

Article

A Review of *Philenis* Champion, 1906 (Coleoptera: Curculionidae: Conoderinae), with Descriptions of New Species from Central and South America

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Abstract: A brief review of the history of the taxonomic treatment of the genus *Philenis* Champion is presented and characters are discussed. *Philenis flavipes* Champion and *P. fuscifemorata* Champion, and 11 new species are described, including the first records from South America: *P. anzaldoi* **new species** (Costa Rica, Panamá), *P. costaricensis* **new species** (Costa Rica), *P. laselvaensis* **new species** (Costa Rica), *P. auritibiae* **new species** (Costa Rica), *P. brunnea* **new species** (Costa Rica, Panamá), *P. muscamimetica* **new species** (Panamá), *P. chiriquiensis* **new species** (Panamá), *P. guyanensis* **new species** (French Guiana), *P. ferruginea* **new species** (Ecuador), *P. howdeni* **new species** (Ecuador), and *P. kuscheli* **new species** (Colombia, Ecuador). A key is provided to separate the species, and an unusual type of “multifurcate” scale is reported for some species. Two species have been associated with plants of the family Araceae. Most collections of this genus by the Arthropods of La Selva (ALAS) biodiversity project in Costa Rica were made by passive trapping methods during the dry season and at lower to middle elevations along an altitudinal transect on the slopes of Volcan Barva. The coloration of some species in the genus is hypothesized to mimic social Hymenoptera or flies.

Keywords: Araceae; biodiversity; ecology; faunal inventories; mimicry; phenology

1. Introduction

The genus *Philenis* Champion [1] was described for two species from western Panama, *P. flavipes* Champion and *P. fuscifemorata* Champion, each based on a single specimen. Specimens of members of the genus are not common in collections, but have been accumulating, largely by passive sampling (see below, also [2]). The Arthropods of La Selva (ALAS) project collected at least 131 specimens of nine species at the La Selva Biological Station in Costa Rica [3] and on an altitudinal transect above La Selva and has stimulated this review. Anzaldo [4] mentions undescribed species in his review of conoderine genera. I have previously suggested [5] that some species in the genus may participate in mimicry complexes and reported a record of larval ecology. This paper describes 11 new species, describes an unusual new character, reports the genus for the first time from South America, and describes what little is known about the biology of members of the genus. A few specimens could not be assigned with certainty to any of the species treated here and may represent either extreme variants or additional undescribed species.

2. Materials and Methods

Only part of the specimens collected by the ALAS project were available for this study. At the time of the original processing of the ALAS material, only a few specimens of commoner species were retained for study, and the rest were deposited with the Instituto Nacional de Biodiversidad (INBio)

collection, now in the care of the National Museum of Costa Rica. These latter specimens are listed here as “other specimens examined” and are not considered to be paratypes. Specimens were measured to the nearest 0.05 mm. Dates have been standardized to day.month.year. In the genus it is difficult to determine the sex of specimens without dissection, and several species are described here without the sex of specimens having been determined. The following acronyms of collections are used:

AMNH, American Museum of Natural History, New York, N.Y.;
 BMNH, The Natural History Museum, London, England;
 CHAH, Henry A. Hespenheide, University of California, Los Angeles, CA;
 CMNC, Canadian Museum of Nature, Ottawa, Canada;
 CSCA, California State Collection of Arthropods, Sacramento, CA;
 LACM, Los Angeles County Museum of Natural History, Los Angeles, CA;
 MNCR, National Museum of Costa Rica, San Jose, Costa Rica;
 MUCR, University of Costa Rica, San Pedro, Costa Rica;
 USNM, National Museum of Natural History, Smithsonian Institution, Washington, DC.

3. Results

3.1. Taxonomic Treatment

Philenis Champion, 1906

Philenis Champion, 1906: 43 [1]

Type species: *Philenis flavipes* Champion, 1906 by original designation.

Champion [1] described the genus and its two included species from single specimens of each. He compared *Philenis* to the genus *Copturus* Schoenherr, 1825, now *Macrocopturus* Heller, 1895, differentiating it by their slender rostrum, short and slender antennae with a small acuminate club, and having only the metafemora dentate but not carinate. The diagnostic characters, relationships with other genera, and tribal placement of the genus have recently been discussed by Anzaldo [4]. Addition of species to the genus and further study will eventually necessitate a redefinition of the genus as only the antennal characters are shared among the species treated here. Champion does not comment on his choice of the name for the genus, which is feminine. “*Philænis*” is a diminutive of the feminine form of the Greek word “*philos*”, meaning “love”. *Philænis* of Samos may have been the author of a famous ancient sex manual, and *Philænis* may also have been a name commonly used by prostitutes in ancient Greece [6], but its connection to this genus of weevils appears to be arbitrary.

3.1.1. Species Descriptions

Philenis flavipes Champion, 1906

Philenis flavipes Champion, 1906: 43 [1]

Figure 1

Redescription: Body size 5.30 mm long, 2.90 mm wide. Moderately robust, oboval, narrower anteriorly, pronotum and head black, otherwise reddish brown, rostrum, legs and abdominal ventrites 1, 2, and 5 paler, abdominal ventrites 3–4 and elytra darker, darkest on posterior 2/3; sparsely to somewhat densely covered with complex pattern of scales: from above, pronotum with pale yellow scales along anterior and basal margins and in undulate transverse fascia at middle, the medial and basal bands joining at sides, otherwise scales black; elytra with scales pale yellow in intervals 1 and 2 along suture, interrupted for middle 1/2 of suture, and narrowly along basal margin and in slightly oblique transverse fasciae at 1/3 and 2/3 of length 1/5, scales dark brown otherwise, scales moderately, uniformly dense and pale yellow on base of rostrum, legs, and ventrally, denser on

metasternum, episternum, mesepimeron, posterior margins of abdominal ventrites 1 and 2, scales brown on ventrites 3–4.



