

Field Assay of Seed Dressing Fungicides for Germination of Groundnut Seed

by

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Introduction : Poor germination of groundnut (*Arachis hypogaea* L.) seeds is a common observation in fields. Improvements in germination percentage by checking pre emergence rotting of groundnut seeds with seed treatments have been reported with the use of one organic sulphur and two organo mercurials by Shaw (1942) ; with Arasan, 2% Ceresan and Spergon by Tisdale (1945) ; and with organic mercurial fungicides by Morwood (1953) and Purs (1960). Nema, Jain and Asthana (1955) reported seed treatment of groundnut with Ceresan, Agrosan GN and Fernasan, beneficial at pre emergence stage. Field trials were conducted in Rajasthan for five years with seed dressing fungicides to study their efficacy for increasing germination of groundnut seed and the results are presented in this paper.

Materials and Methods : Hand shelled seed of groundnut variety Rajasthan Selection No. 1 was dressed with appropriate amount of fungicide in tin containers by constant hand shaking for 15 minutes so as to give an uniform coating over them. Treated and untreated seeds were dibbled at the rate of one seed each in holes at distance of 30 cms in 4 rows placed 45 cms apart in plots of 6 m × 1.8 m with six replications. The germination of seed was recorded till 15 days after sowing. Non germination seeds were found invariably to decay within the soil with profuse growth of fungi in which *Rhizopus arrhizus* Fischer., predominated.

Results and Discussion : The germination percentage of groundnut seed, its value obtained by angular transformation along with critical differences at 1 and 5 percent levels of significance for the five year's data are presented in table 1.

As is evident from the results, the germination percentage was better in all treatments throughout except in case of sulphur dust included in first two years. The results were highly significant at 1 percent level in 4 years and at 5 percent only in fifth year. In the first two year's trials with 8 treatments, Ceresan @ 3 and 4 g/Kg and Agrosan GN and Harvasan @ 3 g/Kg were superior to others even at 1% level, Ceresan at both doses gave significantly better performance than other two in second year at 5 percent level and for future trials, therefore, only lower dose was tested. In the third year of the

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TABLE. Germination of groundnut seeds with different seed dressers during five years of field trials

Name of the treatment	Dose	I Year		II Year		III Year		IV Year		V Year	
		Equiv. %	Equiv. %	Equiv. %	Equiv. %	Equiv. %	Equiv. %	Equiv. %	Equiv. %		
Agrosan GN	3 g/kg	62.6	78.8	53.1	64.0	51.5	61.3	80.4	97.2	77.0	94.9
Ceresan	3 g/kg	64.6	81.6	57.9	71.8	51.5	64.3	78.8	96.2	80.0	97.0
Tillex	3 g/kg	49.7	58.2	43.7	47.7	49.3	57.5	69.6	87.8	73.0	91.4
Lunasan	3 g/kg	49.5	57.8	44.5	49.1	49.1	57.1	69.6	87.9	71.0	89.4
Hervasan	3 g/kg	60.1	75.2	52.4	62.8	51.5	61.3	71.6	90.0	76.0	94.2
Ceresan	4 g/kg	65.9	83.3	58.9	73.3						
Sulphur dust	4 g/kg	45.8	51.4	39.9	41.2						
Thiram	4 g/kg					52.2	62.4	75.2	93.5	79.0	96.3
Beej powder	3 g/kg					53.2	64.1				
Phygon XL	3 g/kg							67.6	85.5	76.0	94.2
Shell seed dresser DA	3 g/kg							74.1	92.5	76.0	94.2
Mercurine	3 ml/kg							77.7	95.5	84.0	98.9
Control		48.7	56.4	40.5	42.2	45.2	50.3	66.5	84.1	66.0	83.5
C.D. 5%		8.05		4.43		1.84		8.04		9.00	
C.D. 1%		10.81		5.93		2.47		10.74			

trials, these three fungicides along with Thiram (newly tested) were significantly superior to others at 5 percent level. In the fourth year these four fungicides and newly introduced Shell seed dresser DA and Mercurine (liquid) were significantly better at 1 percent level and in fifth year all except Lunasan and Tillex were superior at 5 percent level.

Looking to the mean percentage germination calculated for the number of years the particular fungicide has been tested, Ceresan @ 3 g/Kg has shown best results (82.18) among mercurials, followed by Agrosan GN (79.24) and Hervasan (76.7) tested for 5 years; the average figures for these three compounds for last 2 years were 96.6, 96.05 and 92.1 as compared to 93.35 and 97.2 for Shell Seed dresser DA and Mercurine respectively. Comparing the average for last 3 years when Thiram was also used, Ceresan was the best with 85.8 percent germination, followed by Agrosan GN, Thiram and Hervasan giving 84.46, 84.06 and 81.8 percent germination. Thus among dry mercurial compounds, Ceresan @ 3 g was the best, Mercurine was good for liquid treatment and Thiram among the non mercurials. So far as the cost is concerned Agrosan GN was the cheapest.

