

Palpi aplenty: new species in the *Chrysotus longipalpus* species group (Diptera: Dolichopodidae)

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Abstract

Four new Nearctic species belonging to the *Chrysotus longipalpus* species group are described: *Chrysotus keyensis* **sp. nov.** (Florida), *Chrysotus mccreadiei* **sp. nov.** (Alabama), *Chrysotus mystax* **sp. nov.** (Alabama), and *Chrysotus plumarista* **sp. nov.** (Alabama). This brings the number of known species in this group to twelve. A key to species of males of the *C. longipalpus* species group and new distribution records are provided.

Key words: taxonomy, Diptera, Dolichopodidae, *Chrysotus*, palpi, ornaments, Nearctic, Neotropical

Introduction

The *Chrysotus longipalpus* species group is a seemingly monophyletic group recognized by the following synapomorphies in males: variously enlarged palpus, basitarsus of front leg with slight ventral swelling at apex, and phallus with a small ventral projection near apex. This species group occurs in the New World (mostly tropical or subtropical), but two species, *C. crosbyi* Van Duzee and *C. longipalpus* Aldrich, have been unintentionally introduced into other biogeographic regions (Capellari 2015). The *C. longipalpus* species group was recently reviewed by Capellari (2015) and included a discussion of the possible relationship with other *Chrysotus* species with enlarged palpi. Since publication of Capellari (2015), four additional species belonging to the *C. longipalpus* species group have been found from the southeastern United States including three from the Mobile–Tensaw River Delta in Alabama and one from the Florida Keys. The purpose of this paper is to describe these new species and provide an updated key to the species group. New distribution records are provided for *Chrysotus crosbyi* Van Duzee, *C. miripalpus* Parent, *C. xiphostoma* Robinson, and *C. zumbadoi* Capellari.

Material and methods

Material from this work is housed in the following institutions: CNC = Canadian National Collection of Insects, Ottawa, Canada; MTEC = Montana Entomology Collection, Montana State University, Bozeman; MZSP = Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil; USNM = National Museum of Natural History, Smithsonian Institution, Washington, D.C. USA.

The morphological nomenclature follows Cumming & Wood (2009). Measurements of the leg segments are representative ratios given according the formula: trochanter+femur, tibia, tarsomeres 1, 2, 3, 4, and 5. Abbreviations used in the text include: I, II, and III: pro–, meso–, and metathoracic legs; MSSC, male secondary sexual character(s). Features found in all of the species are listed under the species group recognition and not repeated in each species treatment. For a complete description of the *C. longipalpus* species group see Capellari

(2015). Photographs were produced using a Syncroscopy AutoMontagePro® system. Label data for primary types are cited verbatim in quotation marks (lines separated by “|”), and annotations in square brackets.

Male terminalia are virtually identical in this group and offer no reliable characters to separate species (Capellari 2015). As such, the male hypopygium of a single species (*Chrysotus mccreadiei* **sp. nov.**) is illustrated as representative for the entire group (Fig. 6).

Chrysotus longipalpus species group

Recognition. Like most species of the genus *Chrysotus*, members of this group can be confidently identified based only on males. They are recognized as follows: Small-sized species (body size less than 2 mm long). *Head.* Eyes nearly contiguous below antennae (face as broad as middle ocellus). Antennal postpedicel subtriangular. Palpus variously enlarged and ornamented (MSSC). *Legs.* First tarsomere I with ventroapical swelling (MSSC). Femur II with 2 rows of ventral setae on basal half: an anteroventral row of small setae and a posteroventral row of larger setae (longest near middle with length subequal to width of femur) and 2–4 larger posterior setae near apex. Tibia III with row of anterior to anterodorsal setae. *Hypopygium.* Anteroventral margin of epandrium pointed; surstylus with single spine; phallus with small projection at apex; postgonites and hypandrial apodemes short.

