ENTOMOLOGICAL Communications

Entomological Communications, 7, 2025: ec07021
doi: 10.37486/2675-1305.ec07021
e-ISSN: 2675-1305
Open Access Full Text Article

Scientific Note

Record of *Cinnamomum verum* (Lauraceae) as a host for treehoppers (Hemiptera, Auchenorrhyncha: Aetalionidae and Membracidae)

Glauco C. de S. Oliveira

Universidade Federal de Lavras, Lavras, MG, Brazil.
Corresponding author: glaucomlds@hotmail.com

Edited by: Alberto M. Silva-Neto

Received: January 27, 2025. Accepted: July 21, 2025. Published: August 14, 2025.

Abstract. Cinnamon plants are attacked by different phytophagous insects, but there are no records of infestations by treehoppers. Thus, this note reports *Notogonioides erythropus* (Burmeister, 1835), *Talipes appendiculatus* (Fonseca, 1936), and *Bolbonota inaequalis* (Fabricius, 1803) (Hemiptera: Membracidae) using a cinnamon tree as a host in an urban area of southeastern Brazil. Additionally, the formation of an interspecific aggregation between the leafhopper *Aethalion reticulatum* (Linnaeus, 1767) (Hemiptera: Aetalionidae) and *N. erythropus* is recorded.

Keywords: Membracidae, *Notogonioides*, *Talipes, Bolbonota*.

Cinnamon *Cinnamomum verum* J. Presl (Lauraceae), originally from the Asian continent, is cultivated in different tropical and subtropical regions (Khan et al. 2020). Its bark is traditionally used as a spice in cooking and traditional medicine, as it contains substances with pharmacological properties (Singh et al. 2021).

Despite natural strategies against herbivory, such as essential oils with insecticidal properties (Singh & Maurya 2005), *Cinnamomum* Schaeff. plants are known to be attacked by various pests (Jayasinghe et al. 2020). Specifically, *C. verum* is targeted by different phytophagous insects, including some hemipterans (Khan et al. 2020; Oliveira 2024). However, there is little information on leafhoppers and treehoppers using this plant as a host. Thus, the aim of this note was to report three treehopper species infesting *C. verum* plants in an urban area in southeastern Brazil.

The observations took place in January 2025 on a mature *C. verum* tree in a home garden of a residence (21°01'24.17"S / 44°19'11.81"W) in the municipality of Ritápolis, Minas Gerais, southeastern Brazil.

Three species of Membracidae: *Talipes appendiculatus* (Fonseca, 1936), *Notogonioides erythropus* (Burmeister, 1835), and *Bolbonota inaequalis* (Fabricius, 1803), along with one species of Aethalionidae, *Aethalion reticulatum* (Linnaeus, 1767), were observed forming aggregative colonies on *C. verum* branches (Fig. 1). The colonies of *A. reticulatum* were the most numerous, with seven colonies recorded, while *T. appendiculatus* and *B. inaequalis* had two colonies each, and *N. erythropus* was observed in only one colony. The ten colonies were individually distributed across different branches. However, on the 26th, a mixed colony of adult *T. appendiculatus* and both adult and nymphal *N. erythropus* individuals (Fig. 1D-F) was observed on a branch that had not previously been occupied by either species. The treehoppers were identified based on Sakakibara (1996), Sakakibara (2012), Lencioni-Neto & Sakakibara (2016), and ants based on Feitosa & Dias (2024).

Aethalion reticulatum had already been recorded on *C. verum* in the municipality of Ritápolis, Minas Gerais. This leafhopper interacts with ants, wasps, and stingless bees, which consume the honeydew in exchange for providing protection to the leafhoppers (Oliveira 2024).

For the first time, *C. verum* has been recorded as a host for *T. appendiculatus*. This treehopper had previously been observed on the also exotic *Cassia fistula* Linnaeus (Fabaceae) (Lencioni-Neto & Sakakibara 2016) and *Struthanthus marginatus* (Desr.) Blume (Loranthaceae) (Marques et al. 2009). This species also forms associations with bees, ants, and wasps (Lencioni-Neto & Sakakibara 2016), however, there were no prior records of its association with *Camponotus* Mayr, 1861 ants (Hymenoptera: Formicidae).

Similarly, *N. erythropus* had not been previously recorded on *C. verum*. However, this treehopper has been observed on avocado trees (*Persea* sp.) (Lencioni-Neto 2011) and bay laurel (*Ocotea* sp.) (Cavalleri et al. 2010), both from the Lauraceae family, and in association with *Camponotus* spp.

