

Biodiversity Record: Some Typhlocybinae leafhoppers and their host plants in Singapore

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Subjects: Micro-leafhoppers – 7 unidentified genera and species (Insecta: Hemiptera: Cicadellidae: Typhlocybinae);
Coconut, *Cocos nucifera* (Tracheophytes: Arecales: Arecaceae);
White-leafed fig, *Ficus grossularioides* (Tracheophytes: Rosales: Moraceae);
Curtain fig, *Ficus microcarpa* (Tracheophytes: Rosales: Moraceae);
Sandy-leafed fig, *Ficus heteropleura* (Tracheophytes: Rosales: Moraceae);
Angsana, *Pterocarpus indicus* (Tracheophytes: Fabales: Fabaceae);
Creeping oxeye, *Sphagneticola trilobata* (Tracheophytes: Asterales: Asteraceae);
Tropical chestnut, *Sterculia pexa* (Tracheophytes: Malvales: Malvaceae).

Subjects identified by: Yap Ee Hean.

Locations and dates: Seven separate observations at three different locations on Singapore Island —

- 1) Singapore Botanic Gardens on 9 November and 15 December 2022, 5 January and 13 April 2023.
- 2) Toa Payoh on 29 November 2022.
- 3) Sembawang on 12 January 2023.

Habitat: On leaves of the respective host plant species in urban parkland.

Observer: Yap Ee Hean.

Observations: Seven morphospecies of typhlocybinae leafhoppers are recorded on their host plants:

Typhlocybinae sp. 1 (Fig. 1) on *Ficus grossularioides* (Fig. 8) at Singapore Botanic Gardens on 5 January 2023.

Typhlocybinae sp. 2 (Fig. 2) on *Cocos nucifera* (Fig. 9) at Toa Payoh on 29 November 2022.

Typhlocybinae sp. 3 (Fig. 3) on *Ficus microcarpa* (Fig. 10) at Singapore Botanic Gardens on 9 November 2022.

Typhlocybinae sp. 4 (Fig. 4) on *Ficus heteropleura* (Fig. 11) and *Ficus microcarpa* at Singapore Botanic Gardens on 9 November 2022.

Typhlocybinae sp. 5 (Fig. 5) on *Pterocarpus indicus* (Fig. 12) at Singapore Botanic Gardens on 15 December 2022.

Typhlocybinae sp. 6 (Fig. 6) on *Sphagneticola trilobata* (Fig. 13) at Sembawang on 12 January 2023.

Typhlocybinae sp. 7 (Fig. 7) on *Sterculia pexa* (Fig. 14) at Singapore Botanic Gardens on 13 April 2023.

Specimens of each type of planthopper were obtained and deposited at the Zoological Reference Collection (ZRC) of the Lee Kong Chian Natural History Museum, at the National University of Singapore.

Remarks: The Cicadellidae constitute the largest family in the order Hemiptera, with more than 23,000 described species and many more undescribed ones (Cao et al., 2022). With about 6,000 described species, the subfamily Typhlocybinae (microhoppers) is the second largest subfamily within the Cicadellidae (Zhou et al., 2020). The vast number of undescribed species may, however, indicate that Typhlocybinae could be by far the largest subfamily (Dietrich, 2013). Regional faunal studies of the group worldwide have been particularly poor (Chandler & Hamilton, 2017); the Singaporean microhoppers are no exception. Typhlocybinae leafhoppers can be distinguished from the other cicadellids mainly by the apical end of the first tarsomere on the hind legs: typhlocybines have an acuminate end while non-typhlocybines have a truncate end (Dietrich, 2005; also see Fig. 15 in this paper). The minute size (usually less than 5mm) of these hoppers is also another key feature of the subfamily.

The host plant associations were determined by observing multiple specimens (especially with the presence of nymphs) on the leaves of the plants; with single specimen records not considered as important host data. The heavily infested host plants were frequently observed to exhibit symptoms in the form of whitish/yellowish specks on the leaves. These whitish/yellowish specks were likely caused by the leafhopper feeding on the leaves. The leafhopper uses its specialized mouthpart to pierce through the tissue of the leaf and suck up the leaf sap. This results in the bruising of the leaf tissue

that is then seen as whitish/yellowish specks on the leaf surface. We hope that with the documentation of the local species and their hosts, increased interest in the group can be fostered. This is also an attempt at establishing which plant species are the host plants of these Typhlocybinae leafhoppers.

