ISSN 0258-7122
Bangladesh J. Agril. Res. 35(3) : 381-385, September 2010

EFFECT OF *ALTERNARIA* BLIGHT ON THE SEED YIELD OF CAULIFLOWER *(Brassica oleracea* L.)

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Abstract

Effect *of Alternaria* blight *(Alternaria brassiceae* and *A. brassicicola)* on seed yield of cauliflower *(Brassica oleracea* L. var. *botrytis)* was studied during three consecutive growing seasons (2003-2004, 2004-2005, and 2005-2006) in winter under natural epiphytotic condition. There were two treatments viz. sprayed and unsprayed. BARI Cauliflower-1 was used as planting material and Rovral 50 WP (Iprodion) at 0.2% suspension was used as protective chemical to safe the crop against *Alternaria brassiceae* and *A. brassicicola.* Percent pod infection, pod area diseased, number of pods/plant and seed yield differed significantly between the sprayed and unsprayed (control) plots. Percent pod infection and pod area diseased ranged 35.3-62.4% and 94.7-97.6%, 1.9-2.2%, and 10.8-16.4% in sprayed and unsprayed plots in different, respectively. The number of pod/plant was 462-592 in sprayed and 281-395 in unsprayed plots. The seed yield/ha ranged 249.4-355.1 kg in unsprayed plots and 456.8-677.0 kg in Rovral sprayed plots. The seed yield increase were 59.6%, 171.4%, and 75.2% in 2003-2004, 2004-2005, and 2005-2006 cropping seasons, respectively.

Keywords: *Alternaria* blight, seed yield, cauliflower.

Introduction

Cauliflower *(Brassica oleracea* L. var. *botrytis)* is an important vegetable crop cultivated in both tropical and temperate regions. In Bangladesh, it is a popular vegetable and widely grown during the winter season. At present, it is being cultivated in about 12875 hectares with a production of about 101485 metric tonnes (BBS, 2005). About 3399 kg cauliflower seeds are required every year in Bangladesh and the entire quantity is directly imported (BBS, 2005). Bangladesh Agricultural Research Institute (BARI) has developed two high yielding open pollinated (OP) cauliflower varieties having seed producing capacity under Bangladesh condition and BARI Cauliflower-1 (Rupa) is one of them (Satter *et al.,* 2005).

In India, seed yield of cauliflower has been reported to be about 800 kg/ ha against only about 400 kg/ ha in experimental plot in Bangladesh (Ayub, 2001; Ayub *et al.*, 2005). A number of factors are responsible for poor yield of cabbage seeds in Bangladesh and diseases have been reported to play an important role. In Bangladesh, a total of eight diseases of cauliflower have so far been recorded (Ahmed and Hossain, 1985; Meah and Khan, 1987). *Alternaria* blight caused by

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Alternaria. brassicae (Berk) Sacc. and *A. brassicicola* (Schew) Wiltshire is considered to be the most serious disease of cauliflower seed crop in the country (Kudratikhoda *et al.,* 2003; Kohinoor *et al.,* 2003; Anon., 2004 and 2005; Ayub *et al.,* 2005,).

Assessment of the effect of any disease on yield of a crop is pre-requisite for preparing rational disease management programme. Yield losses of many crops due to different species of *Alternaria* have been reported (Huq *et al,.* 1999; Hossain and Mian, 2005). Huq *et al.* (1999) assessed the yield loss of garlic seed due to *A. porri* when a maximum of 23% yield loss was recorded in 1991-1992. Ayub (2001) obtained 54.8% higher seed yield of indigenous cauliflower cultivar (Pusali) over control with the use of Rovral 50 WP. Hossain and Mian (2005) recorded about 59% loss of cabbage seed yield due to *Alternara* blight *(A. brassicicola).* However, the extent of damage to seed yield of BARI Cauliflower-l due to *Alternaria* blight has not been estimated. Hence, an attempt was made to assess the effect of *Alternaria* blight on seed yield of BARI Cauliflower-1 under natural epiphytotic condition.

Materials and Method

The experiment was conducted during the winter season of 2003-2004 and 2004-2005 at Regional Agricultural Research Station (RARS), Jamalpur and during 2005-2006 winter seasons at BARI Farm, Joydebpur. Thirty days old seedlings of BARI Cauliflower-1 (Rupa) were transplanted on 1 November in 2 m × 1.2 m plots maintaining a spacing of 60 cm between lines and 50 cm between plants within a line. Ten seedlings were transplanted in each plot in two rows. The seedlings were watered immediately after transplanting and continued for 3 days to facilitate their establishment. Subsequently weeding, mulching, and irrigation were done as and when necessary. Aphid infestation was controlled by spraying Malathion 57 EC @1.5 ml/ L. Standard doses of fertilizers were also used (Satter *et al.,* 2005). Rovral 50 WP (Iprodione), an effective fungicide against *Alternaria* blight of cauliflower (Ayub, 2001; Kodratikhoda *et al.,* 2003) and cabbage (Hossain and Mian, 2004) was applied as foliar spray to control *Alternaria* blight. Out of 10 plots, five were selected randomly and plants were sprayed with Rovral at 0.2% concentration. Other five plots were sprayed with plain water (control). The fungicide was applied 5 times at 12 days interval beginning from the appearance of first visible symptoms of the disease and continued upto pod maturity. Five plants from each plot were randomly selected and tagged for data collection. When 70% pods of the plant showed the symptoms of maturity (partial yellowing) data on percent pod infection, percent pod area diseased and number of pods/plant was recorded. After harvest, the plants were sun dried and threshed manually. Seed yield/plot was recorded and seed yield/ha were calculated based on ‘per plot seed yield. Yield loss was computed according to Gupta and Singh (1981). Data were analyzed statistically using paired t-test.

