NEW RECORD OF *Ferrisa dasylirii* (COCKERELL) (HEMIPTERA: COCCOMORPHA: PSEUDOCOCCIDAE) IN INDONESIA

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ABSTRACT

The occurrence of mealybug species, *Ferrisa dasylirii* (Cockerell) (Hemiptera: Pseudococcidae) was first reported in Indonesia. It was found on *Durio zibethinus* Murray (Malvaceae), *Gliricidia sepium* (Jacq.) (Fabaceae), *Hibiscus* spp. (Malvaceae), *Psidium guajava* L. (Myrtaceae), *Solanum torvum* Swartz (Solanaceae), and *Theobroma cacao* L. (Malvaceae) at some regencies in Bengkulu Province, Southern Sumatra, Indonesia.

Keywords: Biodiversity, host plant, mealybug, Sumatera, Indonesia

ABSTRAK

Kehadiran spesies koya *Ferrisa dasylirii* (Cockerell) (Hemiptera: Pseudococcidae) telah direkodkan untuk pertama kali di Indonesia. Spesies ini dijumpai hidup pada tanaman *Durio zibethinus* Murray (Malvaceae), *Gliricidia sepium* (Jacq.) (Fabaceae), *Hibiscus* spp. (Malvaceae), *Psidium guajava* L. (Myrtaceae), *Solanum torvum* Swartz (Solanaceae), dan *Theobroma cacao* L. (Malvaceae) di beberapa bandar di daerah Bengkulu, Sumatera Selatan, Indonesia.

Kata kunci: Kepelbagaian biologi, tumbuhan perumah, koya, Sumatera, Indonesia

INTRODUCTION

Ferrisia Fullaway is one of the genera in Pseudococcidae (Hemiptera: Coccomorpha: Pseudococcidae) which is a group of sap-feeding insects, tapping into the phloem via a stylet or piercing, a straw-like mouthpart (Gullan & Martin 2009; Williams 2004). In

nature, this genus can easily be recognized by long glassy filaments with typical dorsal patterns formed by the dark areas of cuticle bare of powdery white mum wax (Gullan et al. 2010; Kaydan & Gullan 2012). It is a genus with huge dorsal tubular ducts surrounded by a flat sclerotized area containing one or more setae situated either within the border or adjacent to the rim and has a couple of cerarii anal lobust (Gullan et al. 2003, 2010).

The New World genus, *Ferrisia* consists of *Ferrisia virgata* (Cockerell) and *F. malvastra* (McDaniel) was known to have been spread to southern Asia and other parts of the world as insect pests of cultivated plants (Sartiami et al. 2017; Williams & Watson 1988; Williams 1996, 2004). To date, the combination of morphological and molecular data gathered this genus comprised at least 18 species of *Ferrisia* i.e *Ferrisia claviseta* (Lobdell); *Ferrisia colombiana* (Kaydan & Gullan); *Ferrisia cristinae* (Kaydan & Gullan); *Ferrisia dasylirii* (Cockerell); *Ferrisia ecuadorensis* (Kaydan & Gullan); *Ferrisia gilli* (Gullan); *Ferrisia kondoi* (Kaydan & Gullan); *Ferrisia malvastra* (McDaniel), *Ferrisia meridionalis* Williams; *Ferrisia milleri* Kaydan and Gullan; *Ferrisia multiformis* (Granara de Willink); *Ferrisia pitcairnia* (Kaydan & Gullan); *Ferrisia quaintancii* (Tinsley); *Ferrisia setosa* (Lobdell); *Ferrisia terani* (Williams & Granara de Willink); *Ferrisia uzinuri* (Kaydan & Gullan); *Ferrisia virgata* (Cockerell); and *Ferrisia williamsi* (Kaydan & Gullan). These 18 species were the results of Kaydan & Gullan (2012) revision on a group of eight species described by Williams (1996).

In Indonesia, the only striped mealybug, *F. virgata*, is found (Sartiami et al. 1999; Williams 2004). This species was first recorded as intercepted species on *Zingiber officinale* Roscoe (Zingiberaceae) by quarantine inspections of San Pedro, the USA in 1992. Then, the species was reported found in Java, Sulawesi, Sumba as polyphagous pests species on *Annona squamosa* L. (Annonaceae), *Azadiractha indica* A. Juss (Meliaceae), *Durio kutejensis* Becc. (Bombacaceae), *Ficus* sp. (Moraceae), *Gossypium* sp. (Malvaceae), *Indigofera* sp., (Fabaceae), *Ipomoea* sp. (Convolvulacea), *Nephelium lappaceum* L. (Sapindaceae), and *Psidium guajava* L. (Myrtaceae) (Sartiami et al. 1999; Williams 1996, 2004). Recently, *F. virgata* predictably becomes a cosmopolitan group insect pest within a broad range of host plants around Indonesia, commonly introduced across the globe through trade or other human-migrated movements (Sartiami et al. 2016). The information on the widespread of *F. virgata* could be confused by other species since recent taxonomic revision of the genus *Ferrisia* was published and there is no more study about those species in Indonesia. Recently, Pacheco da Silva et al. (2019) re-identified some species in North-East Brazil and recorded *F. dasylirii* as a new country record.

