Journal of Science and Research Innovations

Volume - 1, Issue - 2, 2023, ISSN: 2583-9004 (ONLINE)

Study of The Qualitative Composition of Fruit Fly Infesting Cucurbit Crops

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ABSTRACT:

The surveys were made in and around Banaras Hindu University, Varanasi in the cucurbit crop fields to know the qualitative composition of fruit fly. For these different types of bait traps are Banana bait trap, Gur bait trap and Sticky trap were used to collect the fruit fly. Other than these traps the damaged cucurbit fruits were also collected and kept in the laboratory for rearing the adult fruit fly to know the species composition. It has been observed that among the fruit flies collected through bait traps and reared from damaged fruits were identified as Bactroceracucurbitaeand *Bactrocerazonata.* Out of these two species collected the first species i.e. *B. cucurbitae* constitute the major chunk. Some other species of fruit flies were also trapped in the bait traps but the fruit flies that were recovered from the infested fruits after laboratory rearing were only *B. cucurbitae*and *B. zonata*. No other species were recorded infesting cucurbit crops.

KEYWORDS : Fruit fly,Bait & Sticky traps

Received: 18-10-2023 **Revised**: 20-10-2023 **Accepted**: 24-11-2023

INTRODUCTION:

Vegetables are one of the most important components of Indian Horticulture. Though vegetable cultivation in general, is more profitable due to their short crop duration and ready marketability; farmers are not able to harvest the actual potential of the crop. One of the reasons for this is

vulnerability to pest attack which causes reduced yield, unhealthy growth and produce or complete destruction of the crop. Among the various vegetables, cucurbits are extensively grown in mixed cropping of more than one kind in long and meandering riverbeds and are of tremendous economic importance as food plants. It has been difficult to estimate or quantify them because of absence of reliable statistic of their area and production in India. Cucurbits are infested by a number of insect-pests. Amongst which, fruit fly (*Bactrocera*spp.) is of major importance, accounting to severe losses in cucurbit crops. It has been found to cause losses ranging from 30 to 100 per cent (Pareek and Kavadia, 1986 and Kapoor, 1993, Panday et. al., 2008).

These flies are widespread over the entire world, except the Arctic and Antarctic regions. The fruit fly species are divided into two broad morphological categories on the basis of their body form, structure and biology. The first group includes members of subfamily Dacinae, infest almost all kinds of vegetables and fruits. The most destructive pest species are *Bactroceracucurbitae, Bactroceradorsalis, and Bactrocerazonatus.* The second group, that is belonging to subfamily Trypetinae, Schistopterinae and Tephritinae. They usually breed in flower heads especially of family Compositae and Labiatae. Some trypetines also infest a number of fleshy fruit. In Tephritinae and Trypetinae some are gall formers on various parts of the plant and some are stem or shoot miners in Compositae, grasses, including bamboo and probably other plants. Dacine flies cause most economic damage to fruit and vegetable crops. They are well known for their association with the host plants. Most species oviposits directly in living and healthy plant tissues. So far 197 species of fruit flies (out of 200 species 3 species are not included due to their doubtful distribution) are known from various parts of India. These are included in 4 sub families, 13 tribes and 71 genera (Kapoor, 1993). Based on their host range, climatic tolerance and distributional areas, these flies are classified as major pests spp. (polyphagous), having wide climatic tolerance and large distributional area and minor pests spp. (monophagous and oligophagous) having less tolerance and distributional area (Kapoor and Agarwal,1983).Since many species have incomplete distribution, there is a great need to have an extensive survey of these flies in India and other parts of the world.