Treehoppers of the genus *Bolbonota* Amyot & Serville, 1843 (Hemiptera: Membracidae) are found on native plants such as *Byrsonima crassifolia* (L.) Kunth (Malpighiaceae) (Sánchez-Soto et al. 2019), *Solanum lycocarpum* a.st. hil. (Solanaceae), and *Vernonia* sp. (Asteraceae) (Cavalleri et al. 2010), as well as on cultivated plants such as gilo *Solanum aethiopicum* Linnaeus (Solanaceae) (Picanço et al. 1997) and cacao *Theobroma cacao* Linnaeus (Malvaceae) (García & Montilla 2010; Benassi et al. 2016). Regarding associations with ants, there are few reports in the literature, but *Bolbonota* species are known to interact with *Ectatomma tuberculatum* (Olivier, 1792) (Hymenoptera: Formicidae) (Godoy et al. 2006; Sánchez-Soto et al. 2019). Therefore, this note provides evidence of these treehoppers associating with ants of the genus *Camponotus*.

The association between *Camponotus* ants and the hemipteran species in this study does not appear to be species-specific. Individuals of the same *Camponotus* species previously reported interacting with *A. reticulatum* (Oliveira 2024) were also observed associating with all three treehopper species, exhibiting similar behavior to that observed with *A. reticulatum* (see Oliveira 2024). Interestingly, no interactions between stingless bees and the treehoppers were recorded, unlike what was observed for *A. reticulatum* (Oliveira 2024). This could suggest a difference in the composition of the honeydew produced by leafhoppers and treehoppers, despite both using the same plant as a host, which could be confirmed by future studies.

Regarding the interspecific aggregation between *A. reticulatum* and *N. erythropus*, no agonistic behavior was observed between the two hemipteran species, nor was it possible to determine which initiated the interaction. The aggregation was patrolled by *Camponotus* ants, which collected honeydew from both hemipterans. This aggregation may provide greater protection for both species involved, as it could attract a higher number of patrolling ants. Similarly, aphids can compete with intra and interspecific neighbors for tending ants, which are a limited resource (Cushman & Addicott 1989). These authors

