

Short Communication

INFLUENCE OF POISON BAITS AND WEATHER FACTORS ON FRUIT FLY (*BACTROCERA CUCURBITAE* COQ.) CATCHES IN CUCURBITS

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Among the various vegetables, cucurbits are the largest group of summer vegetable crops grown in the country. As all the cultivated cucurbits are vines or creepers, they provide ample hiding places to the insect-pests. Nair (1986) mentioned around 45 insect species belonging to different species, genera, family and order that infest cucurbits. Of these, the fruit fly (*Bactrocera cucurbitae* Coq.) is highly damaging pest of almost all the cucurbit vegetables making fruits unfit for consumption. They cause tremendous economic losses and great problems to fruit and vegetable growers all over the world. The actual damage is virtually done by the maggots which is internal feeder and safe from insecticides applications as the eggs are laid into the fruit tissue. Thus control measures have to be directed at the adult flies which are quite motile and long lived. However, the adult longevity is associated with frequent feeding, enables them to be attracted and killed by poison baits. Indiscriminate use of pesticides by farmers to control the pest has endangered the safety of the environment and increased the chances of accumulation of poisonous residues in the produce. Mass-trapping of fruit flies through pheromone and other bait traps will reduce the fruit fly population, minimize the use of pesticides and help establish a safe control measure for the production of pesticide-free cucurbit vegetables. The susceptibility of fruit flies to attractants has long been recognized (Kapoor, 1993). The food attractants may be added with poison to kill the captured flies in the traps. Keeping these facts in view, the present study was undertaken to develop and evaluate the efficiency of different types of poison bait traps (banana based and gur/molasses based) for trapping of fruit fly infesting cucurbit crops.

The cucurbit crop was raised at Agricultural Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi. Two types of poison baits were

used for studying the quantitative composition of the pest on the basis of trapped fly during the kharif season of the year 2006 and 2007. The following poison baits with different composition of ingredients were prepared in the laboratory and placed at pre determined places near the cucurbits crops for monitoring and evaluating their efficiency on fruit fly catches..

- (1) **Gur based poison bait trap:** 50 ml malathion + 200 g gur + 2 litre water.
- (2) **Banana based poison bait trap:** 1 kg rotten macerated banana + 10 g carbofuron + 5 g yeast + 5 g citric acid.

The poison baits were kept in plastic plate, which was covered with another inverted plastic plate maintaining 5 cm gap between the rim of two plate. The traps were kept suspended with the help of bamboo stick. The poison baits were changed at an interval 4 - 5 days in rainy season. The fruit flies caught in the trap were removed and recorded daily during both the consecutive years and pooled standard week-wise. The data thus obtained were statistically analysed to pinpoint the active period of the pest in the region and also to find out the suitable and efficient bait traps for pest management. The periodical data on weather parameters obtained from observatory of Indian institute of Agricultural sciences, BHU, Varanasi were correlated with corresponding values on fruit fly catches to elucidate the role of weather factors on the pest incidence which can be taken advantage in the management of the pest in the agro-climatic condition of Varanasi region.

Among different traps, banana based poison bait trap containing banana (1 kg) + carbofuron (10 g) + yeast (10 g) + citric acid (5 g) consistently showed significant superiority in terms of higher catches of fruitfly

Table 1. Weekly fruit fly (*B. cucurbitae*) catches in two different types of baits traps during rainy season