MATERIAL AND METHODS:

In order to study the species composition of fruit fly infesting various cucurbit crops surveys were made in selected fields in and around village Tikari during both the seasons. The fruit fly bait traps such as the banana bait (1 kg rotten banana + 10 g carbofuron + 5 g yeast + 5 g citric acid), gur bait (50 ml diazinon + 200 g gur + 2 l of water) and sticky trap were used for the collection of fruit flies. The poison bait was kept in plastic plate, which was covered with another inverted plastic plate maintaining 5 cm gap between two plates and the sticky trap having pheromone lure were hanged with the help of bamboo stick. The poison baits were changed at an interval of 2 - 3 days in summer season and 4 - 5 days in rainy season. The pest lure (pheromone lure) in case of sticky trap was changed after 21 days interval. The traps were kept suspended with the help of bamboo stick and installed 2-3 feet above the crop canopy. The fruit flies were collected from these traps for the identification of the species. The damaged fruits were also collected from these fields and were kept in the laboratory for rearing the adult fly to record the species composition.

RESULTS AND DISCUSSION:

The surveys were made in and around Banaras Hindu University, Varanasi in the cucurbit crop fields to know the qualitative composition of fruit fly. For these different types of bait traps were installed in the fields for collection of fruit fly. The bait traps are: Banana bait trap, Gur bait trap and Sticky trap were used to collect the fruit fly. Other than these traps the damaged cucurbit fruits were also collected and kept in the laboratory for rearing the adult fruit fly to know the species composition. It has been observed that among the fruit flies collected through bait traps and reared from damaged fruits were identified as *Bactroceracucurbitae*and *Bactrocerazonata*. Out of these two species collected the first species i.e. *B. cucurbitae* constitute the major chunk.

The surveys made in and around Banaras Hindu University in the cucurbit crop fields showed that two species of fruit flies infest the cucurbit crops. These species are *Bactroceracucurbitae*(Coquillet) and *Bactrocerazonata*(Saunders). However, some other species of fruit flies were also trapped in the bait traps but the fruit flies that were recovered from the

infested fruits after laboratory rearing were only *B. cucurbitae*and *B. zonata*. No other species were recorded infesting cucurbit crops. According to Butani and Jotwani (1984) and Hill (1994), the species of economic importance are *Bactroceracucurbitae* (Coquillet), *Bactrocerazonata* (Saunders), *Bactroceradorsalis* (Hendel), *Bactroceratau* (Walker), *Bactroceradiversa* (Coquillet), *Bactroceracorrecta* (Bezzi), *Dacusciliatus* (Collart), *Bactroceraoleae* (Gmelin). Of these *Bactroceracucurbitae* (Coquillet) is the most important pest of melon and other cucurbit fruits in the world (Anonymous, 1978).

Table 1.Trap catches of fruit fly (*B. cucurbitae*) in two different types of baits traps during summer season Ist Year

Treatments	Fruit fly catch (trap^{-1}week^{-1})											
	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	Average
Banana bait	9.50 (3.16)	23.50 (4.89)	18.50 (4.36)	27.00 (5.22)	25.00 (5.01)	18.00 (4.30)	17.00 (4.17)	10.00 (3.23)	10.00 (3.23)	5.00 (2.34)	2.00 (1.55)	15.06 (3.77)
Gur bait	2.50 (1.73)	4.00 (2.11)	5.00 (2.34)	6.00 (2.54)	6.00 (2.54)	6.00 (2.54)	3.00 (1.85)	4.50 (2.21)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	3.36 (1.81)
Sticky trap	1.00 (1.14)	4.00 (2.11)	0.00 (0.71)	3.00 (1.85)	3.00 (1.85))	4.00 (2.11)	3.00 (1.85)	1.50 (1.40)	1.00 (1.14)	0.00 (0.71)	0.00 (0.71)	1.86 (1.42)
Average	4.33 (2.01)	10.50 (3.04)	7.83 (2.47)	12.00 (3.21)	11.33 (3.13)	9.33 (2.98)	7.67 (2.62)	5.33 (2.28)	3.67 (1.70)	1.67 (1.25)	0.67 (0.99)	
Difference between Treatments	C. D. (P = 0.05) = 0.23											
Difference between Periods of observation	C. D. (P = 0.05) = 0.38											
Difference between Treatments x periods of observation	C. D. (P = 0.05) = 0.77											

Table 2. Trap catches of fruit fly (*B. cucurbitae*) in two different types of baits traps during summer season IInd Year

