

Two new species of the endemic Hawaiian predaceous fungus gnats *Tylparua* Edwards from the Wai‘anae Mountains, O‘ahu, Hawai‘i (Diptera: Keroplatidae)¹

NEAL L. EVENHUIS

Hawaii Biological Survey, Bernice Pauahi Bishop Museum, 1525 Bernice Street, Honolulu, Hawai‘i 96817, USA; email: neale@bishopmuseum.org

Abstract. Two new species of *Tylparua* Edwards from the Wai‘anae Mountains of O‘ahu: *Tylparua kolekole*, **n. sp.**, and *T. vulgaris*, **n. sp.** are described and illustrated.

INTRODUCTION

Keroplatids in Hawai‘i have been little studied but studies by me underway appear to show they possess a high diversity. Hardy (1960) was the last to revise the family in Hawai‘i (in Mycetophilidae). Evenhuis (2006) described a second species of *Trigemma* Hardy, and Evenhuis (2019) recorded the first introduced species, *Apyrtula sastrei* Matile.

Two new species from O‘ahu are described here to allow their analysis in a more detailed review of the genus *Tylparua* in the Hawaiian Islands.

MATERIAL AND METHODS

Specimens studied derive from and/or are deposited in the the following (abbreviations follow Evenhuis 2021): Bernice P. Bishop Museum, Honolulu, Hawai‘i, USA (BPBM); Canadian National Collection of Arthropods, Ottawa, Ontario, Canada (CNCI); Hawaii State Department of Agriculture, Honolulu, Hawai‘i, USA (HDOA); Hawaii Sugar Planters’ Association (HSPA; now at HDOA); and the University of Hawai‘i Insect Collection, University of Hawai‘i at Manoa, Honolulu, Hawai‘i, USA (UHIM).

Morphological terminology follows Cumming & Wood (2017), and Blagoderov & Ševčík (2017) for wing venation terminology. Confocal photographic images were accomplished by obtaining a series of stacked images using a Leica M165C stereo dissecting scope via the Leica Microsystems LASX 3.04 Multifocus software and using Zerene Stacker[®] stacked focusing software (v. 1.04) (Zerene Systems, LLC, Richmond, Washington, USA) to align and stack-focus each final image.

TAXONOMY

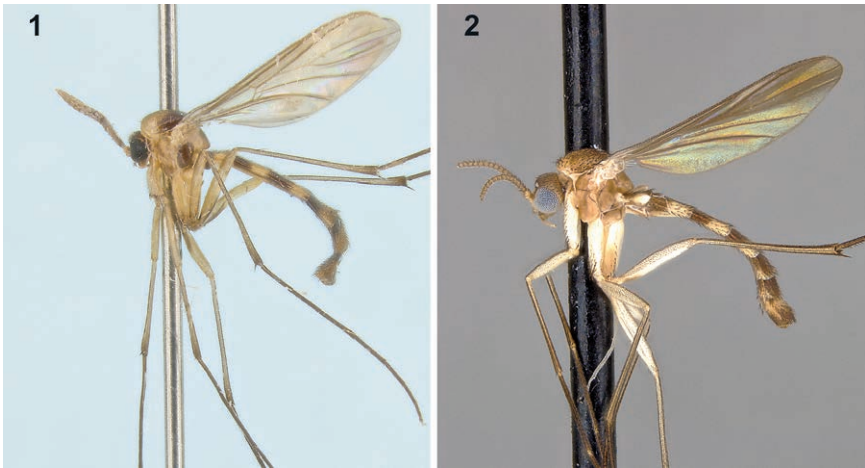
Tylparua kolekole Evenhuis, **new species**

(Figs. 1, 3, 5, 7, 9, 11)

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Diagnosis. Most similar to *Tylparua fuscocostata* (Grimshaw) in having infuscation along the costa and males with antennal flagellomeres II–XIII as long as wide; but it can be separated from it by yellow and black-patterned mesonotum (almost all black in *T. fuscocostata*); the scutellum with yellow along the posterior margin (scutellum all black in *T. fus-*

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Figs. 1–2. *Tylparua*, male lateral habituses. 1. *Tylparua kolekole*, n. sp. 2. *T. vulgaris*, n. sp.

cocostata); the yellow hind coxae (black in *T. fuscocostata*), distinctly patterned abdomen with yellow on posterior half of each tergite I–V (black in *T. fuscocostata*), and the mediotergite extensively yellow laterally (brown to black in *T. fuscocostata*).

