Number 149, 29 pages 18 July 2022

BISHOP MUSEUM
OCCASIONAL PAPERS

The genus *Tylparua* Edwards in Hawai'i (Diptera: Keroplatidae: Orfeliini). Part I: Introduction, new subgenera, and review of the subgenus *Bryanplatyura*, n. subgen.

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Bishop Museum Press
Honolulu

Cover photo: *Tylparua (Bryanplatyura) kolekole* Evenhuis, 2021 (O‘ahu).

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Bishop Museum Bulletins in Cultural and Environmental Studies	(eISSN 2376-3159)

eISSN 2376-3191

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1525 Bernice Street
Honolulu, Hawai‘i 96817-2704, USA

Published online: 18 July 2022

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ISSN (online) 2376-3191

lsid:zoobank.org:pub:FB2C1E67-19BB-48CA-8CA7-8E30E57492A7

The genus *Tylparua* Edwards in Hawai‘i (Diptera: Keroplatidae: Orfeliini). Part I: Introduction, new subgenera, and review of the subgenus *Bryanplatyura*, n. subgen.[1]

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Abstract. The endemic Hawaiian genus of predaceous fungus gnats, *Tylparua* Edwards, of the family Keroplatidae is reviewed. Three new subgenera are proposed: *Bryanplatyura* Evenhuis, **n. subgen**., *Haleplatyura* Evenhuis, **n. subgen**., and *Hardyplatyura* Evenhuis, **n. subgen**. The following five new species are described: *Tylparua* (*Bryanplatyura*) *flavicoxa*, **n. sp.,** *Tyl*. (*Bry*.) *gagnei*, **n. sp**., *Tyl. (Bry.) hakeakea*, **n. sp**., *Tyl*. (*Bry*.) *makue*, **n. sp.**, and (*Tyl*.) *Bry*.) *napau*, **n. sp.** A lectotype is chosen for *Platyura fuscocostata* Grimshaw.

Key words: taxonomy, Hawai‘i, Diptera, Keroplatidae, systematics, *Tylparua*, *Bryanplatyura*, *Haleplatyura*, *Hardyplatyura*

INTRODUCTION

British entomologist Percy Hall Grimshaw (1901) described the first species of keroplatids (as mycetophilids) in Hawai‘i as part of the *Fauna Hawaiiensis*. He described three species collected by R.C.L. Perkins and placed all three in a broad concept of *Platyura* Meigen: *P. fuscocostata* (based on a female from Kīlauea on the island of Hawai‘i and another female from Haleakalā, Maui); *P. hawaiiensis* (one male and two females from the island of Hawai‘i); and *P. insularis* (one female from Moloka‘i and one female from the island of Hawai‘i).

The history of keroplatid taxonomic work in Hawai‘i since the *Fauna Hawaiiensis* is meager. Few collections were made, or papers published mentioning Hawaiian species, until Hardy (1960), who was the first to review the species of Hawaiian Keroplatidae (treating them in Mycetophilidae). At the time, Hardy placed all Hawaiian species in two subgenera of the genus *Orfelia* Costa: *Tylparua* Edwards, 1929 and his new subgenus *Trigemma* Hardy, 1960. Hardy recognized five species of the family in the Hawaiian Islands: four in *Orfelia* (*Tylparua*), and one in *Orfelia* (*Trigemma*). Subsequently, Matile (1989) treated Keroplatidae as a family separate from Mycetophilidae and raised a number of subgenera of *Keroplatus* Bosc and *Orfelia* to generic status; Evenhuis (2006a) described a second species of Hawaiian *Trigemma*; and Evenhuis (2021) described two new species of *Tylparua* from O‘ahu. An introduced keroplatid (*Apyrtula sastrei* Matile) was recently recorded from O‘ahu (Evenhuis 2019).

1. Contribution No. 2022-004 to the Hawaii Biological Survey.

Fig. 1. *Tylparua* (*Bryanplatyura*) *kolekole* Evenhuis, male habitus.

Hardy (1960) mentioned that he thought the species *Tylparua fuscocostata* might consist of more than one species (the typical form was dark-colored while others he had seen were pale colored). Since the pale-colored specimens were males, he refrained from describing them as different. In fact, the male specimens Hardy referred to and others identified subsequently as *Tyl. fuscocostata* are shown here to belong to a complex of six species, placed in a new subgenus (*Bryanplatyura*, **n. subgen**.), five species of which are described as new. The two species identified by Hardy (1960) as *Tyl. insularis* and *Tyl. hawaiiensis*, are also found in this study each to be representatives of separate subgenera, the former in *Hardyplatyura*, **n. subgen**., and the latter in the nominate subgenus *Tylparua*. Each subgenus contains numerous new species that will be the subject of the second and third parts of his study, respectively. A third new subgenus (*Haleplatyura*, **n. subgen**.) is proposed here for *Tylparua cratericola* (Hardy).

A key to the subgenera of *Tylparua* and species in the subgenera *Bryanplatyura* and *Haleplatyura* is provided, and species are illustrated to assist in identification.

MATERIAL AND METHODS

Specimens studied derive from and/or are deposited in the the following (abbreviations follow Evenhuis 2020): Natural History Museum, London, UK (BMNH); Bernice Pauahi. 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); National Museums of Scotland, Edinburgh, UK (NMS); 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 & Ševčik (2017) for wing venation terminology. Extended depth of field photographic images were accomplished by obtaining a series of stacked images using a Leica M165C stereo dissecting scope via Leica Microsystems LASX Multifocus software and using the LASX Multifocus software and Zerene Stacker® stacked focusing software (v. 1.04) (Zerene Systems, LLC, Richmond, Washington, USA) to align and stack-focus each final image.

To differentiate between genus-group names in the narrative and key beginning with the same letter , the following three-letter abbreviations are used: *Bry*. = *Bryanplatyura*; *Hal*. = *Haleplatyura*; *Har*. = *Hardyplatyura*; *Tri*. = *Trigemma; Tyl*. = *Tylparua*.

TAXONOMY

Although proposed as a separate family by Hennig (1954), when studying the Hawaiian taxa, Hardy (1960) continued to treat the Keroplatidae as a subfamily in the Mycetophilidae. Matile (1990) showed the monophyly of the family and it has been treated as a family since [see Mantič *et al*. (2020) for the most recent phylogeny of the family]. The family Keroplatidae can be distinguished from the Mycetophilidae in Hawai'i by the veins M_{1+2} and M_4 connected by a bm-cu crossvein (this crossvein is absent in Mycetophilidae) and crossvein r-m is absent and is replaced by a fusion of Rs and M_{1+2}. In Hawai'i, both families occur, with all but one species of Keroplatidae being endemic (*Apyrtula sastrei* Matile was recently introduced); and most known species of Mycetophilidae being introduced (e.g., *Neoempheria carinata* Sueyoshi, 2014 [see Evenhuis (2019)], and an undetermined species of *Sciophila* Meigen), There is one undescribed endemic species of *Leia* Meigen, which is known only from the deep zones in caves on the island of Hawai'i.

The two endemic genera of keroplatids occurring in the islands, *Trigemma* Hardy and *Tylparua* Edwards, are easily distinguished from each other by the number of ocelli (two in *Tylparua* and three in *Trigemma*). The introduced species in genus *Apyrtula* can be separated from the other keroplatids in Hawai'i by the combination of presence of vein R_{2+3}, uniformly distributed setae on the scutum, and having three ocelli.

When examining specimens for this study, it became clear that there was extremely more diversity in *Tylparua* than Hardy (1960) had indicated. It could have been that Hardy produced the manuscript for his 1960 Hawaiian "Mycetophilidae" paper early in the 1950s based on only a few specimens, and moved on to other families of Nematocera so

as to be able to quickly complete and publish volume 10 of the *Insects of Hawaii* in 1960. This is assumed because, for example, the UHIM collection contains dozens of specimens of his new species *Orfelia (Tylparua) cratericola* collected from the type locality in 1958 that were not included in type series. Had he spent more time on these and other specimens collected before publishing in 1960, he might have also come to the conclusion that there was much more diversity than he initially thought. Perhaps too much attention was paid by Hardy to the wing venation and not other characters, thus missing some new species. For example, easily seen differences such as coloration differences of thorax and abdomen and shape of the epandrium were not discussed by Hardy (1960). Additionally, Hardy had the habit in his *Insects of Hawaii* series to not include detailed material examined information for previously described species (only giving island distribution). He gave detailed information on material examined only for his new species. Thus, it is difficult to impossible to ascertain to what species his illustrations actually pertain (in this study, they most often pertain to nominal species other than what the figure caption says) without scouring all the material he had seen that is now deposited in UHIM, BPBM, and HDOA (the last containing specimens transferred from HSPA).

After examination of hundreds of specimens in this study from the three above-listed collections, plus additional material from a few other collections, it became clear that the four species known to Hardy (1960) in *Tylparua* each represented a separate complex of species. These were decided here to best be treated as subgenera of *Tylparua*; however, each may at some point in the future be raised to generic status once further study is done to ascertain relationships of these genus-groups with other keroplatids.

Remarks on morphological characters

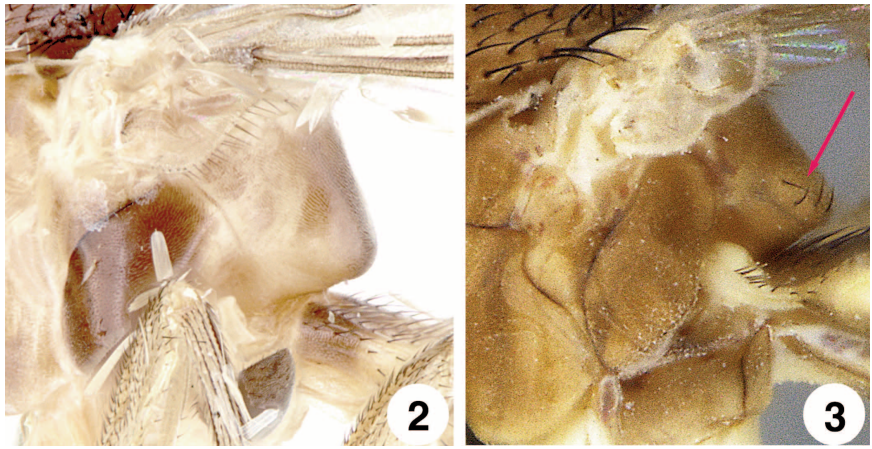
To understand the diversity of species of *Tylparua* in Hawai‘i, I compared morphological characters used in other keroplatid studies to see how they fared in justifiably separating species and, as a result, found additional characters that proved to be useful in separating species and showing little variation. Comments are given here for a few of the more significant characters in hopes they will aid future workers.

Head

Antennae. Hardy (1960) noted the different shapes of male antennal flagellomeres of species in *Tylparua* (treated as a subgenus of *Orfelia* in that work) [female flagellomeres show no differences]. These differences in males do hold true in determining subgenera, but within subgenera, the antennal flagellomere shape and lengths of antennae do not show specific differences. Color differences in the scape and pedicel were noted in some species, but the majority of species tended to have pale-colored basal segments (i.e., scape, pedicel and the base of flagellomere 1), with the remainder of the flagellomere brown to black

Maxillary palps. All *Tylparua* have four palpomeres; in some *Tylparua* the first palpomere is minute and not readily visible in pinned specimens. There are differences in size, shape, and vestiture of the fifth palpomere, but not consistent to identify subgenera. They are used here in some cases to distinguish species.