Figure 1. *Philenis flavipes* Champion, Holotype, dorsal and lateral habitus.

Head 1.00 mm wide, convex in dorsal view, eyes contiguous at upper 1/2; rostrum slender, nearly straight, polished and glabrous below antennal insertions, somewhat flattened dorsoventrally, 1.40 mm long, antennae inserted at basal 1/4.

Pronotum 1.50 mm long, 2.00 mm wide at base, lateral margins weakly rounded from base to apex, in lateral view gibbous at basal 1/4 and declivous anteriorly. vaguely carinate along medial 1/2 of midline. Scutellum narrowly ovate lengthwise.

Elytra 0.5 wider than pronotum, humeri moderately prominent, intervals broad, striae nearly linear.

Mesosternum declivous, flat, posterior margin straight, anterior margin of metasternum declivous. In lateral view abdominal ventrite 1 very convex, 1.4 mm long along midline, ventrite 2 only 0.2 mm long along midline, ventrites 3–5 very narrow, ascending. From front, procoxae broadly rounded-triangular with large tooth on inner margin. Metafemora with suggestion of lateral carina at middle and very weak tooth at distal 2/3.

Specimens examined: Panamá, Bugaba, Champion (Holotype, BMNH). Costa Rica: Heredia: Est. Biol. La Selva., 50–150 m, 10°26' N 84°01' W, INBio-OET, 1.02.1996, 15.03.1994, Bosque

primerio, M/08/561 (MNCR, INBIOCRI002304056), 11 km ESE La Virgen, 250–350 m, 10°21' N 84°03' W, INBio-OET-ALAS transect, 9.03.2004, 03/M/02/022 (MNCR, INB0003613035), 22.02.2004, 03/M/03/003 (MNCR, INB0003611312); Puntarenas Prov., Parque Nacional Corcovado, Est. Sirena, 08°28–31' N 83°36' W, 23.01.1981, H.A. Hespenheide, on aroid; flying 1.5 m above ground (CHAH), Sirena, Corcovado N.P., 0–100 m, 270500, 508300, 12.1989, G. Fonseca (MNCR, INBIOCRI000188371), Osa Peninsula, 2.5 mi SW Rincon, 08°42' N 83°29' W, 8.08.1968, H. Hespenheide (CHAH), R.F. Golfo Dulce, 3 km S Rincon, 10 m, 06.1991, P. Hanson (MUCR), S. Vito, Las Cruces, 1200 m, 17.08–12.09.1982, B. Gill (CMNC).

Discussion: This species differs most obviously from the following in the distinct pattern of the elytra with the transverse fasciae separating three darker areas, with the posterior one being the darkest. The overall color pattern of yellow and dark reddish brown and black suggests the coloration of social Hymenoptera [5], but the robust body form is unlike the slender habitus of wasps, and no particular model is obvious. The specimen from Heredia Province, Costa Rica, has a significantly longer (2.0 mm) and more slender rostrum, but does not differ appreciably in other ways. Specimens vary only slightly in size (5.15–5.30 mm, \bar{x} = 5.24, N = 6). The images in Anzaldo's work [4] attributed to *P. flavipes* are those of the next species.

Philenis anzaldoi Hespenheide new species

Figure 2

<http://zoobank.org/urn:lsid:zoobank.org:act:C4BC5B10-3C30-4A48-A84C-36BAC36A78F1>

Description: Holotype female: body size 5.70 mm long, 3.10 mm wide. Moderately robust, oboval, narrower anteriorly, head, pronotum, mesepimeron, and abdominal ventrites 3–4 black, otherwise reddish brown, rostrum, legs and abdominal ventrites 1 and 2 paler; sparsely to somewhat densely covered with complex pattern of largely pale yellow scales, darker on elytra: from above, pronotum with scales along anterior and basal margins, and in narrow transverse fascia anterior to middle, bands joining at sides for anterior 1/2 of pronotum, otherwise scales black on disc; elytra with scales in intervals 1 and 2 along suture, narrowly interrupted at anterior 1/4 of suture, in narrow transverse fasciae in intervals 1–8, and in broad oblique fascia on posterior 1/2, scales dark brown otherwise; scales sparse on rostrum above antennal insertions, moderately dense on legs, and ventrally, denser on procoxae, metasternum, episternum, mesepimeron, posterior margins of abdominal ventrites 1 and 2, sparser on ventrites 3–4.

Head 1.10 mm wide, convex in dorsal view, eyes narrowly separated; rostrum very slender, nearly straight, polished and glabrous below antennal insertions, somewhat flattened dorsoventrally, 1.90 mm long, antennae inserted at basal 1/5.

Pronotum 1.85 mm long, 2.15 mm wide at base, lateral margins weakly rounded from base to anterior collar, in lateral view gibbous at basal 1/4 and declivous anteriorly. weakly carinate along basal 3/4 of midline, posterior margin extended posteriorly anterior to scutellum. Scutellum narrowly ovate lengthwise.

Elytra 0.5 wider than pronotum, humeri slightly prominent, intervals broader than striae, striae punctate.

Mesosternum declivous, unmodified, weakly emarginate posteriorly, anterior margin of metasternum declivous. In lateral view abdominal ventrite 1 weakly convex, 1.60 mm long along midline, midline linearly impressed, narrowly emarginate at posterior margin, ventrite 2 only 0.25 mm long along midline abruptly, strongly declivous posteriorly, ventrites 3–4 very narrow, ventrite 5 equal to 3 + 4, ascending. From front, procoxae broadly angulate-obovate with large tooth on inner margin. Metafemora with distinct tooth at distal 2/3.



Figure 2. *Philenis anzaldoi*, dorsal and lateral habitus.