Treatments	Population (bait trap ⁻¹ week ⁻¹)															
	Periods of observation (Standard weeks)															
	32 nd	33 rd	34 th	35 th	36 th	37 th	38 th	39 th	40 th	41 st	42 nd	43 rd	44 th	45 th	46 th	Average
Banana poison bait	19.8 (4.5)	28.7 (5.4)	29.0 (5.3)	30.5 (5.5)	27.8 (5.3)	22.0 (4.7)	37.5 (6.1)	51.5 (7.2)	37.0 (6.1)	35.2 (5.9)	35.0 (5.9)	40.0 (6.3)	36.2 (6.0)	34.7 (5.9)	33.5 (5.8)	35.6 (6.2)
Gur poison bait	11.0 (3.3)	18.8 (4.4)	23.3 (4.8)	20.0 (4.5)	21.5 (4.7)	15.7 (4.0)	25.5 (5.0)	40.0 (6.4)	24.5 (5.0)	25.5 (5.0)	23.8 (4.9)	28.2 (5.3)	29.5 (5.5)	30.7 (5.6)	23.0 (4.8)	25.8 (5.2)
Mean	15.4 (39)	23.8 (4.9)	26.2 (5.1)	25.3 (5.0)	24.7 (5.0)	18.8 (4.4)	31.5 (5.6)	45.8 (6.8)	30.8 (5.5)	30.3 (4.5)	29.4 (5.4)	34.1 (5.8)	32.8 (5.7)	32.7 (5.7)	28.3 (5.3)	
Difference between Treatments											C. D. (P = 0.05) = 0.77					
Difference between Periods of observation											C. D. (P = 0.05) = 2.11					
Difference between Treatments x periods of observation											C. D. (P = 0.05) = 2.98					

Table 2 Simple correlation coefficient of trapped fruit fly population and meteorological factors observed during rainy season

Poison baits	Simple correlation coefficient (r)				
	Rainfall (mm)	Temperature (°C)		Relative humidity (%)	
		Maximum	Minimum	Maximum	Minimum
Carbofuron(10 g) + Banana (1 kg) + yeast (10 g) + citric acid (5 g)	0.44	-0.62*	-0.37	0.39	-0.15
Malathion (50 ml) + gur (200 g) + water (2 lit.)	0.38	-0.68**	-0.44	0.52*	-0.20

* Significant at 5% level of significance ** Significant at 1% level of significant

throughout the cropping season with an cumulative average of 35.6 adults/trap/week compared to that of Gur/molasses based poison bait containing Gur/molasses (200 g) + water (2 lit) + diazinon (50 ml) (25.8 adults/trap). The maximum number of adult fruit fly were trapped during 39th standard week (45.8 adults/trap) irrespective of bait traps which was significantly superior to all other periods indicating the peak period of the pest during *kharif* season in the region. It was closely followed by 43rd standard week (34.1/trap) The minimum activity of the pest was noticed during 32nd and 37th standard week as was evident from low catches during these weeks (15.4-18.8/trap). The interaction between treatments (poison baits) and periods of observation for number of fruit fly catches were non-significant showing consistent performance of the treatment over different periods of observation (Table 1). Thus, the banana based poison bait traps may be advocated for the monitoring as well as management of fruit fly infesting cucurbitaceous crop in the region. The poison baits have been used by various workers in the past to monitor the activity of fruit fly. A wide variety of different bait preparations has been recommended and /or used in India over many years, including protein hydrolysate (Gupta and Verma, 1982), brewer's yeast, jaggery, mollasses, toddy and fruit juice and pulp. A wide spread continuing recommendation is for 1 per cent yeast protein and 1 per cent sugar (Srinivasan, 1993). However, poison baits and new design of trap used in the present study

are cheaper and efficient than those used earlier and can be fabricated and prepared locally with little expertise hence can be used as an effective in the over all strategies of fruit fly sustainable management without any risk of residual poisoning.

Among the major abiotic factors, the maximum temperature adversely affected the trap catches of adult fruit fly in both the cases of fruit fly catches either through banana based poison baits ($r = -0.62^*$) or gur based poison baits ($r = -0.68^{**}$), while rainfall tended to show positive relation with trap catches in both the poison baits, however the correlation values were non-significant. Similarly, the maximum relative humidity had positive influence on trap catches in both the cases, it was significant only in case of Gur based poison bait traps ($r = -0.52^*$). The minimum relative humidity exhibited non-significant negative correlation with trap catches in both the cases (Table 2).

References

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