Key to males of the *Chrysotus longipalpus* species group (modified from Capellari 2015)

- 1 Eyes nearly contiguous below antennae; antennal postpedicel subtriangular; palpus variously enlarged. First tarsomere I with ventroapical swelling; tibia III with row of anterior to anterodorsal setae; femur III with 2 rows of ventral setae on basal half ... *Chrysotus longipalpus* species group 2
- Not with the above combination of characters other species groups
- 2 Palpus clearly divided into an enlarged basal part and a strap-like apical projection after abrupt tapering 3
- Palpus not clearly divided into two parts 7
- 3 Palpus brownish, thick (Capellari 2015, fig. 1f); coxa I light brown, yellow at apex, with brownish setae on anterior surface (Belize) *C. pachystoma* Capellari
- Palpus mostly white or yellowish, thin; coxa I entirely yellow, with whitish to yellow setae on anterior surface. 4
- 4 Basal part of palpus densely covered with brownish setae; distal part slightly tapered towards apex, without apical lamella .. 5
- Basal part of palpus covered sparsely with brownish setae; distal part strip-like, with apical lamella 6
- 5 Palpus with silvery tip (Capellari 2015, fig. 1a); apical 1/3–1/4 of femur III brown *C. coquitos* Capellari
- Palpus with brown tip (Fig. 3); femur III entirely yellow. *C. mccreadiei* sp. nov.
- 6 Apex of palpus narrowly oblong, slightly pointed and white (Capellari 2015, fig. 1d) *C. miripalpus* Parent
- Apex of palpus rounded and black (Figs 4a, b, 5). *C. keyensis* sp. nov.
- 7 Palpus entirely bright silvery, relatively short (length $\leq 2\times$ width) and often truncate apically; nearly bare of hairs or setae (as in Figs 1, 2) 8
- Palpus never entirely bright silvery, but often bright yellowish; relatively long (length $> 2.5\times$ width), either uniformly narrow or only gradually tapering towards apex; with hairs or setae scattered over much of surface 10
- 8 Arista-like stylus slightly broadened, feathered, and white at apex (Fig. 1). *C. plumarista* sp. nov.
- Arista unmodified 9
- 9 Palpus oblong (Capellari 2015, fig. 1b); antenna entirely brown; coxae and pleura brown. *C. crosbyi* Van Duzee
- Palpus distinctly truncate apically and pointed laterally (Fig 2); antenna with first flagellomere yellow ventrally; coxae and pleura mostly yellow. *C. mystax* sp. nov.
- 10 Palpus uniformly narrow and straight 11
- Palpus tapered towards apex 12
- 11 Antenna brown; palpus brown with silvery tip (Capellari 2015, fig. 1h); coxa I brown, femur I yellow *C. zumbadoi* Capellari
- Antenna yellow; palpus yellow, bright silvery (Capellari 2015, fig. 1g); coxa and femur I whitish yellow *C. xiphostoma* Robinson
- 12 Palpus sub-triangular with rounded apex, entirely yellow (Capellari 2015, fig. 1c) *C. longipalpus* Aldrich
- Palpus narrow throughout, pointed, basal half yellow with apical half brownish and silvery pruinose (Capellari 2015, fig. 1e) *C. neopedionomus* Capellari

New species descriptions

Chrysotus keyensis Runyon & Capellari, sp. nov.

(Figs 4a, b, 5)

Description. Male. Body length, 1.3–1.4 mm. Wing length, 1.1–1.2 mm, width, 0.4–0.5 mm. *Head:* Frons dark brown to black, with violet reflections; antenna wholly yellow; face yellow; proboscis yellow with yellow setae; palpus (Figs 4a, b) long, yellow, broadest basally, tapered and ending in nearly round, mostly black lamella; basal half with several long, yellow setae (ratio tibia I:palpus, 20:22) (MSSC). *Thorax:* Mesonotum and scutellum metallic green with violet reflections; mesopleuron brown with some bluish reflections and little pruinosity. *Wing:* Halter yellow, calypter brownish at apex. *Legs.* I: 24, 20, 11, 4, 3, 2, 2. II: 24, 24, 12, 6, 4, 2, 2. III: 28, 30, 7, 7, 4, 2, 2. Legs yellow except coxa II, base of coxa III, and apical tarsomeres which are brown. Setae on coxae yellow. Femur III with rather long, yellow ventral setae (longest about half width of femur) along full length (Key West specimen) or with long ventral setae only at base (Big Pine Key specimen). Hypopygium brown, not dissected; cercus yellow, short, with some brown hairs. **Female.** Body length, 1.4–1.5 mm. Wing length, 1.4–1.5 mm, width, 0.5–0.6 mm. Similar to male, except without MSSC and as noted. *Head.* Palpus a little enlarged, as long and as broad as face, dark brown, covered by brown setae that appear yellow in certain lights, with longest setae along apical margin. Antennal postpedicel brown. *Legs.* I: 22, 22, 12, 5, 3, 2, 2. II: 26, 29, 14, 6, 4, 3, 2. III: 30, 32, 8, 8, 4, 3, 2.

