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Population Dynamics and Thrips(Thysanoptera)Attack on Chili Plant (*Capsicum annuum*L.) in Jambi Province, Indonesia

AsniJohari
School of Science Education Jl. RadenMattaher No. 16 Jambi, and Department of Mathematical and Natural Science Education, Jambi University, Raya Street Jambi-Ma, Bulian KM 15, MendaloDarat, Jambi

Abstract:*Population Dynamics and Thrips (Thysanoptera) Attack on Chili Plant (Capsicum annuum L.) in Jambi Province, Indonesia.Thripsare insects that damage agricultural plants such as chili plants (Capsicum annuum L.). the attacks which was caused by the thrips starting from mild to severe attacks. In Jambi province there isn't any report of thripsattacks in chili plants. The research aims to analyze of thrips attack in chili plant. The study was conducted by observing the attacks of thrips on the leaves chili plant. Observations of thrips population and the attack percentage, as well as the abundance of predators were performed on 400 chili plants in the field experiment in Jambi University. Results of research in the field indicates that the attack occurred thrips on the upper leaf surface, occurs at the base, the middle and the edges with silvery attack. The thrips population and thrips attack percentage in chili plant fluctuate. Population and thrips attacks on chili plants at the highest age 8 weeks after planting.*
Keywords:*Thripsattack, Chili plant, Capsicum annuum L.*

I. Introduction

Thrips is a major pest of chili plants. Thrips are polifag, can attack many kinds of plants, including crops. Thrips host plants include chili, cucumbers, cotton, potatoes, beans. Thrips can also attack other vegetable crops.Thrips attack the buds, leaves and flowers of chili plants. Thrips attack the chili plants in the young leaves and flowers (Kalshoven, 1981).Thrips attackson chilliplant can cause leaf curlingupward.Thrips attacks in chili starts from mild to severe attack. Mild attack symptoms on the leaves are characterized by a silvery white color. Furthermore, the silvery color become brown. In the affected leaves are black dirt of thrips. Paroxysm occurs when thrips act as vectors of viruses that cause disease in chili plants (Ananthakrishnan, 1993).Thrips attack plants ranging from larvae to adults by means of scrape and suck.

Thrips pest control is carried out by farmers by spraying periodically using synthetic insecticides that can have negative impacts on the environment.Observationsof population dynamics and thrips attacks on chili plants will provide the specific symptoms thrips as well as pests and virus vectors. This research is useful for the development of science fields of study of biology and behavior of insects. This study is expected to be input to control thrips effectively and efficiently and environmentally friendly.

II. Materials And Methods

Analyze of Population Dynamics and Thrips Attacks on Chilli Plants

To analyze of population dynamics and thrips attacks on the chili plants is done by observation. Observations carried out to observe of attacks that occur due to thrips attack. Thrips attacks observed by means of first planting 400 chili plants (*Capsicum annuum* L.) varieties of hybrid curly. Chili plants were planted not sprayed with insecticides. Thrips attacks allowed to occur naturally.

Observation of Chili Plant at the Experimental Gardens

Population dynamics and thrips attacks observed in experimental gardens ranging from vegetative growth to generative growth. Observations were made during the second week after planting using Nikon 40mm f / 2.8g AF-S DX Micro NIKKOR Lens. Observed include a) part of the plant which attacked, plant colors, plant shapes, and location of the attack symptoms on chili plant, b) population dynamics of thrips that attack plants, and c) the percentage of thrips attacks. The percentage of attacks seen on the percentage of leaf were thrips attacked. The percentage of affected leaves is calculated by comparing the number of leaves affected by the number of total leaf X 100%.

III. Result And Discussion

Population Dynamics and Thrips Attacks on Chili Plant at the Experimental Garden

For observation, the population dynamics and the percentage of thrips attacks in chili plants grown 400 polybags with four replications in the experimental garden. Observations were made against 25% of the crop sample by purposive sampling. Observations began in the second week after planting (1 weeks after planting). Observation result in the experimental garden on chilli plant in Jambi University found that the population of thrips was found on the third week after planting (3 weeks after planting). In the first and second weeks after planting, the thrips was undiscovered. After the third week of observation, the thrips population was found and increase until the eighth week. The highest population thrips was found in the observation on the week eight (9.50 ± 3.12). After the eight week thrips population was found to decrease (Table 1).

Observation of the percentage of thrips attacks known that thrips attacks in chili has been started in the second week after the plants (2 weeks after planting). The highest peak of the attacks occurred in the eight week after the plants (Table 2).