Clypeus. The clypeus is small, hemispherical and slightly produced in lateral view. The only differences found are in coloration, which is used in distinguishing some species.



Figs. 2–3. *Tylparua* mediotergites. **2**. *Tyl*. (*Bry*.) *kolekole* Evenhuis, 2021. **3**. *Tyl*. (*Har*.) *vulgaris* Evenhuis, 2021; arrow points to apical microsetae.

Thorax

Mediotergite. The mediotergite shows some specific differences with regard to the presence or absence of microscopic setae apically and/or apicolaterally (Figs. 2–3). The presence or absence varies among species within some subgenera, but no apical microsetae are found in species of *Tylparua* (*Bryanplatyura*) [except *Tyl*. (*Bry*.) *gagnei*, n. sp.] or *Tyl*. (*Haleplatyura*).

Halteres. The halter in *Tylparua* often has microsetae present on the laterodorsal surface of the stem and knob. The knob coloration is used only in separating species. In some species, the dorsal face is black while the ventral surface is whitish.

Legs

Leg segment lengths. The relative lengths of leg segments have sometimes been used to characterize taxa in Keroplatidae. The legs in *Tylparua* appear to be relatively similar throughout the genus with little variation if any.

Tibial spurs. All species of *Tylparua* have two pairs of hind tibial spurs, with on spur typically longer than the other or both almost equal in length. In the subgenera *Bryanplatyura* and *Haleplatyura*, the spurs are of unequal length with the shorter spur always one-third or less the length of the longer (cf. Figs. 4, 6). In *Hardyplatyura* and *Tylparua* s. str. the spurs may be subequal in length or distinctly unequal in length, but in these subgenera, the shorter spur is always more than half the length of the longer spur (cf. Figs. 5, 7).

Wing

Mantič *et al*. (2020) noted that, although many body characters show a great variety of shapes and sizes, the wing characters remain relatively stable throughout the family, thus are good characters to use in determining relationships as well as distinguishing taxa. As such, they afford a suite of primary characters used in determining taxa within Hawaiian *Tylparua*.

Figs. 4–7. *Tylparua* hind tibial spurs. **4**. *Tyl*. (*Bry*.) *makue*, n. sp. **5**. *Tyl*. (*Har*.) sp. **6**. *Tyl*. (*Hal*.) *cratericola* (Hardy, 1960). **7**. *Tyl*. (*Tyl*.) *hawaiiensis* (Grimshaw, 1901).

Infuscation. Many species of *Tylparua* possess infuscation on various portions of the wing. In *Haleplatyura* and *Bryanplatyura*, there is characteristic dark infuscation along the anterior margin of the wing in the costal cell and in cell cr1 (Figs. 8, 10); in the subgenera *Tylparua* and *Hardyplatyura*, the infuscation (if present) along the costa is much paler, but there may also be infuscation in the distal third to fourth of the wing.

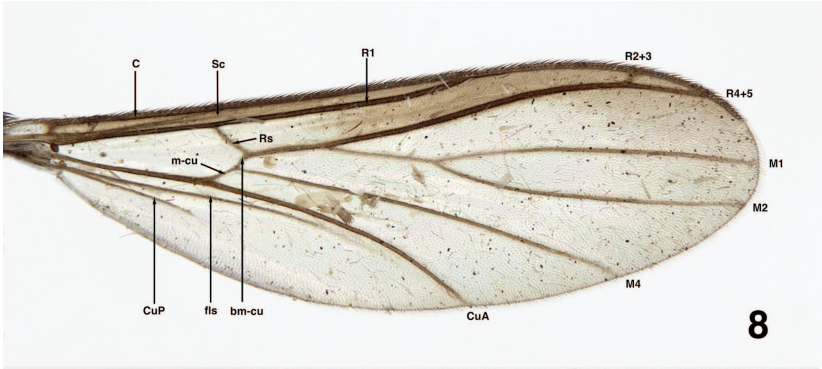
Venation. Venation in *Tylparua* is relatively stable with only a few areas showing usefulness in separating taxa. For example, the absence of vein R_{2+3} at the apex of the wing characterizes species of *Haleplatyura*; the base of M_4 is effaced or absent (cf. Fig. 35) in some species of *Tylparua*; vein Sc is either complete to costal vein or incomplete; the relative positions of vein junctions and whether veins run parallel to each other or diverging can be used in separating species.

WIPs. Wing Interference Patterns in *Tylparua* (cf. Figs. 14–17) were investigated and shown to be useful in separating species as well as associating otherwise dimorphic males and females. Coloration and pattern in cell r4+5 was shown to be particularly useful in separating species in the subgenus *Hardyplatyura*.

Abdomen

General shape. Although not mentioned by Hardy (1960), *Tylparua* exhibits sexual dimorphism with regard to abdominal shape. Male abdomens are generally narrow in dorsal view for their entire length with the genitalic capsule being slightly wider. In contrast,

Figs. 8–11. *Tylparua* wings. **8**. *Tyl.* (*Bry.*) *kolekole* Evenhuis, 2021. **9**. *Tyl.* (*Har.*) *vulgaris* Evenhuis, 2021. **10**. *Tyl.* (*Hal.*) *cratericola* (Hardy, 1960). **11**. *Tyl.* (*Tyl.*) *hawaiiensis* (Grimshaw, 1901). Abbreviations: bm-cu = basal-medial-cubital crossvein; C = costal vein; CuA = anterior branch of cubital vein; CuP = posterior branch of cubital vein; fls = false vein; M = medial vein (M_1, M_2, and M_4); m-cu = medial-cubital crossvein; R = radial vein (R_1, R_{2+3}, and R_{4+5}); Rs =- radial sector vein; Sc = subcostal vein.

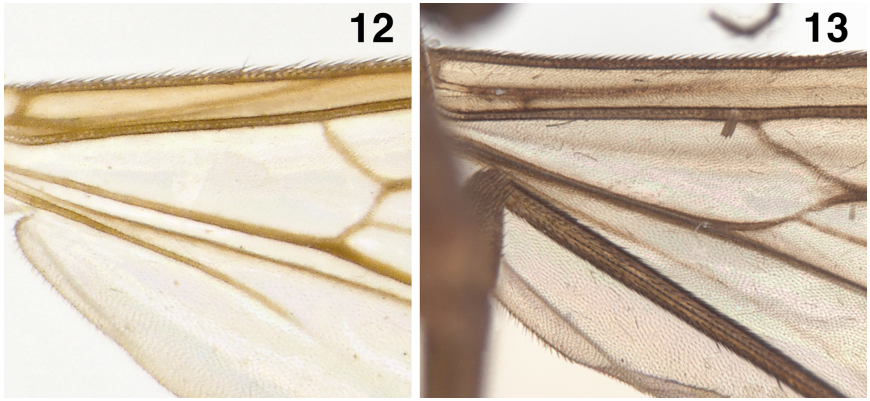


8

9

10

11



Figs. 12–13. *Tylparua* (*Bryanplatyura*), wing bases showing subcostal vein. **12**. *Tyl*. (*Bry*.) *fusco-costata* (Grimshaw, 1901), male. **13**. *Tyl*. (*Bry*.) *makue*, n. sp.

the abdomen of females are linear-obovate in dorsal view with the basal segments being narrow and each successive abdominal segment becoming wider with the apex rounded.

Male genitalia

Epandrium [tergite 9 of Søli (1997)]. Epandrial shape can be used in grouping subgenera of *Tylparua*, with species in the subgenera *Bryanplatyura* and *Haleplatyura* having a cleft or notched apex (Figs. 18, 20) while species in the subgenera *Tylparua* and *Hardyplatyura* have a more rounded, subtrapezoidal, or conical shape. Within subgenera, the general shape of the epandrium (conical, hemispherical, subrectangular, etc.) and coloration and pattern can be used in separating species

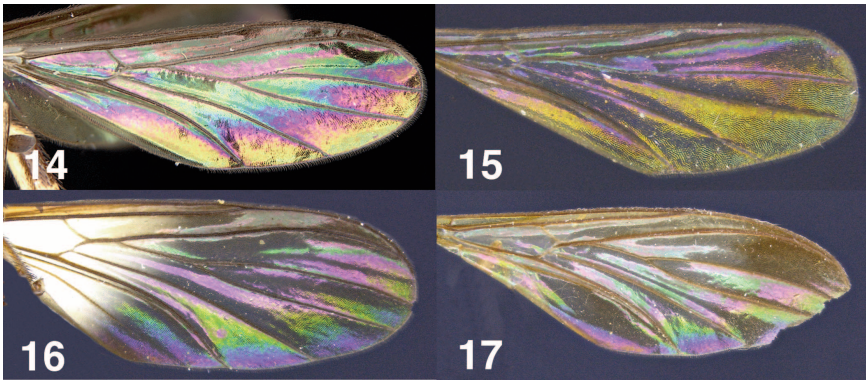
Aedeagus. The shape of the aedeagus was not used by Hardy (1960) but was found here to be useful in separating species of *Bryanplatyura*. Søli (1997) stated that the aedeagus is often hard to be seen clearly, which may be why it is not often used in keroplatid taxonomy. The aedeagus in *Tylparua* may not be well defined in slide mounted genitalic preparations but it is clearly seen in 3-dimensionally preserved material in glycerine. Views in both ventral and lateral should be made to observe the different shapes of the apex (cf. Figs. 48–51).

Gonocoxae* and *Gonostyli. Among species within subgenera of *Tylparua*, the shape and vestiture of the gonocoxae appear to be relatively consistent and do not offer much in separating species.

Key to Genera and Species of Keroplatidae in the Hawaiian Islands

1. With three ocelli; anepisternum bare or setose; tibia with setulae arranged in rows or irregular **2**

–. With two ocelli; anepisternum bare; tibia with setulae arranged in rows ... (***Tylparua*** Edwards) **3**



Figs. 14–17. *Tylparua* Wing Interference Patterns (WIPs). **14**. *Tyl*. (*Bry*.) *napau*, n. sp. **15**. *Tyl*. (*Har.*) *insularis* Grimshaw, 1901). **16**. *Tyl.* (*Hal.*) *cratericola* (Hardy, 1960). **17**. *Tyl.* (*Tyl.*) *hawaiiensis* (Grimshaw, 1901).

2. Vein R_{2+3} present; anepisternum bare; mesonotum with setae distributed uniformly; mid and hind tibiae with two spurs; tibia with setulae arranged in rows; female cerci small, concealed ..... ***Apyrtula sastrei*** Matile

–. Vein R_{2+3} absent, anepisternum setose; mesonotum with admedian bare areas; mid and hind tibiae with a single spur; tibia with setulae arranged irregularly; female cerci extremely large, well exerted ..... ***Trigemma*** Hardy

[Type species: *Orfelia (Trigemma) infurcata* Hardy, 1960]

3. Vein R_{2+3} absent (Fig. 10); vein CuP well developed, extending well beyond level of crossvein m-cu (Fig. 10) ... (***Haleplatyura***, **n. subgen**.) ..... …..... ***Tyl. (Hal.) cratericola*** (Hardy)

[Type species: *Orfelia (Tylparua) cratericola* Hardy, 1960]

–. Vein R_{2+3} present (Figs. 8, 9, 11); vein CuP not as long as above, short, or not visible (Fig. 9) **4**

4. Vein CuP distinct, short, at least not extending beyond level of crossvein m-cu (Fig. 8); generally larger-sized species (ca. 4 mm in length) **5**

–. Vein CuP weak or completely absent (Fig. 9); generally smaller-sized species (length ca. 2.5 mm) ..... (subgen. ***Hardyplatyura*** Evenhuis, **n. subg**.)

