EFFICACY OF FUNGICIDAL SEED TREATMENT IN CONTROLLING *ALTERNARIA* SPP. IN RADISH SEED

S.S. ISLAM[1], M.H. RAHMAN[2], M.J. HASAN[3], M. ASHADUSJAMAN[4] AND M.M. KHATUN[5]

[1]Postgraduate, Plant Pathology, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur, [2]Scientific Officer (SO), [3]Senior Scientific Officer, Hybrid Rice Project, Bangladesh Rice Research Institute (BRRI), Gazipur, [4]AGM. Supreme Seed Co., Uttara, Dhaka, [5] SO, OFRD, BARI, Rangpur, Bangladesh

Accepted of publication: October 03, 2007

ABSTRACT

Islam, S.S., Rahman, M.H., Hasan, M.J., Ashadusjaman, M. and Khatun, M.M. 2007. *Efficacy of Fungicidal Seed Treatment in Controlling Alternaria spp. in Radish Seed.* **Int. J. Sustain. Crop Prod. 2(5): 46-50**

The experiments were conducted to find out effective seed treating fungicides to control seedborne *Alternaria* spp. of the crop. In the experiment, seeds were treated with the six fungicides namely Rovral 50 WP (Iprodione) @ 0.20%, Dithane M-45 (Mancozeb) @ 0.45%, Ridomil MZ 68 WP (Metalaxil) @ 0.20%, Bavistin 70 WP (Carbendazim) @ 0.10%, Tilt (Propiconazol) @ 0.20% and Cupravit (Copper oxichloride) @ 0.70% were tested. Their effectiveness was measured by plating the treated and untreated seeds on blotter in petridishes. All six fungicides significantly reduced seedborne *Alternaria* spp. associated with radish seeds. Rovral 50 WP and Dithane M-45 were found most effective in reducing the seedborne infection of *Alternaria* spp. and increasing seed germination. Radish seeds harvested from fungicidal sprayed plot and naturally infected unsprayed plots. Collected seeds were treated with the six fungicides. Considering the results of the experiments, Rovral 50 WP (Iprodione) @ 0.20% was noted as the best fungicide against seedborne *Alternaria* spp.

Key words: Fungicidal Treatment, Radish seed, *Alternaria* spp.

INTRODUCTION

Radish has two types of varieties on the basis of life duration viz. annual types and biennial types. The optimum temperature for the production of radish is 10^0C to 20^0C in the tropical countries like Bangladesh. Annual types are easily produce seed in Bangladesh. But biennial types do not produce seed in the country, because they need long time vernalization at low temperature (Anon. 1988). The climate of Bangladesh is suitable for producing seeds of annual type radish varieties and farmers of some areas of Bangladesh produce and use locally produced seeds. But the yield and quality of locally produced seeds are not satisfactory. Available reports reveal that *Alternaria* blight of radish can be controlled by spraying fungicides or treating seeds (Mondol *et al*. 1989, Thind and Jhooty 1988). *Alternaria* blight appears on leaves of radish before initiation of flower. If the disease is not controlled at early stage, number of inoculum increased with time. So, application of fungicides at early stage of infection is needed. For seed crop it is necessary to protect the flowers and pods from the infection of *Alternaria* blight. Field fungi associated with seeds cause deterioration of seed quality affect viability and reduce germination (Haware 1971, Srivastava and Gupta 1981). Seed infection can be effectively reduced if seeds are treated with suitable agents before sowing. Fungicidal seed treatments are known to reduce the seedborne mycoflora and thereby improve the seed germination (Shah and Jain 1993, Klich *et al*. 1994). In Bangladesh, reports on use of fungicides to produce healthy seeds and to control seedborne fungi by seed treatment of radish are not available. Considering the above facts, the present study was undertaken with the following objective: to find out effective seed treating fungicides to control seedborne *Alternaria* spp. of the crop.

