



## Influence of Different Lures and Meteorological Factors on Cucurbit Fruit Fly, *Bactrocera cucurbitae* (Coquillett) Catches

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Received: 5.09.2019 | Revised: 14.10.2019 | Accepted: 20.10.2019

### ABSTRACT

Monitoring cucurbit fruit fly using cue lure trap, banana pulp bait and jaggery based poison bait were carried out at district, Deoria, Uttar Pradesh for two consecutive years, 2014-15 and 2015-16. Among the attractants cue lure attracted maximum number of *Bactrocera cucurbitae* followed by banana pulp bait. While comparing different months of the year highest number of trapping was recorded in July and August (20.03 and 20.68 adults/ trap) followed by September and October (15.59 and 12.21 adults / trap). Pooled incidence data on trap catches showed significant positive correlation with maximum & minimum temperature and rainfall in all the lures, but non-significant positive with average relative humidity.

**Key words:** Cucurbits, Melon fruit fly, Monitoring, Attractants.

### INTRODUCTION

Cucurbit fruit fly (*Bactrocera cucurbitae*) is one of the most serious problem in successful cultivation of cucurbits. The extent of damage due to the pest varied between 30 to 100 % depending upon the season and crop species (Dhillon et al., 2005). Female flies prefer young green and tender fruits and flowers for egg laying. The hatched maggot tunnel in the fruits, containing them with frass and providing entry point for microbes which cause the fruits to rot. Such fruits either drop off or unfit for consumption. Attracted fruits may curved and twisted.

Systematic monitoring of the pest population, dispersion and dynamics in different growth phases of crop is of vital importance to forewarn the farmers to take up timely crop production measures. cue lure trap has been reported most effective for monitoring the population of cucurbit fruit fly and best tool for taking decision for its management (Maharjan et al., 2015). Besides, food attractants are also good indicator of flies activity. Since these food lures are locally available food material, easy to prepare, cost effective and ecofriendly can be used in monitoring programme.

**Cite this article:** Singh, R., Kumar R., & Morya, G.P. (2019). Influence of Different Lures and Meteorological Factors on Cucurbit Fruit Fly, *Bactrocera cucurbitae* (Coquillett) Catches, *Ind. J. Pure App. Biosci.* 7(5), 113-116. doi: <http://dx.doi.org/10.18782/2320-7051.7734>

Trap catches of flies greatly influenced by meteorological variables. Flight activity is mainly determined by various weather parameters and thus affect trap catches.

All abiotic factors contribute significantly towards increasing or decreasing fruit flies trap with the help of attractants (Mahmood et al., 2002); Laskar & Chatterjee, 2010). These studies are justifiable to study the population fluctuation of *B.cucurbitae* male round the year through the use of attractants and influence of abiotic parameters on its capture for considered agroecological conditions.

### MATERIALS AND METHODS

In the present studies cucurbit fruit fly population was monitored with the help of cue lure trap and two types of bait, i.e. banana pulp bait and jaggery based poison bait. The experiment was conducted for two consecutive years, 2014-2015 and 2015-16 on farmers field of district Deoria, Uttar Pradesh. Three villages where vegetables grown predominantly were selected for monitoring studies. Each three attractants were used at at three spots in each village. Thus, there were nine traps for each attractant.

#### Preparation of different traps

Plywood blocks measuring 05x05x5x01 cm<sup>3</sup> impregnated with 06 ml ethyl alcohol, 04 ml cue lure and 01ml dichlorvos 76 EC were used for monitoring studies in bottle traps. For banana pulp bait required amount of over ripped banana(100gm) mashed properly. Thereafter added 100ml water, 05 gm borax, 2.5ml malathion 50 EC and mixed thoroughly. Similarly for jaggery based bait took 50 gm jaggery in which added 100ml water, 05 gm borax, 10 ml molasses and 2.5 ml malathion 50 EC followed by mixed properly. Fresh mixture of these two baits were used in earthen pots at plant height. cue lure impregnated wooden blocks were replaced at monthly interval whereas food baits were changed at three days interval.

The observations on adult flies trapped in cue lure traps were removed and recorded weekly, while after 2-3 days in food baits. The

data thus obtained were pooled month wise to pin point the active period of the pest in the region and to find out the suitable and efficient trapping agent for their management.

Meteorological data on temperature, humidity and rainfall were obtained from meteorological observatory of Gorakhpur commissionerary. The data on trap catches of adult flies under different attractants were correlated to elucidate the role of weather factors on the pest incidence which can be taken advantage in the management of the pest in agroclimatic conditions of this part of eastern Uttar Pradesh.

### RESULTS AND DISCUSSION

The population of melon fruit fly (*B. cucurbitae*) in different seasons of the year using different trapping agents have been presented in table-1. Among the three different traps cue lure bottle trap consistently trapped maximum number of male cucurbit fly in all the months during both the years. The cumulative average of 14.96 and 16.34 adults/trap/day were observed during both the years, respectively over 6.77 and 7.64 adults/trap/day in jaggery based food lure. While comparing two food baits, banana pulp bait showed slightly promising in attracting melon fruit fly adults than jaggery based bait. As the month is concerned it appeared that maximum number of adult melon fly were trapped in July and August (20.03 and 20.68 adults/trap) irrespective of bait traps indicating the peak period of the pest during kharif season in this region. It was closely followed by September and October (15.59 and 10.21 adults/trap). The minimum activity of the pest was observed in the cooler months, i.e. December and January in which only 2.52 and 1.33 adults/trap recorded respectively. It is evident from data in table-1 that the activity of the fly was maximum during kharif (July - October), moderate in jaid (March- June) and minimum in rabi season (November - February) in this region.