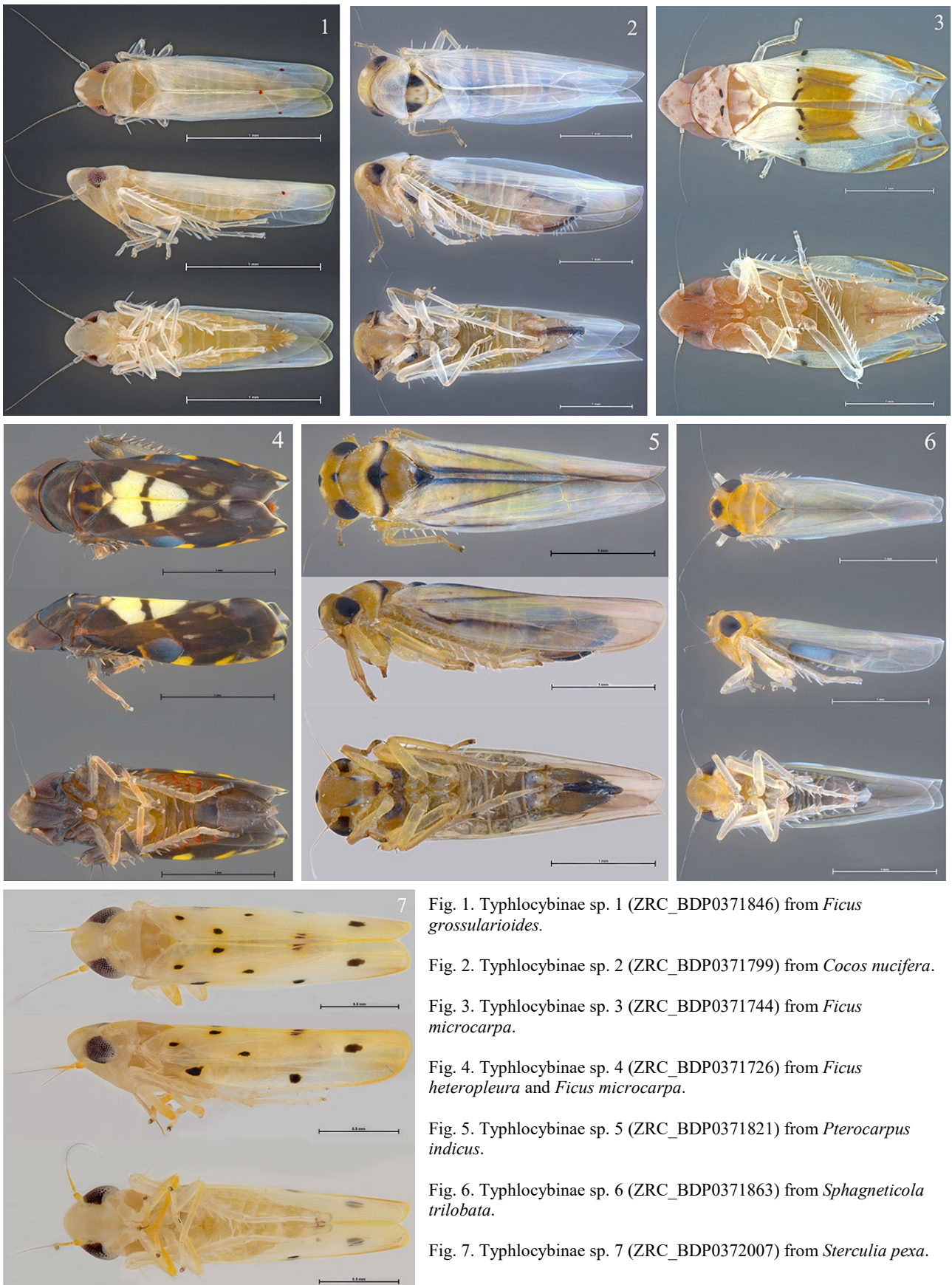


Fig. 1. Typhlocybinae sp. 1 (ZRC_BDP0371846) from *Ficus grossularioides*.