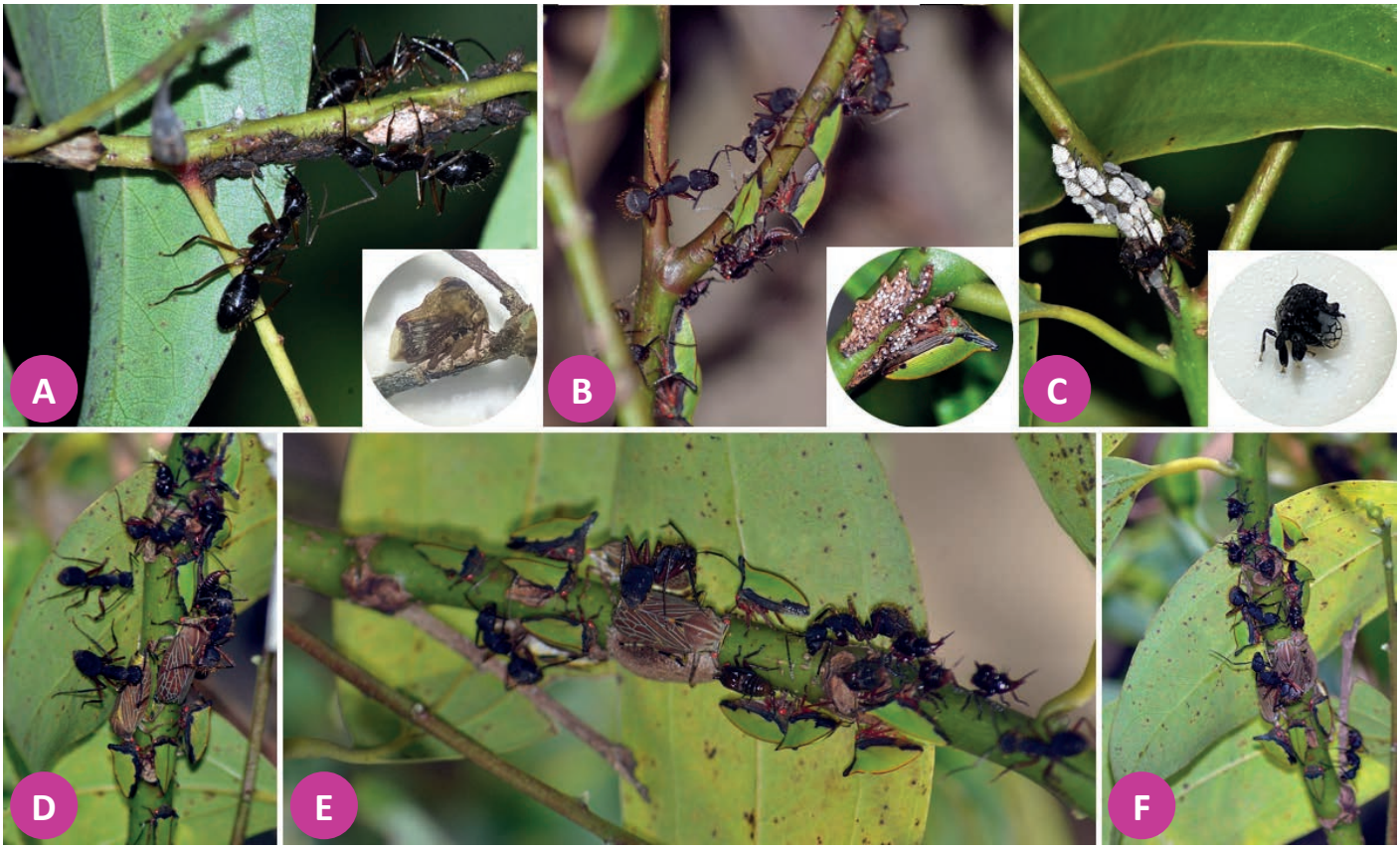

Figure 1. Treehoppers on *Cinnamomum verum* J. Presl. A. *Talipes appendiculatus* (Fonseca, 1936); B. *Notogonioides erythropus* (Burmeister, 1835); C. *Bolbonota inaequalis* (Fabricius, 1803); D-F. Interspecific aggregation between leafhopper *Aethalion reticulatum* (Linnaeus, 1767) and *N. erythropus*.

found that the number of ants had a positive effect on aphid fitness.

On the other hand, this mixed aggregation may have been particularly beneficial for *N. erythropus*, as individuals of *A. reticulatum* also interact with stingless bees and wasps, which can provide additional protection against predators and intruders for the treehoppers (Oliveira 2024). This was not observed in colonies composed only of *N. erythropus*, which were associated only with ants.

Interspecific aggregations among treehoppers are common in tropical forests (Wood 1984; Blüthgen et al. 2000). According to Wood (1984), these associations do not appear casual but are likely related to limitations in oviposition and feeding sites. However, this does not seem to be the case in the present study, since most *C. verum* branches were unoccupied by hemipterans. Since this note is based on a single observation, further studies may help determine the frequency of these interactions and the factors that promote and regulate them.

This note documents the infestation of *C. verum* by different treehoppers. Future studies could quantify the consequences of these interactions for *C. verum* plants, particularly in cinnamon production in tropical regions. Additionally, evidence is provided of an interspecific aggregation between leafhoppers and treehoppers.

Acknowledgments

To Aline Lourenço, Federal University of Paraíba (UFPB), for the identification of *B. inaequalis*.

Funding Information

No funding received.

Conflict of Interest Statement

No conflict of interest to be declared.

References

Benassi, V. L. R. M.; Valente, F. I.; Souza, C. A. S.; Benassi, A. C.; Sakakibara, A. M. (2016) Biodiversidade e sazonalidade de cigarrinhas (Hemiptera: Membracidae) em cacaueiros. *EntomoBrasilis*, 9(1): 41-46. doi: 10.12741/ebrasilis.v9i1.567

Blüthgen, N.; Verhaagh, M.; Goitía, W.; Jaffé, K.; Morawetz, W.; Barthlott, W. (2000) How plants shape the ant community in the Amazonian rainforest canopy: the key role of extrafloral nectaries and homopteran honeydew. *Oecologia*, 125: 229-240.

Cavalleri, A.; Kaminski, L. A.; Mendonça Jr, M. D. S. (2010) Ectoparasitism in *Aulacothrips* (Thysanoptera: Heterothripidae) revisited: host diversity on honeydew-producing Hemiptera and description of a new species. *Zoologischer Anzeiger-A Journal of Comparative Zoology*, 249(3-4): 209-221. doi: 10.1016/j.jcz.2010.09.002

Cushman, J. H.; Addicott, J. F. (1989) Intra-and interspecific competition for mutualists: ants as a limited and limiting resource for aphids. *Oecologia*, 79: 315-321. doi: 10.1007/BF00384310

Feitosa, R. M.; Dias, A. M. (2024) An illustrated guide for the identification of ant subfamilies and genera in Brazil. *Insect Systematics & Evolution*, 1: 1-121. doi: 10.1163/1876312x-bja10062

García, J. L.; Montilla, R. (2010) Hymenopteros parasitoides de insectos asociados a las plantaciones de cacao, en la región costera del estado Aragua, Venezuela. *Agronomía tropical*, 60(3): 91-97.

