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(RESEARCH ARTICLE)

Analysis of the abundance of whitefly in the vegetative and generative phases of eggplant at the Solok botanical garden, Muaro Jambi: A case study of the local ecosystem

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Abstract

This study aims to analyze the abundance of whiteflies (*Bemisia tabaci* Genn.) during the vegetative and generative growth phases of eggplant (*Solanum melongena* L.) at the Botanical Garden of Solok Village, Muaro Jambi District. The type of research used is descriptive exploratory. The sampling technique was conducted using total sampling through hand collecting. Observations of whiteflies were made once a week for 12 weeks on 50 samples of eggplant planted in the experimental garden. Data analysis was performed by counting the number of whiteflies found on the eggplant during the vegetative and generative phases. The results showed that the abundance of whiteflies varied in each growth phase of the eggplant. In the vegetative phase, the highest abundance of whiteflies occurred in the fourth week after transplanting, with a total abundance of 576 individuals. Meanwhile, in the generative phase, the highest abundance occurred in the sixth week after transplanting, the lowest abundance occurred in the tenth week. The average abundance of whiteflies during the vegetative phase was 144 individuals, while in the generative phase it reached 250.64 individuals. Based on the results of this study, it can be concluded that the abundance of whiteflies on eggplant is higher in the generative phase compared to the vegetative phase.

Keywords: Abundance; Whiteflies (*Bemisia tabaci* Genn.); Vegetative phase; Generative phase; Eggplant

1 Introduction

Whiteflies are polyphagous pests that can attack various types of plants, including vegetables, fruits, food crops, ornamental plants, weeds, and others. Several agricultural plants, such as potatoes, cucumbers, melons, pumpkins, chili peppers, lettuce, broccoli, and eggplant, are vulnerable hosts to whitefly attacks. Eggplant is one of the cultivated plants frequently attacked by whiteflies, which can cause significant damage to the plants [1].

Pest attacks on eggplant typically occur from the vegetative phase to the generative phase. Plants can be attacked by pests from the time they are young until harvest, due to synchronization between plant phenology and insect emergence ([2]; [3]). The vegetative phase is when the plant forms vegetative organs such as roots, stems, and leaves, characterized by the development of organs such as buds, leaves, and stems. In contrast, the generative phase is when the plant forms generative organs, namely flowers, fruits, and seeds.

Research on the abundance of whiteflies in the vegetative and generative phases of eggplant is crucial, as the abundance of whiteflies in these two phases can differ, influenced in part by the quality of the host plant [4].

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2 Material and methods

Planting and observations were conducted at the Botanical Garden of Solok Village, Kumpeh Ulu District, Muaro Jambi Regency. A total of 50 eggplant plants were planted in the experimental plot for this study. This research is descriptive exploratory, using a total sampling method for the sampling technique.

Observations of whiteflies were conducted on all parts of the eggplant plant, including the upper, middle, and lower sections. Sampling was conducted once a week for 12 weeks of observation. Environmental data collected included temperature and humidity. Data collection was performed directly using hand collecting methods. The collected whiteflies were placed in specimen bottles containing 70% alcohol for preservation. Data analysis was conducted by counting the number of whiteflies found on all sampled eggplant plants during the vegetative and generative phases.

3 Result and discussion

The results of the observations and sampling yielded data on the number of whiteflies based on their location on the plant, specifically the upper, middle, and lower parts, as presented in Figure 1.

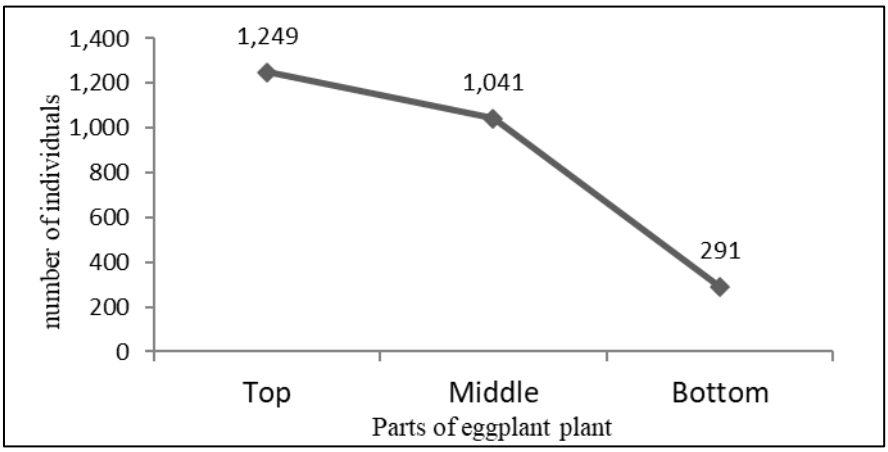

Figure 1 Graph of the Number of Whiteflies Found on Parts of the Eggplant Plant

Based on Figure 1, whiteflies were found more abundantly on the upper part of the eggplant plant, while the fewest whiteflies were found on the lower part of the plant. In the vegetative phase, observations of whitefly abundance showed varying amounts. Overall, the abundance of whiteflies tended to increase each week (Figure 2).

