J. Mycopathol. Res. **52(1)** :145-147, 2014; (ISSN 0971-3719)

Effect of neem products on rhizospheric mycoflora and growth of brinjal (*Solanum melangena* L.) plants

A. K. SINGH[1], M. C. DWIVEDI[2], VAIBHAV KR. SINGH[3], V. K. SINGH[4] AND P. WILLIAMS
Allahabad Agricultural Institute - Deemed University, Allahabad 211007,
[1]Regional Agricultural Research Station, SKUAST-J, Rajouri, 185131 (J&K),
[2]Research Farm, SKUAST-J, Chatha, Jammu 180009 (J&K)
[3]Division of Plant Pathology, IARI, New Delhi 110012 and
[4]College of Agriculture, JNKVV, Tikamgarh 472001(MP)

Received : 18.11.2013 RMS Accepted : 10.01.2014 Published : 28.04.2014

Trial was conducted with all the neem products as basal dressing in lines 7-8 cm deep @ 2 q/ha before sowing at research plots of Department of Plant Pathology and Nematology, Allahabad Agricultural Institute (Deemed University), Allahabad, and gave a good inigation for decomposing the matter before planting of seedlings. Neem products were neem bark, neem cake, neem leaf, neemoria and neem shield. The observations were taken at 30 DAS, 60 DAS and 90 DAS. Neem shield gave more plant height at all stages of plant growth as compared to the other neem products and control. There was significant increase in shoot length and in shoot weight at 60 and 90 DAS as compare to other one including control. The highest yield was recorded in neem shield (275.67 q/ha) followed by neemoria (250.l4 q/ha). Lowest yield was recorded in neem bark (180 q/ha) among all treatments except control (150.17 qha).There was a decrease in fungal population at 30 DAS in all treatments except neem leaf as compared to control, but at 60 DAS treatments neem leaf and neem shield were effective in controlling the fungal population in comparisbn with control. At 90 DAS all treatments except neemoria reduced the fungal population.

Key words: Rhizosphere mycoflora, brinjal, neem products

INTRODUCTION

Brinjal or eggplant (*Solanun melangena* L.) is one of the most common, popular and principal vegetable crops grown in India and other parts of the world. It is a versatile crop adapted to different agro-climatic regions and can be grown throughout the year. Bittemess in eggplant is due to the presence of glycoalkaloids which are of wide occurrence in plants of Solanaceae. The glycoalkaloid content in the Indian commercial cultivars varies from 0.37 to 4.83 mg/l00 g fresh weight (Bajaj *et al.*,l98l). Brinjal is known to have ayurvedic medicinal properties and is good for diabetic patients. It has also been recommended as an excellent remedy for those suffering from liver complaints (Shukla and Naik, 1993).

The neem tree (*Azadirachta indica* A.Juss.) is a tropical and sub-tropical evergreen tree (deciduous in drier areas) native to Indian sub-continent. It has been used in Ayurvedic medicine for more than 4000 years due to its medicinal properties. Most of the plant parts such as fruits, seeds, leaves, bark and roots contain compounds with proven antiseptic, antiviral, antipyretic, anti-inflammatory, antiulcer and antifungal properties.

The use of pesticides has become an integral and economically essential part of agriculture. The hazardous and polluting residual effects of the pesticides pose a serious threat for mankind. In view of above points many alternatives have been suggested for controlling the pest. One of such alternatives is to use neem and its products which have

no residual effect on environment and improve soil fertility also. Considering all the points mention above the present study has been carried out.

MATERIALS AND METHODS

The trial was conducted at research experimental plots of Department of Plant Pathology and Nematology, Allahabad Agricultural Institute - Deemed University, Allahabad. All the neem products were applied as basal dressing in lines 7-8 cm deep @ 2 q/ha before sowing and gave a good irrigation and kept wet for eight days for decomposing the matter before planting of seedlings. Plots size were 2 x 2 m, with six treatments and four replications. A local variety of brinjal was used for experiment. Treatments were designated as To - control, T1 - neem bark,T2-neem cake, T3 - neem leaf, T4 - neemoria and T5 - neem shield. Neem shield and neemoria formulations were received from Godrej Agrovet Ltd., Mumbai and others collected from local trees of neem (*Azadirachta indica*). The observations were taken at 30 DAS, 60 DAS and 90 DAS and data were analyzed.

