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Genus-level records of mite-host associations on ornamental plants across lowland and highland zones of South Sumatra, Indonesia

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Abstract. *Irsan C, Rahmi F, Anggraini E, Herlinda S, Harun MU, Hermawan A, Muslim A, Rindiani DE, Danata NH. 2026. Genus-level records of mite-host associations on ornamental plants across lowland and highland zones of South Sumatra, Indonesia. Biodiversitas 27 (4): d270412. https://doi.org/10.13057/biodiv/d270412.* Ornamental plants are widely cultivated in Indonesia and can host diverse mite communities, including phytophagous pests and predatory species. However, information on mite diversity and host associations on ornamental plants in South Sumatra remains limited. This study aimed to document mite genera and their host plant associations on ornamental plants in lowland (≤100 m asl) and highland (≥700 m asl) areas of South Sumatra. Field surveys were conducted from August to October 2025 in North Indralaya (lowland) and Pagar Alam (highland). Sampling was purposive and focused on ornamental plants showing visible symptoms associated with mite infestation. Infested plant tissues were collected, and mite specimens were prepared using slide-mounting techniques with Canada balsam for morphological identification under compound microscopes. Identification was conducted to genus level based on diagnostic morphological characters. A total of ten ornamental plant species were recorded in the lowland area and sixteen species in the highland area. Four mite genera belonging to four families were identified: *Tetranychus* (Tetranychidae) and *Brevipalpus* (Tenuipalpidae) as phytophagous mites, and *Amblyseius* (Phytoseiidae) and *Bdellodes* (Bdellidae) as predatory mites. Phytophagous mites were associated with symptoms such as chlorotic spots, leaf discoloration, and leaf curling, while predatory mites were observed on several host plants where phytophagous mites were present. Because sampling targeted symptomatic plants, the results represent descriptive records of mite occurrence and host associations rather than quantitative comparisons between altitudinal zones. This study provides the first genus-level documentation of mite-host associations on ornamental plants across contrasting altitudinal zones in South Sumatra, contributing baseline data for future studies on mite biodiversity and integrated pest management.

Keywords: Acarology, host association, phytophagous mites, predatory mites, tropical agroecosystems

INTRODUCTION

Indonesia is an agrarian country with a tropical climate that supports diverse agricultural and horticultural systems (Rahmah 2017). Among these, ornamental plants are widely cultivated in home gardens, urban landscapes, and commercial nurseries for aesthetic and economic purposes (Francini et al. 2022). In addition to their decorative value, ornamental plants contribute to household income and employment opportunities (Adeduntan and Adeniyi 2015), improve environmental quality by enhancing air conditions (Han et al. 2022), and provide psychological benefits to cultivators (Nadeem et al. 2024). The production of ornamental plants in Indonesia continues to increase in response to domestic and international market demand (Mubarok et al. 2023), highlighting the importance of maintaining plant health and quality.

Among the biotic factors affecting ornamental plants, mites (Acari) represent an important group of plant-associated arthropods. Mites belong to the class Arachnida and order Acarina and are generally minute in size, often less than 1 mm in length, making them difficult to detect without magnification (Sánchez-borges et al. 2017). Phytophagous mites feed by piercing plant tissues and extracting cell contents from the mesophyll, resulting in symptoms such as chlorosis, bronzing, necrosis, and premature leaf abscission (Devi et al. 2019; Sandeep et al. 2024). In addition, certain mite species may act as vectors of plant pathogens (Jaisval et al. 2023). At the same time, predatory mites play an important ecological role by

regulating populations of phytophagous mites and contributing to natural biological control.

Previous studies in Indonesia have reported various mite species associated with ornamental plants. Orchids have been reported to host *Tetranychus urticae*, *Tenuipalpus pacificus*, and *Brevipalpus oncidii* (Wildaniyah et al. 2018). Roses and chrysanthemums are commonly infested by *Tetranychus urticae* (Sato et al. 2016; Chacón-hernández et al. 2020). Additional reports include *Tetranychus* sp. on red-tipped plants (Haryanti et al. 2021), *Tetranychus urticae* on Calathea (Hanik et al. 2024), and various mite genera associated with jasmine plants (Kiran et al. 2017; Budianto and Sasongko 2022). These studies indicate that ornamental plants can host diverse mite taxa with different ecological roles, including both phytophagous and predatory groups.

Despite these findings, information on mite diversity and host-mite associations on ornamental plants remains limited, particularly in tropical regions. In Indonesia, acarological studies have largely focused on economically important crops, while ornamental plant systems have received comparatively less attention. As a result, baseline data on mite genera and their host associations on ornamental plants are still poorly documented in many regions.

South Sumatra is one of the regions in Indonesia where ornamental plants are widely cultivated in both lowland and highland environments. These environments differ in temperature, humidity, and other microclimatic conditions that may influence the occurrence of mites on host plants (Abou-awad et al. 2011; Maheswari 2023). However, there has been no systematic documentation of mite genera associated with ornamental plants across these contrasting altitudinal zones in South Sumatra.

Documentation of mite genera and their host associations is essential for understanding mite biodiversity, especially in regions where taxonomic studies are still limited. Genus-level identification, although less resolved than species-level identification, provides important baseline information on the composition of mite communities and their ecological roles in plant systems. Such information can support future studies on mite ecology, host specificity, and integrated pest management.

Therefore, this study aimed to document mite genera and their host plant associations on ornamental plants in lowland and highland areas of South Sumatra. Specifically, this study aimed to (i) record mite genera associated with ornamental plants, (ii) document their host plant associations, and (iii) provide baseline information on the occurrence of phytophagous and predatory mites across two contrasting altitudinal zones. This study emphasizes descriptive documentation of genus-level records rather than comparative analysis between altitudinal zones.

MATERIALS AND METHODS

Study area and period

This study was conducted on ornamental plants growing in home gardens, public green spaces, and ornamental plant sales centers in South Sumatra, Indonesia. Two altitudinal zones were selected: lowland areas (≤100 m asl), represented by North Indralaya, Ogan Ilir Regency, and highland areas (≥700 m asl), represented by Pagar Alam City (Figure 1). The lowland area is characterized by a tropical climate with average temperatures ranging from 27-32°C and relative humidity of approximately 70-85%, while the highland area has cooler conditions with temperatures ranging from 18-25°C and relatively higher humidity. These climatic descriptions are based on general environmental conditions of the study areas.