[Type species: *Tylparua vulgaris* Evenhuis, 2021]

5. Wing with brownish infuscation along costa in costal cell and cell r1 (Fig. 8); males with antennal flagellomeres as long as wide; epandrium with an apical notch (Fig. 18); hind tibial spurs unequal with shorter spur less than one-half length of longer spur (Fig. 4) ..... (subgen. ***Bryanplatyura*** Evenhuis, **n. subgen**.) ... **6**

[Type species: *Tylparua kolekole* Evenhuis, 2021]

–. Wing without costal infuscation in costal cell or cell r1 although apical infuscation in radial and medial fields distinct (Fig. 11); male antennal flagellomeres 2 x longer than wide; epandrium conical to hemispherical, without an apical notch (Fig. 21); hind tibial spurs subequal to unequal in length, shorter spur more than one-half length of longer spur (Fig. 7) ..... (subgen. ***Tylparua*** *s. str*.)

[Type species: *Platyura hawaiiensis* Grimshaw, 1901]

Figs. 18–21. *Tylparua* epandriums. **18**. *Tyl.* (*Bry.*) *kolekole* Evenhuis, 2021. **19**. *Tyl.* (*Har.*) *insularis* (Grimshaw, 1901). **20**. *Tyl.* (*Hal.*) *cratericola* (Hardy, 1960). **21**. *Tyl.* (*Tyl.*) *hawaiiensis* (Grimshaw, 1901).

KEY TO SPECIES OF THE SUBGENUS *BRYANPLATYURA* EVENHUIS, **N. SUBGEN.**

6. Wing with distinctly demarcated apical infuscation in medial cells in addition to costal cell and cell r1 infuscation (Figs. 32, 34) **7**
–. Wing without distinctly demarcated apical infuscation in cell m1 and sometimes also m2, faint infuscation may be present in extreme apical portion of radial field, but medial cells hyaline or faintly infuscated (Figs. 36, 39) **11**

7. Sc complete to costa (Fig. 12) **8**
–. Sc incomplete to costa (Fig. 13) **9**

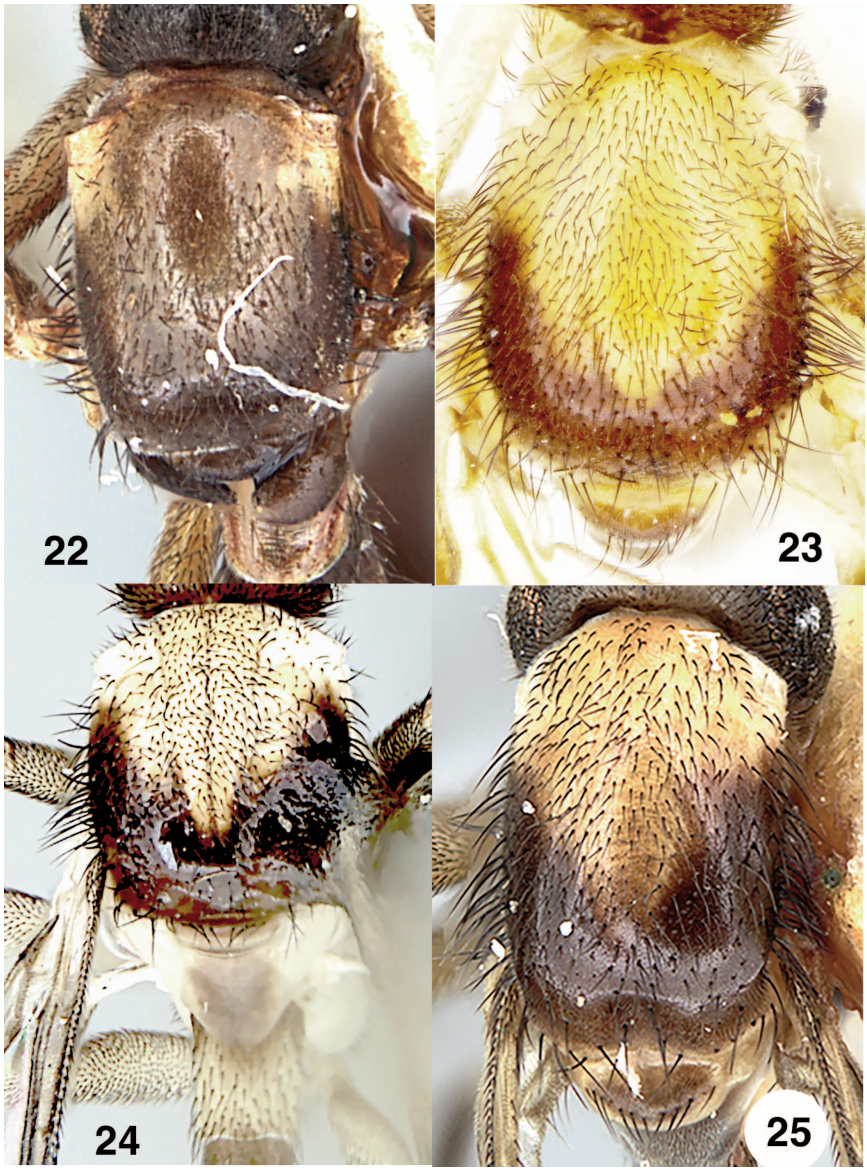
8. Coxae brown to black; humeral callus black ... (Maui Nui) .....
..... female *Tyl. (Bry.) fuscocostata* (Grimshaw)
–. Coxae yellow; humeral callus with spot of yellow ... (Kaua‘i) .....
..... ***Tyl. (Bry.) flavicoxa*** Evenhuis, **n. sp.**

9. Mediotergite dark brown; CuP reaching the level of m-cu ... (Maui) .....
..... ***Tyl. (Bry.) makue*** Evenhuis, **n. sp**.
–. Mediotergite tan, CuP not reaching the level of m-cu **10**

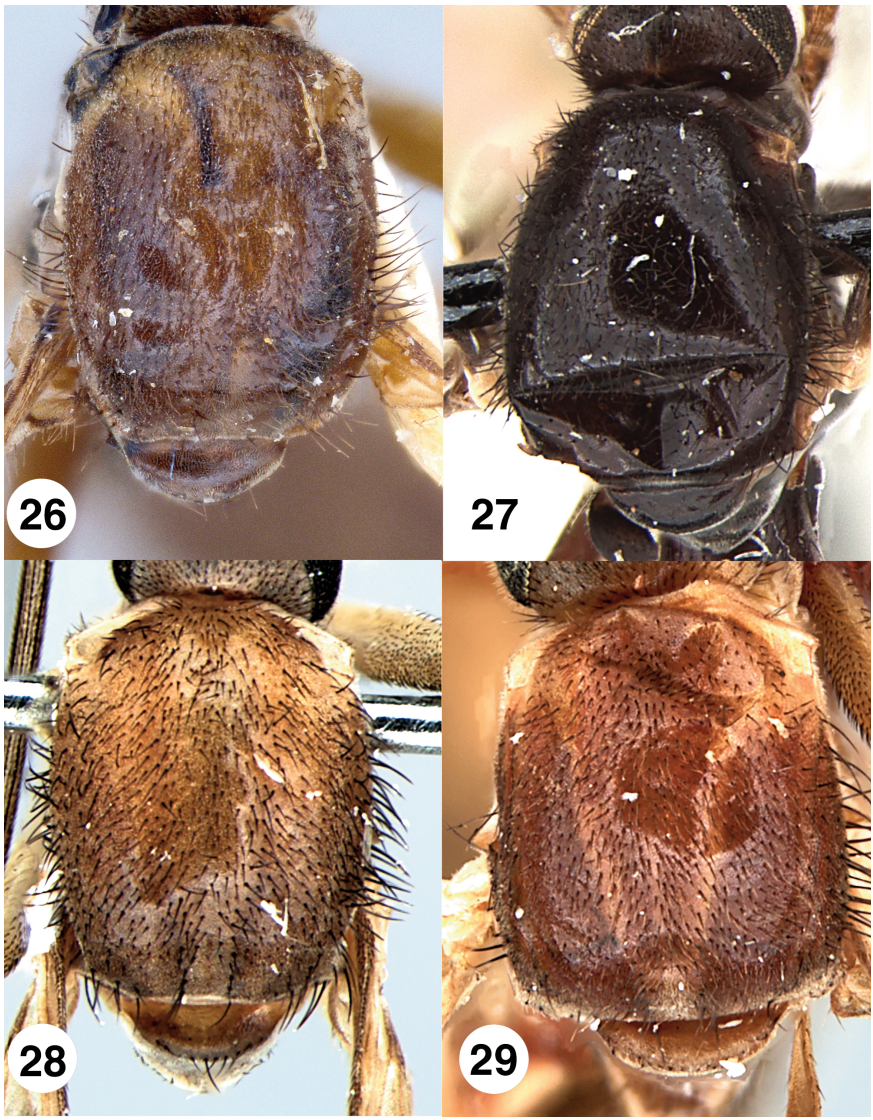
10. M_4 effaced basally at bm-cu (Fig. 35); hind coxa yellow with patch of brown laterally; halter knob yellowish brown ... (Nihoa) ..... ***Tyl. (Bry.) gagnei*** Evenhuis, **n. sp**.
–. M_4 complete to bm-cu; hind coxa all yellow; halter knob with darker brown color at least along borders, not yellowish brown ... (O‘ahu) ... *Tyl. (Bry.) kolekole* Evenhuis

11. Anepisternum brown; mediotergite dark brown with a small spot of yellow color basolaterally ... (Maui Nui) ..... male *Tyl. (Bry.) fuscocostata* (Grimshaw)
–. Anepisternum yellow; mediotergite brown dorsally, largely yellow laterally ... (Hawai‘i) **12**

12. Scutellum brown dorsally, yellow along posterior margin (Fig. 25); vein R_1 ends in costa at level just beyond junction of M_1 and M_2; M_2 slightly bowed to wing margin; epandrium notch shallow (Fig. 47, 51A) ..... ***Tyl. (Bry.) napau*** Evenhuis, **n. sp**.
–. Scutellum yellow basally, brown apically (Fig. 24); vein R_1 ends in costa at level well beyond junction of M_1 and M_2; M_2 straight to wing margin; epandrium notch deep (Fig. 45, 49A) ..... ***Tyl. (Bry.) hakeakea*** Evenhuis, **n. sp**.



Figs. 22–25. *Tylparua* (*Bryanplatyura*), male thoraces, dorsal. **22**. *Tyl*. (*Bry*.) *fuscocostata* (Grimshaw, 1901). **23**. *Tyl*. (*Bry*.) *kolekole* Evenhuis, 2021. **24**. *Tyl*. (*Bry*.) *hakeakea*, n. sp. **25**. *Tyl*. (*Bry*.) *napau*, n. sp.



Figs. 26–29. *Tylparua* (*Bryanplatyura*), female thoraces, dorsal. **26**. *Tyl*. (*Bry*.) *flavicoxa*, n. sp. **27**. *Tyl*. (*Bry*.) *fuscocostata* (Grimshaw, 1901). **28**. *Tyl*. (*Bry*.) *gagnei*, n. sp. **29**. *Tyl*. (*Bry*.) *makue*, n. sp.

Genus *Tylparua* Edwards

Platyura (*Tylparua*) Edwards, 1929: 172. Type species: *Platyura hawaiiensis* Grimshaw, 1901, by original designation. Hardy 1952: 449.

