

Host associations of the Sunda chilli-tail bee, *Euaspsis polynesia*, in Singapore

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Subjects: Sunda chilli-tail bee, *Euaspsis polynesia* (Insecta: Hymenoptera: Megachilidae);
Orange-winged resin bee, *Megachile fulvipennis*, (Insecta: Hymenoptera: Megachilidae);
Disjunct resin bee, *Megachile disjuncta* (Insecta, Hymenoptera: Megachilidae).

Subjects identified by: Zestin W.W. Soh and Jacqueline L.E. Chua.

Location, date and time: Three locations on Singapore Island -

1. HortPark at Hyderabad Road; 8 February 2019; 1145 hrs.
2. Tampines Street 22 (ground floor); early June to late July 2020; morning.
3. Pasir Ris, Elias Road; 4 July 2020; morning.



Fig 1. Cleptoparasitism by *Euaspsis polynesia* upon the nests of *Megachile fulvipennis* at a bee hotel in HortPark. A–B: Construction and provisioning of nests by a female *Megachile fulvipennis*. C–D: *Euaspsis polynesia* carrying resin collected from a nest of *Megachile fulvipennis* and entering another nest made by the same species. Photographs by Zestin W. W. Soh

Habitat: 1. Semi-urban park near secondary forest.
2. Community garden in an urban residential area.
3. Residential apartment on the 8th floor of a concrete high-rise building in an urban area.

Observers: 1. Zestin W.W. Soh and Jacqueline L.E. Chua.
2. Tan King How.
3. Zestin W.W. Soh and Toh Shumin.

Observations:

1. At HortPark, a female *Euaspsis polynesia* was observed entering multiple nests built by *Megachile fulvipennis* and transferring resinous material from one nest to another (Fig. 1A–D). The *Euaspsis* had likely bored into the nests and was now reconstructing the cell partitions after removing the host egg, and laying her own egg within it. These nests were made in a bee hotel comprising wood blocks with drilled holes and situated along the HortPark's Bee Trail (NParks, 2020).



Fig 2. A new *Euaspsis polynesia* emerging from a nest of *Megachile fulvipennis*. Screen shot from a video by Tan King How

2. At Tampines Street 22, a female *Euaspsis polynesia* was observed chewing through the resinous plug of a nest made by a *Megachile fulvipennis* and subsequently entering the nest. The host bee returned subsequently, and was observed re-building this nest. After about one and a half months, three adult *Euaspsis polynesia* were observed emerging from the nest cell (one of the bees is pictured in Fig 2). At a separate nest, a host *Megachile fulvipennis* was observed attempting to fend off an invading *Euaspsis polynesia*, (see video at <https://youtu.be/SJlykYx-3P0>). These nests were made in a bee hotel located beside a community garden, and comprised of hollow bamboo internodes (Fig. 3A&B).

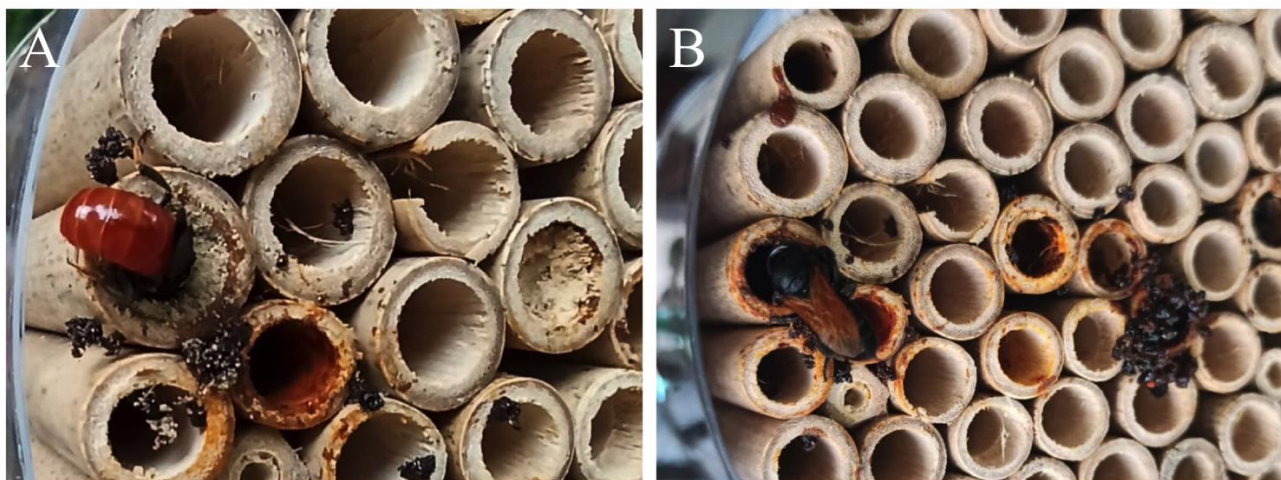


Fig 3. Cleptoparasitism by *Euaspsis polynesia* upon the nests of *Megachile fulvipennis* at a bee hotel in Tampines Street 22. A: *Euaspsis polynesia* entering a nest made by *Megachile fulvipennis*. B: the host, *Megachile fulvipennis*, attempting to repair its nest. Photographs by Tan King How

3. At Elias Road, a female *Euaspsis polynesia* was observed chewing nest plugs and entering multiple nests made by *Megachile disjuncta*. The nests were made in drill holes of a shelf located in a balcony of a residential apartment on the 8th floor (Fig. 4A&B).

Remarks: Despite its apparent distinctiveness and wide distribution across Southeast Asia, the Sunda chilli-tail bee (*Euaspsis polynesia*) is a locally rare and poorly studied species (Soh et al. 2016; Soh & Ascher, 2020). Unlike most cleptoparasitic bees which sneak into their hosts' partially completed nests to lay their eggs, members of the genus *Euaspsis* burrow into fully completed nests of their hosts – usually resin bees (*Megachile* spp.) or woodborer bees (*Lithurgus* spp.) (Michener, 2007; Litman, 2019). *Euaspsis polynesia* exhibits considerable intraspecific size variation, and is therefore, suspected to have multiple host species. However only one host, *Megachile disjuncta*, has previously been recorded (Baker, 1995). In addition to *Megachile disjuncta*, this article documents *Megachile fulvipennis* as a new host for this cleptoparasitic species (Baker, 1995).



Fig 4. Cleptoparasitism by *Eusapis polynesia* upon the nests of *Megachile disjuncta* at a nest on the 8th floor balcony at Elias Street. A: A female *Megachile disjuncta* at her nest, B: *Eusapis polynesia* chewing at a nest plug of a nest made by a *Megachile disjuncta*. Photographs by Zestin W. W. Soh

Cleptoparasitic bees are potentially useful indicators of the health of a local bee fauna as they represent the apex of bee communities, exerting top-down control on populations of their hosts, and play a stabilising role within such communities (Sheffield et al. 2013). As shown in this record, bee hotels may facilitate observations and monitoring of these ecologically important bees while revealing insights into their life history (MacIvor, 2017).

Resin bees in Singapore have previously been found nesting at high stories in urban areas (Ascher et al. 2016; Soh & Khoo, 2018). The record at Elias Street (Fig 3A–B) shows that these resin bees can also be subject to cleptoparasitism by the Sunda chilli-tail bee way above ground level.

Note: The authors would like to thank Ms Arin Mares for her assistance with the bee records at Elias Road.

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