Research Article

EFFECT OF TRICHOCARD ON TOMATO YIELD AND ECONOMICS

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Abstract- Tomato is the one of the most important crop of Uttar Pradesh as well as Indian vegetables. The fruit borer (*Helicoverpa armigera* Hub) is the major pest that causes significant yield losses. An on farm trial was conducted during 2015-16 on hybrid F1 Himsona variety with three treatment T1- Trichocard (*Trichogramma chilonis*), T2-Deltamethrine, T3- farmer practice (Chloro + Cyper). The result revealed that T1 (Trichocards) treatment found better in regards maximum marketable fruit weight per plant (1.72 kg. / Plant), marketable yield (382.18q. /ha.), net return (Rs.257820.00 / ha.), & BCR (2.90). It is also recorded that minimum fruit loss(3.37 %) and weight lose (12.89q / ha.) in T1 treatment. It was concluded that application of *Trichogramma chilonis*@ 250 eggs/card twice fruit setting to fruit development not only reduces infestation of borer, but increase marketable yield and human hazard.

Keywords- Trichocard, tomato, yield, economics.

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Introduction

Tomato is an important commercial vegetable crop grown worldwide for daily food. It is very nutritive and delicious used as fresh & different processed products. Tomato fruit borer (*Helicoverpa armigera* Huber) is a Key pest, it lay eggs on leaf and causes serious damage fruit quality and quantity (Reddy and Zehrm2004) [4]. In India total losses of crops by borer have been estimated 20-60% (Lal and Lal 1996) [1]. To overcome such pest's uses of different synthetic chemical pesticide has quick action but it also causes environmental and human hazards (Lgnacimuthn, 2007) [2].

Due to environmental & human hazards biological method used to control tomato fruit borers. *Trichogramma chilonis* are most commonly egg parasitoids used in biological control programme. They are tiny wasps that kill egg of host by laying eggs of fruit borers. Today *Trichogramma* species are widely used natural insecticide in the world. The present study was carried out the effect of *Trichogramma chilonis* with following object:

1. Yield parameters
2. Economic analysis

Materials and Methods

An on form trial was conducted on five progressive practicing tomato growers of Lakhimpur Kheri district of Uttar Pradesh during 2015-16. on tomato fruit borer.

Treatment T₁ - *Trichogrammachilonis*@ 250 eggs/card
T₂ -Deltamethrin @0.5 ml/lt. water
T₃ -Control (Chloro + Cyper) @ 2.0ml / l. water

Data collection- Twenty plants were selected from each treatment of each farmer's field. Data was recorded number of affected fruit per plant, fruit weight (kg/plant) weight losses over total production (q/ha) percent of fruit damage & total marketable yield (q/ha).

$$(a) \text{ Percent fruit damage} = \frac{\text{cut of damaged fruit } (\frac{q}{ha})}{\text{total yield of fruit } (\frac{q}{ha})} \times 100$$

$$(b) \text{ Total yield (q/ha)} = \frac{\text{weight of each plant (kg)} \times \text{No. of plant /ha}}{1000}$$

(c) **Economic analysis-**The cost of cultivation & gross return of treatments was estimated individually (Rs. /ha) worked out by in front of local market and sale rate of produce at market gate.

$$(d) \text{ Net return (Rs. /ha)} = \text{Gross return (Rs. /ha)} - \text{cost of cultivation (Rs. /ha)}$$

$$(e) \text{ B: C ratio} = \frac{\text{Gross return (Rs./ha)}}{\text{Total cost of cultivation (Rs./ha)}}$$

Result and Discussion

Yield parameter: The results reflected in [Table-1] that *Trichogramma chilonis* significantly effective in reducing number of borer affected fruits, weight of fruit, weight losses over production, percentage of damaged fruit and total yield. The number of affected fruit, weight losses over production (q/ha) and percentage of fruit damage ranged from 1 to 5 per plant, 12.89 to 64.44 (q/ha) and 3.37 to 19.46%, respectively in *Trichogramma chilonis* (T₁) treated plot. *Trichogramma chilonis* decreases the population of fruit borers. Shah (2008)[5], Usman et al., (2012) [7] also reported that *Trichogramma chilonis* is best bio agent for controlling tomato fruit borer.

Table-1 Yield parameters

Treatments	Observations				
	Number of affected fruits /plant	Weight of market able fruit (kg./plant)	Weight losses overproduction (q. /ha.)	Percentage of fruit damage over marketable yield	Market able yield (q. /ha.)
T ₁	1	1.72	12.89	3.37	382.18
T ₂	3	1.63	38.66	10.67	362.19
T ₃	5	1.49	64.44	19.46	331.08

The maximum yield (382.18 q/ha) was recorded in *Trichogramma chilonis* (T₁)

treated plot followed by T₂ and T₃ treatment. It does have in impact less infection of fruit borers. The some finding is confined by Reddy and Manjunatha, (2008) [3], Talekar, *et al.*, (2006)[6] and Usman, *et al.*(2012)[7].

Table-2 Cost Benefit Analysis

Treatments	Observations				
	Gross cost (Rs. /ha.)	Gross return (Rs. /ha.)	Net return (Rs. /ha.)	Net return increase over control (Rs. /ha.)	BCR
T ₁	135825.00	393645.00	257820.00	57670.00	2.90
T ₂	138100.00	373050.00	234950.00	34800.00	2.70
T ₃	139200.00	339350.00	200150.00	-	2.44

* Benefit Cost Ratio

Cost Benefit Analysis- The ultimate goal of grower is to earn more money per unit area by growing crop. Net return, net return increase and cost benefit ratio are very important to adoption strategy of pest control management. [Table-2] revealed that highest net return (Rs. 257820.00 per ha), net return increase over control (Rs. 57670.00/ha) and CBR (2.90) in T₁ treatment followed by T₂ and T₃. The finding is confined by Usman, *et al.*, (2015) [8].

Application of Tricocard Village- Bholanpur, Ikhimpur -Kheri

Conclusion- From the above observation that *Trichogramma chilonis* most effective in reducing fruit damage and gave high marketable yield with highest net return

Application of research: (1) Chemical free production of tomato (2) Eco friendly approaches to control insect infection

Research Category: Effect of Trichocard on tomato yield

Abbreviations: BCR: Benefit Cost Ratio

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