

## EFFICACY OF DIFFERENT FUNGICIDES FOR MANAGING BOTRYTIS GREY MOULD OF CHICKPEA

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### ABSTRACT

Efficacies of different fungicides were evaluated in managing botrytis grey mould of chickpea. This field experiment was conducted in two sub-station of Bangladesh Institute of Nuclear Agriculture (BINA): Magura and Ishwardi. Fungicides increased seed germination over control in field condition both in Magura and Ishwardi. Seed germination percentage in Magura and Ishwardi was higher in Bavistin treated plots 95.25% and 93.87% respectively. Fungicides treated plots showed lower disease incidence over control. In Magura incidence of botrytis grey mould of Binachola-3 was recorded highest in control plots (5.91%) and lowest in Bavistin (2.04%). In Ishwardi lowest incidence was recorded at Bavistin (3.15%) and highest was recorded in control plots (6.54%). Disease incidence reduction over control for Magura and Ishwardi were 65.48% and 51.77% respectively. Plant height, plant stand, number of pod per plant, number of seed per pod, unfilled pod per plant, seed weight per plant and dry plant weight was observed higher in treated plots over the control plots both in Magura and Ishwardi. Bavistin treated plots resulted the lowest botrytis grey mould incidence with higher yield components than the non-treated plots. Others treatments such as Secure, Biofungicides, Ridomil gold, Rovral, nativo, Dithane M-45 also showed significantly the better results (in reducing) for management of botrytis grey mould of chickpea than the control plots in the fields.

**Key words:** Fungicides, efficacy, botrytis grey mould and chickpea

### Introduction

Chickpea is one of the most important pulse crops in Bangladesh after grass pea and lentil occupying third position (BBS, 2008). In Bangladesh, during 2017-2018, lentil was cultivated in an area of 385399 acre with total production of about 176633 M. tons, Soybean was cultivated in an area of 146888 acre with total production of about 98699 M. tons as well as chickpea was cultivated on area of about 12421 acre and total production of about 4964 M. tons (BBS, 2018). Chickpea suffers from many diseases in Bangladesh. Out of them Botrytis gray mold (BGM) caused by *Botrytis ceneria* is an important disease of chickpea. Recently, more than 80% crop losses due to BGM have been observed in the Indo-Gangetic plains of Bangladesh, Nepal, and north-western India. In Bangladesh, a conservative estimate of crop loss due to BGM ranges from 10 to 15% under normal conditions but can reach up to 80% or more under periods of high disease pressure. Therefore, chickpea cultivation has declined sharply from 102,867 ha in 1990 to 18,219 ha in 2000 and further reduced to 7,224 ha in recent years. It was first reported in 1981 in Bangladesh (Ahmed *et al.*, 1981) but its recurrence after 1985 drastically reduced the chickpea area and production in this country. In the recent years, this disease has become a great threat to chickpea cultivation. This pathogen infects all the ariel part of the plant, flowers being most vulnerable (Laha and Grewal, 1983). Various synthetic fungicides for controlling this disease have become ineffective due to the development of resistance. In chickpea, BGM is difficult to manage as the causal pathogen is soil, seed, and air borne and, unfortunately, nonchemical methods for its control are difficult and ineffective. Extensive screening of chickpea germplasm against BGM did not identify a genotype with a high level of resistance. Therefore, integration of chemical application with cultural practices is the only option to manage the disease commercially. So considering the importance of this crop in perspective of our country a management tactic that involves a fungicide based management of BGM of chickpea is carried out in this investigation and ended up with the best outcome of the conclusion. In view of above facts, the present

investigation was carried out to achieve the following objectives: i) to evaluate the efficacy of different fungicides in managing Botrytis Grey Mould of Chickpea and ii) to find out suitable fungicide that control the disease most effectively.

### Materials and Methods

The experiment was conducted in Bangladesh Institute of Nuclear Agriculture (BINA) sub-station farm, Magura and Ishwardi, Bangladesh. The experiment was performed during January 2018 to August 2018. BINASOLA-3 of chickpea was used in this experiment. The treatments followed for the experiment were: T<sub>0</sub>= Control, T<sub>1</sub>= Nativo @ 0.1%, T<sub>2</sub>= Bio-fungicide @ 0.3%, T<sub>3</sub>= Bavistin @ 0.2%, T<sub>4</sub>= Secure @ 0.2%, T<sub>5</sub>= Rovral @ 0.2%, T<sub>6</sub>= Ridomil gold @ 0.2% and T<sub>7</sub>= Dithane M-45 @ 0.2%. The experiment was laid out in Randomized Complete Block Design (Factorial) with three replications. Each replication obtained the same treatment of fungicides. Total plot number of the whole experiment is 48 and it includes 18 plots in Magura and 18 plots in Ishwardi. Every plot size was 2.5meter×2 meter. Plot to plot distance 50cm, line to line 40cm & replication to replication 1m. Seeds were sown on 6<sup>th</sup> January 2018. All the seven fungicides were applied according to guideline and one control plot were maintained without applying any of the fungicides. Data on different parameters viz. germination, plant stand, plant height, branching, percent disease affected, percent defoliation of leaf, disease incidence, no. of pod per plant, no. of seed per pod, number of unfilled pod per plant, seed weight per plant, 1000 seed weight in dry condition, weight of plant in dry condition were taken. Ten plants were randomly selected and uprooted during collecting field data. The data obtained from the experiment on various parameters were statistically analyzed using STAR statistical package to find out the variation resulting from the experimental treatments. The significance of difference between the pair of means compared by LSD test at 5% level of probability (Gomez and Gomez, 1984). The mean values for all the parameters were analyzed by Duncan’s Multiple Range Test (DMRT).

