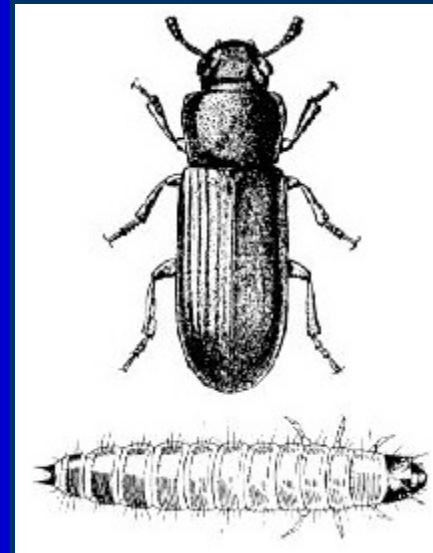
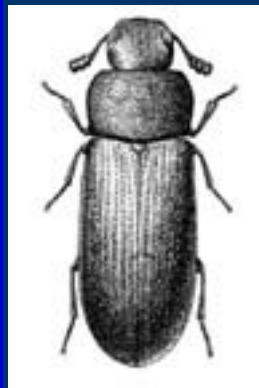


# Secondary Pests

- 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
  - Storcide 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<sup>®</sup> and others)
- Highly effective
- No residual

# Questions