Godoy, C.; Miranda X.; Nishida K. (2006) *Membrácidos de la América Tropical*. Costa Rica: Instituto Nacional de Biodiversidad.

Jayasinghe, G. G.; Rajapakse, R. H. S.; Kumara, K. W.; Ratnasekera, D.; Adikaram, N. K. B. (2020) Pests and Diseases of Cinnamon (*Cinnamomum zeylanicum* Blume). In: Senaratne, R.; Pathirana, R. (Eds), *Cinnamon, Botany, Agronomy, Chemistry and Industrial Applications*. pp. 201-232. Cham: Springer. doi: 10.1007/978-3-030-54426-3_8

Khan, A. U.; Khanal, A. U. K. S.; Gyawali, S. (2020) Insect pests and diseases of cinnamon (*Cinnamomum verum* Presi.) and their management in agroforestry system: A review. *Acta Entomology and Zoology*, 1(2): 51-59. doi: 10.33545/27080013.2020.v1.i2a.19

Lancioni-Neto, F. (2011) Riqueza de espécies e distribuição espacial dos

Membracidae (Hemíptera Auchenorrhyncha) em uma pequena área do Campus Urbanova da Universidade do Vale do Paraíba-SP, Brasil. *Revista Univap*, 17(29): 80-98. doi: 10.18066/revunivap.v17i29.14

Lencioni-Neto, F.; Sakakibara, A. M. (2016) Description of the last nymphal instar of *Talipes appendiculatus* (Hemiptera: Membracidae: Membracinae), and notes on the biology of the immatures and adults. *Zoologia (Curitiba)*, 33(06): e20160103. doi: 10.1590/S1984-4689zool-20160103

Marques, O. M.; Sakakibara, A. M.; Santana, M. J. S.; Carvalho, A. D. A.; Coutinho, M. L. (2009) Species of Membracoidea (Insecta: Hemiptera) associated with the mistletoe *Struthanthus marginatus* (Desr.) Blume (Loranthaceae) in Cruz das Almas, Bahia. *Magistra*, 21(3): 219-221.

Oliveira, G. C. S. (2024) Nova planta hospedeira e novos registros da interação entre *Aethalion reticulatum* (Linnaeus, 1767) (Hemiptera: Aethalionidae) com abelhas-sem-ferrão. *Entomological Communications*, 6: ec06006. doi: 10.37486/2675-1305.ec06006

Picanço, M.; Casali, V. W.; Oliveira, I. R.; Leite, G. L. (1997) Homópteros associados ao jiloeiro. *Pesquisa Agropecuária Brasileira*, 32(4): 451-456.

Sánchez-Soto, S.; Sumano-López, D.; Pascual-Córdova, G.; Córdova-Sánchez, A.; González-Jiménez, V.; Ramírez-García, A. R. (2019) Membrácidos (Hemiptera: Membracidae) asociados a *Byrsonima crassifolia* (Malpighiaceae) en el noroeste de Chiapas, México. *Revista Nicaragüense de Entomología*, 161: 1-12.

Sakakibara, A. M. (1996) On some Polyglyptini (Homoptera, Membracidae, Smiliinae): new genus, new species and taxonomic notes. *Revista Brasileira de Zoologia*, 13(1): 93-108. doi: 10.1590/s0101-81751996000100009

Sakakibara, A. M. (2012) Taxonomic reassessment of the treehopper tribe Talipedini with nomenclatural changes and descriptions of new taxa (Hemiptera: Membracidae: Membracinae). *Zoologia (Curitiba)*, 29: 563-576. doi: 10.1590/s1984-46702012000600008

Singh, G.; Maurya, S. (2005) Antimicrobial, antifungal and insecticidal investigations on essential oils: an overview. *Natural Product Radiance*, 4(3): 179-192.

Singh, N.; Rao, A. S.; Nandal, A.; Kumar, S.; Yadav, S. S.; Ganaie, S. A.; Narasimhan, B. (2021) Phytochemical and pharmacological review of *Cinnamomum verum* J. Presl-a versatile spice used in food and nutrition. *Food Chemistry*, 338: 127773. doi: 10.1016/j.foodchem.2020.127773

Wood, T. K. (1984) Life history patterns of Tropical membracids (Homoptera: Membracidae). *Sociobiology*, 8(3): 299-230.