



# Asian Journal of Plant Sciences

ISSN 1682-3974

**science**  
alert

**ANSI***net*  
an open access publisher  
<http://ansinet.com>

## Comparative Study on Baits and Dust Formulation of Insecticide Against Fruit Flies (Diptera:tephritidae) on Melon (*Cucumis melo*) under Semi-arid Condition of Dera Ismail Khan

Abdul Latif, Khalid Abdullah and <sup>1</sup>Ghulam Shabir Shah  
Agriculture Research Institute, Dera Ismail Khan-29020, NWFP, Pakistan  
<sup>1</sup>Agricultural Research Institute, Tarnab, Peshawar, Pakistan

**Abstract:** The experiment was conducted to study the efficacy of bait (Protein hydrolysate and molasses) and dust formulation of carbaryl, with various concentrations against fruit flies infesting muskmelon under semi arid and water stress area of Dera Ismail Khan (D.I. Khan). Intermittent spray of protein hydrolysate caused least fruit infestation (12%) as compared to molasses (15%). Carbaryl dust (Sevin-10 D) mixed with soil dust at 1.5:15 and 3.0:15 were found statistically at par with bait sprays but significantly deteriorated the efficacy when applied at 1.0:15.

**Key words:** Fruit fly, melon, bait spray, carbaryl dust

### Introduction

Muskmelon (*Cucumis melo*) is an important summer cash crop of Pakistan. In North West Frontier Province, more than 90% of the area under melons cultivation is in rainfed, semi arid belt (Rodkahi) of D.I. Khan (Anonymous, 1996-97).

This important cash commodity is heavily damaged by fruit fly (Diptera: Tephritidae). The extent of damage caused by the pest ranges from 20-90% and in epidemic form whole crop is destroyed (Abdullah *et al.*, 1991; Khan and Hussain, 1978; Khan, 1987).

Adult flies are harmless upto the extent that the female lay eggs with in the fruit. Actual damage is caused by the larval (Maggot) stage, which feeds on the fruit pulp and riddles it unacceptable for human consumption. Three species of fruit flies have been recorded attacking melons i.e., *Dacus cucurbitae* Cog, *D. dorsalis* Heppel, *D. zonatus* (Saunders) have pheromone for male inhalation (Marwat and Abdullah, 1992). Additional and dominant species attacking melon crop in the semi arid areas of D.I. Khan is *Myiopardalis pardalina* (Chughtai and Khan, 1983). Since these species is not attracted to the synthetic pheromones, it has been a challenging pest for the researchers (Abdullah and Latif, 2000). Melons in D.I. Khan are grown in large acreage of semi arid (Rodkahi) areas, where water is a limiting factor. So spraying of insecticide and bait (Protein hydrolysate) is not possible. In this scenario, management of fruit flies has been a challenging task to deal with.

Fruit flies have foraging behavior when searching food and suitable site for egg laying. Exploiting this weak link of insect behavior and utilizing local agro ecological conditions dust formulation of insecticide was considered for the management of fruit flies attacking melons and tested at the farmers' fields.

### Materials and Methods

The experiment was conducted on farmers field at Hanan of Tehsil Kulachi, District D.I. Khan. Bukhara, a local variety of melon was cultivated by bullock driven hand drill on  $\approx 10$  acres. In this pre planted field good and even plant stand area was selected and marked for  $10 \times 10$  m<sup>2</sup> for each treatment. Usually farmers do not use any insecticide, however it was ensured. The experiment was designed in randomized complete block design with six treatments (including check) in 1995.

The treatment included were protein hydrolysate (Sankei Chemical Company Tokyo, Japan), molasses (Gur) syrup (Chashma Sugar Mills Ltd. D.I. Khan) each @ 25ml l<sup>-1</sup> of water and carbaryl dust (Sevin 10-D) National insecticides Co. Pvt. Ltd., Karachi) mixed with soil dust at three different concentrations viz. 1.0:15; 1.5:15; and 3.0:15 respectively

The spray-able Naled baits i.e., protein hydrolysate and molasses (Gur) syrup was sprayed intermittently with back mounted knap

sack sprayer using a pre calibrated water for field solution. While carbaryl dust (Sevin 10D) was mixed with a fine soil dust accordingly and applied by holding the soil and insecticide mixture in mesh linen and tapping it on other hand and covered the foliage and fruit. Proper precautionary measures, while dealing with agrochemical, were followed.

