

Biodiversity Record: Biotic pollinator dependency in white gutta tree *Palaquium obovatum*

Aireen Phang^{1,2*} & Junhao Chen^{1,3}

¹Singapore Botanic Gardens, National Parks Board, 1 Cluny Road, Singapore 259569

²Royal Botanic Garden Edinburgh, 20A Inverleith Row, Edinburgh EH3 5LR, United Kingdom

³Department of Biological Sciences, National University of Singapore, Singapore 117558

Email: aireen_phang@nparks.gov.sg (*corresponding author)

Recommended citation. Phang A & Chen J (2026) Biodiversity Record: Biotic pollinator dependency in white gutta tree, *Palaquium obovatum*. Nature in Singapore, 19: e2026074. DOI: 10.26107/NIS-2026-0074

Subjects: White gutta tree, *Palaquium obovatum* (Angiosperms: Ericales: Sapotaceae);
Ant, *Dolichoderus thoracicus* complex (Insecta: Hymenoptera: Formicidae).

Subjects identified by: Aireen Phang (for tree) and Yap Ee Hean (for ant).

Location, date and time: Singapore Island, Singapore Botanic Gardens, next to left wall of Heritage Museum and opposite Ridley Hall, adjacent to footpath; 30 December 2025 at 1000 hrs (initial bagging experiment setup) to 14 April 2026 at 1000 hrs (removal of bags).

Habitat: Urban parkland.

Observers: Aireen Phang and Junhao Chen.

Observations: On 30 December 2025, an exclusion experiment was initiated on a mature *Palaquium obovatum* tree that was the same subject of camera study in Phang (2023). Four branches around 3 m above ground, each containing inflorescences of ~ 40–70 flower buds, were selected for study:

- Two branches were enclosed in mesh bags of 0.5–0.9 mm² pore size which allowed small insect access while excluding larger foraging visitors (Figs. 1, 2).
- Two branches were enclosed in clear plastic bags which acted as a total barrier to pollinators (Fig. 1).



Fig. 1. Mesh and plastic bags set up on *Palaquium obovatum* inflorescences, 30 December 2025. Fig. 2. Fruit development (indicated by blue arrow) and one of several ants (red arrow) observed in one of the mesh bags, 14 April 2026. (Photographs by: Aireen Phang).

Although the tree had undergone a full flowering in late December 2025, the flower buds on the bagged branches did not undergo anthesis together with most of the other inflorescences on the tree. Instead, during the first week of March, a smaller flowering spell was observed in this tree and other *Palaquium obovatum* trees around the Gardens, where less than 20% of total branches produced fresh inflorescences with open, functional flowers. All the bags under study contained 30–50 fresh flowers that underwent anthesis from 6–7 March 2026. Around one month later, as fruit set was observed on several other (unbagged) branches of the tree, the bags were removed and the branches inspected for fruit development. The results were as follows at the end of the observation period on 14 April 2026:

- **Mesh Bags:** One bag contained five developing berries between 1–1.5 cm in diameter (Fig. 2); fruit dissection indicated normal seeds with embryos and cotyledons. Notably, multiple ants of the *Dolichoderus thoracicus* complex (Fig. 2) were observed within the mesh environment. There was no evidence of fruit development in the second mesh bag.
- **Plastic Bags:** Zero fruit set. Corollas on all the flowers had senesced and detached.

Remarks: The total lack of fruit set in the plastic bags suggests that apomixis and parthenocarpy are likely absent in *Palaquium obovatum* and an external biotic vector is required for mechanical pollen transfer. Fruit development within the mesh treatment suggests that agents smaller than 0.9 mm, such as thrips or small dipterans, may facilitate pollination. Geitonogamy (i.e., transfer of pollen grains from one flower to another on the same plant) cannot be ruled out in the present study because the flowers were not individually bagged. However, a population genetics investigation had found barriers to selfing in the same species (Phang et al., 2024). While *Dolichoderus thoracicus* ants were present during the fruiting stage, and have a small to moderate size capable of squeezing through the mesh treatment (head width: 0.59–1.25 mm, total length: 3.0–4.5 mm; Dill et al., 2002), their role remains ambiguous; they are more likely to be opportunistic scavengers of remnant nectar on the nectary disc of unfertilised flowers rather than the pollinators. Moreover, their lack of flight, grooming habit, and antimicrobial secretions render them unlikely or inefficient pollinators (Dutton & Frederickson, 2012). Other flexible insects capable of squeezing through small spaces may also play a role in pollination, but larger vertebrates are definitely excluded. Our observations therefore expand knowledge of the reproductive ecology of the species in Singapore, which has previously emphasised larger vertebrate visitors like fruit bats and coconut lorikeets (Phang, 2023, Phang et al., 2026), and provides a preliminary basis for further studies to identify the specific entomophilous agents responsible for successful pollination in *Palaquium obovatum*.

Acknowledgements: The authors are grateful to various staff from the Singapore Botanic Gardens, particularly Primeman Tan, Jolene Sim, and Rebecca Tan from the arborist and living collections teams for their kind support with the bagging setup, and Yap Ee Hean from the botanical research branch for ant identification.

Literature cited:

- Dill M, Williams DJ & Maschwitz U (2002) Herdsmen ants and their mealybug partners. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft*, 557: 1–373.
- Dutton EM & Frederickson ME (2012) Why ant pollination is rare: new evidence and implications of the antibiotic hypothesis. *Arthropod-Plant Interactions*, 6: 561–569.
- Phang A (2023) Novel observations of chiropterophily in *Palaquium obovatum* and flower visitation by *Cynopterus brachyotis*. *Nature in Singapore*, 16: e2023001.
- Phang A, Niissalo MA, Ruhsam M, Pezzini FF, Neo WL, Burslem DFRP, Middleton DJ, Wilkie P & Khew GS (2024) Genetic erosion in a tropical tree species demonstrates the need to conserve wide-ranging germplasm amid extreme habitat fragmentation. *Biodiversity and Conservation*, 33: 2527–2548.
- Phang A, Niissalo MA & Utteridge T (2026) Biodiversity Record: Coconut lorikeets foraging on flowers of *Palaquium obovatum*. *Nature in Singapore*, 19: e2026009.