Orfelia (*Tylparua*) Edwards. Hardy, 1960: 203; Colless, 1962: 437; Matile, 1972: 113; Gagné, 1979: 64; Beardsley, 1980: 42.

Tylparua Edwards. Neave, 1940: 599; Matile, 1989: 133, 1990: 389, 417, 435, 439, 441, 558; Nishida 1992: 111, 1994: 104, 1997: 88, 2002: 106; Bechev, 2000: 548; Giffin, 2003: 31; Evenhuis, 2006b: 114, 2009: 51, 2021: 3. Ševčik & Papp, 2009: 347. Evenhuis *et al*., 1997: 147, 2016: 18, 2017: 21, 2018: 21, 2019: 21, 2020: 25, 2021: 27; Blagoderov & Ševčik, 2017: 505.

Diagnosis. Easily separated from the only other endemic genus of keroplatids in Hawai‘i by the presence of only two ocelli, lacking the median ocellus (three ocelli in *Trigemma*), and the presence of two spurs on the mid and hind tibiae (one spur each in *Trigemma*).

Discussion. Species of keroplatids in Hawai‘i were placed within two subgenera of *Orfelia* Costa (*Trigemma* and *Tylparua*) by Hardy (1960) [who treated them within a broader concept of Mycetophilidae]. Matile (1989) later raised the Hawaiian subgenera (and many other Australian and Pacific subgenera of *Platyura* Meigen or *Orfelia*) to generic status. Assigning endemic species in Hawai‘i to either *Trigemma* or *Tylparua* is relatively easy and based primarily on the number of ocelli: *Tylparua* having only 2 ocelli (the median ocellus being absent) or *Trigemma* (having three ocelli). Further separation into lower levels was not done by Hardy (1960) although there were obvious differences in body size, antennal lengths, and male genitalic characters within *Tylparua*. Initial examination of specimens in this study showed that species originally identified as a single species were, in actuality, each a representative of complexes of species in separate discrete groupings based in various characters, with the majority of these being new species. After further morphological examination in this study, it is concluded that these complexes actually represent four separate subgenera, three of which are newly described herein.

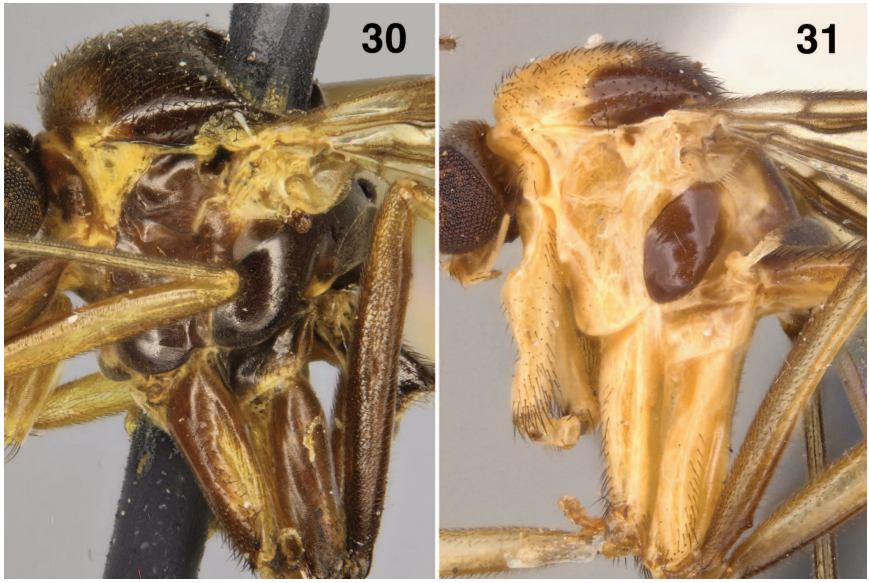
Subgenus *Bryanplatyura* Evenhuis, new subgenus

Type species: *Tylparua kolekole* Evenhuis, 2021, by present designation.

Diagnosis. Characterized by the combination of having two ocelli, presence of vein R_{2+3}, having a distinct vein CuP generally not exceeding the level of crossvein m-cu, having infuscation along the anterior border of the wing in the costal cell and in cell r1, having the hind tibial spurs distinctly unequal in length, lacking minute setae on the apex of the mediotergite, and having the epandrium of the male genitalia with an apicomedial notch.

Included species: *Tylparua (Bryanplatyura) flavicoxa* Evenhuis, **n. sp**. (Kaua‘i); *Tyl. (Bry.) fuscocostata* (Hardy, 1960) (Maui); *Tyl. (Bry.) gagnei* Evenhuis, **n. sp**. (Nihoa); *Tyl. (Bry.) hakeakea* Evenhuis, **n. sp**. (Hawai‘i); *Tyl. (Bry.) kolekole* Evenhuis, 2021 (O‘ahu); *Tyl. (Bry.) makue* Evenhuis, **n. sp**. (Maui); *Tyl. (Bry.) napau* Evenhuis, **n. sp**. (Hawai‘i).

Etymology. The subgeneric name honors the indefatigable Edwin Horace Bryan, Jr. (1898–1985), for his efforts at helping build the entomological collections of the Bishop Museum, for his early contributions to Hawaiian dipterology; and for saving short pencils in a box labeled “pencils too short to use” and tiny bits of string in a box labeled “string too short to tie”. He began in 1919 what has turned out to be an uninterrupted lineage of



Figs. 30–31. *Tylparua* (*Bryanplatyura*) thoraces, lateral. **30**. *Tyl*. (*Bry*.) *fuscocostata* (Grimshaw, 1901), lectotype female. Photo: Vladimir Blagoderov. **31**. *Tyl*. (*Bry*.) *hakeakea*, n. sp.

Bishop Museum natural science employees, succeeded by his daughter B. Leilani Pyle, and grandson, Dr. Richard Pyle, that has lasted for over a century.

Tylparua (Bryanplatyura) flavicoxa Evenhuis, **new species**
(Figs. 26, 32, 40)

Diagnosis. Most similar to *Tyl. (Bry.) fuscocostata* in having a complete Sc, but differs from it by having the coxae yellow (dark brown to black in *Tyl. (Bry.) fuscocostata*) and the humeral calli with a spot of yellow (humeral calli all dark brown to black in *Tyl. (Bry.) fuscocostata*).

Description. **Female**. Lengths: Body: 4.5 mm; wing; 3.2 mm. *Head*. Occiput brown to black. Two ocelli. Ocellar callus darker brown than occiput. Frons brown. Antennae: scape and pedicel brown. Flagellum: segment 1 yellowish brown; segments 2–14 broken off and missing. Face shining dark brown, palp brown, with palpomere 5 longer than palpomeres 3 and 4 combined, acute apically, with small patch of minute hairs at extreme apex.

Thorax. Mesonotum and scutellum brown medially, darker brown laterally with moderately dense hairs dorsally (Fig. 26); humeral callus brown with spot of yellow. Pleurae brown to dark brown. Mediotergite brown, bare. Laterotergite bare. Halter stem and knob brown.

Legs. Yellowish, tarsi and claws brown; mid and hind tibiae yellowish brown at apex; hind tibial spur (Fig. 40) of distinctly unequal length. [Fore leg beyond coxa broken off and missing].

Wing (Fig. 32). Grayish yellow hyaline with densely distributed microtrichiae; infuscated brown anteriorly in cell r1 and in apical one-fourth of wing, apical infuscation fading toward anal cell. Sc complete, ending in C just before origin of Rs; vein M_2 straight to wing margin.

Abdomen. Tergites I–VI shining, brown basally, yellow apically; tergites VII–VIII yellowish. Sternites paler than tergites.

Genitalia. Not dissected.

Male. unknown.

Material Examined. *Holotype* ♀ (BPBMENT 2008010913) from HAWAIIAN ISLANDS: **Kaua'i**: Koke'e, 3 Aug 1940, E.H. Bryan, Jr., on window (BPBM). Holotype in BPBM.

Etymology. The specific name derives from the Latin *flavus* = yellow + *coxa*; referring to the yellow coxae.

Tylparua (Bryanplatyura) fuscocostata (Grimshaw)

(Figs. 27, 30, 33, 34 41, 44, 48)

Platyura fuscocostata Grimshaw, 1901: 1. Bryan, 1934: 446.
Platyura fuscacostata (misspelling for *fuscocostata*; Johannsen 1909: 23)
Orfelia (Tylparua) fuscocostata (Grimshaw). Hardy, 1960: 205.
Tylparua fuscocostata (Grimshaw). Matile, 1989: 133. Nishida, 1992: 111, 1994: 104, 1997: 88, 2002: 106; Evenhuis, 2006b: 115. USDA, 2009: 199.

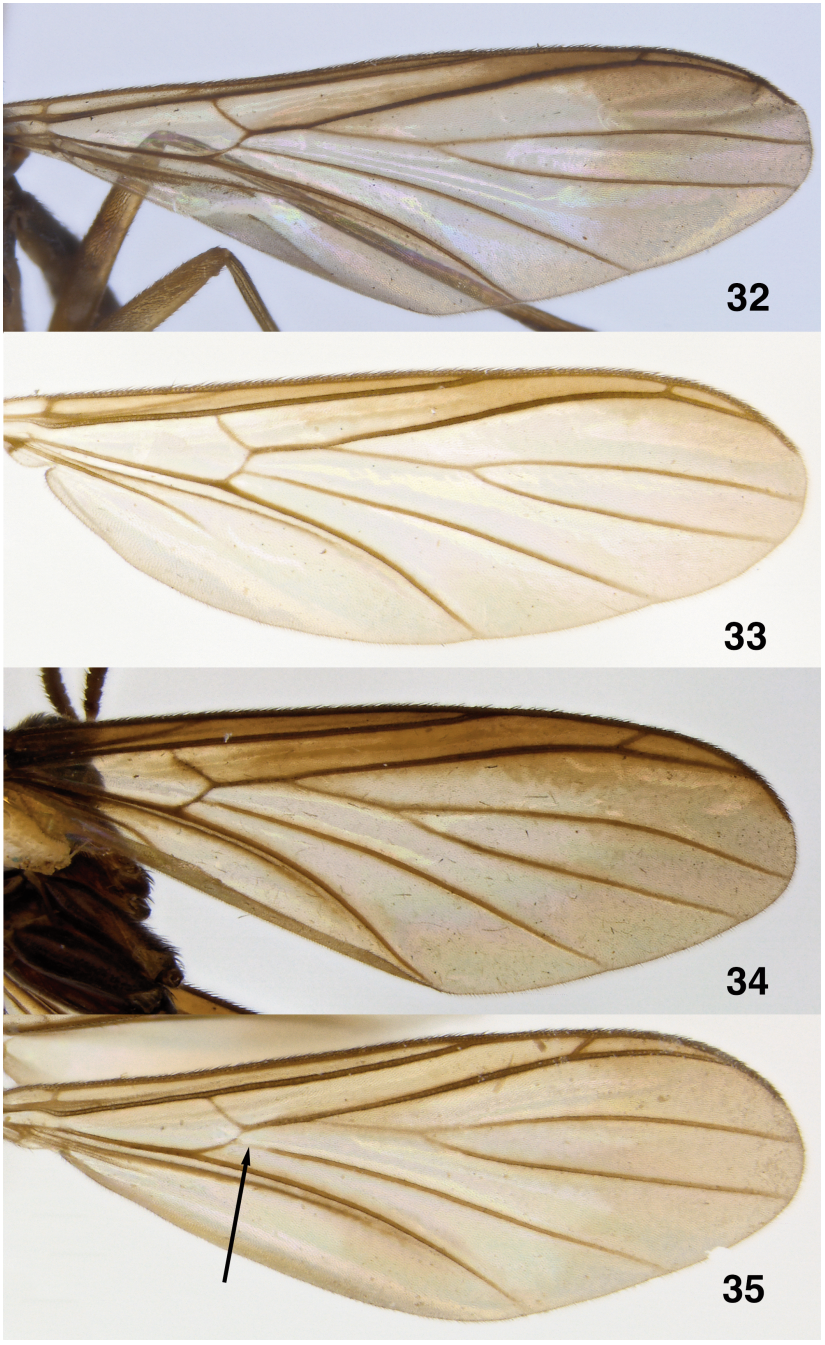
Diagnosis. A sexual dimorphic species; males are most similar to *Tyl. (Bry.) kolekole*, but can be separated from it by the hind coxa being brown to back (yellowish in *Tyl. (Bry.) kolekole*), the prescutellar area not bare (this area bare medially in *Tyl. (Bry.) kolekole*), and the abdominal tergites shining black without yellow and posteriorly (abdominal tergites brown with yellow posterior margins in *Tyl. (Bry.) kolekole*). Females are most similar to *Tyl*. (*Bry*.) *flavicoxa*, but can be separated from it by the all black coxa and humeral callus (the coxae yellow and humeral callus with a spot of yellow in *Tyl*. (*Bry*.) *flavicoxa*.

