Managing Stored Grains Insects

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Stored Grain Insect Review

- Three groups of insects can infest stored grains
  1. Internal Feeders
  2. External Feeders
  3. Fungal Feeders

~90% are beetles
~10% caterpillars
A few others

Wisconsin:
Majority of pests are external or fungal feeders

- Cultural and Mechanical practices are vital
  - Sanitation,
  - Aeration, temperature, moisture control
  - Location on farm

Biology of Stored Product Insects

- Cosmopolitan in distribution
  - Found everywhere

- Generation time of 4-6 weeks at summer temps
  - 2-3 generations/ year in Wisconsin
  - 10-12 in tropics and indoors

Why So Problematic?

- Almost unlimited food in protected environment
- Few if any predators
- Small in size (hard to detect)
- Tolerate wide range of environments
- Long lived: can survive without food and water for extended periods
- Contaminate products: lower inspection grades, salability

Types of Stored Grain Insects

- Primary Feeders
  - Can attack and feed in whole, intact grain
  - Leave a hollowed-out shell
- Secondary Feeders
  - Can only feed on damaged or milled grain, fines, etc.
  - Sometimes move in after primary pests feed
- Fungus Feeders
  - *Don't attack grain*
  - Feed on mold and mildew associated with damp grain

Primary Pests

- Attack whole, sound grain
- 6-8 species in US, few in Wisconsin
  - Weevils: Granary/Rice/Maize weevils
  - Lesser grain borer
- Not common in Wisconsin

- Can be most serious pests of stored grains worldwide
  - In warm regions, can infest grain still standing in the field!

Weevils: Granary, Rice, and Maize

- Long “snout” identifies these insects as true weevils

Lesser Grain Borer

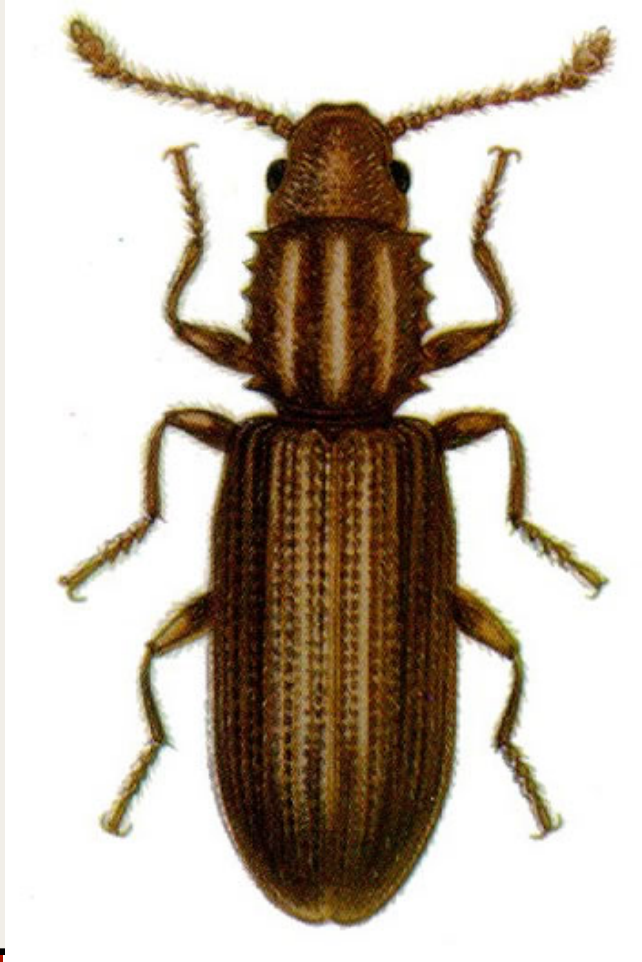
- Serious pest of wheat & rice in some portions of country; rare in corn

Secondary Pests (External Feeders)

- Aka “Bran Bugs”
- Attack broken grain and fines, processed food, and essentially any type of dried plant material
- ~30 common species in the state