### Results and Discussion

Both Magura and Ishwardi the highest germination percentage of Binachola-3 was recorded in fungicide treated plots than control plots (Table 1). In Magura highest germination percentage was recorded in Bavistin treated plot (95.25%) and lowest was recorded in control plots (86.25%). In Ishwardi highest germination percentage for Binachola-3 was recorded in Bavistin (93.87%) and lowest was recorded in control plots (88.26%).

Table 1. Effect of fungicides on incidence of Botrytis Grey mould of Chickpea

Treatment	Magura				Ishwardi			
	Germination (%)	% Disease incidence	% defoliation of leaf/plant	% disease reduction over control (%)	Germination (%)	% Disease incidence	% defoliation of leaf/plant	% disease reduction over control (%)
T <sub>1</sub> (Nativo)	90.11bc	3.98c	3.44c	32.66	92.61ab	3.83d	2.830d	41.44
T <sub>2</sub> (Biofungicide)	91.69 ab	2.77d	2.45d	53.13	90.29bc	4.12c	3.53bc	37.00
T <sub>3</sub> (Bavistin)	95.25a	2.04d	1.82e	65.48	93.87a	3.56e	1.25g	45.57
T <sub>4</sub> (Secure)	93.58ab	2.23e	2.08de	62.27	90.33bc	3.15f	1.61f	51.77
T <sub>5</sub> (Rovral)	89.66 bc	5.27c	4.58a	10.83	91.29ab	3.6e	2.35e	44.95
T <sub>6</sub> (Ridomil gold)	92.07ab	2.67e	4.47ab	62.27	93.58a	4.09c	3.69b	37.46
T <sub>7</sub> (Dithane M-45)	90.23 bc	3.75b	4.14b	36.55	89.62bc	5.04b	3.38c	22.94
T <sub>8</sub> (Control)	86.25 c	5.910a	4.74a	-	88.26c	6.54a	5.060a	-
LSD <sub>0.05</sub>	3.84	0.332	0.396	-	2.74	0.215	0.184	-

In column, figures with same letter do not differ significantly where figures with dissimilar letter differ significantly.

Andrabi *et al.* (2011) reported that seed treatment with carbendazim increased chickpea seed germination (71.24%). In Magura lowest leaf defoliation percentage was recorded in Bavistin (1.82%) and highest was

recorded in control plots (4.74%). In Ishwardi lowest defoliation of leaf was recorded in control plots (1.25%) and highest was recorded in Bavistin treated plots (5.06%). Botrytis grey mould incidence was found significantly decreased in fungicide treated plots compared to control plots. In Magura Botrytis grey mould of Binachola-3 was recorded highest in control plots (5.91%) and lowest in Bavistin (2.04%). In Ishwardi, lowest Botrytis grey mould incidence was recorded at Bavistin (3.15%) and highest disease incidence was recorded per meter square in control plots (6.54%). Haware *et al.* (1997) found that Bavistin was effective in reducing BGM severity of chickpea significantly as compared to *T. viride*.

In Magura the highest plant stand was recorded in Bavistin treated plots (25%) and lowest in control (20.34%). In Ishwardi the highest plant stand was recorded in Bavistin treated plots (26.2%) and lowest in control (21.54%) per meter square (Table 2). In Magura the highest plant height was recorded in Nativo treated plots (53.10cm) and lowest plant height was recorded in control (48.02cm). In Ishwardi the highest plant height was recorded in Bavistin treated plots (54.96cm) and lowest plant height was recorded in control (48.02cm). Both in Magura and Ishwardi highest branching was recorded in Bavistin treated plots and lowest is recorded in control plots. Knights and Siddique (2002) reported that foliar spray of fungicides (Captan, Carbendazim, Mancozeb, Thiabendazole and vinclozolin) after 50 days of sowing reduced the infection due to botrytis gray mold. In Magura the highest number of pod per plant differs from treatment to treatment (Table 3). Highest pod no. per plants was reported from Bavistin treated plots (56.50) and lowest was recorded in control (38.27). The highest seed per pod were recorded at Bavistin (2) and lowest was recorded in control (1.7). The lowest unfilled pod per plants was reported from Bavistin treated plots and it was 1.33 and highest was recorded in control 1.33. The highest seed weight per plants was reported from Bavistin treated plots and it 21.67g and lowest was recorded in control plots 13.21g. The highest dry weight and 1000 seed weight per plants were reported from Bavistin treated plots and in control.

