Original Research Article

Population Density of Small Cabbage Bug (*Eurydema pulchrum* Westw.)(Hemiptera: Pentatomidae) in Cabbage Plants of Batu Palano, West Sumatera

ABSTRACT

Aims: The objective of study was to study population density of *Eurydema pulchrum* in cabbage plants of Batu Palano, Agam, West Sumatera, Indonesia.
Study design: Purposive random sampling
Place and Duration of Study: The research was conducted in cabbage plants, Batu Palano, Agam regency, Wesy Sumatera, Indonesia and Laboratory of Pest, Faculty of Agriculture, Riau University, Pekanbaru, Indonesia from November 2022 to January 2023.
Methodology: Porposive random sampling was used as method to collect *E. pulchrum* in the field. The area of cabbage plant field was 400 m^2. *E. pulchrum* was collected by using using sweep net and bare hand directly. our locations were chosen as sampling locations. 10% of total plants of each location was determined as sampling plants. In each location, a diagonal imaginery line was made to determine sampling plants. ± 67 plants in a diagonal line. The plants in diagonal line was determined systematically. The bugs in determined line was counted. The observation was conducted in 10.00-12.00 a.m for each location.
Results: The population density of *E. pulchrum* in cabbage plants of Batu Palano was 0.06 individual/ plant.
Conclusion: *E. pulchrum* status was not pest in cabbage plants of Batu Palano

Keywords: Batu Palano, Cabbage, Density, Eurydema pulchrum

1. INTRODUCTION

Cabbage, a group of vegetable plant is important plants for human health [1]. It consisted of many species that were classified to Brassicaceae family. Cabbage plants contain vitamin A, B6, zinc and folate that have many benefits for human body [2].
In West Sumatera, cabbage plants were cultivated in highland such as Solok, Tanah Datar and Agam regencies generally. These area were chosen to cultivate the plants due to they require certain temperatures to form flower [3]. Cabbage production in West Sumatera quite plays role to provide local and outside of West Sumatera demands [4].

Batu Palano is a main area of vegetable plants producer in West Sumatera. All vegetables plants that consumed by Indonesian people can be found in this place. Batu Palano is located in Sungai Pua District, Agam Regency, West Sumatera, Indonesia [5]. Located at active volcano's slope, Mount Marapi makes the soil of this area fertile. This condition makes this area is suitable for various plants to be cultivated especially vegetable plants.

Plant cultivation can not be separated from pest attack such as from insects. One of insects that always presence in cabbage plant in cabbage plants in West Sumatera is *Eurydema pulchrum*, known as small cabbage bug [6]. *E. pulchrum* was reported devastating 60% of pak coy plant in South Sumatera [7]. The population of this pest increased in dry season [8]. So far, there is no information about this insect status because no damage caused by *E. pulchrum* reported yet in West Sumatera. The research aimed to study the population density of *E. pulchrum* in cabbage plants of Batu Palano, West Sumatera, Indonesia.

2. MATERIAL AND METHODS

The research was conducted in cabbage plants of Batu Palano, Agam regency, West Sumatera, Indonesia from November 2022-January 2023.

2.1 Method

Porposive random sampling was used as method to collect *E. pulchrum* in the field. The area of cabbage plant field was 400 m^2. *E. pulchrum* was collected by using using sweep net and bare hand directly.

According the criteria, four locations were chosen as sampling locations. 10% of total plants of each location was determined as sampling plants. In each location, a diagonal imaginery line was made to determine sampling plants. There were ± 67 plants in a diagonal line. The plants in diagonal line was determined systematically. The bugs in determined line was counted. The observation was conducted in 10.00-12.00 a.m for each location by using sweep net and bare hand directly. The collected bugs was moved to bottle that was filled by 70% of alcohol.

The collected bugs was carried to Laboratory of Pest, Faculty of Agriculture, Riau University to identify. The identification was conducted using the identification key in www.Waterbugkey.vcsu.edu. [9].

