

**FIRST RECORD OF THE MEALYBUG, *Rastrococcus tropicasiaticus* WILLIAMS  
(HEMIPTERA: PSEUDOCOCCIDAE) IN INDONESIA**

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**ABSTRACT**

*Rastrococcus* is a spectacular genus with no close relatives of the family Pseudococcidae that have unique truncate-conical cerarian setae. The survey studies were conducted through random observation on some woody plants in Bengkulu province, southern Sumatra island from 2019 to 2020. The study recorded a presence of *Rastrococcus tropicasiaticus* Williams (Hemiptera: Pseudococcidae) in Indonesia for the first time. It was found on *Azadirachta excelsa* (Meliaceae), *Cerbera manghas* (Apocynaceae), *Dimocarpus longan* (Sapindaceae), *Ficus* sp. (Moraceae), and *Tectona grandis* (Lamiaceae). The highest mealybug incidence was found on *A. excelsa* and *C. manghas* with 80% and 30% of attacks, respectively.

**Keywords:** Biodiversity, host plant, insect pests, mealybugs, taxonomy

**ABSTRAK**

*Rastrococcus* adalah genus tanpa hubungan terdekat dari famili Pseudococcidae yang memiliki duri serari unik yang tumpul dan pendek. Kajian tinjauan dilakukan melalui pemerhatian secara rawak terhadap beberapa tanaman berkayu di provinsi Bengkulu, wilayah selatan pulau Sumatera dari tahun 2019 hingga 2020. Kajian ini pertama kali merekodkan kehadiran spesies koya *Rastrococcus tropicasiaticus* Williams (Hemiptera: Pseudococcidae) di Indonesia. Spesies ini dijumpai hidup pada tanaman *Azadirachta excelsa* (Meliaceae), *Cerbera manghas* (Apocynaceae), *Dimocarpus longan* (Sapindaceae), *Ficus* sp. (Moraceae), dan *Tectona grandis* (Lamiaceae). Kejadian serangan koya tertinggi dijumpai pada *A. excelsa* dan *C. manghas* dengan masing-masing 80% dan 30% tingkat serangan.

**Kata kunci:** Kepelbagaian biologi, tumbuhan perumah, serangga perosak, koya, taksonomi

## INTRODUCTION

Pseudococcidae is the second species-rich family of Coccoidea after Diaspididae (García et al. 2016). This family includes many polyphagous species that are common invaders of new geographical areas and potential to become pests in many cropping systems (Hodgson 1994; Nurkomar et al. 2021). They feed on plant juices and many are found on greenhouse plants, house plants and trees in almost all parts of the plants from roots to fruits (Williams 2004). It is sometimes not possible to save a badly damaged plant since the mealybugs promote sooty mold and transmit plant viruses (Daane et al. 2012; Franco et al. 2009). To date, two subfamilies and 256 genera within about 2,032 species have been described in this family (García et al. 2016). In Indonesia about 103 species of Pseudococcidae have been recorded, of which *Pseudococcus* Westwood, *Paraputo* Laing, and *Rastrococcus* Ferris are the most species-rich and harmful genera (García et al. 2016).

The genus *Rastrococcus* was first described by Ferris (1954). It is a spectacular genus of Pseudococcidae that appears to have no close relatives because it is the only genus with unique truncate-conical cerarian setae (García et al. 2016). At present, the natural distribution of the genus is southern Asia, China and the tropical Pacific region through Australia and New Zealand. In total, there are 31 species of *Rastrococcus* over the world (García et al. 2016). In Indonesia, the genus *Rastrococcus* is composed of 14 species, namely *R. balinensis* Buchner (Buchner 1957), *R. biggeri* Williams & Watson (Williams & Watson 1988), *R. chinensis* Williams (Williams 1989), *R. expeditionis* Williams (Gavrilov-Zimin 2013), *R. fransonii* Buchner (Buchner, 1957), *R. invadens* Williams (Ben-Dov 1994), *R. jabadiu* Williams (Williams 1989), *R. kendariensis* Gavrilov (Gavrilov-Zimin 2013), *R. neoguineensis* Williams & Watson (Williams 1989), *R. pseudospinosus* Buchner (Buchner, 1957), *R. rubellus* Williams (Williams 2004), *R. spinosus* (Robinson) (Williams 2004), *R. vicorum* Williams & Watson (Williams 1989), and *R. wilsoni* Williams (Williams 2004).

