INTERNATIONAL JOURNAL OF PLANT PROTECTION / VOLUME 5 | ISSUE 2 | OCTOBER, 2012 | 268-271

RESEARCH ARTICLE

Effect of seed dressing fungicides and bioagents on seed borne fungi, seed germination, shoot- root length and seedling vigour index of sorghum at different storage periods

■ MINA D. KOCHE*, R.M. GADEKAR, V.V. KAPSE AND S.A. KONDE

Department of Plant Pathology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, AKOLA (M.S.) INDIA

ARITCLE INFO

Received : 16.06.2012
Revised : 20.07.2012
Accepted : 28.07.2012

Key Words :
Seed borne mycoflora,
Seed dressing fungicides,
Bioagents, Sorghum

* Corresponding author:
mdkoche@gmail.com

ABSTRACT

Sorghum seed showed association of twelve fungi Among the fungicides and bioagents tested for their efficacy against seed borne mycoflora to improve seed germination and plant health study was made on fungal association with sorghum, seed germination percentage, shoot – root length and seedling vigour index which decreased as the storage period increased. Seed treatment with thiram + carbendazim (1:1) 3g/kg of seed was found superior in controlling the seed borne mycoflora (0.50 to 0.0%), increasing seed germination (88.00 to 71.00%), shoot length (12.8 to 10.82 cm), root length (7.3 to 5.45 cm) and seedling vigour index (1768 to 1155).

How to view point the article : Koche, Mina D., Gadekar, R.M., Kapse, V.V. and Konde, S.A. (2012). Effect of seed dressing fungicides and bioagents on seed borne fungi, seed germination, shoot-root length and seedling vigour index of sorghum at different storage periods. *Internat. J. Plant Protec.*, **5**(2) : 268-271.

INTRODUCTION

Sorghum [*Sorghum bicolor* (L.) Moench] is one of the major crops among the millet grown in the dry land. It is mainly grown in the deccan plateau, central and western India apart from a few patches in North India. Seed borne mycoflora refers to diseased appearance of grains, resulting from infection of developing grains by one or more fungal species. Seed borne pathogens affect the seed germination which result into reduction of plant population ultimately lowering the yield. The present investigation was undertaken to see the effect of seed dressing fungicides and bioagents on seed borne fungi, seed germination, shoot – root length and seedling vigour index at different storage period.

MATERIALS AND METHODS

Seed sample of sorghum cultivars CSV-15 were collected from sorghum Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during 2007, for seed health testing and mycoflora associated with seed. Four fungicides *viz.*, carbendazim 0.1 per cent, thiophanate methyl 0.3 per cent, thiram 0.3 per cent, thiram + carbendazim (1:1) and two bioagents *viz,. Trichoderma viride* 4 g/kg seeds and *Pseudomonas fluorescens* 10 g/kg of seed were used as a seed dresser.

Naturally infected sorghum seeds were treated with calculated amount of fungicides and bioagents and thoroughly shaken in conical flask for 15-20 min. to achieve the uniform coating on seed. Treated and untreated seeds were kept under ambient storage conditions in polythene bags. Initial seed germination, fungal association and seedling vigour index were recorded at the time of storage and subsequent observations at monthly interval were recorded. Fungal association with sorghum seeds was tested by blotter method and germination and seedling vigour index were tested by employing paper towel method.

Two hundred seeds of each treatment treated and untreated were tested for fungal association. Observations

were recorded after seven days of incubation. For germination and seedling vigour index, 200 seeds treated and untreated were sown at equidistance on two layers of moist towel paper at 45 cm x30 cm size lined with butter paper and then covered by another moist towel paper. The paper was rolled in many folds and the rolls were placed in upright position in tray containing small amount of water, seven days after sowing the towel paper was unrolled and the number of germinated seed, shoot and root length of seedling were measured.