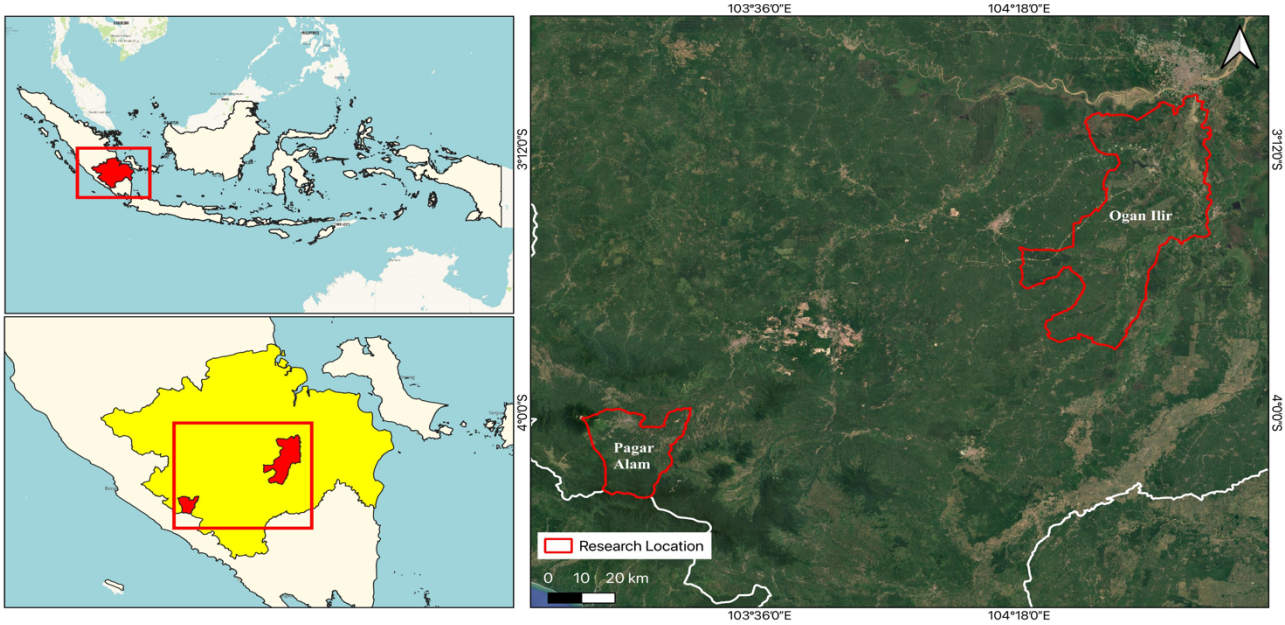

Figure 1. Research location in Ogan Ilir Regency and Pagar Alam City, South Sumatra, Indonesia

Field sampling was conducted from August to October 2025. Identification of mite specimens was carried out in the Entomology Laboratory, Department of Plant Protection, Faculty of Agriculture, Universitas Sriwijaya. This study did not involve protected species or endangered plants. Sampling was conducted on ornamental plants in public and privately owned areas with prior permission from landowners and local authorities. No ethical approval was required for this type of observational study.

Sampling design and plant selection

This study employed an observational survey using purposive sampling. Sampling focused on ornamental plants showing visible symptoms associated with mite infestation, including chlorotic spots, leaf discoloration, bronzing, leaf curling, and the presence of webbing. Sampling was conducted at multiple locations within each altitudinal zone, including home gardens, public green spaces, and ornamental plant markets. Sampling locations were selected based on accessibility, presence of ornamental plants, and representation of lowland and highland environmental conditions. Within each altitudinal zone, multiple sites were surveyed to capture variation in plant composition.

For each ornamental plant species encountered, approximately 5-10 individual plants were examined when available. A total of 6 locations were surveyed in each altitudinal zone, with approximately 5-10 plants examined per location. From each plant, 3-5 leaves were inspected, or floral parts when symptoms were observed on flowers. Each plant species was sampled from at least three individual plants per location when available. Plant species, sampling location, and visible symptoms were recorded for each sample. Because sampling targeted symptomatic plants, the dataset represents descriptive presence-absence records of mite occurrence and host associations rather than quantitative estimates of abundance or diversity.

Collection of mite specimens

Mite specimens were collected from symptomatic plant tissues by cutting infested leaves or flowers using sterilized scissors. Each sample was placed in a labeled zip-lock bag indicating host plant species, sampling location, and date of collection. Samples were stored in plastic containers and transported in a cool box to maintain specimen condition and reduce damage during transport.

Preparation of specimens

In the laboratory, plant samples were allowed to equilibrate at room temperature for approximately 30 minutes before processing. Mites were carefully removed from plant tissues using a fine brush under adequate lighting. Specimens were prepared as permanent microscope slides following standard acarological procedures with minor modifications. Mites were cleared and mounted in Canada balsam on glass slides and arranged to allow observation of diagnostic morphological characters.

Slides were gently heated at approximately 40-45°C to facilitate clearing and proper adhesion of the mounting medium, then dried for 24-48 hours. Slides were subsequently cooled at room temperature prior to examination. Each slide was labeled with specimen code, host plant species, sampling location, and date of collection. Prepared slides were stored as voucher specimens in the laboratory collection.

Mite identification

Mite identification was conducted to genus level based on morphological characters observed under a compound microscope at magnifications of 100×-400×. Identification focused on adult specimens, as these provide the most reliable diagnostic features. Morphological characters used for identification included body shape (idiosoma), arrangement and morphology of dorsal setae, leg and claw structures, and features of the gnathosoma.

Identification was performed using available taxonomic references, including Hernandes et al. (2015), Akyazi et al. (2017), Marić et al. (2017), and Khaustov (2020). Genus-level identification was adopted due to limitations in diagnostic characters and available taxonomic resources for species-level identification. This approach provides baseline information on mite composition and host associations in the study area.

Data recording and analysis

Data collected included host plant species, sampling location, observed symptoms, and identified mite genus. Host-mite associations were compiled for each altitudinal zone. Data were analyzed descriptively and presented in tables and figures as records of mite genera associated with ornamental plant species. No quantitative comparison between lowland and highland areas was performed due to the purposive sampling design. The data presented represent presence-absence records rather than quantitative abundance measurements, due to the purposive sampling design.