*Rastrococcus tropicasiaticus* Williams (Hemiptera: Pseudococcidae) is known from southern Asia and hitherto recorded from Malaysia (Kedah, Pahang, Sabah, Sarawak, Selangor), Philippines, Thailand, and Vietnam (William 2004). Known host plants are mostly woody plant trees of the Anacardiaceae (*Mangifera indica*), Meliaceae (*Azadirachta indica*), Moraceae (*Ficus* sp., *Ficus grossularioides*), Rutaceae (*Citrus* sp.), and Sapindaceae (*Nephelium lappaceum*), but has also been reported associated with a wild grass (Poaceae) (Williams 2004).

## MATERIALS AND METHODS

The survey studies were conducted in Bengkulu province from 2019 to 2020. Specimens were collected through random observation on some woody plants such as *Azadirachta excelsa* (Meliaceae), *Cerbera manghas* (Apocynaceae), *Dimocarpus longan* (Sapindaceae), *Ficus* sp. (Moraceae), and *Tectona grandis* (Lamiaceae) spreading in Bengkulu city, Bengkulu Tengah district, Kepahiang district and Seluma district, a part of southern Sumatra.

The specimens were preserved in 70% ethyl alcohol and slide-mounts were prepared following the method of Kosztarab and Kozár (1988). Species identification was made using light microscopy and identified according to the keys in Williams (2004). The slide-mounted specimens of *R. tropicasiaticus* females and nymphs were deposited in the mini Insects Museum, Plant Protection Department, Faculty of Agriculture, University of Bengkulu (Sumatra-Indonesia) with slide number series: AZ330-342. The incidence of *R.*

*tropicasiaticus* was calculated by counting total infested plants divided by the total number of plants in the size of a quadrant.

## RESULTS AND DISCUSSION

### ***Rastrococcus tropicasiaticus* Williams, 2004**

#### ***Materials examined***

Bengkulu province: 21 ♀, Muara Bangkahulu, campus park of University of Bengkulu, Bengkulu city, *A. excelsa*, *C. manghas*, *D. longan*, *Ficus* sp. and *T. grandis*, 20 m a.s.l., 03°45'33"S, 102°16'10"E, 10.ii.2019 & 15.iii.2020, Coll. A. Zarkani, Djamilah, E. Depari, Nadrawati, Priyatiningsih, S. Ginting & T. Sunardi (AZ224; AZ330-335); 3 ♀, Air Periukan, Seluma district, *A. excelsa*, 10 m a.s.l., 3°59'07"S, 102°25'37"E, 10.iv.2020, Coll. A. Zarkani, (AZ336); 9 ♀, Kabawetan, Kepahiang district, *A. excelsa*, *D. longan*, and *Ficus* sp., 800 m a.s.l., 03°34'54.4"S, 102°38'33"E, 12.vi.2020, Coll. A. Zarkani (AZ337-339); 9 ♀, Taba Penanjung, Bengkulu Tengah district, *A. excelsa*, *C. manghas* and *D. longan*, 550 m a.s.l., 03°42'22"S, 102°30'11"E, 12.vi.2020 Coll. A. Zarkani (AZ340-342).

