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IPM Technique to Prevent Fruit Fly Damage of Mango

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A B S T R A C T

The mango fruit fly *Bactocera dorsalis* (Hendel) (Diptera: Tephnidae) is believed to be the single most devastative pest of mango in Bihar. It accounts for about 27 per cent of harvesting loss. The flies attack semi ripe and mature fruits during the months of April and May. On Farm Trail conducted at 14 farmers plot of Kishanganj district, fly monitoring and fruit infestation estimation were recorded during the two experimental seasons 2012-13 and 2013-14. Maximum (33%) fruit fly infestation recorded where no any control measures or spray of chemical applied for population (Farmers Practice). Use of commercial fruit fly lure@ 5/acre + spray of Rogor 30 Ec @ 1.5 ml at the time of peanut size fruits show noticeable reduction of fruit fly percent infestation on fruit and also receive maximum (3.09) B:C ratio which also support the finding of Ray *et al.*, (2016).

Introduction

Mango fruit fly which is commonly known as oriental fruit fly *Bactocera dorsalis* (Hendel) (Diptera: Tephnidae) is the most devastative pest of mango in Bihar. The Fruit flies (Diptera: Tephritidae) are considered the most destructive insect pests of fruits and vegetables in the world. The hosts of these flies belong to a wide variety of families of plants, and include many major commercial crops (Vayssieres *et al.*, 2008; Salem and Abd-El- Salam, 2013). Without flies control, direct damage has been reported from 30 to 80% depending on the fruit, variety, location and fruit season (Mwatawala *et al.*, 2006). Fruit flies often cause serious damage to mango; owing to their attack the highest damage observed in mango was 56.5% (Jose *et al.*, 2013). The mango fruit fly is believed to be the single largest crop damager in India. It accounts for about 27 per cent of harvesting loss. The flies attack semi ripe and mature fruits during the months of April and May. Other fruits like guava, citrus, plum, peach, sapota, loquot, etc are also susceptible to this pest attack. Damage is caused both by adults and maggots. Adult female punctures the rind of near ripe fruits with its needle like ovipositor and lays eggs. The legless yellowish maggots after hatching bore and feed on fruit pulp and on maturity come out of the fruit, drop on the ground and pupate deep under the soil. Thus the maggots destroy the pulp making it foul smelling and discolored. Infested fruits develop brown rotten patches

on them and fall to the ground ultimately. (Jayraj and Yansundaram, 2015) the reduction of the quality and quantity of marketable mango fruit due to fruit fly infestation impacts negatively on farmers through revenue losses. However, little is known about the magnitude and economic value of losses incurred at the farm level as a result of this infestation. While farmers perceive pesticides as ineffective in combating the fruit fly menace; however, they continue to rely on them because cost-effective and environment friendly alternative control measures are not available to them (Varela *et al.*, 2006). With time, pests develop resistance to pesticides which causes rising pest populations and necessitates increasing chemical applications over time at increased costs. Integrated pest management (IPM) strategies; a combination of more effective and efficient methods referred to as an IPM package have been found to be superior to pesticides in fruit fly control. There are so many tactics available in market which confuses the farmer to easily adopt and apply on their orchards.

Keeping in view KVK Kishanganj conducted on farm trial on 14 farmers mango orchards during year 2012-13 and 2013-14 to develop IPM technique for preventing fruit fly damage specially through use of pheromones.

Materials and Methods

For conducting on farm trail at different locations of 14 farmers plot of Kishanganj district, fly monitoring and fruit infestation estimation were recorded during the two experimental seasons 2012-13 and 2013-14. The experimental area was comprised about 0.5-1.0 acres (fourteen replicates i.e. fourteen farmers plots) of Mango orchard grown with variety mainly "Surjapuri", and field tests were conducted with three technological options T0 = No any measure or spray (farmers practice), T1 = Use of commercial fruit fly lure @ 5/acre and T2 = Use of commercial fruit fly lure@ 5/acre + spray of Rogor 30 EC @ 1.5 ml at the time of peanut size fruits. The traps made of plastic material and hung in tree were distributed in a completely randomized block design. All the traps were hanged at about 3 m height in a shady place of the mango trees.

