Insect Diversity on the Jasmine (Jasminumsambac) Plantation

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Abstract: *Insects are the most diverse group of organisms compared to other groups of organisms. To date, approximately 950,000 insect species have been identified around the world, or about 59.5% of the total described organisms. In Indonesia, to be precise, Jingah HabangIlir village is a jasmine-producing village in the KarangIntan district, Banjar Regency. The purpose of this study was to determine the status of diversity, species richness, and insect dominance on jasmine flowers in Jingah HabangIlir village, KarangIntan district, and Banjar Regency. This research was carried out on a jasmine plantation area with the methods of installing insect traps, namely yellow sticky traps, light traps, and pitfall traps, and direct exploration by taking and collecting the types of insects present on the plant parts by hand, namely hand sorting. The results showed that the insects caught on jasmine plants consisted of 9 orders and 23 families with a total insect population of 197 individuals, with the results of the analysis of the insect diversity index value of 2793, the analysis of the insect species richness index value of 4.164, and the analysis of the dominance index value of 0.073. The species diversity index (H') is in the medium category in stable environmental conditions, the insect dominance index (D) is low, which indicates that no insects dominated the jasmine plantation area, and the species richness index (R) is high.*

Keywords: insects, jasmine, flower, Indonesia

1. Introduction

Insects are living, bloody things. When the temperature of the environment drops, so does the temperature of the body, and the process physiology slows.Some insects can survive at extremely low temperatures, while others can survive at extremely high temperatures.Because in the network her body stores ethyleneglycol, the insect stands to have a low temperature.Development and the cycle of life for insects: experience the levels from simple to complex and even amazing. The life cycle of a locust begins with an egg, which hatches into a nymph, which develops into an imago "mature insect" (Jumar, 2000).

When compared to vertebrates, the structure of insects is spectacular. Bees, wasps, and some ants (order Hymenoptera), for example, have an organ for laying eggs (the ovipositor), which develops into an "awl toxic" (sting). Stinging is one method of attack and self-defense. Insects also have glittering colors, like jewels (Jumar, 2000).

Man obtains benefit from the presence of insects, specifically in field plantations. The role of beneficial insects as pollinator plants among other plants, as well as the role of insects as predators and parasites on a variety of pest plants, is extremely beneficial in biological control (Jumar, 2000).

Species Jasminum Sambac maid of Orleans or Jasminum Sambac is a species that has been crowned as the flower puspa nation and is widely used for flower arrangements as well as deodorizer tea. Jasmine is the wrong type of plant that has the potential to develop goods for import or export (Suyanti et al, 2003).

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Indonesia, specifically village Jingah HabangIlir, is a village producer of jasmine in the District of KarangIntan Regency Banjar. Flower from Village Jingah HabangIlir, District KarangIntan, Regency Banjar, the marketing done in market Martapura. The consumer flower chain consists of the retailer, dealer, collectors, craftsmen flower brides, cosmetic flower brides, and the consumer or user end. Use flowers from Jingah HabangIlir Village for needs ranging from the ceremony, religious rituals, or just for perfume, as well as other uses.

Several types of insects play a role, as the main pest of jasmine plants known in Indonesia are larvae from Lepidoptera, family Pyralidae, that is, Palpitaunionista, Nausinoegeometrica, and Hendeciasisduplifascialis. Pest trip and Pseudococcuslongispinus were also discovered (Kalshoven 1981).

Objective study This is the status of diversity, dominance, and species richness of insects on a jasmine flower plantation in Jingah Village, HabangIlirSubdistrict, Coral Diamond Regency Banjar.

Study This expected capability can give information or a reference about the diversity of insects on plantations of jasmine, as well as give informational data about type, diversity, and population, specifically in the village of JingahHabangIlir in KarangIntanBanjar Regency.

2. Methodology

Study material that is made of yellow paint, water, grease, and 70% alcohol The tools used are a camera, book millimeter block, jar, tool for writing, yellow sticky trap, light trap, pitfall trap, microscope USB, and syringe.

Study This held on expanse planting jasmine with method of installation trap insect that is yellow trap or yellow sticky trap, light trap, pitfalls trap, as well as exploration direct with method of take and gather type anthropopods, which is on part plant with use of hand. Hand sorting is done to retrieve insects that are in parts of the plant that are difficult to reach with insect traps. Insects that are caught are put in a bottle or jar for identification. Study This use method system diagonal.

The implementation study started with location determination, sampling method, and identification.