Etymology. Named for the Florida Keys, the coral archipelago where specimens were collected (Big Pine Key and Key West).

Material examined. HOLOTYPE ♂, “FLA: Monroe Co., Big | Pine Key (north end) | V-14-20-1990 | E. G. Riley, Malaise | trap, Pinelands”, “HOLOTYPE | ♂ *Chrysotus* | *keyensis* | Runyon & Capellari 2018 [red label]”. (USNM, type number USNMMENT01447152). **Paratypes:** same data as holotype (1 ♀, USNM); Florida, Monroe Co., Key West, 22 November 2002, R. Hurley & J. Runyon (1 ♂, 3 ♀, MTEC).

Distribution. USA: Florida.

Remarks. There are small differences in the shape of the palpi and size of ventral setae on femur III between the male from Big Pine Key and the male from Key West. More specimens are needed to assess morphological variation and determine if these specimens might represent two species.

Specimens from Key West were collected south of the airport between salt ponds and the road (Road A1A) by sweeping moist, sandy soil of shaded trails.

Chrysotus mccreadiei Runyon & Capellari, sp. nov.

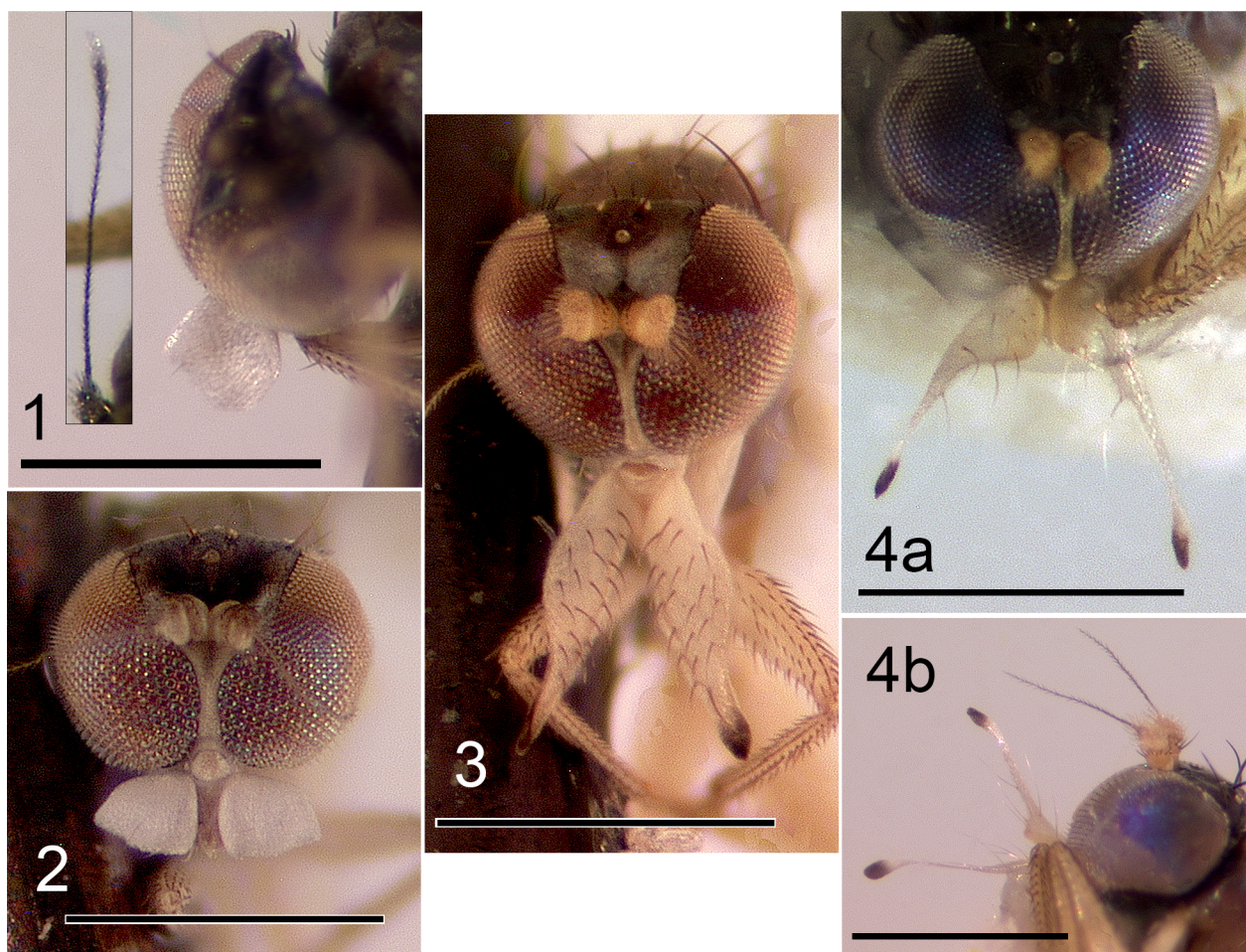
(Figs 3, 6)

