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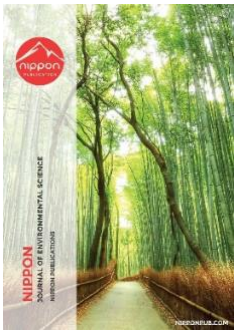

Full Length Research Paper

Management of *Alternaria* Leaf and Umbel Blight of Dill

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Abstract. The experiment was conducted at Spices Research Centre, BARI, Shibganj, Bogura, Bangladesh during Rabi season of 2018-19 to find out the effective fungicides in controlling Alternaria leaf and umbel blight of BARI Sholuk 1 of Dill. Seven fungicides and one control were used as treatment. Alternaria leaf and umbel blight incidence of Dill under different treatments varied from 9.33-90.33%, while the lowest incidence was recorded in seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) which was statistically similar to seed treatment and foliar spraying with Rovral 50 WP (0.2%) and Secure 600 WG (0.15%), and the highest incidence was obtained in control plot. Seed treatment and foliar spraying of Amistar Top 325 SC (0.1%) exhibited the highest number of seeds/plant (1811.43), weight of seeds/plant (18.37 g) and seed yield (1.98 t/ha) and the lowest was observed in control plots. So, farmers and researchers can be used Amistar Top 325 SC (0.1%) or Secure 600 WG (0.15%) or Rovral 50 WP (0.2%) to reduce Alternaria leaf and umbel blight and increased seed yield of Dill.

Keywords: Secure, Amistar Top, Rovral, Alternaria, Blight, Dill

1. INTRODUCTION

Dill (*Anethum graveolens L.*) is an aromatic herbaceous annual plant in the family Umbelliferae that originally comes from Eastern Mediterranean. Dill is a plant of aromatic with an erect growth habit. It possesses branching stems and fine, soft, fibre-like leaves which are arranged in an open cone and are blue-green in color. The plant produces yellow flowers on umbels which upto 16 cm in diameter. Dill can grow upto 1.5 m in height and is an annual plant, surviving in only one growing season. Dill leaves are used fresh or dry as a culinary herb. The leaves may be used to make tea. The seeds of the plant may be used as a spice. Dill is one of the most promising aromatic and medicinal condiments that commonly used to add fragrance and taste in dishes, bakery, biscuits and culinary items. The plant has potential importance as a medicinal herb that contains volatile oils such as β-camphene-pinene, Anethole, lonone, umbeliferone and carvone. Dill is used as antibacterial plant in some conditions such as stomachache. Other essences found in this plant include limonin, dihydrocaron, alfapinen, terpinen, terpinoeid. The dill seeds have essential oil as an active substance, while carvon and limonene are the most important constituents of dill, which is used in the pharmaceutical industry as a diuretic, a stimulant and a carminative. The farmers almost all over the Bangladesh grow Dill for their domestic use and for medicinal value. The small scale cultivation is not sufficient to meet the country requirements. Now-a-days, people become conscious about their health and as a result this type of medicinal and rare condiments has great demand to the farmers. To meet its increasing demand, the productivity must be increased. Seed setting increases seed yield as well as the quality of the produce in dry and cool weather.

Diseases are the major constraints in economic crop production as they inflict heavy losses. Dill is also attacked by many fungal diseases. Among the major diseases of Dill, Alternaria leaf and umbel blight caused by *Alternaria brassicicola* L is the most devastating disease of Dill. Blights appear with very minute brownish necrotic spots on leaves and stems, which later turn to blackish, whereby the stem tips bend downwards. Mostly diseased plants fail to produce seeds. If seeds are produced they remain shriveled, light in weight and dark in colour. Cloudy weather and warm-wet conditions after flowering increase the incidence of disease and spread in the whole field within a short period causing complete failure of the crop (Jadeja and Pipliya, 2008). The disease severity varied from 16-65% and caused serious damage to the crop (Kalpana, 1993). At least 20% of agricultural spoilage is caused by