MATERIALS AND METHODS

An *in vitro* experiment was conducted at the Plant Pathology Laboratory, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur during 2004-2005 radish growing season. To find out the efficacy of seed treatment with fungicides to control *Alternaria* spp. in radish seeds, six fungicides namely Bavistin 50 WP (Carbendazim), Dithane M - 45 (Mancozeb), Rovral - 50 WP (Iprodione), Ridomil MZ - 68WP, Cupravit (Copper oxichloride), and Tilt were tested. A seed sample of radish having natural infection with *Alternaria* spp. was treated with individual fungicides @ 0.25%. For treatment, 100 g of seeds and required amount of individual fungicide were taken in a conical flask. The flask was tightly closed with a polystyrene cork and shaken with hands for 10 minutes for uniform coating of seeds with the fungicide. To determine the effect of the fungicides on prevalence of *Alternaria* spp. and germination of the treated seeds were tested following blotter method (Anon. 1976). Treated seeds were placed on moist sterilized blotter paper in petridishes. Twenty-five seeds were plated on the blotter in each petridish maintaining uniform distance. Seeds without fungicidal treatment were also plated, which served as control. The petridishes were incubated on the desk of Microbiology Laboratory at room temperature (25 ± 4^0 C). Associated *Alternaria* spp. was identified following keys of Mathur and Kongsdal (2003). Seeds harvested from different fungicides treated plots were also treated using respective fungicides which were used in field treatment. The prevalence of *Alternaria* spp. and germination were recorded following blotter method described earlier (Anon. 1976).

Statistical analysis

All the collected data were analyzed for ANOVA using MSTAT-C computer program. Means were compared using DMRT to evaluate the differences among them. Relationships of seed yield/plot and germination of seeds with PDI of *Alternaria* blight (*Alternaria* spp.) and relationship of seed germination with percentage of seeds yielding *Alternaria* spp. were also determine following the same computer programme.

RESULTS AND DISCUSSION

The maximum of 46.50 % untreated seeds of radish yielded *Alternaria* spp. and their germination was only 52.25 %. All six fungicides tested for treatment of seeds caused significant reduction in incidence of the pathogen and increase in germination (Table 1). The reduction in incidence of *Alternaria* spp. ranged from 63.98 to 90.32 % and germination increase ranged from 50.72 to 75.60 % over control (Figure 1). The minimum incidence of 4.50 % was obtained with Rovral, which was statistically similar to Dithane M-45. Efficacy of the two fungicides was statistically similar but significantly higher as compared to control. The second highest incidence of *Alternaria* spp. was 16.75%, which was found under Bavistin. It was noted as the least effective fungicide against the pathogen. Incidence of the fungus was 11.25, 14.25 and 15.25% when seeds were treated with Ridomil, Tilt 250 EC and Cupravit, respectively. Efficacy of the three fungicides was not significantly different (Table 1).The highest germination of 91.75 % was achieved with Rovral, which was followed by Dithane M-45 (89.00%). Seed treatment with other four fungicides gave 78.75 to 85.25 % germination. However, their efficacy to increase germination was not significantly different (Table 1). Findings of the present experiment showed that all fungicides are effective to achieve significant decrease in incidence of seedborne *Alternaria* spp. and increase in seed germination of radish. Similar results were also demonstrated by many other workers. Humperson and Ainsworth (1983b) and Kamal *et al*. (2001) found that percent reduction of *Alternaria* spp. was the highest at seed treatment with Rovral which was in accordance with the result of researcher.