#### ***Diagnosis***

Alive specimen (after Williams 2004), the body of the adult female is covered in the copious secretion of white wax and resembling a species of *Icerya* (Monophlebidae). In slide-mounted specimens, the body of the adult female is broadly oval, about 4.25 mm long and 2.75 mm wide. Antennae with 9 segments, legs well developed, long and slender. Claw about 45 µm long, stout, with a denticle. Circulus wide with a wrinkled surface, lying on borders of abdominal segment III. Ostiole represented by posterior pair only, with inner edges of lips sclerotized, each lip with a few trilocular pores. Dorsal surface with short and almost conical setae whilst ventral surface with normal flagellate setae. Cerarii always conspicuous, each bearing numerous truncate-conical setae, each cerarian seta flat at the apex. Cerarii numbering 17 pairs, each situated on a weak sclerotized base, mostly each smaller in area than the anal ring. All cerarii containing trilocular pores with rim and loculi well defined on each pore.

#### ***Comments***

*Rastrococcus tropicasiaticus* is a new record for the mealybug fauna of Indonesia. In mid-February 2019, the mealybug infestation firstly became apparent when the female insects were found producing copious amounts of white powdery wax secretion which covered the leaves, tree trunk and branches hanging from small trees (Figure 1). In the sapling stages, leaves of plants curl, turn yellow and die due to high infestation of the scales.

The presence of *R. tropicasiaticus* was first observed on the trunk and branches of *Cerbera manghas* and *Azadirachta excelsa*, respectively. These woody plants grow close to each other in one of the main campus parks of the University of Bengkulu. *Cerbera manghas* is an interesting fruit plant with aromatic flower used in gardening displays, whereas *D. molissimum* is an aromatic woody plant species that is most commonly used for the construction of wood and furniture in Indonesia (Dewi et al. 2017; Gan et al. 1999). Furthermore, the species is also found growing as a woody plant in different latitudes and sites in Bengkulu province.



Figure 1. Nymphs and adults of *Rastrococcus tropicasiaticus* Williams on a tree of *Azadirachta excelsa* (Meliaceae)

The morphology of *R. tropicasiaticus* is very close to *R. biggeri*, described from the Solomon Islands, in possessing marginal multilocular disc pores on the venter of the head, thorax and abdomen, and dorsal large-type quinquelocular pores (Williams 2004). However, in *R. biggeri* the multilocular disc pores are numerous on the head and thorax, and extend in a zone to the margins whilst in *R. tropicasiaticus* the marginal multilocular disc pores are few. The species is also similar to *R. jabadiu* by having large-type quinquelocular pores on the dorsum but they can be easily differentiated by the presence of multilocular disc pores on the ventral margin of the thorax (Figures 2a-c).