Red Flower Beetle

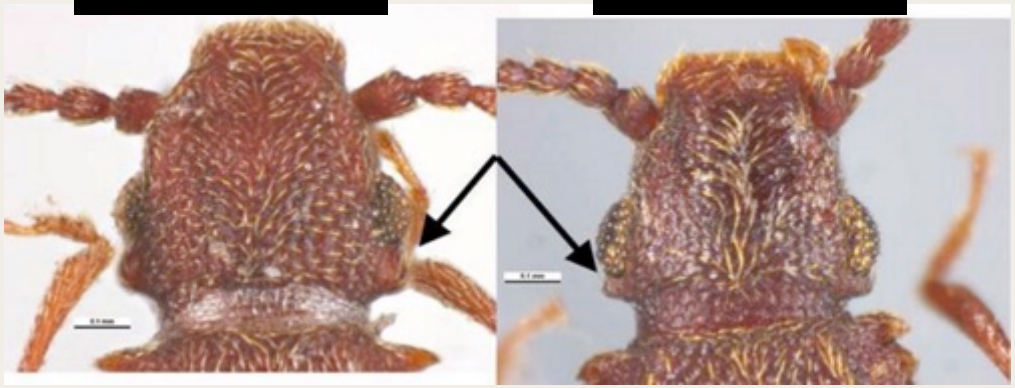
Sawtoothed & Merchant Grain Beetles



- Almost identical in appearance & biology
- Merchant GB can fly

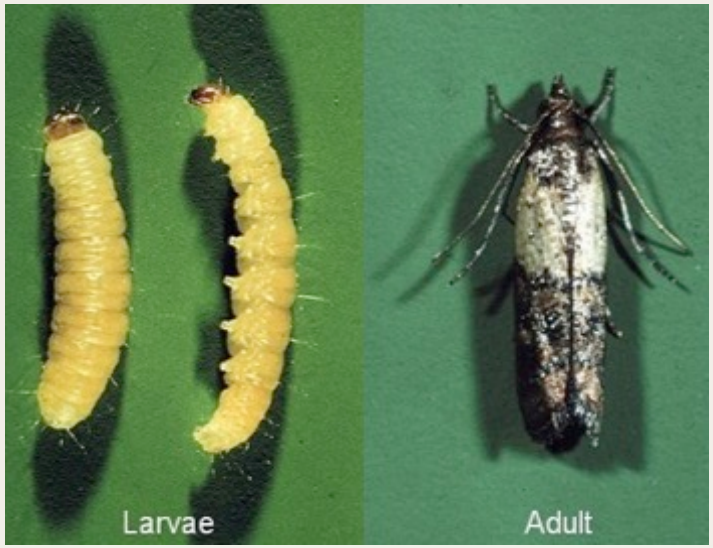
Sawtoothed GB

Merchant GB



Mealworms

Indian Meal Moth



Indian Meal Moth

- Most common grain pest
- Some resistance to malathion treatments
- Larvae create webbing in upper portion of grain

