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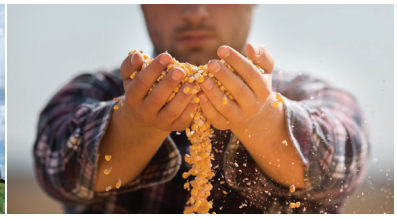


TECHNICAL INFORMATION BULLETIN

Management of Farm-Stored Grain Pests

Below:
Top - Red Flour Beetle
Middle - Granary Weevil
Bottom - Indian Meal Moth

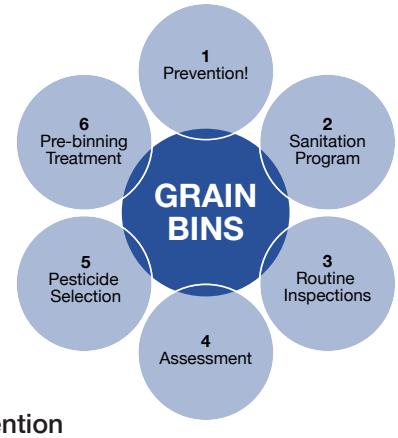
The Issue:

In the U.S., several species of beetles, moths and rodents can infest stored grains. Adults and larvae of several beetles and larval stages of moths can cause significant damage. This damage can result in potential grain buyers rejecting product, post-harvest losses and/or price reductions.[1]

Some of the arthropod pests found in stored-grains include: almond moth (*Ephestia cautella*), angoumois grain moth (*Sitotroga cerealella*), flour beetle (*Tribolium spp.*), granary weevil (*Sitophilus granarius*), Indian meal moth (*Plodia interpunctella*), maize weevil (*Sitophilus zeamais*), rice weevil (*Sitophilus oryzae*), and the saw-toothed grain beetle (*Oryzaephilus surinamensis*).[2]

The solution:

The solution to preventing and controlling farm-stored grain pests is through an integrated pest management (IPM) approach consisting of six steps:



1. Prevention

Properly store grains in a clean, dry environment to reduce or eliminate pest conducive conditions.[2] Prevent contact with old and broken grains, soil or dirt. Repair cracks and openings in the silo; repair roof leaks and eliminate all other moisture sources.[1] Use perforated bin floors to collect fine particles and prevent build up.[1] Redistribute grain regularly from the center of the silo to the top to prevent fine particle settling that can hold moisture.[1] Prevent condensation buildup by regulating temperature and aeration.

2. Sanitation Program

ALWAYS wear proper PPE when cleaning grain bins.

Establish a good housekeeping routine and remove older grain. Before storing new grain, remove all grain by shovel, sweeping, or with industrial vacuums. Remove dust, webbing, small particles and old grains from floors, walls, ceilings, fans, cracks and crevices, equipment or other areas that come in contact with the stored grains. Keep areas around the bins free of weeds and spilled grain.[2] Use grain cleaners such as gravity screens, perforated augers, rotary screens and aspirators to improve storability.[2,3]

3. Routine Inspection

Monthly inspections are recommended. Look for signs of grain damage and live insects. Light traps, lure pheromone kits and sticky traps can be used to collect and monitor pest activity. Monitor changes in temperature and carbon dioxide. Take grain temperature readings and air samples.

4. Assessment

If insects are found in a one-quart sample of collected grain, follow your local and state regulations and recommendations for use of damaged, stored grains. In addition, insecticides can be applied if the product is labeled for this use. Target pests by treating interior cracks and crevices and surfaces on floors, walls and ceilings. Always read and follow label directions, and check with local authorities before making any treatments.

5. Pesticide Selection

ALWAYS wear proper PPE when treating grain storage facilities.

ONLY pre-treat grain-storage facilities with a product approved for such use.

