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# ON THE IDENTITY AND HOST PREFERENCE OF THE YELLOW APHIDS (HEMIPTERA: APHIDIDAE) INFESTING WAX PLANTS, *Hoya* spp., IN THE PHILIPPINES

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## ABSTRACT

**The identity of the yellow aphids infesting various species of *Hoya* (Apocynaceae) in the Philippines is affirmed to be *Aphis nerii* Boyer de Fonscolombe (Hemiptera: Aphididae). The aphid prefers to form colonies on the stems and umbels of *H. camphorifolia*-complex, *H. meliflua*-group, *H. obscura*-group, *H. pubicalyx*-complex, and *H. multiflora*; and on young leaves and shoots of *H. fischeriana*-complex, *H. halconensis*-complex, *H. lacunosa*-complex, and *H. pimenteliana*-complex . Yellowing of leaves was only observed on *H. camphorifolia*-complex, *H. halconensis*, and *H. pimenteliana*.**

**Key words:** Aphididae, aphids, *Aphis nerii,* Hemiptera, *Hoya* spp., wax flowers

## INTRODUCTION

The popularity of ornamental wax plants or hoyas (here used as a common name), a group of species under the genus *Hoya* (plant family Apocynaceae), has kept on increasing ever since Siar (2005) enumerated and illustrated Philippine *Hoya* species. An expanded and more comprehensive treatment by Aurigue (2013) further stimulated public interest on the group. The latter also provided information that became handy and quite useful when gardening and caring for plants heightened during the COVID-19 pandemic. Currently, the number of names listed under Philippine *Hoya* species total 103 (Pelser et al. 2021), a significant proportion of which are endemic and largely, relatively once unknown. The actual number of species maybe much fewer but just the same, the ecology of their associations with insects and other arthropods, particularly the microherbivores, is little-known.

Among the insects considered by Hoya enthusiasts as "pests" are yellow aphids. They were reported by Sison et al. (2014) as the Oleander Aphid, *Aphis nerii* Boyer de Fonscolombe, 1841. Recently, however, a few posts in social media have indicated the species as *A. spiraecola* Patch, 1914. To prevent proliferation of misidentification, this paper discusses the identity of the yellow aphid infesting hoyas. In addition, this paper also reports observed trends in the preferred host *Hoya* species.

## MATERIALS AND METHODS

**Study Plants.** Potted plants of different species of *Hoya* in the authors' garden served as the plants for monitoring from April 2020 to April 2021. They are in different stages of growth, but most were sourced as plantlets grown from cuttings from various sources, and are listed in Table 1.

**Observations, Collection, and Identification.** Aphids were photographed and samples collected for examination under a dissecting microscope in the laboratory. *Hoya* plants belonging to various species were observed weekly for aphid infestation. The plant parts where the aphids occurred were recorded. Plant reactions like curling and yellowing and/or stunted growth were carefully noted.

**Temporary Mounts.** Voucher specimens were preserved in vials with 95% ethanol. Some were processed for temporary slide mounts, mainly for examination under compound microscope (Zeiss PrimoStar HD Digital Microscope) of diagnostic characters enumerated by Calilung (1967) and Blackman (2014). The rest have been set aside for future molecular and morphometric studies.

## RESULTS AND DISCUSSION

### Taxonomy

***Aphis nerii* Boyer de Fonscolombe** (Figures 1A-D, 2A-D)

**Material Examined.** Philippines: Luzon: Bay, Laguna, *ex. Hoya* spp., 16.ii.2021 (IL Lit Jr leg., two slides, C0014);

**Diagnosis.** Live apterous females and nymphs of *A. nerii* are yellow to yellow-orange with dark siphunculi and cauda. The hind tibiae, whether in live individuals, or in specimens mounted on slides, are distinctly mainly dark. On the other hand, apterous adult females of *A. spiraecola* Patch may sometimes appear yellowish but are never yellow-orange but instead approach the yellow-green or apple green range. The hind tibia of *A. spiraecola* are also pale for more than half its length. The antennae of *A. nerii* are also shorter in proportion to its body, whereas those of *A. spiraecola* are longer.

