IPM in Flour Mills

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What is IPM?

- Pest ID/biology
- Sanitation
- Inspection
- Monitoring and trapping
- Physical controls
- Pesticides
Principles of Integrated Pest Management (IPM)

- Use Pesticides
- Phys. Controls
- Trapping
- Monitoring
- Inspection
- Sanitation
- ID Pests; Understand Biology

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Pest ID and biology

- Correct ID
- Passing info along
- Make recommendations based on THAT pest

how planes fly

air magic

some more magic

very important magic
Lesser Grain Borer

- Considered the most damaging pest of wheat in the U.S. and the world.
- Small (0.03 inches/0.8 mm)
- Dark brown
- Head held down
Damage by Lesser Grain Borer

100 adults left in grain for 7 days and then removed
86° F (30°C)

0 days 28 days 56 days 76 days 106 days 128 days
Flour Beetles

- Most important stored product pest
  - Not just a scavenger but likes high grade fresh flour
  - Can be found inside equip
- Infest wide variety of plant and animal materials
- Recorded feeding on 246 different commodities
Flour Beetles vs. others

- To distinguish flour beetles from all other stored product insects, look at the eyes from the side
- Red brown color
- Last segments of antennae are clubbed
- Average of 400 eggs
Red & confused flour beetle eyes

- Best characteristic: eyes
  - RFB – eyes from beneath are close together
  - CFB – eyes are more widely separated
Defining Characteristics

- **RFB** - last three segments of antennae form a small club
- **CFB** – antennae not formed into a club
- **RFB** – thorax widest in the middle
- **CFB** – thorax widest at the top, near head
Flat and Rusty Grain Beetles
Cryptolestes spp.

- Body 1.5-2 mm long; oblong, flattened, light brown
- Head and prothorax account for \( \frac{1}{2} \) the body length
- Antennae are filiform (bead-like) and long
Indianmeal Moth

- Major pest of nuts, pet food, bird feed, animal feed, etc.
- Complete metamorphosis in about 30 days
- Larvae = damaging stage
  - Direct feeding damage
  - Food contaminants
  - Larval silk clogs systems
- Females lay about 160 eggs in seven days
Dermestid Beetles
Warehouse, Carpet, Larder, Hide, etc.

- Associated with food products, dead insects, animal products
- Distinctive long-lived larvae
  - Complete metamorphosis takes 3 months to 3 yrs
- Chewing mouthparts
- Cast larval skins are potential allergens
- Adults lay about 100 eggs
Commensal rodents

House Mouse

Norway Rat

Roof Rat
Principles of IPM

- Pest ID/biology
- **Sanitation**
- Inspection
- Monitoring and trapping
- Physical controls
- Pesticides

giantmicrobes.com
Sanitation is a dynamic and ongoing function and cannot be sporadic or something that can be turned on once a day, once a week, etc. Therefore, another definition could be: "sanitation is a way of life".*

- Since it is impossible to eliminate all spillage or every crack/crevice, thorough periodic cleaning is necessary.
- Cleaning must include the interiors and exterior
- Sanitation includes employees!

*Basic Elements of a Sanitation Program for Food Processing and Food Handling (R. Schmidt)
Outside facility too…

- Grounds
  - Trees
  - Shrubs
  - Lawn care
- Trash bins
- Rodent and bird control
- General outside sanitation
Principles of IPM

- Pest ID/biology
- Sanitation
- **Inspection**
- Monitoring and trapping
- Physical controls
- Pesticides
Signs of Pest Activity

- Trails in product dust
- Webbing
- Cast skins, insect fragments
- Dead insects
- Insect damaged kernels (IDK)
- Frass
- Physical damage to packages/products
- Odors
- “Conducive conditions”
Principles of IPM

- Pest ID/biology
- Sanitation
- Inspection
- **Monitoring and trapping**
- Physical controls
- Pesticides
Insect Traps

- Dome traps
  - Floor
  - Hanging
- Sticky traps
- Pheromone baited
  - Sex
  - Aggregation
- Food baited

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Rodent Traps

- Multi catch/trap door style
- Wind-up style (Ketch-All and others)
- Snap traps
- Glue boards
Rodent Bait Stations
Considerations

- Placement
- Sanitation
- Inspection
- Re-evaluation
Principles of IPM

- Pest ID/biology
- Sanitation
- Inspection
- Monitoring and trapping
- **Physical controls**
- Pesticides
Physical controls

- Keep the outside out and the inside in
- Close the openings
  - Doors and windows
  - Screens
  - Vent openings
  - Cracks, structural deficiencies
- Other physical options
  - Air curtains
  - Modified atmospheres
Principles of IPM

- Pest ID/biology
- Sanitation
- Inspection
- Monitoring and trapping
- Physical controls
- Pesticides
Pesticide Technology

- **Definition**: Anything that claims to kill, control, repel, or mitigate a pest...(insect, rodent, plant disease, others)
- **No reference to toxicity, although most do have some toxic effect**
- **Classification**:
  - “Restricted Use”
  - “General Use”
Pesticide Toxicology Review

- Three routes of exposure
  - Inhalation
  - Contact
  - Ingestion

- Different types of application/formulations
  - Fumigation
  - Fog
  - Bait
  - Crack and crevice
Fumigant vs. Fog

- An airlike substance which expands freely to fill any space available, irrespective of its quantity.
- Substance possessing perfect molecular mobility and the property of indefinite expansion, as opposed to a solid or liquid.
- A substance enclosed under pressure and able to be released as a fine spray, typically by means of a propellant gas.
- A cloud of vaporized liquid.
Turbocide Advanced Fogging Products – CO\textsubscript{2} delivery

- Py 75
- Py 75+IGR
- IGR
- Vap 20

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New Product

"Quality Protection for the Food & Commodity Industries" TM
New Product

Maxforce® FC Magnum Roach Killer Bait Gel

Load your gun with the most powerful cockroach bait gel ever.

- With the fastest results and best overall control, your customers will see results the same day
- Superior contact kill with ContactX™ technology—controls roaches whether they eat the bait or not
- Maxforce FC Magnum has an effective residual of up to one year or until the bait is completely consumed, so a single application provides your customers with long-term protection
- Low toxicity to non-target animals—ideal for use in sensitive areas
- 10% more bait per reservoir—each reservoir contains 33 grams of bait and is individually packaged with EPA label directions

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New Product
No Magic Bullet

- Remember main principles
  - Integrated approach
  - Sanitation
  - Exclusion
  - Harass/train pests to move
  - Understand pressure and appropriate devices
  - Everyone has a part to play

Except this one!
Questions?

Dear Bugs,
Please remove yourself from the vicinity in an orderly fashion. Please don’t force us to squash you.
@Thos003
(licensed to kill)

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