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# Fungicide Treatments of Blackgram Seeds for the Control of Storage Fungi

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ABSTRACT

Blackgram seeds treated with five fungicides were stored for several months. Up to the initial storage period of three months, the effect of fungicide treatments on the yield potential of the stored seeds was not exhibited. But Thiram and Captan treatments maintained the potential for five months or more, while that of seeds treated with other fungicides or untreated, declined markedly.

## INTRODUCTION

Seeds appear to be a nutritive reservoir for the development of both field pathogens and storage fungi. Many serious diseases of cereals, pulses oilseeds, vegetables, cotton, etc. are transmitted through the seeds. Similarly many storage fungi affect seed germination and seedling vigour of various crops. It has become a practice to treat the seeds with fungicides at the time of sowing to control the seed-transmitted field pathogens. But the role of storage fungi in the yield loss is less understood and the present study is to assess the yield loss in blackgram (*Phaseolus mungo* L.) due to storage fungi and to find out suitable control measures against this loss.

## MATERIALS AND METHODS

Freshly harvested blackgram (variety Co. 1) seeds were stored for one month in a glass jar and were assessed for the presence of storage fungi by the standard blotter and agar media technique (Neergaard and Saad, 1962). Five species of storage fungi frequently encountered were used for treating freshly harvested, surface sterilized blackgram seeds in such a manner to give a load of $10^4$ spores per g of seeds. The treated seeds were properly dried under shade for three days and stored in glass stoppered bottles for one month. After the storage, the seeds were sown under greenhouse conditions Precentage seed germination and shoot and root (dry) weight of the seedlings were assessed after 30 days of growth.

Freshly harvested Co. 1 blackgram seeds were treated with five different fungicides at the rate of 2 g/kg of seeds and stored. Untreated seeds served as control. After 1, 3, 5 and 7 months of storage, the seeds were sown in the field in beds of 6 x 3 m size with four replications. Yield of

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seeds per plant was recorded in each treatment.

## RESULTS AND DISCUSSION

*Aspergillus flavus* Link, *A. niger* van Tieghem, *Rhizopus nigricans* Ehrenberg, *Helminthosporium tetramera* Mc Kinney, *Pestalotia* sp., *Fusarium solani* (Martius) Appel and Woolenweber, *F. moniliforme* Sheldon, *Curvularia lunata* (Wakker) Boedijn, *C. pallescens* Boedijn, *Alternaria tenuis* Auct., *Rhizoctonia bataticola* Maubl. and *Chaetomium trilaterale* Chivers were isolated from the stored blackgram seeds. Among them *H. tetramera*, *A. flavus*, *Pestalotia* sp., *R. nigricans* and *F. solani* were more frequently isolated and the effect of these five fungi on seed germination and seedling vigour was tested (Table I). These fungi did not affect the seed germination and shoot development significantly, but root development was very much affected.

TABLE I. Effect of storage fungi on seed germination and seedling vigour of blackgram

| Fungi | Seed germination % | Shoot weight in g/plant | Root weight in g/plant |
|---|---|---|---|
| *H. tetramera* | 100 | 2.33 | 0.33 |
| *A. flavus* | 95 | 2.21 | 0.33 |
| *Pestalotia* sp. | 95 | 2.36 | 0.21 |
| *R. nigricans* | 100 | 2.42 | 0.36 |
| *F. solani* | 100 | 2.22 | 0.25 |
| Untreated | 100 | 2.70 | 0.69 |
| C. D.(P = 0.05) | N.S. | N. S. | 0.12 |

N. S. - Not significant

The data presented in Table II show that up to three months of storage, the seeds do not get deteriorated even if they were not treated with fungicides. After five months the yield potential of the seeds gets reduced. But Thiram or Captan treatments prevent seed deterioration in storage.

TABLE II. Efficacy of fungicides in the protection of seeds during storage

| Fungicide | Yield of seedling plant raised from seeds stored for different periods | | | |
|---|---|---|---|---|
| | 1 month | 3 months | 5 months | 7 months |
| Thiram | 32 | 35 | 38 | 36 |
| Captan | 33 | 31 | 32 | 34 |
| Agrosan | 31 | 34 | 26 | 27 |
| Plantvax | 30 | 35 | 23 | 20 |
| Vitavax | 32 | 34 | 20 | 18 |
| Control | 32 | 33 | 27 | 21 |
| C. D. (P = 0.05) | N.S. | N.S. | 4 | 3 |

N. S. - Not significant

Most of the fungi isolated from blackgram seeds have been found to be the common storage fungi occurring on paddy (Vidhyasekaran *et al.*, 1966), groundnut (Lalithakumari *et al.* 1972), gingelly (Vidhyasekaran *et al.*, 1972, castor (Lalithakumari *et al.*, 1973) and on many other crops. *Pestalotia* sp. alone appears to be specific on this

crop. Storage fungi are known to affect seed germination (Swarup, 1970) but the present studies reveal that root development is highly affected due to these fungi. Vidhyasekaran *et al.*(1970) showed that these storage fungi produced phytotoxins which did not inhibit seed germination but affected the root development markedly. The present studies also showed that the yield of plant is affected by the storage fungi. This finding emphasizes that the seed treatments with fungicides should be done immediately after harvest to eliminate the storage fungi.

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