

# Seed Treatment of Lima Beans

combination fungicide-insecticide seed treatments protect plants against soil-borne pests and permit increased yields

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**Seed treatment** of lima beans with fungicides—effective protection against seed decay caused by soil-borne fungi—does not protect against the attacks of wireworms, seed maggots, and spring-tails. Wireworms bore into the parts of the germinating seeds and into the roots, causing stunting, disfigurement, or death of the plants.

The seed-corn maggot—*Hylemya cili-crura* (Rond.)—remains one of the important pests of beans. The maggots bore into the cotyledons, plumules and roots, not only causing primary damage, but also allowing for the entrance of other organisms. The beans may be killed prior to emergence or plumule damage may result in baldheads.

Seed springtails—*Onychiurus* spp.—feed on the roots of the beans causing stunting and delayed growth, and in addition feed upon the plumules so that they later appear ragged or shot full of small holes.

Growers of large limas—particularly Concentrated Fordhook and Venturas—have been confronted recently with several problems; the choice of an insecticide because there is specificity in the effect of each material on a specific pest; chemicals controlling a pest in one area do not control it in another region; and most of the materials in common use are not too effective in protecting against damage from springtails which have become more prevalent in recent years.

The insecticides and fungicides chosen should be applied simultaneously to the beans as slurries or as liquid fixation treatments. Slurry treatment is the usual method and means the application of a thick suspension of the insecticide-fungicide mixture to the seeds by means of a slurry treater. The newer types of slurry machines do not injure germination if they are operated correctly. The machines should be carefully calibrated and only correct amounts of chemicals used, as overdosages may injure the seed.

Liquid fixation is the application of dry powders to seeds, and the introduction of enough moisture—0.5% for beans—to stick the chemicals to the beans. Wettable powders can be used as they possess adequate wetters and stickers. Only a small amount of seed is treated in this fashion.

The application of dry powders to

beans has not proved as effective in most instances as slurry or liquid fixation, as it is more difficult to apply stipulated amounts and have them remain on the seeds with subsequent handling.

The two insecticides commonly used for seed treatment are lindane and dieldrin. Proprietary combinations of these materials with fungicides are available on the market and should be used according to the manufacturers' specifications.

The insecticides listed below in this column have been satisfactorily combined with either thiram or captan as

slurry or liquid fixation treatments. The 75% materials for slurry treatments—such as Arasan SF-X and Orthocide seed protectant—are used at the rate of two ounces per 100 pounds of beans.

In a few areas of the state growers prefer dust applications with chloranil—for example Spergon.

Lindane applied as a slurry using one third ounce of 75% wettable powder per 100 pounds of beans, with an adequate fungicide, remains one of the best materials for all-around insect control. It has a rapid effect on wireworms which is desirable, and adequately controls the seed-corn maggot. At the specified rate, lindane killed from 88% to 96% of the wireworms in the seed zone in experimental plots. A reduction to one sixth ounce of 75% material reduced the kill to about 68%.

Aldrin, dieldrin, and heptachlor seem to give about the same results in protecting seeds against insect attack. All give excellent control of the seed-corn maggot, although in some tests heptachlor gave quicker kills of wireworms. Tests have been run over a seven-year period with these materials, and although occasional failures occur, the results are uniformly good.

More limited tests with endrin and isodrin indicate that they are the only materials capable of controlling spring-tail injury to germinating lima beans. Also, endrin—in particular—seems to possess good possibilities for control of the seed-corn maggot and wireworms.

Seed treatments are usually ineffective for the control of cutworms and the garden centipede.

In the Santa Clara Valley, aldrin, dieldrin, heptachlor, endrin, and isodrin have all given better protection against the seed-corn maggot than lindane. Several years tests in the Sacramento Valley, however, have given just the reverse—better control with lindane. The reason for the difference is not fully known as occasional tests in the Santa Clara Valley show lindane to better advantage. The difference may result in part from a greater overlap in generations of the maggot in the Santa Clara Valley—resulting in maggots of all stages in the ground at the time of planting. The infestations in the Sacramento Valley may

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Seed Treatment Materials

Insecticide (as 75% wettable powder)	Rate per 100 Pounds of Bean Seed*
Aldrin .....	2/3 oz.
Dieldrin .....	2/3 oz.
Endrin .....	2/3 oz.
Heptachlor .....	2/3 oz.
Isodrin .....	2/3 oz.
Lindane .....	1/3 oz.

\* Equivalent to a per acre rate of application of from one quarter ounce to one half ounce of actual chemical.



Value of seed treatments in test planting of Fordhook lima beans; center left row, lindane alone; right, lindane and Arasan SF-X