Alternaria species, most severe losses may reach up to 80% of yield (Anonymous, 2020). As there is no resistant variety available in Bangladesh against this disease, it has become inevitable to go for the use of fungicides for the management of the disease. The pathogenic fungi attacks leaves and stems, foliar spraying with fungicides may be beneficial in controlling the disease. Seven times spraying of Rovral 50 WP (0.2%) or Companion (0.2%) at an interval of seven days from disease initiation (flowering stage) decreased Alternaria blight and increased seed yield of Cumin (Khalequzzaman, 2016). Amistar 250 EC inhibited the growth of *Alternaria* spp. *in-vitro* (Survilience and Dambrauskiene, 2006). The application of fungicide and botanical significantly greatly reduced Alternaria blight disease control (Shekhawat et al., 2013). Few fungicides were reported earlier for the management of the disease (Solanki et al., 1973; Akbari et al., 1996), but the disease is still causing severe yield losses under favourable environmental conditions. Iprodione and Anilazine significantly reduced the incidence of *Alternaria* spp. on surface-sterilized seeds (Babadoost et al., 1993). Foliar spraying with Amistar Top 325 SC (0.1%) six times at an interval of eight days from disease initiation or pre-flowering stage decreased Alternaria blight and increased seed yield of cumin (Wadud et al., 2017). Yet no research findings were published in Bangladesh, this types of research work is needed in Bangladesh. Therefore, the present study was assigned to find out the effective fungicides in controlling Alternaria leaf and umbel blight of Dill.

2. MATERIALS AND METHODS

The experiment was conducted at Spices Research Centre, BARI, Shibganj, Bogura, Bangladesh during Rabi season of 2018-19. The experimental plot was prepared with five ploughing and cross ploughing followed by laddering to break the clods as well as level the soil. The weeds and stubbles of previous crops were collected and removed from the soil. Cowdung @5 t/ha, N @100 kg/ha, P @60 kg/ha, K @100 kg/ha and S @20 kg/ha were applied. The entire quantity of cowdung, P and K was applied during final land preparation. Nitrogen was applied in two equal splits one half at 20 days after germination and the other half at flowering stage followed by irrigation. The experiment was carried out in Randomized Complete Block Design with three replications. Size of the unit plot was 2.5 m × 1.6 m and plant spacing was 40 cm × 10 cm. BARI Sholuk 1 was used in this experiment. Seven fungicides and one control were used as treatment. The treatments were T_1= Seed treatment and foliar spraying with Rovral 50 WP (Iprodion) @0.2%, T_2= Seed treatment and foliar spraying with Extramil 720 WP (8% Cymoxanil + 64% Mencozeb) @0.2%, T_3= Seed treatment and foliar spraying with Folicur 250 EC (Tebuconazole) @0.1%, T_4= Seed treatment and foliar spraying with Secure 600 WG (Fenamidone + Mancozeb) @0.15%, T_5= Seed treatment and foliar spraying with Ridomil Gold (Metalaxyl + Mancozeb) @0.2%, T_6= Seed treatment and foliar spraying with Timsen TM (N-alkyle dimethyle benzyl ammonium chloride 40%+ Stabilized Urea 60%) @0.1%, T_7= Seed treatment and foliar spraying with Amistar Top 325 SC (Azoxystrobin + Difenoconazole) @0.1% and T_8= Control (Untreated). The fungicides were sprayed five times at an interval of 7 days after the emergence of disease. Seeds were sown on November 8, 2018. Three weedings were done at 25, 50, and 75 days after emergence and three irrigations were also applied just after five days of each weeding. Other intercultural operations were done to maintain the normal hygienic condition of crop in the field. Autostin (0.2%) was sprayed at plant base with soil level four times at an interval of 7 days from seedling stage to control wilt of Dill. The plots were inspected regularly to observe instead of take observations on blight disease from seedling to maturity stage of the crop. Disease plant parts were collected and brought in the laboratory for identifying blight causal pathogens. *Alternaria brassicicola* was isolated from infected leaf and umbel of plant. The crop was harvested from April 7-11, 2019. Data were recorded on Alternaria leaf and umbel blight (%), number of primary and secondary branches per plant, plant height at harvest, number of umbels per plant, number of umbel lets per umbel, number of umbel lets per plant, number of seeds per umbel, weight of seeds per umbel, number of seeds per plant, weight of seeds per plant and seed yield. The recorded data were analyzed statistically to find out the level of significance and the variations among the respective data were compared in instead of following Duncan's Multiple Range Test (DMRT) according to Gomez and Gomez (1984).