RESULTS AND DISCUSSION

Mite genera associated with ornamental plants in lowland and highland areas

A total of four mite genera belonging to four families were recorded on ornamental plants in both lowland and highland areas of South Sumatra. The recorded genera included *Tetranychus* (Tetranychidae) and *Brevipalpus* (Tenuipalpidae) as phytophagous mites, and *Amblyseius* (Phytoseiidae) and *Bdellodes* (Bdellidae) as predatory mites. In the lowland area (North Indralaya), ten ornamental plant species were recorded as hosts of mites. Phytophagous mites of the genus *Brevipalpus* were associated with several host plants, including *Allamanda cathartica*, *Catharanthus roseus*, *Cosmos sulphureus*, and *Phalaenopsis amabilis*. The genus *Tetranychus* was recorded on multiple host plants, including *Helianthus annuus*, *Jasminum sambac*, *Rosa indica*, *Saraca indica*, and *Syzygium myrtifolium*. Predatory mites were also observed in the lowland area. The genus *Amblyseius* was recorded on several host plants, including *A. cathartica*, *Bougainvillea spectabilis*, *C. roseus*, *J. sambac*, and *S. myrtifolium*, while *Bdellodes* was recorded on *B. spectabilis*. Detailed host-mite associations and sampling locations in the lowland area are presented in Table 1.

Several mite genera were recorded on more than one host plant species. Most individuals were observed on the underside of leaves, which provides a relatively protected microhabitat for mites. However, some mites were also found on other plant parts, including flowers and petals. For example, the genus *Brevipalpus* was observed on both leaves and floral structures of *Cosmos sulphureus*. The distribution of mites on different plant parts is summarized in Table 2.

In the highland area (Pagar Alam), sixteen ornamental plant species were recorded. The genus *Brevipalpus* was associated with several host plants, including *A. cathartica*, *C. roseus*, *Cosmos caudatus*, and *Coleus scutellarioides*. The genus *Tetranychus* was recorded on a wider range of host plants, including *Rosa felicia*, *J. sambac*, *S. myrtifolium*, *Saraca indica*, *H. annuus*, *Hydrangea macrophylla*, *Dahlia* spp., *Spathiphyllum* sp., *Brugmansia suaveolens*, *Canna indica*, and *Hippeastrum* sp. Predatory mites were also present in the highland area, where *Amblyseius* was recorded on *A. cathartica*, *B. spectabilis*, and *S. myrtifolium*, while *Bdellodes* was observed on *B. spectabilis*. Detailed host-mite associations in the highland area are presented in Table 3.

Several mite genera were recorded on multiple host plant species. Most individuals were observed on the underside of leaves, where infestations were more frequently detected, likely because this surface provides a relatively protected microhabitat. However, some mites were also found on other plant parts, including flowers and petals. For example, the genus *Brevipalpus* was observed on both leaves and floral structures of *Cosmos* sp. The distribution of mites on different plant parts is summarized in Table 4.

Host ornamental plants of mites in the lowland area

Ornamental plants cultivated in South Sumatra were diverse, particularly in the lowland area. In North Indralaya, ten ornamental plant species were recorded as hosts of mites, namely *R. indica*, *B. spectabilis*, *C. roseus*, *C. sulphureus*, *P. amabilis*, *S. indica*, *J. sambac*, *H. annuus*, *S. myrtifolium*, and *A. cathartica*. These ornamental plants were observed growing in home gardens, public green spaces, and ornamental plant sales centers (Figure 2).

Table 1. Mite genera found on ornamental plants in North Indralaya, Ogan Ilir Regency, South Sumatra, Indonesia

Host Family/Genus	Mite family	Mite genus	Body color of mite	Location/Village	Coordinate point	
					Latitude	Longitude
Apocynaceae	Tenuipalpidae	*Brevipalpus*	Brownish orange	Tanjung Pering	-3.209758°	104.642944°
Allamanda cathartica	Phytoseiidae	*Amblyseius*	Pellucid			
Nyctaginaceae	Bdellidae	*Bdellodes*	Dark red	Pulau Semambu	-3.17753°	104.685458°
Bougainvillea spectabilis	Phytoseiidae	*Amblyseius*	Pellucid			
Apocynaceae	Tenuipalpidae	*Brevipalpus*	Brownish orange	Tanjung Pering	-3.208061°	104.644931°
Catharanthus roseus	Phytoseiidae	*Amblyseius*	Pellucid			
Asteraceae	Tenuipalpidae	*Brevipalpus*	Brownish orange	Timbangan	-3.222588°	104.646462°
Cosmos sulphureus						
Asteraceae	Tetranychidae	*Tetranychus*	Red	Timbangan	-3.206888°	104.652213°
Helianthus annuus						
Oleaceae	Tetranychidae	*Tetranychus*	Red	Timbangan	-3.199194°	104.658573°
Jasminum sambac	Phytoseiidae	*Amblyseius*	Pellucid			
Orchidaceae	Tenuipalpidae	*Brevipalpus*	Brownish orange	Universitas Sriwijaya	-3.211588°	104.648825°
Phalaenopsis amabilis						
Rosaceae	Tetranychidae	*Tetranychus*	Red	Palem Raya	-3.212202°	104.655147°
Rosa indica						
Fabaceae	Tetranychidae	*Tetranychus*	Red	Permata Baru	-3.210806°	104.625436°
Saraca indica						
Myrtaceae	Tetranychidae	*Tetranychus*	Red	Tanjung Pering	-3.209188°	104.636718°
Syzygium myrtifolium	Phytoseiidae	*Amblyseius*	Pellucid			

Table 2. Plants and mite genera recorded on ornamental plants in the lowlands

Mites found		Host	Habitat	Role
Mite family	Mite genus			
Tenuipalpidae	*Brevipalpus*	*Allamanda cathartica*, *Catharanthus roseus*, *Cosmos sulphureus*, *Phalaenopsis amabilis*	On the leaves and flowers	Phytophagous
Tetranychidae	*Tetranychus*	*Rosa indica*, *Jasminum sambac*, *Syzygium myrtifolium*, *Saraca indica*, *Helianthus annuus*	On the leaves	Phytophagous
Bdellidae	*Bdellodes*	*Bougainvillea spectabilis*	On the leaves	Predator
Phytoseiidae	*Amblyseius*	*Catharanthus roseus*, *Allamanda cathartica*, *Bougainvillea spectabilis*, *Jasminum sambac*, *Syzygium myrtifolium*	On the leaves	Predator