Fig. 2. Typhlocybinae sp. 2 (ZRC_BDP0371799) from *Cocos nucifera*.

Fig. 3. Typhlocybinae sp. 3 (ZRC_BDP0371744) from *Ficus microcarpa*.

Fig. 4. Typhlocybinae sp. 4 (ZRC_BDP0371726) from *Ficus heteropleura* and *Ficus microcarpa*.

Fig. 5. Typhlocybinae sp. 5 (ZRC_BDP0371821) from *Pterocarpus indicus*.

Fig. 6. Typhlocybinae sp. 6 (ZRC_BDP0371863) from *Sphagneticola trilobata*.

Fig. 7. Typhlocybinae sp. 7 (ZRC_BDP0372007) from *Sterculia pexa*.

(Photographs by: Yap Ee Hean)



Fig. 8. Example of heavily-infested *Ficus grossularioides*. Note yellow specks on the leaves, with a couple of adult Typhlocybae sp. 1 (in red circles) on the ventral side of a leaf (Photographs by: Yap Ee Hean).



Fig. 9. A & B. Example of *Cocos nucifera* with heavily-infested leaves; note the yellow specks. C. Infested leaves with nymphs and adults of Typhlocybae sp. 2 (Photographs by: Yap Ee Hean).

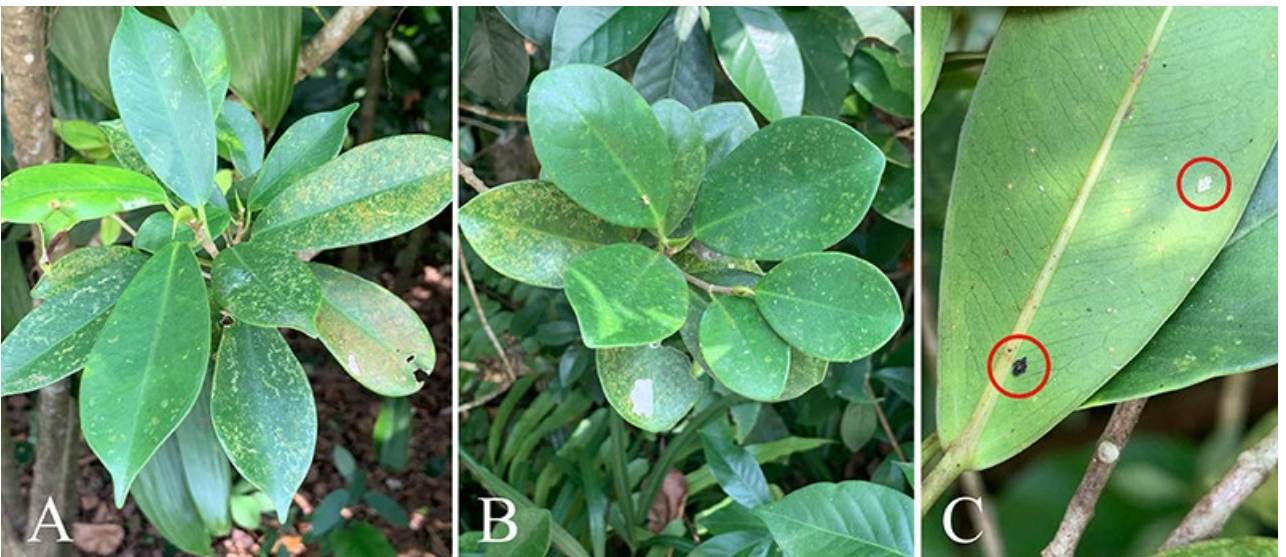


Fig. 10. A & B. Example of *Ficus microcarpa* with infested leaves. Note yellow trails and specks on the leaves, which are signs of feeding by the Typhlocybae C. Ventral side of infested leaf with nymphs of Typhlocybae sp. 4. (Photographs by: Yap Ee Hean).