Soil samples were collected at pre-sowing time by the help of sterilized khurpi from the field and put it in sterilized polythene bags. Sample were taken from five places in each replication and mixed well, out of them only ten gram soil collected and transferred into conical flask containing 100 ml distilled water for serial dilution. The soil samples were processed using serial dilution technique (Wakman 1927). A 10 g of sample of the sieved soil was taken in a sterilized conical flask to which 100 ml distilled water was added. The suspension was stirred and poured into 1000 ml Erlenmeyer flask. The flask containing the suspension was subjected to mechanical shaking for 30 min followed by filtration through a course filter paper. One ml of the filtrate was added to a sterilized test tube containing 9 ml distilled water. The procedure was repeated three times to obtain the dilution of I:10,000, which was pipetted before pouring the PDA in Petri plates under a laminar flow. Mycoflora were isolated, purified and maintained in agar slants for further studies. For the determination of population of fungi, their isolation was done by dilution plate technique (Warcup, 1960). For rhizosphere soil sample two plants from each replication was gently up-lifted with soil,with the help of sterilized khurpi.The excess soil was shaken off the roots by gently tapping the stem. The plants were taken at random and root system was cut off from the plant with the help of sterilized scissor and transferred in a conical flask containing100 ml distilled water. These cuts of plant (both root and shoot) were measured and weighed separately, numbers of leaves per plant also were counted and data recorded for statistical analysis.

RESULTS AND DISCUSSION

Results revealed from Table 1 that, neem shield gave more plant height at all stages of plant growth as compared to the other neem products and control. There was significant increase in shoot length and in shoot weight at 60 and 90 DAS as compared to other one including control. Numbers of leaves increased by used of neem cake at 30 DAS. How ever, neem shield was effective at 60 DAS and 90 DAS. The highest yield was recorded in neem shield (275.67 q/ha) followed by neemoria (250.14 q/ha). Lowest yield was recorded in neem bark (180 q/ha) among all treatments except control (150.17 q/ha). Rajput *et al*, (2011) observed that neem products used as spray increased the

Table 1 : Effect of neem products on plant growth and yield

30 DAS	Shoot length (cm)	Shoot wt.(g)	Root length (cm)	Root Wt. (g)	no.of leaves	Yield (q/ha)
T0	9.2	6.35	11.15	0.77	**6.25**	–
T1	13.62	9.2	16.37	1.02	**6.75**	–
T2	14.25	12.47	14.5	2.26	**7.5**	–
T3	**14.75**	10.56	15.82	1.87	**7.25**	–
T4	15.37	14.1	**14.87**	1.77	**7**	–
T5	14.83	12.1	16	1.35	**7.75**	–
CD at 5%	NS	NS	NS	0.90	**NS**	
60 DAS						
T0	17.66	18.66	13.16	3.55	14.5	–
T1	24	33.95	15.33	5.55	18.25	–
T2	23.83	36.57	17.33	5	20	–
T3	17	14.79	20.5	4	19.75	–
T4	22.45	27.93	13.32	0.97	17.5	–
T5	21.75	13.83	26.83	4.77	20.25	–
CD at 5%	12.15	12.15	4.71	2.07	NS	
90 DAS						
T0	35.15	**48.75**	16.3	12.85	40.75	150.17
T1	40.87	**53.32**	18.05	14.37	54.75	180
T2	43.53	**56.8**	18.6	16.77	59.25	231.63
T3	45.37	**59.47**	19.82	17.9	58.5	245.24
T4	46.87	**64.45**	22.15	19.7	60	250.14
T5	56.8	**66.6**	25.9	20.9	63.25	275.67
CD at 5%	2.25	**2.47**	1.57	1.39	5.23	5.23

*There was no yield obtained till 60 DAS.

Table 2 : Population density (x10³) of various fungi per gm of dry soil

Organisms		T0	T1	T2	T3	T4	T5
	Fusarium oxysporum	1.4	1.1	1	1.46	1.12	1.21
30 DAS	*Mucor* sp.	0.92	0.71	0.65	0.95	0.73	0.78
	Rhizopus sp.	0.65	0.5	0.46	0.67	0.51	–
	Penicillium sp.	1.5	1.16	1.05	1.54	1.18	1.28
	Aspergillus flavus	1.19	0.92	0.84	1.23	0.94	1.01
	Alternaria solani	1.26	0.98	0.89	1.3	–	1.08
	Fusarium oxysporum	0.9	0.69	0.74	0.71	1	1.13
	Mucor sp.	0.83	0.8	0.68	0.91	0.92	0.74
	Rhizopus sp.	0.76	–	0.97	0.82	0.84	1.04
60 DAS	*Penicillium* sp.	0.93	1.29	0.77	–	1.03	–
	Aspergillus flavus	0.97	1.25	1.02	1.07	1.07	1.2
	Alternaria solani	–	1.46	0.68	0.75	0.92	–
	Fusarium oxysporum	0.73	0.84	0.78	0.91	1.01	0.74
	Mucor sp.	0.94	0.73	1.01	0.84	1.3	0.68
	Rhizopus sp.	0.57	–	–	–	–	–
90 DAS	*Penicillium sp.*	0.96	0.67	0.61	0.77	0.79	0.63
	Aspergillus flavus	0.94	0.86	1.03	1.12	1.07	0.91
	Alternaria solani	–	–	–	–	–	–

growth of inoculated shisham seedlings as compared to injected at root zone or mixed with soil. Neem oil (15%) used as spray increased root and shoot length and weight of inoculated shisham seedling followed by neem seed decoction, neem seed without coat and neem leaf extract as compared to untreated and inoculated shisham plants.

