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Management practices for fruit fly, *Bactocera cucurbitae* Coq. affected on *Cucumis melo* L. var. *conomon*

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Abstract

The research was undertaken at the College of Horticulture, UHS, Bagalkot, during 2015-2016 to study the bio efficacy of some botanicals, insecticides and plant extracts which were effective against fruit fly *Bactocera cucurbitae* (Coquillet) on Oriental pickling melon. The results indicated that the molecules viz., deltamethrin 2.8% EC @ 0.5ml/l, Azadirachtin 10000ppm @ 1ml/l, NSKE 4% @ 40ml/l and indoxacarb 15.8% EC @ 0.3 ml/l of water were found very effective in minimizing the fly population and were superior in reducing the fruit damage and also fetched higher yields of 18.33, 18.16 18.2 and 18.2 t/ha, respectively throughout period of experiment.

Keywords: Oriental pickling melon, Fruit fly

Introduction

Oriental pickling melon (*Cucumis melo* L. var. *conomon*) is one of the vegetables of melon group belonging to the family Cucurbitaceae, with a chromosomal number $2n=24$ as reported by Munshi and Alvarez, 2005^[1]. It is popularly called as golden melon or culinary melon in English. In Karnataka it is called by various local names like *sambar southe*, *Mogghe kayi* or *Mangalore southe*. It is an ideal summer vegetable crop chiefly grown for use as a fresh vegetable, in preparation of curry and for pickling. It has small fruit with smooth tender skin, white flesh usually with little sweetness and odour. George, 2008 reported that fruits possess cooling properties and are used as a skin moisturizer and as a digestive agent^[2].

But the edible fruits have been infested by the fruit fly. As per the previous research studies the extent of yield loss caused by the pest in cucurbitaceous vegetables ranged from 30 to 100 percent depending upon species and the season in different parts of the world was reported by Dhillon *et al.*, 2005^[3]. The studies conducted by Choudhary *et al.*, 2012 reveals that melon fruit fly (*Bactocera cucurbitae* Coq.) is a serious pests against cucurbitaceous crops^[4] and also Krishna Kumar *et al.*, 2006 reported that 73.83 percent damage on cucumber was due to melon fruit fly^[5]. So, to manage the pest the evaluation of insecticides, botanicals, plant extracts and trap was taken up in the study. The study includes the different treatments with chemicals, some of the botanicals like neem seed extract, panchagavya and also botanical product and traps which are used against fruit fly. This study helps in finding the most earliest and effective treatment against the major pest. The fruit fly infests the fruit stage of the crop, as the economic part is the fruit in this crop, the study will be helpful for management against fruit fly.

Materials and Methods

The experiment was laid out in a Randomized Complete Block Design taken up during 2016. The variety used for the study was Sirsi local. The spacing between the rows and plants were 2m and 1m, respectively. The treatments used are given in table 1. The experiment was replicated three times. First spray was taken at initial first fruit set and the observations on total number of fruits and number of infested fruits were taken. Second spray was taken at 15 days interval. At each picking number of fruits harvested and also infested fruits were sorted and percentage fruit infestation was calculated using the formula

$$\text{Percentage fruit infestation} = \frac{\text{Number of infested fruits} * 100}{\text{Total number of fruits}}$$

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Data pertaining to management trial were analyzed by using one way ANOVA and treatment means were separated by using DMRT.

a. Bait spray

1000ml of water was taken and 10gms of jaggery was added after dissolving and then two ml malathion was added to one litre of water and spray was taken.

b. Preparation of extracts Neem seed kernel extract (4%)

Forty grams of neem kernels were taken for use in one litre of

water. The neem kernel was pounded gently. The outer coat was removed before pounding. The seeds that were used for the preparation of neem kernel extract were five months old. The pounded neem kernel powder was gathered in a muslin pouch and soaked overnight in water and was stirred with wooden plank in the morning till solution turned milky white. This was filtered through double layer of muslin cloth. The pouch was squeezed and the extract was filtered. Soap with no detergent was added to the filtrate. The spray solution is mixed and spray was taken.