3. RESULTS AND DISCUSSION

3.1. Effect of fungicides on Alternaria leaf and umbel blight incidence of Dill

The effect of fungicides on Alternaria leaf and umbel blight incidence of Dill were presented in Table 1. It was found that Alternaria leaf and umbel blight of Dill was differed significantly from one to another treatment. Alternaria leaf and umbel blight incidence of Dill under different treatments varied from 9.33-90.33%, while the lowest incidence was recorded in the plot of seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) which was statistically similar to plots of seed treatment and foliar spraying with Rovral 50 WP (0.2%) and Secure

600 WG (0.15%), and the highest incidence was obtained in control plot which was statistically at par with plot of seed treatment and foliar spraying with Timsen TM (0.1%). Seed treatment and foliar spraying of Amistar Top 325 SC (0.1%) treated plot revealed the highest (89.67%) disease reduction over control where Timsen TM (0.1%) showed the lowest (1.83%) disease reduction over control.

Table 1. Effect of fungicides on Alternaria leaf and umbel blight incidence of Dill

Fungicides	Alternaria leaf and umbel blight (%)	Disease reduction over control (%)
T_1= Seed treatment and foliar spraying with Rovral 50 WP (0.2%)	11.67 de	87.08
T_2= Seed treatment and foliar spraying with Extramil 720 WP (0.2%)	15.00 d	83.39
T_3= Seed treatment and foliar spraying with Folicur 250 EC (0.1%)	25.33 c	71.95
T_4= Seed treatment and foliar spraying with Secure 600 WG (0.15%)	12.33 de	86.35
T_5= Seed treatment and foliar spraying with Ridomil Gold (0.2%)	86.67 b	4.05
T_6= Seed treatment and foliar spraying with Timsen TM ((0.1%)	88.67 ab	1.83
T_7= Seed treatment and foliar spraying with Amistar Top 325 SC (0.1%)	9.33 e	89.67
T_8= Control (Untreated)	90.33 a	-
Level of Significance	*	-
CV (%)	6.88	-

Similar letter(s) did not differ significantly at 5% level of probability.

3.2. Effect of fungicides on growth parameters of Dill

Effect of fungicides on the growth parameters of Dill were presented in Table 2. No significant effect was found on number of branches per plant and plant height, yet the highest branches per plant (8.26) and plant height (133.33 cm) were observed in seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) treated plot and the lowest was observed in control plot.

Table 2. Effect of fungicides on growth parameters of Dill

Fungicides	No. of branches/Plant	Plant height (cm) at harvest
T_1= Seed treatment and foliar spraying with Rovral 50 WP (0.2%)	7.80	129.66
T_2= Seed treatment and foliar spraying with Extramil 720 WP (0.2%)	7.46	127.67
T_3= Seed treatment and foliar spraying with Folicur 250 EC (0.1%)	7.40	128.00
T_4= Seed treatment and foliar spraying with Secure 600 WG (0.15%)	7.73	131.66
T_5= Seed treatment and foliar spraying with Ridomil Gold (0.2%)	7.40	126.67
T_6= Seed treatment and foliar spraying with Timsen TM (0.1%)	7.13	125.00
T_7= Seed treatment and foliar spraying with Amistar Top 325 SC(0.1%)	8.26	133.33
T_8= Control (Untreated)	7.13	120.33
Level of Significance	NS	NS
CV (%)	7.08	8.03

NS=Not Significant

3.3. Effect of fungicides on number of umbels per plant, number of umbel lets per umbel and number of umbel lets per plant of Dill

Results on effect of fungicides on the number of umbels per plant, number of umbel lets per umbel and number of umbel lets per plant of Dill were presented in Table 3. Number of umbels per plant, number of umbel lets per umbel and number of umbel lets per plant of Dill were significantly affected by the fungicides. The highest number of umbels per plant (94.07), number of umbel lets per umbel (66.53) and number of umbel lets per plant (6251) were obtained in seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) treated plots which was followed by seed treatment and foliar spraying of Rovral 50 WP (0.2%) and seed treatment and foliar spraying with Secure 600 WG (0.15%) treated plots, and the lowest of these parameters were found in control plots.