Description. Lengths: Body: 6.0–6.58 mm; wing; 5.3–5.5 mm. **Female**. *Head*. Occiput dark brown to black. Two ocelli. Ocellar callus black. Frons dark brown. Antennae: scape and pedicel yellow. Flagellum: segment 1 flared apically, 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 basal three-fourths. Face dark brown, palpus yellowish brown, palpomere 5 slightly longer than palpomeres 3 and 4 combined, blunt apically.

Thorax. Mesonotum and scutellum (Fig. 27) shining dark brown to black with decumbent white hairs dorsally, black setulae laterally (supraalar area) and posteriorly (prescutellar area). Pleurae dark brown with bright yellow anteriorly on propleura and anterior portion of anepimeron surrounding anterior spiracle. Mediotergite and laterotergite dark brown, bare. Halter stem yellow, knob dare brown dorsally, white ventrally.

Legs. Yellowish brown to brown with black spines and hairs normally distributed. Hind tibial spurs (Fig. 41) unequal.

Wing (Figs. 12, 34). Grayish yellow hyaline with densely distributed microtrichiae, infuscated brown anteriorly in costal cell and cell r1, paler brown infuscation in apical one-fourth along posterior margin of wing, faced in anal field. Sc complete, ending in C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just before origin of Rs (Fig. 12); R_{2+3} ending in costa closer to end of R_{4+5} than end of R_1; veins M_1 and M_2 slightly curved upward at point meeting wing margin.

Abdomen. Generally shining dark brown to black with black setulae distributed evenly on dorsum. Sternites with same pattern as tergites.

Male. As in female except for following: antennae all brown. Mesonotum and scutellum brown with broad yellow color anterolaterally on mesonotum and humeral callus. Mediotergite and laterotergite brown, bare (cf. Fig 30). Coxae, femora and tibiae yellowish brown; tarsi black. Wing (Fig. 33) with infuscation in costal cell and cell r1 paler than in female; without distinct infuscation in the medial field of the apical portion of the wing. Abdomen generally yellowish; tergite I all yellow; tergites II–VI yellow with brown on posterior margin.

Hypopygium. Dark brown to black. Epandrium longer than gonocoxites, subrectangular, tapering slightly to apex, apical margin (Figs. 44, 48A) notched medially. Gonocoxites tapering toward apex, long setulose laterally, dense fine hairs medially. Gonostyle tapered to acute apex, with short setae basolaterally. Aedeagus (Fig. 48B,C) in ventral view pyramidal, with hooked apex; in lateral view with subapical blunt hawk-nose-like process, below which is a deep concavity.

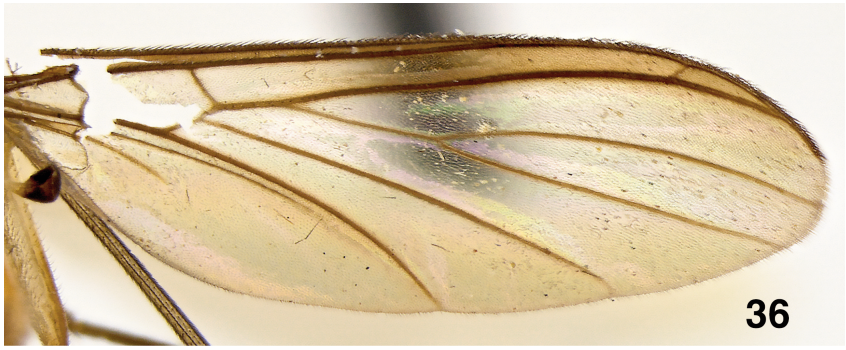
Types. Grimshaw (1901) described *Platyura fuscocostata* based on two specimens. One female from Kīlauea, Hawai'i; and one specimen without an abdomen from Haleakalā, Maui. Hardy (1960) examined the female syntype from Kīlauea in the BMNH, but described the species based on a different specimen (a male that turns out to belong to *Tylparua (Bry.) kolekole*). Unfortunately, the syntype Hardy saw in the BMNH has become lost (a search in 2006 did lot locate it, and checking the BMNH database online during this study shows it to still not be present). Hardy (1960) did not mention examining the other syntype, most likely because he was unaware of where it was deposited. It has been located in this study with other of Grimshaw's Hawaiian specimens in NMS[2]. The specimen is without a locality label but the accession ledger shows it to be the specimen from Haleakalā, Maui, 5000 ft, Oct 1896[3]. That specimen (shown in Fig. 30, [Z.1902.97.3, NMS-10000019]) is here **designated lectotype female**. It is, as Grimshaw (1901) indicated, without an abdomen. It is determined here to be a female because of the extremely dark mesonotal coloration (males have the mesonotum brown to pale brown).

Other Material Examined. HAWAIIAN ISLANDS: **Maui**: 1♀, Haleakalā, 25 Aug 1918, O.H. Swezey, BPBMENT 2008010911 (BPBM); 1♀, Kula Pipe Line, 4,500 ft [ca. 1,372 m], 8 Apr 1932, O. Bryant, BPBMENT 2008010912 (BPBM); 1♀, Auwahi, 3,700 ft [ca. 1,128 m], 20 Jul 1965, J.W. Beardsley (BPBM). *Paratypes*: HAWAIIAN ISLANDS: **Maui**: 2♀, Auwahi, 3,700 ft [ca. 1,128 m],

Figs. 32–35. *Tylparua* (*Bryanplatyura*) wings. **32**. *Tyl*. (*Bry*.) *flavicoxa*, n. sp. **33**. *Tyl*. (*Bry*.) *fuscocostata* (Grimshaw, 1901), male. **34**. *Tyl*. (*Bry*.) *fuscocostata* (Grimshaw, 1901), female. **35**. *Tyl*. (*Bry*.) *gagnei*, n. sp.; arrow points to effaced base of M_4.

2. According to Manning (1986), the arrangement with authors of the *Fauna Hawaiiensis* regarding disposition of the type series specimens was that the first specimen would go to the BMNH, the second to the BPBM, and the third could be kept by the author; and the same order of disposition for all subsequent specimens of type series of more than three specimens. Apparently, Grimshaw was unaware of this with regard to his keroplatid specimens as the BPBM does not have any specimens although Grimshaw based his descriptions of *Platyura fuscocostata*, *P. hawaiiensis*, and *P. insularis* on more than one specimen.

3. The type locality on Maui that Perkins labeled as "Haleakala, 5000 ft." is better pinpointed in Evenhuis (2007) where Perkins's camp was situated in the windward forest upslope of Makawao.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17 Jun 1965, D.E. Hardy, J.W. Beardsley (BPBM); 1♀ (UHIM2016.03443) Pu'u Kukui, 4,500 ft. [ca. 1,370 m], Jun 1954, M. Tamashiro (UHIM); 1♂, Olinda, 4,500 ft [ca. 1,371 m], 8 Apr 1932, O. Bryant (BPBM), 1♂, Olinda, 15 Mar 1932, O. Bryant (BPBM). **Moloka'i**: 1♀, Pu'u Kolekole, Jul 1952, M. Tamashiro (BPBM).

Remarks. Hardy (1960) considered this species to be fairly widespread throughout the islands. It is here found to be restricted to the island of Maui and Moloka'i [eroded emerged remnants of the former Maui Nui complex Price & Elliot-Fisk (2004)].

Tylparua (Bryanplatyura) gagnei Evenhuis, **new species**
(Figs. 28, 35)

Diagnosis. Most similar to *Tyl. (Bry.) kolekole* based on both species having a tan mediotergite, but *Tyl. (Bry.) gagnei* can be separated from it by vein M_4 effaced basally (M_4 connected to bm-cu in *Tyl. (Bry.) kolekole*); the hind coxa with a patch of brown laterally (all yellow in *Tyl*. (*Bry*.) *kolekole*), and the halter knob yellowish brown (halter knob black in *Tyl. (Bry.) kolekole*).

Description. **Female**. Lengths: Body: 3.8 mm; wing; 3.0 mm. *Head*. Occiput yellowish brown. Two ocelli. Ocellar callus brown. Frons black. Antennae: scape and pedicel yellowish brown. Flagellum: segment 1 longer than wide, cylindrical, brown; segments 2–5 squarish. Flagellomeres brown [segments 6–14 broken off and missing]. Face dark brown, palpus yellowish white.

Thorax. Mesonotum and scutellum (Fig. 28) subshining yellowish brown to brown, paler anteriorly, with scattered black setulae dorsally. Pleurae brown. Mediotergite brown, with minute apicolateral setulae. Laterotergite brown, yellowish posteriorly, bare. Halter stem and knob yellow.

Legs. For and mid coxae yellow, hind coxa yellow with brown laterally on apical half; fore femur yellow, mid femur and tibiae yellow, tarsi brown [rest of legs broken off and missing].

Wing (Fig. 35). Grayish yellow hyaline with densely distributed microtrichiae, infuscation in costal cell and cell r1 pale brown; infuscated pale brown on apical one-fourth. Sc incomplete, not ending in C. R_{2+3} ending in C at roughly midpoint between end of R_1 and end of R_{4+5}. M_1 and M_2 parallel to wing margin. Base of M_1 effaced.

Abdomen. Tergites I yellowish brown with black posterior margin; tergites II–VI brown basally, yellow apically. Sternites with same pattern as tergites.

Male. Unknown.

Material Examined. *Holotype* ♀ (BPBMENT 0000081247) from HAWAIIAN ISLANDS: **Nihoa**: West Palm Valley, 70 m, 23 Apr 1983, at UV light, W.C. Gagné (BPBM Acc. 1983.184). Holotype in BPBM. [NB: The abdomen broke off during examination and is glued to the mount.]

Etymology. The specific name honors the memory of the collector of this species, my late friend and colleague, Wayne Charles Gagné (1942–1988), who gave us all the pleasure of his company for an all-too-brief window of opportunity.

