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Research Paper

STANDARDIZATION OF DIETS FOR THE LABORATORY REARING OF MELON FLIES, *BACTROCERA CUCURBITAE* COQUILLETT

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Melon fly*, Bactrocera cucurbitae* Coquillett is a serious pest of cucurbitaceous vegetables, affecting fruit quality, often causing great economic loss. Biological control of melon flies using entomopathogenic fungi is an ideal option since the vegetables are consumed fresh. For the screening of the entomopathogenic fungi against melon fly, continuous availability of different life stages of the insect is necessary. The present study was undertaken to evaluate dietary constituents comprising of honey, sucrose, jaggery, sugar and water in combination with yeast for the *in vitro* rearing of the melon fly. Among the different diets, bait preparation in 100 ml water containing 20g jaggery and 10g yeast supported the maximum survival percentage (98.14) of adult melon flies. Hence, jaggery + yeast diet was standardized as a suitable diet for the laboratory rearing of melon fly.

Keywords: Diet, Jaggery, Melon fly, Rearing, Survival percentage, Yeast

INTRODUCTION

The melon fly, *Bactrocera cucurbitae* Coquillett (Diptera: Tephritidae) is a serious pest of cucurbitaceous vegetable crops, causing substantial economic loss. The extent of crop loss varies between 30 to 100 per cent (Gupta and Verma, 1992). Several management measures involving hydrolyzed protein bait spray, para-pheromone lures (Verghese *et al*., 2006), botanicals, field sanitation, bagging of fruits and chemical sprays (Akhtaruzaman *et al*., 2000) have been used for the management of the pest. Use of pesticides needs to be minimized, as vegetables are mostly consumed fresh.

In this context, it is relevant to explore the scope of biological control of melon fly for implementing effective integrated pest management (IPM). Deuteromycetes fungi *viz., Beauveria bassiana* (Bals.)Vuill, *Metarhizium anisopliae* (Metsch.) Sorok., *Paecilomyces fumosoroseus* (Wize) Brown and Smith, *P. lilacinus* (Thom) Samson and *Aspergillus candidus* Link:Fries (Castillo *et al*., 2000, Cossentine *et al*., 2010, Jiji *et al*., 2006) have been

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known to cause widespread epizootics in fruit flies under laboratory and field conditions. The maintenance of laboratory culture of melon flies is needed for evaluating the pathogenicity of the entomopathogenic fungi against the melon flies.The purposes of rearing insects in the laboratory may be, to study the insect itself, facts pertaining to its life history, habits, habitats, host relationship, and dietary requirement to facilitate the continuous availability of insect cultures for the *in-vitro* studies. The present study was undertaken to standardize different dietary constituents for the *in vitro* rearing of melon flies.

MATERIALS AND METHODS

The experiment was conducted in Completely Randomized Design (CRD) with four replications. The adult flies were maintained inside the wooden cages of size 50 x 50 x 50 cm. Twenty adult flies with male and female in the ratio 1:1 were used per replication. They were supplied with different diets kept in petriplates (3 numbers) containing diet solution at the rate of 4 ml per plate. The diet was replaced regularly at an interval of two days. Four bittergourd fruits per replication were kept inside the cages for oviposition and the fruits were replaced at an interval of 4, 8, 12, 16, 20, 24 days. The following were the treatments used for the study,

T_1 – Diet preparation in water (100 ml) containing Honey (20 ml) + Yeast (10g)

T_2 – Diet preparation in water (100ml) containing Sugar (20g) + Yeast (10g)

T_3 – Diet preparation in water (100 ml) containing Jaggery (20g) + Yeast (10g)

T_4 – Diet preparation in water (100 ml) containing Sucrose (20g) + Yeast (10g)

T_5 – Water (100 ml) + Yeast (10g)

OBSERVATIONS

The observations on the number of surviving adult flies were recorded at 4, 8, 12, 16, 20, 24 days after treatment (DAT) and the survival percentage of the flies were calculated using the formula,

$$\text{Survival Percentage} = \frac{\text{Number of surviving insects}}{\text{Total no. of insects released remarks}} \times 100$$

The recorded observations were presented in Table1.

Table1: Effect of different diets on the survival of adults in cage conditions

	TreatmentsMean Survival Percentage of Adults (Days after treatment)					
	4	8	12	16	20	24
T_1 Honey (20ml) + Yeast (10g) in 100ml water	91.50 (73.05)	89.75 (71.33)	88.63 (70.30)	76.02 (60.68)	42.47 (40.67)	34.91 (36.22)
T_2 Sugar (20g) + Yeast (10g) in 100 ml water	74.58 (59.72)	53.45 (46.98)	47.82 (93.75)	11.77 (20.06)	10.87 (19.25)	0.00(0.00)
T_3 Jaggery (20g) + Yeast (10g) in 100 ml water	98.14 (82.16)	98.14 (82.16)	97.98 (81.82)	95.75 (78.10)	85.36 (67.50)	67.72 (55.38)
T_4 Sucrose (20g) + Yeast (10g) in 100 ml water	66.92 (54.89)	56.53 (48.75)	60.45 (51.03)	63.87 (53.05)	17.77 (24.93)	8.76 (17.22)
T_5 Water (100ml) + Yeast (10g)	30.09 (33.27)	13.97 (21.95)	17.77 (24.93)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
CD(0.05)	17.65	23.16	27.26	25.12	28.67	39.14

Note: Figures in parentheses are angular transformed values.

RESULTS AND DISCUSSION

The survival percentage of adult flies was highest in jaggery+yeast followed by honey+yeast irrespective of the day after treatment and both the treatments were statistically on par. Sucrose + yeast recorded a survival percentage which was on par with the survival percentage in sugar + yeast in all the days of treatment. Maximum survival percentage (98.14 on the 8th day) of adults was recorded in jaggery (20g) + yeast (10g) diet.

Higher Survival Percentage

The higher survival percentage of adults in jaggery + yeast diet may be attributed to the diet preference of the host. Banana - jaggery food bait was found to be the preferred diet for the trap catch of melon flies under field conditions by many workers (Jiji *et al*., 2005). The jaggery + yeast diet was found to be more economical and effective in the maintenance of colony of melon fly in the laboratory.

CONCLUSION

It can be concluded that, jaggery + yeast diet serves as a suitable diet for the laboratory rearing of melon fly.

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