

Evaluation of Different Baiting Materials for Pollinators in Mango

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Abstract

To study the effectiveness of different baiting materials, the experiment was conducted during the flowering season of 2016 at the Centre of Excellence for Mango, Department of Horticulture, Dr.B.S.K.K.V. Dapoli. Experiment was laid out in randomized block design (RBD) with eight treatments and three replication in Alphonso and Ratna mango variety blocks. The baits tested included cow dung, chicken waste, dry fish, poultry manure, kitchen waste, chopped banana fruits, molasses and yeast cake. The superiority of the bait was determined on the basis of mean number of adult insect pollinators emerging from the bait. In Alphonso, the chicken waste recorded maximum (50) adults. Similarly in Ratna, in case of treatments chicken waste (97.69) and dry fish (89.67) recorded highest mean number of adults. Thus, chicken waste emerged as a superior treatment among all the treatments.

Keywords: Mango pollinators, baiting material, Alphonso, Ratna

Introduction

Mango, *Mangifera indica* L. is the most important crop among the tropical and subtropical fruits grown in more than 111 countries of the world. Mango is the national fruit of India. India is the largest producer of mango in the world, and ranks first in area and production (Anon. 2014). Konkan region on the west coast of Maharashtra is one of the largest mango growing belts which contributes

nearly 10 per cent of total mango area in the country (Anon. 2015). Losey and Vaughan (2006) emphasized that flower visiting insects provide an important ecosystem function to global crop production through their pollination services. Although some varieties of mango plant are self pollinated, adequate pollinators are needed for pollen transfer to increase fruit set (Free and Williams, 1976). The kinds and biology of pollinators of mangoes have been studied in India and Israel, and their results demonstrated that insects of the Diptera and Hymenoptera play major role in pollinating of this important fruit (Singh 1997). Therefore, an attempt has been made to bring the light on the facts about the pollinators visiting mango flowers. Evidence concerning the pollinators in mango is still limited in Konkan region of Maharashtra. Therefore, there is a need to initiate studies to expand the existing knowledge and to serve as a basic reference for field management and academic studies in the future. Present report emanates from one such study.

Materials and Methods

To evaluate different baiting materials, the experiment was conducted during the flowering season of 2016 at the Centre of Excellence for Mango and Nursery No. 10, Department of Horticulture, Dr.Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli. Experiment was laid out in randomized block design (RBD) with eight treatments and three replications. For this purpose two varieties of mango were selected viz., Alphonso and Ratna. The tested baiting materials included cow dung @100g, chicken waste @100g, dry fish @100g, poultry manure @ 100g, kitchen waste @100g, chopped banana fruits @100g, molasses @ 100g and yeast cake @ 100g. At the time of flowering, plastic bottles (500 g capacity) were taken and the different baits were kept in the bottles

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on 2-3 inch layer of soil and moist coconut waste at base to keep the bait in moist condition and then labeled accordingly. The mouth of the bottles was covered with the wire mesh and sealed well with a string and then the bottles were hanged to the branches of randomly selected mango trees of Alphonso and Ratna with the help of nylon thread. These bottles were regularly monitored to check the moisture and the egg laying and further immature stages of Dipteran pollinators. The plastic bottles were collected from the field after seven days from the treatment application so as to give sufficient time for egg laying kept in the acrylic boxes in the laboratory with their mouths tied with double layered muslin cloth for further observations. After emergence of adults from different baits they were collected in the different glass vials containing 70 per cent ethyl alcohol and preserved separately as per the baiting material used. And they were kept separately according to each baiting material and the total number of the same was also recorded. Then the specimens were identified up to the family level with help of taxonomic keys. The efficacy of different baits was judged based on - the bait in which more number of adults emerged and, secondly, the bait in which more diverse groups of Dipteran pollinators were recorded. The data were statistically analyzed to draw the conclusions about the best suitable bait for the Dipteran pollinators in mango.