Here we report *Ferrisia dasylirii* (Cockerell), a native species of arid zones in northern Mexico that has not been recorded from Indonesia before. This report includes new information on the host range and distribution of the species in Indonesia.

MATERIALS AND METHODS

The specimens were collected from several host plant species growing around the site of Agricultural Faculty, the University of Bengkulu, Bengkulu city (3°45'33.0"S, 102°16'10.1"E, 50 m a.s.l.). A sampling of different instars was done from Aug to Nov 2019. Similarly, sampling was also conducted from the same host plants species in Bengkulu Tengah regency (3°42'22.7"S 102°30'11.8"E, 550 m a.s.l.) and Seluma regency

(3°59'07.1"S 102°25'37.4"E, 60 m a.s.l.), a part of municipals in Bengkulu Province. The species of *Ferrisia dasylirii* was collected on the following host plants: *Durio zibethinus* Murray (Malvaceae), *Gliricidia sepium* (Jacq.) (Fabaceae), *Hibiscus* spp. (Malvaceae), *Psidium guajava* L. (Myrtaceae), *Solanum torvum* Swartz (Solanaceae), and *Theobroma cacao* L. (Malvaceae).

The specimens were preserved in 70% ethanol and slide-mountings were prepared with methods refers to Kosztarab & Kozár (1988). Species identification was performed under a light microscope and with the guide of keys mentioned in Kaydan & Gullan (2012). The slide-mounted of *Ferrisia dasylirii* adult females and nymphs are deposited in the mini Insect Museum, Plant Protection Department, Faculty of Agriculture, University of Bengkulu (Sumatra-Indonesia). Slide numbers: 300-305/1/2020. All specimens obtained were shown in Figures 1A—C.

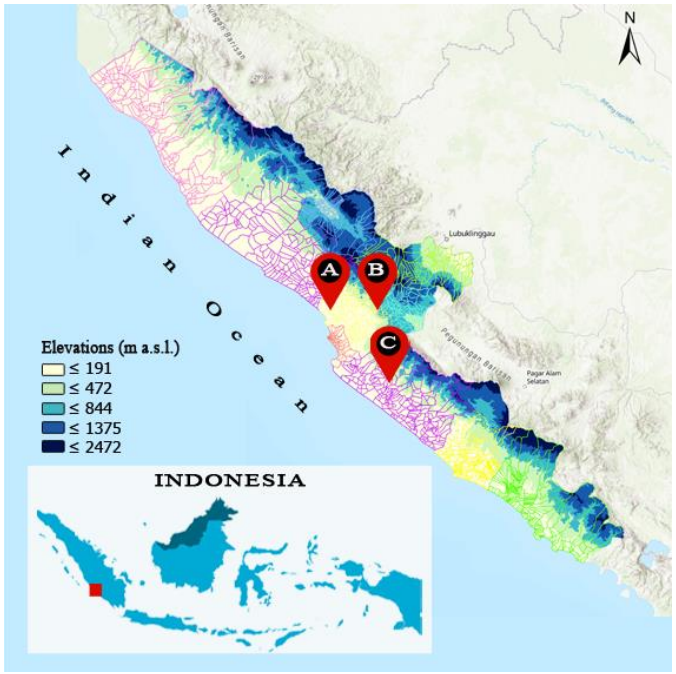

Figure 1. Sampling locations of *Ferrisa dasylirii* (Cockerell): A, Bengkulu city (3°45'33.0"S, 102°16'10.1"E, 50 m a.s.l.); B, Bengkulu Tengah regency (3°42'22.7"S 102°30'11.8"E, 550 m a.s.l.); C, Seluma regency (3°59'07.1"S 102°25'37.4"E, 60 m a.s.l.)

RESULTS AND DISCUSSION

Result found that the *G. sepium* grown as a shade tree for some cultivated plants such as *T. cacao* and *Coffea canephora* (Rubiaceae) as well as "living supporting tree" for *Piper nigrum* (Piperaceae) bearing a more abundant population of *F. dasylirii* than the other trees where the insect was collected (Figure 2). As such, *G. sepium* should be further evaluated to ascertain whether the plant serves as a reservoir or an alternative host plant for such a scale pest.

Figure 2. Nymphs and adults of *Ferrisa dasylirii* (Cockerell) on the leaf lower surface of *Gliricidia sepium* (Jacq.) (Fabaceae)

In nature, *F. dasylirii* (Figure 3A) is mostly similar to *F. virgata* in form and size. The species has eight segments antennae with ≥ 595 µm long; elongate body oval with 3.10–5.30 mm long and 1.30–2.86 mm wide (Figure 3B) observed the bodies of females cleared of soft contents and the cuticles stained and mounted on microscope slides. They could be easily distinguished from other taxa by their discoidal pores associated with the sclerotized area around the rim of dorsal enlarged tubular ducts on the abdomen. Discoidal pores are situated on the sclerotized area's outer margin and often with pore and its surrounding sclerotization projecting out from the margin (Figures 3C- D).