Evans and Poole (1938) and Crosier (1944) observed the presence of many saprophytic or weakly pathogenic fungi on seed and soil and proved that such microorganisms under suitable conditions are enough to retard germination and emergence of groundnut seeds. Shaw (1942) during his tests found

that most of the decay of groundnut seeds took place during first 3-4 days after planting. For the germination of seeds in field it is, therefore, very important to provide a suitable protectant in the initial stages against the seed rotting fungi existing on seed and in soil. Improvement in emergence of groundnut seed with all other fungicidal dressings has been observed by the authors in three trials except with sulphur dust. These results are in line with those observed by Shaw (1942), Tisdale (1945), Nema *et al.* (1955) and Purss (1960) in the laboratory and by Gibson (1950) and Morwood (1953) in field.

There are all possibilities that the soil temperature and moisture prevalent at seeding time might be important factors indirectly in pulling down the germination of seeds. Fenne (1946) and Wilson (1950) observed that these factors may vary from season to season and place to place resulting in differences in performance of the same chemical, irrespective of the similarity in treatment and other cultural practices in groundnut seed treatment tests. Before reaching to any final results about efficacy of different fungicides it was, therefore, considered essential by the authors to continue the groundnut seed dressing trials for five years so as to cover possibility of variability in the climatic conditions prevailing at sowing time in the different years.

Summary: During five year's field trials, eleven seed dressing fungicides, 8 mercurials namely Ceresan @ 3 and 4 g, Merculine @ 3 ml, Agrosan GN, Tillex, Lunasan, Hervasan, Beej powder, Shell seed dresser DA @ 3 g and 3 non mercurials Phygon XL and Sulphur dust @ 3 g and Thiram @ 4 g/Kg were used for treating the groundnut seeds before sowing.

All fungicides except sulphur increased germination significantly. Ceresan @ 3 g/Kg, among the dry mercurials, merculine for liquid treatment and Thiram @ 4 g/Kg, were found to be the best for increasing germination percentage. Agrosan GN @ 3 g/Kg was however, the cheapest and significantly at par in efficacy with Ceresan.

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REFERENCES

- Crosier, W. F. 1944. Seed borne micro-organisms. *New York (Geneva) Agr. Expt. Sta. Ann. Rept.*, 62 : 56-57.
- Evans, M. M. and R. F. Poole. 1938. Some parasitic fungi harbored by peanut seed stock. *Jour. Elisha Mitchell Sci. Soc.*, 54 : 190-91.
- Fenne, S. B. 1946. Report of the regional peanut seed treatment tests conducted in 1946. *U. S. Dept. Agr. Plant. Dis. Rept.*, 30 : 461-70.
- Gibson, I. A. S. 1950. In overseas Food Corporation Scientific *Dep. E. Afr. Rep.*, 1949-50 : Sec. 19.

- Morwood, R. B. 1953. Peanut Pre emergence and Crown rot investigations. *Qd. J. Agric. Sci.*, 4 : 222-36.
- Nema, K. G., A. C. Jain and R. P. Asthana. 1955. Further studies on *Aspergillus* blight of groundnut seedlings. Its occurrence and control. *Indian Phytopath.*, 8 : 13-21.
- Purss, G. S. 1960. Further studies on the control of Pre-emergence rot and Crown rot of Peanuts. *Qd. J. Agric. Sci.*, 17 : 1-14.
- Shaw, L. 1942. Results of seed treatment test on peanut. (Abst.) *Phytopathology*, 32 : 649.
- Tisdale, W. B. 1945. Treat peanut seed for better stands. *Florida Agr. Expt. Sta. Press Bul.*, 610.
- Wilson, C. 1950. Peanut seed treatment. U. S. Dept. Agr. *Plant Dis. Repr.*, 34 : 87-95.

A Study on the Alkali Soils of the Krishnagiri Reservoir Project Area

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Of late considerable emphasis has come to be laid on augmenting food production by all possible means. In this, the role of irrigation projects needs no emphasis. The irrigation projects, instead of being 'saviour' to the farming community, sometimes bring in their wake problems of salinity and alkalinity. The Krishnagiri Reservoir Project in Dharmapuri district is one such, and more than one third of the total ayacut of 5,000 acres under its left main canal have become completely alkaline in the course of six years from the inception of the project. The causes for alkalinity in this area and the remedial measures for reclaiming the affected fields and the prospects of growing high yielding varieties in this area are discussed in this paper.

Review of literature: Sanyasi Raju and Govinda Iyer (1955) reported that in the Cauvery-Mettur Project area, application of 5,000 lb of green manure was better than that of gypsum at 2½ tons per acre and other chemical ameliorants in the reclamation of alkali lands for better crop performance. Govinda Iyer *et al.* (1963) observed that there was a close correlation between the exchangeable sodium percentage values and pH of the alkali soils of the Amaravathy ayacut area. Velayutham *et al.* (1967) in their study on the characteristics and reclamation of a typical alkali soil of Somayanulloor farm, Madurai, also reported a close correlation between the exchangeable sodium percentage value and the pH of the alkali soil. Krishnamurthy and Premnathan (1968) studied the problems of salinity and alkalinity besetting the paddy fields adjoining the sea-coast in Tamil Nadu and suggested remedial measures for overcoming them.

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