

New Species of Hawaiian *Campsicnemus* (Diptera: Dolichopodidae)¹

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Abstract. Six new species of endemic Hawaiian *Campsicnemus* are described and illustrated: *C. kokokekuku*, n. sp. (Hawai'i), *C. maui*, n. sp. (Maui), *C. maukele*, n. sp. (Kaua'i), *C. prestoni*, n. sp. (Hawai'i), *C. sinuosus*, n. sp. (Hawai'i), and *C. ui*, n. sp. (Kaua'i).

Introduction

Recent aquatic and other arthropod surveys conducted by the Hawaii Biological Survey have resulted in a number of new findings of endemic Hawaiian dolichopodids. The new species here (from the islands of Kaua'i, O'ahu, Maui, and Hawai'i) are being described to allow their names to be used in further arthropod surveys of the Hawaiian Islands and phylogenetic and molecular analyses of Hawaiian and Pacific dolichopodids. The addition of the new species described herein brings the total number of Hawaiian *Campsicnemus* to 163, all of which are endemic to the islands.

Material and Methods

Material derives from the Bishop Museum, Honolulu (BPBM) where holotypes of new species described herein are deposited. Paratypes, where series allow, are deposited in the University of Hawai'i at Mānoa Insect Museum (UHM).

Terminology for morphological characters generally follows Evenhuis (2003).

New Taxa Descriptions

Campsicnemus kokokekuku Evenhuis, new species

(Fig. 6)

Diagnosis. This species appears to be the Big Island representative of the group of species that have a barb-like projection on the male mid tibia (*C. kuku* Evenhuis [Kaua'i] and *C. ephydrus* Hardy & Kohn [Maui]). It can be separated from *C. ephydrus* by the distinct sharp barb-like shape of the basal process (this process more bump-like without a distinct "barb" in *C. ephydrus*) and from *C. kuku* by the presence of strong black setae on the apical half of the mid femur (these setae in two patches [basally and apically] in *C. kuku*).

Description. Body: 2.60 mm; wing: 3.38 mm. **Male.** *Head.* Face and clypeus white, front and vertex shining black; oc and vt black, about one-half length of antennal arista; clypeus slightly yellowish pollinose; face only slightly constricted at middle, eyes dichoptic below antennae by 2 x width of

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median ocellus; palp small, brown; proboscis brown to yellowish-brown, extending below eye in lateral view; antennal scape and pedicel dark brown; both flagellomeres and aristae broken off and missing.

Thorax. Brown throughout, mesoscutum and scutellum darker brown; thoracic setae black: 4 dc; 2+1 np; 2+1 ph; 1 pa; 1 sc; ac absent.

Legs. Fore coxa yellow, mid and hind coxa brown; FI and II yellow, FIII yellow with brown color on apicodorsal half; tibiae and tarsi brown. Leg I unmodified, without MSSC. FII swollen basally, tapering to thin apex, row of short black stiff setae on apical half of ventral surface (MSSC); TII (Fig. 6) two times length of basitarsus, with basal barb-like projection bearing row of minute peg-like setae, single long lateral seta at basal 1/3, two long setae apically, otherwise, with fine setae along mesal and lateral surfaces (MSSC); II₁ two times length of II₂; II₃ and leg III unmodified, without MSSC.

Wing subhyaline; halter stem and knob yellowish white.

Abdomen. Shining dark brown with short black hairs dorsally on each tergite, a few longer hairs laterally; venter paler brown. Hypopygium brown, not dissected.

Female. Unknown.

Types. *Holotype* ♂ (BPBM 16,743) from HAWAIIAN ISLANDS: **Hawai'i:** Mauna Loa Kipuka Mosaic, Saddle Road, 19°39'59.9"N, 155°21'32.3"W, fogging mossy fallen koa, 5 Apr 2004, D.J. Preston & M.K.K. McShane.

Etymology: The specific epithet derives from the Hawaiian *kokoke* meaning "near, close"; referring to the close appearance of this species to *C. kuku* Evenhuis from Kaua'i.

