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Efficacy of phytochemicals against the sucking pests of okra *Abelmoschus esculents* (L) Moench

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The field experiments conducted during 2005-06 at PAJANCOA & RI, Karaikal with Arka anamika okra variety to study the efficacy of botanicals on the sucking pests with ten treatments in three replications. In the first crop the population of aphid was less in NSKE 5 per cent (2.59), neem oil 3 per cent (3.33) and notchi leaf 5 per cent (4.53). Jassid and whitefly population was less in neem oil 3 per cent (0.25 and 0.38). Similar trend was also noticed in the second crop. The maximum yield was recorded in NSKE 5 percent (9892.12, 9325.72 kg ha^{-1}) as against in control (5800.00 and 5916. 67 kg ha^{-1}) in the first and second crop, respectively. Among the botanicals the NSKE registered highest B:C ratio of 2.28 and 2.15 in the first and second crop, respectively.

Key words : Botanicals, Okra, B:C ratio.

INTRODUCTION

Okra [*Abelmoschus esculentus* (L) Moench] is the most popular vegetable crop in India is subject to the ravages of the sucking pest complex of jassids, aphids and whiteflies resulting in economic yield loss to the growers. In India, okra is cultivated in an area of 3.26 lakh ha with an annual production of 33.80 lakh tonnes (Thamburaj and Singh, 2002). In U.T. of Puducherry, it is being cultivated in an area of 144 acres with a production of 1152 tonnes (Anon, 2004). But the production and yield of this valued crop is often hampered, as it is susceptible to various insect pests from early stage to maturity. Among the wide array of insect pests infesting okra crop, the sucking pests *viz.*, aphid (*Aphis gossypii* Glover) , leafhopper(*Amrasca biguttula biguttula* Ishida) and whitefly (*Bemesia tabaci* Gennadius) are quite serious (Nair, 1976).

MATERIALS AND METHODS

Two field experiments were conducted in 2005-06. Both the trials were carried out in PAJANCOA & RI, Karaikal, U.T. of Puducherry. The experiment was laid out in a simple Randomized Block Design (RBD) with three replications and ten treatments under irrigated conditions using Arka anamika as the test variety.

The cultivation practices for raising the crop were followed as per the crop production guide on vegetable culture (Veeraragavathatham *et al.*, 1998) except for pest management practices. Four foliar spray applications of the test treatments were given at fortnight intervals (20^{th}, 35^{th}, 50^{th} and 65^{th} days after sowing). Assessment of sucking pests *viz.*, leafhopper, aphid and whiteflies were made on three leaves (3^{rd}, 5^{th} and 7^{th} leaf from top) in each of the ten randomly selected plants per plot and expressed as number/three leaves. The data analysed statistically are presented in Table 1 and 2.

RESULTS AND DISCUSSION

The data on the efficacy of different botanicals against the sucking pests of okra are furnished in Table 1 and 2. The two experimental data revealed that the application of botanicals was found to be better in reducing the population of sucking pests in okra and increased in yield as compared to the control. In the present study the results of over all mean of four sprays were furnished along with reduction over the control. The aphid population was less in carbaryl treatment (1.86) followed by NSKE 5 per cent (2.59), neem oil 3 per cent (3.33) and notchi leaf 5 per cent (4.53). The reduction over control ranged from 49.97 to 89.33 per cent. The population density of jassids were less in neem oil 3 per cent (0.25) followed by carbaryl 0.1 per cent (0.34) and NSKE 5 per cent (0.38). They were at par with each other. The kottaikaranthai leaf 5 per cent recorded 0.51 as against 5.60 in control. The reduction over control ranged from 66.61 to 95.54. The population of whitefly was minimum in neem oil 3 per cent (0.38) followed by NSKE 5 percent (0.48) and carbaryl 0.1 per cent (0.62). The reduction over control ranged from 45.53 to 86.90.

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Table 1 : Bioefficacy of botanicals on okra sucking pest in first crop during 2005 – 06.

S. No.	Treatment	Concen-tration (Per cent)	Aphids		Jassids		Whitefly		Yield/ Kg/ ha	B:C ratio
			Over all mean of four sprays	% ROC	Over all mean of four sprays	% ROC	Over all mean of four sprays	% ROC		
1.	Adhatoda leaf *(Adhatoda vasica)*	5	5.92 (2.53)^{e}	66.04	1.43 (1.58)^{e}	74.46	1.42 (1.39)^{f}	50.44	7733.33	1.83
2.	Kottaikaranthai leaf *(Sphaeranthus indicus)*	5	5.35 (2.41)^{e}	69.31	0.51 (1.08)^{b}	90.89	0.66 (1.07)^{b}	76.97	7761.67	1.83
3.	Notchi leaf *(Vitex negundo)*	5	4.53 (2.24)^{d}	74.01	0.78 (1.27)^{c}	86.07	1.13 (1.28)^{d}	60.51	8300.00	1.96
4.	Illupai oil *(Bassia latifolia)*	3	5.84 (2.51)^{e}	66.49	1.17 (1.45)^{d}	79.11	1.27 (1.33)^{e}	55.78	7833.33	1.76
5.	Kattamanakku oil *(Jatropha curcas)*	3	8.72 (3.03)^{g}	49.97	0.82 (1.22)^{c}	85.36	1.56 (1.43)^{g}	45.53	7738.33	1.73
6.	Neem oil *(Azadirachta indica)*	3	3.33 (1.95)^{c}	80.90	0.25 (0.95)^{a}	95.54	0.38 (0.93)^{a}	86.90	9015.00	2.04
7.	NSKE *(Azadirachta indica)*	5	2.59 (1.75)^{b}	85.14	0.38 (1.02)^{ab}	93.21	0.48 (0.99)^{b}	83.33	9892.12	2.28
8.	Marigold Achenes *(Tagetus erecta)*	5	7.25 (2.78)^{f}	58.41	1.87 (1.75)^{f}	66.61	1.22 (1.31)^{de}	57.58	8383.33	1.96
9.	Carbaryl (Sevin 50 WP)	0.1	1.86 (1.53)^{a}	89.33	0.34 (0.99)^{ab}	93.93	0.62 (1.06)^{c}	78.28	10086.00	2.36
10.	Control	-	17.43 (4.23)^{h}	0.00	5.60 (2.43)^{g}	0.00	2.87 (1.83)^{h}	0.00	5800.00	1.37
	CD Value	-	0.15**	-	0.10**	-	0.06**	-	-	-

