



The Potential Availability of Insects in The Vegetative and Generative Phase of Wheat (*Triticum Aestivum* L.) in Benar Meriah District, Aceh Province

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Abstract

Wheat crops are effective for cultivation in the Benar Meriah District of Aceh Province and produce maximum production related to insect activity. This research aims to study insect population size at the vegetative and generative phase of wheat plants. This research was conducted in the Benar Meriah District of Aceh Province, from January to June 2017. The insect sampling method in this study was carried out using a trap tool. The results of the study of total insects found in wheat plants were 349 individuals at the vegetative phase and 447 individuals at the generative phase or 43% for the vegetative phase and 56% for the generative phase.

Keyword: insect, wheat, vegetative phase, generative phase

Introduction

Several provinces in Indonesia are effective for wheat cultivation such as Jambi, Bengkulu, Sumatra, Lampung, Aceh Province, and others. District in Aceh Province designated as pilot projects for wheat cultivation are Benar Meriah and several other districts. Wheat cultivation in Benar Meriah District has many problems and one of them is the pest attack. So far, pest control is carried out using synthetic insecticides (Doni, 2012).

Insects at the location are thought to originate from the order of Coleoptera, Diptera, Orthoptera, Homoptera, Lepidoptera, and others (Schoowalter, 2000). Therefore, in this study, we want to study the population size of various insects' orders on wheat plants in the Benar Meriah District. This study aims to study the size of insect populations from various orders found in wheat plants at Farm University, Universitas Syiah Kuala.

Materials and Methods

Materials and methods used in this study were microscopies, label paper, film bottles, scissors, cameras, meters, plastic bags, rubber bands, basins, books, and stationery. While the ingredients are wheat

seeds of Dewata-DW 162 variety from Central Java, 70% alcohol, 50g salt, and 50g detergent. The research was carried out by adopting a survey method, namely by observing insects found in wheat plants in both the vegetative and generative phases. The research was conducted at the University Farm, Universitas Syiah Kuala Experimental Garden in Lampahan Village, Timang Gajah District, Bener Meriah Regency from January to June 2016.

Insect Collection was done by using a light trap and devices installed since 18:00 WIB and observed at 8.00 WIB. Trap laying equipment in the field containing 50 g of water and detergent, 50 g salt, is done by hanging lights on the surface of the media. The insect collection is carried out in two phases, namely in the vegetative phase (ages 3-4 MST) and generative (10-12 MST). The collection of insects is then stored in a film bottle containing 70% alcohol and labeled with the name.

Insect Identification is insects collected from the field brought to the Laboratory of Plant Pest of the Plant Protection Study Program, Faculty of Agriculture, Unsyiah for identification and the basis is the key book for insect determination (Siregar, 2007). Observations

were made on: total insect population of each order in the vegetative phase, total insect population of each order in the generative phase, percentage of individual insects in the vegetative and generative phases, the presence of individual insects from each order in the vegetative phases, and the presence of individual insects from each order in the generative phase.

Data Analysis

Estimating the insect species richness using the Jackknife Estimator system. To create insect species accumulation curve to calculate the entire collection of insect individuals of any sample plot randomized 18 times using 8.20 EstimateS program (Colwell, 2000). The diversity index and evenness index are calculated using the Primary 5 program.

Results and Discussion

Total insect population of all orders in the vegetative and generative phase

Observations related to the size of individual insect populations of all orders collected from wheat plants were higher found at the generative phase compared to vegetative (Figure 1). Insect population size at the vegetative phase was 349 individuals, whereas compared to the generative phase the insect population size was up to 447 individuals. This indicates that at the generative phase the source of nutrition for insects is considered more available than the vegetative phase in wheat plants. This condition is thought to be the cause of the high diversity of insect populations. Also, planting wheat plant that are not simultaneously become a supporting factor to increase the diversity of the population that affects the availability of food sources for insects for a long time until its life cycle is sustainable.

The temperature and humidity and food sources are factors that directly influence insect activity. According to Rahayu (2012) temperature, humidity, and food sources are important factors that accelerate the growth and development of insects in a particular environment.

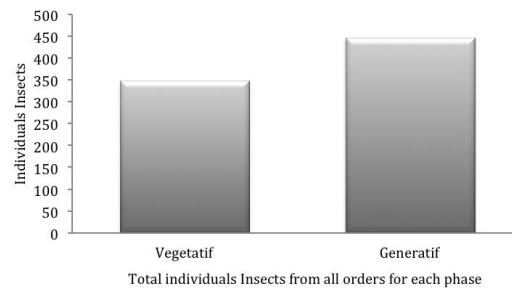


Figure 1. Insect Population Size of all Vegetative and Generative Phase orders in wheat plants

Percentage of availability of individual insects at the vegetative and generative phases

The observations showed that the percentage of availability of individual insects at the vegetative phase was lower than the generative phase (Figure 2).