The observed parameters are the index diversity of insects, the index dominance of insects, and insect species richness index.

The diversity of insect species is calculated using the following biodiversity indices:

2.1. Index of Species Richness is determined by the formula according to Margalef (Ludwig and Reynolds, 1988):

$$R = (S-1) / LnN$$

Where: R = Species Richness index
S = Number of Insect Species
N = Total Number of individual insects
Ln = Natural logarithm
Assessment criteria / criteria:
R = < 3.5: indicates the richness of the species is low
R = 3.5 – 5: : indicates the richness of the species is moderate
R = >5: indicates the richness of the species is high

2.2. The Index of Diversity is determined by Shannon Wienner (Southwood, 1978; Ludwig and Renold, 1988)

type diversity index:

$$H' = -\Sigma \{(n_i /N) Ln(n_i/N)\}$$
where:
H' = Index of species diversity
n_i = Number of individuals of each type
N = Total number of all individuals

The criteria of the diversity index (H ') by Odum (1971) as the benchmark values of the H' diversity index are: Low species diversity when H '< 1, productivity is very low (poor) as an indication of severe ecological pressures, unstable ecosystems. Medium species diversity when $1<H'\leq3.32$, productivity is sufficient, ecosystem conditions are sufficiently balanced, moderate ecological pressures. High species diversity when > 3.32, stable ecosystem stability, high productivity

2.3. The dominance index is determined by Simpson's dominant index (Ludwig and Reynold, 1988) using the formula:

$$C = \sum_{1}^{s} (n_i /N)$$

Where: C = Simpson's dominant index
s = Number of species
n_i = Total number of i-type individuals
N = Total number of individuals in total n
P_i = n_i / N = as proportion of type i,
with criterion,
0<C<0.5, 5: Low dominance,
$C>0.5\leq0.75$: : moderate dominance and,
$0.75<C\leq 1$: high dominance

3. Results and Discussion

3.1 Number and type of insects caught

Based on observations, the insect population in the village of JingahHabangIlir in the KarangIntan Regency of Banjar, which was discovered while planting jasmine, is made up of 9 orders and 23 families, totaling 197 individuals. This information is shown in chart 1.
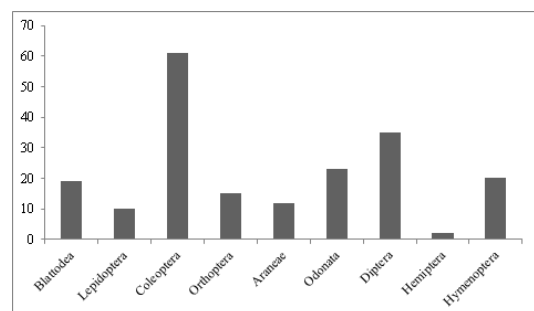

Figure 1: shows an insect collection graph from a land jasmine crop.

The order Coleoptera, which has 61 individuals, is the source of the majority of the insects found in Jingah Village's jasmine planting in HabangIlirSubdistrict, KarangIntan Regency Banjar. This order includes the families Coccinelidae (27 individuals), Carabidae (16 individuals), Sphaeriusidae (14 individuals), Mordellidae (3 individuals), and Nitidulidae (1 individual). The availability of organic materials in the form of litter or residue from jasmine trimming that was left on the ground contributed to this issue, as did the fact that the order Coleoptera has a greater variety of species than any other order.

According to Borror (1996), more types and individual insects from the order Coleoptera were found compared to another order. This is caused by the insect, which is a general insect with a large family that operates on the ground level. Fewest insects discovered _ _ while planting jasmine in Village Jingah Habang Ilir Subdistrict Karang Intan Banjar district originate from the order Hemiptera with a total of two individuals, which includes the family Pentatomidae with one individual and the Alydidae with one

individual. Because area jasmine plantation Village JingahHabangIlirSubdistrict Coral Diamond Regency Banjar No is habitats original from family Pentatomidae And Alydidae that likes grain crops. According to Jumar (2000), if food is available in sufficient quantity and of sufficient quality, the population of insects will rapidly increase. On the other hand, if food is scarce, the population of insects will decrease.