Specimens examined: Holotype: Panamá: Canal Zone, Barro Colorado Is., 09°10' N 79°50' W, 17.08.1974, H.A. Hespenheide, aroid gall, l[ea]f. vs, vial (USNM). Paratypes: Panamá: Canal Zone, Barro Colorado Is., 12.11.1923, F 4857 OL (AMNH), Madden Forest, 09°05' N 79°37' W, 15.03.1984, Stockwell (CMNC); Panamá Prov., (8 km NW Capiरा), Cerro Campana, 1000 m, 7.05.1981, R.W. Brooks, on *Clethra lanata* (CMNC); Prov. Colón, 'Achiote-PN San Lorenzo', 09°12' N 79°59' W, 100 m, Pastizal B Dist, 12–27.05.2004, A. Mercado, Tr. Intercepción (CMNC). Costa Rica: Prov. Guanacaste, Estac. Pitilla, 9 km S Santa Cecilia, 700 m, 330200–380200, 09.1989, GNP Biodiversity Survey (MNCR, INBIOCRI000035371); Heredia Pr., F. La Selva, 3 km S Pto. Viejo, 10°26' N 84°01' W, 26.06.1985, H.A. Hespenheide (CHAH), Est. Biol. La Selva., 50–150 m, 10°26' N 84°01' W, INBio-OET, 14.06.1993, Bosque primario, M/08/130 (MNCR, INBIOCRI0022718655), 16.10.1995, Parcelas sucesionales, M/01/471 (MNCR, INBIOCRI002300586), 11 km ESE La Virgen, 250–350 m, 10°21' N 84°03' W, INBio-OET-ALAS transect, 21.03.2004, 03/M/03/043 (MNCR, INB0003614035), 6.04.2004, 03/M/03/063 (MNCR, INB0003615778); [Limon Prov.], Hamburg Farm, Sta Clara Pr, 27.01.1926, Nevermann Coll. (USNM).

Host: The aroid liana with the gall from which the holotype was cut is probably a species of *Philodendron*.

Derivation of name: This species is named in honor of Salvatore Anzaldo for his review [4] of the conoderine genera of North and Central America.

Discussion: This is the species figured in Anzaldo's review [4] as *Philenis flavipes*. The two species are similar, but differ most obviously in the color and pattern of scales on the elytra. Specimens vary in length from 5.00–6.40 mm, (\bar{x} = 5.66, N = 12).

Philenis fuscofemorata Champion, 1906

Philenis fuscofemorata Champion, 1906:44. [1]
Figures 3 and 4b

Redescription: Body size 4.50 mm long, 2.40 mm wide. Moderately robust, elliptical, conspicuously narrower anteriorly, pronotum, mesosternum, mesepimera, epimeron, apical 1/4 of elytra, abdominal ventrites 4 and 5, coxae and femora black, otherwise head, metasternum, metepimera, abdominal ventrites 1–3, middle portion of metafemora, and tibiae reddish brown, and basal 3/4 of elytra darker reddish brown; sparsely to somewhat densely covered with complex pattern of scales: scales reddish-brown on reddish brown portion of elytra; scales black on black portion of elytra and in broad longitudinal stripes on pronotum lateral to midline; scales yellowish-white on head, on pronotum in narrow stripe along midline and on anterior portions of broad stripe along lateral margins extending to sides, on elytra in small slightly oblique spot on intervals 2–5 at basal 1/3 of elytra and in broader irregular oblique transverse fascia at apical 2/3 of elytra, along apical 1/2 of elytral suture and narrowly along elytral apices; in dorsal view, scales white in posterior portions of lateral margins of pronotum; ventrally, scales white, and more or less uniformly dense throughout and on femora, denser on metasternum and on metepisterna; scales golden on most of tibiae, except white on posterior margin of metatibiae; sides of pronotum and apical 3/4 of rostrum glabrous (Figure 3).



Figure 3. *Philenis fuscofemorata* Champion, Holotype, dorsal and lateral habitus.

Head 0.80 mm wide, 0.40 mm long, convex in dorsal view, eyes separated by 2 rows of small semi-erect scales; rostrum forming distinct obtuse angle at base with frons, rounded-rectangular in cross section, broadening toward apex, curved, micropunctate below antennal insertions, 1.25 mm long, antennae inserted at basal 1/5.

Pronotum 1.45 mm long, 1.50 mm wide at base, lateral margins weakly convex at base then nearly straight to anterior collar, weakly convex on basal 2/3 in lateral view. weakly carinate along

basal 2/3 of midline, posterior margin obliquely convergent from posterior angles and extended in rounded-acute projection anterior to scutellum. Scutellum small, round.

Elytra abruptly 3/5 wider than pronotum at base, widest at basal 1/3; humeri somewhat prominent, intervals rounded, 1.5–2× broader than striae, striae coarsely punctate.

Mesosternum deeply emarginate and concave to receive apex of rostrum, lateral angles narrow, curved and raised interior to mesocoxae; anterior margin of metasternum strongly declivous. In lateral view abdominal ventrite 1 very weakly, broadly convex, slightly depressed along midline, posterior margin slightly narrowly emarginate, 1.10 mm long, ventrite 2 0.50 mm long along midline, strongly declivous at posterior margin, ventrites 3–5 narrow, subequal in length. From front, procoxae broadly rounded-triangular with long tooth on inner margin. Metafemora with tooth at distal 2/3, mesofemora with minute tooth at middle. Genitalia as in Figure 4b.