Table 3. Effect of fungicides on number of umbels per plant, number of umbel lets per umbel and number of umbel lets per plant of Dill

Fungicides	No. of umbels/plant	No. of umbel lets/umbel	No. of umbel lets/plant
T_1= Seed treatment and foliar spraying with Rovral 50 WP (0.2%)	92.73 a	59.4 b	5508 b
T_2= Seed treatment and foliar spraying with Extramil 720 WP (0.2%)	88.13 ab	55.73 c	4911 d

T_3= Seed treatment and foliar spraying with Folicur 250 EC (0.1%)	85.46 b	54.47 c	4655 d
T_4= Seed treatment and foliar spraying with Secure 600 WG (0.15%)	90.73 ab	57.07 bc	5177 c
T_5= Seed treatment and foliar spraying with Ridomil Gold (0.2%)	70.83 c	50.66 d	3588 e
T_6= Seed treatment and foliar spraying with Timsen TM (0.1%)	63.93 d	47.11 e	3011 f
T_7= Seed treatment and foliar spraying with Amistar Top 325 SC(0.1%)	94.07 a	66.53 a	6251 a
T_8= Control (Untreated)	58.86 d	40.5 f	2385 g
Level of Significance	*	*	*
CV (%)	7.51	6.82	7.53

Similar letter(s) did not differ significantly at 5% level of probability.

Effect of fungicides on number of seeds per umbel and weight of seeds per umbel of Dill

Fungicides had significant effect on the number and weight of seeds per plant (Table 4). Seed treatment and foliar spraying of Amistar Top 325 SC (0.1%) exhibited the highest number of seeds per umbel (111.33) and weight of seeds per umbel (0.45 g) that were followed by seed treatment and foliar spraying with Rovral 50 WP (0.2%) and seed treatment and foliar spraying with Secure 600 WG (0.15%), and the lowest of these parameters were noted in Control plots.

Table 4. Effect of fungicides on number of seeds per umbel and weight of seeds per umbel of Dill

Fungicides	No. of seeds/umbel	Wt. of seeds (g)/umbel
T_1= Seed treatment and foliar spraying with Rovral 50 WP (0.2%)	107 ab	0.42 a
T_2= Seed treatment and foliar spraying with Extramil 720 WP (0.2%)	95.66 cd	0.33 b
T_3= Seed treatment and foliar spraying with Folicur 250 EC (0.1%)	91.66 d	0.29 c
T_4= Seed treatment and foliar spraying with Secure 600 WG (0.15%)	102 bc	0.36 b
T_5= Seed treatment and foliar spraying with Ridomil Gold (0.2%)	79.43 e	0.25 d
T_6= Seed treatment and foliar spraying with Timsen TM (0.1%)	70.67 f	0.21 e
T_7= Seed treatment and foliar spraying with Amistar Top 325 SC(0.1%)	111.33 a	0.45 a
T_8= Control (Untreated)	65.39 f	0.19 e
Level of significance	*	*
CV (%)	7.86	7.56

Similar letter(s) did not differ significantly at 5% level of probability.

Effect of fungicides on yield and yield contributing characters of Dill

Yield and yield contributing characters of Dill were significantly influenced by the application fungicides (Table 5). The highest number of seeds per plant (1811.43), weight of seeds per plant (18.37 g) and seed yield (1.98 t/ha) were observed in seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) treated plot followed by seed treatment and foliar spraying with Rovral 50 WP (0.2%) and seed treatment and foliar spraying with Secure 600 WG (0.15%). The lowest of these parameters were found in untreated control. Seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) resulted in increasing the highest yield (224.59%) over control while seed treatment and foliar spraying with Timsen TM (0.1%) marked the lowest yield increased (65.57%) over control.

Table 5. Effect of fungicides on yield and yield contributing characters of Dill

Fungicides	No. of seeds/plant	Wt. of seeds/plant (g)	Seed yield (t/ha)	% yield increased over control
T_1= Seed treatment and foliar spraying with Rovral 50 WP (0.2%)	1705.83 a	16.23 b	1.82 b	198.36
T_2= Seed treatment and foliar spraying with Extramil 720 WP (0.2%)	1378.87 c	13.28 d	1.68 c	175.41
T_3= Seed treatment and foliar spraying with Folicur 250 EC (0.1%)	1201.63 d	12.39 e	1.55 d	154.09
T_4= Seed treatment and foliar spraying with Secure 600 WG (0.15%)	1588.47 b	14.33 c	1.71 c	180.33
T_5= Seed treatment and foliar spraying with Ridomil Gold (0.2%)	1001.89 e	10.48 f	1.12 e	83.61
T_6= Seed treatment and foliar spraying	905.79 ef	9.05 g	1.01 f	65.57

with Timsen TM (0.1%)				
T_7= Seed treatment and foliar spraying with Amistar Top 325 SC(0.1%)	1811.43 a	18.37 a	1.98 a	224.59
T_8= Control (Untreated)	652.44 f	6.50 h	0.61 g	-
Level of Significance	*	*	*	-
CV (%)	7.69	6.96	7.57	-

Similar letter(s) did not differ significantly at 5% level of probability.