Description. Male. Body length, 1.5 mm. Wing length, 1.2 mm, width, 0.5 mm. *Head.* Frons dark brown with violet reflections, ventral half covered with dense silver pollen; antenna yellow; face yellow, about 1 ommatidium wide near middle; proboscis yellow with yellow setae; palpus (Fig. 3) large, yellow, oblong, rather uniformly covered with about 15 black setae, broadest before middle with apex narrowed, slightly thickened, black (ratio tibia I:palpus, 24:24) (MSSC). *Thorax.* Mesonotum and scutellum brown to green with metallic violet reflections; mesopleuron brown with silver-blue pruinosity. *Wing.* Halter yellow, calypter yellow. *Legs.* I: 18, 20, 12, 5, 4, 3, 2. II: 25, 26, 14, 6, 4, 3, 2. III: 28, 28, 8, 7, 4, 3, 2. Legs yellow except coxa II brown; apical tarsomeres only very slightly darkened. Setae on coxae I yellow, those on coxae II and III yellow-brown. Hypopygium (Fig. 6): genital capsule brown; epandrial lobe with 2–3 setae. Surstylus with apical spine and small seta posteriad. Apex of phallus with ventral projection. Cercus yellow, short, with some brown hairs. **Female.** Body length, 1.6 mm. Wing length, 1.4 mm, width, 0.5 mm. Similar to male, except without MSSC and as noted. *Head.* Proboscis brownish, larger and more sclerotized than in male. Palpus short, oblong, about as long as clypeus, dark brown with silver pollinosity and brown setae that appear yellow in certain lights, longest setae along apical margin. Antennal postpedicel brown. *Legs.* I: 22, 20, 10, 5, 4, 2, 2. II: 28, 28, 16, 7, 4, 3, 2. III: 30, 32, 8, 8, 4, 3, 2.

Etymology. This species is named for Dr. John McCreadie (University of South Alabama) who provided specimens of this new species and of two other species described in this paper.

Material examined. HOLOTYPE ♂, “ALABAMA: Baldwin Co. | Little Briar Crk | 30°84 N, 87°94 W | 5 Sept. 2000 | J.W. McCreadie”, “HOLOTYPE | ♂ *Chrysotus* | *mccreadiei* | Runyon & Capellari 2018 [red label]” (USNM, type number USNMMENT01447153). **Paratypes:** Alabama: Baldwin Co., Raft, Raft River, 30°77 N, 87°95 W, 24 August 2000, J.W. McCreadie (2 ♂, 2 ♀, MTEC, MZSP).

Distribution. USA: Alabama, Mobile-Tensaw River Delta.



FIGURES 1–4. Heads of males of new species in the *Chrysotus longipalpus* species group. **1.** *Chrysotus plumarista* sp. nov., dorsolateral view; inset shows male arista. **2.** *Chrysotus mystax* sp. nov., anterior view. **3.** *Chrysotus mccreadiei* sp. nov., anterior view. **4.** *Chrysotus keyensis* sp. nov.; **a.** anterodorsal view; **b.** lateral view. Scale bar = 0.5 mm.