Table 3. Mites recorded on various ornamental plants in the highlands

Host	Family	Genus	Body color	Location/village	Coordinate point	
					Latitude	Longitude
Apocynaceae *Catharanthus roseus*	Tenuipalpidae	*Brevipalpus*	Brownish orange	Curup Jare	-4.005317°	103.132717°
Apocynaceae *Allamanda cathartica*	Tenuipalpidae Phytoseiidae	*Brevipalpus* *Amblyseius*	Brownish orange Pellucid	Nendagung	-4.013292°	103.125788°
Rosaceae *Rosa felicia*	Tetranychidae	*Tetranychus*	Red	Pagar Wangi	-4.021980°	104.655147°
Asteraceae *Cosmos caudatus*	Tenuipalpidae	*Brevipalpus*	Brownish orange	Dempo Makmur	-4.013508°	103.112608°
Nyctaginaceae *Bougainvillea spectabilis*	Bdellidae Phytoseiidae	*Bdellodes* *Amblyseius*	Dark red Pellucid	Pagar Wangi	-4.022178°	103.113946°
Oleaceae *Jasminum sambac*	Tetranychidae	*Tetranychus*	Red	Pagar Wangi	-4.022014°	103.113541°
Myrtaceae *Syzygium myrtifolium*	Tetranychidae Phytoseiidae	*Tetranychus* *Amblyseius*	Red Pellucid	Karang Dalo	-4.031024°	103.175500°
Fabaceae *Saraca indica*	Tetranychidae	*Tetranychus*	Red	Bumi Agung	-4.030517°	103.121377°
Asteraceae *Helianthus annuus*	Tetranychidae	*Tetranychus*	Red	Prahu Dipo	-4.043381°	103.200255°
Hydrangeaceae *Hydrangea macrophylla*	Tetranychidae	*Tetranychus*	Red	Curup Jare		
Araceae *Spathiphyllum* sp.	Tetranychidae	*Tetranychus*	Red	Nendagung	-4.014501°	103.141823°
Solanaceae *Brugmansia suaveolens*	Tetranychidae	*Tetranychus*	Red	Pagar Wangi	-4.041927°	103.113729°
Asteraceae *Dahlia* spp.	Tetranychidae	*Tetranychus*	Red	Pagar Wangi	-4.022156°	103.113951°
Lamiaceae *Coleus scutellarioides*	Tenuipalpidae	*Brevipalpus*	Brownish orange	Pagar Wangi	-4.022153°	103.113918°
Cannaceae *Canna indica*	Tetranychidae	*Tetranychus*	Red	Dempo Makmur	-4.013634°	103.112230°
Amaryllidaceae *Hippeastrum* sp.	Tetranychidae	*Tetranychus*	Red	Pagar Wangi	-4.021984°	103.113305°

Table 4. Plants and mite genera recorded on ornamental plants in the highlands

Mites found		Host	Habitat	Role
Mite family	Mite genus			
Tenuipalpidae	*Brevipalpus*	*Allamanda cathartica*, *Catharanthus roseus*, *Cosmos caudatus*, *Coleus scutellarioides*	On the leaves and flowers	Phytophagous
Tetranychidae	*Tetranychus*	*Rosa felicia*, *Jasminum sambac*, *Syzygium myrtifolium*, *Saraca indica*, *Helianthus annuus*, *Hydrangea macrophylla*, *Spathiphyllum* sp., *Brugmansia suaveolens*, *Dahlia* spp., *Canna indica*, *Hippeastrum* sp.	On the leaves	Phytophagous
Bdellidae	*Bdellodes*	*Bougainvillea spectabilis*	On the leaves	Predator
Phytoseiidae	*Amblyseius*	*Allamanda cathartica*, *Bougainvillea spectabilis*, *Syzygium myrtifolium*	On the leaves	Predator

Host ornamental plants of mites in the highland area

In the highland area (Pagar Alam), sixteen ornamental plant species were recorded as hosts of mites, namely *Spathiphyllum* sp., *H. macrophylla*, *C. scutellarioides*, *C. indica*, *Dahlia* spp., *B. suaveolens*, *R. felicia*, *B. spectabilis*, *C. roseus*, *C. caudatus*, *S. indica*, *H. annuus*, *J. sambac*, *S. myrtifolium*, *A. cathartica*, and *Hippeastrum* sp. These ornamental plants were observed in home gardens, public green spaces, and ornamental plant sales centers (Figure 3).

Symptoms of mite infestation on ornamental plants

Mite infestations produced similar symptoms across the observed ornamental plant species. In general, initial symptoms appeared as fine yellowish to grayish spots on the leaves surface, particularly along the veins. These spots gradually turned brown as infestation progressed. In roses (*R. indica*), fine yellowish spots developed along the veins and later caused leaf discoloration and a dull appearance (Figure 4.A). On *B. spectabilis*, pale yellow to grayish spots were scattered across the leaf surface, with mites commonly observed on the underside of leaves (Figure

4.B). Similar chlorotic spots were observed on *C. roseus* (Figure 4.C) and *C. sulphureus* (Figure 4.D). On *P. amabilis*, early infestation symptoms appeared as faint grayish spots distributed across the leaf surface (Figure 4.E). Brownish spots were observed on *S. indica* (Figure 4.F), whereas *J. sambac* showed yellowish spotting on the leaves surface (Figure 4.G). In *H. annuus*, small yellowish spots accumulated under heavy infestations (Figure 4.H). On *S. myrtifolium*, yellowish spotting was evident on the leaves (Figure 4.I). Severe infestations on *A. cathartica* resulted in grayish spots on the underside of leaves and occasional leaf curling (Figure 4.J).

Mite infestations in the highland area produced similar symptoms across host plants, generally appearing as yellowish to silvery spots on the leaves surface. On *Spathiphyllum* sp. (Figure 5.A), *C. indica* (Figure 5.D), and *B. suaveolens* (Figure 5.F), symptoms were observed as diffuse yellowish to silvery spotting. On *H. macrophylla* (Figure 5.B) and *Dahlia* spp. (Figure 5.C), similar spotting was observed, accompanied by fine webbing associated with *Tetranychus* infestations. In *C. scutellarioides*, chlorotic spots were more concentrated along the leaf veins (Figure 5.E).

