BIOLOGY, MEDICINE, & NATURAL PRODUCT CHEMISTRY ISSN 2089-6514 (paper)
Volume 15, Number 1, April 2026 | Pages: 505-512 | DOI: 10.14421/biomedich.2026.151.505-512 ISSN 2540-9328 (online)

Plant Lice Species (Suborder: Sternorrhyncha) on Ornamental Plants in Kampal Village and Surrounding Areas

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Manuscript received: 04 January 2026. Revision accepted: 13 April 2026, Published: 12 May 2026.

Abstract

Plant lice (Suborder: Sternorrhyncha) are important pests of ornamental plants, capable of causing physical damage and transmitting plant pathogens. These insects pose a significant threat as they can reduce growth, impair physiological functions, and even cause plant death. Their feeding activity affects leaves, stems, and flowers, thereby reducing overall plant health and aesthetic value. Understanding the diversity and host associations of these pests is essential for effective management. This study aimed to identify the species of Sternorrhyncha plant lice present on ornamental plants in Kampal Village, Parigi Moutong, Central Sulawesi. A qualitative descriptive approach was employed, using purposive sampling to collect specimens from different plant parts, including shoots, leaves, flowers, and stems. Observations were recorded and analyzed to determine species composition, host range, and infestation patterns. A total of 25 ornamental plant species belonging to 16 families were observed as host plants. Some plant families, such as Euphorbiaceae, Acanthaceae, Rubiaceae, Palmae, Rutaceae, Araceae, and Agavaceae, were infested by more than one plant louse family, while individual plant species could host multiple louse families simultaneously. Seventeen Sternorrhyncha species were identified, distributed across seven families: Pseudococcidae (6 species), Coccidae (3), Diaspididae (2), Aphididae (2), Margarodidae (2), and Aleyrodidae and Ortheziidae (1 species each). These results provide baseline data on the diversity and distribution of Sternorrhyncha plant lice in Kampal Village. Such information is critical for developing targeted pest management strategies to protect ornamental plants and maintain their health and aesthetic value in residential and cultivated areas.

Keywords: Diaspididae; Plant Lice; Pseudococcidae; Sternorrhyncha; Ornamental Plants.

INTRODUCTION

Ornamental plants are defined as all plants cultivated for aesthetic purposes (Yurlisa et al., 2022). They can also be described as plants that possess decorative value, such as flowers, stems, leaves, roots, or fragrances that create an artistic or visually pleasing impression (Acquah, 2002; Arifin, 2004; Marina, 2016). Ornamental plants are commonly found in home gardens or yards. Examples of ornamental plants frequently encountered in residential areas include Jasmine (*Melati*), Rose (*Mawar*), Periwinkle (*Tapak Dara*), Snake Plant (*Lidah Mertua*), Aloe Vera (*Lidah Buaya*), Cat's Whiskers (*Kumis Kucing*), Hibiscus (*Kembang Sepatu*), and Love-in-a-Mist (*Gelombang Cinta*), among others. However, as the demand for ornamental plants increases, the problems of pests and plant diseases have become more complex (Majanah, 2013). Therefore, the cultivation of ornamental plants requires careful attention, including land preparation, watering, fertilization, pruning, exposure to sunlight, crop rotation, and pest management.

One of the main pests frequently attacking ornamental plants is the louse (Hemiptera: Sternorrhyncha). Species of plant lice in the suborder Sternorrhyncha pose a threat to plants because they can damage plant growth, cause plant death, and induce diseases. In addition to causing physical damage by sucking phloem sap, whiteflies can also act as biological vectors of pathogenic microorganisms, including viruses, bacteria, and fungi (Chuai et al., 2022; Jose et al., 2020). Sternorrhyncha is an order within Hemiptera divided into four subgroups: Psyllomorpha (jumping plant lice), Aleyrodomorpha (whiteflies), Aphidomorpha (aphids), and Coccomorpha (scale insects) (Ouvrard et al., 2015). Morphological studies indicate that these hemimetabolous insects form a monophyletic group, including aphids, scale insects, and psyllids (Franielczyk et al., 2019). Some plant louse families that commonly attack ornamental plants include Aleyrodidae, Aphididae, Coccidae, Diaspididae, Margarodidae, and Pseudococcidae, which are polyphagous (Drohojowska et al., 2020).