***Chrysotus mystax* Runyon & Capellari, sp. nov.**

(Fig. 2)

Description. Male. Body length, 1.3 mm. Wing length, 1.0 mm, width, 0.4 mm. *Head:* Frons dark brown to black, with brown pollinosity and little violet reflections; antenna yellow except dorsal edge of pedicel and first flagellomere dark brown; face yellow; proboscis yellow with yellow setae; palpus (Fig. 2) white, shiny, subquadrate, somewhat pointed apicolaterally, with a few short white setae along minutely fringed apical margin (ratio tibia I: palpus, 18:6) (MSSC). *Thorax:* Mesonotum and scutellum brown with violet reflections and some silver pollinosity; mesopleuron yellow and brown with some violet reflections and little pruinosity. *Wing:* Halter yellow, calypter very slightly brown at apex. Legs. I: 20, 18, 8, 4, 3, 2, 2. II: 22, 24, 12, 5, 4, 2, 2. III: 24, 24, 6, 6, 4, 2, 2. Legs yellow except coxa II brown. Setae on coxae brown. Abdominal tergites 2–4 yellow laterally. Hypopygium brown, not dissected; cercus yellow, short, with some light brown hairs. **Female.** Unknown.

Etymology. The species epithet is from the Greek *mystax* (mustache), in reference to the shape of the male palpi, which resembles facial hair on the upper lip of some male *Homo sapiens* L. (Fig. 2).

Material examined. HOLOTYPE ♂, “ALABAMA: Baldwin Co. | Byrnes (Byrnes Lake) | 30°79’N 87°91’W | 21-IX-2000 | J.W. McCreadie”, “HOLOTYPE | ♂ *Chrysotus* | *mystax* | Runyon & Capellari 2018 [red label]” (USNM, type number USNMENT01447154).

Distribution. USA: Alabama, Mobile-Tensaw River Delta.



FIGURE 5. Lateral male habitus of the holotype of *Chrysotus keyensis* **sp. nov.** Scale bar = 1 mm.

***Chrysotus plumarista* Runyon & Capellari, sp. nov.**
(Fig. 1)

Description. Male. Body length, 1.6–1.7 mm. Wing length, 1.4 mm, width, 0.5 mm. *Head.* Frons dark brown to black, with violet reflections; antenna mostly brown, arista-like stylus (Fig. 1, inset) with distal fifth very slightly broadened, feathered and white at apex; face yellow, essentially obliterated by eyes near middle; proboscis yellow-brown with pale setae; palpus (Fig. 1) white, shiny, bare except small medioapical seta, roundish with inner and apical edge nearly straight, apical edge minutely fringed (ratio tibia I: palpus, 23:12) (MSSC). *Thorax.* Mesonotum and scutellum metallic green with violet reflections; mesopleuron brown with some bluish reflections and some

pruinosity. *Wing*. Halter yellow, calypter brownish. Legs. I: 22, 23, 12, 5, 4, 2, 2. II: 25, 28, 14, 6, 4, 3, 2. III: 29, 32, 8, 8, 5, 3, 2. Legs yellow except all coxae and base of femur I brown; apical tarsomeres only very slightly darkened. Setae on coxae I, II, and III brown. Hypopygium brown, not dissected; cercus yellow, short, with some brown hairs. **Female**. Unknown.

Etymology. Name derived from the Latin *pluma* (feathery) + *arista*, in reference to the slightly broadened and feathered apex of the arista in males (Fig. 1).

Type material. **HOLOTYPE** ♂, “ALABAMA: Baldwin Co. | Byrnes (Byrnes Lake) | 30°79’N 87°91’W | 18 July 2000 | J.W. McCreadie”, “HOLOTYPE | ♂ *Chrysotus* | *plumarista* | Runyon & Capellari 2018 [red label]” (USNM, type number USNMENT01447155). **Paratype**: Alabama: Mobile Co., Chunchula, malaise, 30.90°N, 88.20°W (site 20), 19 April 2004, E. Benton (1 ♂, USNM).

Distribution. USA: Alabama, Mobile-Tensaw River Delta.

Remarks. This is the only known species in the *C. longipalpus* group with a modified arista (Fig. 1, inset). The antennae are missing in the paratype.