In *R. felicia* (Figure 5.G) and *B. spectabilis* (Figure 5.H), yellowish spots developed along the veins and gradually turned brown as infestation progressed. On *C. roseus* (Figure 5.I), symptoms were primarily distributed along the leaf veins, with mites commonly found on the underside of leaves. Leaves of *C. caudatus* (Figure 5.J) and *S. indica* (Figure 5.K) exhibited small yellowish to brownish spots. Similar symptoms were observed on *H. annuus* (Figure 5.L) and *J. sambac* (Figure 5.M). In *S. myrtifolium*, small yellowish spots accumulated under heavier infestations (Figure 5.N). On *A. cathartica*, mite feeding resulted in chlorotic spotting and leaf discoloration (Figure 5.O).

Phytophagous mites were found on several ornamental plant species in both lowland and highland areas. In the lowland area, phytophagous mites were recorded on nine ornamental plant species, namely *R. indica*, *B. spectabilis*, *C. roseus*, *C. sulphureus*, *S. indica*, *J. sambac*, *H. annuus*, *S. myrtifolium*, and *A. cathartica* (Figure 6). In the highland area, phytophagous mites were found on fourteen ornamental plant species, including *Spathiphyllum* sp., *H. macrophylla*, *Dahlia* spp., *C. scutellarioides*, *C. indica*, *B. suaveolens*, *R. felicia*, *C. roseus*, *C. caudatus*, *S. indica*, *H. annuus*, *J. sambac*, *S. myrtifolium*, and *A. cathartica* (Figure 7). Predatory mites were also observed in both study areas. In the lowland area, predatory mites were recorded on *B. spectabilis*, *C. roseus*, *J. sambac*, *S. myrtifolium*, and *A. cathartica* (Figure 8). Meanwhile, in the highland area, predatory mites were found on *B. spectabilis*, *A. cathartica*, and *S. myrtifolium* (Figure 9).

Figure 2. Representative ornamental plant species recorded as hosts of mites in the lowland area. A. *Rosa indica*, B. *Bougainvillea spectabilis*, C. *Catharanthus roseus*, D. *Cosmos sulphureus*, E. *Phalaenopsis amabilis*, F. *Saraca indica*, G. *Jasminum sambac*, H. *Helianthus annuus*, I. *Syzygium myrtifolium*, J. *Allamanda cathartica*. All images were taken by the authors during field sampling

Figure 3. Representative ornamental plant species recorded as mite hosts in the highland area. A. *Spathiphyllum* sp., B. *Hydrangea macrophylla*, C. *Dahlia* spp., D. *Coleus scutellarioides*, E. *Canna indica*, F. *Brugmansia suaveolens*, G. *Rosa felicia*, H. *Bougainvillea spectabilis*, I. *Catharanthus roseus*, J. *Cosmos caudatus*, K. *Saraca indica*, L. *Helianthus annuus*, M. *Jasminum sambac*, N. *Syzygium myrtifolium*, O. *Allamanda cathartica*, P. *Hippeastrum* sp. All images were taken by the authors during field sampling

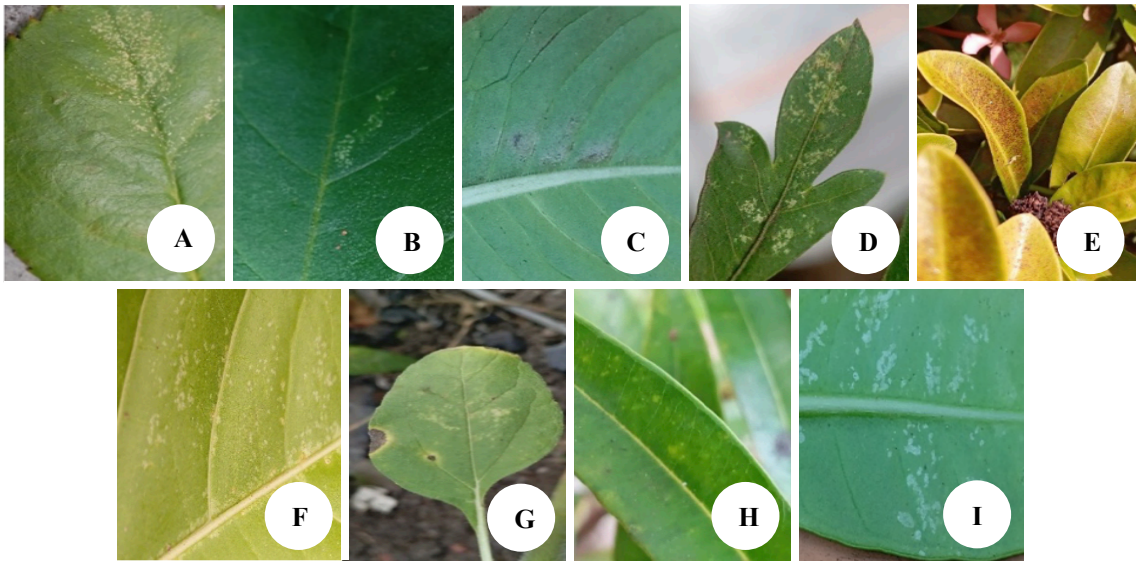

Figure 4. Symptoms of mite infestation observed on ornamental plants in the lowland area. A. *Rosa indica*, B. *Bougainvillea spectabilis*, C. *Catharanthus roseus*, D. *Cosmos sulphureus*, E. *Saraca indica*, F. *Jasminum sambac*, G. *Helianthus annuus*, H. *Syzygium myrtifolium*, I. *Allamanda cathartica*. All images were taken by the authors during field sampling

