

## A New Species of the Hawaiian Endemic Predaceous Fungus Gnat Genus *Trigemma* Hardy (Diptera: Keroplatidae) from Hawai‘i Island<sup>1</sup>

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### Introduction

Keroplatids are represented in Hawai‘i by two endemic genera: *Tylparua* Edwards and *Trigemma* Hardy. *Trigemma* was erected as a new subgenus of *Orfelia* Costa by Hardy (1960) to take the single new species *Orfelia (Trigemma) infurcata*. Matile (1989) elevated the subgenus *Trigemma* to generic status.

*Trigemma infurcata* was originally described from Moloka‘i, with additional paratype specimens listed from Kaua‘i and Maui. Specimens collected by the U.S. International Biological Program (IBP) in the 1970s in the Kilauea Forest of the Big Island of the Hawaiian Islands [see Mueller-Dombois *et al.* (1981) for further details of the transects used and ecosystem analysis] reveal a new species closely related to *T. infurcata*, described below. This is only the second species known in the genus, which is endemic to the Hawaiian Islands.

### Materials and Methods

The material examined in this study derives from the collection of the Bishop Museum, Honolulu (BPBM) and the University of Hawai‘i at Manoa (UHM)). Descriptive terminology follows Sølvi *et al.* (2000).

### Systematics

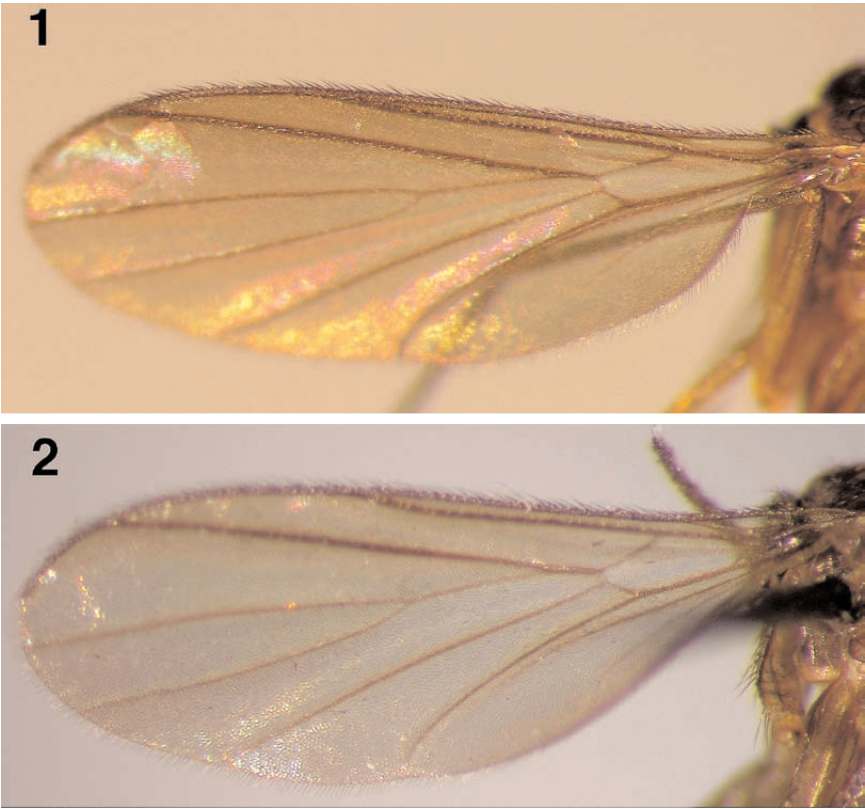
#### KEY TO THE SPECIES OF *TRIGEMMA* HARDY

1. Wing with Sc ending in costa before origin of Rs (Figs. 2, 3b); male hypandrium shorter than gonocoxites; gonostyle bifid (Fig. 4) ..... **infurcata** Hardy
- . Wing with Sc ending in C at or beyond origin of Rs (Figs. 1, 3a); male hypandrium longer than gonocoxites; gonostyle flared, with one apical prong (Fig. 5) ..... **kilauea** Evenhuis, **n. sp.**

#### *Trigemma kilauea* Evenhuis, **new species** (Figs. 1, 3a, 5)

**Diagnosis:** *Trigemma kilauea* can be separated from the only other known species in the genus by the vein Sc ending in the costa at or beyond the origin of the Rs vein (this vein ending well before the costa in *T. infurcata*), the hypandrium being longer than the gonocoxites (hypandrium shorter in *T. infurcata*), and the single-pronged and flared gonostyle

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Figures 1–2. *Trigemma* wings. 1. *T. kilauea*, n. sp. 2. *T. infurcata* Hardy.

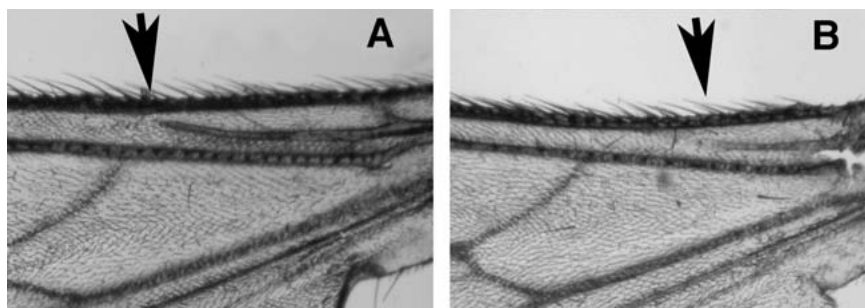
(bifid and rounded in *T. infurcata*). In addition, its generally dark body color will separate most specimens, however, some teneral specimens will appear tawny as in *T. infurcata*.