Campsicnemus maui Evenhuis, new species

(Figs. 1, 7)

Campsicnemus new sp. 2: Englund *et al.*, 2003: 7.

Diagnosis. Using the key in Tenorio (1969), this species runs to couplet 73 but is stymied there. It differs from *C. tibialis* Van Duzee by the presence of weak ventral hairs on the hind femur (with strong black setae in *C. tibialis*) and the lack of villosity on the fore basitarsus (all tarsomeres with fine villosity in *C. tibialis*); and it differs from *C. truncatus* Hardy & Kohn by the presence of pulvilli longer than the claws (pulvilli shorter than claws in *C. truncatus*) and the 7 anterodorsal setae on the hind tibia (3 in *C. truncatus*).

Description. Body: 2.96–3.02 mm; wing: 2.75–3.00 mm. **Male.** *Head.* Face, front and clypeus brownish black, vertex shining dark brown; oc and vt black; eyes dichoptic below antennae by approximately two times width of median ocellus; palp brown; proboscis brown, extending below eye in lateral view; antenna (Fig. 1) brown, flagellomere subconical, length slightly less than height.

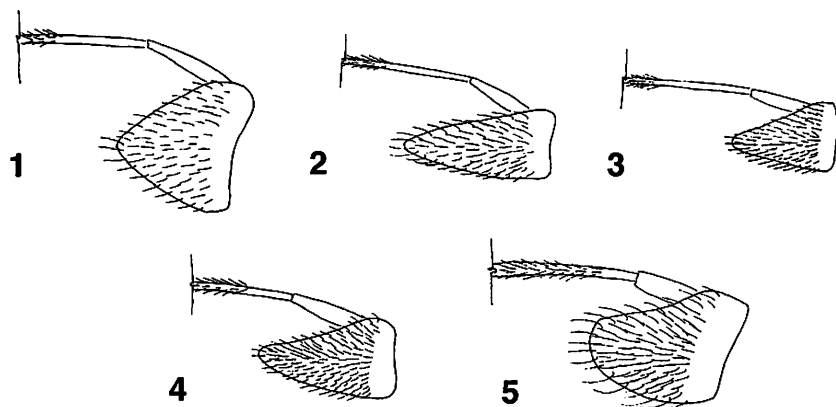
Thorax. Brown throughout, darker brown on dorsum of mesoscutum and scutellum and on anepimeron, brownish; thoracic setae black: 4+1 dc; 2+1 np; 1+1 ph; 1 pa; 1 sa; 1 sc; ac absent.

Legs. Fore coxae yellowish brown, remainder of legs brown. Leg I unmodified, without MSSC. FII broad basally, tapering to thin apex, with row of black setae along ventral surface (MSSC); TII (Fig. 7) straight, length subequal to length of FII, with 8 long thin black truncate setae on basomesal three-fourths, single strong long black seta at basal third and apical third, and subapically on lateral surface, numerous short fine hairs along apical one-fourth (all MSSC); II₃ and leg III unmodified, without MSSC.

Wing subhyaline; halter stem and knob brown.

Abdomen. Dark brownish black with short black hairs dorsally on each tergite. Hypopygium brown, not dissected.

Female. Unknown.



Figures 1–5. *Campsicnemus* antennal flagellomeres and bases of arista. 1. *C. maui*, n. sp. 2. *C. maukele*, n. sp. 3. *C. prestoni*, n. sp. 4. *C. sinuosus*, n. sp. 5. *C. ui*, n. sp.

Types. *Holotype* ♂ (BPBM 16,746) and paratype ♂ from HAWAIIAN ISLANDS: **Maui:** W. Wailua Iki Stream, 1600–1800 ft, 20.80900°N, 156.14473°W, riffle/pool, R. Englund. Holotype and paratype in BPBM.

Etymology: The name derives from the island on which this species was collected. The specific epithet is treated as a noun in apposition.

