Your Paper for The 2nd International Conference and The 11th Congress of The Entomological Society of Indonesia

ID 37

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Authors: Chandra Irsan

Keywords: Aphids, Citrus, South Sumatera, Indonesia

Topic

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Aphid species found on citrus in Ogan Komering Ilir District, South Sumatra, Indonesia

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Keywords: Aphididae, *Citrus microcarpa, Citrus grandis*, symptoms, Toxoptera

1. Introduction

Citrus (*Citrus* sp.) is a fruit commodity horticultural crop from the Rutaceae family with economic value and market opportunities [1]. Citrus, which is currently widely developed by the community, consists of several types, including sweet orange, lime, kaffir lime, grapefruit, and lemon originating from Southeast Asia [2]. Various obstacles limiting the cultivation of citrus plants cannot be separated from the problem of plant pest organisms (OPT), which can affect citrus quality and reduce citrus production [3]. Aphids (Ordo Hemiptera) are one of the plant pest organisms that can be detrimental to citrus farmers [4]. This insect can be a significant pest in citrus plants [5]. Aphids attack stems, young leaves, old leaves, flowers, and fruit [6]. This insect attacks by stabbing its stylet and then sucking plant cells so that it can damage the

plant [7]. Aphids suck liquid from the leaves so that it can cause plant growth to be inhibited [8]. Aphids can also cause plant growth to stunt because leaves attacked by aphids will wrinkle and curl [9]. Aphids can also secrete a sweet, honey-like liquid [10]. The liquid will attract ants and cause sooty mold on the fruit and leaves, which can cause a decrease in the quality of citrus fruit [11].

Aphids can also be vectors of viruses in citrus. According to research by [12], Citrus plants can be attacked by diseases that can be caused by viruses such as *Citrus Tristeza Virus* (CTV), spread by aphids (*Toxopteda citricida*). It is necessary to control aphids to get maximum results, and control can be done by spraying synthetic and botanical pesticides. The presence of predatory insects can also control aphids. Cocci beetles act as predatory insects that can control scale lice, mites, mealybugs, aphids, and flour beetles [13]. Aphids commonly found on citrus plants are from Aphididae, Aleyrodidae, Coccinellidae, Diaspididae, and Pseudococcidae [14].

2. Methods

2.1. Preparation

The research was conducted in the sub-districts of Kayu Agung Asli, Pedamaran, and Teluk Gelam, Ogan Komering Ilir Regency, South Sumatra in June 2023. The land used as the object of research was the yard of a smallholding citrus farmer in Ogan Komering Ilir Regency, which includes: District 1: Kayu Agung Asli, District 2: Pedamaran, District 3: Teluk Gelam.

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The total number of individuals from each species was used to analyze evenness diversity. The calculation of the diversity index used Shannon-Wienner.

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The results of research that has been done observation of aphids on citrus plants in Ogan Komering Ilir Regency found three aphid species, namely *Toxoptera aurantii, Toxoptera citricidus, Aphis spiraecola* derived from the Aphididae family. The most common species found was *T. aurantii, with* as many as 861 individuals; the lowest was *A. spiraecola,* with 29 individuals. *T. aurantii* species were found in every observation location, while *A. spiraecola* species were only found in the Teluk Gelam sub-district (Table 1).

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Location	Species discovered		
	Toxoptera aurantii	*Toxoptera citricidus*	*Aphid spiraecola*
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The species *T. aurantii* has a very high number of individuals (861 individuals) compared to *A. spiraecola*, with only 29 individuals, and *T. citricidus*, 263 individuals (Table 2). The most common species of aphids found on citrus in Ogan Komering Ilir Regency was *T. aurantii*. *T. aurantii* was found presumably because the host range of *T. aurantii* is broader and more diverse. *T. aurantii* has more than 80 host plant families [15]. In addition, *T. aurantii* is commonly found because it can attack young leaves, old leaves, flowers, and fruit. *T. aurantii* can attack citrus on fruit, flowers, and young and old leaves [16]. The lowest aphid species found in Ogan Komering Ilir Regency is *A. spiraecola*. *A. spiraecola* is suspected because citrus is not the primary host of *A. spiraecola*. The main host of *A. spiraecola* is the plant species *Spiraea* sp. [17]. The optimal temperature for developing *A. spiraecola* is 25^0C [18].