RESULTS AND DISCUSSION

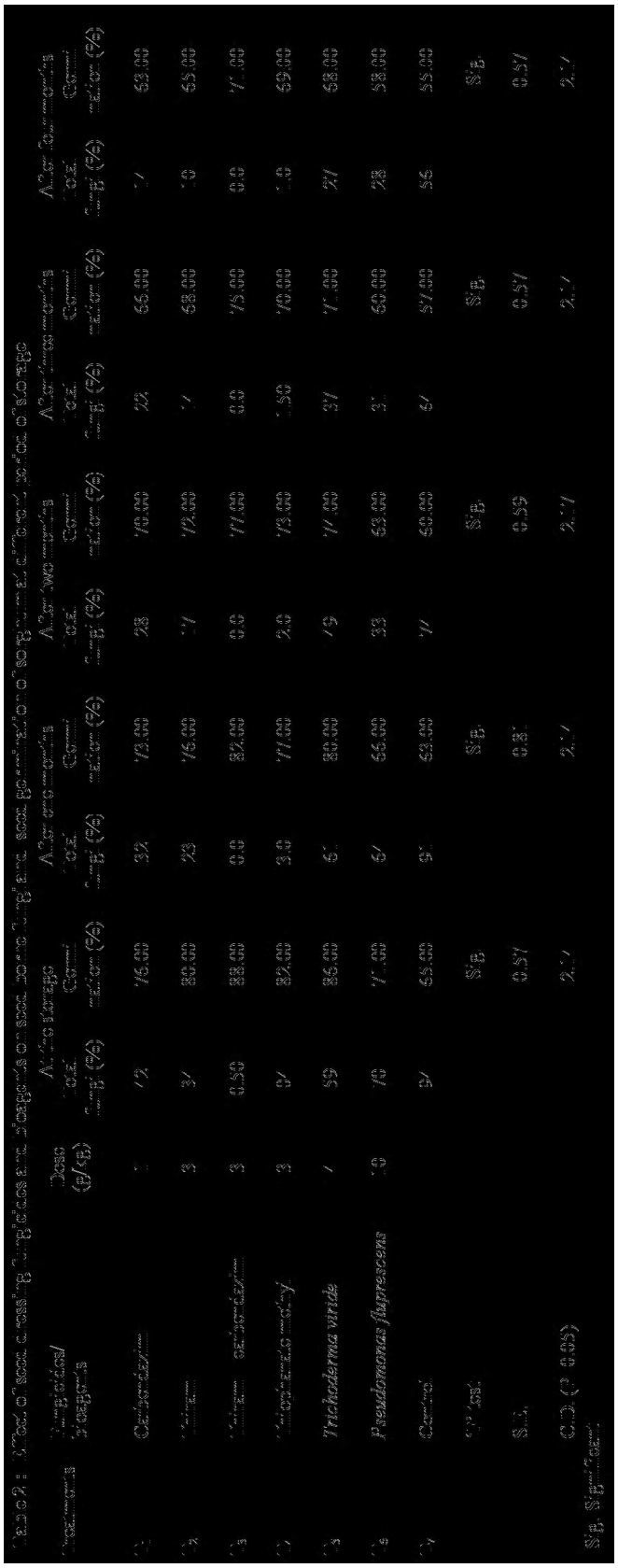
Four fungicides and two bioagents were studied for their effect on seed borne fungi, seed germination, shoot length, root length and seedling vigour index for different periods of storage. Seed borne mycoflora of sorghum seed were assessed at the time of storage, 1,2,3 and 4 months after by blotter paper method and seed germination by paper towel method.

