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Habronyx Förster (Hymenoptera: Ichneumonidae: Anomaloninae) in Peru and Ecuador: three new species, a range extension, and a new host record

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Abstract

The ichneumonid genus *Habronyx* is recorded for the first time from Peru and Ecuador, and three new species are described and figured—*Habronyx (Camposcopus) flavus* Alvarado, new species, *H. (Habronyx) nigrofasciata* Alvarado, new species, and *H. (H.) saqsaywaman* Alvarado, new species. *Hadronyx (H.) punensis* is recorded for the first time in Peru. *Habronyx (H.) nigrofasciata* was reared from *Paracles tapina* (Dyar, 1913) (Erebidae: Arctiinae). In addition, the distribution of *P. tapina* is expanded and figures of its larvae, pupae, and adult female and male are provided.

Key words: Ichneumonoidea, taxonomy, parasitoids, wasps, hosts, *Paracles tapina*

Resumen

El género *Habronyx* es registrado por primera vez para Perú y Ecuador, tres nuevas especies son descritas e ilustradas - *Habronyx (Camposcopus) flavus* Alvarado, especie nueva, *H. (Habronyx) nigrofasciata* Alvarado, especie nueva, y *H. (Habronyx) saqsaywaman* Alvarado, especie nueva. *Habronyx (H.) punensis* es registrada por primera vez para Perú. *Habronyx (H.) nigrofasciata* fue recuperada de pupas de *Paracles tapina* (Dyar, 1913) (Erebidae: Arctiinae). Adicionalmente, la distribución de *P. tapina*, es ampliada y figuras de la larva, pupas y adultos son incluidas.

Palabras clave: Ichneumonoidea, taxonomía, parasitoides, avispas, hospederos, *Paracles tapina*

Introduction

The genus *Habronyx* is a moderately diverse group of nearly worldwide distribution except for its characteristic absence from the Afrotropical region (Porter 2007, Dash 1984, Yu *et al*. 2005). The genus comprises four subgenera, two of them present in the Neotropical region—*Camposcopus* Förster and *Habronyx* (*s. str.*) (Gauld & Bradshaw 1997). *Habronyx* (*s. str.*) is known from four species—*Habronyx albifrons* (Spinola, 1851) and *H. citrinus* Porter 2007 in Chile, *H. punensis* Porter 2007 in Bolivia, and *H. regalis* (Morley, 1913) in Mexico. The subgenus *Camposcopus* is documented by two species in Costa Rica, namely *H. ariasae* Gauld & Bradshaw, 1997 and *H. carmonai* Gauld & Bradshaw, 1997 (Gauld & Bradshaw 1997, Yu *et al*. 2005).

Habronyx have been reared from a variety of lepidopteran larvae, attacking hosts in families as diverse as Erebidae, Geometridae, Noctuidae, Olethreutidae, Pyralidae, Saturniidae, and Sphingidae (Porter 2007). In the Neotropical region only *H.* (*s. str.*) *punensis* has a host record, and was reared from an unidentified noctuid moth larva feeding on *Chenopodium quinoa* Willd. (Chenopodiaceae) (Porter 2007).

The aim of this paper is to register for the first time the genus *Habronyx* from Peru and Ecuador, describe three new species from two subgenera, and record a new host species. Keys for the Neotropical species of both subgenera involved are also provided.

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Material and methods

Specimens studied are deposited in the San Marcos Natural History Museum, Peru (MUSM) and Faculty of Biological Sciences of Universidad Nacional San Antonio Abad del Cusco (UNSAAC), and were compared with the type series of *H. citrinus* Porter 2007 and *H. punensis* Porter 2007, deposited in the Florida State Collection of Arthropods (FSCA); and holotype of *H. regalis* deposited in the Natural History Museum, London, England (BMNH). Also, non-type material of *H. albifrons* deposited in the BMNH was revised. Type material of the subgenus *Camposcopus* were not revised as the original descriptions are more than sufficient for understanding the circumscription and identification of these taxa. Morphological terminology and the format for the descriptions generally follow Gauld & Bradshaw (1997). Photomicrographs were prepared using a Canon EOS 7D digital camera attached to an Infinity K-2 long-distance microscope lens.

Systematics

Genus *Habronyx* Förster, 1869

Remarks. The genus is characterized by a frons with or without a vertical carina; the clypeal apex with a median tooth; a complete occipital carina that is dorsally separated from the posterior ocelli by about the diameter of an ocellus; the pronotum with the lower corner truncate, generally without a tooth; and the mesoscutum in profile angularly rounded, without an apical concavity (Gauld 1976).

