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Evaluation of fungicides, neem product and bio-agent against *Alternaria* leaf spot of datepalm

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Datepalm (*Phoenix dactylifera* Linn.) is an important arid fruit plant. It is reported to have been cultivated in Southern Iran as early as 4000 B.C. In India, it is commercially grown in Kutch district of Gujarat and is also a basic commercial fruit plant in many other sub-tropical desert areas. Datepalm fruits have high nutritive value containing 60-65 per cent sugar (3150 calories/ kilogram of fresh fruits) along with fair amount of fibre (2.5%), protein (2.0 %), fat (upto 2.0 %) and minerals (upto 2.0 %) i.e. iron, potassium, calcium, copper, magnesium, chlorine, sulphur, phosphorus etc., Pectic substances (less than 2.0 %) and vitamins (Vitamin A, Vitamin B_1 and Vitamin B_2). The leaves of datepalm are used for thatching of huts, preparation of baskets and ropes. The datepalm tree plantation in arid regions of Rajasthan can improve the ecology of the region by providing green cover to the barren land and by improving the micro climate of the region.

Alternaria leaf spot of datepalm caused by *Alternaria alternata* (Fr.) Keissler is one of the devastating diseases that occurs regularly at Datepalm Research Centre, Bikaner, Rajasthan for last several years (Anonymous, 2004). This disease was first reported by Elarosi *et al*. (2) from Saudi Arabia. The disease appears in severe form and causes significant losses in the fruit yield. Sufficient information on field efficacy of fungicides, neem product and bio-agent alone or in combination against *Alternaria* leaf spot of datepalm is not available. The present investigation was therefore, undertaken to find out suitable control measures against the disease.

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In order to study the efficacy of different fungicides, neem product and bio agent against *Alternaria* leaf spot of datepalm, a field experiment was conducted during rabi season of 2004-05 in Randomized Block Design, with three replications at Datepalm Research Centre, Bikaner, Rajasthan. The variety Zahidi was used in this experiment. Five fungicides, one neem product, one bio-agent and their combinations was tested in different concentrations. The fungicides namely, mancozeb 75 WP (Current M-45), carbendazim 50 WP (Bavistin), carbendazim + mancozeb WP (Companion), chlorothalonil 75 WP (Kavach), difenoconazole 25 EC (Score), neem product azadirachtin 0.03 EC (Nimbicidine), companion + Nimbicidine and bio-agent *Trichoderma viride* were sprayed twice, at an interval of 15 days. The first spray was done on initial appearance of the disease symptoms i.e. during the last week of February. Untreated or water sprayed were maintained as control. The percent disease incidence was recorded 20 days after last spraying following Mckinney (6). The data were analysed statistically to find out comparative efficacy of various treatments.

The data presented in Table 1 shows that incidence of the disease was significantly less in all the treatments as compared with the untreated or water sprayed check. The minimum disease incidence (23.33%) was recorded with Companion + Nimbicidine with 60.22 per cent disease control over the untreated or water sprayed check. The least effective treatment was *Trichoderma viride* where disease incidence was recorded on 49.00 per cent as compared to control (58.66%). It is concluded that two sprays of Companion + Nimbicidine at the interval of 15 days was found

Table 1. Effect of different fungicides, neem product and bio-agent on the incidence of *Alternaria* leaf spot of datepalm

S. No.	Treatment	Dose (%)	Disease incidence (%)	Disease control (%)
1.	Current M-45	0.2	41.33(40.00)*	29.54
2.	Bavistin	0.1	32.66(34.85)	44.32
3.	Companion	0.2	27.00(31.31)	53.97
4.	Kavach	0.2	36.33(37.06)	38.06
5.	Score	0.1	38.00(38.05)	35.21
6.	Nimbicidine	0.3	47.00(43.28)	19.87
7.	Companion + Nimbicidine	0.1+0.2	23.33(28.86)	60.22
8.	*Trichoderma viride*	0.6	49.00(44.43)	16.46
9.	Control		58.66(49.99)	-
	S.Em. ±		0.45	
	C.D. (P=0.05)		1.34	

* Figures in parenthesis are angular transformed values

most effective in reducing the per cent disease incidence as compared to control, where disease incidence was recorded on 58.66 per cent. The disease incidence differed significantly between all the treatments.

In the support of the present investigation similar effect of various fungicides, neem product, bio-agent and their combinations against the incidence of *Alternaria alternata* has been shown by various workers on date palm plants as well as other crops. Singh and Shukla (7) controlled *Alternaria* leaf spot and fruit rot of brinjal caused by *Alternaria alternata* by spraying fungicides on inoculated aubergine plants in plot tests and observed that Brestan-60 followed by Dithane M-45 Difolatan, Cuman-L and Zineb effectively controlled the disease. Smita Ranjan *et al*. (8) showed that carbendazim and captafol (0.05%) completely inhibited spores germination of *Alternaria alternata* of sunflower. Gao Binda *et al*. (4) reported that the low concentration of carbendazim could control *Alternaria alternata* on cotton seedling. Kumar (5) showed that Carbendazim (1000 ppm) followed by Chlorothalonil (1000 ppm) was effective against *Alternaria* fruit rot of ber. Vir and Sharma (9) reported that neem was found to inhibit the growth of *Alternaria alternata* by 61 percent at a concentration of 1 percent and by 100 percent at 10 percent concentration. El-Zawahry-Am *et al.* (3) observed that *Alternaria alternata* fungal disease on datepalm trees can be suppressed by biological control through *Trichoderma viride* and *Trichoderma harzianum.*

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