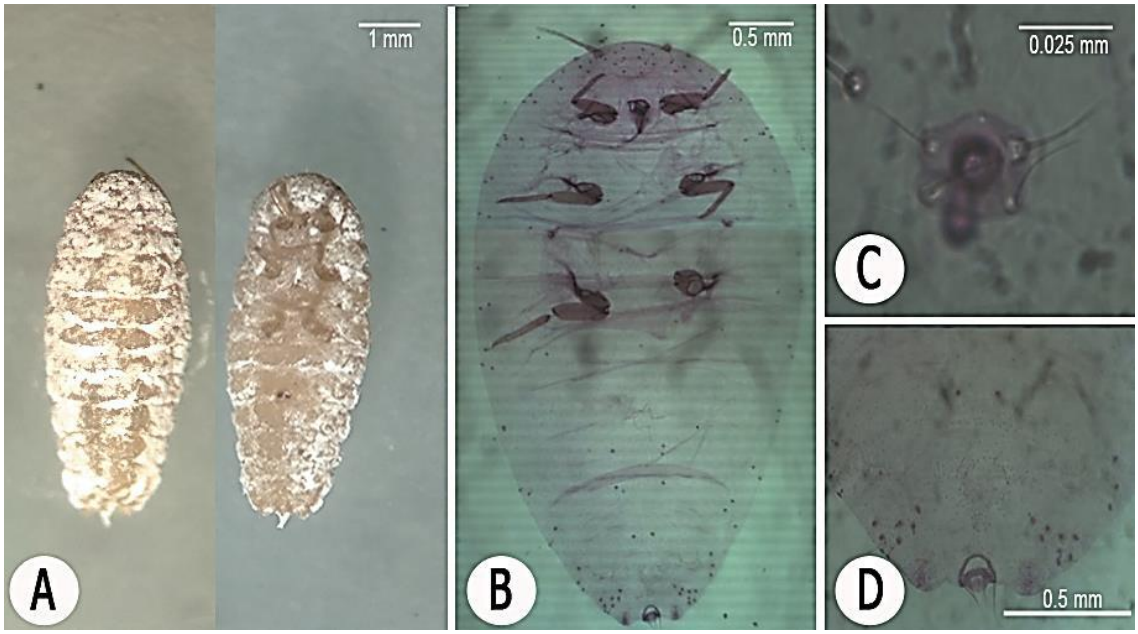

Figure 3. Female of *Ferrisa dasylirii* (Cockerell): A, In life specimens; B, Slide-mounted specimens; C, Tubular duct with a minute discoidal pore touching the outer margin of the sclerotised area; D, Multilocular disc pores in a row on abdominal segment VI-VIII

Ferrisia dasylirii is already spread into 22 countries where Indonesia is now the second Southeast Asia country reported to have *F. dasylirii* after Malaysia. Sartiami et al. (2016) firstly reported the species as an invasive species attacking *Hibiscus rosasisnensis* L. and *Hibiscus* spp. (Malvaceae) in Selangor and Kuala Lumpur, Malaysia. The exact time of arrival of *F. dasylirii* in Indonesia is unknown, but it is probably unintentionally introduced here by international transportation and trade from Malaysia to Indonesia. However, the abundance of *F. dasylirii* in some plants in the different territories with various infestation outbreak levels indicates that the species was probably introduced some years before its report. Besides, the species probably have already existed for a long time ago since they are confused by *F. virgata*.

The economic losses of *F. dasylirii* have not clearly stated, but the species was reported currently as a potential pest of *Salicornia bigelovii* (Torr.) (Chenopodiaceae) feed and reproduced in 10% of commercial plantations at Baja California Sur, Mexico (Magallón-Servín et al. 2019). It should be aware that the mealybug species are known as the most common invaders of new geographical areas and capable of becoming a significant pest and virus transmission vectors in many cropping systems (Hodgson 1994) and as such, further study is urgently needed.

The slide-mounted adult females of *Ferrisia* species in southern Asia can be distinguished from each other according to the following key (after Williams 2004):

1. Multilocular disc pores either absent from abdominal segment VI, or occasionally numbering 1-3. Dorsal duct each with a rim about the same size as a multilocular disc pore or smaller, with setae situated either adjacent to the rim or just outside it……..……...***F. malvastra*** (McDaniel)
- Multilocular disc pores present in a row on abdominal segment VI numberings at least 8. Dorsal duct each with rim larger than a multilocular disc pore, containing setae situated within border of the rim .....(2)
2. Most discoidal pores associated with the sclerotized area around rim of a dorsal enlarged tubular duct with a minute discoidal pore just touching outer margin of sclerotized area, to projecting outside of margin (Figure 3 C)…….... ... ***F. dasylirii*** (Cockerell)
- Enlarged tubular duct with a minute discoidal pore not touching the sclerotized rim of duct opening; pore position varies from entirely within the sclerotized area……. ... ……....***F. virgata*** (Cockerell)

CONCLUSION

The species that has become an important pest on the Malaysian national flowering plants, *Hibiscus rosa-sisnensis* L. and *Hibiscus* spp. (Malvaceae) growed in Selangor and Kuala Lumpur is now recorded in Bengkulu province, Sumatra-Indonesia and this is the first ever.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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