Original Research Article

Studies on pheromone catches of Helicoverpa armigera hubner and relation of moth activity with larval infestation on tomato in Baghpat Uttar Pradesh

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Abstract

Attack of Helicoverpa armigera has led to several suicidal deaths in India on many crops. The present investigation was conducted in Lycopersicon esculentum field in Baraut, Baghpat of Uttar Pradesh (India). The maximum moth population was observed during the flowering of tomato plant. It causes about 40-60% tomato fruit losses between 21st-25th standard weeks. Present study indicates that the installation pheromone traps optimum period during just before flowering of plant. It was followed by absence of egg laying, nonappearance of larvae and reduces the moth population enhancement in tomato as well as other related crops.

Keywords: Helicoverpa armigera, moths, Lycopersicon esculentum

1. Introduction

Changing cropping system dynamics and polyphagous nature of tomato fruit borer, Helicoverpa armigera Hubner (Lepidoptera: Noctuidae) have made it, a global problem. In Western plain zone of U.P. under ambient climatic conditions, it is found round the year on one crop or the other. It is an important pest of gram, pigeon pea and tomato. It causes about 18-55% loss to tomato crop in India (Tiwari and Krishnamurthy, 1984). Among IPM components, the behavioral manipulation (semiochemicals) of insect pests is a feasible approach for monitoring & minimizing its population. Number of male insects caught in pheromone baited trap is used as an indicator of pest presence or as an estimate of population density. The present study was under taken to determine the peak period of population density and infestation by Helicoverpa armigera in Baraut (Baghpat) of U.P. This study was conducted in tomato crop. A rubber was septa impregnated with 1mg of synthetic pheromone. Pheromone traps and septa (helilure) obtained from BCRL, Pest Control (India) Ltd. Bangalore were utilized for this study (Fig A). Moth population was monitored from 18th March 2011 (12th Standard week) to 10th June 2011 (24th S.W). Tomato field (2400 Sq. mts) was divided into 3 equal plots. Two pheromone traps were placed in each plot at 1.0 m from ground level. A minimum distance of 20 m was maintained between two traps and helilure was replaced after 21 days. Trapped moths were counted and averaged for each standard week (The calendar year was divided into 52 standard week; 1st January to 7th January was considered as 1st S.W). Observations on fruit infestation counting the healthy and infected parts of these five plants were selected randomly from the each plot at weekly interval. Twenty five fruits were counted randomly from each plant and then percentage infestation was calculated.

The pest appeared in 13th S.W of 2011. There were 2 peak periods of activity of male moths. The 1st peak period was recorded in 17th S.W (465 moths) which shows the higher magnitude than the 2nd peak recorded in 22nd S.W (345.6 moths) (Fig B).

Fig A: Moth Population Catches in Pheromone trap
Population of male moths began to increase sharply just after installation of traps. The first observed peak indicated the arrival of moth during the flowering of tomato plant. This was followed by egg lying, appearance of larvae and population build up in tomato crop causing heavier fruit infestation in subsequent standard weeks (Fig C).

The reports made from Haryana, Andhra Pradesh, Punjab and Himachal Pradesh (Sinha and Jain, 1992 and Prasad et al. 1993), confirm to these findings. Devi et al. (1996) observed that Helicoverpa armigera was abundant during 3rd week of April to 2nd week of May and population peak coincided with the active vegetative and flowering stage. Parihar and Singh (1985) noticed the incidence of fruit borer on tomato and found that the maximum number fruits were infested in 2nd week of April. In the present investigation, major peak of moth activity coincides with egg laying, larval population followed by fruit infestation. In the field, male moths were probably initially attracted to calling virgin females in preference to the pheromone trap because of this male moth coincided with fruit infestation.

References
