Preliminary Tests on Control of Insects In Stored Segmented Seed

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Insects commonly attacking stored grains have been found in segmented sugar beet seed after prolonged periods of storage. Seldom have these insects been found in whole seed. No doubt the exposed seed germs of segmented beet seed, plus the dust or "flour" from the shearing process which accumulates on the seed units, afford greater feeding possibilities for the insects.

During recent years Dr. R. T. Cotton and Dr. J. 0. Frankenfeld of the U.S.D.A. Agricultural Research Administration, Bureau of Entomology and Plant Quarentine *(1.) (2)*[2] have conducted much research OJI the treatment of stored grain to protect it from storage insects. Both poisonous and non-poisonous types of dusts have been used in their work. Of the non-poisonous dusts, finely powdered magnesium oxide has been found to kill the insects and act as a repellarit against re-infestation. DDT dust has been the most promising of the poisonous kinds of chemicals used.

A preliminary study was conducted by the author during the summer of 1945 to determine the repelling or killing effect on Indian meal moth *(Plodia i/itcrpuncteUaJ* of certain materials already available. The materials included DDT, Sabadilla, Pyrocide, Pyrax, Arasan, "moth balls", and Dichloricide.

The conditions of the test were certainly much more severe than any normally encountered in the storage of segmented sugar beet seed.

The tests were conducted at Grand Junction, Colo., and Sheridan, Wyo. The segmented seed was all the same variety, 2 pounds in a paper bag constituting a lot or treatment, and all treatments were duplicated. An attempt was made (part A) to determine if the larvae of the Indian meal moth would move into lots of treated seed and (part B) to determine if larvae of this insect could survive on treated seed.

In studying the movement from infested to insect-free seed (part A), 2-pound paper bags of clean segmented seed, treated as shown in table 1 were placed in open boxes, and between the bags and completely surrounding them was placed waste material from the shearing operation which was heavily infested with Indian meal moth larvae.

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[5]Italic numbers in parentheses refer to literature cited.

Table 1.—Indian meal moth larvae in seed treatment, tests.

Treatment of seed	Live larvae present per pound of segmented sugar beet seed			
	At start	After 4 months	At start*	After 4 months
Check—untreated	0	182	25	120
Inside of bag walls treated with DDT	0	56	25	5
Moth balls (one per pound)	0	633	25	4
Dichloricide (1gram per pound)	0	258	25	1
DDT 3 percent (one oz. per 100 pounds)	0	49	25	1
DDT 3 percent 1½ ozs. per 100 pounds)	0	35	25	1
Subadilla (10 ozs. per 100 pounds)	0	281	25	5
Pyrocide "10" (1 oz. per 100 pounds)	0	165	25	6
Pyrax (12 ozs. per 100 pounds)	0	169	25	2
Arasan (16 ozs. per 100 pounds)	0	20	25	2

*Actually introduced by hand.

The mouths of the bags were, left open. Over the boxes containing the test material was thrown a light canvas cover. The seed treated with moth balls and dichloricide WHS placed in boxes separate from the other eight treatments.

After 4 months exposure of the small lots of seed to the insect-infested waste materia] the bags of seed were examined for the presence of insects. Live larvae were found in all bags regardless of treatment but those treated with Arasan and DDT dusts contained fewer than the other treatments, indicating that these materials were more effective as repellants (see table 1, part A). The presence of DDT on the inside lining of the bag may have considerable promise, since the insects entering the bagged seed generally follow the inside bag wall for a short distance before going into the seed, except in direct punctures of bags.

In Part B of the test, to each 12-pound bag of clean segmented seed were added f50 live Indian meal moth larvae and the bag sealed up, the purpose being to determine whether the materials on the seed would kill the insects. Four months later, counts were made for live insects and in all cases except the untreated check the mortality was great, in lots treated with DDT and dichloricide only one live insect was found, giving a kill of 96 percent, in the lots treated with Pyrax (non-poisonous) and Arasan two live larvae remained, while in seed stored in bags with inside walls treated with DDT five live ones were present. The count on the check or untreated lots showed 120 live insects or about a 5 to 1 increase over the original (see table 1, part B).

Under the conditions of these; tests it appears that dusting segmented sugar beet seed with DDT dusts before storing was much more effective in keeping away live insects than any other treatment except Arasan. DDT on the walls of the bags was also effective. When insects were placed in lots of seed already treated, the DDT dusts and Dichloricide were most deadly,

Further tests under more nearly normal conditions are planned. Powdered magnesium oxide will be thoroughly tested since it is a non-poisonous material and has shown such great promise in stored grains.

Literature Cited

1. Cotton, R, T. and Frankenfeld, J. C. 1945 Dust Treatment for Protecting Stored Seed. Seed World, Nov. *2,* 1945.

2. Cotton, R. T. and Frankenfeld, J. C. Protecting Stored Grain from Insect Attack. U.S.D.A., Agr. Res. Adm., Bureau of Entomology and Plant Quarantine, Div. of Cereal and Forage Insect Investigations. Bul. E-677. Dec. 1945.

Lygus Control on Sugar Beet Seed Isolation Plots By Dusting With DDT

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Tn the iniiial increases of breeding stocks of sugar beet seed it is quite essential that a large yield of good quality seed be produced. Generally these increases are small in area, usually less than 1/4 acre, and are plantings of mother beets or steckling roots.

Satisfactory seed yields can be assured by maintaining a high soil fertility level and optimum care throughout the growing season. Quality as reflected by germination is much harder to maintain, and many times the yields are high but quality low.

These lower germinations are caused principally by the attacks of lygus *(Lygus elisus* and *Lygus oblineatus).* Dusting to control lygus by killing the insects or repelling them has proved very satisfactory. Many chemicals have been tried in dust form on these isolations but none has been so effective as DDT in killing the lygus.

Two or three dustings per season using about. 25 to 30 pounds of 3-percent DDT has proved very effective in the control of this insect on the isolation plots at the Holly Experiment Station, Sheridan, Wyo.