In their activity, several species of plant lice may infest the same plant or location. These pests are not limited to a single species; two or more species from the same plant family may coexist. Research on the diversity of plant louse species on ornamental plants in Indonesia is still limited. Therefore, understanding the species of plant lice that attack ornamental plants is essential, as infestations can cause significant damage (Chuai et al., 2022). This study aims to identify the species of plant lice in the suborder Sternorrhyncha on ornamental plants in Kampal Village, Parigi Moutong Regency, Central Sulawesi.

MATERIALS AND METHODS

Study area

This study was carried out in residential areas of Kampal Village, Parigi Moutong Regency, Central Sulawesi (Figure 1). The village is characterized by a tropical climate with relatively high humidity and temperatures, which provide suitable conditions for the growth of various ornamental plants. The selection of residential areas as study sites was based on the presence and diversity of ornamental plants in household gardens, which serve as potential habitats for plant lice (Hemiptera: Sternorrhyncha).

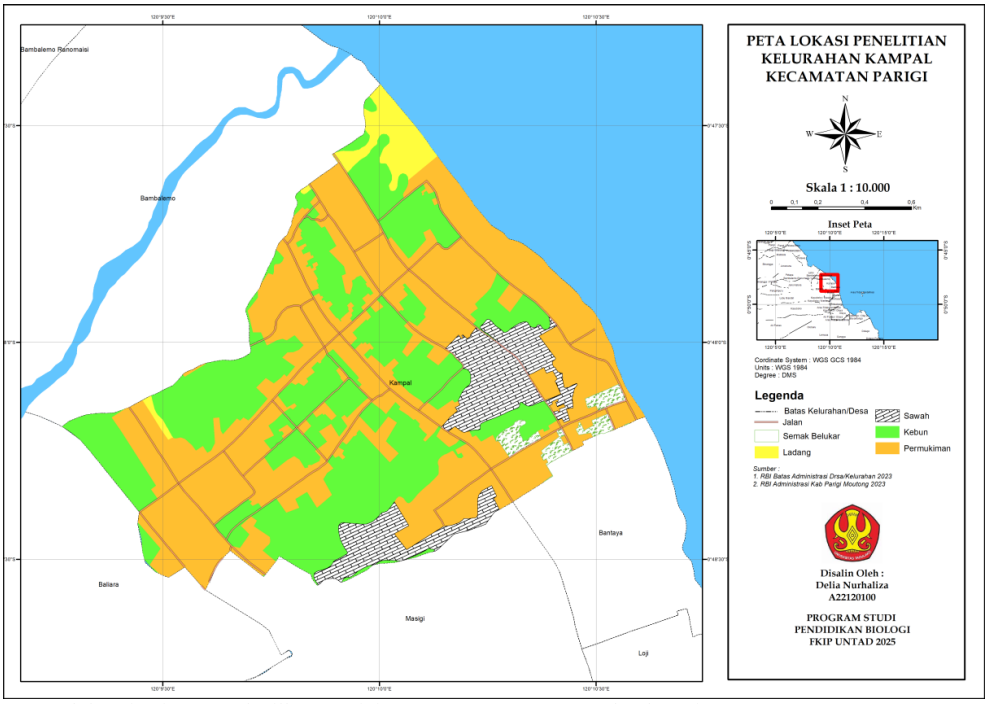

Figure 1. Map of the research location in Kampal Village, Parigi Moutong Regency, Central Sulawesi.