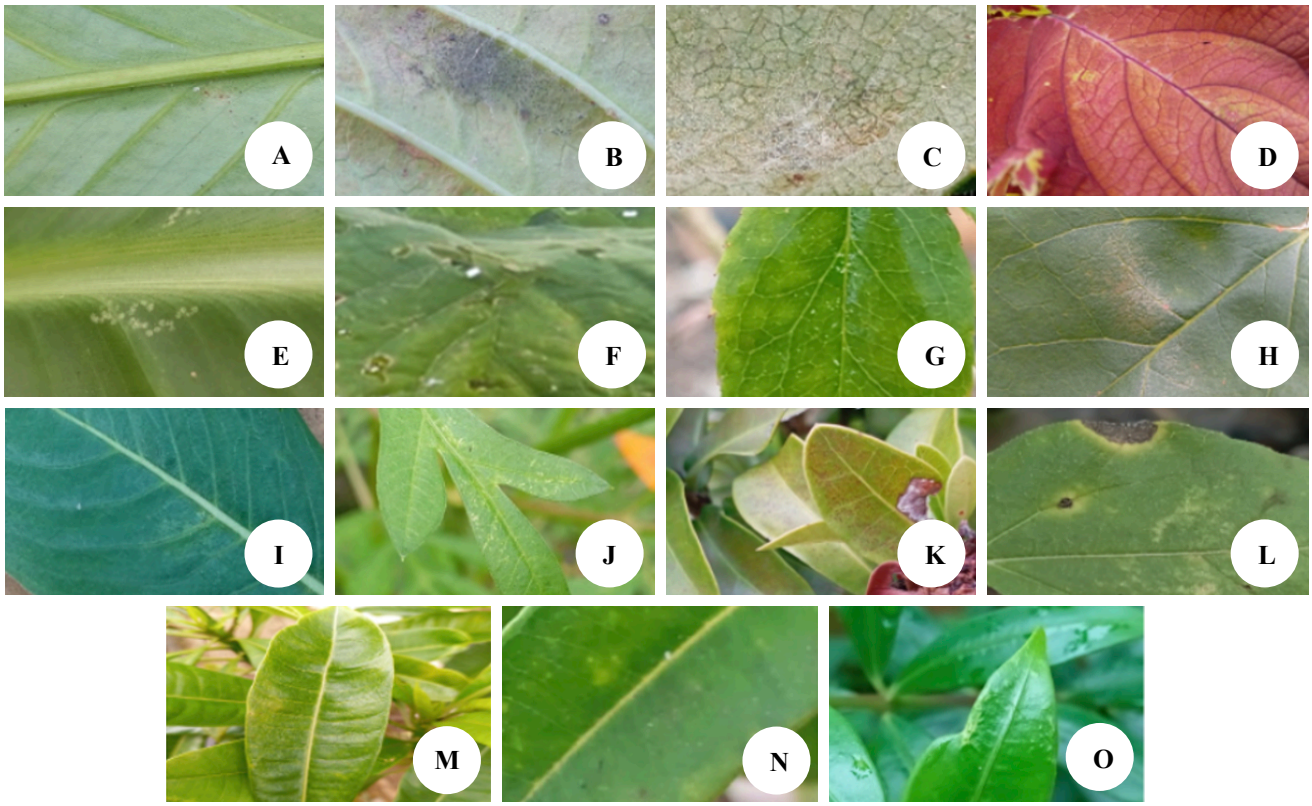

Figure 5. Symptoms of mite infestation observed on ornamental plants in the highland area. A. *Spathiphyllum* sp., B. *Hydrangea macrophylla*, C. *Dahlia* spp., D. *Coleus scutellarioides*, E. *Canna indica*, F. *Brugmansia suaveolens*, G. *Rosa felicia*, H. *Bougainvillea spectabilis*, I. *Catharanthus roseus*, J. *Cosmos caudatus*, K. *Saraca indica*, L. *Helianthus annuus*, M. *Jasminum sambac*, N. *Syzygium myrtifolium*, O. *Allamanda cathartica*. All images were taken by the authors during field sampling

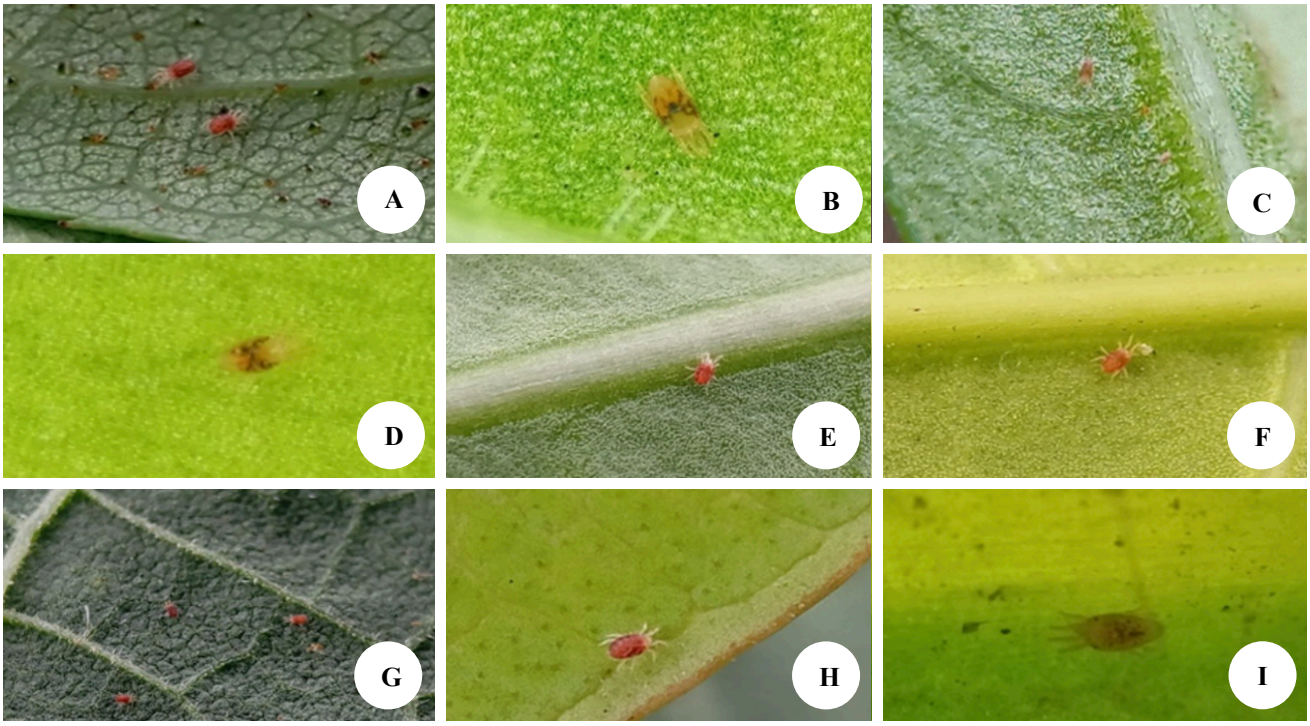

Figure 6. Phytophagous mites found on ornamental plants in the lowland area. A. *Rosa indica*, B. *Bougainvillea spectabilis*, C. *Catharanthus roseus*, D. *Cosmos sulphureus*, E. *Saraca indica*, F. *Jasminum sambac*, G. *Helianthus annuus*, H. *Syzygium myrtifolium*, and I. *Allamanda cathartica*. All images were taken by the authors during field sampling