**Table 1.** *Hoya* species, their species grouped and parts attacked by yellow aphids, *Aphis nerii.*

| ***Hoya* Species** | **Group or Complex** | **Parts Targeted, if Attacked**[a] |
|---|---|---|
| *H. alwitriana* | *H. merrillii*-group | not attacked |
| *H. anncajanoae* | *H. wayetii*-group | not attacked |
| *H. aurigueana* | Ungrouped | leaves |
| *H. bicolensis* | *H. camphorifolia*-complex | ys, lvs, inf, umb, ycr |
| *H. bilobata* | *H. bilobata*-group | not attacked |
| *H. burtoniae* | *H. wayetii*-group | not attacked |
| *H. cagayanensis* | *H. pimenteliana*-complex | ys, ylv; ycr |
| *H. camphorifolia* | *H. camphorifolia*-complex | ys, lvs, inf, umb, ycr |
| *H. carandangiana* | *H. camphorifolia*-complex | ys, lvs, inf, umb, ycr |
| *H. carmelae* | Ungrouped | not attacked |
| *H. carnosa* | *H. carnosa*-group | only occasionally attacked; lvs |
| *H. celata* | *H. pubicalyx*-complex | ys, ylv |
| *H. crassicaulis* | *H. crassicaulis*-group | not attacked |
| *H. cumingiana* | *H. cumingiana*-group | not attacked |
| *H. darwinii* | Ungrouped | not attacked |
| *H. deleoniorum* | Ungrouped | |
| *H. densifolia* | *H. cumingiana*-group | not attacked |
| *H. diversifolia* | Ungrouped | ys, lvs, inf, umb |
| *H. elmeri* | *H. mindorensis*-group | ys, ylv |
| *H. espaldoniana* | *H. wayetii*-group | not attacked |
| *H. fischeriana* | *H. fischeriana*-complex | ys, ylv; ycr |
| *H. fitchii* | *H. fischeriana*-complex | ys, ylv; ycr |
| *H. golamcoana* | *H. cumingiana*-group | not attacked |
| *H. halconensis* | Ungrouped | ys, ylv; ycr |
| *H. heuschkeliana* | Ungrouped | not attacked |
| *H. incrassata* | *H. crassicaulis*-group | not attacked |
| *H. irisiae* | *H. multiflora*-group | ys, ylv; ycr |
| *H. krohniana* | *H. lacunosa*-complex | ys, ylv |
| *H. lacunosa* | *H. lacunosa*-complex | ys, ylv |
| *H. litii* | *H. merrillii*-group | not attacked |
| *H. madulidii* | *H. madulidii*-group | not attacked |
| *H. marvinii* | *H. obscura*-complex | ys, lvs, inf |
| *H. meliflua* | Ungrouped | ys, lvs, inf, umb |
| *H. merrillii* | *H. merrillii*-group | not attacked |
| *H. mindorensis* | *H. mindorensis*-group | ys, ylv |
| *H. multiflora* | *H. multiflora*-group | ys, ylv; ycr |
| *H. myrmecopa* | Ungrouped | not attacked |
| *H. obscura* | *H. obscura*-complex | ys, lvs, inf |
| *H. panayensis* | *H. bilobata*-group | not attacked |
| *H. panchoi* | *H. bilobata*-group | not attacked |
| *H. pimenteliana* | *H. pimenteliana*-complex | ys, ylv; ycr |
| *H. pubicalyx* | *H. pubicalyx*-complex | ys, ylv |
| *H. pubicorolla* | *H. pubicalyx*-complex | ys, ylv |
| *H. rosarioae* | *H. obscura*-complex | ys, lvs, inf |
| *H. sipitangensis* | *H. obscura*-complex | ys, lvs, inf |
| *H. surigaoensis* | *H. merrillii*-group | not attacked |
| *H. wayetii* | *H. wayetii*-group | not attacked |