A thorough description for the genus and its constituent subgenera was provided by Gauld (1976). *Camposcopus* can be distinguish by the epicnemial carina that extends dorsally at an incline to contact the anterior margin of the mesopleuron at about its mid-height; while in *Habronyx* (*s. str.*) the epicnemial carina extends some distance dorsad but is nearly vertical so that its upper end does not approach the front margin of the mesopleuron (Gauld & Bradshaw 1997).

Key to species of *Habronyx (Camposcopus)* occurring in the Neotropical region

1. Lower face strongly narrowed ventrally, width across clypeal sulcus about 0.4 times width across base of antennal toruli; metasoma black, except subgenital plate and ovipositor sheath yellow . . . . . *carmonai* Gauld & Bradshaw,1997 *
- Lower face weakly narrowed ventrally, width across clypeal sulcus more than 0.6 times width across base of antennal toruli; metasoma yellowish or reddish brown, with tergites IV+ progressively more intensely infuscate 2
2. Hind wing with distal abscissa of Cu1 present; 32 flagellomeres; hind trochanter and trochantellus black . . . . . *ariasae* Gauld & Bradshaw,1997 *
- Hind wing with distal abscissa of Cu1 absent; 36–40 flagellomeres; hind trochanter and trochantellus yellow . . . . *flavus* **sp. n.**

*not occurring in Peru or Ecuador.

Habronyx (Camposcopus) flavus Alvarado, new species

(Figs. 1–3)

Holotype: ♀, "PERÚ: AM [Amazonas], Abra - Patricia [Protected Area], 19.viii.2012 05º41'36''S/77º48'41.9''W, 2362 m, yellow [pan] trap, J. Suárez & P. Sánchez" (MUSM).

Paratypes: ♀, same data as holotype, except 12.xi.2012 and Malaise trap"; and ♀, "ECUADOR: Napo, Est. Biol. [Estación biológica] Yanayacu, 2000m 00º34'20"[S]/ 77º52'20"[W] 21–24.xi.2006, C. Castillo" (MUSM).

Diagnosis. This species can be distinguish from the other Neotropical taxa of its subgenus by the coloration of the legs, especially evident on the yellow of the metatibia grading to dark brown proximally in *H. flavus*, while the metatibia is blackish grading to dark brown proximally in *H. ariasae* and is entirely black in *H. carmonai*.

Description. Female: Fore wing length 14 mm. The paratypes are slightly smaller, with fore wing lengths of 7.8–13mm.