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Table 3. Shannon-Weiner Diversity Index, Dominance Index, and Evenness Index of aphids found in Ogan Komering Ilir District.

Index	value
Diversity (H')	0.648
Dominance (D)	0.610
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The morphological characteristics of the three aphids are different. The species *T. aurantii* and *T. citricidus* have almost the same morphological characteristics; in the species *T. aurantii*, the body is slender and oval with a brown color, while in *T. citricidus*, the body is round and black. *T. aurantii* has a more petite body than *T. citricidus*, namely *T. aurantii* 2-6 mm, while *T. citricidus* 2-8 mm. *T. aurantii* has shorter cauda than *T. citricidus* (Figure 1 A and B). The

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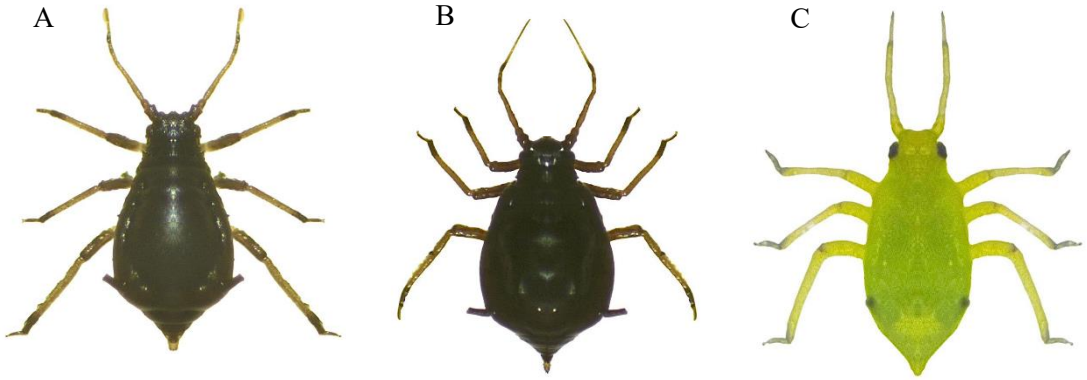

Figure 1. Species of aphids on citrus. (A) *Toxoptera aurantii*, (B) *Toxoptera citricidus*, (C) *Aphis spiraecola.*

4. Discussion

The morphological characteristics of the three species are different. The *T. aurantii* species has a characteristic brown, slender, oval-shaped body [19]. The morphological characteristics of *T. aurantii* are characterized by a body length of no more than 2 mm, a cauda shaped like a tongue, and 10-21 hairs [20]. Imago *T. aurantii* is oval-shaped and blackish brown, with black and white antennae interspersed, caudal, and black cornicles. In the species *T. citricidus*, the body is oval with a blackish color, more significant than the species T. aurantii, and has a longer cauda than *T. aurantii*. The body shape is oval and black, and the femur has fine hairs that are very long and many compared to *T. aurantii* [21]. Cauda size is longer than *T. aurantii* species. The species *A. spiraecola* is characterized by a slender, oval-shaped body and green in color. The tarsus is brownish. The aphids measuring 0.07-0.13 mm in length have a yellow or green color, adult aphids without wings, and dark-colored cauda [22].

Aphids are an important pest of citrus crops that can result in reduced citrus production [5]. These insects attack and damage the fruit, leaves, and stems [23]. Aphids are found to attack young leaves, old leaves, and flowers [24]. The symptoms found are on young leaves and old leaves that are stiff and curled, then the flowers will wither and die. The presence of aphids is significant because they can attack various types of citruses [25]. The abundance of aphids population can be influenced by biotic and abiotic factors [26]. Climate is one of the essential factors that can affect the population of aphids [27].