It was found that Alternaria leaf and umbel blight of Dill was differed significantly from one to another treatment. Alternaria leaf and umbel blight incidence of Dill under different treatments varied from 9.33-90.33%, while the lowest incidence was recorded in the plot of seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) which was statistically similar to plots of seed treatment and foliar spraying with Rovral 50 WP (0.2%) and Secure 600 WG (0.15%), and the highest incidence was obtained from control (untreated) plot which was statistically at par with plot of seed treatment and foliar spraying with Timsen TM (0.1%). Wadud *et al*. (2017) observed that foliar spraying with Amistar Top 325 SC (0.1%) at an interval of eight days from disease initiation (Pre-flowering stage) reduced Alternaria blight of cumin. Islam et al. (2007) stated that Rovral 50 WP and Dithane M-45 were most effective in reducing the seed borne infection of Alternaria spp. and increasing seed germination of Radish. Few fungicides were reported earlier for the management of the disease (Solanki et al., 1973; Akbari et al., 1996). Survilience and Dambrauskiene (2006) used Amistar 250 EC against *Alternaria* spp. *in-vitro* and found that the fungicide inhibited the growth of *Alternaria* spp. Babadoost et al. (1993) observed that Iprodione and Anilazine significantly reduced the incidence of *Alternaria* spp. on surface-sterilized seeds. Davis and Shoemaker (1999) registered Rovral (iprodione) for controlling Alternaria leaf blight on ginseng in North Carolina and was available in 3 formulations (50W, WG and 4F). Shekhawat et al. (2013) applied fungicides and botanicals for disease control and found in significantly greater Alternaria blight disease control. Humpherson-Jones and Maude (1982) sprayed three time with Iprodione (Rovral 50% w. p.) at 0.5-1 kg a. i./ha applied to *Brassica oleracea* seed crops in experimental plots and field trials at 3-wk intervals from the young green pod stage until cutting controlled pod infection caused by *A. brassicicola* in seasons 1976–1979 and found that few seeds were infected, seed yields were increased and their germination was improved. Arifuzzaman (2007) tested fungicides against Alternaria blight of radish, among the fungicides, Iprodione (0.2%) was found to be the most effective. Two sprays of Iprodione significantly reduced the leaf area diseased by 76.01% and pod area diseased by 81.87% over control. Khalequzzaman (2016) reported that seed treatment and foliar spraying with Rovral 50 WP (0.2%) or Companion (0.2%) or Amistar Top 325 SC (0.1%) seven times at an interval of seven days from disease initiation (flowering stage) decreased Alternaria blight of Cumin. Babadoost et al. (1993) evaluated Iprodione, Anilazine and Chlorothalonil to control *Alternaria* diseases of brassica seed crops in field trials. They found that in 1978 and 1979, two applications of either Iprodione (1.2 g a.i./litre), Anilazine (3.6 g a.i./litre) or Chlorothalonil (1.4 g a.i./litre), applied with a backpack sprayer to Brussels sprouts seed plants at 5 and 3 or 4 and 2 weeks before swathing, significantly reduced the severity of diseases caused by *A. brassicae* and *A. brassicicola*. Sundar et al. (2005) observed that Mancozeb and Iprodione reduced effectively Alternaria leaf blight disease caused by Alternaria brassicae in mustard. Seed treatment and foliar spraying of Amistar Top 325 SC (0.1%) treated plot signified the highest disease reduction over control where Timsen TM (0.1%) showed the lowest disease reduction.

Though treatments did not show any significant effect on number of branches per plant and plant height, yet the highest branches per plant and plant height were observed in seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) treated plot and the lowest of these parameters were found in control plot. Wadud *et al*. (2017) reported that the tallest plants at harvest were recorded in Amistar Top (0.1%) sprayed plots, which was statistically similar to Cabriotop treated plots in Cumin. Khalequzzaman (2016) observed that Significantly the tallest plants at harvest were recorded in Secure (0.15%) sprayed plots as reported by Khalequzzaman (2016) which was statistically at par with Rovral 50 WP (0.2%) and Companion (0.2%) sprayed plots in Cumin.