**Description:** Lengths: Body: 4.2–4.8 mm; wing: 3.0–3.5 mm. **Male. Head.** Occiput brown to black. Three ocelli near middle of frons, outer pair large, medial punctiform. Ocellar callus black. Frons dark brown. Antennae: scape and pedicel yellow. Flagellum: segment 1 longer than wide; segments 2–14 squarish, each successive segment reduced in width apically as antennae slightly tapers to rounded apex. Flagellomeres brown except flagellomere 1 yellow at extreme base. Face dark brown, palpi brown to black.

**Thorax.** Mesonotum and scutellum shining brown to dark brown with scattered black setulae dorsally, bare strips admedially on scutum. Pleurae brown to reddish brown, anepisternum with patch of small fine yellowish to brownish hairs. Mediotergite with patch of erect brown posterodorsal setae. Laterotergite bare. Halter stem yellow, knob brown with minute black setae.

**Legs.** Yellowish brown to brown with black spines and hairs normally distributed. Mid and hind tibia with single spur, fore tibia without spur. Claws minute

**Wing** (Figs. 1, 3a). Grayish yellow hyaline with densely distributed microtrichiae. Veins C and  $R_{2+3}$  with dense hairs; remainder of veins bare. Tip of vein Sc effaced but ending in C at origin of Rs (Fig. 3a).



**Figure 3.** Detail of base of wing showing insertion of Sc at costa (arrow). **A.** *T. kilauea*, n. sp. **B.** *T. infurcata* Hardy.

*Abdomen.* Generally brownish with black setulae distributed evenly on dorsum; tergites I–VI shining brown; tergites VII–VIII dark brown to black. Sternites with same pattern as tergites.

*Hypopygium* (Fig. 5). Dark brown to black. Hypandrium longer than gonocoxites, subconical. Gonocoxites tapering toward apex, long setulose laterally, dense fine hairs medially. Gonostyle flared apically with single pronglike projection apically, densely haired.

**Female.** As in male except: abdomen flattened dorsoventrally and expanded at level of tergites V–VII.

**Types.** Holotype ♂ (BPBM 16,625) and paratype ♂ from HAWAIIAN IS: **HAWAI'I I:** Kīlauea Forest Reserve, IBP Study Site, 1586 m, 16–23 Aug 1971, Malaise trap, W.A. Steffan. **Other paratypes:** 3 ♂, 2 ♀, same data except: 19 Jul 1971, 26 Jul 1971, 31 May–7 Jun 1971, 28 Jun–5 Jul 1971, L. Goff & W.A. Steffan (BPBM); 1 ♂, Ola'a, 36.0 ft [sic!], 30 Jul 1918 W.M. Giffard (BPBM). 1 ♂, Mt. House Road above Na'alehu, 3000 ft [ca. 915 m], 15 Jul 1965, D.E. Hardy (UHM).

**Etymology.** Named for the type locality of Kīlauea. The name means “spewing, or much spreading” in Hawaiian, referring to the frequent volcanic eruptions in this area. The name is treated as a noun in apposition.

### *Trigemma infurcata* (Hardy)

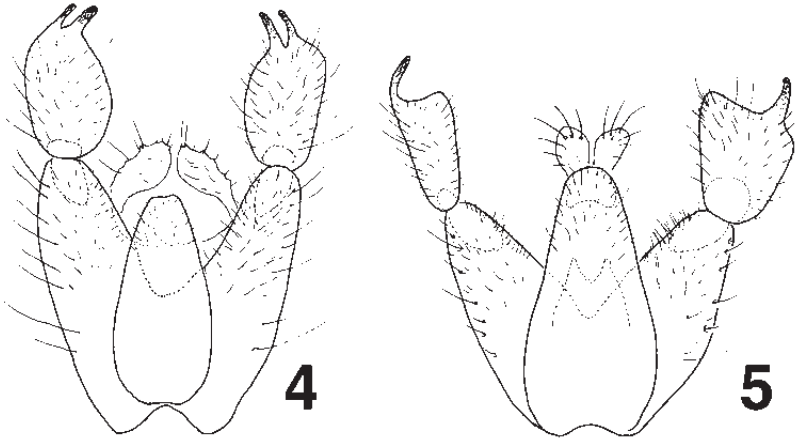
(Figs. 2, 3b, 4)

*Orfelia* (*Trigemma*) *infurcata* Hardy, 1960: 201.

*Trigemma infurcata* (Hardy). Matile, 1989: 133.

The description given by Hardy (1960) contains all the salient characters and need not be repeated here. To better identify the species of the genus in Hawai'i the wing and male terminalia are illustrated again with the gonostyle shown also in a lateral view to compare directly with the gonostyle in lateral view of *T. kilauea*, n. sp.

*Material examined:* HAWAIIAN IS: **MAUI:** 1 ♂ [paratype], Honomau, 23 Jun 1920, E.H. Bryan, Jr. (UHM); 1 ♂, Kula Pipe Line, 4200 ft [ca. 1280 m], Jul 1956, D.E. Hardy (UHM). **MOLOKA'I:** 2 ♂, 1 ♀ [paratypes], Pu'u Kolekole, 3600 ft [ca. 1100 m], Jul 1953, D.E. Hardy (BPBM); 1 ♂, Pēpē'ōpae, 4000 ft [1220 m], Jul 1959, D.E. Hardy (BPBM); 1 ♀ same data except: 25 Aug 1949 (UHM).



Figures 4–5. *Trigemma* male genitalia, ventral view, gonostyle slightly twisted to show lateral view. 4. *T. infurcata* Hardy. 5. *T. kilauea*, n. sp.

#### Acknowledgments

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