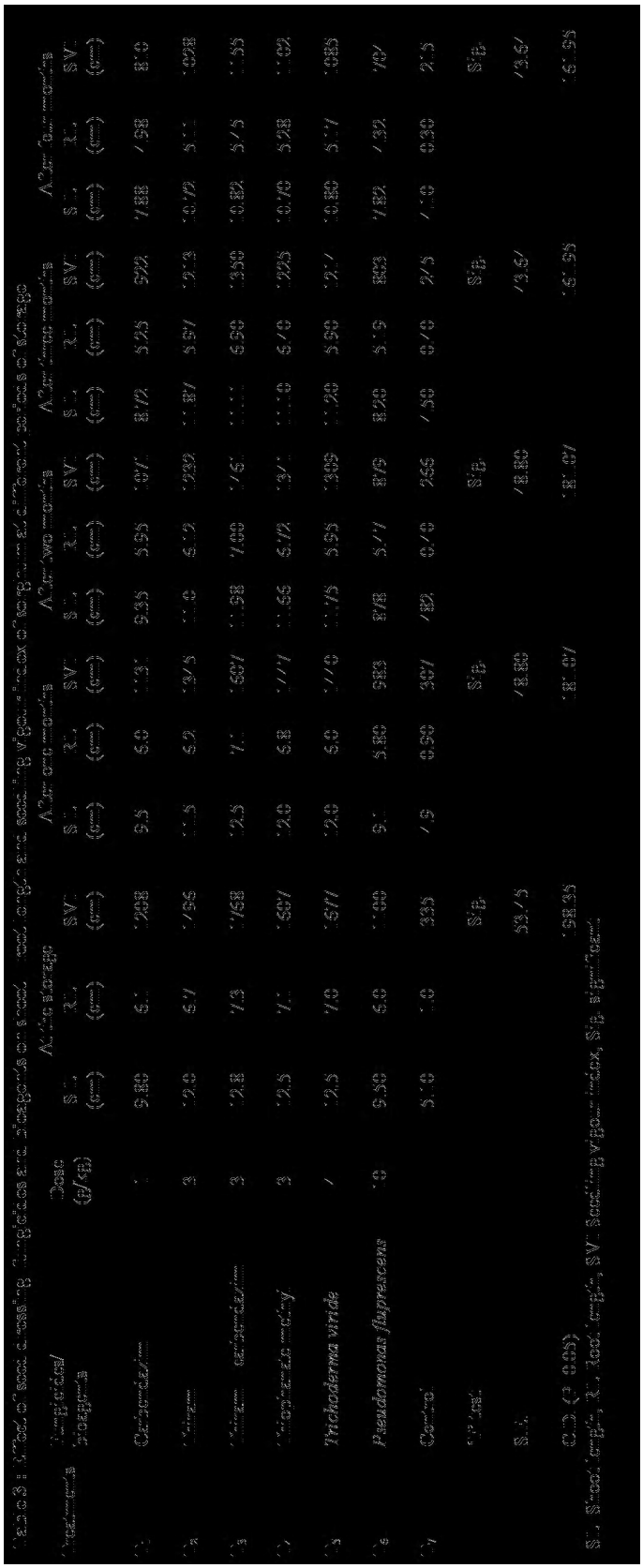
The result obtained in standard blotter method showed that CSV-15 sorghum cultivar recorded twelve fungi belonging to evevan genera *viz., Alternaria, alternata, Aspergillus flavus, A. niger, Acremonium strictum, Bipolaris* spp., *Curvularia lunata, Cladosporinum oxysporium, Cercospera* spp., *Drechslera halodes, Fusarium moniliforme, Phoma sorghina* and *Penicillium* spp. (Table 1).

Table 1 : Per cent association of seed borne fungi of sorghum seed (blotter paper method)

Seed borne fungi	Variety (CVS-15)
1. *Acremonium strictum*	05
2. *Alternaria alternata*	01
3. *Aspergillus flavus*	45
4. *A. niger*	13
5. *Bipolaris* spp.	05
6. *Cercospora* spp.	03
7. *Cladosporium oxysporium*	03
8. *Curvularia lunata*	28
9. *Drechslera halodes*	01
10. *Fusarium moniliforme*	63
11. *Penicillium* spp.	01
12. *Phoma sorghina*	01

It was observed that, in general fungal association with sorghum seed was reduced as the time of storage increased, probably due to decrease in seed moisture with increase in time of storage. Maximum fungal association (94.00%) was recorded at the time of storage, where as minimum fungal association (50.00%) was recorded after four months of storage. Seed treatment with thiram + carbendazim (1:1) was found superior over all other treatments at the time of storage,





1, 2, 3 and 4 months of storage. Bioagents, *Trichoderma viride* and *Pseudomonas fluorescens* did not show lower fungal association as compared to fungicidal treatments but it was quite low than that of control (Table 2). Similar reports were made by Prajapati *et al*. (2003) in chickpea and Srivastava and Tripathi (1998) in sugar beet.