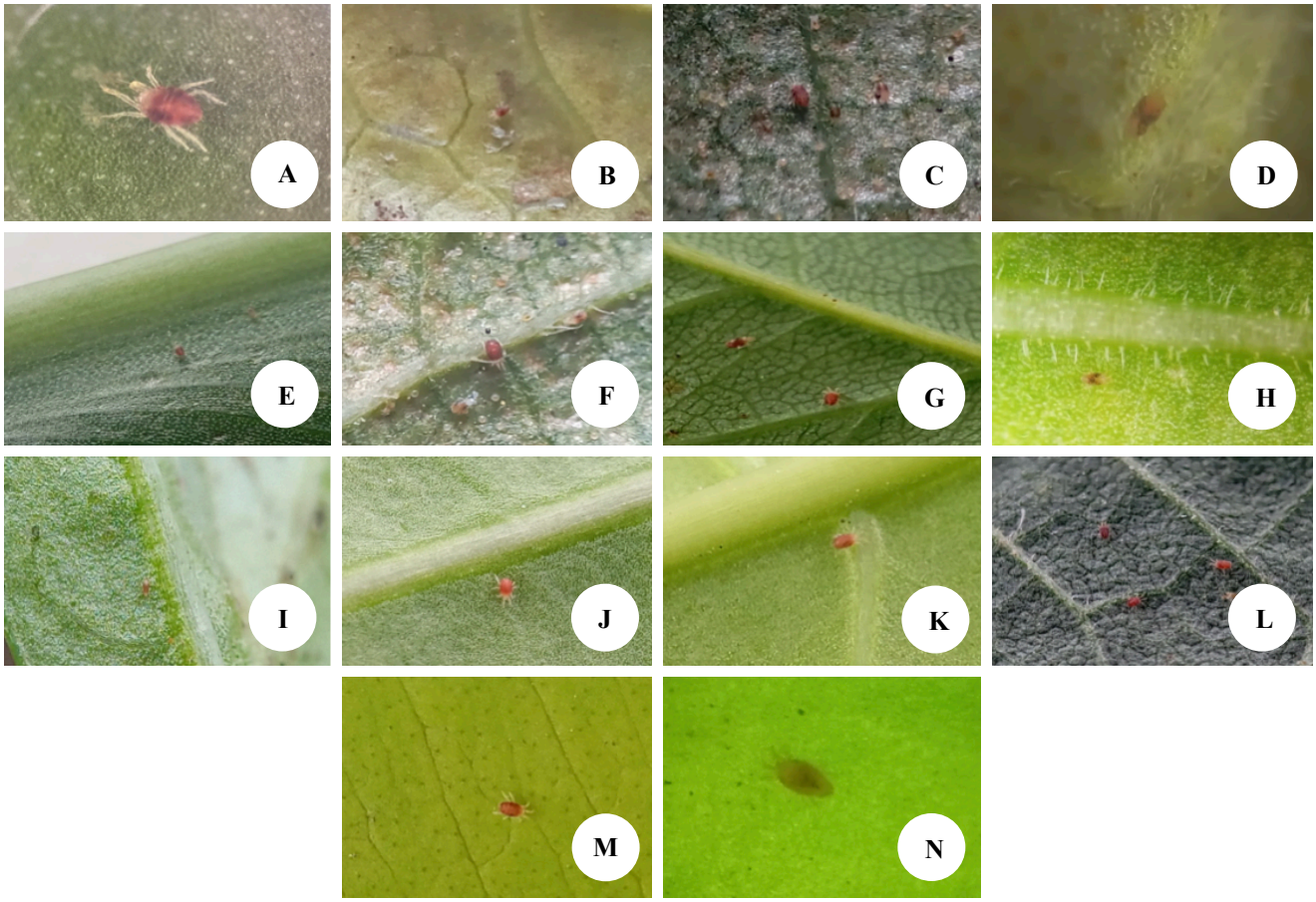

Figure 7. Phytophagous mites found on ornamental plants in the highland area. A. *Spathiphyllum* sp., B. *Hydrangea macrophylla*, C. *Dahlia* spp., D. *Coleus scutellarioides*, E. *Canna indica*, F. *Brugmansia suaveolens*, G. *Rosa felicia*, H. *Catharanthus roseus*, I. *Cosmos caudatus*, J. *Saraca indica*, K. *Helianthus annuus*, L. *Jasminum sambac*, M. *Syzygium myrtifolium*, N. *Allamanda cathartica*. All images were taken by the authors during field sampling

Figure 8. Predatory mites found on ornamental plants in the lowland area. A. *Bougainvillea spectabilis* (*Amblyseius*), B. *Catharanthus roseus*, C. *Jasminum sambac*, D. *Syzygium myrtifolium*, E. *Allamanda cathartica*, and F. *Bougainvillea spectabilis* (*Bdellodes*). All images were taken by the authors during field sampling

Mite genera identified on ornamental plants

Laboratory observations revealed that phytophagous mites collected from ornamental plants in both lowland and highland areas exhibited distinct morphological characteristics. Specimens collected from *A. cathartica*, *C. roseus*, *C. sulphureus*, and *P. amabilis* in the lowland area, as well as from *A. cathartica*, *C. roseus*, *C. caudatus*, and *C. scutellarioides* in the highland area, shared similar diagnostic features. The observed mites possessed a dorsoventrally flattened, oval body with brownish-orange coloration. Dark dorsal markings were present, and a jugal furrow was observed on the propodosoma, while a disjugal furrow was present on the hysterosoma. Dorsal setae were short and simple. The legs consisted of the coxa, trochanter, femur, genu, tibia, and tarsus, with the anterior legs slightly longer than the posterior legs. The tarsal claws bore clustered setae accompanied by a single longer seta. The gnathosoma was relatively short, with chelicerae shorter than the palps (Figure 10.A). Based on these morphological characteristics, the specimens were identified as belonging to the genus *Brevipalpus*.

