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## Monitoring of guava fruit fly, *Bactrocera* spp. through methyl eugenol traps

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### Abstract

The present study on monitoring of guava fruit fly, *Bactrocera* spp. through methyl eugenol traps were carried out during rainy season at farmer's field at village Sunderpur, District Rohtak, Haryana during 2016-17. The population of fruit fly started appearing in methyl eugenol traps from 23rd SMW (7.2 fruit flies/trap/week) reaching its maximum in 33rd SMW (264.2 fruit flies/trap/week) and then population suddenly declined in 37th SMW which coincided with termination of harvesting of guava crop. The average maximum temperature 32.9 °C, average minimum temperature 26.6 °C, average morning relative humidity 81.8 per cent, average evening relative humidity 71.7 per cent and rainfall 0.86 mm were congenial for peak population build up of fruit fly on guava fruits crop during rainy season. The population of guava fruit fly, *Bactrocera* spp. had significantly negative correlation with maximum temperature and significantly positive correlation with morning and evening relative humidity.

**Keywords:** Guava, fruit fly, *Bactrocera* spp., methyl eugenol, traps

### Introduction

Guava (*Psidium guajava* L.) is a very important fruit crop as it is highly rich in minerals like phosphorus and calcium. In India, it occupies an area of 2.68 lakh ha and 0.107 lakh ha in Haryana with a production of 36.67 and 1.25 lakh metric tons, respectively (Saxena and Gandhi, 2015) [7].

Among various factors responsible for low yields of guava, the insect-pests are major one that have been reported to attack guava at different stages. Guava is infested by around 80 species of insect pests out of which fruit fly is the major one causing a heavy loss in the yield (Verghese and Sudhadevi, 1998; Singh *et al.*, 2003; Rajitha and Viraktamath, 2005; Atwal and Dhaliwal, 2009) [12, 10, 7, 1]. The crop loss due to fruit flies can vary from a few to 100 per cent, depending on population, locality, variety and season (Kumar *et al.*, 2011; Sharma *et al.*, 2011) [5, 9].

Fruit flies belong to the family Tephritidae which is one of the largest, most diversified families of order Diptera. About 4000 species arranged in 500 genera are included in this family. Out of these, 392 species have been recorded in India (Kapoor, 1993) [4]. Most common fruit flies attacking guava fruit are *Bactrocera dorsalis* (Hendel) and *B. correcta* Bezzi. From economic point of view, Oriental fruit fly, *Bactrocera dorsalis* (Hendel); guava fruit fly, *Bactrocera correcta* (Bezzi) and ber fruit fly, *Bactrocera zonata* (Saunders) are very important pests of fruit crops and are recognized worldwide as they caused major loss to horticultural crops. Deposition of eggs by the fruit flies on the host fruits generally takes place when fruit is physiologically ripe. On hatching, the maggots bore inside the fruit and feed on pulp. Only adults are exposed while eggs and maggots remain protected in the host tissues. Methyl eugenol traps can be used for male annihilation technique (MAT) for the management of *Bactrocera* spp. (White and Elson Harris, 1992) [13]. Methyl eugenol traps have been standardized by different institutes, but this technique is still less exploited in India. Thus, keeping in view the importance of fruit flies on guava crop, the present studies on monitoring of guava fruit fly, *Bactrocera* spp. through methyl eugenol traps were undertaken.

### Materials and Method

The present studies on monitoring of guava fruit fly, *Bactrocera* spp. through methyl eugenol traps were carried out at farmer's field in village Sunderpur, District Rohtak, Haryana during rainy season of 2016-17. The methyl eugenol traps were purchased from PAU, Ludhiana and fixed with the seven year old guava trees var. Hisar Safeda at equidistance from each other @40 traps/ha in the last week of May.

The observations on fruit fly catches were recorded at weekly interval from 23<sup>rd</sup> Standard Meteorological Week (SMW) till end of rainy season guava (37<sup>th</sup> SMW). The fruit fly catches/trap were collected, counted and removed from the traps every week. The data collected were correlated with weather parameters.

**Results and Discussion**

Population of fruit fly captured in methyl eugenol traps on rainy season guava crop presented in Table 1 indicated that first observation on population of fruit fly *Bactrocera* spp. was recorded in 23<sup>rd</sup> SMW (7.2 fruit flies/trap/week) and was fluctuating in subsequent weeks. There was a sharp increase numbers of fruit fly in 29<sup>th</sup> SMW (165.7 fruit flies/ trap/week)

reaching its peak in 33<sup>rd</sup> SMW (264.2 fruit flies/trap/week). During 37<sup>th</sup> SMW, there was sudden decline in fruit fly population (20.5 fruit flies/trap/week) which synchronised with termination of rainy season guava crop.