Campsicnemus maukele Evenhuis, new species

(Figs. 2, 7)

Diagnosis. Using the key to Kaua'i species of *Campsicnemus* in Evenhuis (2003), this species runs to *C. lipothrix* Evenhuis but can be easily separated from it by the different male mid tibial setation and pleural coloration.

Description. Body: 1.80 mm; wing: 2.13 mm. **Male.** *Head.* Face and clypeus yellowish white, frons and vertex shiny dark brown; oc and vt black, about one-third length of antennal arista; eyes dichoptic below antennae, separated by approximately two times width of median ocellus; palp small, brown; proboscis brown, extending below eye in lateral view; antenna (Fig. 2) brown, flagellomere subtriangular, length 2.5 times width, arista subequal to head height.

Thorax. Yellowish throughout, brown on dorsum of mesoscutum and scutellum and on proepimeron and anepimeron; thoracic setae black: 3+1 dc; 2 np; 2 ph; 1 pa; 1 sa; 1 sc; ac absent.

Legs. Mid and hind coxae and all tibiae and tarsi brown, remainder of legs yellow. Leg I unmodified, without MSSC. FII long, broad basally, tapering to thin apex, with sparse fine brown hairs ventrally (MSSC); TII (Fig. 7) length subequal to FII, slightly bowed, with three rows of long spiky setae on apical three-fourths, short fine setae elsewhere (all MSSC); IIt and leg III unmodified, without MSSC.

Wing subhyaline brownish; halter stem and knob white.

Abdomen. Yellowish brownish with brown posterior margins, short black hairs dorsally on each tergite. Hypopygium brown, not dissected.

Female. Unknown.

Types. Holotype ♂ (BPBM 16,742) from HAWAIIAN ISLANDS: **Kaua'i:** Mt. Wai'ale'ale summit area, Wainiha headwaters, 4890 ft, 18 May 2005, pyrethrin fogging of mossy logs and trunks, D.A. Polhemus.

Etymology: The name derives from the Hawaiian *maukele*, meaning "rainforest"; referring to the type locality of this species.

***Campsicnemus prestoni* Evenhuis, new species**

(Figs. 3, 10)

Campsicnemus n. sp. near *truncatus*: Preston *et al.*, 2004: 22.

Diagnosis. Using the key in Tenorio (1969), this species runs to *C. truncatus* Hardy & Kohn from Maui but can be easily separated from it by the all yellow legs (apices of femora and remainder of legs brown in *C. truncatus*), the lack of a comb of truncate long setae on the mesal surface of the male mid tibia (present in *C. truncatus*), and the presence of two patches of setae on the lateral surface (single setae in three places in *C. truncatus*).

Description. Body: 1.88–2.00 mm; wing: 2.17–2.30 mm. **Male.** *Head.* Face and clypeus brown, frons and vertex shining dark brown; oc and vt black, about one-half length of antennal arista; eyes holoptic below antennae; palp small, brown; proboscis pale yellow, extending well below eye in lateral view; antenna (Fig. 3) yellow, flagellomere subtriangular, slightly longer than wide, arista length subequal to head height.

Thorax. Brown throughout, darker brown on dorsum of mesoscutum and scutellum; thoracic setae black: 3+1 dc; 2+1 np; 2 ph; 1 pa; 1 sa; 1 sc; ac absent.

Legs. Fore coxae yellowish white, remainder of legs yellow with tarsomeres 4 and 5 yellowish brown. Leg I unmodified, without MSSC. FII broad basally, tapering to thin apex, with 4 long black setae on ventral surface, 4 shorter black setae on apical half (MSSC); TII (Fig. 10) long, straight, length 1.25 times length of FII, with vestiture as follows: patch of long thin hairs with wavy tips basomesally, row along anterior surface in two patches: 2 basally, 7 on apical half, 2 strong apicolateral setae, mesal surface with short fine hairs (all MSSC); II t and leg III unmodified, without MSSC.

Wing subhyaline; halter stem and knob white.