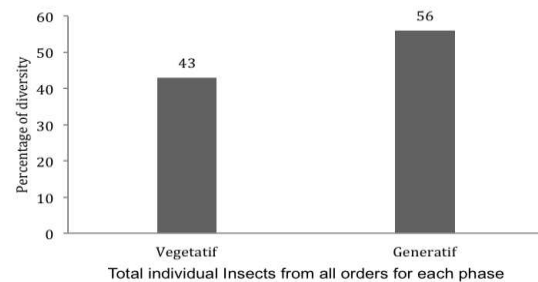


Figure 2. Percentage of availability of individual insects at the vegetative and generative phases in wheat plants

The diversity of individual insects at the generative phase is higher than the vegetative phase, it is estimated that at the generative phase food sources are more available to insects to survive to be sustainable. According to Ministry of Agriculture (2001), the cause of the diversity index at the vegetative phase is because plants do not produce flowers compared to the generative phase as a phase that produces food sources for consumption by insects.

According to Schoowalter (2000), the level of diversity of insect communities is related to time, it indicates that the old community has developed into a lot compared to the young community that will grow and develop. At the generative phase, the level of insect diversity is higher than that of vegetative because food sources are

available for insects. According to Krebs (1999), insects will respond to food that is influenced by morphological characteristics such as size, shape, and color of the material as a food source for insects.

Availability of individual insects from various orders at the vegetative phase

The observations showed that the presence and total number of individual insects at the vegetative phase (Figure 3).

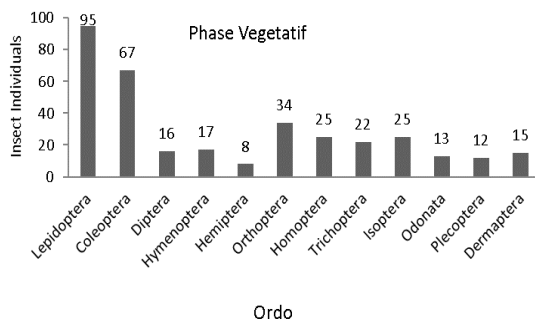


Figure 3. Availability of individual insects from various orders at the Vegetative phase in the Wheat crop

Figure 3 shows that individuals from the higher Lepidoptera order were found at the vegetative phase and were followed by the Coleoptera order, compared to a small Hemiptera order. This condition is thought to be related to food sources available in wheat plants, especially in the vegetative phase.

According to Ganeshiararchchi (1997), the existence of insects in a habitat is determined by factors of temperature, humidity, and food sources available in the habitat. According to Garibaldi *et al.* (2016), the presence of insects in a natural habitat can provide important resources, such as food, alternative hosts, and shelter. The richness and abundance of insect species in a habitat are affected by the condition of the related habitat.

Availability of individual insects from each order at the generative phase

The observation that the total number of individual insects from each order is the lepidoptera order is higher than the order of the diptera.

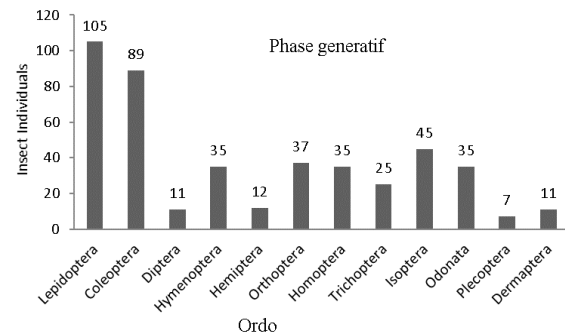


Figure 4. The presence of individual insects from each order at the generative phase in the wheat crop

The condition is thought to be related to the food sources available in wheat plants, especially at the vegetative phase. According to Ganeshiararchchi (1997), the availability of insects in their habitat is determined by temperature, humidity, and available food sources. According to Garibaldi *et al.* (2016), the presence of insects in a natural habitat can provide important resources such as food, alternative hosts, and shelter.

Conclusion

Total insects collected from the wheat plants in the vegetative and generative phases were 796 individuals consisting of 349 (43%) vegetative phases and 447 generative phases (56%). The order of insects found and dominant at both phases (vegetative and generative) is the order Lepidoptera. The availability of individual insects on wheat plants at the vegetative and generative phases tend to be higher at the generative phase.

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