In studies of seed germination, shoot length, root length and seedling vigour index of stored seed treatment with fungicides and bioagents, it was observed that per cent germination, shoot root length and seedling vigour index reduced as the time of storage increased. The present findings correlate with those of Kanwade *et al*. (1986) in case of cotton seed. Initially untreated seed showed 65.00 per cent germination at the time of storage which reduced to 55.00 per cent after four months of storage. Among the fungicidal treatments thiram + carbendazim (1:1) was found best and recorded higher values regarding seed germination (88.00, 82.00, 77.00 and 71.00 % at the time of storage, 1,2,3 and 4 months period of seed storage, respectively) (Table 3).

Bioagent *Trichoderma viride* also showed significant increase in seed germination. The present finding correlates with Mathivanan *et al*. (2000). Indira *et al*. (2006) also reported increased germination in *Trichoderma* treated seed. As regards shoot-root length and seedling vigour index, all the seed treatment showed increase in shoot-root length and seedling vigour index. Highest shoot length, root length and seedling vigour index was recorded in thiram + carbendazim (1:1) throughout the storage period of four months (Table 3). Sudheer Kumar and Jain (2004) reported the similar observation in barley. Fungicidal seed treatment enhanced the seed germination, shoot-root length and seedling vigour index. Dakshinamoorthy and Sivaprakasam (1989) reported the increase in vigour index values *i.e*. per cent germination and seedling length in carbendazim and thiram treated seed. Subrahmanya *et al*. (1988) also found increase in seedling vigour index of sorghum in thiram treated seed.

REFERENCES

Dakshinmoorthy, T. and Sivaprakasam, K. (1989). Effect of seed treatment with fungicides and insecticides on the seedling vigour index. *Madras Agric. J.* ,**75:**166-169.

Indira, S. Muthusubramanian, V. Tonapi, V. Varanvasiappan, S. and Seetharama, N. (2006). Utility of biocontrol agents in the suppression of seed-borne pathogenic mycoflora and their effect on seed quality in sorghum [*Sorghum bicolor* (L.) Moench]. *Archives Phytopathol. & Pl. Prot.,* **39**:379-387.

Kanwade, L.R., Sathe, P.E., Ingle, N.J. and More, H.G. (1986). Storage studies in cotton seeds. *Curr. Res. Reporter,* **2**.

Mathivanan, N. Shrinivasan, K. and Chelliah, S. (2000). Biological control of soil borne disease of cotton, egg plant, okra and sunflower with *Trichoderma viride*. *Fur zeitschrif pflankra nkheiten & Dflanzenschutz,* **107**:235-244.

Prajapati, R.K. Srivastava, S. S. L. and Chaudhary, R.G. (2003). Incidence of chickpea dry root rot in Uttar Pradesh and Uttaranchal and efficacy of seed dressing fungicides on seed germination of seedling infection. *Farm Sci. J*., **12**:107-172.

Srivastava, S. N. and Tripathi, R.C. (1998). Management of sugarbeet seedling disease complex by combination of fungicide. *Indian Phytopath*., **51**:75-77.

Subrahmanya, K.N., Rakesh, H.S. Shetty, H.S. and Koronth, N.G. (1988). Effect of thiram and bavisin on sorghum seed stored under different condition. *Pesticides,* **22**: 22-27.

Sudheer Kumar and Jain, S.C. (2004). Seed borne inoculum of *Drechslera* sp. in barley (*Hordeum vulgarae*) and its control. *J. Mycol. Pl. Pathol*., **34** : 325-327.

****