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CONTROL OF VEGETABLE LEGUMES DISEASES BY FUNGICID SEED TREATMENTS

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INTRODUCTION

In the Caribbean cryptogamic diseases are very numerous on beans (Phaseolus vulgaris). In Guadeloupe, amongst the soil borne pathogens, Pythium aphanidermatum, Rhizoctonia solani, Sclerotium rolfsii and Fusarium solani induce pre or post-emergence damping off or, further, collar rot and root necrosis.

Foliage diseases are not less important. During the dry and cool season powdery mildew (Erysiphe polygoni) and rust (Uromyces phaseoli) occur. Anthracnose caused by Colletotrichum lindemuthianum, splash dispersed either by rain or by overhead irrigation may take more importance in the future when introduced with seeds originating from temperate countries if they are sown during a cool and wet period (ex. December 1971).

It would be ideal for the grower to have resistant varieties, and breeders endeavour to find them. Presently the most efficient way of control is obtained from fungicid treatments. Whenever an active product is available, it is important to apply it at the best place, at the best time so that the plants are secured at the lowest cost. Possibilities of food pollution must not be forgotten either.

In this connection seed dressings, when efficient a long time after germination, are interesting. They can be done by cooperative or official organisms for growers lacking spraying equipment.

Our experiments deal with two fungicides, Benomyl and Chloroneb, together well known for their syatemic properties. Benomyl (du Pont's Benlate 50 W P) is translocated up to the foliage. Thapliyal and Sinclair (1970) showed that in soybean seed, benomyl (or a compound related to it) becomes first localized in the cotyledons, our experiments show that it is then transplocated to the leaves.

Chloroneb is also able to get into the soybean seed and may be found in the hypocotyl and roots.

MATERIALS AND METHODS

Most of the experiments were done on beans (Phaseolus vulgaris var. Contender) some trials on Cowpea (black eye). Seeds were dressed at three rates: 2‰, 4‰, and 8‰ W.P., with addition of an equal amount of water to obtain adherence of the powders on the seeds.

Preliminary trials tested the phytotoxic action of the treatment on seed germination and growth of bean seedlings, Benomyl did not exert any toxic effect at any rates. Chloroneb at 8‰ reduced the percentage of germination and the seedling weight. This action was enhanced when combined with benomyl.

RESULTS

BENOMYL EFFECT ON AERIAL DISEASES

Powdery mildew

Repeated inoculations were done on plants grown in a greenhouse. Caution was taken not to wet the leaves during watering, so that the conditions for disease development were better than in nature. At blooming the non-treated plants had their leaves entirely covered with powdery mildew.

At 2‰ the leaves were moderately attacked, and at 4‰ only a few spots appeared.

Demosan was inefficient against the disease and when added did not change the benomyl action. Similar results were obtained on Cowpea (black eye)

Anthracnose

Seeds of red kidney beans, showing characteristic spots of the disease were treated with benomyl. Six days after the beginning of the germination, cotyledons were taken off for observation.

Item	% Observed for		
	non treated	Benomyl 2%	Benomyl 4%
healthy cotyledons	12	26	38
cotyledons with cicatrized or limited anthracnose lesions	42	71	58
cotyledons with large anthracnose lesions	26	1	0
other attacks*	20	2	4
sporulation (Colleto	+	0	0
sporulation (Fusarium	+	0	0

*mainly Fusarium solani

There is curative effect of the fungicide even at 2%. A low rate of Benomyl is sufficient to stop the sporulation. At 4%, the plants issued from severely infected seeds never showed disease symptoms during all their development.

CHLORONEB EFFECT ON SOIL BORNE PATHOGENS

Pythium aphanidermatum

Seedlings were grown in pots inoculated with a disc from an actively growing Pythium colony on oatmeal agar.

After seven days, an observation was done and the disease noted from 0 to 100 (100 corresponding to the death of the plant).

% disease occurrence			
no treated	Chloroneb 2%	Chloroneb 4%	Chloroneb 8%
100	6	11	26

The best results are obtained from a low rate of chloroneb, probably in relation with a weakening phytotoxic effect on the plants.

Sclerotium rolfsii

Experiments carried out by Beyries (1969) had shown that seed dressing of beans was very efficient against S. rolfsii. He noticed also that high rate of Chloroneb incited phytotoxicity. At 2.5‰ and 5% the protection was complete. These results obtained in temperate climate were checked in Guadeloupe.

CONCLUSION

Some experiments are yet necessary in the field to check these results. Some growers in Guadeloupe have received treated seeds at the following rates: Benomyl 4% W P and Chloroneb 2% W. P The first results are promising, others fungi will be tested too.

LITERATURE CITED

Beyries A. 1969. Efficacité de quelques rongicides systémiques contre Rhizoctonia (Corticium) solani Kuhn par traitements de semences de Haricot et de radis. Phyt. phytopharmacie 2: 107-116.

Messiaen C.M. et Lafon R. 1970. Les maladies des plantes maraicheres 441 pp. illustr. I.N.R.A.

Thapliyal P.N. and Sinclair J.B. 1970. Uptake of 3 systemic fungicides by germinating soybean seed. Phytopathology 60: 1373-1375.