[a] Legend: ys - young/growing shoots; ylv - young leaves; mlv - mature leaves; lvs - leaves in general; inf - inflorescences; umb – mature umbels; ycr – yellowing or curling of leaves

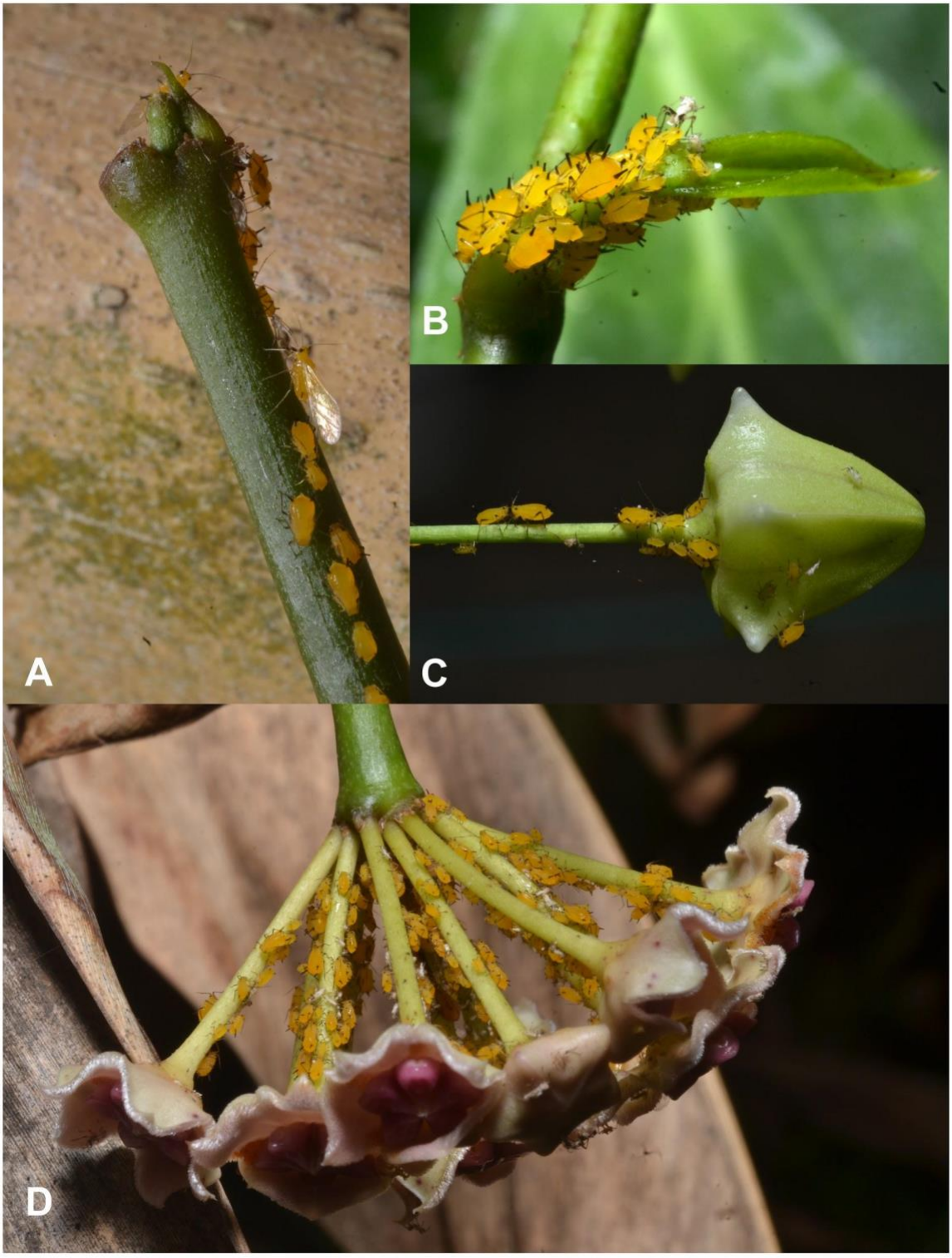


**Figure 1.** A colony of the yellow oleander aphid, *Aphis nerii* Boyer de Fonscolombe on selected *Hoya* species. **A.** on apical shoots of *H. meliflua*; **B.** on internode and new leaf of *H. carandangiana*; **C.** individual floret of *H. multiflora*; **D.** umbel of *H. diversifolia*. Photographs by C.C. Lucanas, 05 November 2021.