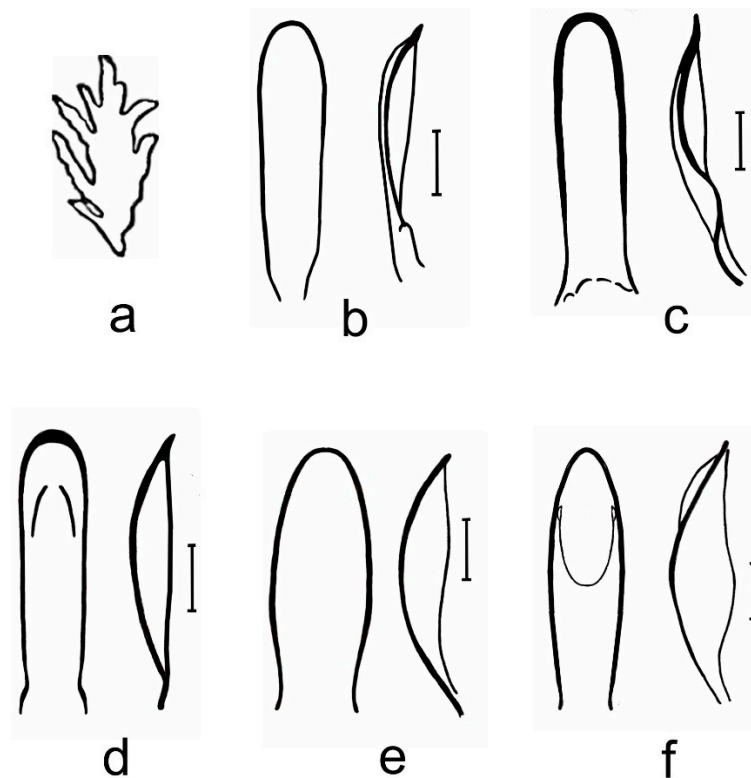


Figure 4. (a). Multifurcate scale; **b–f**. male genitalia, dorsal and lateral views; (b). *Philenis fuscofemorata*; (c) *P. costaricensis*; (d) *P. laselvaensis*; (e) *P. brunnea*; (f) *P. chiriquiensis*; scale bars = 0.2 mm.

Specimens examined: Costa Rica: Prov. Guanacaste], Est. Cacao, Lado suroeste del Volcan Cacao, 1000–1400 m, L-N-323300-375700, II curso Parataxon., 06.1990 (MNCR, INBIOCRI000255075); Heredia: Est. Biol. La Selva., 50–150 m, 10°26' N 84°01' W, INBio-OET, 10.1992 (CHAH), 29.09.1995, Bosque secundario, M/02/460 (MNCR, INBIOCRI002300930), 14.04.1999, Bosque secundario, L/17/566 (MNCR, INBIOCRI001284616), La Selva Biol. Sta., 3 km S Pto. Viejo, 10°26' N 84°01' W, 3.01.1994, Bosque secundario, M/13/315 (MNCR, INBIOCRI002267491), 13.04.1993, Bosque secundario, L/06/027 (MNCR, INBIOCRI001274880), 14.04.1999, Bosque secundario, L/18/619 (MNCR, INBIOCRI001285095), 11 km ESE La Virgen, 250–350 m, 10°21' N 84°03' W, INBio-OET-ALAS transect, 6.04.2004, 03/M/15/075 (6, MNCR, INB0003614609-12, -14-15), 18.04.2004, 03/M/15/095 (2, MNCR, INB0003616876, -77), 11 km SE La Virgen, 450–550m, 10°20' N 84°04' W, 8.04.2003, 05/M/06/066 (MNCR, INB0003231453), 05/M/03/033 (MNCR, INB0003243099), 05/M/17/037 (2, MNCR, INB0003243092 [genitalia figured], -3); Prov. Puntarenas, Rancho Quemado, Peninsula de Osa, 200 m, L-N-292500, 511000, 05.1992, F. Quesada y G. Varela (MNCR, INBIOCRI000407983),

Est. Sirena, P.N. Corcovado, 0–100m, L-S 270500, 508300, 17.06–4.09.1991, Tp. Malaise (2, CMNC, INBIOCRI000721235, -66), 03–06.1991, Tp. Malaise (MNCR, INBIOCRI000335807), Corcovado National Park, Sirena stn., Rio Pavo trail 5 m, 8°29'5" N 83°35'33" W, 25–28.06.2000, Z. H. Falin, ZF2000-37, *ex f.i.t.* (CMNC), Rincon de Osa, 150 m, 8°41.141' N 83°31.117' W, 22–26.06.2001, S. & J. Peck, 97–24, S&JP 2001-14, *ex f.i.t.*, rain forest (3, CMNC), Pen. Osa., Est. Fund. Neot. Aguas Buenas, 7 km W Rincon de Osa, 80 m, 21–25.06.1997, S. & J. Peck, 97–24, *f.i.t.*, *ex* rain forest (CMNC), R.F. Golfo Dulce, 5 km W Piedras Blancas, 100 m, 08.1992, P. Hanson (MUCR). Panama: Chiriqui, La Fortuna, Hydrological Trail, 1050m, 9–12.06.1995, J. Ashe & R. Brooks, #188, FIT (CMNC), V. de Chiriqui, 4000–6000 ft., Champion (Holotype, BMNH).

Discussion: As treated here, this is a widespread and very variable species but may actually be a complex of sibling species. Initially I had separated out different groups of specimens based partially on geography and morphological characters, but variability within groups and overlaps in both geography and characters recommended this more conservative interpretation. There is also the possibility of significant sexual dimorphism that parallels that in the following species. As a consequence, many other collections from the ALAS transect initially determined as this species are probably this species but are not listed. Further study and collections, including genetic barcoding, is required. The coloration is somewhat suggestive of that of social Hymenoptera, but unspecific in pattern.

This species is similar to the following species, but is smaller in size and differs in other characters given in the key, below, especially the metafemoral teeth which are minute in *P. fuscofemorata* and strong in the following species. Specimens vary in length from 3.75–4.80 mm, (\bar{x} = 4.17, N = 22).

