

Issues & Challenges: Pests in Cereal Milling

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Pest Management Workshop

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Who's Expectations?

- Customers
 - Complaints
 - Audit findings
 - ‘Competition’
- Regulatory Compliance
- Our Employees

Customer Demands

- Complaint follow-up and impacts
 - Protect yourself
- Audit findings and interpretations
 - What is risk?
 - What message does it send?
 - How can you defend yourself?

Grade Standards

- ‘Infested’ Wheat [Official Standards 810.107(a)(1)]
 - 2 or more live weevils
 - 1 live weevil and 1 or more live insects injurious to grain
 - 2 or more live insects injurious to grain

Grain Standards

- ‘Infested’ Barley, Corn, Oats, etc. [Official Standards 810.107(b)(1)
 - 2 or more live weevils
 - 1 live weevil and 5 or more other live insects injurious to stored grain
 - 10 or more other live insects injurious to stored grain

Official Standards

- Part 810 Subpart A General Provisions:
“...Compliance with the provisions of these standards does not excuse failure to comply with provisions of the Food, Drug, and Cosmetic Act or other Federal laws.”

Check it out:

<http://www.usda.gov/gipsa/lawsandregs/lawsregs.htm>

Impact?

- Official representative sample is small
- On any given day, it is possible for thousands of insects to be introduced into your grain cleaning process
- On any given day, it is possible for some of these insects to enter your mill

Pest Management

- The Food, Drug, and Cosmetic Act clearly impacts pest control operations in the food industry:
- Section 402(a)
 - food adulterated if bears or contains any poisonous or deleterious substances;
 - or if prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth

Pest Management

- The GMP's (21 CFR Part 110) also impact food industry pest control practices:
- 110.5(1)
 - support of FD&C Act 402(a)(3, 4)
- 110.20(a)(1, 3, 4)
 - pest harborage and attractants
- 110.20(b)(7)
 - pest exclusion
- 110.35(c)
 - no pests shall be allowed in any area of a food plant

FDA IOM Guidance

- Used to train field operations
- Points to specific issues for examination during inspections
- Check it out:
http://www.fda.gov/ora/inspect_ref/igs/iglist.html

Pest Induced Losses

- Actual consumption of materials
- Defile/reduce value
- Factor in facility losses (i.e.. fires)
- Costs to bring back into control
- Human costs as known disease vectors

Serious Disease Vectors

- Cryptococcosis- from bird droppings
- Histoplasmosis- from bird droppings
- Hanta Virus- rodents and their evidence
- Lyme Disease- ticks from rodents
- Plague- fleas from rodents
- Rat Bite Fever- rodent bites
- Spotted Fever- ticks from rodents

OSHA

- General Duty Clause
- Must maintain healthy work environment

Food, Drug, and Cosmetic Act

- 402 (a)(3)
- “...if it consists in whole or in part of any filthy, putrid, or decomposed substance and is otherwise unfit for food...”

Food, Drug, and Cosmetic Act

- 402 (a)(4)
- “...if prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth or rendered injurious to health...”

Defect Action Levels (DALs)

- Set levels of “natural and unavoidable” filth
- Do not excuse allowing additional rodent or bird defilement
- Additional contaminants neither “natural” nor “unavoidable”

Food Plant Pests

- GMP's define "pest" as "any objectionable animal or insect ..."
 - Insects
 - Rodents
 - Birds
- Includes flies, larvae, and others

Insect Types

- Various types impact the facility:
 - Stored product insects
 - Structural insects
 - Exterior insects
- Regardless of insect type, we need to react promptly

For Proper Reaction to Findings

- Many types of beetles or moths may look very similar
- Since insects have specific needs for development, we must **PROPERLY IDENTIFY** any insects found
- **PROPER IDENTIFICATION** allows evaluation of risks to ingredients, process, products

Issues:

- No ‘hard and fast rules’
- Need to understand the basic biology
- Little experience for Staff
- Background and experience of ‘experts’ may be lacking

Flour Beetles

- Eggs coated with sticky substance
- Usually 7 or 8 Instars (range 5-7)
- On peanuts: egg to adult in 46 days
- On wheat feed: (98 F, <70% RH) egg to adult
 - Red Flour Beetle 19-20 DAYS
 - Confused Flour Beetle 25 DAYS

Flour Beetles

E g g s L a i d
(a v e r a g e)

(m a x)