The fungicides showed its significant effect on number of umbels per plant, number of umbel lets per umbel and number of umbel lets per plant of Dill. The highest number of umbels per plant, number of umbel lets per umbel and number of umbel lets per plant were attained from seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) treated plots followed by seed treatment and foliar spraying with Rovral 50 WP (0.2%) and seed treatment and foliar spraying with Secure 600 WG (0.15%) treated plots, and the lowest of these parameters were noticed in control plots. Khalequzzaman (2016) found that the highest number of umbels/plant, number of umbel lets/plant, number of seeds/umbel was obtained from Rovral (0.2%) sprayed plot which was statistically at par with Companion and Secure sprayed plots in Cumin. Spraying of Amister Top exerted the highest number of

umbel/plant and number of umbel lets/umbel and the lowest number of umbels/plant was recorded from control plots (Wadud et al., 2017).

Seed treatment and foliar spraying of Amistar Top 325 SC (0.1%) provided the highest number of seeds per umbel and weight of seeds per umbel followed by seed treatment and foliar spraying with Rovral 50 WP (0.2%) and seed treatment and foliar spraying with Secure 600 WG (0.15%), and the lowest was in Control plots. The highest number of seeds per plant, weight of seeds per plant and seed yield were observed with seed treatment and foliar spraying in Amistar Top 325 SC (0.1%) treated plot followed by seed treatment and foliar spraying with Rovral 50 WP (0.2%) and seed treatment and foliar spraying with Secure 600 WG (0.15%). The lowest of these parameters were recorded in untreated control plots. Rovral sprayed plots showed the highest number of seeds per plant and weight of seeds/plant which was followed by Companion (0.2%) and Secure in Cumin (Khalequzzaman, 2016). Wadud et al. (2017) observed that six times foliar spraying with Amistar Top 325 SC (0.1%) at an interval of eight days from disease initiation (Pre-flowering stage) increased yield of cumin followed by Deconil and Cabriotop treated plots. Gemawat and Prasad (1972) found that wet conditions infection readily favoured spreading to the stem and blossom. The succulent leaves and blossoms are more affected and may be killed. In cases of very severe infection, there may not be any seed production. Even if seeds are produced, they are shrivelled, dark-coloured, light and usually nonviable. Wadud et al. (2017) also observed that the highest number of seeds/umbel let was recorded in Amistar Top sprayed plots. Khalequzzaman (2016) reported that seed treatment and seven times foliar spraying of Rovral 50 WP (0.2%) or Companion (0.2%) or Amistar Top 325 SC (0.1%) at an interval of seven days from disease initiation (flowering stage) increase in seed yield of Cumin. Seed treatment and foliar spraying with Amistar Top 325 SC (0.1%) resulted the highest seed yield increased (224.59%) over control followed by seed treatment and foliar spraying with Rovral 50 WP (0.2%) and seed treatment and foliar spraying with Secure 600 WG (0.15%), while seed treatment and foliar spraying with Timsen TM (0.1%) showed the lowest yield increased (65.57%) over control. Hossain and Hossain (2010) sprayed Rovral 50 WP (Iprodion) at 0.2% suspension as protective chemical to safe the crop against *Alternaria brassiceae* and *A. brassicicola* and found that seed increase of yield 59.6, 171.4 and 75.2% in 2003-2004, 2004-2005, and 2005-2006 cropping seasons, respectively. Sundar et al. (2005) reported that Mancozeb and Iprodione increased seed yield by 48 and 130% of Mustard sprayed plot, respectively.

4. CONCLUSION

It may be concluded that seed treatment and five times foliar spraying of Secure 600 WG (0.15%) and Seed treatment and five times foliar spraying with Rovral 50 WP (0.2%) and Seed treatment and five times foliar spraying of Amistar Top 325 SC (0.1%) at interval 7 days significantly individually decreased Alternaria leaf and umbel blight and increased seed yield of Dill. So, farmers and researchers may use Amistar Top 325 SC (0.1%) or Secure 600 WG (0.15%) or Rovral 50 WP (0.2%) in reducing instead of to decrease Alternaria leaf and umbel blight and increased seed yield.

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