Procedures

Research Method

The research employed a qualitative descriptive method, which aims to systematically describe and interpret the characteristics and diversity of plant lice species present on ornamental plants. This method allows for a detailed examination of species composition, abundance, and host-plant associations without manipulating the natural environment. The qualitative descriptive approach is particularly suitable for exploratory studies where baseline data are limited, as is the case for plant lice diversity in residential ornamental plants in this region.

Sample Collection Technique

The collection of plant lice (suborder Sternorrhyncha) was performed on various parts of ornamental plants, including the apical shoots, leaf axils, flowers, and stems, within the residential areas of Kampal Village. The plant lice found on ornamental plants were carefully collected and placed into inflated sample bags to prevent damage. Specimens from different ornamental plant species were separated according to the host plant and subsequently preserved in 70% ethanol for identification purposes. Morphological observations and species identification were conducted using a compound light microscope at a magnification of 4×10. This approach ensured accurate documentation of the diversity and characteristics of the Sternorrhyncha species present in the study area.

Data analysis

The identification of plant louse species (suborder Sternorrhyncha) was carried out based on morphological characteristics following the guidelines of Williams and Watson (1988, 1990), Williams and Granara de Willink (1992), Gillian W. Watson (2007), Blackman and Eastop (1994, 2000), Cox (1989), Hodgson (1994), Hodgson et

al. (2008), and Miller et al. (2009). Identification of host plants was conducted using reference books, including *1001 Garden Plants in Singapore* (Min et al., 2003) and *Tanaman Hias Indonesia* (Soerotaroeno, 2009). Collected data were systematically recorded, categorized by plant louse species and host plant, and then analyzed descriptively to determine species diversity, distribution, and host associations. This approach allowed for a detailed assessment of the diversity and composition of Sternorrhyncha species present on ornamental plants in Kampal Village.

RESULTS AND DISCUSSION

Host Plant Associations and Diversity of Plant Louse Species (Suborder Sternorrhyncha)

During the study, a total of 25 ornamental plant species belonging to 16 plant families were observed. Generally, each plant family was associated with a single family of plant lice. However, some plant families, such as Euphorbiaceae, Acanthaceae, Rubiaceae, Palmae, Rutaceae, Araceae, and Agavaceae, were infested by more than one plant louse family. Additionally, a single plant species could host multiple plant louse families simultaneously, indicating the complexity of host–pest interactions in ornamental plants (Table 1). Seventeen species of plant lice belonging to the suborder Sternorrhyncha were identified, distributed across seven plant louse families that attack various ornamental plants. The families recorded included Pseudococcidae (6 species), Coccidae (3 species), Diaspididae (2 species), Aphididae (2 species), Margarodidae (2 species), Aleyrodidae (1 species), and Ortheziidae (1 species) (Table 2 and Figure 2). These findings highlight the diversity of Sternorrhyncha species present on ornamental plants in Kampal Village and their potential impact on horticultural health.

Table 1. Plant louse families and observed host plant locations.

No	Family	Species	Local Name
1	Acanthaceae	*Pachystachys lutea*	Lilin emas
		Graptophyllum pictum	Daun wungu
2	Agavaceae	*Agave* sp.	Agava
3	Apocynaceae	*Plumeria* sp.	Kamboja
4	Araceae	*Philodendron* sp.	Philodendron
		Anthurium sp.	Gelombang cinta
		Dieffenbachia amoena	Belenceng
		Anthurium crystallinum	Kuping gajah
		Aglonema sp.	Aglonema putih
5	Cupressaceae	*Thuja accidentalis*	Cemara kipas
6	Cycadaceae	*Cycas revoluta*	Sikas
7	Euphorbiaceae	*Codiaeum varigetum*	Puring
		Jatropha integerima	Batavia
		Euphorbia pulcherrima	Kastuba
8	Heliconiaceae	*Heliconia psittocorum*	Pisang-pisangan
9	Iridaceae	*Neomarica longifolia*	Iris kuning
10	Liliaceae	*Ophiopogon intermedias*	Lili kucai panjang
11	Malvaceae	*Hibiscus rosa sinensis*	Kembang sepatu
12	Melastomataceae	*Medinilla magnifica*	Medinila
13	Oleandraceae	*Nephrolepis biserrata*	Paku-pakuan
14	Palmae	*Caryota mitis*	Kariota rumpun
		Chamaedorea seifreizii	Palem kamedoria
		Chrysallidocarpus lucubensis	Palem kuning besar
15	Pandanaceae	*Pandanus utilis*	Pandan laut
16	Rosaceae	*Rosa sinensis*	Mawar

Table 2. Plant louse families and species (Suborder Sternorrhyncha) identified.