Laboratory observations showed that phytophagous mites collected from *R. indica*, *J. sambac*, *S. myrtifolium*, *S. indica*, and *H. annuus* in the lowland area, as well as from *R. felicia*, *J. sambac*, *S. myrtifolium*, *S. indica*, and *H. annuus* in the highland area, exhibited consistent morphological characteristics. The specimens displayed a compact, oval body with red to dark red coloration and darker markings along the body margins. The gnathosoma and legs were brownish. Twelve pairs of dorsal setae were observed. The legs bore numerous setae, and the tarsal claws possessed characteristic three-branched (empodial) setae. The anterior legs were slightly longer than the posterior legs. The gnathosoma was relatively short, with chelicerae shorter than the palps (Figure 10.B). Based on these morphological characteristics, the specimens were identified as belonging to the genus *Tetranychus*.

Laboratory observations showed that mites collected from *B. spectabilis* exhibited distinct morphological characteristics. The specimens possessed an elongated oval body tapering posteriorly from the hysterosoma region. Body coloration was brownish on the propodosoma and legs, and dark reddish-brown on the hysterosoma. Two pairs of relatively long dorsal setae were present on the propodosoma. Leg setae were fewer, shorter, and finer compared to phytophagous mites. The posterior legs were longer than the anterior legs. The tarsal claws bore setae arranged in a distinct V-shaped configuration (Figure 10.C). Based on these morphological characteristics, the specimens were identified as belonging to the genus *Bdellodes.*

Figure 9. Predatory mites found on ornamental plants in the highland area. A. *Bougainvillea spectabilis*, B. *Allamanda cathartica*, and C. *Syzygium myrtifolium*. All images were taken by the authors during field sampling

Figure 10. A. Mite *Brevipalpus*, B. Mite *Tetranychus*, C. Mite *Bdellodes*, D. Mite *Amblyseius*

Laboratory observations showed that mites collected from *C. roseus*, *A. cathartica*, *B. spectabilis*, *J. sambac*, and *S. myrtifolium* in the lowland area, as well as from *A. cathartica*, *B. spectabilis*, and *S. myrtifolium* in the highland area, exhibited consistent morphological characteristics.

The specimens possessed a pear-shaped, translucent body. Six pairs of dorsal setae were observed. Leg setae were relatively fewer, shorter, and finer compared to phytophagous mites. The posterior legs were slightly longer than the anterior legs. The tarsal claws exhibited knob-like structures (Figure 10.D). Based on these morphological characteristics, the specimens were identified as belonging to the genus *Amblyseius*.

Discussion

Mites are among the most important arthropods associated with ornamental plants due to their potential to cause significant damage and reduce plant quality, particularly in tropical environments where warm temperatures and high humidity favor their development. In this study, four mite genera representing both phytophagous (*Tetranychus* and *Brevipalpus*) and predatory (*Amblyseius* and *Bdellodes*) groups were consistently recorded across both lowland and highland areas of South Sumatra. This finding indicates that ornamental plant systems in these environments support similar mite assemblages at the genus level despite differences in altitude.

The dominance and widespread occurrence of *Tetranychus* across multiple host plants suggest that this genus is highly adaptable and polyphagous. Previous studies have reported that *Tetranychus* species are capable of infesting a wide range of horticultural and ornamental plants (Indayani et al. 2022; Hanik et al. 2024). Its presence in both lowland and highland areas indicates that this genus can tolerate varying environmental conditions, including differences in temperature and humidity. This adaptability is likely related to its rapid life cycle and high reproductive capacity.

Similarly, *Brevipalpus* was recorded on several host plants, particularly those with relatively soft leaf tissues. This observation is consistent with previous reports indicating that this genus is widely distributed and associated with multiple plant species (Mendonça et al. 2025). Its feeding behavior, which involves piercing plant tissues and extracting cell contents, is closely related to the development of chlorotic and necrotic symptoms observed in this study.

The occurrence of predatory mites, particularly *Amblyseius*, on several host plants where phytophagous mites were present suggests potential predator-prey interactions. Predatory mites are known to play an important role in suppressing populations of phytophagous mites and are widely recognized as biological control agents (Ghazy et al. 2016; Vásquez et al. 2023). The presence of multiple predatory mite genera on the same host plant, such as *B. spectabilis*, suggests potential niche overlap or complementary predation within the same microhabitat. However, this observation is based on presence-absence data, and further quantitative studies are required to confirm these interactions.

Despite environmental differences between lowland and highland areas, the composition of mite genera was relatively similar. This suggests that, at the genus level, mite assemblages are not strongly influenced by altitude. Instead, host plant availability and microhabitat conditions, particularly the underside of leaves, may play a more important role in determining mite occurrence (Sudo and Osakabe 2011; Dube et al. 2018).

The symptoms observed, including chlorotic spotting, leaf discoloration, bronzing, and webbing, are consistent with typical damage caused by phytophagous mites (Devi et al. 2019; Bhattacharjya et al. 2024). These symptoms were relatively similar across host plants, indicating that mite feeding produces comparable physiological responses in plant tissues. Such damage can reduce the aesthetic value of ornamental plants (Ismayil et al. 2024). This study employed purposive sampling targeting symptomatic plants; therefore, the results represent descriptive presence-absence records rather than quantitative comparisons. In addition, identification was limited to the genus level due to taxonomic constraints, which may mask species-level diversity. Nevertheless, this study provides baseline information on mite-host associations on ornamental plants in South Sumatra. The presence of both phytophagous and predatory mites across altitudinal zones highlights the ecological complexity of ornamental plant systems and suggests a potential role of natural enemies in regulating pest populations. Future studies should focus on species-level identification and incorporate quantitative approaches, including assessments of abundance and predator-prey interactions, to support the development of sustainable integrated pest management strategies.

In conclusion, this survey provides baseline genus-level documentation of mites and their host associations on ornamental plants across lowland (North Indralaya) and highland (Pagar Alam) areas of South Sumatra. A total of ten ornamental plant species were recorded in the lowland area and sixteen species in the highland area. Four genera representing two functional groups were consistently recorded: the phytophagous *Tetranychus* (Tetranychidae) and *Brevipalpus* (Tenuipalpidae), and the predatory *Amblyseius* (Phytoseiidae) and *Bdellodes* (Bdellidae). *Tetranychus* and *Brevipalpus* occurred on multiple ornamental hosts and were associated with typical damage symptoms, including chlorotic to silvery spotting, discoloration, bronzing, occasional curling, and webbing, largely on the underside of leaves. The co-occurrence of predatory mites on several infested hosts suggests potential natural regulation, although this study used purposive, symptom-based sampling and presence-absence records. Despite contrasting altitudes, mite composition was similar at the genus level, implying that host availability and microhabitat may be more influential than elevation.

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