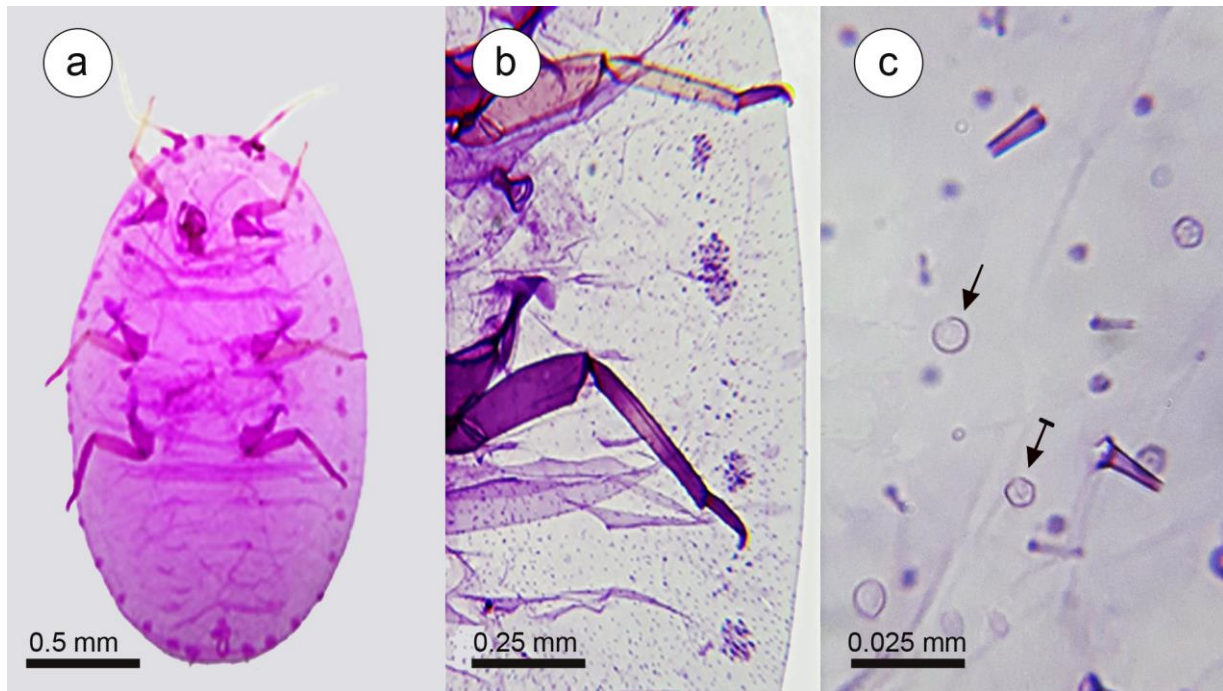


Figure 2. A stained slide-mounted specimen of *Rastrococcus tropicasiaticus* Williams: a. Female specimen with 17 pairs of cerarii; b. Ventral margin of thorax; c. Multilocular disc pores (↓) on ventral margin of thorax with quinquelocular pores (↓) present on dorsum

The incidence of *R. tropicasiaticus* on some woody plants varied. Throughout the year 2020, simultaneous outbreaks of *R. tropicasiaticus* were found on *A. excelsa* and *C. manghas* reaching the highest point of 80% and 30%, respectively. Furthermore, other plants such as *D. longan*, *Ficus* sp. and *T. grandis* were also found attacked by *R. tropicasiaticus* with about 1% to 5% incident. An outbreak of *Rastrococcus* sp. was reported by Ginting et al. (2020) attacking *Dysoxylum mollissimum* Blume (Meliaceae) which is probably the same species as *R. tropicasiaticus*. This species is a polyphagous insect widespread in southern Asia and it must be regarded as a potentially invasive species (García et al. 2016; Williams 2004).

The exact time of arrival of *R. tropicasiaticus* in Indonesia is not precise. Hitherto it was recorded on woody plants and wild grass in southern Asia: Malaysia (Selangor; Kedah; Sabah; Sarawak), Philippines (Luzon; Manila), Thailand (Rayong; Chanthaburi), and Vietnam (Hanoi) (García et al. 2016). In this study, the distribution of the species is updated to include Bengkulu, Sumatra Island (Figure 3). It may have been introduced unintentionally through the international transportation and trade from its known range to Indonesia. It is also possible that winds and storms may have carried it from Malaysia to Indonesia. The presence of *R. tropicasiaticus* on various host plants in Bengkulu and its high prevalence levels of the mealybug indicate that the species was very probably introduced some years before this report. This mealybug incidence is quite similar to the presence of *Ferrisa dasyliirii* (Cockerell) (Hemiptera: Pseudococcidae) reported a year before (Zarkani et al. 2020). Further studies are needed to clarify the phenology, female fecundity, search for the presence of males as well as identify predators and parasitoids on this newly established mealybug. It would be interesting to determine its distribution, dynamics in its colonization phase, reproductive biology and host plants in Indonesia.



Figure 3. Updated distribution of *Rastrococcus tropicasiaticus* Williams in Southeast Asia (after García et al. 2016).

## CONCLUSION

A newly recorded mealybug species, *R. tropicasiaticus* has been reported from Indonesia. It was found on woody plants such as *A. excelsa*, *C. manghas*, *D. longan*, *Ficus* sp., and *T. grandis* in Bengkulu province, southern Sumatra. Of these, all plants except *Ficus* sp. are the new hosts of *R. tropicasiaticus*.

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