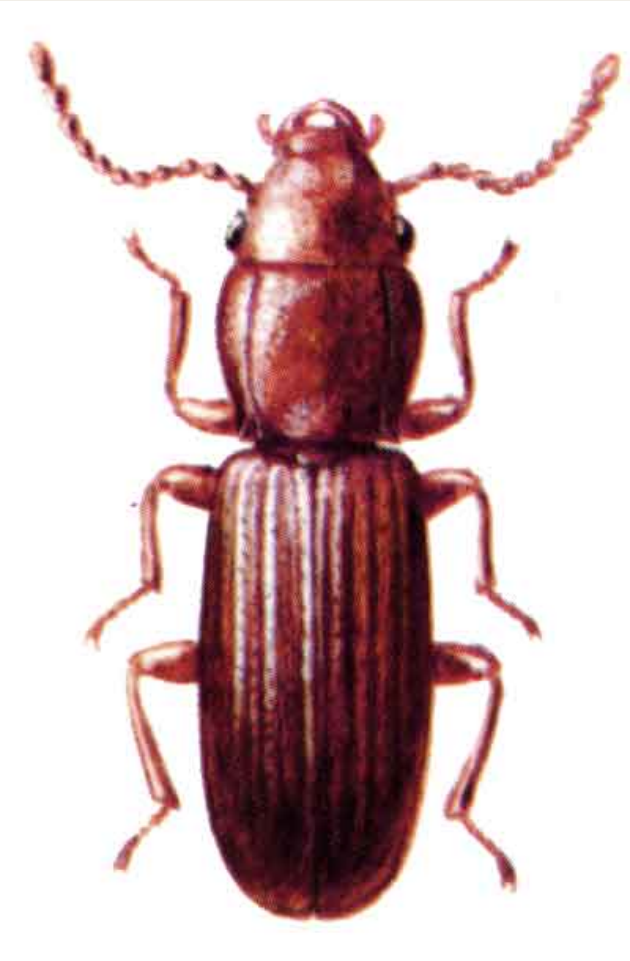
Fungal Feeding Insects

- Feed on mold and mildew (growing on stored products)
- Many can fly and are attracted in large numbers
- Can generate heat which causes more mold
- ~15 species common in the state
  - Most problematic group of stored product pests
  - Over half of stored grain insect samples coming into diagnostic lab are from this group
- *Properly stored grain will not become moldy or have issues*

Foreign Grain Beetle

Flat Grain Beetle

Rusty Grain Beetle



Hairy Fungus Beetles

Booklice

- Need humid conditions to thrive

Grain Mites

- Very small
  - 0.3-0.6 mm
- Looks like walking dust

Stored Grain Insect Management

1. **Prevention**
   - Good sanitation
   - Proper storage
   - Ventilation-aeration

2. **Scouting**

3. **Select proper insecticides if needed**

What's the Story in Wisconsin?

- **In Wisconsin**: If insect-free grain is stored properly in clean bins, you shouldn't have any infestations until the following summer

Where do Stored Grain Insects Come From?

- Previously infested grain
  - Grain still in storage bins
  - Trucks
  - Handling equipment
  - Augers
  - Elevators
  - Animal feed areas
  - Nearby contaminated grain
  - Etc.

Prevention

1. Before storing grain, clean out (vacuum/sweep):
   - Storage Bins (and associated facilities: fans, etc.)
   - Transport Equipment (trucks, combines, etc.)
   - Handling Equipment (elevators)

2. Seal Bin

Don't mix old and new grain!