Description. Male (Fig. 1). Lengths: Body: 5.8–6.2 mm; wing: 4.0–4.2 mm. *Head.* Occiput brown. Two ocelli. Ocellar callus black. Frons brown. Antennae (Fig. 3): 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 segment 14 ellipsoid with rounded apex. Flagellomeres brown except flagellomere 1 yellow at basal 1/3. Face and palpi yellow.

Thorax. Mesonotum and scutellum subshining yellow with dark brown on posterior and lateral margins of mesonotum making a U-shaped pattern when viewed dorsally (Fig. 5), with scattered black setulae dorsally, longest laterally. Pleurae predominantly yellowish white, laterotergite contrastingly brown. Mediotergite (cf. Fig. 5) yellowish white with brownish medial stripe, without minute apical setae. Halter stem yellow, knob black with minute black setae dorsally.

Legs. Coxae and fore femur yellow, mid and hind femora with pale brownish color on basoventral 1/4; tibiae yellow, yellowish brown only at extreme apex; tibial setae in rows; tibial spurs 1:2:2; hind tibia with spurs of unequal length (Fig. 7); tarsi all black. Claws minute.

Wing (Fig. 9). Grayish hyaline with infuscation along most of costa to tip of wing and in cell r1; apical 1/5 slightly infuscated; vein CuP darkly sclerotized, extending to level of M₄ base.

Abdomen. Generally patterned yellow and black with tergites I–VI black basally and yellow posteriorly. Sternites with same pattern as tergites.

Hypopygium. Genitalia not dissected. Epandrium (Fig. 11) dark brown, yellow basally, with distinctly cleft apical margin.

Female. Unknown.



Figs 3–4. *Tylparua*, heads and thoraces, lateral view. **3.** *T. kolekole*, n. sp. **4.** *T. vulgaris*, n. sp.

Material Examined. *Holotype* ♂ from HAWAIIAN ISLANDS: O‘ahu: Kolekole Pass, 1,725 ft [ca. 525 m], 5 Jun 1967, J.R. Vockeroth (CNCI). *Paratype*: 1♂, same data as holotype except, 8 May 1967 (CNCI). Holotype in CNCI; paratype in BPBM.

Remarks. Although the genitalia were not dissected, they will be as part of a larger study when more material is available. The fact that somal colors and patterns and epandrial shape and coloration has shown to be consistent within species in the genus allows for this species to be confidentially separated from the congeners.

Etymology. The specific name refers to the type locality of Kolekole Pass on O‘ahu. The specific name is treated as a noun in apposition.

***Tylparua vulgaris* Evenhuis, new species**

(Figs. 2, 4, 6, 8, 10, 12, 13)

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Diagnosis. Separated from other species in the genus by having the combination of infuscation in the apical one-fourth of the wing and vein M_4 effaced basally (Fig. 10) (no other species with an apically infuscated wing are known with an effaced base of M_4). Using Hardy’s (1960) key, *T. vulgaris* runs to *T. insularis* (Grimshaw). It can be separated from it by the effaced M_4 basally (not effaced in *T. insularis*), and male genitalic characters (cf. Figs. 13–14): the densely setose gonocoxa apically (gonocoxa uniformly setose in *T. insularis*) and the single subapical setae on the gonostylus (multiple subapical setae in *T. insularis*).

Description. Male (Fig. 2). Lengths: Body: 2.5–2.8 mm; wing; 2.8–3.0 mm. *Head.* Occiput dark brown to black. Two ocelli. Ocellar callus black. Frons brown. Antennae:

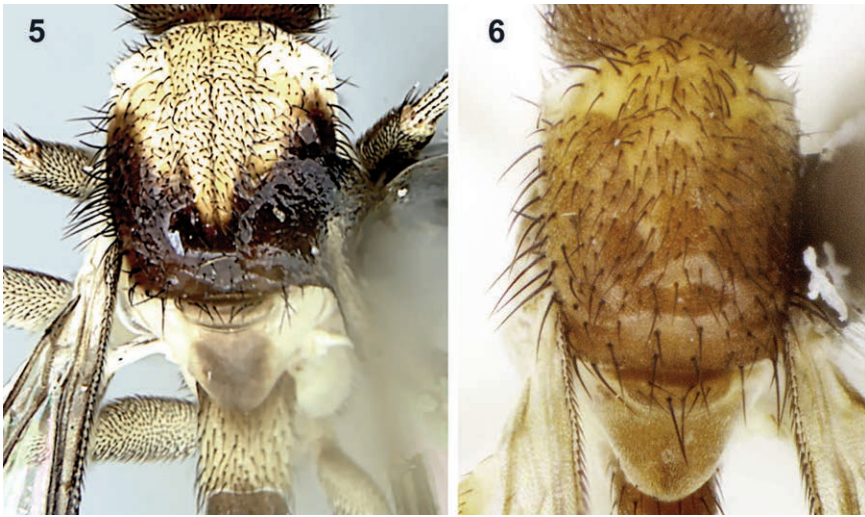


Fig. 5–6. *Tylparua*, thoraces, dorsal view. 5. *T. kolekole*, n. sp. 6. *T. vulgaris*, n. sp.

scape and pedicel yellowish brown. Flagellum: segments 2 times longer than wide; segments 2–13 squarish, each successive segment reduced in width apically as antennae slightly tapers to segment 14 ellipsoid with rounded apex. Flagellomeres brownish black except flagellomere 1 yellow at extreme base. Face brown, palpi brown.

Thorax. Mesonotum (Fig. 6) and scutellum subshining brown, humeri yellowish brown, with scattered black setulae dorsally, longest laterally. Pleurae (Fig. 4) brown, propleuron with patch of small fine black hairs, otherwise pleura bare. Mediotergite brown, with minute setulae apically (Fig. 4). Halter stem white, knob white with tan dorsal margin.

Legs. Coxae whitish yellow, yellowish brown apically on hind coxa; femora and tibiae yellow; tibial setae in rows; tibial spurs 1:2:2; hind tibia with spurs of subequal length (Fig. 8), hind basitarsus subequal in length to hind tibia; tarsi black. Claws minute.

Wing (Fig. 10). Grayish hyaline with densely distributed microtrichiae, infuscated slightly darker grayish on apical one-fourth; Tip of vein Sc effaced, ending in C before origin of Rs. C ending halfway between R_{4+5} and M_1 ; vein bm-m weak to effaced; M_4 effaced basally; CuP rudimentary; CuA not reaching wing margin.

Abdomen. Tergite I all black; tergites II–IV black basally, yellowish white apically; Tergite V with a thin yellow band posteriorly; Tergite VI all black; tergites with scattered black hairs; sternites II–V predominantly yellow with dark brown basally; sternite VI predominantly black with yellow apically.

Hypopygium (Figs. 12–13). Pale yellowish brown. Epandrium (Fig. 12) longer than gonocoxites, subconical. Gonocoxites (Fig. 13) broad, subrectangular, tapering toward apex, densely long setose apicolaterally. Gonostyle (Fig. 13) hook-shaped, tapered to a point and sclerotized apically, with single subapical seta, short haired laterally.

Female. As in male except female tibial spurs shorter than in male.



Figs. 7–8. *Tylparua*, hind tibiae showing tibial spurs. 7. *T. kolekole*, n. sp. 8. *T. vulgaris*, n. sp.

