



## RESEARCH NOTE

### Management of fruit fly, *Bactrocera dorsalis* (Hendel) through fruit bagging in custard apple

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**ABSTRACT:** An investigation on “Assessment of hybrid custard apple (*Annona* spp.) genotypes for Fruit fly (*B. dorsalis*) infestation and control strategies” was carried out at AICRP, Arid Zone Fruit, MPKV, Rahuri during 2023. Seasonal incidence study of fruit fly (*B. dorsalis*) on twelve hybrid genotypes of custard apple, it was observed that the genotypes Hy-06, Hy-07, Hy-08, Hy-20, Hy-21, Hy-22, and Annona-7 showed no incidence of fruit fly maggots. Moderate infestation was found in the genotypes Balanagar and Phule Janaki, while NMKG, NMK-3, and Arka Sahan were significantly more susceptible to fruit fly attacks compared to the other genotypes. Among the seven treatments against fruit fly control on the NMKG genotype, the white wax-coated bag proved the most effective, showing no maggots in the fruit. It was at par to the polypropylene white bag and the brown-colored wax coated bag. Then next effective treatment was the brown paper bag which was on par with the methyl eugenol trap and karanj + neem oil spray showed higher levels of infestation compared to other treatments while untreated control had the highest infestation.

**Keywords:** Fruit fly, *B. dorsalis*, custard apple pests

The custard apple (*Annona* spp.) is a tropical fruit crop belonging to the Annonaceae family. The major custard apple-producing states are Maharashtra, Gujarat, Andhra Pradesh, Uttar Pradesh, Madhya Pradesh, Bihar, Assam, Rajasthan, Odisha and Tamil Nadu. Maharashtra being the top producer of custard apple cultivation, covers over 17,080 hectares, out of a total of 52,000 hectares nationwide, with a production of 1,39,230 MT in Maharashtra and 4,60,100 MT across the country (Anonymous, 2023).

Among different insect pests attacking custard apple, Oriental fruit fly, *Bactrocera dorsalis* (Hendel) is emerging as a serious pest of custard apple particularly in hybrid cultivars compared to *Annona squamosa*. The fruit fly infests semi-ripened fruit by laying eggs, maggots feed on flesh by bore into the fruit, puncturing the skin and causing direct damage. Integrated management strategies include destroying infested fruits, ploughing around trees to eliminate pupae and using mass trapping with methyl eugenol traps to monitor and manage the pest population. Recently fruit bagging is being advocated to prevent fruit fly damage in different fruit crops. However no systematic studies were conducted on efficacy of different types of

bags to cover *Annona* fruits. Hence present study was conducted to evaluate bags made of different materials for fruit fly management.

The experiment was conducted at the Institutional Research Orchard, MPKV Rahuri, in a Randomized Block Design (RBD) using the cv. NMKG hybrid of custard apple, with three replications for each treatment. The materials tested included polypropylene bags (white), white wax-coated bags, brown paper bags and brown wax-coated bags, all sized 6 x 5 inches, alongside methyl eugenol traps and a mixture of karanj oil (1%) and neem oil (99%) at 3 ml/lit. Fruits were bagged one month before harvest (Karim, 1989) when they reached the size of a cricket ball as it shows a preference for laying eggs on fruits between 30 to 40 days before harvest fruit based on maturity indices. After ripening, the number of maggots in the fruits was counted by cutting them horizontally and the surviving maggots per fruit were recorded from each treatment replicate. This data was used for further analysis, which was performed using the technique of analysis of variance (ANOVA), with significance determined according to the method by Panse and Sukhatme (1978) for Randomized Block Design.

**Table 1. Evaluation of different treatment against fruit fly (*B. dorsalis*) on hybrid custard apple**

Tr. No.	Name of the treatment	Size/Dose	Av. no. of maggots observed per three fruits	Per cent fruit damage
T <sub>1</sub>	Polypropylene white bag	6 x 5"	0.4 (0.92)	13.3
T <sub>2</sub>	White wax coated bag	6 x 5"	0.0 (0.71)	0.0
T <sub>3</sub>	Brown paper bag	6 x 5"	1.7 (1.49)	56.7
T <sub>4</sub>	Methyl eugenol Trap	1 trap	2.1 (1.61)	70.0
T <sub>5</sub>	Brown color wax coated bag	6 x 5"	0.9 (1.20)	30.0
T <sub>6</sub>	Spraying of Karanj oil + Neem oil	3 ml/lit+ 3 ml/lit	2.8 (1.81)	93.0
T <sub>7</sub>	Untreated control	-	4.0 (2.13)	133.0
SE(m)±			0.07	-
Cd at 5%			0.23	-

Figures in the parenthesis indicates  $\sqrt{x + 0.5}$  transformed values

The data presented in table 1 reveal that all four types of bagging materials effectively protected against fruit fly infestation, with untreated control (T<sub>7</sub>) fruits averaging 3.67 maggots per fruit. Notably, the white wax-coated bag (T<sub>2</sub>) exhibited superior performance, showing no maggots in the fruit. This result positions it as the most effective treatment among the options tested. It was at par to the polypropylene white bag (T<sub>1</sub>) registered an average of 0.4 maggots per fruit (13.3% damage) and the brown color wax-coated bag (T<sub>5</sub>) had an average of 0.9 maggots per fruit (30% damage). The brown paper bag (T<sub>3</sub>) was also effective, recording an average of 1.7 maggots per fruit (56.7% damage), which was at par to the methyl eugenol trap treatment (T<sub>4</sub>), showing 2.1 maggots per fruit (70% damage). Additionally, the treatment involving a karanj and neem oil spray (T<sub>6</sub>) resulted in 2.8 maggots per fruit (93.5% damage), which, while exhibiting more maggots than the other treatments, was still lower than the untreated control, which had 4.0 maggots per fruit (133% damage). The current findings

are consistent with research by Begum *et al.* (2013), who tested five bagging techniques over two fruiting seasons, including perforated polythene and paper bags. They found that perforated white polybags nearly eliminated fruit fly infestation, producing almost 100% non-infested fruits. Similarly, Mondal *et al.* (2015) studied fruit wrapping methods, reporting infestation rates between 1.32% and 17.31%, with transparent polypropylene bags and partial paper covers yielding the lowest loss at 1.66%. Both studies emphasize the effectiveness of bagging in reducing fruit fly infestations and enhancing fruit quality. Bagging fruits with white wax-coated bags, and another polypropylene white bags, emerged as the most effective management strategy, substantially reducing infestation levels.

These results underscore the efficacy of various bagging materials and highlight the potential for implementing these strategies in custard apple cultivation to manage fruit fly infestations effectively.

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