Values in parentheses are square root ($\sqrt{}$ X+0.5) transformed values
Mean followed by same letters in a column are not significantly different by DMRT
ROC - reduction over control; ** - significant at 1 % Level; # Mean of three replications

Table 2. Bioefficacy of botanicals on okra sucking pest in second crop during 2005 – 06.

S. No.	Treatment	Concen-tration (Per cent)	Aphids		Jassids		Whitefly		Yield/ kg/ha	B:C ratio
			Over all mean of four sprays	% ROC	Over all mean of four sprays	% ROC	Over all mean of four sprays	% ROC		
1.	Adhatoda leaf *(Adhatoda vasica)*	5	7.89 (2.89)^{f}	51.96	2.97 (1.86)^{f}	53.15	1.88 (1.54)^{e}	41.69	7572.33	1.79
2.	Kottaikaranthai leaf *(Sphaeranthus indicus)*	5	5.26 (2.39)^{d}	67.93	1.07 (1.25)^{bc}	83.12	1.33 (1.35)^{d}	58.93	7472.72	1.76
3.	Notchi leaf *(Vitex negundo)*	5	6.38 (2.62)^{ef}	61.11	1.53 (1.42)^{d}	75.87	1.18 (1.30)^{c}	63.36	8228.67	1.94
4.	Illupai oil *(Bassia latifolia)*	3	7.16 (2.76)^{ef}	56.41	2.19 (1.64)^{e}	65.46	1.39 (1.37)^{d}	56.91	7121.33	1.60
5.	Kattamanakku oil *(Jatropha curcas)*	3	7.23 (2.78)^{f}	55.95	1.22 (1.31)^{c}	80.76	2.05 (1.60)^{e}	36.53	7526.67	1.69
6.	Neem oil *(Azadirachta indica)*	3	4.38 (2.20)^{c}	73.24	0.76 (1.11)^{a}	88.01	0.57 (1.03)^{a}	82.22	8575.89	1.94
7.	NSKE *(Azadirachta indica)*	5	3.68 (2.04)^{b}	77.48	1.06 (1.25)^{bc}	83.28	0.99 (1.22)^{b}	69.30	9325.72	2.15

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S. No.	Treatment	Concen -tration (Per cent)	Aphids		Jassids		Whitefly		Yield/ kg/ha	B:C ratio
			Over all mean of four sprays	% ROC	Over all mean of four sprays	% ROC	Over all mean of four sprays	% ROC		
8.	Marigold Achenes (*Tagetus erecta*)	5	8.89 $(3.06)^{g}$	45.90	3.44 $(1.98)^{g}$	45.74	1.48 $(1.40)^{d}$	54.08	7922.89	1.85
9.	Carbaryl (Sevin 50 WP)	0.1	2.49 $(1.72)^{a}$	84.71	0.86 $(1.17)^{ab}$	86.44	1.13 $(1.28)^{c}$	64.91	9900.00	2.32
10.	Control	-	16.46 $(4.12)^{h}$	0.00	6.34 $(2.62)^{h}$	0.00	3.23 $(1.93)^{f}$	0.00	5916.67	1.40
	CD Value	-	0.16**	-	0.09**	-	0.05**	-	-	-

Values in parentheses are square root ($\sqrt{X+0.5}$)transformed values
Mean followed by same letters in a column are not significantly different by DMRT
ROC - reduction over control; ** - significant at 1 % Level; # Mean of three replications

Similar trend was also noticed in the second crop. The population of aphids, jassids and whiteflies were (4.38, 0.76, 0.57 and 3,68, 1.06, 0.99) with a reduction over control were 73.24, 88.01, 82.22 and 77.48, 83.28 and 69.30 in neem oil 3 per cent and NSKE 5 per cent, respectively. The yield was more in NSKE 5 per cent 9892.12, kg ha^{-1} , 9325.72 kg ha^{-1}, followed by neem oil 3 per cent 9015. 00 kg ha^{-1}, 8575. 89 kg ha^{-1} and notchi leaf 5 per cent 8300.00 kg ha^{-1} , 8228.67 kg ha^{-1} in the first and second crop respectively. B:C ratio was (2.28 and 2.15) for NSKE 5 per cent as against in control (1.37 and 1.40) in the first and second crop, respectively. The above results were in accordance with the findings of Uthamasamy and Gajendran (1992); Patel and Patel (1996); Sundararajan and Kumuthakalavalli (2000). Neem oil 3 per cent and NSKE 5 per cent may be fitted in integrated pest management system in okra for the control of sucking pests.

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