Table 1: Details of the spray treatments

Treatments		Dosage/ Concentration (g/ml/l)
T1	Bait spray (Jaggery + water + malathion 50% EC) as recommended by UHS, Bagalkot	10gm + 1000 ml + 2ml/l
T2	Botanical (Neem leaves + Pomgamia + Custard apple leaves) 5%	50 ml/l
T3	Azadirachtin (10000ppm)	1ml/ l
T4	Panchagavya 5%	50 ml/l
T5	NSKE 4%	40ml/l
T6	Cue -lure trap	20/ha
T7	Methyl eugenol trap	20/ha
T8	Deltamethrin 2.8% EC	0.5 ml/ l
T9	Emamectin benzoate 5% SG	0.2 g/ l
T10	Indoxacarb 15.8% EC	0.3 ml/ l
T11	Spinosad	0.3 ml/ l
T12	Untreated	--

c. Preparation of Panchagavya

Preparation of Panchagavya (5 percent) consists of five cow products and other ingredients viz., cow dung, cow urine, milk, ghee, curd, jaggery, banana, tender coconut and water, 7 kg of cow dung and 1 kg of cow ghee are thoroughly mixed in the morning and evening hours and kept it for 3 days. After 3 days, 10 litres of cow urine and 10 litres of water were mixed and kept for 15 days with regular mixing both morning and evening hours. Another 15 days mix 3 litres of cow milk, 2 litres of cow curd, 3 litres of tender coconut water with 3kg of jaggery and a dozen of well ripened poovan banana were mixed thoroughly and left for 30 days. 25 litres of panchagavya was ready. While spraying 50 ml of panchagavya was mixed to one litre of water and spray was taken.

Results and Discussion

The study indicated non-significant difference between the

treatments against the fruit fly infestation among all the treated plots but deltamethrin 2.8% EC (4.83%), Azadirachtin 10000ppm (4.83%), NSKE 4% (4.83) and indoxacarb 15.8% EC (4.83) were superior over untreated control throughout the period of investigation and they were on par with each other (figure 1). Panchagavya 5% (4.98), botanical extract (Neem leaves + Pomgamia leaves + custard apple leaves) @ 5% (5.33), cue lure trap (5.50) @ 20 no./ha, methyl eugenol trap @ 20 no./ha (5.58) and bait spray (5.83) were the next best treatments in the order of efficacy (Table 2).

The fruit fly infestation was lower in the plots treated with Deltamethrin 2.8 EC (4.83), Indoxacarb 15.8% EC (4.83), azadirachtin 10000ppm (4.83) and spinosad 45 SC (4.83) were on par with each other for mean % infestation of fruits followed by panchagavya 5% (4.98) was statistically superior from the untreated plot. All the plots showed lesser infestation than the untreated plots.

Table 2: Bio-efficacy of botanicals, insecticides and traps against fruit fly at COH, Bagalkot

Sl. no.	Spray Treatments	Yield (tons/ha)	*Mean of % fruit infestation of two pickings
1	Bait spray (Jaggery + water + malathion) 10gm + 1000 ml + 2ml/ l	17.43 b	5.83
2	Botanical (Neem leaves + Pomgamia leaves + custard apple leaves)5% @ 50ml/l	17.23 c	5.33
3	Azadirachtin (10000 ppm) @ 1ml/ l	18.16 a	4.83
4	Panchagavya 5% @ 50 ml/l	18.3 a	4.98
5	NSKE 4% @ 40 ml/l	18.2 a	4.83
6	Cue -lure trap @ 20 no./ha	17.36 bc	5.50
7	Methyl eugenol trap @ 20 no./ha	17.4 bc	5.58
8	Deltamethrin 2.8% EC @ 0.5 ml/ l	18.33a	4.83
9	Emamectin benzoate 5% SG @ 0.2 g/ l	18.33a	5.42
10	Indoxacarb 15.8% EC @ 0.3 ml/ l	18.2 a	4.83
11	Spinosad 45 SC @ 0.3ml/l @ 0.3 ml/ l	18.16 a	4.83
12	Untreated	10.3 d	42.65
S. Em±		0.031623	0.43
CD= (0.05)		0.169	1.27