Several types of trapping agents have been used by various workers in past to monitor the activity of melon fruit fly. Similar

to present findings cue lure traps were found to be more effective than food attractants in monitoring *B. cucurbitae* (Pawar et al., 1991; Zaman, 1995; Vergas et al., 2000; Maharjan et al., 2015). Although food baits could not be denied because they are locally available, easy to make and attract and kill both male and female fly without any risk of residual poisoning. As the cropping season is concerned our results are very close to the findings of Khan et al. (2003), Laskar and Chatterjee (2010) and Vignesh and Viraktamath (2015).

The results further revealed that abiotic factors had strong impact on the population fluctuation of melon fruit fly

irrespective of trapping agents (table-2 & table-3). Pooled incidence data on trap catches of *B. cucurbitae* showed significant positive correlation with minimum & maximum temperature and rainfall in all the three trapping agents i.e., cue lure, banana pulp bait and jaggery based bait. However average relative humidity showed non-significant positive correlation with trap catches in all the three trapping agents (table-4). Similar observations with regards to influence of meteorological parameters on the incidence of the melon fruit fly was also claimed earlier by several workers (Mahmood and Mishkatullah, 2007; Raghuvanshi et al., 2012; Maharjan et al., 2015).

**Table 1: Trap catches of *B. cucurbitae* in different trapping agents during 2014 –15 and 2015-16**

| Month     | Mean number of flies caught / trap / day |              |                  |             |                    |             | Mean         |
|-----------|--|--------------|------------------|-------------|--------------------|-------------|--------------|
|           | cue lure bottle trap                     |              | Banana pulp bait |             | Jaggery based bait |             |              |
|           | 2014 -15                                 | 2015 -16     | 2014 -15         | 2015 -16    | 2014 -15           | 2015 -16    |              |
| February  | 8.01                                     | 4.64         | 3.07             | 2.21        | 3.20               | 2.83        | <b>3.99</b>  |
| March     | 14.37                                    | 13.53        | 5.87             | 5.43        | 3.69               | 6.45        | <b>8.22</b>  |
| April     | 11.53                                    | 16.65        | 7.39             | 7.95        | 6.71               | 7.53        | <b>9.62</b>  |
| May       | 12.23                                    | 14.80        | 7.51             | 8.62        | 7.86               | 8.96        | <b>9.99</b>  |
| June      | 18.60                                    | 17.65        | 6.94             | 11.33       | 7.42               | 11.54       | <b>12.24</b> |
| July      | 30.22                                    | 32.31        | 14.21            | 14.47       | 13.30              | 15.72       | <b>20.03</b> |
| August    | 32.56                                    | 33.06        | 13.50            | 13.93       | 16.10              | 14.95       | <b>20.68</b> |
| September | 23.25                                    | 26.39        | 12.04            | 11.75       | 9.18               | 10.97       | <b>15.59</b> |
| October   | 16.45                                    | 19.94        | 5.84             | 8.19        | 4.21               | 6.63        | <b>10.21</b> |
| November  | 7.8                                      | 10.60        | 2.71             | 3.79        | 1.72               | 3.24        | <b>4.97</b>  |
| December  | 3.3                                      | 4.93         | 1.44             | 2.79        | 1.03               | 1.64        | <b>2.52</b>  |
| January   | 1.3                                      | 1.63         | 0.80             | 1.60        | 1.41               | 1.27        | <b>1.33</b>  |
| Mean      | <b>14.96</b>                             | <b>16.34</b> | <b>6.77</b>      | <b>7.66</b> | <b>6.36</b>        | <b>7.64</b> | <b>-----</b> |

**Table 2: Correlation coefficient between trapped fruit flies in different attractants and meteorological factors (2014 - 2015)**

| Meteorological factors. | cue lure bottle trap | Banana pulp bait | Jaggery based bait |
|-------------------------|----------------------|------------------|--------------------|
| Temperature (Max.)      | 0.567                | 0.613            | 0.572              |
| Temperature (Min.)      | 0.819                | 0.822            | 0.756              |
| Relative humidity (Av.) | 0.266                | 0.138            | 0.099              |
| Rainfall (mm)           | 0.466                | 0.393            | 0.436              |

**Table 3: Correlation coefficient between trapped fruit flies in different attractants and meteorological factors (2015 - 2016)**

| Meteorological factors. | cue lure bottle trap | Banana pulp bait | Jaggery based bait |
|-------------------------|----------------------|------------------|--------------------|
| Temperature (Max.)      | 0.691                | 0.709            | 0.674              |
| Temperature (Min.)      | 0.852                | 0.888            | 0.892              |
| Relative humidity (Av.) | 0.148                | 0.089            | 0.090              |
| Rainfall (mm)           | 0.352                | 0.437            | 0.411              |

**Table 4: Pooled correlation coefficient between trapped fruit flies in different attractants and meteorological factors (2014 -2015 and 2015 - 2016)**

| Meteorological factors. | cue lure bottle trap | Banana pulp bait | Jaggery based bait |
|-------------------------|----------------------|------------------|--------------------|
| Temperature (Max.)      | 0.632*               | 0.663*           | 0.625*             |
| Temperature (Min.)      | 0.836*               | 0.858*           | 0.836*             |
| Relative humidity (Av.) | 0.206                | 0.112            | 0.093              |
| Rainfall (mm)           | 0.409*               | 0.414*           | 0.420*             |

\* Significant at 5 % level of significance.

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