Results and Discussion

Pollinators emerging from different baits in Alphonso

Overall average numbers of adult insect pollinators of different Dipteran families that emerged from various baiting material are presented in Table 1. The results in Alphonso variety indicate that mean number of adult insect pollinators emerging from different baiting materials ranged from 00 to 50. Chicken waste (T₂) recorded maximum (50) adults, while poultry manure (T₄) recorded minimum (00). Hence, chicken waste (T₂) emerged as a significantly superior treatment among all the treatments. The treatments viz., dry fish (T₃), cow dung (T₁) and kitchen waste (T₅) recorded 17.67, 13.67 and 6.00 adults, respectively and were at par with each other, whereas the remaining treatments chopped banana fruits (T₆), molasses (T₇), yeast cake (T₈) and poultry

manure (T₄) recorded 3.33, 2.00, 1.00 and 0.00 adults, respectively and remained as poor baits in attracting Dipteran pollinators.

Pollinators emerging from different baits in Ratna

Overall average numbers of adult insect pollinators of different Dipteran and Coleopteran families that emerged from various baiting materials are presented in Table 1. The results in Ratna variety show that mean number of adult pollinators emerged from baiting material ranged between 2 to 97.67. The treatments chicken waste (T₂) and dry fish (T₃) recorded 97.67 and 89.67 adults respectively and were at par with each other. These were followed by chopped banana fruits (T₆) and yeast (T₈) with 25.33 and 19.67 adults respectively and were also at par with each other. Further, adult pollinators emerged from remaining treatments viz., cow dung (T₁), poultry manure (T₄), molasses (T₇) and kitchen waste (T₅) were

Table1: Mean numbers of adults emerged from different baits in Alphonso and Ratna varieties of Mango.

Sr. No.	Pollinator baits	Quantity (g)	Overall mean pollinators	
			Alphonso	Ratna
1	Cow dung (T ₁)	100	13.67 (3.75)	6.00 (2.53)
2	Chicken waste (T ₂)	100	50.00 (7.10)	97.69 (9.90)
3	Dry fish (T ₃)	100	16.67 (4.14)	89.67 (9.49)
4	Poultry manure (T ₄)	100	0.00 (0.71)	4.33 (2.18)
5	Kitchen waste (T ₅)	100	6.00 (2.55)	2.00 (1.47)
6	Chopped banana fruits (T ₆)	100	3.33 (1.94)	25.33 (5.08)
7	Molasses (T ₇)	100	2.00 (1.56)	3.67 (2.02)
8	Yeast cake (T ₈)	100	1.00 (1.17)	19.67 (4.49)
S.Em.±			0.64	0.73
CD (0.05%)			1.95	2.22

*Figures in parentheses are $\sqrt{x+0.5}$ values

6.00, 4.33, 3.67 and 2.00 adults respectively and were at par with each other. These last four were the poor baits as far as adults emerged were concerned.

Hence, from the above results in case of two varieties of mango viz., Alphonso and Ratna it was revealed that, according to the demand of the pollinators the baits can be installed in the orchards of mango such as if there is need of the saprophagous insect pollinators in the fields or orchards the baits viz., chicken waste or dry fish should be installed in the required orchards while, fruity baits like chopped banana fruits and molasses should be installed in the orchards for the pollinators from Drosophilidae family only. Likewise, more number of pollinators from these groups will be attracted certainly in the orchards for increasing the pollination efficiency in mango.

The observations made in the present study are in agreement with those of Sharma *et al.* (1998) who revealed rearing of *Lucilia* sp. and *Sarcophaga* sp. flies in their attempt to increase the abundance of pollinators in mango orchard. These flies were supplemented with fish or mutton pieces in mesh bags hanged on the lower branches of mango trees. Stokl *et al.* (2010) investigated that the fruity odour is highly attractive to certain drosophilid flies, which subsequently become trapped and were exploited as pollinators. Moretti and

Godoy (2013) reported that Dipteran families viz., Calliphoridae, Muscidae and Sarcophagidae preferred the chicken bait. Patitucci *et al.* (2013) reported that among total specimen of Muscidae *M. domestica* preferred liver bait than other flies.

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