2.2 Parameter and data analysis

The parameters were field condition and population density *of E. pulchrum.* The population density was measured by using formulas as follows:

$$D = \frac{x}{y} \text{ x } 100\%$$

Notes :

D : Population density of *E. pulchrum*
x : Number of individual of E. pulchrum
y : Number of sampling plants

3. RESULTS AND DISCUSSION

3.1 Field Condition

There were four Brassicaceae plants that were cultivated in locations, broccoli, caisim, green cabbage and cauliflower. In general, these four plant types were cultivated together in one field or multiple crop system. The field condition could be seen in Figure 1. The tillage was conducted conventionally. In early tillage, the manure was used before seedling planting and then, the fertilization twice, in early week of planting and 30 days after planting.

Figure 1. Field condition of location

The synthetic pesticide was used for controlling pests and diseases. Generally, the application was conducted in three weeks after planting and applied one time in a week. If rain intensity was high, the application was conducted more than one time in a week. The farmers always mixed several different types of chemicals in application time.

3.2 Pupulation density of *E. pulchrum*

The result showed that the population density of *E. pulchrum* in cabbage plants of Batu Palano was 0.06 individual/plant (Table 1). The result indicated that this number of *E. pulchrum* was not categorized as pest yet. A herbivore could be categorized as plant pest if the population of it had exceeded economic threshold level [10][11]. This result was not enough for *E. pulchrum* decreased cabbage production in Batu Palano. During observation, not only adult of *E. pulchrum* found in the field, but nymph too. Nymph and adult of *E. pulchrum* had same way to get the nutrition from plant by sucking the plant fluids [12].

Table 1. Population density of *Eurydema pulchrum*

Location	Population (individual per plant)
Batu Palano	0.06

The presence of *E. pulchrum* in cabbage plants of Batu Palano was cased by several factors, the host presence, fecundity of *E. pulchrum* and environmental [6][8]. *E. pulchrum* was oligophages for brassicaceae plants so it could be found in cabbage plants in Batu Palano [13]. Place and source of nutrition presence caused *E. pulchrum* presence was not diffucult to find in Batu Palano eventhough in smal number.

Environmental factor like climate and rainfall significantly affected the abundance of *E. pulchrum* in the field. Insect development was affected by factors, internal and external factor. High and low population of the insect in certain time was combination result between these factors [14]. Low population density of *E. pulchrum* (< 1 per plant) was affected by rainfall. Rain directly affected insect population in the field. High rain intensity caused many insects die, particularly affected growth and activity of insect. Important elements in rain analysis were rainfall, number of day and rain density [15]. November-December was peak of rainy season in a year in Batu Palano. This condition caused the population of *E. pulchrum* in these months was low as study result [16].

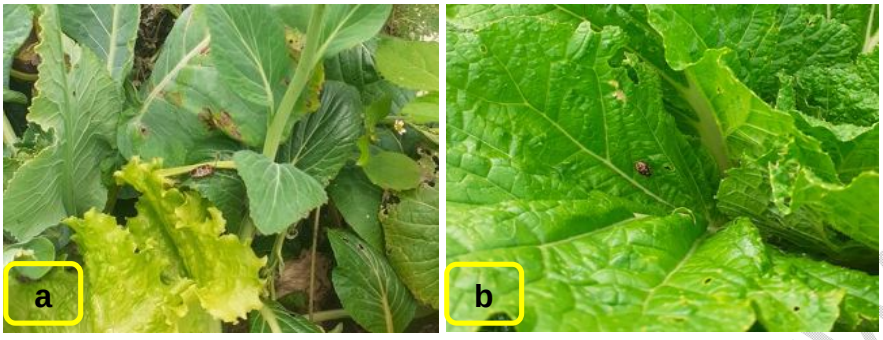

Figure 2. *E. pulchrum* found in location (a. adult; b. nymph)

4. CONCLUSION

The population density of *E. pulchrum* in cabbage plants of Batu Palano was 0.06 individual/ plant. This result was not enough to categorize *E. pulchrum* as pest in cabbage plants in Batu Palano.

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