Figs. 36–39. *Tylparua* (*Bryanplatyura*) wings. **36**. *Tyl*. (*Bry*.) *hakeakea*, n. sp. **37**. *Tyl*. (*Bry*.) *kolekole* Evenhuis, 2021. 38. *Tyl*. (*Bry*.) *makue*, n. sp. 39. *Tyl*. (*Bry*.) *napau*, n. sp.

Remarks. Evenhuis (1986) recorded undetermined material of "*Orfelia* (*Tylparua*)" from Nihoa Island. In addition to the holotype, Gagné also collected two larvae of this keroplatid from a web discovered in a moist shelter cave on the island. The larvae were examined shortly after collection but subsequently became destroyed when the vial with ethanol in which they were preserved dried out and the specimens could not be rehydrated.

Tylparua (Bryanplatyura) hakeakea Evenhuis, **new species**
(Figs. 24, 31, 36, 42, 45, 49)

Diagnosis. Similar to *Tyl*. (*Bry*.) *napau* in having a yellow anepimeron and a mediotergite with yellow laterally. It can be separated from it by the scutellum being yellow basally and brown apically (scutellum brown dorsally and yellow along the posterior margin in *Tyl*. (*Bry*.) *napau*), the epandrium having a deep apicomedial notch (this notch shallow in *Tyl*. (*Bry*.) *napau*), and the aedeagus in lateral view with a subapical process angled ventrally (apex of aedeagus pointed and slightly angled, and without subapical process in *Tyl*. (*Bry*.) *napau*). Aedeagus similar to that of fuscocostata, but *Tyl*. (*Bry*.) *hakeakea* can be separated from it by the lack of a deep notch basad of the subapical projection (present in *Tyl*. (*Bry*.) *fuscocostata*).

Description. **Male**. Lengths: Body: 4.2–4.8 mm; wing; 3.8–4.0 mm. *Head*. Occiput dark brown. Two ocelli. Ocellar callus black. Frons black. 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 in basal half. Face and clypeus yellow, palpus yellow; palpomere 5 thin, slightly tapering to apex, cylindrical, 1.3 x longer than palpomeres 3 and 4 combined, with rounded apex with minute hairs.

Thorax (Figs. 24, 31). Mesonotum shining yellow with dark brown pattern laterally and posteriorly; scutellum yellow basally, brown posteriorly. Pleura yellow except laterotergite dark brown, bare. Mediotergite brown dorsally, yellow laterally, bare. Halter stem yellow, knob black dorsally, white ventrally.

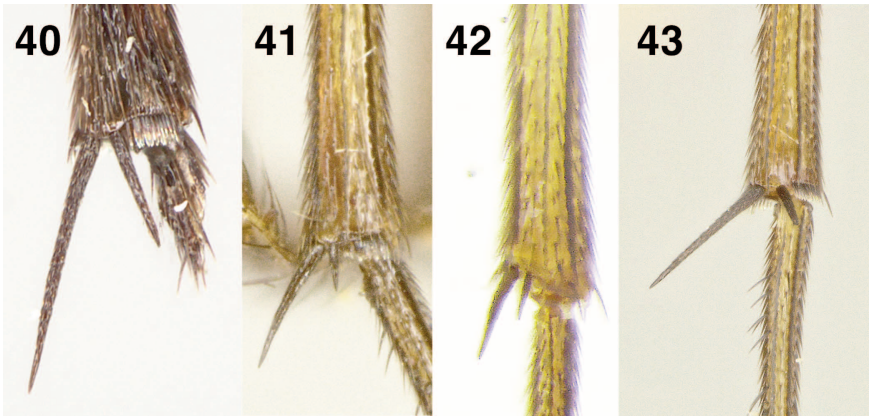
Legs. Coxae, femora, and tibiae yellow; tarsi brown; hind tibial spurs unequal (Fig. 42), shorter spur one-third length of longer one.

Wing (Fig. 36). Grayish yellow hyaline with densely distributed microtrichiae; costal cell and apical two-thirds of cell r1 infuscated brown; apical portion of radial field not infuscated, pale brown infuscation present in cell m4 and anal field. Vein R_{2+3} ending in C closer to end of R_{4+5} than to end of R_1; Veins M_1 and M_2 parallel at wing margin, M_1 slightly bowed before meeting wing margin.

Abdomen. Tergite I yellow; tergites II–VI with basal half brown and apical half yellow; tergite VII yellow. Sternites with same pattern as tergites.

Hypopygium. [Not dissected. Description based on *in situ* genitalia in holotype.] Brown, black apically. Epandrium longer than gonocoxites, subrectangular, tapering slightly to apex, apical margin rounded, bifid (Fig. 45, 48A) deeply notched medially. Gonocoxites tapering toward apex, long setulose laterally, shorter hairs medially. Gonostyle tapered to acute apex, with short setae basolaterally. Aedeagus (Fig. 49B,C) in ventral view pyramidal with pointed apex; in lateral view conical with sharply pointed angled apex with blunt ventrally-oriented subapical projection, without deep notch immediately basad of subapical projection.

Female. Unknown.



Figs. 40–43. *Tylparua* (*Bryanplatyura*) hind tibial spurs. **40**. *Tyl*. (*Bry*.) *flavicoxa*, n. sp. **41**. *Tyl*. (*Bry*.) *fuscocostata* (Grimshaw, 1901). **42**. *Tyl*. (*Bry*.) *hakeakea*, n. sp. **43**. *Tyl*. (*Bry*.) *makue*, n. sp.

Material Examined. *Holotype* ♂ (BPBMENT 2008013006) from HAWAIIAN ISLANDS: **Hawai'i:** Saddle Road, 5,000 ft [ca. 1,524 m], 15 May 1959, S. Kimoto (BPBM). *Paratypes*: HAWAIIAN ISLANDS: **Hawai'i:** 1♂, Mt. House Road above Na'alehu, 3,000 ft [ca. 915 m], 15 Jul 1965, D.E. Hardy (BPBM); 1♂, Kīlauea, 3 Aug 1946, F. Bianchi (HDOA). Holotype in BPBM; paratypes in BPBM, HDOA.

Etymology. The specific name derives from the Hawaiian *hakeakea* = pale-colored, faded, blonde; referring to the generally pale body coloration. The specific name is treated as a noun in apposition.

Tylparua (Bryanplatyura) kolekole Evenhuis
(Figs. 1, 2, 8, 31, 37, 46, 50)

Orfelia (Tylparua) fuscocostata: Hardy, 1960: 207, fig. 65c (misidentification).
Tylparua kolekole Evenhuis, 2021: 3.

Diagnosis. Most similar to *Tylparua (Bry.) gagnei* in having the mediotergite tan and vein CuP not reaching the level of m-cu; but it can be separated from it by the base of M_4 not effaced (effaced basally in *Tyl. (Bry.) gagnei*); and the hind coxae being all yellow (with a patch of brown laterally in *Tyl. (Bry.). gagnei*).

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 palpus yellow; palpomere 5 the same as in *Tyl. (Bry.) fuscocostata*.

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. 31), with scattered black setulae dorsally, longest laterally. Pleurae predominantly yellow-

ish white, laterotergite contrastingly brown. Mediotergite (cf. Fig. 2) pale brown to yellowish white laterally with brownish dorsomedial 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; hind tibia with spurs of unequal length; tarsi all black. Claws minute.

Wing (Figs. 8, 37). Grayish hyaline with infuscation along most of costa to tip of wing and in cell r1; apical one-fifth slightly infuscated; Sc incomplete; vein CuP darkly sclerotized, extending to level of M_4 base.

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

Hypopygium. Dark brown to black. Epandrium longer than gonocoxites, subrectangular, tapering slightly to apex, apical margin bilobed (Fig. 46, 50A) with deep medial notch. Gonocoxites tapering toward apex, long setulose laterally, dense fine hairs medially. Gonostyle tapered to acute apex, with short setae basolaterally. Aedeagus (Fig. 50B,C) in ventral view conical with truncate apex; in lateral view tapered unevenly toward apex, with apex subrounded.

Female. Unknown.

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 (BPBM). *Other material examined*: 1♂, Hālawa, 28 Feb 1974, J.W. Beardsley (UHIM);1♂ (UHIM2016.03444), Mokulē‘ia, 1500 ft. [ca. 450 m], 13 Dec 1952, C. Hoyt (UHIM). Holotype in CNC; paratypes in BPBM and UHIM.

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.

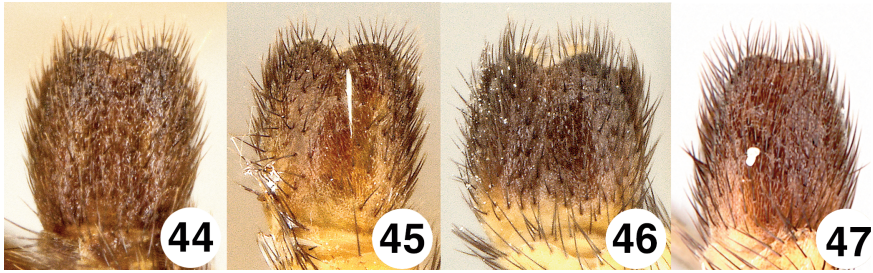
Remarks. Hardy’s (1960: fig 65c) illustration of the male genitalia of “*fuscocostata*” is found here to have been a misidentified specimen (the Mokulē‘ia specimen collected by Hoyt) and is actually *Tyl*. (*Bry*.) *kolekole*.

Tylparua (Bryanplatyura) makue Evenhuis, **new species**
(Figs. 4, 13, 29, 38, 43)

Diagnosis. Most similar to *Tyl. (Bry.) gagnei* and *Tyl. (Bry.) kolekole* in having an incomplete Sc, but can be separated from both by the dark brown mediotergite (tan in *Tyl. (Bry.) gagnei* and *Tyl. (Bry.) kolekole*).

Description. Lengths: Body: 6.2–6.4 mm; wing; 6.8–7.0 mm. **Female**. *Head*. Occiput brown to black. Two ocelli. Ocellar callus black. Frons black. Antennae: scape and pedicel brown. 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 and clypeus brown, palpus brown to black; palpomere 5 short, club-shaped, length about equal to length of palpomere 3 and 4 combined.

Thorax. Mesonotum and scutellum (Fig. 29) brown, humeral callus yellowish, with scattered black setulae, strongest laterally, disc of mesonotum with paired yellowish



Figs. 44–47. *Tylparua* (*Bryanplatyura*) epandriums. **44**. *Tyl*. (*Bry*.) *fuscocostata* (Grimshaw, 1901). **45**. *Tyl*. (*Bry*.) *hakeakea*, n. sp. **46**. *Tyl*. (*Bry*.) *kolekole* Evenhuis, 2021. **47**. *Tyl*. (*Bry*.) *napau*, n. sp.

stripes originating admedial to humeral calli and converging in prescutellar area. Pleurae brown. Mediotergite brown to dark brown, bare. Laterotergite bare. Halter stem yellowish brown, knob brown with minute black setae.

Legs. Coxae, femora and tibiae yellowish brown, tarsi brown. Hind tibial spurs (Fig. 43) unequal in length.

Wing (Figs. 13, 38). Grayish yellow hyaline with densely distributed microtrichiae, with light brown infuscation in costal cell and apical half of cell r1; apical one-fourth of wing infuscated pale brown, anal field also infuscated. Sc incomplete. R_{2+3} ending in wing closer to end of R_{4+5} than end of R_1; veins M_1 and M_2 parallel and angled slightly downward to wing margin

Abdomen. Tergite I yellowish; tergites II–VI brown with yellow band posteriorly. Sternites with same pattern as tergites.

Male. Unknown.