Table 1. Effect of seed treatment with fungicides in controlling seedborne *Alternaria* spp. and on seed germination of radish

Seed treatment (0.25%)	Incidence of *Alternaria* spp. (%)	% Germination
Rovral 50 WP	4.50d	91.75a
Dithane M-45	6.25d	89.00ab
Ridomil MZ 68 WP	11.25c	82.50bc
Bavistin 70 WP	16.75b	85.25abc
Tilt 250 EC	14.25bc	78.75c
Cupravit	15.25bc	83.00bc
Control	46.50a	52.25d

Value within a column with a common letter do not differ significantly (P=0.05) by DMRT

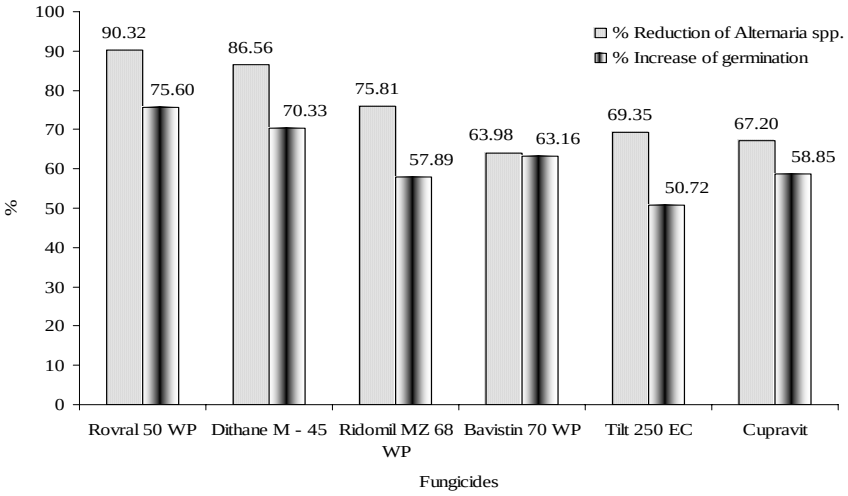

Figure 1. Percent reduction in incidence of seedborne *Alternaria* spp. and increase in germination of seeds of radish due to seed treatment with fungicides

Radish seeds harvested from fungicidal sprayed plot and naturally infected unsprayed plots were also treated with all of the fungicides to find out effect of both foliar and seed treatment on the incidence of *Alternaria* spp. and germination. The reduction in incidence of the pathogen associated with seeds and seed germination were improved remarkably (Table 2 and Figure 2).

Double treatment i.e. foliar spray of seed crop and seed treatment of harvested seeds gave better results than only foliar spray in respect of seed germination and incidence of *Alternaria* spp. (Figure 3 and 4). Both foliar spray and seed treatments with fungicides are suggested for getting healthy seeds of radish.

Table 2. Effect of both foliar spray and seed treatment with fungicides in controlling seedborne *Alternaria* spp. and on seed germination of radish

Seed treatment (0.25%)	Infection of *Alternaria* spp. (%)	% Germination
Rovral 50 WP	2.00d	94.00a
Dithane M-45	3.50cd	92.00a
Ridomil MZ 68 WP	5.00c	85.50b
Bavistin 70 WP	8.50b	84.75b
Tilt 250 EC	9.25b	81.00b
Cupravit	10.00b	83.25b
Control	49.00a	54.25c

Value within a column with a common letter do not differ significantly (P=0.05) by DMRT

