International Journal of ChemTech Research
CODEN(USA): IJCRGG ISSN : 0974-4290
Vol.5, No.3, pp 1222-1223, April-June 2013

IPACT-2013[14th – 15th March 2013]

National Conference on Industrial Pollution And Control Technology-2013

Mycotrophy of Cotton as Influenced by Insecticides

Kumaresan G.

**Department of Agricultural Microbiology, Annamalai University
Annamalainagar – 608 002, Tamil Nadu, India.**

Abstract: The present study was conducted to study the interaction effect of *Glomus fasciculatum* with insecticides were used at different concentration *viz.*, 100, 115 and 130 per cent Recommended Dose (RD) on MCU-7 cotton. Among the different insecticides monocrotophos, endosulfan and phosphamidon had no reduction on AM fungi colonization, spore population and 'P' uptake in cotton at 100 per cent over control, but above 100 per cent reduction was observed. Hence, higher doses of insecticides inhibit the AM fungi root colonization, spore population and 'P' uptake than the recommended dose.
Key Words: Mycotrophy of Cotton, Cotton, Insecticides.

Introduction

The symbiotic association established between plant roots and fungi belonging to the endogonaceae known as Arbuscular Mycorrhizae Fungi (AMF) can significantly improve the plant growth and development due to enhanced uptake of soil phosphorus and certain other nutrients *viz.*, N, K, Mn, Zn, Cu, etc[1].

Cotton crop responds to mycorrhizal fungi and increase in growth can be obtained by mycrorrhizal inoculation (*G. fasciculation*) in low phosphate soils[5]. Commonly used pesticides may influence the growth and the development of AM fungi and the beneficial root symbiotic relationship may also result harmful effect on the growth and development of the crop plants. Inhibitory effects of insecticides on AM fungi have been demonstrated by Jalai *et al*[2]..

Materials And Methods

The earthen pots (30 cm diameter) were filled with 8 kg of clay loam soil which have pH 7.3, available N 195 kg ha^{-1}, P_2O_5 16.5 kg ha^{-1} and K_2O 215 kg ha^{-1}. The method of inoculation of arbuscular mycorrhizal fungal culture was by the placement method @ 25 g of soil inoculum per plant. MCU - 7 cotton seeds were sown @ 3 seeds per pot. The Recommended Dose (RD) of different chemical insecticides *viz.*, monocrotophos @ 1.25 l ha^{-1}, endosulfan @ 2 l ha^{-1} and phosphamidon @ 300 ml ha^{-1}, were used at different concentration *viz.*, 100, 115 and 130 per cent recommended dose. The insecticides were sprayed on cotton at 40 Days After Sowing (DAS). Among the treatments control (without spraying of chemicals) was maintained. The experiments were laid out in randomized block design (RBD) with three replications.

The per cent root colonization was estimated by the 0.05 % tryphan blue in lacto phenol[6] and arbuscular mycorrhizal fungal spores were recorded by the wet sieving and decanting technique following the method of Gerdemann and Nicolson method[3]. The total phosphorus was determined by the Vandomolybdate Method[4].

Effect of insecticides on AMF root colonization, spore population and 'P' content in cotton

T. No	Treatment	Root colonization (%)		AMF spore population (100^{-1} g soil)		Phosphorus Content (%)	
		Sampling period in days					
		60	90	60	90	60	90
T_1	Control (AMF only)	65.49 (54.02)	82.28 (67.44)	110.33	158.00	0.69 (4.76)	0.82
T_2	Monocrotophos 100% RD + AMF	62.65 (52.33)	80.46 (63.77)	103.67	128.67	0.68 (4.73)	0.80 (5.13)
T_3	Monocrotophos 115% RD + AMF	51.12 (45.64)	71.37 (57.65)	86.67	81.33	0.64 (4.59)	0.72 (4.87)
T_4	Monocrotophos 130% RD + AMF	39.15 (38.73)	55.20 (47.98)	57.66	139.00	0.55 (4.25)	0.63 (4.55)
T_5	Endosulfan 100% RD + AMF	53.67 (47.10)	76.22 (60.81)	90.67	84.33	0.65 (4.62)	0.76 (4.97)
T_6	Endosulfan 115% RD + AMF	39.78 (38.81)	54.30 (47.47)	61.00	46.00	0.58 (4.37)	0.68 (4.73)
T_7	Endosulfan 130% RD + AMF	15.82 (23.44)	20.44 (26.88)	28.66	104.00	0.48 (3.97)	0.57 (4.93)
T_8	Phosphamidon 100% RD + AMF	42.39 (40.62)	58.83 (50.09)	67.00	60.33	0.62 (4.51)	0.72 (4.87)
T_9	Phosphamidon 115% RD + AMF	21.47 (27.60)	30.26 (30.37)	39.00	9.67	0.54 (4.21)	0.63 (4.55)
T_{10}	Phosphamidon 130% RD + AMF	0.00	0.00	4.67	9.67	0.41 (3.67)	0.48 (3.97)
S.Ed		0.2620	0.3179	0.6353	0.7002	0.02441	0.0320
CD (p=0.05)		0.7448	0.9035	1.8061	1.9903	0.0532	0.0640

Results And Discussions

Among the three insecticides, phosphamidon was found to reduce the AM spore population, root colonization and P content drastically followed by endosulfan and monochrotophos at different doses in cotton (**Table).** The highest AM spore population (151.00 100 g^{-1} soil) root colonization (80.46%) and P content (0.80%) were recorded at treatment combination T_2 (monocrotophos 100 per cent RD + AMF) among the different insecticides sprayed on cotton at 90 DAS. More variation in root colonization, spore population were observed in all treatments, when insecticides were applied at a dose higher than the recommended dose, it drastically suppressed the above characters as the result of toxic to *G. fasciculatum*. It was concluded that the side effects of the foliar applied systemic pesticides on *G. fasciculatum* may be brought about the changes in the spectrum of cotton root exudates in the perfect investigation. This has been demonstrated by Jalali *et al*. The study revealed that foliar application of monocrotophos at RD is safer to mycorrhizal development than the other insecticides.

References

1. Gianinazzi – Pearson, V. and S. Gianinazzi, 1989. Phosphorus metabolism in mycorrhizal. In : Boddyu, L.R. Marchant and D.J. Read (Eds.) Nitrogen, phosphorus and sulphur utilization by fungi. Cambridge Univ. Press Cambridge, New York, pp. 227-244.
2. Jalai, B.M.L., Chhabar and Singh, 1990. Interaction of dual inoculation of vesicular – arbuscular mycorrhizal. In : Jalai, B.L. and Chand, H. (Eds.) Current trends in mycorrhizal research. Proc. Natl. Conf. on mycorrhizal / Haryana Agrl./ Univ. Hissar / India. fed., 14-16, pp. 20-21.
3. Gerdemann, J.W. and T.H. Nicolson, 1963. Spores of mycorrhizal Endongone species extracted from soil by wet sieving and decanting. *Trans. Br. Mycol. Sol.,* 235-244.
4. Jacksson, M.L. 1973. Soil chemical analysis. Prentice Hall of India Ltd., New Delhi.
5. Bagyaraj, D.J. and Manjunath, A. 1980. Response of crop plants to VA-Mycorrhizal inoculation in an unsterile Indian soil. *New Phytol.,* **85:** 33-36.
6. Philips, J.M. and Haymann, D.S. 1970. Improved procedures for cleaning roots and staining parasitic and VA-mycorrhizal fungi for rapid assessment of infection. *Trans. Br. Myclo. Soc.,* **55:** 158-161.

*****