Material Examined. *Holotype* ♀ (BPBMENT 0000081248) from HAWAIIAN ISLANDS: **Maui**: Haleakalā, Ukulele Pipe Line, 5,000 ft [ca. 1,524 m]13 Jul 1919 [collector unknown]. Paratype: HAWAIIAN ISLANDS: **Maui**: 1♀, Kula Pipe Line, 16 Aug 1927, O.H. Swezey (BPBM); 1♀, Waikamoi, Aug 1958, D.E. Hardy (UHIM). Holotype in BPBM; paratypes in BPBM and UHIM.

Etymology. The specific name derives from the Hawaiian *māku'e*, meaning dark brown; referring to the dark brown color of the mediotergite. The specific name is treated as a noun in apposition.

Tylparua (Bryanplatyura) napau Evenhuis, **new species**
(Figs. 14, 25, 39, 47, 51)

Diagnosis. Most similar to *Tyl. (Bry.) fuscocostata* in lacking distinct infuscation in the medial field of the apical portion of the wing, but can be separated from it by the yellow anepisternum (brown in *Tyl. (Bry.) fuscocostata*) and the mediotergite extensively yellow laterally (mediotergite with only a small spot of color yellow laterally in *Tyl. (Bry.) fuscocostata*).

Description. **Male**. Lengths: Body: 4.2–4.8 mm; wing; 3.8–4.0 mm. *Head*. Occiput brown. Two ocelli. Ocellar callus black. Frons black. 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 and clypeus yellow, palpus yellowish white; palpomere 5 thin, longer than palpomeres 3 and 4 combined.

Thorax (Fig. 25). Mesonotum shining yellow with dark brown pattern laterally and posteriorly; scutellum brown dorsally, yellow laterally and posteriorly. Pleura yellow. Mediotergite and laterotergite brown, bare. Halter stem yellow, knob black dorsally, white ventrally.

Legs. Coxae yellow; femora and tibiae yellowish brown; tarsi brown.

Wing (Fig. 14, 39). Grayish yellow hyaline with densely distributed microtrichiae; costal cell and apical 7/8 of cell r1 infuscated brown; apical portion of wing not infuscated. Vein R_{2+3} ending in C closer to end of R_{4+5} than to end of R_1; Veins M_1 and M_2 both slightly bowed, parallel at wing margin. Wing Interference Pattern (as in Fig. 14).

Abdomen. Tergite predominantly yellow, brown at extreme base; tergites II–VI with basal half brown and apical half yellow; tergites VII yellow. Sternites with same pattern as tergites.

Hypopygium. Dark brown to black. Epandrium longer than gonocoxites, subrectangular, tapering slightly to apex, apical margin (Figs. 47, 51A) notched medially, apicolateral bulging areas well developed, heavily setose. Gonocoxites tapering toward apex, long setulose laterally, shorter hairs medially. Gonostyle tapered to acute apex, with short setae basolaterally. Aedeagus (Fig. 51B,C) in ventral view pyramidal with pointed apex; in lateral view conical with acute apex slightly angled ventrally.

Female. Unknown.

Material Examined. *Holotype* ♂ (UHIM2016.03441) and paratype ♂ (UHIM2016.03442) from HAWAIIAN ISLANDS: **Hawai'i**: Napau Crater, 2,900 ft. [ca. 885 m], Jul 1956, D.E. Hardy. Holotype in UHIM. Paratype in BPBM.

Etymology. The specific epithet derives from the type locality just south of Kilāuea summit on the Big Island. The name is treated as a noun in apposition.

Subgenus *Haleplatyura* Evenhuis, new subgenus

Type species: *Orfelia (Tylparua) cratericola* Hardy, 1960, by present designation.

Diagnosis. This subgenus is characterized by the lack of vein R_{2+3} and vein CuP well developed, extending well beyond level of crossvein m-cu (Fig. 10). All other species of *Tylparua* have a vein R_{2+3} and vein CuP is shorter, weak, or not visible.

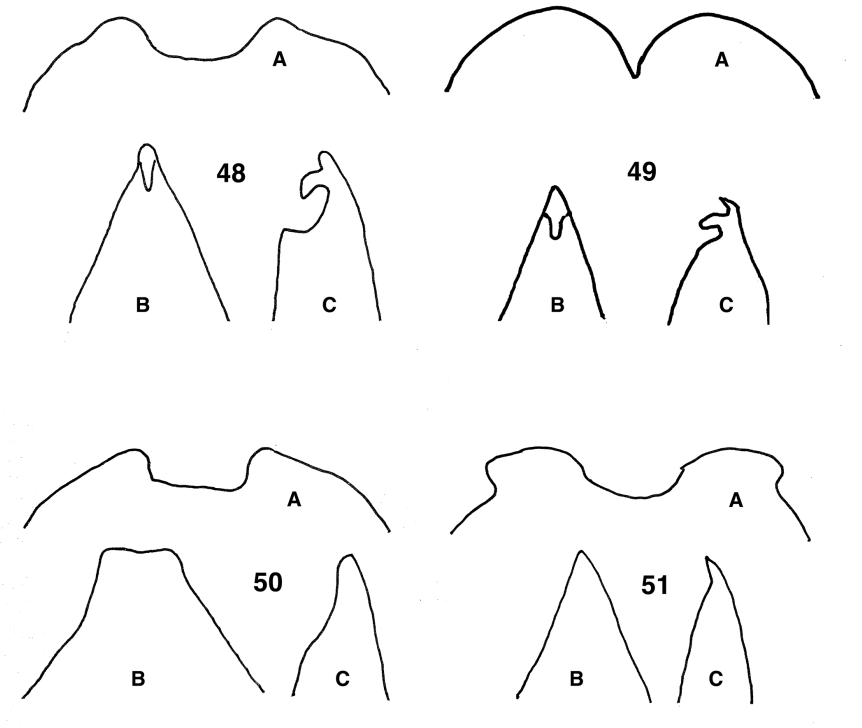
Included species: *Tylparua (Haleplatyura) cratericola* (Hardy, 1960) (Maui).

Etymology. The subgeneric epithet derives from the first four letters of Haleakalā Crater (and the four-letter notation of Haleakalā National Park by the U.S. Park Service), *Hale* + *Platyura*.

Subgenus *Hardyplatyura* Evenhuis, new subgenus

Type species: *Tylparua vulgaris* Evenhuis, 2021, by present designation.

Diagnosis. Characterized by having two ocelli, presence of vein R_{2+3}, a weak or non-visible vein CuP, lack of infuscation along the anterior of the wing (infuscation present, although often faint, in the distal third to one-fourth of the wing); and by the stem of R_{2+3} short in length than or subequal in length to R+M fusion (the stem vein longer in species



Figs. 48–51. *Tylparua* (*Bryanplatyura*) epandrial apices and aedeagi (A = epandrial apex showing notch shapes; B = aedeagus, ventral view; C= aedeagus, lateral view). **48**. *Tyl*. (*Bry*.) *fuscocostata* (Grimshaw, 1901). **49**. *Tyl*. (*Bry*.) *hakeakea*, n. sp. **50**. *Tyl*. (*Bry*.) *kolekole* Evenhuis, 2021. **51**. *Tyl*. (*Bry*.) *napau*, n. sp.

of the subgenera *Tylparua*, *Bryanplatyura* and *Haleplatyura*). Generally, species of this subgenus are smaller in size (ca. 2.5 mm long) than species of the other subgenera (ca. 4.0 mm long).

Included species: *Tylparua (Hardyplatyura) insularis* (Grimshaw) (Hawai‘i); *Tylparua vulgaris* Evenhuis, 2021 (O‘ahu).

Etymology. The subgeneric epithet honors the memory of D.E. Hardy for his significant work on the taxonomy and systematics of Hawaiian Diptera during his more than 60 years of work.

Subgenus *Tylparua* Edwards

Type species: *Platyura hawaiiensis* Grimshaw, 1901, by original designation.

Diagnosis. Species of the nominate subgenus are closest in appearance to members of the subgenus *Bryanplatyura* based on the short, but distinct vein CuP (not reaching the level of crossvein m-cu), but can be distinguished from *Bryanplatyura* by the lack of infuscation in the costal cell (with infuscation in the costal cell and cell r1 in *Bryanplatyura*) and

the antennal flagellomeres of the male being two times longer than wide (as long as wide in *Bryanplatyura*). Males of *Tylparua* can also be separated from *Bryanplatyura* by the lack of an apical notch on the epandrium (the epandrium in *Tylparua* is normally either conical or hemispherical in shape and lacks a notch). In addition to having longer antennal flagellomeres, species of the subgenus *Tylparua* s. str. can also be separated from those of the subgenus *Hardyplatyura* by having the stem of R_{2+3} longer than the R+M fusion (as long as or short than R+M in *Hardyplatyura*), their generally larger size (ca. 4 mm in *Tylparua* and ca. 2 mm in *Hardyplatyura*), and the very dark brown-colored laterotergite, contrasting from other more paler colored pleura (this sclerite is normally concolorous with other pleura in *Hardyplatyura*).

Included species. *Tyl. (Tyl.) hawaiiensis* (Grimshaw) (Hawai‘i).

ACKNOWLEDGMENTS

Thanks to Dan Rubinoff (UHIM) for providing access to the UHIM material. Janis Matsunaga graciously allowed examination of specimens from HSPA currently housed in HDOA and transfer of type material to BPBM. William Perreira kindly donated specimens he collected. Vladimir Blagoderov (NMS) searched for and provided photos of syntypic material in NMS, and kindly reviewed the manuscript, his comments of which improved the paper. Special thanks to the late F. Christian Thompson for providing funds in partial support of research and publication.

REFERENCES

Beardsley, J.W., Jr. 1980. Haleakala National Park Crater District resources basic inventory: insects. *Cooperative National Park Resources Studies Unit, Technical Report* **31**, iv + 49 pp.

Bechev, D. 2000. World distribution of the genera of fungus gnats (Diptera: Sciaroidea, excluding Sciaridae). *Studia Dipterologica* **7**(2): 543–552.

Blagoderov, V. & Ševčik, J. 2017. Keroplatidae (predaceous fungus gnats), pp. 505–525. *In*: Kirk-Spriggs, A.H. & Sinclair, B.J. (eds.), *Manual of Afrotropical Diptera*. Vol. 1. Introductory chapters and keys to Diptera. Suricata 4. South African National Biodiversity Institute, Pretoria.

Bryan, E.H., Jr. 1934. A review of the Hawaiian Diptera, with descriptions of new species. *Proceedings of the Hawaiian Entomological Society* **8**(3): 399–468.

Colless, D.H. 1962. *Chetoneura cavernae* n. gen., n. sp. from Batu Caves, Malaya (Diptera: Mycetophilidae). *Pacific Insects* **45**: 437–439.

Cumming, J.M. & Wood, D.M. 2017. Adult morphology and terminology, pp. 89–133. *In*: Kirk-Spriggs, A.H. & Sinclair, B.J. (eds.), *Manual of Afrotropical Diptera*. Vol. 1. Introductory chapters and keys to Diptera. Suricata 4. South African National Biodiversity Institute, Pretoria.

Edwards, F.W. 1929. Notes on the Ceroplatinae, with descriptions of new Australian species (Diptera, Mycetophilidae). *Proceedings of the Linnaean Society of New South Wales* **54**(3): 162–175.

Edwards, F.W. 1940. New Neotropical Mycetophilidae (IV) (Diptera). *Revista de Entomologia* **11**(1-2): 440–465.