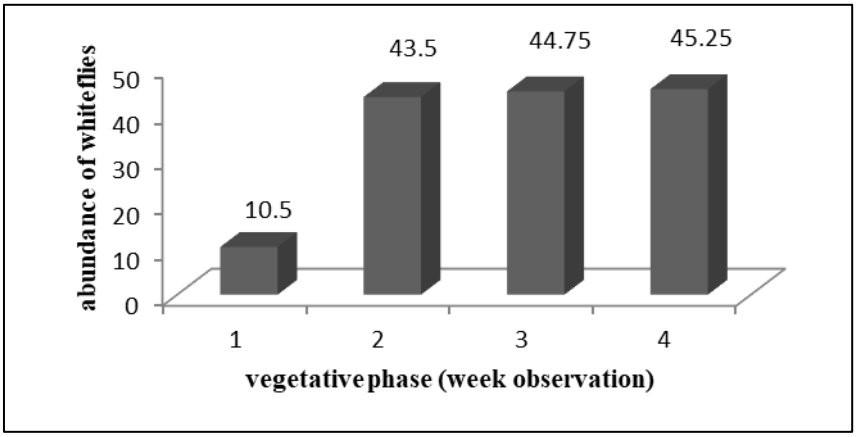

Figure 2 Average Abundance of Whiteflies in the Vegetative Phase of Eggplant Plants

Based on Figure 2, the average abundance of whiteflies in the vegetative phase was highest in the fourth week, while the lowest abundance was found in the first week.

The observations indicate that the generative growth phase of the eggplant plants begins between the fifth and twelfth weeks after transplanting, which is when the eggplant plants start to flower. Observations of whitefly abundance during the generative phase showed varying amounts each week (Figure 3).

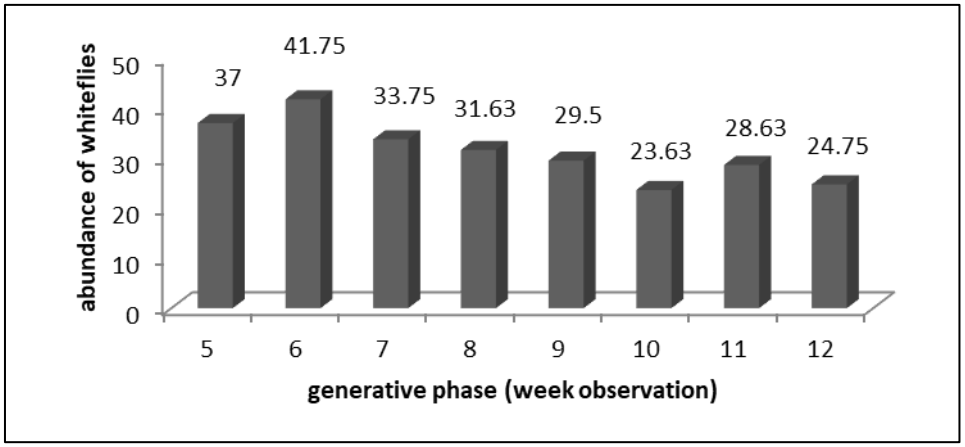

Figure 3 Average Abundance of Whiteflies in the Generative Phase of Eggplant Plants

Based on Figure 3, the abundance of whiteflies in the generative phase was highest in the sixth week, while the lowest abundance occurred in the tenth week. The total average abundance during the generative phase was 250.64 individuals, which is higher than that in the vegetative phase (Figure 4).

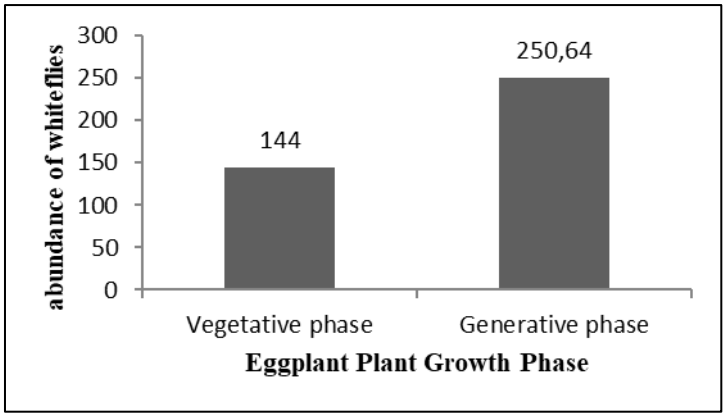

Figure 4 Graph of Total Average Abundance of Whiteflies in the Vegetative and Generative Phases of Eggplant Plants

The results of the study indicate that the abundance of whiteflies is more prevalent in the generative phase. The abundance of insects can be influenced by food factors and other environmental factors [5]. Food factors include availability, quality, and nutritional content of food, plant tissue hardness, secondary metabolite content, plant age, and water content in the plant. Sap-sucking pests, such as whiteflies, prefer young plant leaves because young leaves have low secondary metabolite content and high nitrogen content [6, 7, 8].

[9] states that insects tend to live in groups and prefer parts of the plant consisting of young shoots or buds because these parts are succulent plants with high water content. [10] also explain that young leaf buds provide better nutrition and make it easier for whiteflies to suck plant sap as their food source.

The decline in whitefly abundance is attributed to the decrease in plant quality and the aging of the plant, leading to a reduction in its nutritional content. [11] state that the decrease in pest population on plants is caused by the decline in the quality of young leaves. [10] add that as the plant ages, the nutritional quality it contains declines, making whiteflies less attracted to suck sap from the plant. [12] also state that pest populations decrease when the plants begin to age due to a reduction in shelter and food sources.

4 Conclusion

Based on the research conducted, it can be concluded that the abundance of whiteflies is higher during the generative phase of the plant, with an average total abundance of 250.64 individuals. In contrast, during the vegetative phase, the average total abundance of whiteflies is only 144 individuals.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that they have no conflict of interests.

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