IPM in Stored Product Entomology

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What are “Stored Products”?  

• Bulk grains in bins and elevators  

• Transportation Industry-railcars, ships  

• Milling, processing, and warehouse industry  

• Urban environments (stores, homes)
Country Grain Elevator
Food Processing Plant
Flour Mill
Insects in Stored Products

- Internal feeders inside stored raw grains
- Difficult to kill immatures inside the kernel
- External feeders of stored grain
- Insect pests in mills, processing plants, and food warehouses
Lesser grain borer

*Rhyzopertha dominica*
Rice Weevil
*Sitophilus oryzae*
Angoumois grain moth
*Sitotroga cerealella*
Insect Pests: External feeders

- Often considered secondary pests
- Red flour beetle, sawtoothed grain beetle, rusty grain beetle
- Immature beetles vulnerable, easy to kill compared to the primary pests
Red flour beetle
*Tribolium castaneum*
Rusty grain beetle

*Cryptolestes ferrugineous*
Sawtoothed grain beetle

*Oryzaephilus surinamensis*
Indian meal moth (IMM)

*Plodia interpunctella*
Integrated Pest Management (IPM)

- Concept developed for field crops
- Define an Economic Injury Level (EIJ), then set a lower Economic Threshold (ET)
- Extensively sample for insects to monitor populations
- Apply insecticides only when ET is exceeded
Barriers to IPM in Stored Grain

• Large vertical 3-D storage structures make it difficult to sample effectively

• Hazardous environments for sampling

• Low value in storage system often eliminates paying scouts or consultants for sampling

• Regardless, there is room for improvement
Barriers to IPM in Processed Food

- Zero tolerance for insects
- Distribution chain from manufacturer to consumer is extensive, with many different sites for infestations to occur
- Impact of consumers regarding potential legal issues from pest infestation
IPM Programs for Stored Products

- Components of IPM programs in stored products are similar to those in other systems
- Sampling and monitoring are still employed as a means to reduce insecticide use
- Reduced-risk insecticides and other alternative controls are being emphasized
- Research on IPM system approaches
Symposium Topics

- Pheromones for monitoring and control
- Sampling programs for bulk grain
- Insect growth regulators (IGRs) as part of control programs
- IPM in food processing