No.	Family	Species
1	Aleyrodidae	*Aleurodicus dispersus*
2	Aphididae	*Cinara tujafilina*
		Toxoptera aurantii
3	Coccidae	*Coccus celeatus*
		Parasaissetia nigra
		Saissetia neglecta
4	Diaspididae	*Aulacaspis rosarum*
		Aulacaspis yasumatsui
5	Margarodidae	*Icerya aegyptica*
		Icerya seychellarum
6	Ortheziidae	*Insignorthezia insignis*
7	Pseudococcidae	*Dysmicoccus brevipes*
		Dysmicoccus neobrevipes
		Ferrisia virgate
		Maconellicoccus hirsitus
		Pseudococcus jackbeardsleyi
		Rastrococcus spinosus

Figure 2. A. *Insignorthezia insignis*, B. *Icerya aegyptiaca*, C. *Icerya seychellarum*, D. *Coccus celatus*, E. *Parasaissetia nigra*, F. *Saissetia neglecta*, G. *Aulacaspis rosarum*, H. *Aulacaspis yasumatsui*, I. *Dysmicoccus brevipes*, J. *Ferrisia virgata*, K. *Maconellicoccus hirsitus*, L. *Rastrococcus spinosus*, M. *Dysmicoccus neobrevipes*, N. *Pseudococcus jackbeardsleyi*, O. *Aleurodicus dispersus*, P. *Cinara tujafilina*, Q. *Toxoptera aurantii*.

Description of Sternorrhyncha Plant Louse Species

Insignorthezia insignis

Figure 2.A

Insignorthezia insignis was found on Golden Wax Plant (family Acanthaceae). Rahayu et al. (2023) reported that this pest attacks Wungu leaves (Acanthaceae) in West

Java. The species is dark green with long, waxy egg sacs exceeding the length of the body. In this study, *I. insignis* was observed on stems and leaf surfaces.

Icerya aegyptica
Figure 2.B
Icerya aegyptica was found on Puring plants. Moharum & Bakry (2015) reported that this species can infest Puring, Acacia, Banyan, and Rose plants. The adult stage is reddish-orange, covered with white wax, with black antennae and legs. In this study, the species was found on stems and leaves.

Icerya seychellarum
Figure 2.C
Icerya seychellarum infested various ornamental plants, including ferns, Love-in-a-Mist, Belenceng, Cluster Kariota, Kamedoria palm, Yellow Palm, Yellow Iris, and Long Chives. According to Sridhar (2022), this polyphagous pest has been reported on Hibiscus, Plumeria, Acacia, and Alkalipa. Findings in this study expand the known host range of *I. seychellarum*, confirming it as a generalist pest.

Coccus celeatus
Figure 2.D
Coccus celeatus was observed on Elephant Ear plants (Araceae), consistent with Kondo et al. (2022). The adults are green, and infested leaves exhibit chlorosis due to sap and nutrient loss. Specimens were found on the leaf surface.

Parasaissetia nigra
Figure 2.E
Parasaissetia nigra was recorded on *Anthurium* sp. (Araceae). The species is dark brown and hard-bodied, with variation in shape and color depending on the host plant and location (Croat & Ortiz, 2020). Infestation can damage plant tissues, making plants susceptible to bacterial or fungal infections, often visible as black or brown spots on leaves and stems.