R e d

3 2 7

9 5 6

C o n f u s e d

4 5 8

9 7 6

Flour Beetles

L I F E S P A N
(D A Y S) 8 0 F

R e d	M a l e s	5 4 7
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	F e m a l e s	2 2 6
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C o n f u s e d	M a l e s	6 3 4
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	F e m a l e s	4 4 7
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Structural Insects

- Do not infest food products, but can thrive in food plant setting:
- Domestic flies
- Fruit flies
- Cockroaches
- Ants
- As these pests may enter product zones, cannot be tolerated

Exterior Insects

- Cannot survive in food plant due to inappropriate habitat:
 - Grasshoppers
 - Crickets
 - Night fliers
 - Bees, wasps, hornets
 - Ground beetles
 - Fungus beetles
- Constant movement in search of suitable habitat, may enter product zones

Signs of Insect Activity

- Through daily awareness and inspection we can detect presence of these pests:
 - Trails in product dusting
 - Webbing or cast skins
 - Dead insects at floor-wall junctures
 - Physical damage such as chewed entrance holes

IPM for Food Processors

- Emphasis on non-chemical practices and controls:
 - Structural integrity of facility and processing systems
 - Cleaning efficiency
 - Pest monitoring
 - Training
 - Non-chemical controls
 - Chemicals as necessary

Structural Integrity

- Design and installation of facility and equipment allowing effective sanitation program:
 - Facilitates cleaning
 - Dust control adequate
 - Excludes pests
 - New and existing construction
 - Properly maintained!

Controlling Living Space, e.g.

- Sealing cracks and crevices in floors, walls, ceilings, under equipment mounting pads, between elements of construction
- Repairing facility defects in equipment such as insulation, inaccessible areas, lower sections of motor control panels, and other difficult to clean areas

Issues:

- Maintenance done on limited number of down days
- Limited capital budgets for necessary repairs and upgrades
- Work systems use same personnel for both cleaning and maintenance
- Scheduling coordination to accomplish both

Controlling Food Sources

- Requires a combination of proper system design and operation as well as thorough cleaning

System Design and Operation

- Dusting from transfer and processing systems must be controlled or eliminated
- Eliminate food deposits on equipment and structures
- Some of these deposits end up in difficult to clean areas and may result in insect harborage
- Excessive build-ups increase the areas to be cleaned and waste valuable cleaning resources

Cleaning

- Since it is impossible to eliminate ALL spillage or EVERY crack or crevice, thorough periodic cleaning is a MUST
- Cleaning must concentrate on the interiors of equipment as well as the processing and packaging environments

Cleaning Timing

- Schedules and frequencies should be set to disrupt insect life cycles
- Generally this means cleaning within 3 to 4 week cycles
- Insects- if present- are denied the opportunity to become established

Cleaning Thoroughness

- Required thoroughness takes into account the small amount of food insects need as well as the nature of the product residues to support insect development
- Access for cleaning is **CRITICAL**- some modification of equipment may be necessary to allow adequate cleaning or eliminate build-up points

Cleaning Efficiency

- Cleaning resources must be utilized effectively:
 - Master Sanitation Schedules with frequencies to interrupt insect life cycles
 - Documentation, written cleaning procedures, and follow-up audits
 - Access via catwalks, lifts, ladders
 - Vacuum capability provided in preference to compressed air

Issues:

- Limited opportunities for system interiors
- Cleaning not rewarding or ‘glamorous’
- Cleaning is hard- takes great effort
- Coordination of efforts can be challenging
- Must take advantage of cleaning opportunities during the run

Pest Monitoring

- Intensive monitoring activities with prompt follow-up to signals:
 - Inspection programs for incoming raw materials and ingredients
 - Monthly inspection of all plant areas
 - Pheromone trap monitoring
- Employee training in these areas

Training

- Employees must be properly trained to assure identification and reaction to program signals:
 - Pest identification, habits, and habitats
 - Importance of preventive practices
 - Swift, effective action when pests noted

Chemical Control

- Effectiveness of chemical controls limited by many factors:
 - Inadequate preparatory cleaning
 - Structural deficiencies
 - Low temperatures reducing pest respiration and movement
 - Life stages of target pest
 - Improper concentration of chemical as applied

Total Pest Management

- Effective measures required
 - Customers, laws, employee health
- Needs consistent, persistent, managed approach and effort
- Utilize all available tools, emphasize control of habitat
- Success measured over time