

The First Record of the Family Thaumastocoridae (Heteroptera) from the Hawaiian Islands¹

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The heteropteran family Thaumastocoridae is a widespread but infrequently collected group. On 5 May 2020, entomologist Karl Magnacca contacted the first author (DP) to inquire as to the identity of an odd bug he had collected in a remote tract of predominantly native forest on Pu'u Hāpapa, in the Wai'anae Mountains of O'ahu, Hawai'i. He noted that the insects were abundant but moved rapidly and were difficult to capture. He suspected on first evaluation that this taxon might be an infrequently encountered member of the family Lygaeidae. However, upon closer microscopic examination by the first author (DP) it became clear that based on the highly elongated lateral mandibular plates (Fig. 1), which exceed the length of the clypeus (the pointed central portion of the head that forms the anterior apex in most families of Heteroptera), that the specimen in question was in fact a thaumastocorid.

The single specimen provided was a female, which presented difficulties in determining the proper genus and species, since confident identification of thaumastocorid species requires male specimens. Therefore, it was fortuitous that on a field excursion several weeks later to Mt. Ka'ala, the highest peak in the Wai'anae Mountains of western O'ahu, with a Bishop Museum crew sampling native tardigrades, the first author was able to collect a male specimen of the same species. This was taken while sampling from *Coprosma ochracea*, a native species of Rubiaceae, near the summit of the mountain. Based on this collection, it was then possible to definitively identify the insect in question.

Thaumastocoridae

***Thaumastocoris peregrinus* Carpintero New State Record**

& Dellape, 2006

(Figs. 1–3)

The thaumastocorid taken on O'ahu proved to be *Thaumastocoris peregrinus* Carpintero & Dellape, also known as the bronze bug. This species was described from specimens

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Fig. 1. *Thaumastocoris peregrinus* Carpintero & Dellapé, female, specimen from Pu'u Hāpapa, Wai'anae Mountains, O'ahu.

taken in Argentina (Carpintero & Dellapé 2006), but appears to be originally native to Australia, where it feeds on *Eucalyptus* (Noack *et al.* 2011). It has been subsequently spread by human agency to New Zealand (Sopow & George 2012), South Africa (Jacobs & Nesser 2005), Reunion (Streito *et al.* 2016), Italy (Laudonia & Sasso 2012), Portugal (Garcia *et al.* 2013), Malta (Mifsud & Carapezza 2020), Israel (Novoselsky & Freidberg 2016), South America (Martinez & Bianchi 2010; Ide *et al.* 2011), Mexico (Jiménez-



Figs. 2, 3. *Thaumastocoris peregrinus* photographed on various host plants on O‘ahu. **2.** Adult male at Mauna Kapu, Wai‘anae Mountains, feeding on *Cordyline fruticosa*. **3.** Adults and immatures at Schofield Barracks, feeding on *Eucalyptus robusta*. Photos: K. Magnacca.

Quiroz *et al.* 2011), and southern California (Hodel *et al.* 2016). In these areas it can be a pest of ornamental *Eucalyptus* and *Corymbia* plantings, causing leaf silvering and loss, canopy thinning, and in some cases branch dieback (Soliman *et al.* 2012). Because this species seems to attack a range of host plants across several genera in the family Myrtaceae, it is plausible that it could also feed on *Metrosideros*, known to Native Hawaiians as 'ōhi'a, the dominant species of canopy-forming tree in Hawaiian forests across a variety of elevations and precipitation regimes. Given that both recent captures came from areas where there are no *Eucalyptus* trees present, but where *Metrosideros* is abundant, the first author considered it possible that this species could be established on O'ahu, probably breeding on *Eucalyptus*, but potentially also feeding on 'ōhi'a. The discovery of this species, and the associated concerns, were subsequently communicated to staff at the Hawaii Department of Agriculture.

Based on this report, additional field survey work was undertaken by the second and third authors (KM and JM) at the Mt. Ka'ala capture site. They found the species to be common there on many species of native plants, but with no obvious signs of feeding damage, and no immature specimens detected. In addition to the area around the summit shelter, specimens were also observed in even higher abundance at the far western end of the summit boardwalk, on the opposite side of the summit plateau, but again with no feeding damage or immature specimens seen.