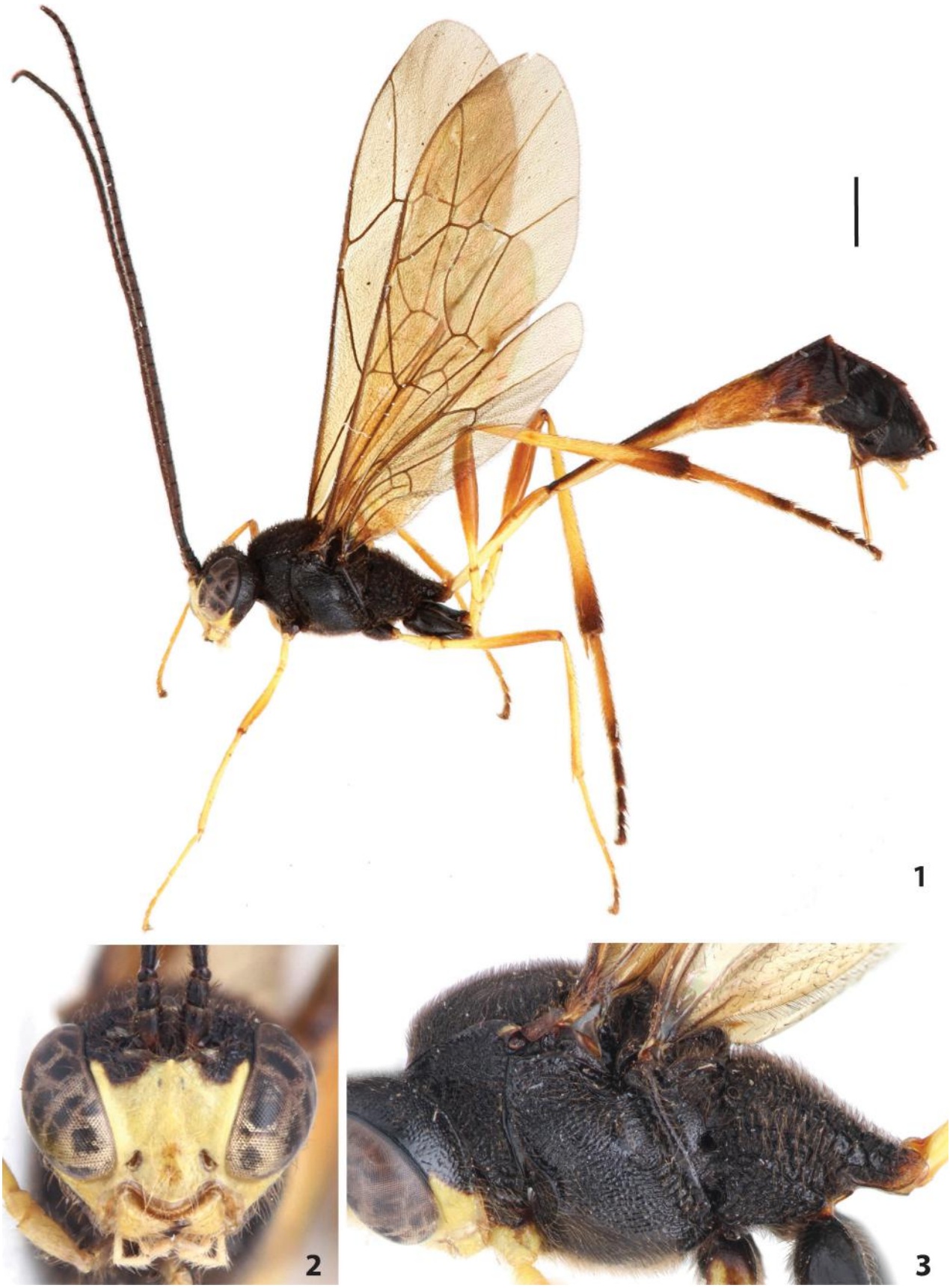

PLATE 1 FIGURES 1–3. Details of *Habronyx (Camposcopus) flavus* Alvarado, new species. **1.** Lateral habitus (scale =1 mm) **2.** Facial view **3.** Mesosoma, in lateral view.

Head. Mandibles stout, upper tooth stouter than, and about twice as long as lower tooth; lower face rather weakly narrowed ventrally with width across clypeal sulcus about 0.7x width across base of antennal toruli; frons areolate-rugose, with weak median vertical carina; lateral ocellus separated from compound eye by 1.7–1.8x ocellar diameter; distance between ocelli 1.1–1.3x ocellar diameter; gena, in lateral view (measured perpendicularly to torulus), 0.8x as wide as compound eyes; gena punctate, smooth between punctures, in upper area coarsely punctate (punctures separated by 0.1–0.3x a puncture width) grading to sparsely punctate in lower area (punctures separated by 2–3x a puncture width), next to compound eyes smooth; 36 flagellomeres in paratype, *vide* Comments, *infra*).

Mesosoma. Pronotum dorsally punctulate-reticulate grading ventrally to striate; epomia present, upper third diverging straight up from front margin, and then forming a rounded corner as it curves back towards front margin; mesoscutum punctulate-reticulate; notauli distinct, becoming less so in posterior half of mesoscutum; mesoscutellum slightly concave, punctulate-reticulate, with distinct lateral carinae; mesopleuron punctate ventrally, striate dorsally; sternal region punctate. Metapleuron and propodeum reticulate. Fore wing with distal abscissa of Rs 2.0x length of Rs+2r; 2+3rs-m 1.3x length of M between 2+3rs-m and 2m-cu.

Metasoma. Tergite I 0.9–1.0x length of metafemur, smooth and polished with isolated setae; tergite II+ smooth, with fairly thick, medium-length setae; ovipositor about 0.3x length of metatibia.

