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FIELD EFFICACY OF PLANT PRODUCTS AGAINST SPOTTED POD BORER, *MARUCA VITRATA* (GEYER) IN PIGEONPEA

G. Srinivasan and R. Philip Sridhar

National Pulses Research Centre,
Vamban Colony – 622 303, (T.N) India

ABSTRACT

Field experiment was conducted to know the efficacy of plant products *viz.*, Neem oil 3.0%, Illupai oil 3.0%, Neem cake Extract (NCE) 5.0%, Neem Seed Kernel Extract (NSKE) 5.0%, Eucalyptus Leaf Extract 5.0%, *Acacia holosericia* leaf extract 5.0% as well as NSKE combined with half dose of monocrotophos 0.025%, chlorpyriphos 0.025%, endosulfan 0.035% in comparison with conventional insecticides, endosulfan 0.07% and dichlorvos 0.08% against the spotted pod borer, *Maruca vitrata* (Geyer) in short duration pigeonpea APK 1 during Kharif 2004 and 2005 at National Pulses Research Centre, Tamil Nadu Agricultural University, Vamban. The results showed that Neem oil 3.0% and NSKE 5.0% were found effective in reducing the larval population and obtaining higher yields, followed by the NSKE combined with half dose of insecticides. However, the conventional insecticides endosulfan 0.07% and dichlorvos 0.08% were superior to all other treatments.

INTRODUCTION

The spotted pod borer, *Maruca vitrata* (Geyer) has been reported as pest of grain legumes including cowpea, blackgram, greengram, pigeonpea and common beans. Recently, with the introduction of short duration pigeonpea, *Maruca* emerged as a major pest on this crop. The grain yield loss by this pest is estimated to be 9-84% (Vishakantaiah and Jagadeesh Babu, 1980). *Maruca*, completes its larval development inside the web formed by rolling and tying together leaves, flowers and buds using silken threads. It is therefore essential to kill the first instar larvae during the period when they hatch and till they enter the flowers and buds. Numerous insecticides have been tested and few were found effective against pod borer complex in pigeonpea (Degri and Chaudhary, 1998; Sahoo and Senapati, 2000; Narendra Reddy *et al.*, 2001; Sahoo, 2002; Das Mohapatra and Srivastava, 2002; Kumar and Nath, 2004). Attempts are being pinned on the use of biopesticides to reduce the resistance risk and the harmful effects of chemical insecticides. The present studies were therefore made to evaluate certain plant products and their combination with insecticides against *Maruca* in pigeonpea.

MATERIAL AND METHODS

Field experiments were conducted in a randomised block design with 12 treatments replicated thrice at National Pulses Research Centre, Tamil Nadu Agricultural University, Vamban during kharif 2004 and 2005. Pigeonpea cultivar APK 1 was sown with a spacing of 45 x 100 cm during the first week of July in both the years. The recommended agronomic practices were followed to raise the crop. Six plant products, three combinations of insecticide and NSKE and two insecticides alone (Table 1) were sprayed once at 50 % flowering stage of the crop. Water sprayed plots were kept as control and volume of spray liquid was taken as 500 lit/ha. Larval population of the pest was recorded one day before and 3, 7 and 14 days after spraying. Ten plants randomly selected from each plot were observed to record the number of larvae. Grain yield from each plot was also recorded. Data thus obtained were subjected to statistical analysis.

RESULTS AND DISCUSSION

The perusal of data showed significant variation in the larval populations during the post treatment period at 3, 7 and 14 days after treatment. During *kharif* 2004, the results showed that all the treatments were significantly effective

TABLE 1: Evaluation of botanicals against *Maruca vitrata* in pigeonpea (Kharif 2004)

