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FIELD EFFICACY OF *PAECILOMYCES LILACINUS* AGAINST ROOT KNOT NEMATODE IN BETELVINE

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Management of root knot nematode, *Meloidogyne incognita* in field conditions by using *Paecilomyces lilacinus*, mass cultured in mustard oil cake revealed that split applications of *Paecilomyces lilacinus* augmented growth and yield of betelvine. Increased frequency of split application of *P. lilacinus* caused increase in yield of betelvine leaves with corresponding decrease of soil nematode population and root knot index.

Keywords :Betelvine ; Field efficacy ; *Meloidogyne incognita* ; *Paecilomyces lilacinus.*

Introduction

Betelvine (*Piper betle* Linn) is a highly labour intensive cash crop grown for its green leaves. Root knot nematode *Meloidogyne incognita* is one of the major constraints in the production of betel leaves. Yield losses of 29.06 to 38% was recorded in betelvine due to root knot nematode[1,2]. As betel leaves are chewed raw, systemic chemicals are never advised against any pest or disease of betelvine. Jatala[3] reported that *P. lilacinus* has the characters of a successful bioagent against nematodes. Many authors have reported the efficacy of *Paecilomyces lilacinus* against root-knot nematode on different crops[4-6].The present study deals with field applications of *Paecilomyces lilacinus* on betelvine *infested with M. incognita* to study its efficacy against the nematode.

Materials and methods

The experiment was conducted in field condition,in Assam Agricultural University, Jorhat consecutively for three seasons from 1995 to 1997 with cv. Local Bangla. There was twenty plots of 4m x 1m. From each plot initial nematode population was recorded by analysing five random soil samples each year and the average of three years was taken. Randomized block design of experiment was used in the study with four replications. Fresh and healthy, three noded cuttings were planted in the plots maintaining the space of 30cm and 15cm between rows and plants, respectively. Full dose of nitrogen @ 200kg/ ha as MOC+ urea (1:1) in four split applications, applied at 20 days interval. For field application of *P. lilacinus*, the split dose of MOC was incorporated with asceptically grown *P.lilacinus* on MOC @ 100g/10kg of well grounded moist MOC and kept in polyethylene bags for tweny days at room temprature. The contents of the poly bags were mixed intermittently after every three days to facilitate uniform growth of the fungus on MOC. After twenty days, a whitish colour development on the MOC indicated the growth of the fungus and was applied to the field according to the schedule of treatments starting from mid April.

After six months, on twenty selected plants from each plot, data were recorded on plant height and gall index. Final nematode population was recorded as done for the initial population dynamics. The marketable leaf yield per vine was recorded as and when harvesting was done and shown as cumulative yield. Data were analysed statistically and after completion of three years-pooled analyses done.

Result and Discussion

Three years pooled data on soil nematode

Table 1. Soil nematode population and infestation (gall index).

Treatments	Initial nematode population	Soil nematode population (200ml soil)				Percent population reduction	infestation (gall index,. 1-5 scale)			
		1995	1996	1997	Pooled		1995	1996	1997	Pooled
1.One dose of *P. lilacinus* with one dose of MOC	266.00	192.50	195.00	200.00	195.83	26.38	3.00	3.20	3.20	3.13
2. Two doses of *P.lilacinus* with two doses of MOC	265.00	193.00	193.00	195.00	193.66	26.92	2.75	2.80	3.00	2.85
3.Three doses of *P.lilacinus* with three doses of MOC	265.33	149.00	150.20	161.00	153.40	42.56	1.50	1.60	2.20	1.76
4.Carbofuran @ 1.5 kg a.i./ha	265.33	178.50	181.80	171.00	177.00	33.25	2.25	2.40	2.40	2.35
5. Control (4 splits of MOC)	266.00	198.70	191.00	204.00	197.00	25.60	3.25	3.40	3.60	3.41
SEM	-	7.29	2.12	5.18	2.98	-	0.19	0.29	0.20	0.25
C.D. (P=0.05)	-	22.47	17.66	15.55	9.76	-	0.61	0.61	0.61	0.73

population and gall index recorded in different treatments are presented in Table 1 and that of growth and yield of betel leaves in Table 2.

Data (Table 1) showed that all the treatments reduced initial soil nematode population with varying degrees of infestation on betelvine. The lowest final nematode population (153.40) was recorded in the treatment with three doses of *P.lilacinus* in combination with one dose of MOC, Which was significantly superior over rest of the treatments. The reduction of soil nematode population in this treatment was 42.56% and was better than in other treatments with either carbofuran, MOC alone or *P.lilacinus* at lower doses together with MOC. Maheswary and Mani[4] reported similar results of 66% reduction in population of *M.javanica* in combined treatment of *P.lilacinus* and *Pasteuria penetrans*.

The lowest infestation (1.76) was

Table 2. Plant growth and yield of betel leaves.

Treatments	Plant height(cm)				Number of marketableleaf yield/vine				weight of 100 fresh leaves(g)			
	1995	1996	1997	Pooled	1995	1996	1997	Pooled	1995	1996	1997	Pooled
1. One dose of *P. lilacinus* with one dose of MOC	172.25	172.60	177.00	173.95	20.25	19.40	17.40	19.01	215.75	226.40	222.00	221.38
2. Two doses of P.*lilacinus* with two doses of MOC	176.75	171.00	175.00	174.25	22.25	21.20	19.40	20.95	222.75	228.60	228.00	226.45
3. Three doses of P.lilacinus with three doses of MOC	186.25	185.00	189.00	186.75	24.00	24.00	21.00	23.00	233.00	240.00	235.40	236.13
4. Carbofuran @ 1.5 kg a.i./ha	180.00	176.80	179.20	178.66	21.75	20.80	21.00	21.18	222.50	228.80	224.00	224.83
5. Control (4 splits of MOC)	169.50	164.60	164.00	166.00	19.75	18.40	17.00	18.39	211.75	210.00	208.00	209.91
Sem	2.90	2.58	2.35	0.97	0.58	0.67	0.50	0.43	2.88	5.49	6.26	1.30
C.D. (P=0.05)	6.15	5.47	7.05	2.79	1.22	1.99	1.49	1.23	6.11	11.65	13.28	3.72

recorded in the treatment which received three doses of *P.lilacinus* along with one dose of MOC and differed significantly from traeatment with lower doses of *P.lilacinus* with MOC. Similarly reduced infestation of *M.incognita* on mung bean and okra due to combined treatment of *P.lilacinus* and carbofuran was reported earlier by Shahzad and Ghaffer[7] . The treatment with carbofuran and two doses of *P.lilacinus* with MOC was at par but significantly superior over control in respect of infestation. Similar findings on infestation on tomato was reported by Vyas *et al.*[6] in treatments with reduced dose of *P.lilacinus* and carbofuran @ 1 kg a.i./ha.

Table 2 reveals that plant height and yield of betel vines were also influenced by different treatments. The plant height (185.75 cm), marketableleaf yield per vine (23.00) and weight of 100 fresh leaves (236.13g) were significantly higher in the treatment which received three doses of *P.lilacinus* together with one split dose of MOC. Similar results in respects of growth and yield of betelvine was reported earlier by Bhatt andChaurasia[8] due to application of *P.lilacinus* along with MOC.

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