Saissetia neglecta
Figure 2.F
Saissetia neglecta was found on Wungu leaves (Acanthaceae). Schuiling (2009) also reported this pest on Wungu leaves in West Java, Ambon, and Jayapura. Kakoti et al. (2023) and Githae (2021) did not previously report this species on ornamental plants. In this study, it was observed on leaves, petioles, and stems.

Aulacaspis rosarum
Figure 2.G
Aulacaspis rosarum infested Rose plants, consistent with Ahmed et al. (2021). Originally from China, this white-bodied scale insect produces whitish-grey waxy crusts along stems and leaves, which protect females and eggs (Williams & Watson, 1988).

Aulacaspis yasumatsui
Figure 2.H
Aulacaspis yasumatsui was found on Cycas plants. This species has not been previously reported in Indonesia and may represent a new pest introduction (Deloso et al., 2025). Infestation symptoms included leaf and stem discoloration, yellow or white spotting, and chlorophyll loss. Specimens were observed on both upper and lower leaf surfaces.

Dysmicoccus brevipes
Figure 2.I
Dysmicoccus brevipes is a minor pest with oval, pinkish bodies covered in wax filaments. Nyarko (2019) reported that its feeding activity causes wilting in pineapple plants and transmits Pineapple Mealybug Wilt-associated Virus (PMWaV). In this study, it was found on banana plants, a previously unreported host (Akhsan & Dewi, 2024).

Ferrisia virgata
Figure 2.J
Ferrisia virgata was observed on four host plants, including Batavia, Puring, Elephant Ear, and Plumeria (Pirithiraj & Chandrasekaran, 2021). Populations were particularly high on Puring, and on Elephant Ear plants, it co-occurred with *Coccus celeatus* (Coccidae).

Maconellicoccus hirsitus
Figure 2. K
Maconellicoccus hirsitus was only found on Hibiscus plants, consistent with Khan (2023). The reddish-brown bodies are coated with a thin layer of wax, and eggs are orange.

Rastrococcus spinosus
Figure 2.L
Rastrococcus spinosus was observed on Plumeria, similar to previous reports (Galanihe & Watson, 2013). Adults are oval and flattened with a thick wax coating, primarily attacking young leaves, shoots, petioles, and sometimes roots, reducing ornamental value.

Dysmicoccus neobrevipes
Figure 2. M
Dysmicoccus neobrevipes infested Aglonema, Agave, Medinilla, and Pandanus. Sartiami et al. (2011) reported it on Plumeria and Yucca, while Chellappan et al. (2022) noted its presence in Malaysia on pineapple. Adults are gray with short filaments embedded in wax along body edges.

Pseudococcus jackbeardsleyi
Figure 2.N
Pseudococcus jackbeardsleyi was found on Green Aglonema. Kondo et al. (2022) reported their hosts as Plumeria and Aglonema.

Aleurodicus dispersus
Figure 2.O
Aleurodicus dispersus adults and pupal sacs were observed on the underside of Kastuba leaves, often in clusters. Hidayat et al. (2018) did not report this species on Kastuba in Indonesia, making this a new host record. Adults are 1–2 mm, white-gray, living on the lower leaf surfaces.

Cinara tujafilina
Figure 2.P
Cinara tujafilina was found on Fan Pine (Cupressaceae). Kalshoven (1981) and Sartiami et al. (2011) did not report this species in Indonesia, suggesting it may be a new pest. Adults are reddish-brown with darker dorsal patterns and a thin wax layer.

Toxoptera aurantii
Figure 2.Q
Toxoptera aurantii was recorded on Belenceng (Araceae). Populations were concentrated on young shoots. Adults are dark brown to black and oval, feeding on soft, young plant tissues such as buds, shoots, and leaves (Erdoğan, 2023).

