

Management of *Alternaria* blight of mustard with fungicides- A. Shivpuri, Department of Plant Pathology, Rajasthan Agricultural University, Agricultural Research Station, Durgapura-Jaipur-302018, Rajasthan, India.

Brassica juncea is commonly known as Indian mustard and is one of the most important oil seed crops of Northern India. In Rajasthan the cultivated area of rape seed and mustard is about 2.31 million hectares producing about 1.89 million tonnes of grains. *Alternaria* leaf blight caused by *Alternaria brassicae* (Berk) Sacc. is responsible for heavy yield losses in mustard crop due to shrivelling and dis-colouration of infected grains in the severely diseased plants. The present investigations are aimed to check the disease through the use of chemicals.

#### MATERIAL AND METHODS

A susceptible mustard variety varuna (T-59) was sown in randomised block design with three replications during rabi 1987, 1988 and 1989 in a plot size of 3x3 m. The crop was artificially inoculated with spore suspension ( $1 \times 10^5$  spores/ml) of *Alternaria brassicae*, 50-55 days after sowing. This was followed by two subsequent sprays of inoculum at an intervals of 48 hrs. to ensure the reaction of pathogen. Fungicidal spray was started on the initiation of disease symptoms on the lower leaves. Three sprays of six fungicides viz. Bavistin (0.1%) (2 methoxy-carbamoyl benzimidazol (50 WP); Blitox-50 (0.3%) [(Copper Oxychloride (50% copper))] (50 WP); Dithane M-45 (0.2%) (75% Zinc ion and manganese ethylene bis-dithio carbamate); Captafol (0.2%) (Cis NC 1, 1, 2, 2, tetra-chloroethyl thio-4 cyclohexene-1, 2 dithiocarbamate); Rovral (0.2%) (Iprodione); Thiram (0.3%) (tetramethyl thirum disulphide) were given at an intervals of 12 days. The final disease intensity was recorded 20-22 days before harvesting by selecting 50 plants per plot at random from each treatment alongwith check. These plants were rated by employing 1-9 disease rating scale as

recommended by Subrahmanyam et al (1982). Disease intensity was computed by using the formula-

$$\text{Percent Disease Intensity} = \frac{\text{Sum of all numerical ratings} \times 100}{\text{Total number of plants counted} \times \text{maximum rating}}$$

### RESULTS AND DISCUSSIONS

The losses caused by A. brassicae are maximum due to secondary infection of the disease when it spreads to upper leaves and pods. In the present study the average of three years data showed that the disease intensity was minimum (33.40%) in the plots where three sprays of Rovral (0.2%) were given (Table-1). All the fungicides tested were found significantly superior in controlling the disease as compared to check. But Rovral was found to be the best followed by captafol (46.20%) and Dithane M-45 (46.40%). Similarly, maximum yield (2696.30 kg/ha) was recorded in Rovral treated plots followed by captafil (2325.93 kg/ha) and Dithane M-45 (2151.85 kg/ha). Rest were at par with check. However the difference in the yields of Rovral and captafol treated plots was not significant. Dithane M-45 was next best to them. However, statistically it was at par with captafol.

An interesting observation made at the time of recording the disease observation was that Rovral treated plants had minimum defoliation and yellowing of leaves as compared to other treatments. This is an indication of the antisenescence property of the chemical. This may be one of the reasons for the increase in yield in the Rovral treated plots. It was also observed that in Rovral, Captafol and Dithane M-45 sprayed plots incidence of the disease on pods were negligible i.e. one to two spots on each pod as compared to rest of the treatments and check where pods showed 4 to 6 spots. Thus in Rovral treated plots increase in yield was more than double as compared to check while in captafol and Dithane M-45 treated plots yield increased by 76.90 and 63.66 per cent

respectively over check. Humperson et al.(1983) has also reported that Rovral (iprodione 0.5 kg. a.i/ha) was the best fungicide against the pod infection of rapeseed induced by A. brassicae. The relative efficacy of the fungicidal treatments in terms of their economic viability to the farmers has also been studied. Data in Table-1 shows that Rovral (0.2%) was found to be the best in all respect. Since Rovral was received as a free sample and has not been marketed in India till now, its economics is not possible to be calculated. Rovral was closely followed by captafol and Dithane M-45 giving the net profit of Rs.6768.00 and Rs.5946.00 per hectare, respectively. Kolte and Tiwari. (1978) reported excellent control of Alternaria blight on rape and mustard by using Difolatan (0.2%) but they did not work out its economics. Kaushik et al (1983) also found that 4 sprays of Difolatan (0.2%) were effective in controlling the disease and giving maximum yield of 1800 kg/ha alongwith the highest return. Chahal and Kang (1980) reported that yield losses were negligible when intensity of disease on pods was reduced to 10.7 percent or less. In the present investigation also three sprays of captafol were found best in increasing the yield. Therefore, in view of the additional yield and the accruing net profit, three sprays of captafol (0.2%) or Dithane M-45 (0.20%) may be recommended to the farmers for adoption.

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Chahal, A.S., and M.S. Kang (1980) Different levels of Alternaria blight in relation to grain yield of Brown Sarson. Indian J. Mycol. PL. Pathol. 10(2): 260-261.

Humperson-Jones, F.M., and L.F. Ainsworth. 1983. Alternaria disease of Brassica seed crop. In 34 annual report for 1983. Nat. Neg. Res. statn. Warwick, U.K.

Kaushik, C.D., J.C. Kaushik and G.S. Saharan. 1983. Field evaluation of fungicides for the control of Alternaria leaf blight of Brassica juncea. Indian J. Mycol. Pl. Pathol. 13(3): 262-264.

Kolte, S.J., and A.N. Tiwari. 1978. Efficacy of different chemicals for the control of Alternaria blight of yellow sarson. Indian Phytopath. 31(1) : 81-84.

Subrahmanyam, P.D. McDonald, R.W. Gibbson, S.N. Nigam and D.J. Nevill. 1982. Resistance to rust and late leaf spot disease in some genotypes of Arachis hypogaea Peanut Sci. 9:6-10.

Table : 1 Economic efficacy of different fungicides for the control of leaf blight of mustard induced by Alternaria brassicae.

Treatment	Mean* disease intensity (%)	Mean** Yield kg/ha	Increa- sed yield due to treatment kg/ha	Increa- sed income due to treatment (Rs.)	Total treat- ment cost/ha (Rs.)	Net profit per ha (Rs.)
Bavistin (0.1%)	63.00 (52.51)	1485.19	170.38	1363.00	1350.00	13.00
Blitox-50 (0.3%)	62.00 (51.93)	1596.30	281.49	2252.00	825.00	1427.00
Captafol (0.2%)	46.20 (42.83)	2325.93	1011.12	8088.96	1329.00	6759.96
Dithane (0.2%)	46.40	2151.85	837.04	6696.00	750.00	5946.00
Rovral <sup>+</sup> (0.2%)	33.40 (35.02)	2696.30	1381.49	11051.92	-	-
Thiram (0.3%)	55.90 (49.00)	1551.85	237.04	1896.00	1050.00	846.00
Check	75.10 (60.00)	1314.81	-	-	-	-
S.Em = ±	2.07	143.44 Kg/ha				
C.D. at 5% level	5.89	408.30 Kg/h				

\* Average of three years data, Angular transformed values in parenthesis.

\*\* Total treatment cost includes cost of fungicide, labour charges, hire charges of sprayer.

\*\*\* Market price of mustard at Rs. 8.00 per kg.

+ Cost cannot be determined since Rovral was received as a free sample.