Color. Head black with face, gena ventrally, mandibles, a mark on the upper genal orbit and palpi yellow; antenna black with scape ventrally yellow. Mesosoma black with apical- dorsal tip with a yellow mark and tegula brownish dark; foreleg yellow with a ventral black mark on procoxal basal half; mid-leg yellow with procoxa black basally and infuscate apically; hind leg with coxa black, trochanter and trochantellus yellow, femur reddish brown, tibia yellowish grading to dark brown proximally, and, basitarsus yellowish with distal third and remaining tarsomeres black. Wings uniformly infuscate, pterostigma brownish. Metasoma with tergite I yellow, dorsally reddish brown; tergite II yellowish narrowly black dorsally; tergite III reddish brown; terguite IV reddish brown on proximal half grading to black; and with tergites V+ black. Ovipositor sheath yellow.

♂: Unknown.

Etymology. The specific epithet *flavus,* meaning "yellow", is a reference to the coloration of the hind trochanter and trochantellus.

Comments. The paratypes are considerably smaller, with a fore wing length of 7.8 and 9.1 mm, and differ from the holotype in the following aspects: antenna with 36 flagellomeres, mesopleuron centrally smooth; ovipositor longer than 0.5x length of metatibia and pro- and mesocoxae completely black. The smaller specimen, from Ecuador, has the meso- and metacoxae infuscate basally and grading to yellow distally.

This species was collected in a humid tropical premontane forest on the northeastern slopes of the Andes (Fig. 16). This is the first record of a species of this subgenus in South America and the one with the most austral distribution.

Key to species of *Habronyx (Habronyx)* occurring in the Neotropical region

1. Wings strongly infuscate; flagellomeres orange, except in some specimens first flagellomere infuscate . . . . . *regalis* (Morley,1913)*
- Wings hyaline to weakly infuscate; flagellomeres black with or without a white band 2
2. Flagellum with a postmedian white band; clypeus and face white; metasoma black . . . . . *albifrons* (Spinola, 1851)*
- Flagellum uniformly black; clypeus and face yellow with black markings or black with white bands laterally; metasoma orange and black 3
3. Notauli not impressed; gena foveolate- reticulate (Figs. 4, 13) 4
- Notauli impressed, extending at least to half the length of mesoscutum; gena punctate except smooth next to compound eyes 5
4. Face black with white making next to compound eyes (Fig. 5); metatibia orange on basal half and black on apical half (Fig. 4) . . . . . *nigrifrons* **sp. n**
- Face with clypeus and face yellow with black markings (Fig. 14); metatibia black (Fig. 13) . . . . . *saqsaywaman* **sp. n**
5. Metatibia orange on basal half and black on apical half; mesopleural lower half rugulose-lacunose; hind wing with distal abscissa of Cu1 sclerotized throughout . . . . . *citrinus* Porter 2007*
- Metatibia black with rather dull orange on its basal 0.3–0.4; mesopleuron lower half with strong punctures; hind wing with distal abscissa of Cu1 weaker but traceable throughout . . . . . *punensis* Porter 2007

*not occurring in Peru or Ecuador.

***Habronyx (Habronyx) nigrifrons* Alvarado, new species**
(Figs. 4–6)

Holotype: ♀, "PERU: JU [Junín], Laguna Capilla 10º53'30"S/75º57'01"W 4040 ♂, 16.iv.2012 J. Grados & I. Galindo" (MUSM).

Paratypes: 3 ♀♀, same data as holotype (MUSM).

Diagnosis. This species can be distinguished from other Neotropical congeners by the combination of the mesoscutellum and face predominantly black and the foveolate-reticulate integumental sculpture of the gena.

Description. Female: Fore wing length 14 mm.

Head. Mandibles stout, upper tooth stouter than, and about twice as long as lower tooth; lower face with strong punctures separated by 0.3–0.5x a puncture width, centrally convex, rather weakly narrowed ventrally with width across clypeal sulcus about 0.8–0.9x width across base of antennal toruli; clypeus smooth with isolated punctures, convex; frons areolate-rugulose, with weak median vertical carina; lateral ocellus separated from compound eye by 2.8–3.0x ocellar diameter; distance between ocelli 1.8x ocellar diameter; gena, in lateral view (measured perpendicularly to torulus), 1.0x as wide as compound eyes, gena punctate-reticulate grading to smooth between punctures on lower quarter, and next to compound eyes smooth; antenna with 38 flagellomeres.