Discussion

This study reveals a considerable diversity of Sternorrhyncha plant lice associated with ornamental plants in Kampal Village, Central Sulawesi, highlighting the role of residential landscapes as important habitats for sap-sucking insect pests. The identification of 17 species from seven families indicates that ornamental plants not only function as aesthetic elements but also act as reservoirs that sustain diverse pest assemblages. Similar patterns have been reported in tropical regions, where high plant diversity, stable microclimatic conditions, and minimal pest control practices facilitate the persistence of polyphagous Sternorrhyncha species (Drohojowska et al., 2020; Sridhar et al., 2022).

Pseudococcidae emerged as the most species-rich family, accounting for more than one-third of the total species recorded. The dominance of mealybugs can be attributed to their broad host range, high reproductive potential, and protective waxy secretions that enhance survival under fluctuating environmental conditions. In tropical ornamental systems, Pseudococcidae are often the most problematic pests due to their cryptic behavior and ability to exploit a wide variety of host plants, as also observed in previous surveys of ornamental and horticultural crops (Pirithiraj et al., 2021). Their prevalence in Kampal Village suggests that this family plays a central role in shaping pest dynamics in residential ornamental plant communities.

The presence of multiple species from Coccidae, Diaspididae, Aphididae, and Margarodidae further emphasizes the structural complexity of Sternorrhyncha assemblages. Several plant families, including Araceae, Euphorbiaceae, Palmae, and Acanthaceae, were infested by more than one plant louse family, and in some cases, individual host plants supported co-occurring species from different families. Such overlap reflects resource sharing and niche compatibility among sap-feeding insects and may intensify physiological stress on host plants through cumulative phloem extraction. Multi-species infestations are particularly important from a management perspective, as they can accelerate plant decline and complicate control strategies (Kondo et al., 2022).

Most infestations were concentrated on the abaxial leaf surfaces, young shoots, and stems, which are known to provide optimal feeding sites due to higher nutrient flow and protection from environmental stressors. Feeding damage observed in this study, including leaf curling, chlorosis, deformation, and growth suppression, is consistent with the typical impact of Sternorrhyncha feeding on ornamental plants. These symptoms directly reduce the aesthetic value of ornamental plants, which is a key criterion for their cultivation, and may ultimately lead to plant mortality when infestations are severe (Majanah, 2013; Erdoğan, 2023).

Notably, the detection of Aulacaspis yasumatsui on Cycas revoluta and Cinara tujafilina on Cupressaceae represents a significant finding. These species have not been widely reported in Indonesia and may indicate recent introductions through the ornamental plant trade and movement. The establishment of such species poses a serious risk, as invasive Sternorrhyncha are known to spread rapidly and cause substantial ecological and economic damage if not detected early (Deloso et al., 2025). The presence of potential new pest records underscores the importance of routine monitoring of ornamental plants, even in non-agricultural settings.

The relatively high diversity of host plants recorded in this study, comprising 25 species from 16 families, likely contributed to the observed pest diversity. Ornamental plants in residential areas are often maintained year-round and receive limited pest management interventions, allowing plant lice populations to persist and disperse among suitable hosts. The polyphagous nature of many species identified further enhances their capacity to exploit diverse plant resources and maintain stable populations within the landscape (Majanah, 2013).

CONCLUSIONS

This study identified 17 species of plant lice belonging to seven Sternorrhyncha families associated with ornamental plants in Kampal Village, Central Sulawesi. The family Pseudococcidae showed the highest species richness, indicating its dominant role in residential ornamental plant infestations. Most plant lice were found on the abaxial leaf surfaces and young plant parts,

causing morphological damage that reduced plant growth and aesthetic value.

Acknowledgements: The authors would like to express their sincere gratitude to Tadulako University for the institutional support and facilities provided during the conduct of this research.

Authors' Contributions: Delia Nurhaliza, Masrianih, and Manap Trianto designed the research study. Amalia Buntu, Lestari MP Alibasyah, and Yulia Windarsih conducted the fieldwork and performed the identification of the specimens. Delia Nurhaliza and Masrianih analyzed the data and wrote the manuscript. All authors read and approved the final version of the manuscript.

Competing Interests: The authors declare that there are no competing interests.

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