The abiotic factors prevailing during first fortnight of August (33<sup>rd</sup> SMW) i.e., average maximum temperature 32.9 °C, average minimum temperature 26.6 °C, average morning relative humidity 81.8 per cent, average evening relative humidity 71.7 per cent and rainfall 0.86 mm were found congenial for buildup of peak population of fruit fly on guava fruit crop during rainy season. Similar observations were reported by Jalaluddin *et al.* (1999) [3] and Chaudhary and Jamal (2000) [2].

**Table 1:** Population of guava fruit fly, *Bactrocera* spp.\* captured per trap on guava during rainy season

Sr. No.	SMW	Number of fruit flies/ trap/ week	Weather parameters				Rainfall (mm)
			Temperature (°C)		Relative humidity (%)		
			Maximum	Minimum	Morning	Evening	
1	23	7.20	42.20	29.10	43.20	40.60	0.00
2	24	17.70	40.70	27.40	49.00	44.10	1.14
3	25	25.70	38.00	28.20	55.00	45.70	0.86
4	26	44.20	38.40	29.00	60.20	52.20	0.00
5	27	23.70	36.70	27.80	72.10	65.40	4.44
6	28	57.20	36.90	28.20	86.10	63.50	3.29
7	29	165.70	32.90	28.10	82.70	73.00	13.43
8	30	61.70	36.40	27.80	84.40	63.20	3.00
9	31	232.70	33.50	28.10	85.40	76.10	2.14
10	32	189.20	35.50	27.60	84.40	72.20	0.29
11	33	264.20	32.90	26.60	81.80	71.70	0.86
12	34	123.00	33.70	27.20	81.70	66.10	0.14
13	35	257.00	33.90	26.90	83.80	72.50	3.29
14	36	180.00	33.30	24.80	83.70	74.70	2.14
15	37	20.50	34.90	25.20	71.80	54.10	0.00

\* = *Bactrocera dorsalis* Hendel and *Bactrocera zonata* Saunders

Population of fruit fly had significant negative correlation with maximum temperature (r= -0.863) and was having significant positive correlation with morning relative humidity (r= 0.763) and evening relative humidity (r= 0.885) (Table 2).

The fruit fly population had no significant correlation with minimum temperature and rainfall. The results are in conformity to the observation of Singh and Sharma (2013) [11] and Rajitha and Viraktamath (2006) [6].

**Table 2:** Simple correlation between abiotic factors and population of fruit fly, *Bactrocera* spp. trapped in methyl eugenol traps

Abiotic factor	Fruit fly
Temperature (maximum) (°C )	-0.863**
Temperature (minimum) (°C )	-0.516 <sup>NS</sup>
Relative humidity morning (%)	0.763**
Relative humidity evening (%)	0.885**
Rainfall (mm)	0.344 <sup>NS</sup>

\*\* Significant at 1% level of significance, \*Significant at 5% level of significance, <sup>NS</sup> Non-significant

**Table 3:** Multiple regression analysis between fruit fly population and abiotic factors on guava crop during rainy season

Regression equation	R <sup>2</sup>
Y = 129.3474-16.078X1+11.723X2-5.189X3+10.218X4-6.866X5	0.80

- X1 = Temperature (maximum)
- X2 = Temperature (minimum)
- X3 = Relative humidity (morning)
- X4 = Relative humidity (evening)
- X5 = Rainfall (mm)

The multiple regression analysis, which explained the average relationship between populations of fruit fly with abiotic factors, i.e., the amount of changes in population of fruit fly per unit change in weather parameters, indicated that these factors accounts for 80 per cent (regression equation)

variability in population of fruit fly (Table 3).

**Conclusion**

It can be concluded from the present study that the population of fruit fly catches started from 23<sup>rd</sup> SMW (7.2 fruit flies/trap/week) reaching its maximum during 33<sup>rd</sup> SMW (264.2 fruit flies/trap/week). Fruit fly had significant negative correlation with maximum temperature and significant positive correlation with morning relative humidity and evening relative humidity during rainy season. Correlation of abiotic factors and their impact through multiple regression

analysis on population build of population of guava fruit fly, *Bactrocera* spp. indicated that abiotic factors contributed for 80 per cent variability in fruit fly population, collectively.

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