There was a decrease in fungal population at 30 DAS in all treatments except neem leaf as compared to control, but at 60 DAS treatments neem leaf and neem shield were effective in controlling the fungal population in compare with control. At 90 DAS all treatments except neemoria reduced the fungal population (Table 2). All neem products were effective in reducing the fungal population in comparison to control. Results are in agreement with those reported by Singh and Singh (1983), Chandel and Tomar (2003) and Singh and Shukla (2010). Singh and Singh (2010) found that soil amendment with neem products: neem cake nimin and nimco promoted better growth in brinjal plants. The neem products protected plants from disease incidence. Nimco treated plants were more susceptible to pest incidence. Jadon (2009) observed that use of neem cake @ 10 q/ha before transplanting was effective for the management of collar rot of brinjal. Joseph *et al.* (2008) reported that 20% extract of *Azadirachta indica* was found more effective in controlling the wilt of brinjal.

Neemoria produced significant increase in shoot length and in shoot weight at 30 DAS and 60 DAS, while that neem shield enhanced at 90 DAS of plant growth as compared to other neem products including control. Neem shield increased the root length at all stages of plant growth while that, root weight only at 90 DAS as compared to control and other treatments. It was observed that neem shield effective after at 60 DAS onward but gave better performance.

Considering above observation it is concluded that the results given by neem shield was best in management of a rhizospheric mycoflora and giving better plant growth as well as yield.

REFERENCES

Bajaj K. L, Kaur, G., Chadha, M. L and Singh, B. P. 1981. Polyphenol oxidase and other chemical constituentsin fruits of eggplant (*S. melongena*) varieties. *Veg. Sci.*,**8**:37-44.

Chandel, S. and Tomar, M. 2008. Effectiveness of bioagents and neem formulations against Fusarium wilt of carnation *Indian Phytopath.* **61:** 152-154.

Jadon, Kuldeep Singh 2009. Eco-friendly management of brinjal collar rot caused by *Sclerotium rolfsii* Sacc. *Indian Phytopath.* **62:** 345-347 .

Joseph, Babu, Dar, Muzafar Ahmad, and Kumar, vinod 2008. Bioefficacy of plant Extracts to Control Fusarium solani F. Sp. Melongenae Incitant of Brinjal Wllt. *Global Jour. of Biotech. & Biochem.***3:** 56-59.

Rajpul, Nasir Ahmed, Pathan, Mumtaz Ali, Lodhi, Abdul Mubeen, Dou, Daolong and Rajput, Shahjahan 2011. Effect of neem (Azadirachta indica) products on seedling growth of shisham dieback. *African Journ. of Microb. Res.* **5:** 4937 -4945.

Shukla, V. and Naik L.B. 1993. Agro-techniques of solanaceous vegetables, in *Advances in Horticulture*', Vol.5, Vegetable Crops, Part I (K. L. Chadha and G. Kalloo, eds.), Malhotra Pub. House, New Delhi, p. 365.

Singh, Ashok Kumar and Shukla, D.N. 2010. Effectiveness of neem formulations against mycoflora of pigeonpea [*Cajanus cajan* (L.) Millsp.]. *J Mycol Pl Pathol.* **40:**293-295.

Singh N and Singh R S. 1983. Inhibition of *Fusarium udum* (Pigeon pea wilt pathogen) by other distillate of Margosa cake amended soil. *Indian J. of Mycot. Pt. Pathot.* **23:** 329-333.

Singh, Rashmi and Singh, Arvind Kumar 2010. Effect of neem based products on yield, pest incidence, nematode incidence in brinjal (*Solanum melongena* l.). *Plant Archives* **10 :** 891 -892

Wakman, S.A. 1927. *Principles of soil Microbioloy.* Baltimore; Williams and Wilkins Co. 600 pp.

Warcup, J.H. 1960. Method for isolation and estimation of activity of fungi in soil. In *The Ecologt of Soil Fungi* (Eds. Parkinson D and Waid JS), Liverpool University Press, Liverpool, U.K. 3-21pp.