Table1. The population of adult thrips on chili plantation in the experimental garden

Age chili week	Thrips population (individual/25 plants)	Description
	Average ± SD	
2	0,00 ± 0,00	chili plants star flowering
3	3,50 ± 2,08	chili leaves already attacked thrips
4	5,00 ± 0,82	weeds already growing
5	5,75 ± 1,71	grass weeds cleared
6	6,50 ± 2,38	the amount of interest increases
7	6,50 ± 1,91	diseased leaf increases
8	9,50 ± 3,12	full flowering and fruiting plants
9	5,75 ± 1,26	diseased leaf decreased
10	4,25 ± 2,99	weeds cleared
11	4,50 ± 1,73	adult population of thripsdeclines
12	4,00 ± 2,71	adult population thrips declines
13	4,50 ± 2,38	diseased leaf initiated that fall
14	3,75 ± 1,71	weeds cleared
15	4,00 ± 1,41	many diseased leaf fall

Description: The sample is determined after an infestation / attack (week 2 after planting)

Table 2. The percentage of thrips attacks on chili plants in the experiment garden

Age chili week	The percentage of thrips attack (%)
	Average ± SD
2	12,91 ± 3,58
3	14,92 ± 10,02
4	21,71 ± 13,8
5	20,01 ± 10,8
6	17,63 ± 9,1
7	16,17 ± 8,52
8	24,20 ± 14,42
9	19,04 ± 9,82
10	20,06 ± 11,48
11	17,66 ± 9,38
12	15,65 ± 8,66
13	17,79 ± 9,89
14	16,04 ± 9,19
15	15,44 ± 8,85

Description: The sample is determined after an infestation / attack (week 2 after planting)

In Table 1 above, it can be seen that the newly discovered of the thrips population are on the third week after planting (3 weeks after planting). In the subsequent weeks of age chili thrips populations were found to increase. Population was highest in the age of eight weeks after planting chillies (8 weeks after planting). At the age of chili after eight weeks after planting, thrips populations were found to decrease in number until the chili

was fifteen weeks after planting (15 weeks after planting). The thrips population in chili plantation is affected by several factors such as the age of the plant, number of flowers, temperature and humidity, and predators. Eight weeks after planting (8 weeks after planting) phase chili plants flowering phenology full or nearly all of chili plants are in bloom. This will affect crops invest thrips to eat and reproduction. The abundance of thrips increased is affected by the density function of interest. During the peak of blooming flowers, *F. occidentalis* adults are more abundant in the flowering structure of the other parts of the cotton plant (Gonzalez*et al*. 1982) and (Gonzalez& Wilson, 1982). Nectar and pollen is a source of additional food for adult thrips. Nectar and pollen necessary for the development and production of eggs of thrips. Nymph and adults of various types of thrips including *T. imaginis*, *T. cameroni*, *F. schultzei*,*F. intonsa*, and *T. obscuratus* require pollen to complete the development and to optimize the production of eggs (Pearsall& Myers, 2000). Further(Pearsall& Myers, 2000) adds that *F. intonsa* can be maintained on pollen tea, pears, strawberries, tulips, and pine. Without pollen, nymph can not develop and mature females only produce a few eggs. Pollen in flowers provide nectar a source of protein and carbohydrates are an important source (Plowright *et al*, 1993).

Thrips attack in the chili plants on the upper leaf surface. Thrips attacks generally occur on the upper leaves. From 100 samples that were observed, only three attacks that occurred in the shoots. Attacks on leaves can occur at the ends, middle, and upper chilli leaf base is characterized by a white color like silver.

In Table 2 above can be seen that at the age of chili plants two weeks after planting (2 weeks after planting) already found their thrips attacks. Thrips attacks in chili fluctuates, at the age of 4 weeks after planting increasing attack. The highest percentage of attacks occurred in eight-week-old chili plants after the crop (24.20 ± 14.42). At the age of 9 weeks after planting attack decreased (19.04 ± 9.82), then aged 10 weeks after planting attacks increased (20.06 ± 11.48). At the age of 8 weeks after plantingattack decrease until chili plants was 15 weeks after planting (15.44 ± 8.85).

Thrips attacks on chili plants can be affected by plant age that determines the appearance of flowers. Thrips prefer the young plants compared with plants that are old. When the number of the largest flower is found in plants, adult thrips are found in flowers (Wilson &Gutierrez, 1980).

With a population of thrips found high in chili, attacks on crops will also increase.Diversity and abundance of insects related to the abundance of resources that are needed for life. Predator survive because it is located in suitable vegetation (Funderburk, 2002). Abundance also may be influenced by several factors including the age of the plant. Determine the age of the plant flowering phase and the number of flowers of the plant. Full form of chili plant is when flowering will get a higher thrips abundance. In chili (*Capsicum annuum* L.), the diversity of insect species that visit the flowers of the plant is related to the available resources, and the amount of interest (Raw, 2000). Abundance of flowers on chili plants also affect for insect to visits (Kandori, 2002) and (Hegland&Totland, 2005).

IV. Conclusion

1. Thrips attacks on the leaves of chili plants occur on the surface of the upper leaves at the base, middle, or at the edge of the leaf. Thrips are invested leaf chili plants occur individually, or in groups.
2. Thrips attacks on the leaves of chili plants are round, oval, elongated and form a figure eight with color silvery attack, subsequently changed color to brown.
3. The highest population of thrips attack are found at the age of 8 weeks after planting.

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