



USE OF TRAPS AND BAITS IN THE MANAGEMENT OF CUCURBIT FRUIT FLY, *Bactrocera cucurbitae* (Coquillett)

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ABSTRACT

Influence of traps and baits on the management of cucurbit fruit fly, *Bactrocera cucurbitae* (Coquillett) was studied during November 2014 - April 2015 in farmer's field at Thondamuthur, Coimbatore district of Tamil Nadu. Traps of varying shapes, color and lures were evaluated in the study. Observation showed that cylindrical trap shape was more effective in trapping the male adults with 6.5 adults/trap/day followed by conical and sphere shape which respectively trapped 3.08 and 1.67 adults/trap/day. Among the trap colour evaluated, a mean of 4 adults/trap/day recorded in green was the maximum, followed by 3.17 adults/trap/day in blue coloured traps. Both these colour traps were on par with each other and superior to red colour trap which collected 1.83 adults/trap/day. Among the lures tested, Sun Agros lure B attracted more adults of 5.4/trap/day, which is a blend of cue lure + methyl eugenol. Among the food baits tested, neera 200ml (padaneer) attracted maximum number of adult flies, 6.66 fruit flies/trap/day inclusive of both the sex. This treatment was followed by neera100ml + yeast (5g) which trapped 3.67 adults/trap/day.

KEY WORDS: Cucurbits, *Bactrocera cucurbitae*, Colour trap, baits, Neera.

INTRODUCTION

Cucurbits are infested by several pests such as fruit flies, Epilachna beetle, red pumpkin beetle, aphids, thrips and others. Among the pests, cucurbit fruit fly, *Bactrocera cucurbitae* (Coquillett) is one of the devastating pests. The crop loss caused by cucurbit fruit fly is more than 60% (Kapoor, 1993). Cucurbit fruit fly is distributed widely in temperate, tropical and sub-tropical regions of the world. Though it has been reported to damage 81 host plants, it attacks bitter gourd (*Momordica charantia*), muskmelon (*Cucumis melo*), snap melon (*C. melo* var. *momordica*), and snake gourd (*Trichosanthes anguinascurely*) as a major pest of cucurbitaceous vegetables.

Fruit infestation by melon fruit fly in bitter gourd has been reported to vary from 41 to 89%. (Rabindranath and Pillai, 1986). The production and productivity of bitter-gourd is severely damaged by melon fruit-fly. Maggots feed inside the fruits, but at times also feed on flowers and stems. Generally, the females prefer to lay the eggs in soft tender fruit tissues by piercing them with the ovipositor. A watery fluid oozes from the puncture, which becomes slightly concave with seepage of fluid and transforms into a brown resinous deposit. Sometimes pseudo-punctures (punctures without eggs) have also been observed on the fruit skin which reduces the market value of the produce.

MATERIALS AND METHODS

Field experiments to study the attraction of fruit flies to various traps, lures and baits were conducted in snake gourd in farmer's field at Thondamuthur, Coimbatore district of Tamil Nadu. Traps of different shapes and lures A and B were purchased from Sun Agros, Pvt Ltd., Chennai. Similarly veg lure and fruit lure along with

cylindrical traps were purchased from Barrix Pvt Ltd., Trichy.

Influence of trap shape on the attraction of fruit flies in snake gourd

Traps of three shapes viz., sphere, cylindrical and conical were evaluated in snake gourd field with uniform lure B obtained from Sun Agros Pvt. Ltd., Chennai. The male adults collected per week represent one replication and likewise the observation was made for twelve weeks. After the weekly observation, the site of trap was changed to have uniform distribution in field during the study period of twelve weeks. During the period of study, the lure was replaced once. The collected adults were counted and analyzed based on the standard statistical analysis.

Effect of trap colour on attraction of fruit flies in snake gourd

The experiment consists of four coloured traps namely green, red, yellow and blue made using cylindrical trap shape. In each treatment 3 traps were placed in the snake gourd field for the evaluation. The observation on the adult catches for 7 days (1 week) represents one replication. Likewise, the observation was carried out for 8 weeks which represents 8 replications. After every week of observation, the site of trap was changed to have uniform distribution of the trap in the field. The adult catches in traps of different colours were analysed statistically.

Efficacy of commercial lures on the attraction of male adults

The efficacy of commercially available and commonly used lures was evaluated in snake gourd field for the attraction of male adult fruit flies. The experiment consists of four treatments and for each treatment; two lures in two

cylindrical traps were used. The traps were placed 45 days after sowing for the weekly observation. The attraction of male adult to commercial lures for seven days represents one replication. There was 8 such replication. After the observations on adults for one week, the location of the trap was shifted to other place in the field to have uniform distribution. The male fruit flies trapped in different lures were analyzed for assessing the efficacy.

Efficacy of food baits on the attraction of fruit fly adults

The common food baits like ripened fruit of banana and guava with or without jaggery, inflorescence sap of Palmyra *i.e.*, neera (Padaneer) and sugarcane juice were tried as food baits in comparison with cue lure of Sun Agros Pvt Ltd. The food baits were placed in cylindrical trap and suspended at 15 cm height from the roof of the pandal in snake gourd crop. There were nine treatments and three replications. The observations on adult catches in different food baits were carried out for two months during the fruiting period. The adult catches in different treatments were compared using standard statistical tools.