Table 2. Effect of fungicides on plant height, branching and plant stand in the field of Chickpea

Treatment	Magura			Ishwardi		
	% Plant stand/m <sup>2</sup>	Plant Height (cm)	No. of branch/plant	% Plant stand/m <sup>2</sup>	Plant height (cm)	No. of branch/plant
T <sub>1</sub> (Nativo)	22.6bc	53.10a	4.030d	22.46bc	71.29a	4.730bc
T <sub>2</sub> (Biofungicide)	22.94b	49.93cd	4.770b	21.74cd	60.75cd	5.680a
T <sub>3</sub> (Bavistin)	25a	50.40bcd	5.160a	26.20a	61.32bcd	5.880a
T <sub>4</sub> (Secure)	24.2ab	51.94abc	5.090a	22.26bcd	63.96bc	5.340ab
T <sub>5</sub> (Rovral)	20.6d	52.36abc	4.680b	22.80b	64.07b	5.870a
T <sub>6</sub> (Ridomil gold)	23.54ab	52.17abc	4.350c	22.60bc	60.68d	5.390ab
T <sub>7</sub> (Dithane M-45)	21cd	52.85ab	4.99 a	25.74a	63.16bcd	5.590a
T <sub>8</sub> (Control)	20.34d	48.02d	3.99d	21.54d	54.96e	4.580c
LSD <sub>0.05</sub>	8.78	2.40	0.215	4.13	2.99	0.646

Table 3. Effect of fungicides on different growth and yield parameters of Chickpea in Magura

Treatment	No. of pod/plant	No. of seed/pod	No of unfilled pod/plant	Seed weight/ plant (g)	1000 seed weight in dry condition (g)	Dry plant weight/ Plant (g)
T <sub>1</sub> (Nativo)	38.70b	1.80b	2.130b	21.42a	249.0b	75.86c
T <sub>2</sub> (Biofungicide)	44.87b	1.950a	1.500d	18.15bc	239.8c	71.73d
T <sub>3</sub> (Bavistin)	56.50a	1.960a	1.33e	21.67a	273.6a	84.11a
T <sub>4</sub> (Secure)	47.33b	2.000a	1.870c	18.89b	197.4d	80.46b
T <sub>5</sub> (Rovral)	39.07c	1.960a	2.130a	17.04cd	188.3e	71.96d
T <sub>6</sub> (Ridomil gold)	46.70b	2.000a	1.930c	16.00d	148.6f	78.61b
T <sub>7</sub> (Dithane M-45)	40.76c	1.990a	1.370e	14.39e	187.8e	73.72cd
T <sub>8</sub> (Control)	38.27c	1.700c	2.33a	13.21e	143.8f	68.91e
LSD <sub>0.05</sub>	4.06	0.096	0.124	1.42	8.31	2.45

In column, figures with same letter do not differ significantly where figures with dissimilar letter differ significantly.

Almost similar result was recorded in Ishwardi (Table 4). Rajib *et al.* (1996) reported that carbendazim (bavistin WP) was superior to carboxin for reducing wilt for increasing seed yield. Hossain (2009) observed that maximum grain yield of lentil when treated with 0.2% bavistin.

Table 4. Effect of fungicides on different growth and yield parameters of Chickpea in Ishwardi

Treatment	No. of pod/plant	No. of seed/pod	No of unfilled pod/plant	Seed weight/ plant (g)	1000 seed weight in dry condition (g)	Dry plant weight/ Plant (g)
T <sub>1</sub> (Nativo)	47.60 b	2.00a	2.30b	16.70e	168.87e	71.25c
T <sub>2</sub> (Biofungicide)	37.20c	1.98a	2.60a	17.60e	205.64d	77.21b
T <sub>3</sub> (Bavistin)	53.10a	2.00a	1.10f	27.97a	375.94a	89.12a
T <sub>4</sub> (Secure)	51.40ab	1.90a	2.10c	22.34b	256.99b	69.00c
T <sub>5</sub> (Rovral)	41.50c	2.00a	1.8d	16.70e	157.25f	70.85c
T <sub>6</sub> (Ridomil gold)	50.50ab	2.00a	2.60a	21.33c	237.66c	86.90a
T <sub>7</sub> (Dithane M-45)	41.90c	1.95a	1.60e	17.36de	198.09d	76.88b
T <sub>8</sub> (Control)	30.13d	1.87 b	2.70a	13.91f	129.14g	64.29d
LSD <sub>0.05</sub>	4.61	0.078	0.157	0.834	11.37	3.86

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### Conclusion

Based on the findings of the present study it may be concluded that Bavistin can be used for controlling botrytis grey mould of chickpea. But more research on other control management need to be carried out under different agro-ecological zones (AEZ) of Bangladesh for achieving desirable outcome.

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