4. Conclusion

The aphid species found on *Citrus* sp. in the Ogan Komering Ilir district consisted of 3 aphid species, namely *T. aurantii, T. citricidus*, and *A. spiraecola.* The species *T. aurantii* and *T. citricidus* have almost the same characteristics; *T. aurantii* has a slender oval body shape and is blackish brown, while *T. citricidus* has an oval, round body shape and is solid black. In contrast, the species *A. spiraecola* has an oval body shape and is green in color. The *T. auranti* species was mainly found in the Ogan Komering Ilir district, South Sumatera, Indonesia.

5. Acknowledgments

This research is a part of a grant with contract number 0096.058/UN9/SB3.LP2M.PT/2023, with the chairman of the research grant, Chandra Irsan. Also, we thank the smallholding farmers who allowed us to conduct surveys and observations on citrus plants in Ogan Komering Ilir Regency.

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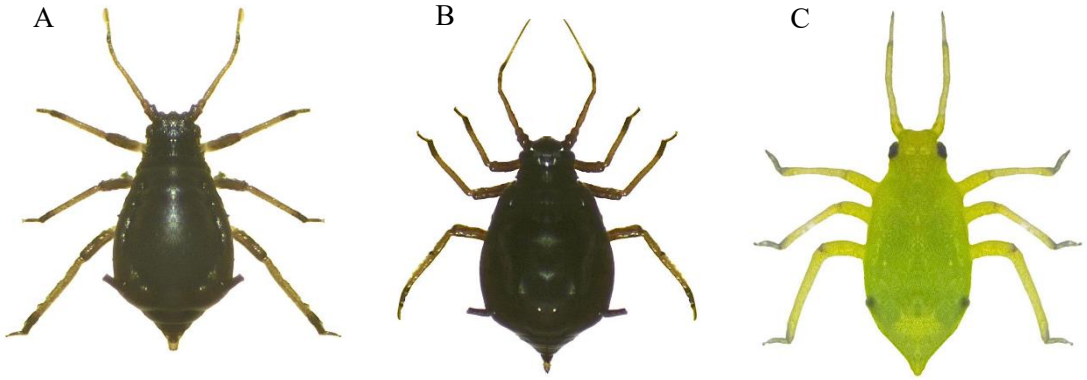

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ICCESI 2023

The 2nd International Conference and The 11th Congress of **The Entomological Society of Indonesia** 2023

29,30 September - 01 October 2023
Padang, West Sumatra - Indonesia

Letter of Acceptance

Ref. No: 115/ICCESI/2023

Dear Chandra Irsan
Universitas Sriwijaya

Based on the review process performed by our review team, we are delighted to inform you that your abstract **ID 115**, entitled:

Aphid Species Found on Citrus in Ogan Komering Ilir District, South Sumatera
(Chandra Irsan, Nanda Riana, Erise Anggraini, M. Umar Harun)

is **accepted** for oral presentation at the 2nd International Conference and the 11th Congress of the Entomological Society of Indonesia (ICCESI 2023). The conference will be held at Padang, Indonesia, 29-30 September 2023.

We would like to convey the following information for you who will publish the full paper in the proceeding/journal proposed by the committee:

- Your full paper will be considered for publication in the Jurnal Entomologi Indonesia **(Sinta 2)/** IOP - EES Proceeding **(Q4),** but the final decision will be based on the recommendation from the editors.
- The full paper should be formatted according to the guidelines provided by the journal/ proceeding. We recommend that your article include the institutional email and Orcid ID number
- Make a payment according to the attached invoice through:

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Account No.	**: BNI (0185836599)**
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WA: +62 812-7899-030 (Araz Meilin)

Your interest in ICCESI 2023 is very much appreciated. We look forward to meeting you at the conference, Padang, Indonesia.

Dr. Suputa
Chair, Organizing Committee
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RECEIPT

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Receipt Number : 115
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CERTIFICATE

This is to certify that:

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As

ORAL PRESENTER

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