Statistical analysis

The data gathered in the field experiments were analyzed by completely randomized design using AGRES 3.01 and AGDATA software. The data on the population of insect pests were subjected to square root transformations (Snedecor and Cochran, 1967). Duncans multiple range test (DMRT) was applied for comparing treatment means at 5 per cent level of significance (Duncan, 1951).

RESULTS AND DISCUSSION

Trap studies

The results of the studies on the trap shapes indicated the superior attraction of adult fruit flies in cylindrical followed by conical and sphere shapes. Regarding the

influence of colour on the male adult fruit flies studied, green colour was found promising which is able to attract 4 adults per trap per day followed by blue, yellow and red colour traps. Among the lures tested, Sun Agros lure B attracted more adults of 5.4/trap/day, which is a blend of cue lure + methyl eugenol (Fig. 18). The results of Soumya and Verghese (2015) on the influence of light green colour as visual cue in attracting *Bactrocera dorsalis*, can well support the present finding on the attraction of more males in green coloured traps. Likewise, the results of Amsa *et al.* (2015) that blending of cue lure with methyl eugenol attracted more *Bactrocera cucurbitae* was similar to the finding of the present study which indicates maximum attraction of adult fruit flies in lure B, a blend of cue lure + methyl eugenol. Regarding the shape of the trap studied, superior attraction of adults was reported by Venkatachalam *et al.* (2014) against *Bactrocera cucurbitae* in cylindrical shape as compared to square type. This finding fully endorses the results obtained in the present study.

3.2. Food baits on the attraction of adult fruit flies

The results of the study conducted with different food baits on the attraction of adult fruit flies indicated more attraction of fruit flies both male and female in palm juice (padaneer) at the dosage of 200ml. It is found superior to all other food baits. The inflorescence sap of Palmyra (Palm juice) contains sucrose in higher concentration which might have attracted the fruit flies as compared to other food baits. The superior performance of banana and jaggery as food bait in attraction *Bactrocera cucurbitae* in Kerala by Thomas *et al.* (2005) showed that sugar base in food baits attract the fruit flies. Similar result was also reported by Stone house *et al.* (2005). Hence, the traps and bait lures are playing a major role in cucurbit fruit fly, *Bactrocera cucurbitae* management.

TABLE 1. Influence of trap shape on the attraction of fruit flies in snake gourd

Shape	Mean number of adults / trap/day
Cylindrical	6.5 (2.53) ^a
Conical	3.08 (1.86) ^b
Sphere	1.67 (1.35) ^c
CD at 5%	0.2692

Mean of 12 replications; Values in the parentheses are square root transformed values. Means followed by the common letter (s) are not significantly different at P=0.05 level by DMRT

TABLE 2. Effect of trap colour on the attraction of fruit flies in snake gourd

Colour	Mean number of adults / trap/day
Green	4 (2.09) ^a
Red	1.83 (1.47) ^c
Yellow	2.5 (1.71) ^{bc}
Blue	3.17 (1.89)
CD at 5%	0.34

Mean of 6 replications; Values in the parentheses are square root transformed values. Means followed by the common letter (s) are not significantly different at P=0.05 level by DMRT

TABLE 3. Efficacy of commercial lures on fruit fly attraction

Treatment	Mean number of adults / trap/day
Sun-Agros (Lure A)	3.37 (1.97) ^b
Sun-Agros (Lure B)	5.4 (2.43) ^a
Barrix vegetable lure	3 (1.87) ^b
Barrix fruit lure	0.5 (1) ^c
CD at 5%	0.211

Mean of 5 replications; Values in the parentheses are square root transformed values. Means followed by the common letter (s) are not significantly different at P=0.05 level by DMRT

TABLE 4. Efficacy of different food baits on attraction of fruit fly adults

S.no	Treatment	Mean adult catches/trap / day
1	Ripened Banana fruit (robusta) – 16 slices	1.00 (1.22)d
2	Ripened Guava fruit(local)-16cut pieces	1.33 (1.35)cd
3	Ripened Banana fruit (robusta) 8 slices +jaggery 10%	2.33 (1.68)bcd
4	Ripened Guava fruit (8 cut pieces)+jaggery 10%	1 (1.22)d
5	Neera (sap extracted from the inflorescence of <i>Palmyra palm</i>)- 200ml	6.66 (2.68)a
6	Sugarcane juice -200ml	1.33 (1.35)d
7	Neera (100ml)+sugarcane juice(100ml)	1.00 (1.22)d (0.71)
8	Sugarcane juice(10ml)+banana(robusta) 8 slices+jaggery 10%	2 (1.58)bcd
9	Neera (150ml)+yeast(5g)	3.67 (2.04)b
10	Sugarcane juice+yeast	3.33c (1.95)bc
11	Cue lure of sun agros	3.33 (1.95)c
CD at 5%		0.43

Mean of 3 replications; Values in the parentheses are square root transformed values. Means followed by the common letter (s) are not significantly different at P=0.05 level by DMRT

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