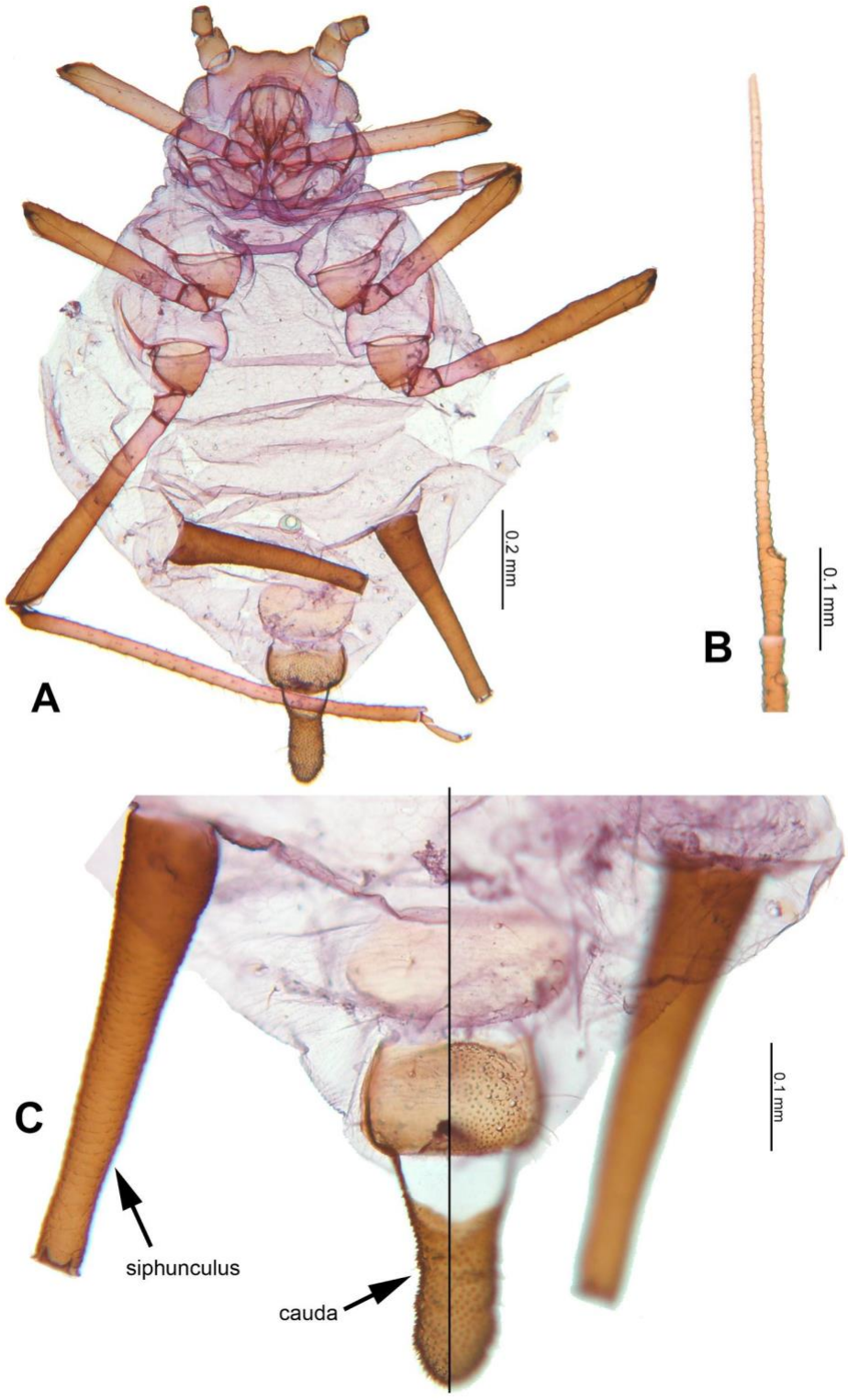


**Figure 2.** Adult apterous viviparae as mounted on slide. **a.** young adult apterous viviparous female. **b.** terminal segment of antenna (*processus terminalis*). **c.** siphunculus. **d.** cauda. Photographs by C.C. Lucañas, 22 May 2021.

**Remarks.** *A. nerii* was among the species of *Aphis* included in the pioneering work of Calilung (1967). Its type host *Nerium oleander* belongs to the plant family Apocynaceae, which now also includes genera and species like *Hoya* spp., formerly grouped under a separate family, the Asclepiadaceae.

The confusion with *A. spiraecola* probably arose from the near yellow color of some individuals and/or the mention in some pest lists of *A. spiraecola* occurring on *H. carnosa* (e.g., Saraç et al. 2015) as well as the listing of *A. spiraecola,* again on *H. carnosa*, as vectors of the Arjumnia mosaic virus (Massey 2007). The reiteration and affirmation of the aphids on *Hoya* spp. in the Philippines as *A. nerii*, herein emphasized, will hopefully prevent the proliferation of misidentification in literature and in social media, which is admittedly quite influential during this pandemic.

**Host Preference**

Sison et al. (2014) reported to have evaluated different species of *Hoya* for their reaction to *A. nerii*. They noted that some indigenous hoyas were preferred as observed by the heavy infestation of the aphids on the plants. However, they did not list the preferred species. Nonetheless, they enumerated three species as showing resistance to the insect, namely: *H. madulidii, H. carnosa variegata* and *H. obscura*.

