MANAGEMENT OF ALTERNARIA BLIGHT OF SENNA (*Cassia angustifolia* VAHL) WITH NEEM (*Azadiracta indica*) PRODUCTS

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ABSTRACT

Senna (Cassia angustifolia Vahl.), a perennial shrub, is an important medicinal plant growing commercially in west parts of Rajasthan. Different neem products with various concentrations (1000, 2000, 5000 and 10000 ppm) were used to test their efficacy against Alternaria alternata in senna, of which nimin was found most effective in inhibiting the mycelial growth, spore germination of A. alternata and in disease control caused by it followed by neem gold and nimbicidine. In general, higher concentrations of neem products were more effective reducing the mycelial growth and recorded minimum disease intensity as compared to low concentration.

KEY WORDS: *Alternaria alternata*, management, senna

INTRODUCTION

Senna (*Cassia angustifolia* Vahl.) leaves and pods posses a group of anthracene derivative collectively known as sennosides that form an important source of organic laxatives. India is the major producer and exporter of senna and there is enough scope for the expansion of area under cultivation of this crop to earn more foreign exchange while catering the needs of the world demand. The crop is known to suffer from diseases like damping off, leaf spots, root rot, root knot, die back, and leaf blight. Among these diseases, leaf blight caused by *Alternaria alternata* is the most serious disease causes lots of damage to the crop (Patel and Pillai, 1979). As a result of leaf blight infection, defoliation occurs that affect the crop yield very badly. Use of chemicals for the management of senna blight may affect its medicinal value. Several researchers (Singh *et al*., 2003); Kumar *et al*., 2004); Nandagopal and Ghewande, 2004)) tested the efficacy of neem products against fungal pathogens. The present investigation was undertaken to evaluate some neem products for the management *Alternaria* blight disease of senna.

MATERIALS AND METHODS

Different neem products with various concentrations (1000, 2000, 5000 and 10000 ppm) were used to test their efficacy against *Alternaria alternata* in senna. Neem leaves and neem bark were thoroughly washed with sterilized distilled water and were ground in electric grinder using equal amount of sterilize distilled water separately to get stock solution.

The mixture was squeeze of double layered sterilized cheesecloth. The extract thus obtained was considered as of 100 per cent concentration. Other commercial neem product were obtained from market and used under present investigation.

The effect of neem products against mycelial growth was tested using Poisoned-Food-Technique. Required quantity of each neem product was mixed thoroughly in melted PDA to get desired concentrations just before pouring in sterilized petridishes and allowed to solidify for 12 hours. Each plate was inoculated with 2 mm disc of mycelial bit taken form the periphery of 7 days old culture of *A. alternata* growing on PDA. The inoculated petridishes were then incubated at 25±1 ^{0}C. Four petridishes were used for each treatment. petridishes without neem product severed as control. Colony diameter was measured from two diagonals after 7 days of incubation. Proper controls were maintained. Percent growth inhibition was calculated using Vincent's, (1947) formula. To test the spore germination, Hanging-Drop-Method was used. Spore suspension, prepared in sterilized distilled water to get 10 to 12 conidia per microscopic field (10X), was placed in the center of a clean glass slide and was allowed to air-dry. Immediately after air-drying, a drop of neem products of required concentration was put on the air-dried surface on glass slide. The slides were kept inverted in humid chamber and incubated at 25 ± 1 ^{0}C for 24 hrs. Sterilized water severed as control. After incubation, a drop of lactophenol was added to the spore suspension and number of total spore and germinated spore was recorded from five randomly selected microscopic fields from each slide. The experiment was conducted with four replications.

Efficacy of neem products against senna blight was tested under cage house conditions in the year 2004 and 2005. Senna plants were raised in cage house of Department of Plant Pathology, S. K. N. College of Agriculture, Jobner. Eight weeks old plants were used in the experiments. First, plants were inoculated with *A. alternata*. The first spray of neem products were applied 7 days after inoculation, when disease symptoms initiated on the inoculated foliage. The spray was repeated after 15 days interval. Each neem product was used at three concentrations viz., 0.15, 0.20, and 0.25 per cent. Three plants were sprayed with each concentration of individual neem products to serve as three replications. Observations on disease intensity were recorded one month after spray. Twenty five leaves were taken randomly from each plant and assessed for per cent leaf area affected with the help of disease assessment key and per cent disease intensity was computed. Plants sprayed with water served as control.

