

Assessing the Infestation and Abundance of *Thrips tabaci*, (Thysanoptera: Thripidae) on the Host crop of Tomato, (*Solanum lycopersicum*) in Aligarh Region (U.P.), India

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Abstract:- The aim of this study was to conduct a survey to monitor the population of *Thrips tabaci* in district of Aligarh, located in Uttar Pradesh region, during the favorable growing season of tomato crops. The main objective was to provide relevant information on the infestation levels and abundance of *Thrips tabaci* population. *Thrips tabaci*, commonly known as “Onion Thrips”, is primarily known to infest onion crops (*Allium cepa*). The survey focused on three villages in this region, namely Jalali, Pikhloni and Harduaganj. We collected data on the infestation and abundance of *Thrips tabaci* in these localities. Our findings indicated that infestation and damage caused by *Thrips tabaci* on tomato fields began in the last week of September, with the highest population levels recorded in the first week of November.

Keywords:- Monitor, Infestation, Abundance, *Thrips tabaci*.

I. INTRODUCTION

Tomato (*Solanum lycopersicum*) belong to family Solanaceae and is the second most important fruit or vegetable crop in India, after Potato (*Solanum tuberosum*). Apart from its economic significance, tomatoes contain numerous health-promoting compounds such as vitamins, carotenoids and phenolic compounds. Additionally, tomato plants serve as a model for the studying fleshy fruit development and pathogenic effect of various pests, including *Thrips tabaci*. Tomato plants are more sensitive to several biotic and abiotic stresses. *Thrips tabaci* gave a significant effect on agricultural production worldwide. Though it also attacks tomato plants, its impact on tomato crops is primarily seasonal. Because *Thrips tabaci* is a key insect pest of several cultivated plant species because it is also infected to other crops so, its host range is very broad. It also begins hostilities on tomato plant but in this case it gives seasonal effect. In winter season thrips found in the upper layer of soil but can emerge anytime it is significantly warm condition in the winter. It feeds on plant tissue by rasping and sucking sap, leading to tissue depletion of the plants. (Walter et al., 1990, Shipp et al., 1998). It reduced the photosynthetic activity of plant and also reduce the production of fruits. In resulting directly and indirectly effect on the economy, given its impact on tomato crop

yields. After the infection of *Thrips tabaci*, common symptoms on tomato plants including twisting, curling and spotted like silver coated patches on leaves. *Thrips tabaci* is mostly found in flowers, new leaves, developing shoots and fruits of tomato plants. Glod flecking occurs on fruits, sometimes in a circle pattern where fruits are touching, with *Thrips tabaci* favouring the protected area next to where fruit touches. The wilted tissues also resemble to late blight disease.

II. MATERIAL METHODS

A field experiment was conducted to analyse the occurrence and damage caused by *Thrips tabaci* on tomato crops by visiting, field crops in Aligarh district in Uttar Pradesh, India. Biological monitoring was carried out in three villages- Jalali, Pikhloni and Harduaganj. For this survey five farmers were randomly selected in each village, and a total of 20 tomato fields were chosen on these farms. Ten plants were randomly selected from each tomato field, and data were collected by counting and collecting thrips found on the underside of the five top most fully expanded tomato leaflets. Thrips samples were collected during the late morning hours by gently tapping on the leaves, which dislodged the *Thrips* from the leaves to white plastic trays placed under each plant. Using camel hair brushes, Thrips were transferred to vials containing 60% ethanol, glycerin and Acetyl Glyceric Acid (AGA) fluid in the ratio 10:1:1 respectively to preserve their features (Palmer et al., 1989; Palmer, 1990). The vials of thrips were sent to the laboratory for counting and identification. Additionally, two flowers per tomato preserved in the AGA (Riley and Pappu, 2004), and Thrips were mounted and identified under the compound light microscope at the magnification of 40.

III. OBSERVATION

During our observation, we found that *Thrips tabaci* had a significant impact on the tomato plant. It caused serious damage to plant tissue, resulting in reduced fruiting and undesirable tissue formation. *Thrips tabaci* feed on the plant tissue by using their piercing and sucking type mouth parts, which can lead to a reduction in the value of tomato crop. The *Thrips tabaci* infestation can cause high damage range, resulting in a significant loss of tomato

production or market value. Heavy infestation of tomato plants by *Thrips tabaci* can cause abscission of leaves and flowers, leading to a reduction in the rate of photosynthesis in tomato plants, resulting in the shedding of young leaves and flowers and also reduced the growth of plants. We observed that *Thrips tabaci* could rupture the leaf tissue by sucking the cellular fluids, resulting in curling of leaves. The damaged areas appeared as silver scars on leaf surface, often visible near the veins of leaves and petals of tomato flowers, and also visible on fruits of tomatoes.

In addition to the damage caused by *Thrips tabaci*, we also observed the seasonal effect of *Thrips tabaci* infestation on tomato plants. The infestation and damage by *Thrips tabaci* on tomato fields began in the last week of September, and the highest population of *Thrips tabaci* was recorded in the first week of November. These observations suggest that tomato plants are more susceptible to Thrips infection during the favorable growing season, and timely management of *Thrips tabaci* is necessary to prevent significant loss in tomato production.

IV. PREVENTION AND CONTROL

Prevention and control measures for *Thrips tabaci* infestation involve reducing the use of pesticides, as they can harm natural enemies of the pest and disrupt the ecological balance. Cultural practices such as removing the weed host plants, cleaning the debris from the field and rotating crops can help to reduce the population of *Thrips tabaci*. Early detection of infestation and monitoring of pest population can aid in timely intervention with targeted pesticides, biological control agents, and beneficial insects like predatory mites and insects. Insecticidal soaps, neem-based products and pyrethrin are some of the effective pesticides that can be used as a last resort. To avoid the resistance built-up, the pesticides should be rotated to prevent the development of resistant pest strains. Integrated pest management (IPM) strategies should be implemented in order to minimize the use of chemicals and to promote sustainable crop production.

V. RESULT AND DISCUSSION

The result of the field experiment showed that *Thrips tabaci* infestation on tomato crop started in last week of September and continued until the growing season. The lowest population of thrips tabaci was recorded during the 3rd week of September, while the highest population was observed in the 1st week of November. These findings are consistent with previous research studies (Subba B. and Ghosh S.K., 2016). The damage caused by *Thrips tabaci* on tomato plants was observed in the form of reduced fruiting and tissue damage due to their feeding behaviour, which involves piercing and sucking the plant tissue. Heavy infestation of tomato plants by thrips resulted in the abscission of leaves and flowers, which in turn reduced the rate of fruiting up to 40-80%. Moreover, continuous feeding of *Thrips tabaci* reduced the rate of photosynthesis, caused shedding of young leaves and flowers, and also led to stunted growth of tomato plants.

This suggests that the occurrence of *Thrips tabaci* infestation is affected by climatic conditions. The infestation also resulted in the appearance of silver scars on the leaf surface, marks near the veins of leaves and petals of tomato flowers, and even on the fruits of tomatoes. Therefore, the prevention and control measures of *Thrips tabaci* infestation on tomato crops are crucial to reduce the economic losses and increase the yield of tomato fruits.

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