Material Examined. *Holotype* ♂ (BPBM000016665) and 5♂, 1♀ paratypes from HAWAIIAN ISLANDS: **O‘ahu:** Lualualei Naval Magazine, Halona Valley, 1,280 ft [390 m], 21.42611°N, 158.10304°W, 10–13 Sep 2019, N.L. Evenhuis, yellow pan traps. *Other paratypes:* **O‘ahu:** 15♂, topotypic, 10–12 Jul 2019, 23♂, 6♀, same data, 23–26 Jul 2019, yellow pan traps (BPBM); 1♂, 2♀, Lualualei Naval Magazine, Halona Valley, Pohakea Spring, 21°26.0'N, 158°05.8'W, 1475 ft. [ca. 450 m], 24 Apr–16 May 1996, D.J. Preston, F.G. Howarth, Malaise trap (BPBM); 1♀, Makaleha Stream, 3 ft [1 m], 27 Mar–3 Apr 2017, W.D. Perreira & D.A. Yee (BPBM); 1♂, Round Top, 1,100 ft. [335 m], 17–20 Nov 2020, black pan trap, W.D. Perreira, D.A. Yee (BPBM); 1♂, 1♀, Mt. Tantalus, 1,800 ft. [ca. 549 m], 17, 27 Nov 1966, J.R. Vockeroth (CNCI). *Holotype* in BPBM. *Paratypes* in BPBM, CNCI, HDOA, and UHIM. *Non-types.* HAWAIIAN ISLANDS. **Lāna‘i:** 1♂, 1♀, Lanaihale, 914 m, W.C. Gagné (BPBM); 1♂, Lāna‘i Mountains, 17 Feb 1965, N.L.H. Krauss (BPBM).

Remarks. The specimens collected at the type locality and environs over the years had been misidentified in reports as *Tyl. hawaiiensis* based on the apical infuscation of the wing (true *hawaiiensis* does not have vein M_4 effaced basally). Specimens of Hawaiian keroplatids are rarely collected and usually only as singletons or a few at a time, so it is highly unusual that dozens of specimens would be collected from one locality over a period of a few months (and only three collecting events). The only other species of keroplatid with such large numbers from one locality is *Tyl. cratericola* (Hardy) from Paliku in Haleakalā Crater on Maui. It could be that the use of pan traps allowed more specimens to be collected, but collecting with pan traps in previous years at the same locality did not produce any results; and it is noteworthy that no specimens were collected in the Malaise trap that was set up a few meters away from the pan traps. As can be seen, the vast major-



Figs. 9–10. *Tylparua*, wings. **9.** *T. kolekole*, n. sp. **10.** *T. vulgaris*, n. sp.

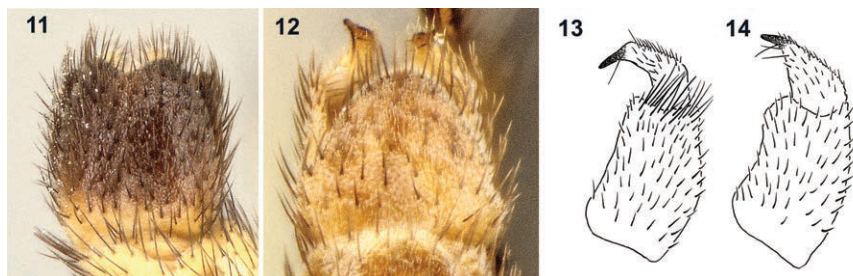
ity of those collected using yellow pans were males, which may indicate that males were swarming. The same male-predominant collecting results is seen in the material of *Tyl. cratericola*. Searching at the type locality was conducted to determine where the immatures might be (but without luck) including creating a dark moist area under a rock in hopes it would be seen as a possible site for females to oviposit and immatures to breed. It became inhabited instead by a spider.

Since all the other specimens from this species are known only from O‘ahu, the specimens from Lāna‘i that key to this species are not considered part of the type series as they differ slightly in coloration of the pleura and epandrium. Dissection of male genitalia of the Lāna‘i specimen was not conducted due to the paucity of material. Further study of additional specimens is needed to better ascertain their position.

Etymology. The specific name derives from the Latin *vulgaris* [= common, commonplace]; referring to the relative commonness of adults on the island of O‘ahu.

ACKNOWLEDGMENTS

Thanks to Dan Rubinoff (UHIM) for providing access to the UHIM material; Owen Lonsdale kindly loaned specimens from CNCI for study. Janis Matsunaga graciously



Figs. 11–14. *Tylparua*, male genitalia. **11.** *T. kolekole*, epandrium. **12.** *T. vulgaris*, epandrium. **13.** *T. vulgaris*, gonocoxa and gonostylus, ventral view. **14.** *T. insularis* gonocoxa and gonostylus, ventral view.

allowed examination of specimens from HSPA currently housed in HDOA and transfer of type material to BPBM. William Perreira kindly donated specimens he collected. Scott Fitzgerald reviewed the manuscript and his suggestions helped improve it.

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