Treatments were administered twice at the interval of 10 days (20 and 30<sup>th</sup> May, 1995) after one week of fruit setting. Fruit infestation data were recorded by counting total and infested fruits at the time of each fruit picking and % infestation was worked out. Melon fruits were declared infested if they had 2 or more exit holes made by last instar larvae. Fruits with one hole or which looked deformed were cut opened and examined. If they contained larvae or evidence of larval feeding, they were counted infested.

The mean % infestation data was analyzed by ANOVA. L.S.D test was used to compare means at 5% level of significance (Dowdy and Wearden, 1991).

### Results and Discussion

The data on effect of bait sprays and carbaryl dust with variable concentrations in reducing fruit infestation (Table 1) revealed significant difference between treated and untreated check plots (F = 2.99, df = 5,17; p > 0.05). Least fruit infestation (12.10 %) was achieved by protein hydrolysate bait spray followed by Molasses (14.7%). Carbaryl dust mixed with soil dust at the ratios of 3.0:15 and 1.5:15 were statistically at par with bait sprays However, dust formulation with 1:15 was significantly less effective, compared to rest of the treatments, in lowering fruit infestation.

Table 1: Mean percent fruit infestation in relation to bait spray and dust formulation of insecticides against melon fruit flies

Treatments	Mean fruit infestation %
Protein hydrolysate (Bait)	12.1a
Molasses (Gur syrup)	14.7a
Carbaryl + Soil dust (3.0:15)	13.0a
Carbaryl + Soil dust (1.5:15)	15.4a
Carbaryl + Soil dust (1.0:15)	19.8b
Control, (Soil dust only)	39.8c

Means sharing a letter in common do not differ significantly at P $\leq$ 0.05

Research on the food foraging behavior of adult fruit has led to the development of baits for the effective control of flies' population. Food baits such as protein hydrolysate and/or molasses mixed with some insecticides have been effectively used against both sexes of Mediterranean fruit fly, Oriental fruit fly and melon fruit flies (Bateman and Mortan, 1981; Abdullah *et al.*,

Latif *et al.*: Fruit fly management through bait

1994). The results of the present studies are in conformity with that of the authors who used food bait for the management of fruit flies and got significant reduction of infestation. Unsprayable formulation of insecticides such as granules have been successfully used for soil treatment to kill soil inhabiting stages of fruit flies (Bindra and Mann, 1981). Anonymous (1996) and Anonymous (1997) tested the dusting of carbaryl mixed with soil for the management of fruit flies in the semiarid conditions and got as good control as by the sprayable formulations.

**References**

- Abdullah, K. and A. Latif, 2000. Management of Fruit flies, SAIC Newsletter, Oct.- Dec., 2000, pp: 6.
- Abdullah, K., A. Ahmed and M. Akram, 1994. Non-traditional method of fruit fly control in guava orchards in Dera Ismail Khan. Pak. J. Agric., 15: 135-37.
- Abdullah, K., N.K. Marwat and M. Akram, 1991. Chemical control of *Dacus* sp. of fruit fly in melon. Tehzique, 8: 12-15.
- Anonymous, 1996. Annual Progress Research Report. Agril. Res. Inst. Dera Ismail Khan, pp: 28-39 .
- Anonymous, 1997. Annual Progress Research Report. Agril. Res. Inst.. Dera Ismail Khan, pp: 10-28.
- Anonymous, 1996-97. Agriculture Statistics of NWFP, Govt. of NWFP, Peshawar, pp: 45.
- Bateman, M.A. and T.C. Mdotan, 1981. The importance of ammonia in proteinaceous attractants for fruit flies. Aust. J. Agric. Res., 32: 883-903.
- Bindra, O.S. and G.S. Mann, 1981. Relative efficacy of some insecticidal treatment against the Guava fruit flies. J. Res. Panjab Agric. Univ., 16: 413-416.
- Chughtai, G.H. and L. Khan, 1983. Studies on the biology and chemical control of melon fly. Pak. Entomol., 5: 17-20.
- Dowdy, S. and S. Wearden, 1991. Statistics for Research. Pub. Johan Willey and Sons, NY, pp: 340.
- Khan, S. and G. Hussain, 1978. Melon flies control in D.I. Khan. Fr. J. Agril. Res., 5: 60-81.
- Khan, L., 1987. Bionomics and control of melon fruit fly. Ph.D. Thesis, Deptt. of Entomology, University of Agriculture Faisalabad, Pakistan, pp: 239.
- Marwat, N.K. and K. Abdullah, 1992. Relative abundance and effect of weather on the diurnal activity of fruit flies (*Dacus* spp.) Gomal Univ. J. Res., 12: 67-72.