



## EFFICACY OF DIFFERENT CONTROL METHODS AGAINST ORIENTAL FRUIT FLY *Bactrocera zonata* (SAUNDERS)

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### ABSTRACT

Oriental fruit fly is a major threat to fruit in Pakistan; the oriental fruit fly (*Bactrocera zonata*) attacks fruits including guava, persimmon, peach and apple. A study was carried out to evaluate different control methods and their efficacy in district Peshawar NWFP, Pakistan during 2007. IPM was adopted for controlling oriental fruit fly that comprised cultural control, Bait Application Technique (BAT) and Male Annihilation Technique (MAT). Farmers were randomly interviewed through questionnaire. Statistical analysis of the data revealed that farmers favored MAT as it was found to be economically feasible and environment friendly. Maximum control was found in MAT which was followed by BAT; however the lowest control was noted in cultural control. Present study suggested that farmers should be encouraged to adopt the Integrated Pest Management that involves MAT, which was found the most effective control method. Further studies should be carried out in other regions of province and country to find out economic and effective control methods for this pest.

**Keywords:** fruit fly, disease, pest control, IPM, BAT, MAT.

### INTRODUCTION

NWFP has temperate climate and most of the temperate fruit are successfully grown in the upper half of the province, which include plum, pear, peach and apple (Khan, 1994). The insect pests are the most important factor, responsible for the low yield and inferior quality of fruit of Pakistan. Numerous species of insects attack and damage the fruits. Among them the fruit flies are the serious pests of fruit the fruit flies adults (*Bactrocera spp.*) are more or less about the size of house fly. They are light yellow to blackish in colour. The wings of various species are ornamented with brown yellow spot. Their bodies taper posteriorly and the females are provided with a pointed ovipositor at the apex of abdomen (Yasuda *et al.*, 1981). In addition to, causing direct losses in the yield and marketability, they pose as significant threats to quarantine security and thus to international trade in fruits and fresh vegetables world-wide (Joomaye *et al.*, 2000). Four hundred species belonging to the genus *Bactrocera* are widely distributed in tropical Asia, South Pacific and Australia regions, but very few species of such genus were recorded in Africa (Drew *et al.* 1994). Fruit flies cause loss in Pakistan estimated in 200 million dollars annually at farm level. The use of cover insecticide sprays against fruit flies is wide spread and increasing. The value of insecticides used against fruit and (cucurbit) vegetable flies was 637 million rupees in 1994, equivalent to U.S \$18.7 million. Small farmers suffer more than large ones, through limited access to protection methods such as insecticides (John *et al.*, 1997). Peach fruit fly *Bactrocera zonata* (Saunders) is one of the most serious polyphagous insect pests. It attacks a large host range of fruit and vegetables hosts; such as mango, peach, Figure, guava, citrus, tomato and apple (Fletcher, 1987).

The objective of the study was to get feed back from the farmers about IPM Technology and to compare different control methods.

### MATERIALS AND METHODS

To control fruit fly in district Peshawar we followed the following methods:

#### Cultural control

In cultural control different measures were taken such as ploughing, sanitation hoeing, and weeding. In these practices a large number of insects were killed by the farmers unconsciously. In cultural most important and effectiveness was field sanitation. This practice reduced re-infestation pressure. All unmarketable and infested fruits were destroyed.

#### Bait application technique (BAT)

Bait Application Technique (BAT) was the second method which was used. Adult fruit flies are strong fliers and after emergence fruit flies need a dietary source of protein material before they can develop eggs, so protein hydrolysate bait spray were used to control adult population of both sexes.

#### Male annihilation technique (MAT)

The third and last method which was used was Male Annihilation Technique (MAT). This was the only effective to control the male adult of fruit fly in the fields. Traps were installed in the field. Mostly four traps were installed per acre. In traps Methyl eugenol was used as attractant and Diptrex was used as a killer. The direction of the traps was north and south sides.

#### Survey

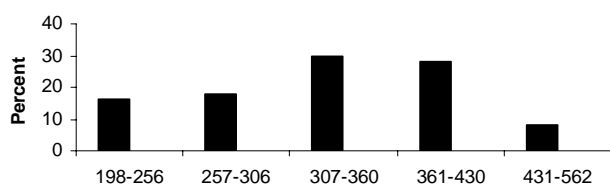
After using these methods we conducted a survey. The survey was conducted in different parts of Peshawar district. We collected the information from farmers through questionnaire. We collected the data on Monday, Tuesday, Wednesday and Thursday every week.



We contacted fifty farmers and after collecting the data we analyzed that through SPSS (Statistical Package for Social Sciences).