Fumigants, like aluminum phosphide, magnesium phosphide, methyl bromide, and sulfuryl fluoride, can be used for heavy infestations, but are not the focus of this technical bulletin. The lower the moisture level of the grain, the better insecticide products will work.[4]

6. Pre-binning Treatment

a. **DO NOT** make direct applications to grains.

b. **TREATMENT INSIDE THE GRAIN STORAGE BIN**
Stored Product Pests (exposed adult and immature stages)

i. **Fendona® CS** Controlled Release Insecticide may be used to treat grain storage facilities and other listed areas for stored product pest control.

ii. Before storing products, treat warehouses, production facilities, storage areas, rail cars, truck beds and other areas where products are stored.

iii. Apply insecticide at least two weeks before binning the new harvest.[2]

iv. Apply as a spot and/or crack & crevice treatment to cracks, crevices, and surfaces where pests have been seen or may have harborage.

v. Cleaning areas prior to use of this product will increase levels of control. Remove and destroy any foodstuffs infested with pests.

vi. Treat along the edge of the bin floor, on the walls, under floors, and as crack and crevices and spot application where pests are found or may have harborage.

c. TREATMENT OUTSIDE THE GRAIN STORAGE BIN:
Stored Product Pests (exposed adult and immature stages

i. **Fendona CS** may be used on outdoor surfaces and/or as a crack, crevice, and void treatment of buildings, porches, window frames, eaves, patios, garages, garbage dumps and other areas where pests are or may congregate or enter premises.

ii. Use the 0.025% or 0.050% rate unless otherwise noted.

iii. Perimeter Treatment – read and follow label directions to treat areas around and adjacent to the building. Treat other insect entry points such as doors, windows, under siding, decks, and eaves of structure. This product may be applied in compressed air, backpack or power spray equipment. An application rate of 0.5 to 1.0 fluid ounce concentrate per 1,000 square feet is desirable.
Apply in enough water to adequately cover the area being treated. Application should be made in such a manner to limit dripping and runoff on structural surfaces and plants. Alternate directions are to use 4 to 8 fluid ounces per 50 gallons of water.

About Fendona CS Controlled Release insecticide

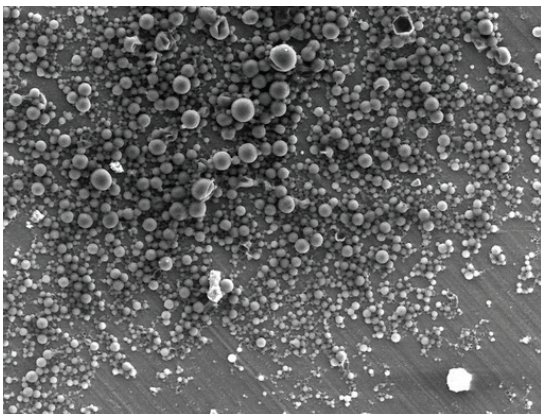


Fig. 1

IMPORTANT: Fendona CS is a controlled release insecticide in a microencapsulated formulation that allows the lipophilic microcapsules to adhere to the exoskeleton of arthropods.The properties of the formulation also allow the product to adhere to different surfaces like metal (Fig. #1, Scanning Electron Microscopy [SEM] image of Fendona CS microcaps on metal surface, BASF), wood, concrete and others.

Citations

1 Barbercheck, M. April 2018. Management of Stored Grain Pests in Organic Ecosystems. Art-5360. Penn State College of Agricultural Sciences. https://extension.psu.edu/management-of-stored-grain-pests-in-organic-systems

2 Rinehold, J. March 2020. Agronomic Crops. Farm-Stored Grain Pests. PNW Insect Management Handbook.

3 Johnson, D. W. and Townsend, L.H. 2003. Controlling insects in stored grain. Cooperative Extension Service Publication ENTFACT-145. Univ. of Kentucky. College of Agriculture. http://www.uky.edu/Ag/Entomology/entfacts/entfacts.html

4 Mason, L. J. and Obermeyer, J. 2010. Stored Product Pests. Purdue Extension E-66-W. https://extension.entm.purdue.edu/publications/E-66.pdf

Other resources:

https://extension.sdstate.edu/stored-grain-pests-spring-insect-and-disease-issues
http://www.grdc.com.au/GRDC-FS-GrainStoragePestControl www.grdc.com.au/GRDC-FS-GrainStoragePestControl
https://www.tsgcinc.com/news/grain-temperature-monitoring-improves-profits
https://www.gipsa.usda.gov/fgis/standards/general_provisions.pdf

For more information, consult the Fendona CS Controlled Release Insecticide label. EPA Reg. No. 499-570

Always read and follow label directions.