***Philenis costaricensis* Hespeneheide new species**

Figure 4c and Figure 5

<http://zoobank.org/urn:lsid:zoobank.org:act:F4AC77DB-3F8B-4740-81C0-14780A0FF156>

Description: Holotype male: body size 5.20 mm long, 2.70 mm wide. Moderately robust, elliptical, narrower anteriorly, black, except tibiae, head, metasternum, and abdominal ventrites 1 and 2 reddish brown, basal 2/3 of elytra darker reddish brown; sparsely to somewhat densely covered with complex pattern of scales: scales reddish-brown on reddish brown portion of elytra; scales black on black portion of elytra and in broad longitudinal stripes on pronotum lateral to midline; scales yellowish-white on head, on metafemora, in slightly oblique transverse fascia on intervals 2–5 at basal 1/3 of elytra and in broader, irregular oblique transverse fascia at apical 2/3 of elytra, along apical 1/4 of elytral suture and narrowly along elytral apices; in dorsal view, scales white in longitudinal stripes along midline and lateral margins of pronotum, narrowly at base of elytra; ventrally scales white on procoxae and on pronotum just above procoxae, on metasternum, meso and metepisterna, abdominal ventrites, and fore- and mesofemora, denser on lateral portion of metasternum and on metepisterna, abdominal ventrite 5, and lateral margins of ventrites 2–4; scales golden on most of tibiae; sides of pronotum and apical 2/3 of rostrum glabrous.

Head 0.95 mm wide, 0.45 mm long, convex in dorsal view, eyes separated by 4 rows of small semi-erect scales; rostrum rounded-rectangular in cross section, curved, micropunctate below antennal insertions, weakly transversely depressed and weakly carinate along midline above antennal insertions, somewhat flattened dorsoventrally, 1.35 mm long, antennae inserted at basal 1/4.

Pronotum 1.55 mm long, 1.80 mm wide at base, lateral margins weakly convex at base then nearly straight to anterior collar, weakly convex in lateral view. weakly carinate along basal 3/4 of midline, posterior margin extended in acute projection anterior to scutellum. Scutellum small, round.

Elytra abruptly 0.5 wider than pronotum at base, humeri not prominent, intervals relatively flat, 1.5–2× broader than striae, striae narrow, punctate.

Mesosternum emarginate and concave to receive apex of rostrum, lateral angles narrow and raised interior to mesocoxae; anterior margin of metasternum strongly declivous. In lateral view abdominal ventrite 1 nearly flat, very weakly, broadly concave, 1.20 mm long along midline, ventrite 2

0.45 mm long along midline, strongly declivous at posterior margin, ventrites 3–5 narrow, subequal in length. From front, procoxae broadly rounded-triangular with tooth on inner margin. Metafemora with small tooth at distal 3/5, mesofemora with minute tooth at middle. Genitalia as in Figure 4c.

Allotype female: Body size 5.00 mm long, 2.80 mm wide. Robust, elliptical, slightly narrower anteriorly; generally dark reddish brown, head, abdominal ventrites 1–3, and legs paler; pronotum above procoxae, coxae, abdominal ventrites 3–4, and interior surface of metafemora black; sparsely to somewhat densely covered with complex pattern of scales: scales dark-brown or black in broad longitudinal stripes on pronotum lateral to midline; scales yellowish-white on head, on pronotum in narrow stripe along midline and on anterior portions of broad stripes along lateral margins extending to sides; in dorsal view, scales white in posterior portions of lateral margins of pronotum, on elytra in small slightly spots anterior to humeri, narrowly on intervals 2–4 at base of elytra extending on intervals 1–2 to narrow weakly arcuate transverse fascia at basal 1/3, and in broader irregular oblique transverse fascia at apical 2/3, and on intervals 1–2 along apical 2/3 of elytral suture continuing narrowly along elytral apices; ventrally, scales white, and more or less uniformly dense throughout except absent on medial 2/3 of abdominal ventrites 3–4 and sparser on femora; scales pale golden on tibiae; sides of pronotum above procoxae, most of elytra, medial 2/3 of abdominal ventrites 3–4, and apical 3/4 of rostrum glabrous.