Abdomen. Brown with short black hairs dorsally on each tergite. Hypopygium dark brown, not dissected.

Female. As in male except for lack of MSSC.

Types. *Holotype* ♂ (BPBM 16,741) and 1 ♂ *paratype* from HAWAIIAN ISLANDS: **Hawai'i:** Mauna Loa Kīpuka Mosaic, Upper Waiākea bog Sanctuary, 19°39'7.89"N, 155°21'19.91"W, 4 Mar 2004, yellow pan traps, D.J. Preston & M.K.K. McShane. *Other paratypes:* **Hawai'i:** 1 ♂, Mauna Loa Kīpuka Mosaic, Saddle Road, 19°40'14.71"N, 155°20'50.83"W, 7 Mar 2004, yellow pan traps, D.J. Preston & M.K.K. McShane; 2 ♂, 1 ♀, same data except: 19°40'22.09"N, 155°20'20.79"W, 9 Mar 2004. Holotype in BPBM; paratypes in BPBM and UHM.

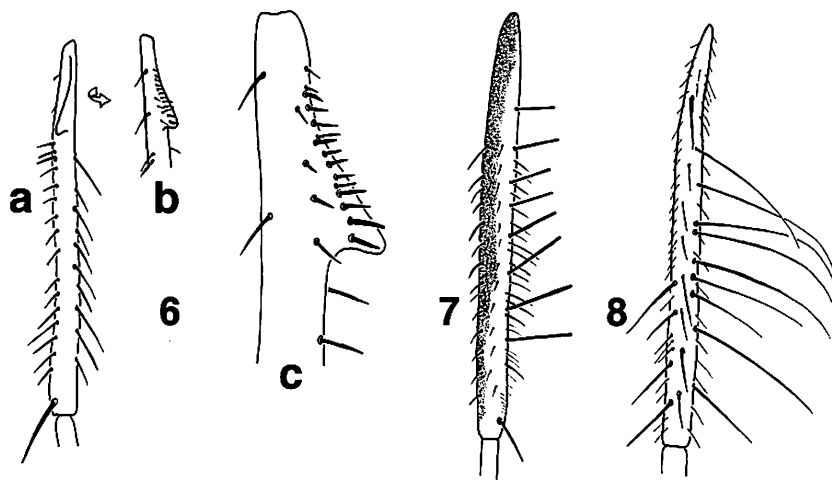
Etymology. The species is named for David Preston, in appreciation for his entomological collecting efforts in Hawai'i throughout the years.

***Campsicnemus sinuosus* Evenhuis, new species**

(Figs. 4, 11)

Campsicnemus n. sp. with "sinuous tibia": Preston *et al.*, 2004: 22.

Diagnosis. Using the key in Tenorio (1969), this species keys to *C. coniculus* Hardy &



Figures 6–8. *Campsicnemus* mid tibiae. 6. *C. kokokekuku*, n. sp. a) lateral view; b) mesal view of basal portion showing barb-like process; c) detail of barb-like process. 7. *C. maui*, n. sp. 8. *C. maukele*, n. sp.

Kohn but differs by the sinuous tibia (straight in *C. coniculus*) and the much shorter tibial setation (long wavy hairs medially in *C. coniculus*).

Description. Body: 2.00–2.05 mm; wing: 2.46–2.83 mm. **Male.** *Head.* Face, front and clypeus brownish black, vertex shining dark brown; oc and vt black, about one-half length of antennal arista; eyes dichoptic below antennae, separated by 2.5 times width of median ocellus; palp small, yellowish brown; proboscis brown, extending below eye in lateral view; antenna (Fig. 4) with scape and pedicel yellowish brown, flagellomere brown, subconical, length 1.25 times width, aristae subequal to head height.

Thorax. Brown throughout, darker brown on dorsum of mesoscutum and scutellum, brownish pollinose admedially; thoracic setae black: 3+1 dc; 2+1 np; 2 ph; 1 pa; 1 sc; ac absent.