Significant at P=0.05

*mean of three replications from two pickings

Conclusion

Among the eleven treatments, deltamethrin 2.8% EC (4.83%) of water, Azadirachtin 10000ppm (4.83%), NSKE 4% (4.83) and indoxacarb 15.8% EC (4.83) were superior over other treatments throughout the period of investigation and they were on par with each other. Panchagavya 5% (4.98) of water, botanical 5% (5.33), cue lure trap (5.50) @ 20 no./ha, methyl eugenol trap @ 20 no./ha (5.58) and bait spray (5.83) were the next best treatments in their efficacy. Earlier reports are line with our present study with respect to deltamethrin (0.0028%) which was recorded as most effective treatment in reducing

fruit infestation by the fruit fly (Mehta *et al.*, 2000; Oke, 2008) [6, 7]. The property of the deltamethrin 2.8% EC had reduced the infestation.

The results indicated that the molecules viz., deltamethrin 2.8% EC @ 0.5ml/l, Azadirachtin 10000ppm @ 1ml/l, NSKE 4% @ 40ml/l and indoxacarb 15.8% EC @ 0.3 ml/l of water were found very effective in minimizing the fly population and were superior in reducing the fruit damage and also fetched higher yields of 18.33, 18.16 18.2 and 18.2 t/ha, respectively throughout period of experiment.

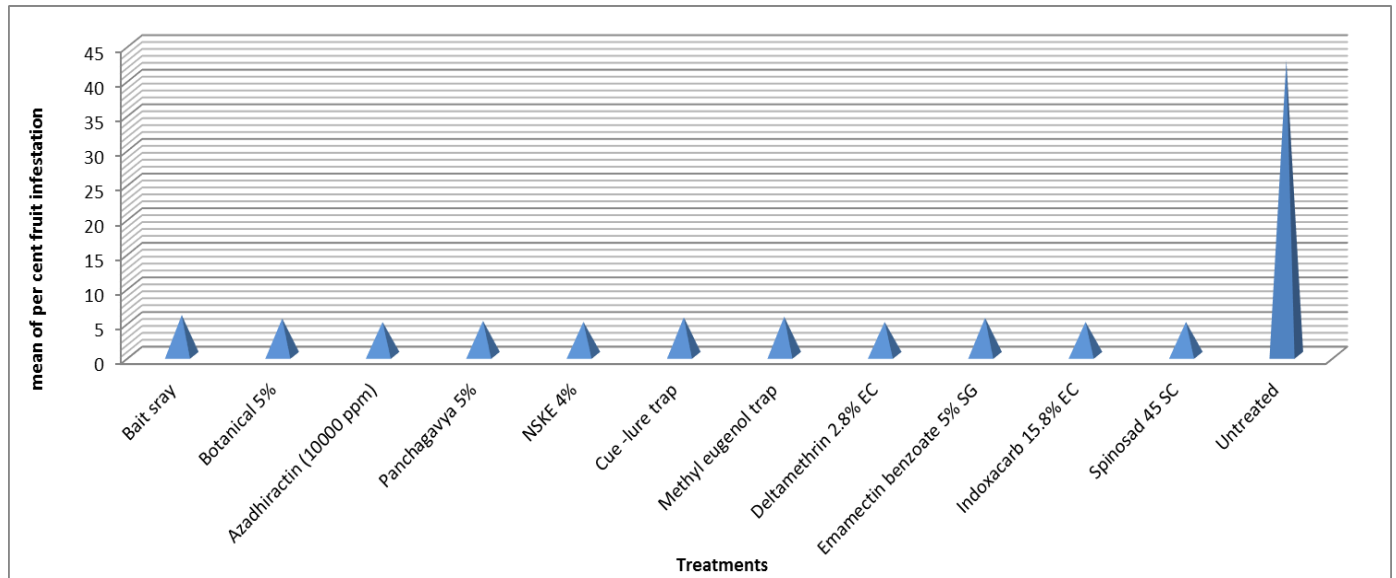


Fig. 1: Bio-efficacy of botanicals, synthetic insecticides, biopesticide and traps against fruit fly at COH, Bagalkot

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