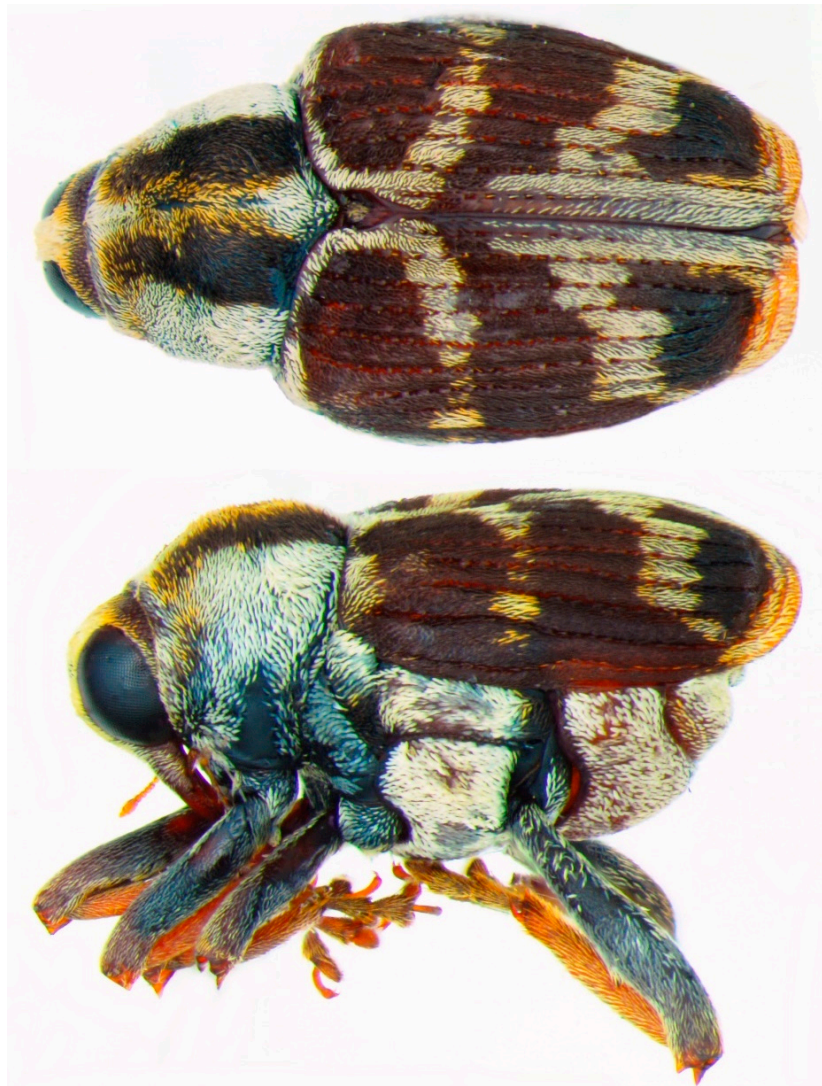


Figure 5. *Philenis costaricensis*, dorsal and lateral habitus.

Head 1.05 mm wide, 0.60 mm long, convex in dorsal view, eyes separated by 4 rows of semi-erect scales; rostrum slender, rounded-rectangular in cross section, broadening slightly at apex, weakly curved, weakly carinate above antennal insertions along midline to just above lower margins of eyes, micropunctate below antennal insertions, 1.25 mm long, antennae inserted at basal 1/5.

Pronotum 1.70 mm long, 1.80 mm wide at base, lateral margins weakly convex to weak anterior collar, in lateral view convex on basal 2/3. very weakly carinate along medial 1/3 of midline, posterior margin obliquely convergent from posterior angles and obtusely angulate anterior to scutellum. Scutellum very small, round.

Elytra 1/2 wider than pronotum at base, widest at basal 1/3. humeri somewhat prominent, intervals rounded, 1.5–2× broader than striae, striae coarsely punctate.

Mesosternum deeply emarginate and concave to receive apex of rostrum, lateral angles narrowly angulate and raised interior to mesocoxae; anterior margin of metasternum strongly declivous. In lateral view abdominal ventrite 1 very convex, slightly depressed along midline, posterior margin broadly rounded, 1.70 mm long, ventrite 2 0.50 mm long along midline, strongly ascending and declivous at posterior margin, ventrites 3–5 narrow, subequal in length. From front, procoxae broadly rounded-triangular with long tooth on inner margin. Metafemora with tooth at distal 2/3, mesofemora with minute tooth just beyond middle.

Specimens examined: Holotype: Costa Rica: Prov. Heredia, 16 km SSE La Virgen, 1050–1150 m, 10°16' N 84°05' W, INBio-OET-ALAS transect, 9.04.2001, 11/M/20/080 (MNCR, INB0003202065). Allotype: Costa Rica: Heredia: Est. Biol. La Selva., 50–150 m, 10°26' N 84°01' W, INBio-OET, 29.09.1995, Bosque primario, M/07/464 (MNCR, INBIOCRI002300837). Paratypes: Costa Rica: Cart[ago] Prov., Tapanti Nat Pk., Orosi, 1500 m, 3–4.06.1997, S. Peck, FIT, mont. evergr forest (m, CMNC); Prov. Guanacaste, Rio San Lorenzo, Tierras Morenas, 1050m, L_N_287800_427600, 10.1995, G. Rodriguez, Malaise de Cianuro (2m, MNCR, INBCRI002362313, -4); Heredia: Same data as allotype but 1.10.1993, Bosque primario, M/06/235 (f, INBC, INBIOCRI001245081), 16.08.1995, Bosque primario, M/07/440 (f, MNCR, INBIOCRI002301652), 11 km SE La Virgen, 450–550m, 10°20' N 84°04' W, 23.03.2003, INBio-OET-ALAS transect, 05/M/16/056 (MNCR, INB0003238453), Prov. Limon, Sector Cerro Corocori, F[in]ca de E. Rojas, 150 m, L–N 286000, 567500, 04.1992, E. Rojas (f, MNCR, INBCRI000879457), Puntarenas [Province], 1 km SE Monte Verde, 1500–1600 m, 10°18' N 84°48' W, 16.08.1976, H.A. Hespeneheide (m, CHAH), Est. G. Brenes, Res. Biol. Monteverde, 1300 m, L–N-249750, 450075, 06.1991, E. Bello (m, MNCR, INBIOCRI000601598).

Other Specimens examined: Costa Rica: Heredia: 11 km ESE La Virgen, 250–350 m, 10°21' N 84°03' W, INBio-OET-ALAS transect, 12.02.2004, 03/M/09/009 (5, MNCR, INB0003610223, -24, -28, -29, -31), 21.03.2004, 03/M/09/049 (MNCR, INB0003613913), 12.02.2004, 03/M/11/011 (MNCR, INB0003610202), 18.04.2004, 03/M/14/094 (MNCR, INB0003617566), 22.02.2004, 03/M/15/015 (5, MNCR, INB0003610962, 63, 72, -73, -74), 9.03.2004, 03/M/15/035 (MNCR, INB0003612483), 6.04.2004, 03/M/15/075 (3, MNCR, INB0003614607, -08, -13), 18.04.2004, 03/M/15/095 (MNCR, INB0003616879), 11 km SE La Virgen, 450–550 m, 10°20' N 84°04' W, 2003, INBio-OET-ALAS transect, 23.03.2003, 05/M/13/053 (MNCR, INB0003236729), 8.04.2003, 05/M/14/074 (MNCR, INB0003231670), 23.03.2003, 05/M/16/056 (MNCR, INB0003238453), 23.02.2003, 05/M/17/017 (MNCR, INB0003237584), 11.03.2003, 05/M/17/037 (MNCR, INB0003239388), 23.03.2003, 05/M/17/057 (MNCR, INB0003238213), 8.04.2003, 05/M/17/077 (MNCR, INB0003231528), 23.02.2003, 05/M/19/019 (MNCR, INB0003238964), 05/R/DB/013 (MNCR, INB0003657435), 16 km SSE La Virgen, 1050–1150 m, 10°16' N 84°05' W, INBio-OET-ALAS transect, 9.03.2001, 11/M/13/053 (MNCR, INB0003200184), 21.03.2001, 11/M/14/074 (MNCR, INB0003202146).