Sl.No.	Treatment	Conc. (%)	No. of larvae/ plant				Yield (kg/ha)
			3DAS	7DAS	14 DAS	Mean	
1.	Neem oil	3.0	1.07(1.25)	0.63(1.06)	0.70(1.09)	0.80(1.14)	649.0
2.	Illupai oil	3.0	1.93(1.55)	0.90(1.18)	0.77(1.12)	1.20(1.30)	602.6
3.	Neem Cake Extract	5.0	2.13(1.62)	1.10(1.26)	0.97(1.21)	1.40(1.37)	567.3
4.	Neem Seed Kernel Extract	5.0	1.67(1.47)	1.00(1.22)	0.87(1.17)	1.18(1.29)	605.0
5.	Eucalyptus Leaf Extract	5.0	1.07(1.25)	0.90(1.18)	0.93(1.19)	0.97(1.21)	588.0
6.	*Acacia holosericia* Leaf Extract	5.0	1.37(1.36)	1.17(1.29)	0.83(1.15)	1.12(1.27)	600.3
7.	Monocrotophos + NSKE	0.025+2.5	0.90(1.18)	0.90(1.18)	1.07(1.25)	0.96(1.20)	645.0
8.	Chlorpyriphos + NSKE	0.025+2.5	0.77(1.12)	1.30(1.34)	0.93(1.19)	1.00(1.22)	653.6
9.	Endosulfan + NSKE	0.035+2.5	0.70(1.09)	1.57(1.43)	0.93(1.19)	1.07(1.25)	627.0
10.	Endosulfan	0.07	0.20(0.83)	0.63(1.06)	1.03(1.23)	0.62(1.05)	672.3
11.	Dichlorvos	0.08	0.37(0.93)	0.47(0.98)	0.93(1.19)	0.59(1.04)	667.0
12.	Control		3.00(1.87)	2.17(1.63)	1.73(1.49)	2.00(1.58)	509.6
	SEm. ±		0.14	0.14	0.11	0.10	11.75
	CD (P=0.05)		0.45	0.42	0.35	0.33	36.20

Figures within parentheses are square root transformed values
PTC- Pre treatment count
DAS- Days After Spraying

TABLE 2: Evaluation of botanicals against *Maruca vitrata* in pigeonpea (Kharif 2005)

S.No.	Treatment	Conc. (%)	No. of larvae/ plant				Yield (kg/ha)
			3 DAS	7DAS	14 DAS	Mean	
1.	Neem oil	3.0	0.66(1.07)	1.20 (1.30)	0.06 (0.74)	0.64(1.06)	544.3
2.	Illupai oil	3.0	1.53(1.42)	0.80(1.14)	0.0 (0.70)	0.77(1.12)	531.0
3.	Neem Cake Extract	5.0	1.40(1.37)	0.93(1.19)	0.0 (0.70)	0.77(1.12	545.3
4.	Neem Seed Kernel Extract	5.0	0.33(0.91)	0.53(1.01)	1.0(1.22)	0.62(1.05)	570.0
5.	Eucalyptus Leaf Extract	5.0	2.06(1.60)	1.13(1.27)	0.26(0.87)	1.06(1.24)	560.3
6.	*Acacia holosericia* Leaf Extract	5.0	2.26(1.66)	1.40(1.37)	0.46(0.97)	1.37(1.36)	552.0
7.	Monocrotophos + NSKE	0.025+2.5	0.33(0.91)	0.40(0.94)	0.06(0.74	0.26(0.87)	590.0
8.	Chlorpyriphos + NSKE	0.025+2.5	0.20(0.83)	0.46(0.97)	0.06(0.74)	0.24(0.86)	645.0
9.	Endosulfan + NSKE	0.035+2.5	0.20(0.83)	0.33(0.91)	0.0 (0.70)	0.17(0.81)	639.0
10.	Endosulfan	0.07	0.20(0.83)	0.06(0.74)	0.06(0.74)	0.10(0.77)	584.0
11.	Dichlorvos	0.08	0.40(0.94)	0.06(0.74)	0.26(0.87)	0.22(0.84)	627.0
12.	Control		5.60(2.46	3.46(1.98	0.93(1.19)	3.33(1.95)	491.0
	SEm. ±		0.43	0.17	0.08	0.18	14.01
	CD (P=0.05)		1.33	0.53	0.25	1.15	43.02

