

DiaSource® Grain Storage Insecticide Application Procedures

Grain-handling equipment

Treat combine headers, augers, conveyor belts, empty trucks, and wagon beds with DiaSource D.E. using a hand/power duster or sandblasting gun/siphon gun that works on the Venturi principle. The pressure of the compressed air inlet into the sandblasting gun must be at least 100 psi. Dust DiaSource in hard to reach areas which may harbor insects, and surfaces that may come in contact with grain.

Empty Storage Facilities

Thoroughly clean storage facilities (bins, flat storages, ship holds, box cars, silos etc.) of grain debris. Clean grain debris in subfloor areas and under false floors. Treat floors, walls and ceilings with DiaSource D.E. at one to three pounds per 1,000 sq. ft. Treat the outside foundation of storage facilities with DiaSource to kill any exposed insects. Use a siphon gun or a hand/power duster for applying DiaSource D.E. For storage facilities equipped with aeration, apply the recommended amount of DiaSource D.E. through an aeration fan. It takes about two minutes to treat an empty 16,000-bushel capacity bin. After dusting with DiaSource there is no need to remove the dust prior to storing grain. Treat empty storage areas two weeks before storing grain. Redust each time storage area is emptied to kill residual insect populations.

Stored Grain

- 1) Empty Bin Treatment: Apply DiaSource D.E. to walls and floors of empty bins and storage areas at the rate of one (2) pound per 1,000 square feet of surface area prior to filling bins.
- 2) Grain Treatment: Apply DiaSource D.E. to the top two feet of the grain at time of storage, using 1-2 pounds per ton of grain, (28-56 pounds per 1,000 bushels for this top two feet of the treated grain). To prevent infestations in newly harvested grain, treat only the top two feet of the grain mass with DiaSource D.E. at the time of storage. If the grain is below 12% moisture, a 1 pound rate per ton is recommended. This rate is based on studies conducted on DiaSource D.E. at the University of Minnesota. For grain in trucks, apply DiaSource D.E. evenly to the grain surface. At time of unloading from the truck, DiaSource gets admixed with the grain. DiaSource D.E. can be applied to grain as it is being augered into a storage facility. The physical properties of grain such as test weight, angle of repose, and flowability are affected to some extent by D.E. However, when used as recommended (by treating the top two foot layer), the DiaSource treated grain constitutes a small portion of the total grain mass. Therefore, at the time of unloading, mixing of DiaSource treated layers with untreated grain will dilute the amount of DiaSource D.E. applied to grain, and the effects of DiaSource on physical properties of the grain are minimal.
- 3) Surface Treatment: Apply to the surface of grain at the rate of one (1) pound per 1,000 square feet after filling the bin.

Stored grain IPM and DiaSource® D.E.

Stored grain IPM involves replacing some or all insecticide applications with insect control practices such as sanitation, use of parasites or predators, aeration, and alternatives to conventional insecticides. A sound IPM program involves understanding how insect populations respond to grain temperature and moisture, understanding effects of insecticides on insect populations, developing procedures for sampling insects, determining the relationship between insect numbers and stored grain losses. No single control measure is effective for extended periods of time in controlling stored-grain insects. Therefore, a combination of techniques should be used. Any damage to the grain caused by insects is not replaceable. Thus, preventing stored-grain insect infestation is the key for protecting stored grain. The following are key IPM tactics for managing stored-grain insect pests.

Maintain weed free fields to reduce amount of weed seeds in the harvested grain.

Remove grain residues from combine headers, augers, elevator buckets, conveyer belts, grain transporting vehicles or containers and dust DiaSource D.E. on all surfaces that come in contact with the grain.

Maintain weed free surroundings around grain storage facilities.

Clean empty grain-storage areas of debris and grain residues. Seal cracks and crevices in and around the facility and treat the empty facility with DiaSource D.E.

Properly set the combine header to minimize kernel breakage during harvesting.

Store grain at 12% or less moisture. At this moisture range, grain can be safely stored for six months to a year.

Avoid adding new to old grain and uninfested to infested grain.

Clean grain before storage.

Treat newly harvested grain with DiaSource D.E. at the time of storage. Also, apply DiaSource to the grain surface.

When temperatures are above 65_ F use probe traps to check for insect activity. Use 10 traps for a 10,000 bushels of grain, and insert traps in the top 1-2 feet of the grain mass. At temperature below 65_ F, insects will be less active and at these cooler temperatures a trier or deep-bin cup samples may be useful in detecting insects.

Hang a pheromone-baited sticky trap to detect Indianmeal moth activity. Use 1 trap for 1,000 cu. ft. of head space.

Monitor grains temperatures and be alert to sudden changes in temperature. Changes may indicate insect or mold activity. Use aeration to equalize temperature differences within the grain mass. Remove samples monthly to ascertain grain moisture and quality.

Reduce pesticide use by making DiaSource D.E. a part of your stored grain IPM. Chemical grain protectants affect the insect's central nervous system. Some species have developed low to high levels of resistance to these protectants. DiaSource D.E. affects the waterproofing layer of insects; hence, insects are unlikely to develop resistance to Diatomaceous Earth.

NOTE: The DiaSource® D.E. recommendations are based on research. We wish to thank Bh. Subramanyam, Ph.D. (now at Kansas State University) for his work in the lab and field testing of our Harper Valley Diatomaceous Earth and for his assistance in compiling the Application Techniques. We were also pleased to have been included in the recently published Textbook; "Alternatives to Pesticides in Stored-Product IPM", edited by Dr. Subramanyam, in the chapter co-authored by him, "Inert Dusts.