The samples of mango fruit were collected weekly for checking pest infestation symptoms and noting fruit fly infestation. The percentage fly infestation for mango fruit was examined randomly by analyzing a total of 100 fruits, and numbers of healthy fruits and fruits showing fruit fly oviposition marks (damaged and undamaged fruits) were counted.

For assessing fruit fly infestations, from total numbers of fruits observed subtracted the numbers of infested fruits counted and then percent infestation was calculated by following the formula (Anon, 2007 for stem borer infestation).

$$\text{Per cent infestation} = \frac{\text{Numbers of infested fruits}}{\text{Total numbers of fruits}} \times 100$$

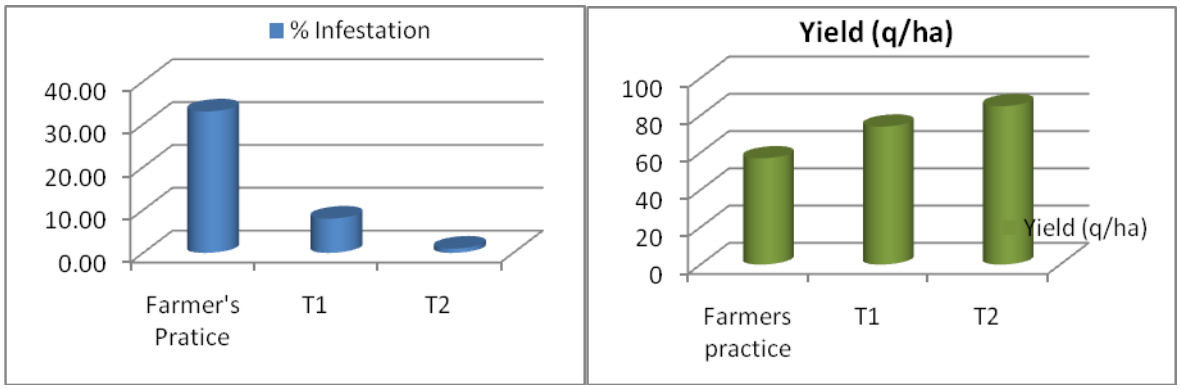
Data obtained on fruit infestation estimation were statistically analyzed the data means were compared according to ANOVA.

Results and Discussion

The obtained data as shown in Table 1, indicated that fruit fly infestation recorded maximum (33%) in farmers practice in which no any control measures or spray of chemical applied for population management of fruit fly whereas technological option T1 (Use of commercial fruit fly lure @5/acre) reduce the population of fruit fly and finally minimize the fruit infestation up to 8%.

Table.1 Evaluation of technological options for management of mango fruit fly

Technological Option	% infestation	Av. Yield (q/ha)	% Increase in Yield	Cost of intervention (ha)	Cost of production (Rs /ha)	Gross Return (Rs /ha)	Net Return (Rs /ha)	B:C ratio
T0 = No any measure or spray of any chemical (Farmer's Practice)	33.00	57.00	0.00	0.00	52000	114000	62000	2.19
T1 = Use of commercial fruit fly lure @5/acre	8.00	74.00	29.82	1620	53620	148000	94380	2.76
T2 = Use of commercial fruit fly lure@ 5/acre + spray of Rogor 30 Ec @ 1.5 ml at the time of peanut size fruits	1.00	85.00	49.12	3000	55000	170000	115000	3.09
CD at 5% SEm CV	1.98 0.47 4.68	1.83 0.43 2.39						



The T2 i.e. Use of commercial fruit fly lure@ 5/acre + spray of Rogor 30 Ec @ 1.5 ml at the time of peanut size fruits show noticeable reduction of fruit fly percent infestation on fruit. All technological options showed statistical significant difference among them.

So far yield is concern T1 showed 29.82 per cent increase in fruit yield while T2 showed maximum percent increase of yield i.e.49.12%. On comparison of B: C ratio T2 receive maxim mum (3.09) closely followed by T1 and Farmers practice (T0) that is 2.76 and 2.19, respectively.

On the basis of evaluation of different technological options we conclude that farmer can effectively prevent the losses caused by mango fruit fly by use of commercial fruit fly lure@ 5/acre + spray of Rogor 30 Ec @ 1.5 ml at the time of peanut size fruits which also support the finding of Ray *et al.*, 2016.

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