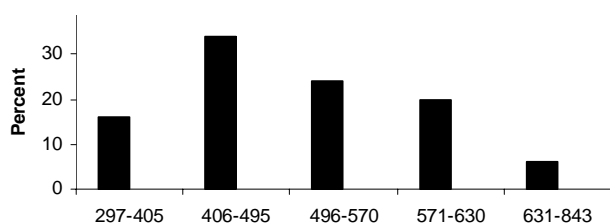
## RESULTS AND DISCUSSIONS

Production in kg per kanal before the use of IPM (Integrated Pest Management) technology is shown in Figure-1. Sixteen percent farmers were getting production between 198-256 kg per kanal. Eighteen percent were getting production between 257-306 kg per kanal. Thirty percent farmers have production between 307 kg per kanal to 360 kg per kanal. Twenty eight percent farmers were getting production above 361 kg per kanal and less than 430 kg per kanal. Only eight percent farmers were getting production above 431 kg per kanal and less than 562 kg per kanal. Minimum production before IPM was 198 kg per kanal and maximum production was 562 kg per kanal.



**Figure-1.** Production in kg/Kanal before IPM.

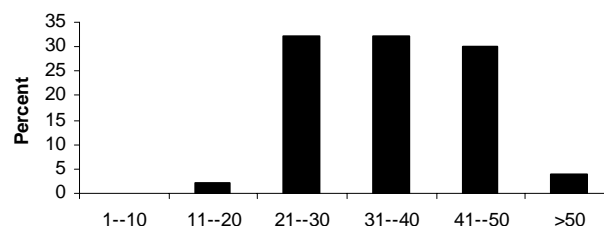
Figure-2. Shows the production after the use of IPM (Integrated Pest Management) technology. Sixteen percent farmers got production between 297 to 405 kg per kanal. Thirty four percent farmers got production above 406 kg per kanal and less than 495 kg per kanal. Twenty four percent farmers were getting production between 496 -570 kg per kanal. Twenty percent farmers have production between 571 to 630 kg per kanal. Only six percent farmers got production above 631 kg per kanal and less than 843 kg per kanal. The minimum production after the use of IPM was 297 kg per kanal and maximum was 843 kg per kanal.



**Figure-2.** Production in kg/Kanal after IPM.

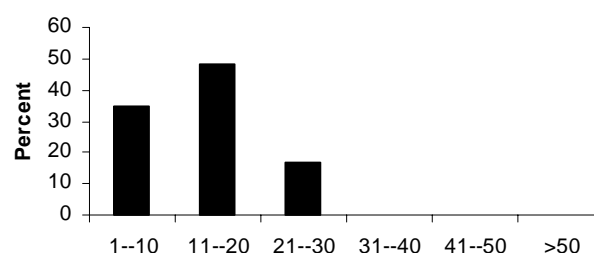
Percent infestation level before IPM is shown in Figure-3. Only two percent farmers have infestation level between 11-20 %. Thirty two percent farmers have infestation level between 21-30 %. Thirty two percent farmers have infestation level between 31-40 % before treatment. Thirty percent farmers have infestation level between 41-50 %. Only four percent farmers have infestation level above 50 %. Most of the farmers have

infestation level above 21 %. In simple words that farmers were losing 21 kg out of 100 kg before the use of IPM.



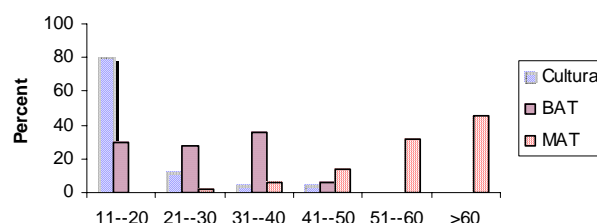
**Figure-3.** Infestation level before IPM.

Figure-4 shows the percent infestation level after IPM. After the IPM thirty five percent farmers were between 1 to 10 % and forty eight percent farmers were between 11 to 20 %. Only seventeen percent farmers had the infestation level between 21 to 30 %. The infestation was reduced up to a great extent.



**Figure-4.** Infestation level after IPM.

The percentage of different control in IPM can be viewed in Figure-5. Eighty percent of farmers were of the view that cultural control used for the control of fruit fly had controlled the pest from 10-19 %. Twelve percent were of the view that it had controlled the pest from 20-29 %. Only eight percent were of the view that it had controlled the pest above 30 %. About Bait 30%, 28%, 36% and 6% farmers have the view that it gave 10-19, 20-29, 30-39 and 40-49 % control respectively. Forty six percent farmers viewed that MAT has give above 60 % control and this was the maximum control.



**Figure-5.** Control level.

## CONCLUSIONS AND RECOMENDATIONS

The farmers were very satisfied from IPM technology. They considered this technology very good, economic and feasible. The production of the farmers was increased. After the IPM the percent infestation in the



orchards was also reduced up to great extent. The expenditure on these control methods was also very less as compare with pesticides. The farmers were very satisfied from MAT. So IPM is very good technology for the control of fruit and in IPM especially MAT (Male Annihilation Technique) is very good as compare with other methods. MAT is a sustainable agricultural practice which can reduce the cost of production without damaging and disturbing the flora and fauna.

These control methods should be adopted on community basis. Seminars and Field days on a wider scale should be organized and the use of Mass media must be encouraged. Further studies may be carried out in other districts of NWFP Pakistan as to validate and update the findings of the present study.

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