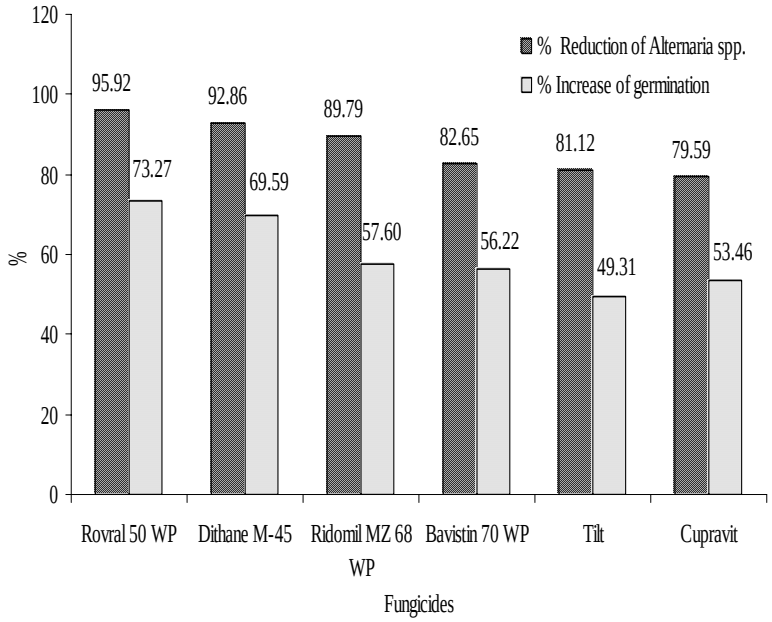

Figure 2. Percent reduction of incidence of seedborne *Alternaria* spp. and increase of germination of seeds of radish due to both foliar spray and seed treatment with fungicides

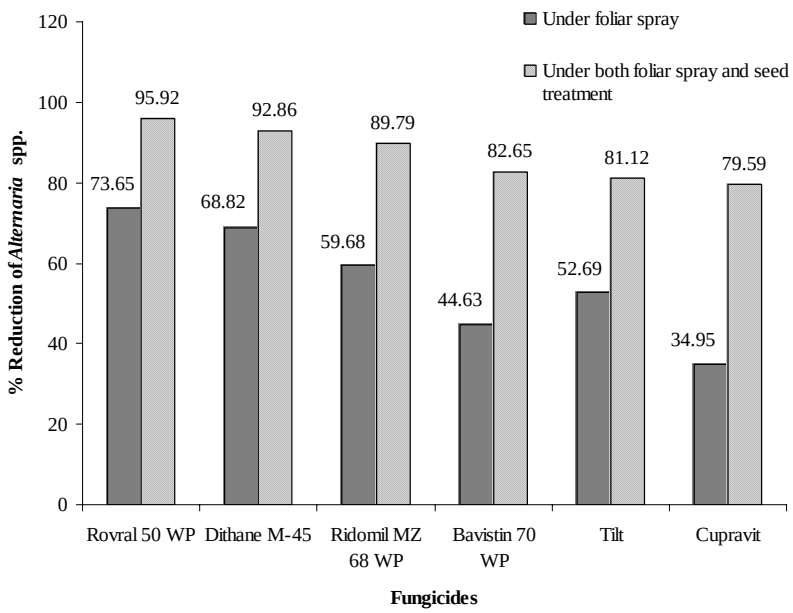

Figure 3. Comparison of efficacy between foliar spray and both foliar spray and seed treatments of six fungicides in controlling seedborne *Alternaria* spp. of radish