Mesosoma. Pronotum areolate-rugulose grading by lower third to areolate-rugulose; epomia present, upper third diverging from front margin and then forming a rounded corner as it curves back towards front margin; mesoscutum areolate-rugulose; notauli not distinct; mesoscutellum convex, reticulate, lateral carinae indistinct; mesopleuron punctulate-reticulate. Metapleuron and propodeum reticulate. Fore wing with distal abscissa of Rs 1.4–1.6x length of Rs+2r; 2+3rs-m 1.1–1.4x length of M between 2+3rs-m and 2m-cu. Hind wing with distal abscissa of Cu1 sclerotized throughout.

Metasoma. Tergite I 0.8–0.9x length metafemur, smooth with isolated setae; tergite II+ smooth, with fairly thick, medium-length setae; ovipositor about 0.3x length of metatibia.

Color. Head black with mandible apically, a spot on vertex (next to compound eyes), and on inner margin of gena (next to compound eyes) orange, and labium and face with lateral margins yellowish white. Mesosoma black except fore leg with femur, tibiae, basitarsi, second tarsomeres orange; mid leg with femur, tibiae, basitarsi, second tarsomeres orange; hind leg basal sixth of tibia and basal sixth of basitarsis orange. Metasoma black except apical third of tergite I, tergite II (narrowly black dorsally), tergite III and basally tergite IV orange. Ovipositor sheath black.

♂: Unknown.

Etymology. The specific epithet *nigrifrons* refers to the largely black coloration of face.

Comments. One paratype has a white-yellowish spot in the center of the lower face.

Host. *Habronyx (Habronyx) nigrifrons* was reared from pupae of the moth *Paracles tapina* (Dyar, 1913) (Erebidae: Arctiinae). Host larvae were found in the sounding area of the lake Capilla—Pasco department, after the rainy season when the peatlands are in climax. The larvae move easily through the water bodies, feeding on Juncaceae, probably *Juncus ebracteatus* E. Mey. Larvae belonging to the genus *Paracles* (Walker) have been previously reported inhabiting aquatic environments in Argentina and Brazil like *P. azollae* (Berg, 1877), *P. tenuis* (Berg, 1877) and *P. klagesi* (Rothschild, 1910) (Berg 1877; Meneses 2013). The moth pupae were found in groups under rocks (Fig. 10) in elevated areas in each locality, usually dark and humid places. Pupae and larvae (in the last instar) were collected and reared; from one group of pupae the wasps described here and one adult moth emerged.

Previously, *P. tapina* was known from a single adult male collected in Coropuna, Arequipa, Peru, at 4419 m during October 1911 (Dyar 1913); its distribution is expanded in Peru to include the departments of Arequipa, Junín, and Pasco (Fig. 17). Additionally, this is the first time that the larvae (Figs. 9–10), pupae (Fig. 11) and adult female are recorded. Females (Fig. 8) are slightly larger than males (Fig. 7), female fore wing measures 18–21mm (n=5) and males measure 15mm (n=1); coloration of the fore wings in females is clearer and have whitish setae on the dorsal and ventral part of the last two abdominal segments.

This is not the first time that an arctiine has been registered as a host for species of *Habronyx*, but it is the first record of a Neotropical species attacking this group. The European species *H. (C.) perspicuus* (Wesmael, 1849) was found parasitizing *Cymbalophora pudica* (Esper, 1784) (Yu *et al*. 2005).

PLATE 2 FIGURES 4–6. Details of *Habronyx (Habronyx) nigrifrons* Alvarado, new species. **4.** Lateral habitus (scale =1 mm) **5.** Facial view **6.** Mesosoma, in lateral view.

Material studied. ♀, "PERU: JU [Junín department], Laguna Capilla 10º53'30"S/ 75º57'01"W 4040 m, 16.iv.2012 J. Grados & I. Galindo"; 3♀♀, "PERU: PA [Pasco department] Río Gayco, 10º50'13"S/ 75º57'43"W 4323m 13–14.vi.2012 J. Grados & I. Galindo" (Fig. 17); ♀, "PERU: PA [Pasco department], Laguna Aguascancha 10º51'58"S/ 75º56'10"W 4170m 15.iv.2012 J. Grados & I. Galindo"; ♂ "PERU, PA. Río Gayco 10º48'48" S / 75º48'54" W 4323 m 13–14.vi.2012 J. Grados & I. Galindo"; 2 ♂♂ "PERU: Dpto. [Department] Huancavelica, cerca a Pariona, 4000 m, larva colectada el 25.v.2002, adulto recuperado el 15.vi.2002, P. Hocking"; 2♂♂ "PERU: AR [Arequipa department], Quebrada Chacnia, 4805 m, 14º46'11.9''S/ 72º22'38.1''W, 18.viii.2011, E. Rázuri" (MUSM).