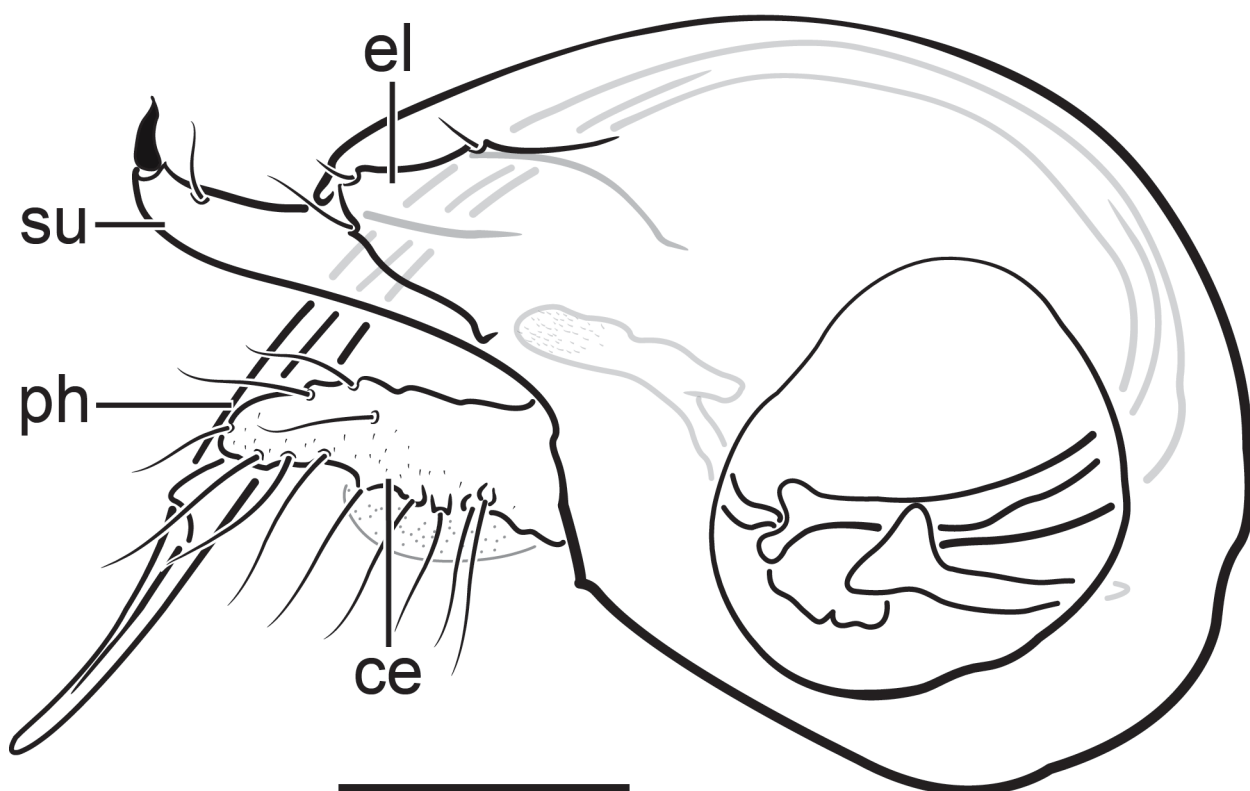


FIGURE 6. Hypopygium of *Chrysotus mccreadiei* sp. nov. Abbreviations: ce, cercus; el, epandrial lobe; ph, phallus; su, surstylus. Scale bar = 0.1 mm.

New distribution records

(* = new record)

Chrysotus crosbyi Van Duzee

Chrysotus crosbyi Van Duzee, 1924: 43.

Chrysotus magnipalpus Van Duzee, 1927: 2.

Known distribution. Nearctic Region: Eastern USA, Bermuda; Neotropical Region: Belize*, British Virgin Islands (Tortola)*, Cuba, Ecuador*, French Guyana, Puerto Rico, Brazil; Australasian Region: Guam, Hawaiian islands (O‘ahu, Hawaii*), French Polynesia and Commonwealth of the Northern Mariana Islands (Pollet *et al.* 2004; Capellari 2015; Evenhuis 2015; Bickel, pers. comm.; Runyon, pers. obs.).

***Chrysotus miripalpus* Parent**

Chrysotus miripalpus Parent, 1928: 165.

Known distribution. Belize*, Costa Rica, Panama, and Brazil (Parent 1930; Robinson 1970; Runyon, pers. obs.).

***Chrysotus xiphostoma* Robinson**

Chrysotus xiphostoma Robinson, 1975: 84.

Known distribution. Dominica, Montserrat*, Saint Kitts*, Saint Lucia, Nevis* (Capellari 2015; Runyon, pers. obs.)

***Chrysotus zumbadoi* Capellari**

Chrysotus zumbadoi Capellari, 2015: 56.

Known distribution. Costa Rica, Ecuador (Galápagos: Santa Cruz)* (Capellari 2015; Sinclair pers. comm.).

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