Results and Discussion

Severity of *Alternaria* blight of cauliflower seed crop (percent pod infection and percent pod area diseased) was significantly reduced over control due to spraying of Rovral 50 WP during the three crop seasons. The percent pod infection in sprayed plots was 48.9, 62.4, and 35.3 in 2003-2004, 2004-2005, and 2005-2006 cropping seasons, respectively, while in unsprayed plots, it was 96.2, 97.6, and 94.7%, respectively. The decrease of percent pod infection over control was 49.2, 36.1, and 62.8% during 2003-2004, 2004-2005, and 2005-2006 cropping seasons, respectively (Table 1). Percent pod area diseased ranged from 1.9 to 2.2 in sprayed plots with an average of 2.0 and in unsprayed plot, it ranged from 10.8 to 16.6 with an average of 13.7. The parameter decreased over unsprayed plot by 83.8, 88.2, and 81.5% during 2003-2004, 2004-2005, and 2005-2006 cropping seasons, respectively (Table 1). The variation in the disease severity among the growing seasons may be attributed from environmental variations in different seasons because the pathogen is extremely dependant on environmental conditions that have a significant effect on epidemics (Alam *et al.*, 1995).

Table 1. Effect *of Alternaria* blight on seed yield and yield contributing characters of cauliflower seed crop.

Parameters	Sprayed	Unsprayed	Percent Increase (+)/ decrease (-)	t- value
2003-2004				
Percent pod infection	48.9	96.2	- 49.2	10.45**
Pod area diseased (%)	2.2	13.6	-83.8	6.71**
Pod number/plant	526.8	395.0	+ 33.4	l1.24**
Seed yield/ha (kg)	566.9	355.1	+ 37.4	17.37**
2004 - 2005				
Percent pod infection	62.4	97.6	-36.1	6.74**
Pod area diseased (%)	1.9	16.4	-88.2	9.64**
Pod number/plant	591.8	281.4	+110.1	13.54**
Seed yield/ha (kg)	677.0	249.4	+63.2	22.79**
2005-2006				
Percent pod infection	35.3	94.7	-62.8	11.55**
Pod area diseased (%)	2.0	10.8	-81.5	5.53**
Pod number/plant	461.8	308.6	+49.4	8.23**
Seed yield/ha (kg)	456.8	260.7	+49.2	9.51

The number of pods/plant were significantly lower in unsprayed plots as compared to sprayed plot. The number of pods/plant in sprayed plot was 526.8,

591.8, and 461.8 in 2003-2004, 2004-2005, and 2005-2006 cropping seasons, respectively; but in unsprayed plots, the number of pods/plant was 395.0, 281.4, and 308.6, respectively, in the corresponding growing seasons. The pod number/plant in Rovral sprayed plot was increased by 33.4, 110.1, and 49.4% as compared to unsprayed control (Table 1). Dixon (1984) mentioned that *Alternaria* blight attacks inflorescence causing flower drop leading to reduced flowering and pod formation. Spraying of Rovral protected the flower drop resulting higher number of pod formation (Hossain and Mian, 2004).

The seed yield recorded from sprayed plot was 566.9, 677.0, and 456.8 kg/ha in 2003-2004, 2004-2005, and 2005-2006 cropping seasons, respectively, whereas the corresponding seed yield in case of control was 355.1, 249.4, and 260.7 kg/ha. The seed yield increased by 59.6, 171.4, and 75.2% over unsprayed control in 2003-2004, 2004-2005, and 2005-2006 cropping seasons, respectively (Table 1). The highest yield loss (63.2%) was recorded during 2004-2005 cropping season. This might be due to higher severity of pod area diseased (16.4%) and effect of disease on reduction of pod number (52.5%). These results are in accordance with Kodratikhoda *et al.* (2003) and Hossain and Mian (2004) and also with Kohinoor *et al.* (2003) who obtained 112% more seed pod of cauliflower over control by spraying Rovral 50 WP.

The average yield increase due to Rovral spray was upto 102% which are supported by Hossain and Mian (2004) and Anon. (2005). Kohinoor *et al.* (2003) recorded 124% higher seed yield of cauliflower over control by spraying Rovral 50 WP against *Alternaria* blight. Rovral also protected the pod from being infected by *Alternaria* blight. Hossain (2003) mentioned that pod is an important component of seed yield of *Brassica* species. When pods are protected from infection, normal filling of pod inside takes place and seed yield is increased.

Based on the finding of present result of the experiment, it may be concluded that *Alternaria* blight may cause about 47.8% reduction in yield of cauliflower seed. The loss can be avoided by spraying 0.2% Rovral 50 WP.

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