PLATE 3 FIGURES 7–12. Details of *Paracles tapina.* **7.** Habitus of male, dorsal view at right, ventral view at left (scale =10 mm) **8.** Habitus of female, dorsal view at right, ventral view at left (scale =10 mm) **9–11.** Larvae in habitat, photograph taken in surrounding of Capilla Lake **12.** Pupae found under rocks, photograph taken in surrounding of Capilla Lake.

***Habronyx (Habronyx) punensis* Porter 2007**

This species was collected near La Paz, Bolivia at more than 3000 m (Porter 2007); in Peru it was collected in Cusco and Puno departments at a similar elevation. These specimens differ slightly from the type series—deposited at the FSCA—in having the hind trochantelli black and not obscurely stained orange. Also, the Peruvian female has the first metasomal segment dark brown grading apically (about 0.9 of its length) to orange, similar to the male of the Bolivian specimens.

Material studied. ♀, "Cusco Sacsayhuaman 3585m 3.v.77 col. R. Garcia", and ♂, "Puno Ayaviri 29.iv.74 col: R. Garcia" (MUSM); ? "[Cusco department] Huañacahua 15-3-93 E. Yabar" [specimen without metasoma and antennae] (UNSAAC).

***Habronyx (Habronyx) saqsaywaman* Alvarado, new species**
(Figs. 13–15)

Holotype: ♀, "Cusco Sacsayhuaman 3585 m 3.v.77 col. R. Garcia" (MUSM).

Diagnosis. This species can be distinguished from other Neotropical congeners by the coloration of the hind tibia entirely black.

Description. Female: Fore wing length 12.4 mm.

Head. Mandibles stout, upper tooth stouter than, and about twice as long as lower tooth; lower face with strong punctures, centrally flat, rather weakly narrowed ventrally with width across clypeal sulcus about 0.7x width across base of antennal toruli; clypeus convex basally and concave apically, smooth with isolated punctures; frons areolate-rugose, with weak median vertical carina; lateral ocellus separated from compound eye by 2.3x ocellar diameter; distance between ocelli 1.8x ocellar diameter; gena, in lateral view (measured perpendicularly to torulus), 1.3x as wide as compound eyes, gena punctate-reticulate grading to smooth between punctures on lower quarter, and next to compound eyes smooth; antenna with 40 flagellomeres.

Mesosoma. Pronotum areolate-rugulose grading by lower quarter to striate-rugose; epomia present, upper third diverging from front margin and then forming a rounded corner as it curves back towards front margin; mesoscutum areolate-rugulose; notauli not distinct; mesoscutellum convex, reticulate, lateral carinae distinct reaching to the distal end; mesopleuron punctulate-reticulate. Metapleuron and propodeum reticulate. Fore wing with distal abscissa of Rs 1.6x length of Rs+2r; 2+3rs-m 1.1x length of M between 2+3rs-m and 2m-cu. Hind wing with distal abscissa of Cu1 sclerotized throughout.

Metasoma. Tergite I 0.8x length metafemur, smooth with isolated setae; tergite II+ smooth, with fairly thick, medium-length setae; ovipositor about 0.6x length of metatibia.

Color. Head black with lower face and clypeus yellow, except black marks from tentorial pits reaching to below each antennal socket and on clypeus two marks shaped as half round on each side of it (like in Fig.14), and scape ventrally with a yellow mark on base; and, a spot on vertex (next to compound eyes) and on inner margin of gena (next to compound eyes) orange.

Mesosoma black except fore leg with femur brownish (except dorsally on apical 3/4) orange, tibia brownish except orange ventrally, and tarsomeres orange; mid leg with tibia and tarsomeres brownish; and hind leg with basal sixth of basitarsis orange. Metasoma black except with apical half of tergite I, tergite II (narrowly black dorsally on anterior 2/3), tergite III and basally tergite IV orange. Ovipositor sheath black.

♂: Unknown.

Etymology. The specific epithet *saqsaywaman* is the Quechua word for Sacsayhuaman, the type locality. The name is treated as a noun in apposition.