3. Treat bins and grain if necessary
   - Residual bin sprays
   - Treatments at time or just after storage

4. Store dry/dried grain

5. Cool Grain to <60 ˚F

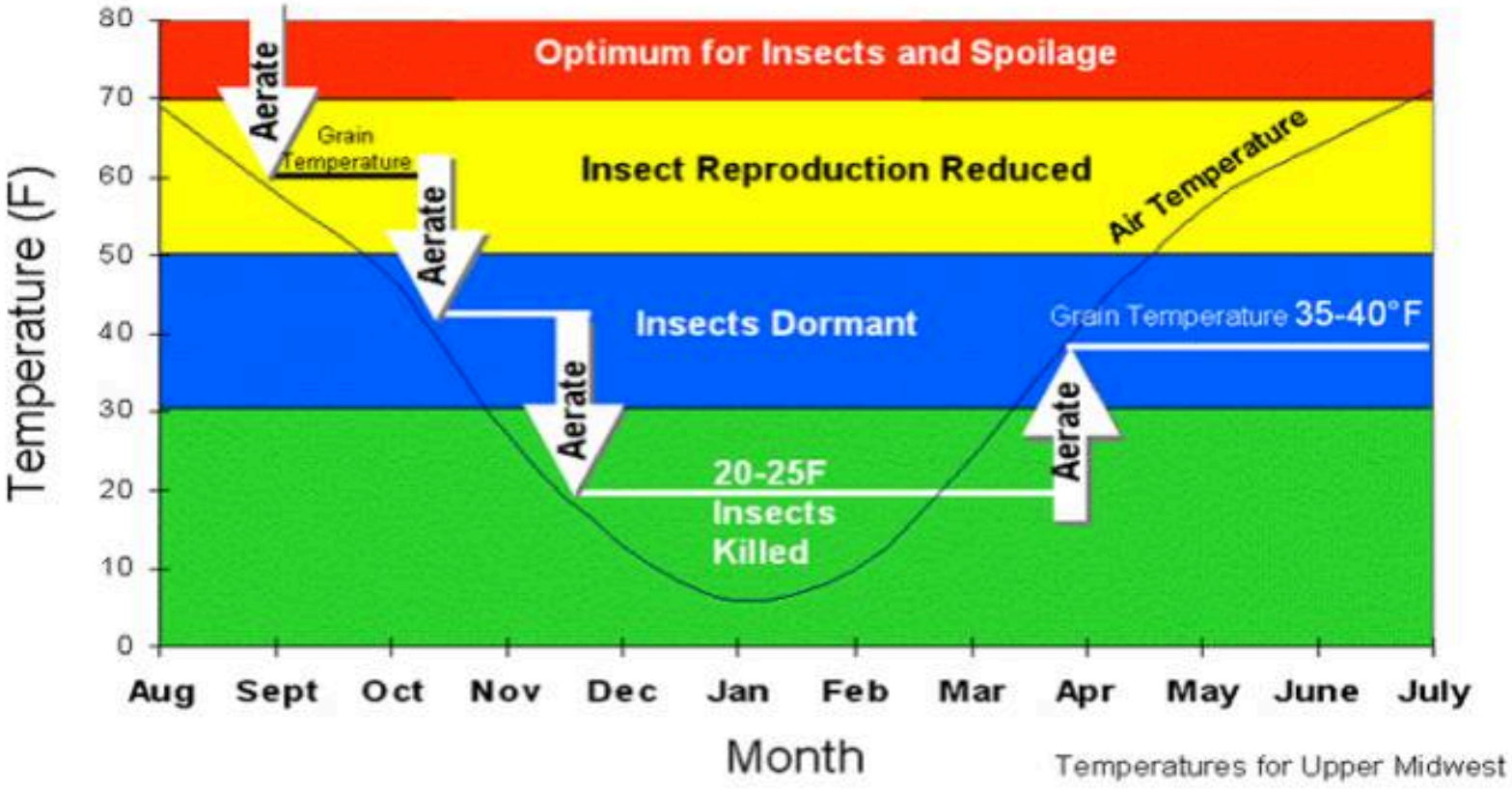
Proper Grain Storage

- **Drier and cooler is better**

- Properly Stored Grain will not develop mold
  - If moisture is elevated, mold can grow and attract fungal feeders
  - If moisture is ~12-13% ---> too dry for many insects

- Insect pests won't develop below 50˚F
  - Every drop in grain temperature of 10˚F ---> double storage life

Cool Grain to Prevent Storage Problems



Temperatures for Upper Midwest

* Prevent crusting due to moisture migration by cooling grain to within 15°F of average outdoor temperatures.
* Cooling grain by 10°F doubles its allowable storage time

Dr. Kenneth J. Hellevang, PE
NDSU Extension Service

Mold Problems


Cereal Research Centre

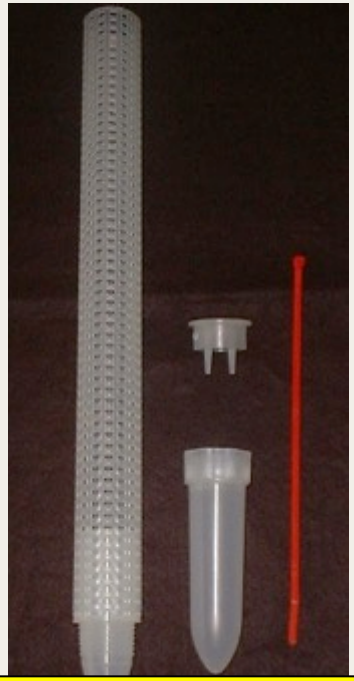
So You've Stored Your Harvest, Now what?

- **In Wisconsin**: *If insect-free grain is stored properly in clean bins, you shouldn't have any infestations until the following summer*

- But, insects can be active above 50˚F ⟹ need to scout

Scouting Stored Grains

- Various grain probes and traps available
- Inspect every 2-3 weeks in summer
- Inspect every month during cool season



Probe Traps:
5 Traps per
bin (20 ft wide)

If You Discover an Infestation:

1. Collect specimens

2. Get them positively identified
   - Management varies for fungal feeders vs. primary/ secondary pests

Stored Grain Insecticides

- Residual Bin Sprays
  - Applied to storage bin after cleaning and before storage
- Protectants
  - Applied uniformly to grain as placed into storage
- Surface treatments (Top-Dressing)
  - Applied to surface of grain
- Fumigants
  - Gases applied to enclosed spaces

Check labels to make sure you can use it on your type of grain

Contact your buyer before applying

Fumigation

- Better results with increased temperatures
- Check label (must fumigate above 40˚F)

- Products Available:
  1. Phosphine (typically as Aluminum Phosphide Tablets)
  2. Sulfuryl Flouide (=*Profume*)

Contact Information

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