The species was later found at the Palikea summit area, further south along the Wai'anae Mountains crest, in this case present on introduced *Eucalyptus* and other nearby plants (Fig. 2). Another, larger population was then located on the grounds of the Schofield Barracks military base in July 2021, breeding on *Eucalyptus robusta*. The survey team observed hundreds of individuals on a few branches, including adults, immatures, and eggs (Fig. 3). This to date is the only host on which this level of infestation and reproduction has been seen. Subsequent visits to the same area in September and October found only a few sporadic adults and no nymphs.

Thaumastocorids, although oddly rare in world collections, are capable of attaining high local population densities. As noted by Schuh & Weirauch (2020): "The now classic work of Drake & Slater (1957) might allow one to conclude that thaumastocorids are uncommon in nature because those authors examined relatively few specimens, and in most museum collections specimens of the group are unknown or few in number. This would be an erroneous conclusion, however, because thaumastocorids can occur in tremendous numbers on their host." Therefore, it is possible that the specimens seen in native upland forest systems on O'ahu may have been wafted upward into such habitats from higher density populations breeding on *Eucalyptus* in the lowlands.

It is concluded that *T. peregrinus* is now established on O'ahu and breeding on *Eucalyptus robusta*, with individuals possibly being carried uphill into native forest habitats. Hawaii Department of Agriculture's records indicated in June 2021 that this species had not yet been officially reported from Hawai'i (JM). Clearly, it has now viably invaded the archipelago, where it most likely initially established itself on *Eucalyptus* in lowland settings before moving into the upland native forest habitats where it was first detected. The covid pandemic that reduced many field survey activities in 2020 and 2021 may have delayed its detection and reporting in urban and suburban settings.

It also remains to be seen what impact the introduction of this species will have on the wide array of both introduced and native Myrtaceae present on O'ahu. In the near term, it is likely that this species will spread to the remainder of the main Hawaiian Islands in short order, given that it has already hopped across multiple ocean basins and continents. It is also likely to be a permanent pest of ornamental *Eucalyptus* in the islands in the future.

Material examined: HAWAIIAN ISLANDS, **O'ahu:** 1 female, Wai'anae Mountains, Pu'u Hāpapa shelter, 2670 ft [810 m], 21°28'00"N, 158°06'10"W, 7 Dec 2020, on self, *K. Magnacca* (BPBM); 1 male, Wai'anae Mountains, Mt. Ka'ala, near shelter on east side of summit area, 3980 ft [1215 m], 21°30'29"N, 158°08'38"W, 15 May 2021, on *Coprosma ochracea*, CL 8065, D.A. Polhemus (BPBM); 1 female, Wai'anae Mountains, Mt. Ka'ala, east side of summit plateau near parking area, 3970 ft [1210 m], 21°30'29"N, 158°08'38"W, 1 Jun 2021, sweeping low vegetation, *K. Magnacca* (BPBM); 1 female, same data as preceding but on *Metrosideros polymorpha*, *K. Magnacca* (BPBM); 1 male, Wai'anae Mountains, Peacock Flat, 1500 ft [455 m], 21°32'52"N, 158°11'09"W, 4 Jul 2021, on *Eucalyptus* cf. *robusta*, *K. Magnacca* (BPBM); 3 males, 8 immatures, Schofield Barracks, 1000 ft [305 m], 21°29'39"N, 158°04'56"W, 15 Jul 2021, on *Eucalyptus robusta*, *K. Magnacca* (BPBM); 1 male, 2 females, Wai'anae Mountains, Mauna Kapu, 2750 ft [840 m], 21°24'16"N, 158°05'52"W, 15 Jul 2021, on *Cordyline fruticosa* and *Hibiscus arnottianus*, *K. Magnacca* (BPBM); 1 female, Wai'anae Mountains, Mauna Kapu, 2675 ft [955 m], 21°24'12"N, 158°05'52"W, 23 Sep 2021, on *Eucalyptus robusta*, *K. Magnacca* (BPBM).

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