We confirm that the two species, *H. madulidii,* and *H. carnosa* may not be preferred and hence, maybe resistant indeed. Additionally, members of *H. cumingiana*-group (*H. cumingiana*, *H. densifolia*, and *H. golamcoana*), *H. crassicaulis*-group, (*H. crassicaulis* and *H. incrassata*), *H. bilobata*-group (*H. bilobata*, *H. panayensis* and *H. panchoi*), *H. wayetti*-group (*H. anncajanoae*, *H. burtoniae, H. espaldoniana* and *H. wayetti*), and *H. merrillii*-group (*H. alwitriana, H. litii, H. merrillii,* and *H. surigaoensis*) were not infested despite being in proximity with infested plants.

In contrast, *H. obscura*-complex (*H. marvinii, H. obscura*, *H. rosarioae* and *H. sipitangensis*) were infested, particularly on young shoots, leaves and inflorescences. Additionally, umbels of species from *H. camphorifolia*-complex (*H. camphorifolia*, *H. carandangiana*, and *H. bicolensis*), *H. meliflua*, and *H. diversifolia* are almost always infested. On the other hand, growing shoots and young leaves of *H. fischeriana*-complex (*H. fischeriana,* and *H. fitchii*), *H. lacunosa*-complex (*H. krohniana* and *H. lacunosa*), *H. mindorensis*-group (*H. elmeri* and *H. mindorensis*), *H. multiflora*-group (*H. irisiae* and *H. multiflora*), *H. pimenteliana*-complex *(H. cagayanensis* and *H. pimenteliana*), and *H. pubicalyx*-complex (*H. celata*, *H. pubicalyx* and *H. pubicorolla*) are also favorite settling sites of aphid colonies. Among these, *H. camphorifolia*-complex, *H. fischeriana*-complex, *H. multiflora*-group and *H. pimenteliana*-complex show yellowing or curled leaves when attacked by aphids on their shoots or young leaves.

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