Legs. Mid coxa brown, remainder of coxae and other leg segments pale yellow. Leg I unmodified, without MSSC. FII (broad basally, tapering to thin apex, with pair of long black setae on ventral surface (MSSC)); TII (Fig. 11) length one and a third times FII, slightly sinuous, anterior surface with three patches of long setae in rows, setae with curved tips (1st and 2nd rows [counted from base] slightly overlapping), shorter stiff hairs on lateral and mesal surfaces, single apical dark brown seta apicolaterally (all MSSC); III and leg III unmodified, without MSSC.

Wing subhyaline; halter stem and knob brown.

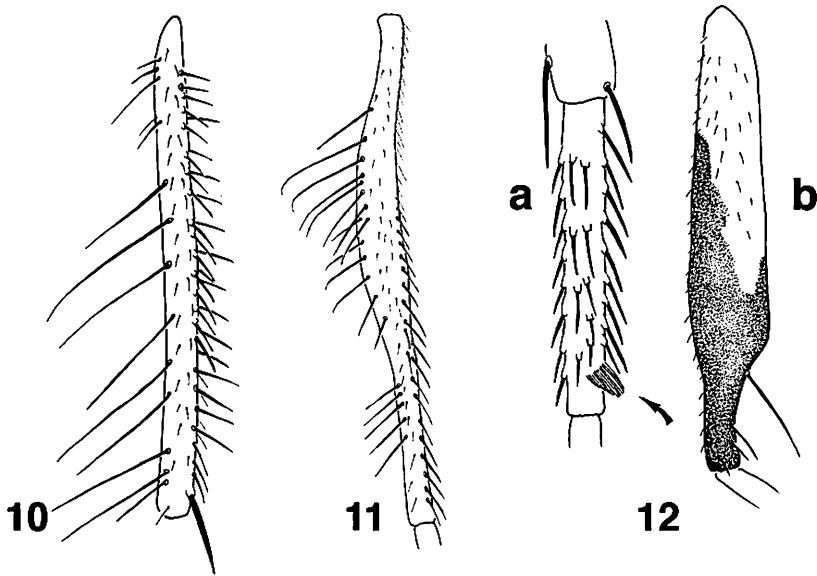
Abdomen. Dark brownish black with short black hairs dorsally on each tergite. Hypopygium brown, not dissected.

Female. Unknown.

Types. *Holotype* ♂ (BPBM 16,745) and 4♂ paratypes from HAWAIIAN ISLANDS: **Hawai'i:** Hakalau Forest Reserve, Pua 'Ākala Tract, 4 Nov 2002, Malaise trap, F.G. Howarth, D.J. Preston, J. Jeffrey. *Other paratypes:* HAWAIIAN ISLANDS: **Hawai'i:** 1♂, Hakalau Forest Reserve, Mau lua Tract, 9 Jul 2002, Malaise, F.G. Howarth, D.J. Preston, J. Jeffrey; 2♂, Mauna Loa Kīpuka Mosaic, Saddle Road, 19°40'22.09"N, 155°20'20.79"W, 9



Figure 9. *Campsicnemus ui*, n. sp., male habitus.



Figures 10–12. *Campsicnemus* male legs. 10. *C. prestoni*, n. sp. 11. *C. sinuosus*, n. sp. 12. *Campsicnemus ui*, n. sp., hind leg; a. Hind second tarsomere, showing apical pecten (arrow), b. Hind femur.

Mar 2004, yellow pan traps, D.J. Preston, M.K.K. McShane. Holotype in BPBM; paratypes in BPBM and UHM.

Etymology: The name derives from the Latin, *sinuosus* = “bend”; referring to the characteristic wavy/sinuuous mid tibia of the male.

***Campsicnemus ui* Evenhuis, new species**

(Figs. 5, 9, 12)

Diagnosis. Using the key to species in Tenorio (1969), this species runs to couplet 38 but is stymied there. It differs from *C. nigricollis* Van Duzee and *C. truncatus* by the lack of modifications of the male mid tibia (in *C. nigricollis* possessing truncate comb of setae mesally and in *C. truncatus* possessing long setae apically). It is also easily separated from these two species by the strongly constricted apex of the hind femur and the presence of a strongly produced pecten on the hind basitarsus.