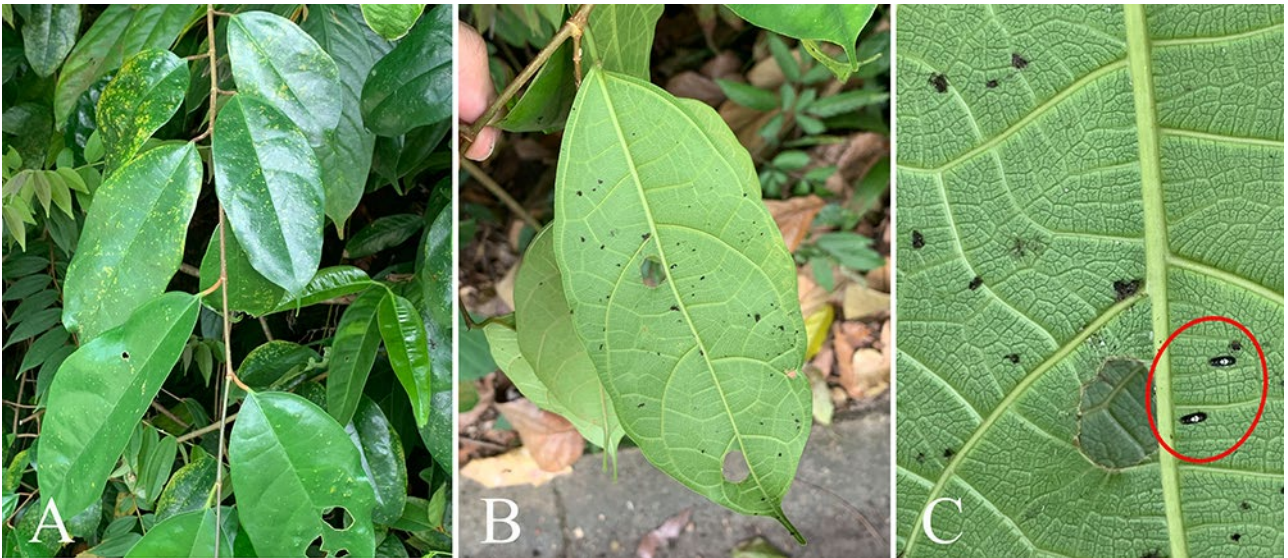


Fig. 11. A. *Ficus heterocarpa* with infested leaves. Note yellow specks on the leaves, which are signs of feeding by Typhlocybae. B. Ventral side of an infested leaf. C. Close-up of leaf with adults of Typhlocybae sp. 4. (Photographs by: Yap Ee Hean).