Treatments	Fruit fly catch (trap^{-1}week^{-1})											
	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	Average
Banana bait	15.00 (3.93)	20.50 (4.57)	29.50 (5.47)	32.00 (5.70)	24.50 (5.00)	19.50 (4.46)	13.50 (3.73)	21.50 (4.68)	18.00 (4.30)	8.00 (2.89)	3.500 (2.00)	18.68 (4.25)
Gur bait	1.00 (1.14)	2.50 (1.73)	4.50 (2.23)	4.00 (2.11)	6.00 (2.54)	5.00 (2.34)	5.00 (2.34)	5.00 (2.34))	0.00 (0.71)	0.50 (0.97)	0.00 (0.71)	3.05 (1.74)
Sticky trap	0.00 (0.71)	2.00 (1.58)	2.50 (1.67)	2.50 (1.675)	1.00 (1.14)	3.00 (1.78)	1.50 (1.29)	2.50 (1.67)	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	1.36 (1.25)
Average	5.33 (1.93)	8.33 (2.63)	12.17 (3.13)	12.830 (3.18)	10.50 (2.89)	9.17 (2.86)	6.67 (2.45)	9.67 (2.88)	6.00 (1.90)	2.83 (1.52)	1.17 (1.14)	
Difference between Treatments	C. D. (P = 0.05) = 0.25											
Difference between Periods of observation	C. D. (P = 0.05) = 0.41											
Difference between Treatments x periods of observation	C. D. (P = 0.05) = 0.81											

Journal of Science and Research Innovations

Volume - 1, Issue - 2, 2023, ISSN: 2583-9004 (ONLINE)

Table 3. Trap catches of fruit fly (*B. cucurbitae*) in two different types of baits traps during summer season (Average of two years)

Treatments	Fruit fly catch (trap^{-1}week^{-1})											
	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	Average
Banana bait	12.25 (3.54)	22.00 (4.73)	24.00 (4.91)	29.50 (5.46)	24.75 (5.01)	18.75 (4.38)	15.25 (3.95)	15.75 (3.95)	14.00 (3.77)	6.50 (2.62)	2.75 (1.75)	16.86 (4.01)
Gur bait	1.75 (1.44)	3.25 (1.92)	4.75 (2.28)	5.00 (2.32)	6.00 (2.54)	5.50 (2.44)	4.00 (2.10)	4.75 (2.26)	0.00 (0.71)	0.25 (0.84)	0.00 (0.71)	3.20 (1.78)
Sticky trap	0.50 (0.93)	3.00 (1.84)	1.25 (1.19)	2.75 (1.79)	2.00 (1.51)	3.50 (1.95)	2.25 (1.57)	2.00 (1.54)	0.50 (0.93)	0.00 (0.71)	0.00 (0.71)	1.61 (1.27)
Average	4.83 (1.97)	9.42 (2.83)	10.00 (2.80)	12.42 (3.19)	10.92 (3.01)	9.25 (2.92)	7.17 (2.54)	7.50 (2.58)	4.83 (1.80)	2.25 (1.39)	0.92 (0.83)	
Difference between Treatments	C. D. (P = 0.05) = 0.14											
Difference between Periods of observation	C. D. (P = 0.05) = 0.24											
Difference between Treatments x periods of observation	C. D. (P = 0.05) = 0.47											

CONCLUSION:

*Bactroceracucurbitae*and *B. zonata* are known to have a wide host range and are considered most important pests of wide variety of cucurbitaceous plants, tomatoes, peppers and other vegetables. *B. cucurbitae*is commonly known as 'melon fly' due to its preference over melons, whereas, *B. zonata* is rated as an important pest after *B. cucurbitae* and *B dorsalis* (Kapoor, 1993). Although there is a report from Bangladesh that the cucurbit crops are infested by the fruit fly species, *B. cucurbitae*, *B. tau* and *Dacusciliatus*. Out of these three species, *B. cucurbitae* was dominant in all the locations followed by *B. tau* and *D. ciliatus* (Akhtaruzzaman*et al*, 2001).

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