RESULTS AND DISCUSSION

Irrespective to concentrations, nimin was found most effective in inhibition to the mycelial growth of *A. alternata* followed by neem gold and nimbicidine (Table 1). Neem leaf and neem bark extracts were least effective in checking the mycelial growth In general, higher concentration of neem products was more effective in reducing the mycelial growth as compared to low concentration. Similarly, all the neem products significantly inhibited the conidial germination at all concentrations used. Nimin was significantly superior in checking conidial germination followed by neem gold and nimbicidine. Earlier workers have also found nimin to be effective against growth and /or conidial germination of *Alternaria* spp. pathogenic to other crop like wheat (Singh *et al.,* 2003) and rapeseed and mustard (Kumar *et al.,* 2004). Increasing the concentration of neem products increased their efficacy in inhibiting the conidial germination.

All the neem products tested were superior over check in reducing the disease in both the year i.e. 2004 and 2005 under cage house conditions (Table 2). In general, higher concentrations of neem products were more effective and recorded minimum disease intensity. The most effective among neem products was nimin (0.25%), that gave minimum disease intensity (31.43 %) followed by neem gold (0.25%) with 35.05 per cent disease intensity and nimbicidine (0.25 %) with (35.65 per cent disease intensity. However, neem gold and nimbicidine were at par in controlling the disease at 5 per cent level of significance. Neem leaf extract (0.15 %) was least effective in controlling disease intensity (52.30 %) followed by neem bark extract (0.15 %) and neem leaf extract (0.02 %).

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Table 1: *In vitro* efficacy of neem products against mycelial growth of *A. alternata* after 7 days of incubation at 25 ± 1^{0}C temperature

Neem roduct	Per Cent Inhibition of Mycelial Growth* Concentration in ppm				Mean
	1000	2000	5000	10000	
Nimin	13.32 (21.40)	25.48 (30.31)	35.00 (36.27)	75.95 (60.63)	37.45 (37.15)
Nimbicidine	9.80 (18.24)	18.72 (25.63)	29.45 (32.87)	50.18 (45.10)	27.04 (30.46)
Neem gold	12.96 (21.10)	23.75 (29.16)	32.60 (34.82)	66.70 (54.75)	34.00 (34.96)
Neem oil	7.44 (15.83)	16.72 (24.14)	25.82 (30.54)	33.55 (35.10)	28.88 (26.48)
Neem leaf extract	4.70 (12.52)	8.20 (16.64)	15.30 (23.03)	25.36 (30.24)	13.39 (20.61)
Neem bark extract	6.40 (14.65)	10.90 (19.28)	18.32 (25.34)	28.50 (32.27)	16.07 (22.88)
Check	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Mean	7.80 (14.82)	14.82 (20.74)	22.35 (26.12)	40.00 (36.91)	22.39 (24.65)
	SEm±	CD (P=0.05)			
Neem product (NP)	0.31	0.86			
Concentration (C)	0.23	0.65			
NP x C	0.61	1.71			

**** Average of four replications***
Figures in parentheses are angular transformed values.

Table 2: Efficacy of neem product in controlling leaf blight of senna in case house conditions

Neem product**	Concentration (%)	Per Cent Disease Intensity		Pooled
		2004	2005	
Nimin	0.15	34.90 (36.20)	35.10 (36.33)	35.00 (36.27)
	0.20	33.20 (35.18)	34.80 (36.15)	34.00 (35.67)
	0.25	30.25 (33.36)	32.60 (34.81)	31.43 (34.09)
Nimbicidine	0.15	38.75 (38.49)	40.25 (39.37)	39.50 (38.93)
	0.20	37.25 (37.61)	38.75 (38.33)	38.00 (38.05)
	0.25	35.50 (36.57)	35.80 (36.75)	35.65 (36.66)
Neem gold	0.15	37.00 (37.46)	39.80 (39.11)	38.40 (38.29)
	0.20	36.20 (36.98)	37.90 (37.99)	37.05 (37.49)
	0.25	34.90 (36.21)	35.20 (36.39)	35.05 (36.30)
Neem oil	0.15	40.80 (39.69)	43.20 (41.09)	42.00 (40.39)
	0.20	35.25 (36.42)	40.00 (39.23)	37.62 (37.83)
	0.25	33.75 (35.51)	35.40 (36.51)	34.58 (36.00)
Neem leaf extract	0.15	51.20 (45.68)	53.40 (46.94)	52.30 (46.31)
	0.20	48.50 (44.14)	50.50 (45.28)	49.50 (44.71)
	0.25	46.70 (43.10)	48.25 (43.99)	47.48 (43.55)
Neem bark extract	0.15	48.25 (43.99)	49.75 (44.85)	49.00 (44.42)
	0.20	47.00 (43.28)	45.25 (42.27)	46.13 (42.78)
	0.25	45.60 (42.47)	43.85 (41.46)	44.73 (41.97)
Check	-	58.30 (49.80)	60.20 (50.88)	59.25 (50.34)
SEm±		**1.11**	**0.94**	**0.73**
CD at 5 %		**3.18**	**2.68**	**2.05**

***** Average of three replications***
Figures in parenthesis are angular transformed values

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