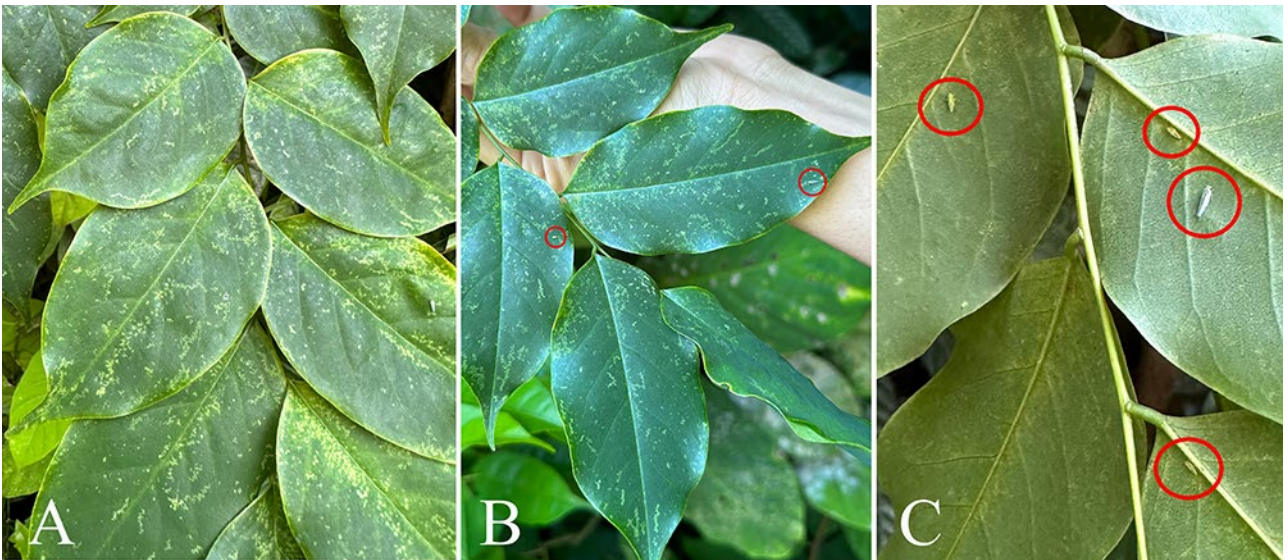


Fig. 12. A. Example of heavily-infested *Pterocarpus indicus*. Note the various whitish yellow spots on the leaves. B & C. Ventral side of infested leaves with nymphs and adults of Typhlocybae sp. 5. (Photographs by: Yap Ee Hean).



Fig. 13. A. Example of *Sphagneticola trilobata*. B. Close-up of leaves and developing flower. (Photograph by: Yap Ee Hean).

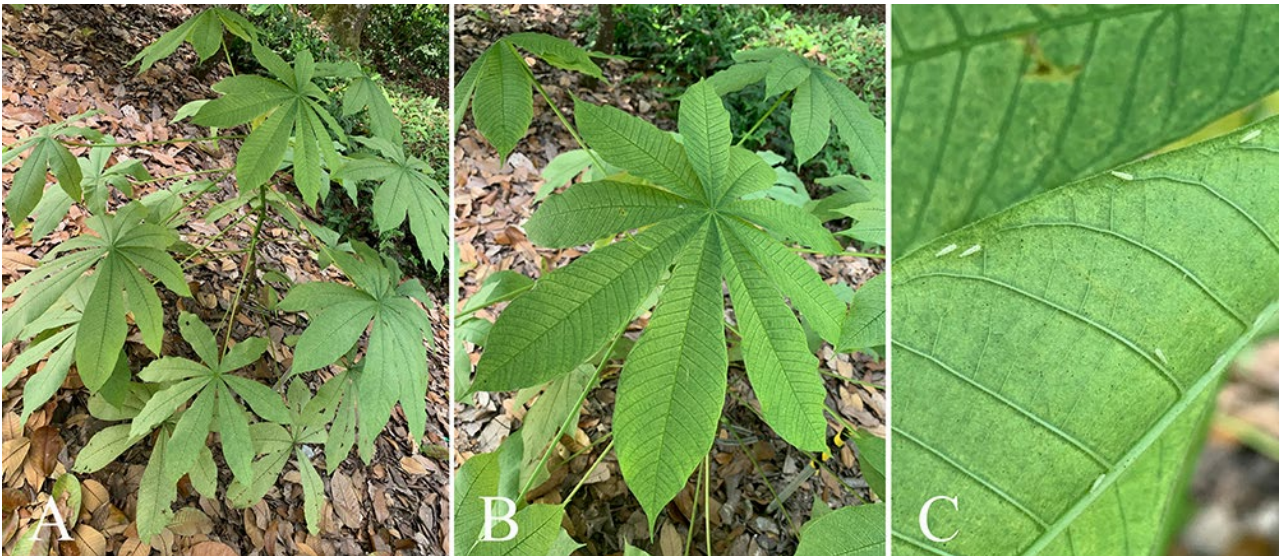


Fig. 14. A & B. Example of heavily-infested *Sterculia pexa*. Note the yellowish leaves. C. Ventral side of infested leaves with nymphs and adults of Typhlocybinae sp. 7. (Photographs by: Yap Ee Hean).



Fig. 15. Comparison of the hind tarsi of a typhlocybine (left) and a non-typhlocybine (right) leafhopper. Also note the distinct size difference between the two. (Photograph by: Yap Ee Hean).

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