Edwards, F.W. 1941. Mycetophilidae (Diptera) collected by the expedition to Matto Grosso of the Brazilian Zoological Club, in July 1939. *Revista de Entomologia* **12**(102): 303–314.

Evenhuis, N.L. 1986. [Notes & Exhibitions]. *Orfelia* (*Tylparua*) sp. *Proceedings of the Hawaiian Entomological Society* **26**: 3.

Evenhuis, N.L. 1997. Diversity of insects and related arthropods of the Naval Magazine Lualualei, Headquarters Branch, Oahu, Hawaii. Final report prepared for the U.S. Navy. *Bishop Museum Technical Report* **9**, 170 pp.

Evenhuis, N.L. 2006a. A new species of the Hawaiian endemic predaceous fungus gnat genus *Trigemma* Hardy (Diptera: Keroplatidae). *Bishop Museum Occasional Papers* **87**: 63–66.

Evenhuis, N.L. 2006b. Catalog of the Keroplatidae of the world (Insecta: Diptera). *Bishop Museum Bulletins in Entomology* **13**, 178 pp.

Evenhuis, N.L. 2007. Barefoot on lava: the journals and correspondence of naturalist R.C.L. Perkins in Hawai‘i, 1892–1901. *Bishop Museum Bulletin in Zoology* **7**, 412 pp.

Evenhuis, N.L. 2009. Hawaii's Diptera biodiversity, pp. 47–70. *In*: Pape, T., Bickel, D. & Meier, R., (eds.), *Diptera diversity; status, challenges and tools*. Brill, Leiden.

Evenhuis, N.L. 2019. New records of Sciaroidea (Diptera: Mycetophilidae, Keroplatidae) from the Hawaiian Islands. *In*: Evenhuis, N.L. (ed.), Records of the Hawaii Biological Survey for 2019. *Bishop Museum Occasional Papers* **129**: 33–36.

Evenhuis, N.L. 2020. Insect and spider collections of the world website. Available at: http://hbs.bishopmuseum.org/codens/ (Last accessed 11 November 2020).

Evenhuis, N.L. 2021. Two new species of the endemic Hawaiian predaceous fungus gnats *Tylparua* Edwards, from the Wai‘anae Mountains, O‘ahu, Hawai‘i (Diptera: Keroplatidae). *In*: Evenhuis, N.L. (ed.), Records of the Hawaii Biological Survey for 2021. *Bishop Museum Occasional Papers* **142**: 3–9.

Evenhuis, N.L., Preston, D.J., Arakaki, K.T. & Imada, C.**T**. 2016. Terrestrial arthropod survey of Halona Valley, Joint Base Pearl Harbor-Hickam, Naval Magazine Lualualei Annex, August–December 2015. Final report prepared for the U.S. Navy. 30 pp.

Evenhuis, N.L. Arakaki, K.T. & Imada, C.T. 2017. Terrestrial arthropod survey of Halona Valley, Joint Base Pearl Harbor-Hickam, Naval Magazine Lualualei Annex, November 2016–February 2017. Final report prepared for the U.S. Navy. 33 pp.

Evenhuis, N.L. Arakaki, K.T. & Imada, C.T. 2018. Terrestrial arthropod survey of Halona Valley, Joint Base Pearl Harbor-Hickam, Naval Magazine Lualualei Annex, August 2017–October 2017. Final report prepared for the U.S. Navy. 33 pp.

Evenhuis, N.L. Arakaki, K.T. & Imada, C.T. 2019. Terrestrial arthropod survey of Halona Valley, Joint Base Pearl Harbor-Hickam, Naval Magazine Lualualei Annex, September 2018–December 2018. Final report prepared for the U.S. Navy. 33 pp.

Evenhuis, N.L. Arakaki, K.T. & Imada, C.T. 2020. Terrestrial arthropod survey of Halona Valley, Joint Base Pearl Harbor-Hickam, Naval Magazine Lualualei Annex, July 2019–September 2019. Final report prepared for the U.S. Navy. 37 pp.

Evenhuis, N.L. Arakaki, K.T. & Imada, C.T. 2021. Terrestrial arthropod survey of Halona Valley, Joint Base Pearl Harbor-Hickam, Naval Magazine Lualualei Annex, August–November 2020. Final report prepared for the U.S. Navy. 37 pp.

Evenhuis, N.L. & Thompson, F.C. 2004. bibliography of and new taxa described by D. Elmo Hardy (1936–2001). *In*: Evenhuis, N.L. & Kaneshiro, K.Y. (eds.), D. Elmo Hardy Memorial Volume: Contributions to the systematics and evolution of Diptera. *Bishop Museum Bulletins in Entomology* **12**: 179–222.

Gagné, W.C. 1979. Canopy-associated arthropods in *Acacia koa* and *Metrosideros* tree communities along an altitudinal transect on Hawaii Island. *Pacific Insects* **21**(3): 56–82.

Giffin, J.G. 2003. Puʻu Waʻawaʻa biological assessment. Puʻu Waʻawaʻa, North Kona, Hawaii. State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife. ii + 92 pp.

Grimshaw, P. 1901. Diptera, pp. 1–77. *In*: Sharp, D. (ed.), *Fauna Hawaiiensis, or the zoology of the Sandwich (Hawaiian) Isles: being results of the explorations instituted by the joint committee appointed by the Royal Society of London for promoting natural knowledge and the British Association for the Advancement of Science and carried on with the assistance and bodies of the trustees of the Bernice Pauahi Bishop Museum at Honolulu*. Volume III. Part I. Cambridge University Press, Cambridge.

Hardy, D.E. 1952. Additions and corrections to Bryan's check list of the Hawaiian Diptera. *Proceedings of the Hawaiian Entomological Society* **14**(3): 443–484-D.

Hardy, D.E. 1960. Diptera: Nematocera–Brachycera. *Insects of Hawaii* **10**, ix + 368 pp.

Hennig, W. 1954. Flügelgeäder und System der Dipteren unter Berücksichtigung der aus dem Mesozoikum beschriebenen Fossilien. *Beiträge zur Entomologie* **4**: 245–388.

Johannsen, O.A. 1909. Diptera. Fam. Mycetophilidae. *Genera Insectorum* **93**, 141 pp.

Kurina, O., Mantič, M. & Ševčik, J. 2017. A remarkable new genus of Keroplatidae (Insecta, Diptera) from the Afrotropical Region with DNA sequence data. *African Invertebrates* **58**(1): 93–105.

Manning, A. 1986. The Sandwich Islands committee, Bishop Museum, and R.C.L. Perkins: cooperative zoological exploration and publication. *Bishop Museum Occasional Papers* **26**: 1–46.

Mantič, M., Sikota, T., Burdikova, N., Blagoderov, V., Kjaerandson, J., Kurina, O. & Ševčik, J. 2020. Hidden in plain sight: comprehensive molecular phylogeny of Keroplatidae and Lygistorrhinidae (Diptera) reveals parallel evolution and leads to a revised family classification. *Insects* **11**, 348; doi:10.3390/insects/11060348 [16 pp.] https://doi.org/10.3390/insects11060348

Matile, L. 1967. Notes sur les Mycetophilidae de la région pyrénéenne et description de quatre espèces nouvelles. *Bulletin de la Société Entomologique de France* **72**(3): 121–126.

Matile, L. 1972. Keroplatinae des îles de l'Océan Indien occidental (Diptera, Mycetophilidae). *Cahiers de ORSTOM, Série Biologie* **16**: 105–123.

Matile, L. 1977. Keroplatinae de Madagascar (Diptera: Mycetophilidae). *Annals of the Natal Museum* **23**(1): 23–36.

Matile, L. 1982. Systématique, phylogénie et biogéographie des diptères Keroplatidae des Petites Antilles et de Trinidad. *Bulletin du Muséum National d'Histoire Naturelle* (A) (4) **4**: 189–235.

Matile, L. 1989. Family Keroplatidae, pp. 128–133. *In*: Evenhuis, N.L. (ed.), Catalog of the Diptera of the Australasian and Oceanian regions. *Bishop Museum Special Publication* **86**, 1,123 pp.

Matile, L. 1990. Recherches sur la systématique et l'évolution des Keroplatidae (Diptera, Mycetophiloidea). *Mémoires du Muséum Nationale d'Histoire Naturelle, Série A, Zoologie* **148**: 1–682.

Neave, S.A. 1940. *Nomenclator zoologicus*. *A list of the names of genera and subgenera in zoology from the tenth edition of Linnaeus 1758 to the end of 1935*. In four volumes. Vol. IV. Q–Z and supplement. Zoological Society of London, London. 758 pp.

Neave, S.A. 1950. *Nomenclator zoologicus*. Vol. V. 1936–1945. Zoological Society of London, London. 308 pp.

Nishida, G.M. 1992. Hawaiian arthropod checklist. *Bishop Museum Technical Report* [**1**]: 1–262.

Nishida, G.M. 1994. Hawaiian arthropod checklist. Second edition. *Bishop Museum Technical Report* **4**: 1–287.

Nishida, G.M. 1997. Hawaiian arthropod checklist. Third edition. *Bishop Museum Technical Report* **12**: 1–263.

Nishida, G.M. 2001. NOWRAMP 2000 Terrestrial arthropod report. Prepared ... for the U.S. Fish & Wildlife Service. Bishop Museum, Honolulu. 33 pp.

Nishida, G.M. 2002. Hawaiian arthropod checklist. Fourth edition. *Bishop Museum Technical Report* **22**, iv + 313 pp.

Oliveira, S.S., Falaschi, R.L., Urso-Guimarães, M.V. & Amorim, D.S. 2017. Lista das espécies de Bibionomorpha (Diptera) do Estado do Mato Grosso do Sul, Brasil. *Iheringia, Séries Zoologia* **107**(Suplemento): e2017127.2017. [8 pp.] https://doi.org/10.1590/1678-4766e2017127

Powell, A. 2008. *Race to save the world's rarest bird: the discovery and death of the Po'ouli*. Stackpole Books, Mechanicsburg, Pennsylvania. 304 pp.

Price, J.P. & Elliot-Fisk, D. 2004. Topographic history of the Maui Nui Complex, Hawai'i, and its implications for biogeography. *Pacific Science* **58**(1): 27–45.

Ševčik, J. & Papp, L. 2009. *Mikrokeroplatus*, a new genus of Keroplatidae (Diptera) from the Oriental Region. *Acta Zoologica Academiae Scientiarum Hungaricae* **55**(4): 339–347.

Solórzano-Kraemer, M.M. & Evenhuis, N.L. 2008. The first keroplatid (Diptera: Keroplatidae) species from the Lower Eocene amber of Vastan, Gujarat, India. *Zootaxa* **1816**: 57–60.

Suehiro, A. 1986. Insects of Honaunau, pp. 31–61. *In*: Bryan, E. H., Jr. & Emory, K.P. (eds.), The natural and cultural history of Honaunau, Kona, Hawaii. Departmental Report Series 86-2, Department of Anthropology, Bernice Pauahi Bishop Museum, Honolulu.

USDA [United States Department of Agriculture]. 2009. At-risk species and habitat lists. *USDA Natural Resources Conservation Service, Pacific Islands Area, Technical Note* **9**, 403 pp.

Vockeroth, J.R. 2009. Keroplatidae (predaceous fungus gnats), pp. 259–263. *In*: Brown, B.V., Borkent, A., Cumming, J.M., Wood, D.M., Woodley, N.E. & Zumbado, M.A., (eds.), *Manual of Central American Diptera*. Volume 1. National Research Council Press, Ottawa.