Description. Body: 2.67 mm; wing: 2.62 mm. **Male** (Fig. 9). **Head.** Face, front and clypeus brownish black, vertex shining dark brown; oc and vt black, about one-half length of antennal arista; eyes dichoptic below antennae, separated by two times width of median ocellus; palp small, brown; proboscis brown, extending below eye in lateral view; antenna (Fig. 5) brown, flagellomere subtriangular, length about 1.25 times width, arista length subequal to head height.

Thorax. Brown on dorsum of mesoscutum and scutellum, yellowish laterally; pleura brown on upper sclerites, yellowish on lower sclerites; thoracic setae black: 3+1 dc; 2+1 np; 2 ph; 1 pa; 1 sa; 1 sc; ac absent.

Legs. Fore and hind coxae, and fore and mid femora, basoventrally on hind femur yellowish, remainder of legs brown. Leg I unmodified, without MSSC. FII unmodified, no MSSC; FIII (Fig. 12b) broad subapically, tapering to extremely thin rod-like apex, with pair of long black setae on ventral surface (MSSC); IIII₂ (Fig. 12a) with large pecten apically (MSSC); TII with two strong setae at basal one-third, and one at apical one-fourth (MSSC); II and remainder of leg III unmodified, without MSSC.

Wing subhyaline; halter stem and knob white.

Abdomen. Yellowish brown, with darker brown on posterior margins, with short black hairs dorsally on each tergite. Hypopygium brown, not dissected.

Female. Unknown.

Types. Holotype (BPBM 16,744) from HAWAIIAN ISLANDS: **Kaua'i:** Mt. Wai'ale'ale summit, 4950 ft, Upper Wainiha headwaters, 22°04'12"N, 159°30'03"W, 18 May 2005, pyrethrin fogging mossy logs and trunks, D.A. Polhemus.

Etymology: The name derives from the Hawaiian 'ui = "to squeeze, squeezed"; referring to the acutely narrowed apex of the male mid femur. The name is treated here as a noun in apposition.

Acknowledgments

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Literature Cited

- Englund, R.A., Arakaki, K., Preston, D.J., Evenhuis, N.L. & McShane, M.K.K.** 2003. Systematic inventory of rare and alien aquatic species in selected O'ahu, Maui, and Hawai'i island streams. Final report prepared for Hawai'i Department of Land and Natural resources, Honolulu, Hawaii. 18 pp. Available at: <http://hbs.bishopmuseum.org/pdf/rare&alien.pdf>
- Evenhuis, N.L.** 1997. Review of flightless Dolichopodidae (Diptera) in the Hawaiian Islands. *Bishop Museum Occasional Papers* 53, 29 p.
- . 2003. Review of the Hawaiian *Campsicnemus* species from Kaua'i (Diptera: Dolichopodidae), with key and descriptions of new species. *Bishop Museum Occasional Papers* 75, 34 pp.
- Hardy, D.E. & Kohn, M.A.** 1964. Family Dolichopodidae Latreille. *Insects of Hawaii* 11: 13–296.
- Preston, D.J., McShane, M.K.K., Evenhuis, N.L., Samuelson, G.A., Arakaki, K.T. & Polhemus, D.A.** 2004. Arthropod survey of the Waiākea 1942 Lava Flow Natural area Reserve and selected kīpuka within the Mauna Loa Kīpuka Mosaic, Hawai'i. Report submitted to the Hawai'i Department of Land and Natural Resources, Honolulu. 47 pp. Available at: <http://hbs.bishopmuseum.org/pdf/NAR-hawaii.pdf>
- Tenorio, J.M.** 1969. Diptera: Dolichopodidae. Appendix (Phoridae). *Insects of Hawaii* 11(Supplement), v + 73 pp.