3.2. Insect species diversity index

The insect diversity index value on land planted with jasmine is H = 2,793. Value of index diversity type insect according to Shannon Wiener showing that own category diversity moderate insects, namely 1 H' 3, and conditions of the environment are stable. This is in accordance with literature criteria for diversity according to Krebs (1978), i.e., H' > 3 = height, 1 H > 3 = moderate, and H' > 1 = low. Environment that is stable in this manner consists of many types, whereas environment that is unstable is only inhabited by a few species. According to Price (2011), biological diversity is a one-size-fits-all ecosystem. Diversity increases the complexity of food webs, which increases the stability of the ecosystem.

Plant annuals around the field to protect the diversity of insects in the ecosystem. Density predators and pest insects in field plants can be improved with habitats nearby because they can provide shelter, develop breeding sites, and source food alternatives (Dennis *et al.,* 2000).

Table 1: Details of insects was found in Jasmine plantations

Classification	
Order	Family
Blattodea	Blattidae
	Archotermopsidae
Lepidoptera	Crambidae
	Erebidae
Coleptera	Coccinelidae
	Carabidae
	Sphaeriusidae
	Mordellidae
	Nitidulidae
Orthoptera	Gryllotapidae
	Gryllidae
	Acricidae
Araneae	Dictynidae
Odonata	Libellulidae
	Gomphidae
	Coenagrionidae
Diptera	Dolicopodidae
	Syrphidae
	Polleniidae
	Tabanidae
Hemiptera	Pentatomidae
	Alydidae
Hymenoptera	Formicidae
Total	

Table 2: Value of Diversity Index (H'), Dominance index, and Species richness index on the jasmine plantation

Diversity Index (H')= - (- 2.793) = 2.793
Dominance Index (C) 0.073
Richness index (R) 4.164

According to the farmers, the research location was often sprayed with insecticides, so the diversity was not too high. Because many insects died. Pesticides affect the abundance and diversity of non-target insects (Rands and Sotherton, 1986; Marko et al., 2009; Murat et and Fontaine, 2015).

Based on the results of Ramya's research , (2021) in the jasmine flower patch, the diversity index was found to be 2.8000, slightly higher than the research results.

3.3. The richness index value of insect

The index richness function lets us know the richness type of every species found in a community. Index riches type is defined as the number of species in a community (S) compared to the total number of individuals (N) observed. Based on results analysis, the richness index (R) in plantations of jasmine (R = 4.64) shows that it is included in the high category (2.5>R>4), namely R = 4.64. Richness types can be said to have a high diversity index if the species is composed of many individuals, This is in accordance with literature Isnawan et al. (2015), which state that index riches can be counted with the use of the formula from Margalef (1958), with the criterion R 2.5 indicating the level of low category species richness, 2.5 > R > 4 showing the level of richness of the category type, and R > 4 indicating the level of wealth type category tall. Richness type is the amount or many types within the sample or community. This index is very influenced by amounttotal individual which found on area planting jasmine. If index The bigger the margalef, the higher the index value of diversity.

3.4. Dominance index value of insects

Index dominance is used to obtain information about the species that dominate in a specific community. Domination is a comparison of the number of individuals in one species to the total number of individuals in the entire species.

Based on results analysis, the species index dominance (C) on planting jasmine shows that it belongs to the low category, namely 0.073. The low category shows that there are no species that dominate in the jasmine planting area. This is appropriate according to the opinion of Odum (1996), where an index value dominance of less than 0.50 means barely No, there are species that dominate (low); a dominance index value > 0.50–0.75 means index dominance, including category medium; a value > 0.75–1 means the dominance index is tall. The dominance index ranges from 0 to 1. Where the smaller the dominance index value (approaches 0), showing that there are no species that dominate, on the contrary, the bigger the index dominance (close to 1) then indicates there is a species that dominate.

Dominance index value describes the pattern of dominance of the inner species community. A high dominance index value indicates a low diversity index. Community which under control biologically often influenced by one single species or a group of species Which dominate environment and organism the dominant.

A community's diversity is determined by the number of species and their degree of similarity. Level similarity is the

distribution of all individuals present in something within a community.

4. Conclusion

Based on a study, the species diversity index (H') of insects is currently categorized as having a value of 2.793, indicating that ecosystem conditions are sufficiently balanced to moderate ecological pressures. The value of the dominance index (D) of insects in category low, with a value of 0.073, indicates that there is no dominant insect in the jasmine-planted area, and the Species richness index value (R) in category high, with a value of 4.164, indicates that there is no dominant insect in the jasmine-planted area.

Future Scope

The results of this study can be used to conserve insect natural enemies, both predators and parasitoids and can increase the role of natural enemies in controlling insect pests of plants.

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