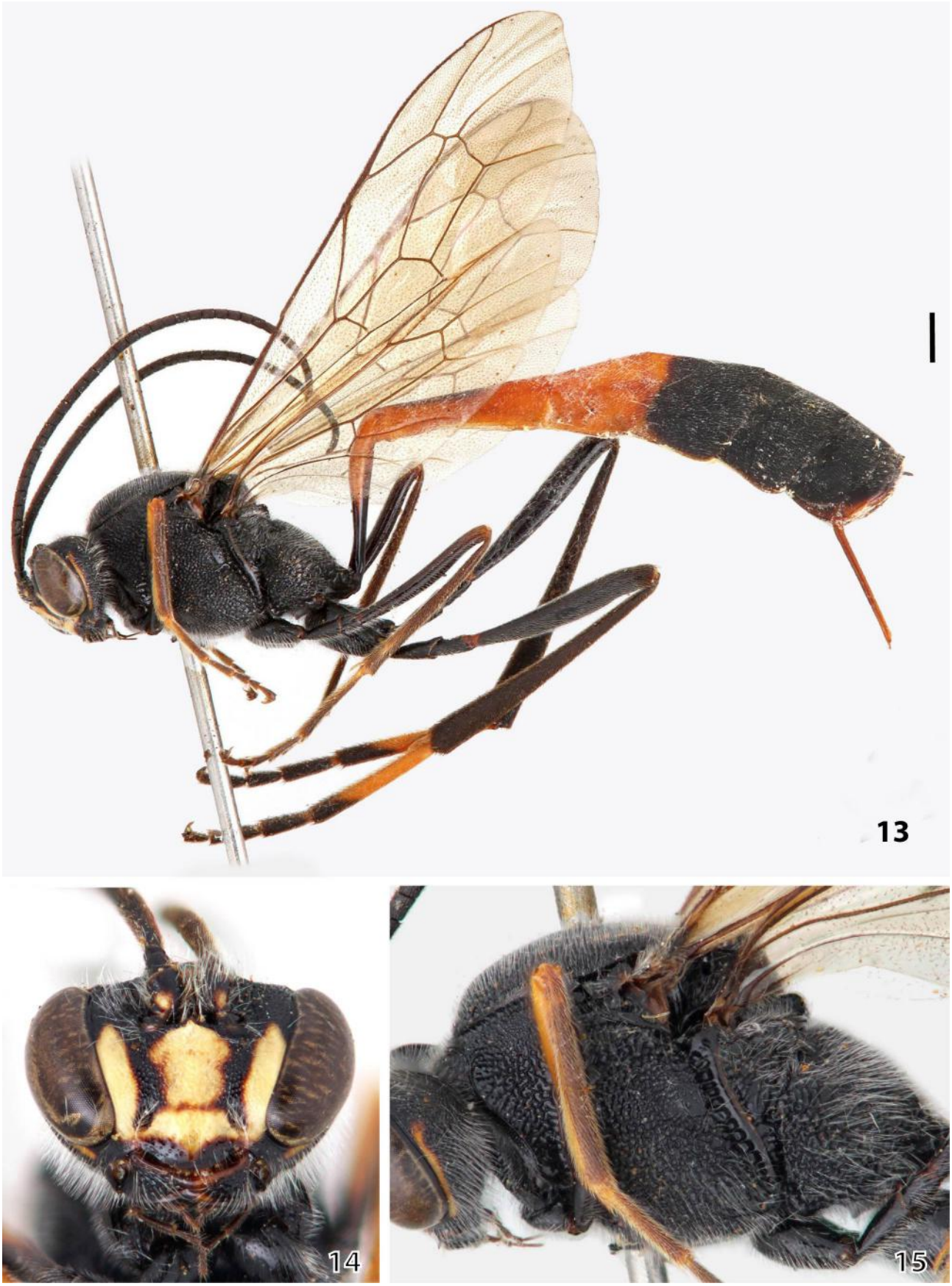

PLATE 4 FIGURES 13–15. Details of *Habronyx (Habronyx) saqsaywaman* Alvarado, new species. **13.** Lateral habitus (scale =1 mm) **14.** Facial view **15.** Mesosoma, in lateral view.

PLATE 5 FIGURES 16–17. Habitat photographs **16.** Photographs of the premontane forest habitat in which *Habronyx (Camposcopus) flavus* Alvarado, new species was captured (photograph taken by Jeferson Suarez). **17.** Photograph of the peatlands habitat in which *Habronyx (Habronyx) nigrifrons* Alvarado, new species was captured (photograph taken by Juan Grados).

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