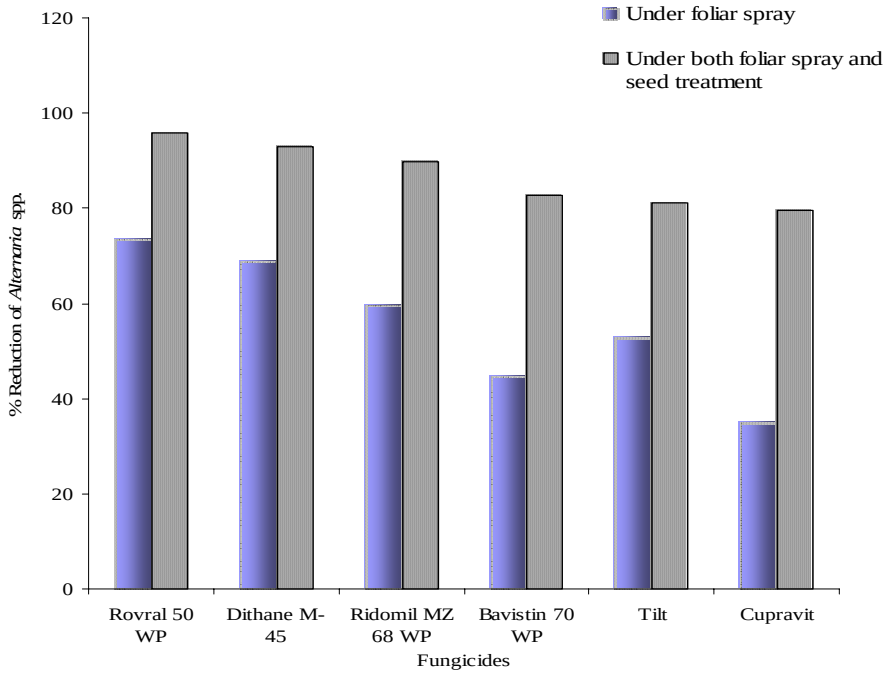

Figure 4. Comparison of efficacy between foliar spray and both foliar spray and seed treatments with six fungicides in increasing germination percentage of radish seed crop

Efficacy of fungicidal seed treatment to control seedborne *Alternaria* spp. of radish, naturally infected radish seeds were treated with all six fungicides tested as foliar spray. Seeds of radish were treated with individual fungicides @ 2.5 g/kg seed. To determine the effect of the fungicides on seedborne *Alternaria* spp. and germination, treated seeds were plated on moist blotter paper following a standard procedure. Incidence of seedborne *Alternaria* spp. and seed germination were recorded after 7 days of incubation at room temperature. All the fungicides significantly reduced the seedborne infection of *Alternaria* spp. Rovral 50 WP and Dithane M-45 were found most effective in reducing the seedborne infection of *Alternaria* spp. Significant increase in germination was observed in fungicide treated seeds over control. Rovral was found the most effective in increasing the rate of seed germination of radish.

REFERENCES

Anonymous. 1976. International Rules for Seed Testing. International Seed Testing Association (ISTA). Seed Sci. Tech. 24 (supplement): 29-72.

Anonymous. 1988. Fall, Shaksabji o Masla Jatio Fasal. Department of Agricultural Extension, Khamarbari, Dhaka. 56 pp.

Haware, M. P. 1971. Fungal micoflora of seeds of *Pisum sativum* L. and its control. Mycopathol. 43: 343-345.

Humpherson, J. F. M. and Ainsworth, L. F. 1983b. 34th Annual Report for 1983. Veg. Res. Statn., Warwick., U. S. A. 64(6): 244pp.

Kamal, M. M., Jafar, A. H. M., Islam, M. S., Howlader, S. H., Chowdhury, M. J. U. and Dey, T. k. 2001. Efficacy of seed treatment with fungicides to control seed borne pathogens of true potato seed. Bangladesh J. Plant Pathol. 17 (1&2): 23-26.

Klich, M. A., Arthur, K. S., Lax, A. L. and Blade, J. M. 1994. A potential new fungicide for stored grains. Mycopathol. 127: 123-127.

Mathur, S. B. and Kongsdal, O. 2003. Common laboratory seed health testing methods for detecting fungi. Danish Govt. Inst. Seed Pathol. Developing Countries, Copenhagen, Denmark. 425pp.

Mondal, M. F., Hossain, I., Bakshi, A. L. and Nasiruddin, K. M. 1989. Effect of fungicides to control *Alternaria* blight of radish seed crop. Bangladesh J. Plant. Pathol. 5 (1-2): 37-39.

Shah, R. and Jain, J. P. 1993. Seed mycoflora of mustard and its control. Indian J. Mycol. 23: 291-295.

Srivastava, R. N. and Gupta, J. S. 1981. Seed mycoflora from seed lots of *Cosmos bipinatus* and their control. Indian Phytopathol. 34 (3): 383-385.

Thind, T. S. and Jhooty, T. S. 1988. Differential Behaviour of fungicides against *Alternaria* blight of some cruciferous hosts. Indian J. Mycol. and Plant Pathol. 18 (2): 122-127.