Derivation of name This largely black/dark species is named for the country where all specimens have been collected.

Discussion: *Philenis costaricensis* is very similar to *P. fuscofemorata* but is larger, with the pronotum more globose and not conspicuously narrower than the elytra, and differs in the pattern of scales on elytra. The sexual dimorphism of this species led me originally to consider the sexes separate species

and parallels that of *P. fuscifemorata*. The distinctive coloration suggests that it is mimetic, but no model is obvious. Specimens have been collected from lowlands to middle and higher elevations, above 1000 m. Males vary in length from 5.15–5.70 mm, (\bar{x} = 5.36, N = 6); females vary in length from 5.00–5.40 mm, (\bar{x} = 5.26, N = 5)

***Philenis laselvaensis* Hespenheide new species**

Figure 4d and Figure 6

<http://zoobank.org/urn:lsid:zoobank.org:act:6D85E6CE-E3A0-49B7-A2DC-6489BFD78F18>

Description: Holotype male: body size 5.50 mm long, 2.80 mm wide. Moderately robust, elliptical, somewhat narrower anteriorly, from the side nearly flat above, convex below; black, except elytra, tibiae, antennae and rostrum reddish brown, elytra darker; sparsely to somewhat densely covered with complex pattern of scales, except rostrum below antennal insertions, most of elytra, and broad longitudinal areas lateral to midline of pronotum glabrous: scales reddish brown on most of tibiae; scales pale brownish-yellowish-white on head and in sparse, broad stripe along midline of pronotum; in dorsal view, scales yellow in broad longitudinal stripes along lateral margins of pronotum, on intervals 1 and 2 along suture and along apices of elytra, in weakly indicated transverse fascia at basal 1/4 of elytra and in weakly indicated oblique fascia just beyond middle of elytra; laterally and ventrally scales dense and white or yellowish white throughout; scales sparser on sides of femora (Figure 6).



Figure 6. *Philenis laselvaensis*, dorsal and lateral habitus.

Head 1.15 mm wide, convex in dorsal view, eyes narrowly separated by 2 rows of small scales; rostrum weakly carinate above antennal insertions, polished below antennal insertions, widening from middle toward apex, from side slightly curved and somewhat flattened dorsoventrally, 1.50 mm long, antennae inserted at basal 1/4.

Pronotum 1.80 mm long, 2.10 mm wide at base, lateral margins nearly straight from base to indistinct anterior collar, in lateral view only slightly convex. weakly carinate along midline, posterior margin narrowly convex anterior to scutellum. Scutellum very small, round.

Elytra 1/3 wider than pronotum, humeri not prominent, widest at basal 1/3, intervals slightly broader than striae.

Mesosternum declivous, deeply quadrately emarginate to receive apex of rostrum with slightly elevated, narrowly rounded lateral margins, anterior margin of metasternum declivous. In lateral view abdominal ventrite 1 weakly convex, 1.35 mm long along midline, ventrite 2 0.50 mm long along midline, strongly declivous, ventrites 3–4 narrow, subequal in length, ascending, ventrite 5 longer. From front, procoxae broadly rounded-triangular with large tooth on inner margin. Metafemora with distinct tooth at distal 2/3, mesofemora with indistinct tooth at middle. Genitalia as in Figure 4d.

Specimens examined: Holotype: Costa Rica: Heredia, Est. Biol. La Selva, 50–150m, 10°26' N 84°01' W, Mar 1993, INBio-OET, 3.03.1993, Bosque primario, M/10/025 (MNCR, INBIOCRI001262759). Paratypes: Costa Rica: Rio [Bouciano?], 250m, 2.04.1935, F. [Gongora] col., F. Nevermann (USNM); Prov. Alajuel[a], Chiles de Aguas, Zarcas, Café. 300 m, 11.1989–1.1990, R. Céspedes (MUCR); Prov. Heredia, F. La Selva, 3 km S Pto. Viejo, 10°26' N 84°01' W, 1.03.1979, T. Ray, 156 (CHAH), 22.03.1987, H.A. Hespenheide (CHAH); La Selva Biol. Sta., 3 km S Pto. Viejo, 10°26' N 84°01' W, 20.01.1993, Bosque primario, M/00/009 (MNCR, INBIOCRI002267490), same data as holotype but, INBio-OET-ALAS transect 24.02.2004, Malaise, M/21/763 (MNCR, INB0003663309), 24.02.2004, Malaise, M/22/764 (MNCR, INB0003663364), 24.02.2004, Malaise, M/29/771 (MNCR, INB0003663090), 9.03.2004, Malaise, M/24/776 (MNCR, INB0003663661), 9.03.2004, Malaise, M/29/781 (2, MNCR, INB0003663513, -4), 21.03.2004, Malaise, M/29/791 (MNCR, INB0003664169); 11 km SE La Virgen, 450–550m, 10°20' N 84°04' W, 2003, INBio-OET-ALAS transect, 11.03.2003, 05/M/10/030 (MNCR, INB0003236656), 17–21.03.2003, R. Anderson (CMNC); Prov. Limón, Cerro Tortuguero, P.N. Tortuguero, 100 m, 285000 588000, 11.1989, J. Solano (MNCR, INBIOCRI000141186), Amburi, 70 m, L_S_385000_578100, 07.1996, G. Gallardo, #7884 (MNCR, INBIOCRI002446633).