Figures within parentheses are square root transformed values
PTC- Pre treatment count
DAS- Days After Spraying

in reducing the larval population. The combinations of NSKE (2.5%) with monocrotophos (0.025%), chlorpyriphos (0.025%) and endosulfan (0.035%) were found effective in reducing the population of *Maruca* larvae (0.96, 1.00 and 1.07 nos./plant, respectively) and also recorded higher yields (627 – 653.6 kg/ha). Among the plant oils, neem oil 3.0% recorded minimum pest population (0.80/plant) as against 2.0 larvae / plant in control. The application of dichlorvos (0.08%) and endosulfan (0.07%) registered the minimum number of larvae (0.59 and 0.62 /plant) and higher yields (667.0 and 672.3 kg/ha). During *kharif* 2005, the results revealed the same trend and all the treatments were effective in reducing the larval population.

TABLE 3: Evaluation of botanicals against *Maruca vitrata* in pigeonpea – Pooled analysis for Kharif 2004 and 2005

S.No.	Treatment	Conc. (%)	No. of larvae/ plant				
			3 DAS	7DAS	14 DAS	Mean	Yield (kg/ha)
1.	Neem oil	3.0	0.86(1.16)	0.91(1.18)	0.38(0.93)	0.72(1.10)	596.6
2.	Illupai oil	3.0	1.73(1.49)	0.85(1.16)	0.38(0.93)	0.98(1.21)	566.8
3.	Neem Cake Extract	5.0	1.76(1.50)	1.01(1.23)	0.48(0.99)	1.08(1.25)	556.3
4.	Neem Seed Kernel Extract	5.0	1.0(1.22)	0.76(1.12)	0.93(1.19)	0.90(1.18)	587.5
5.	Eucalyptus Leaf Extract	5.0	1.56(1.43)	1.01(1.23)	0.59(1.04)	1.01(1.23)	574.1
6.	*Acacia holosericia* Leaf Extract	5.0	1.81(1.52)	1.28(1.33)	0.64(1.07)	1.24(1.32)	576.1
7.	Monocrotophos + NSKE	0.025+2.5	0.61(1.05)	0.65(1.07)	0.56(1.03)	0.61(1.05)	617.5
8.	Chlorpyriphos + NSKE	0.025+2.5	0.48(0.99)	0.88(1.17)	0.49(0.99)	0.62(1.05)	649.3
9.	Endosulfan + NSKE	0.035+2.5	0.45(0.97)	0.95(1.20)	0.46(0.98)	0.62(1.05)	633.0
10.	Endosulfan	0.07	0.20(0.83)	0.34(0.91)	0.54(1.02)	0.36(0.92)	648.1
11.	Dichlorvos	0.08	0.38(0.94)	0.26(0.87)	0.59(1.04)	0.40(0.95)	647.0
12.	Control		4.3(2.19)	2.81(1.82)	1.33(1.35)	2.66(1.78)	500.3
	SEm. ±		0.28	0.15	0.10	0.14	13.01
	CD (P=0.05)		0.85	0.47	0.31	0.43	40.8

Figures within parentheses are square root transformed values
PTC- Pre treatment count
DAS- Days After Spraying

The insecticides and plant products were reported effective against *Maruca vitrata* (Degri and Chaudhary, 1998; Sahoo and Senapati, 2000 ; Kumar and Nath, 2004). In the present studies, endosulfan and dichlorvos were found effective and recorded higher yields. Superiority of endosulfan in controlling the pod borers in pigeonpea has been reported by several researchers (Samalo and Patnaik, 1986; Patil *et al.*, 1988; Sahoo and Senapati, 2000). The effectiveness of monocrotophos and endosulfan was also reported by Sinha and Srivastava (1989) and Jakhmola and Bhadauria (1998).

The neem oil 3.0% and NSKE 5.0% were also reported effective by Thakre *et al.* (1981) and Sahoo and Senapati (2000). Performance of plant products and their combinations with insecticides against *Maruca vitrata* was satisfactory as evidenced from the present study and those of the several earlier workers.

Hence, from the present studies, it can be concluded that repeated use of conventional insecticides may be minimized by selecting plant products *viz.*, neem oil and NSKE and their combinations with insecticides as they were found very effective against *Maruca vitrata* on pigeonpea and recording higher yields on par with endosulfan and dichlorvos.

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