Other specimens examined Costa Rica: Prov. Heredia, Est. Biol. La Selva, 50–150 m, 10°26' N 84°01' W, INBio-OET-ALAS transect, 1.12.1993, Bosque secundario, M/02/277 (MNCR, INBIOCRI001268174), 14.09.1995, Bosque secundario, M/02/448 (MNCR, INBIOCRI002289496), 15.03.1993, Bosque primario, M/04/035 (MNCR, INBIOCRI001245200), 15.03.1993, Bosque primario, M/05/036 (MNCR, INBIOCRI001262732), 1.04.1993, Bosque primario, M/05/052 (MNCR, INBIOCRI001239872), 31.08.1995, Bosque primario, M/08/441 (MNCR, INBIOCRI002301592), 16.02.1996, Bosque primario, M/08/573 (MNCR, INBIOCRI002304148), 15.03.1996, Bosque primario, M/08/597 (MNCR, INBIOCRI002304277), 29.09.1995, Bosque secundario, M/09/466 (MNCR, INBIOCRI002301108), 3.03.1993, Bosque primario, M/10/025 (MNCR, INBIOCRI001262759), 2.04.1993, Bosque primario, M/10/057 (MNCR, INBIOCRI002276663), 1.09.1993, Bosque primario, M/10/200 (MNCR, INBIOCRI001244971), 1.09.1993, Bosque secundario, M/11/201 (MNCR, INBIOCRI001245099), 1.11.1995, Bosque secundario, M/11/492 (MNCR, INBIOCRI002289671), 29.09.1995, Bosque secundario, M/13/470 (MNCR, INBIOCRI002300875), 16.04.1993, Bosque secundario, M/14/077 (MNCR, INBIOCRI001244670), 23.01.1998, M/18/700 (MNCR, INBIOCRI002289971), 19.02.1998, M/18/702 (2, MNCR, INBIOCRI002284055, -56), 21.01.1999, M/18/726 (MNCR, INBIOCRI002721198), 21.02.2000, M/19/742 (2, MNCR, INBIOCRI002727070, -80), 11 km ESE La Virgen, 250–350 m, 10°21' N 84°03' W, INBio-OET-ALAS transect, 9.03.2004, 03/M/01/041 (MNCR, INB0003613693), 18.04.2004, 03/M/01/081 (MNCR, INB0003616968), 9.03.2004, 03/M/02/022 (MNCR, INB0003613033), 22.02.2004, 03/M/03/003 (MNCR, INB0003611310), 22.02.2004, 03/M/05/005 (MNCR, INB0003610322), 18.04.2004, 03/M/15/095 (MNCR, INB0003616857), 9.03.2004, 03/M/16/036 (MNCR, INB0003612319), 11 km SE La Virgen, 450–550m, 10°20' N 84°04' W, 2003, INBio-OET-ALAS transect, 23.02.2003, 05/M/13/013 (2, MNCR, INB0003237736, -7), 11.03.2003, 05/M/13/033 (MNCR, INB0003238065), 23.03.2003, 05/M/13/053

(2, MNCR, INB0003236730, -1), 8.04.2003, 05/M/13/073 (MNCR, INB0003231478), 20.04.2003, 05/M/13/093 (MNCR, INB0003231913), 20.04.2003, 05/M/17/097 (MNCR, INB0003231859).

Derivation of name: This species is named for the La Selva Biological Station where this is the most frequently collected species of *Philenis*. See discussion below under ecology.

Discussion: The bright yellow scales of this common species are unique among the species treated here. Specimens varied in size from 4.9–6.5 mm (\bar{x} = 5.93 mm, N = 17).

***Philenis auritibiae* Hespénheide new species**

Figure 4a and Figure 7

<http://zoobank.org/urn:lsid:zoobank.org:act:4F1E70FB-1D9A-4268-B8C6-514709681DFB>

Description: Holotype: body size 5.55 mm long, 3.00 mm wide. Moderately robust, oboval, narrower anteriorly, black, except tibiae, antennae and apical 2/3 of rostrum reddish brown, intervals 2–8 of elytral disc dark reddish brown; sparsely to somewhat densely covered with complex pattern of scales: scales reddish-brown on reddish brown portion of elytra and in small triangular spots anterior to humeri; scales golden on most of tibiae; scales yellowish-white between eyes, in narrow stripe along midline of pronotum and broad transverse fascia on basal 1/3 of elytra; in dorsal view, scales white in longitudinal stripes along lateral margins of pronotum, in narrow bands at bases and apices of elytra, along apical 1/6 of elytral suture and in broad transverse fascia at apical 2/3 of elytra; ventrally scales white on procoxae and on pronotum just above procoxae, on metasternum, meso and metepisterna, mesepimeron, posterior margins of abdominal ventrites 1 and 5, posterior 1/2 of ventrite 2, and lateral margins of ventrites 3–4; scales sparser and white on femora and posterior margins of meso- and metatibiae, otherwise scales black; sides of pronotum and apical 3/4 of rostrum glabrous (Figure 7).



Figure 7. *Philenis auritibiae*, dorsal and lateral habitus.

Head 1.00 mm wide, convex in dorsal view, eyes separated by 4 rows of small scales; rostrum nearly straight, polished below antennal insertions, somewhat flattened dorsoventrally, 1.25 mm long, antennae inserted at basal 1/4.

Pronotum 1.80 mm long, 2.00 mm wide at base, lateral margins nearly straight from base to indistinct anterior collar, in lateral view gibbous at basal 1/3 and declivous anteriorly. weakly carinate along basal 3/4 of midline, posterior margin extended posteriorly anterior to scutellum. Scutellum small, round.

Elytra 0.5 wider than pronotum, humeri slightly prominent, intervals much broader than striae, striae linear.

Mesosternum declivous, deeply emarginate to receive apex of rostrum, anterior margin of metasternum declivous. In lateral view abdominal ventrite 1 weakly convex, 1.50 mm long along midline, ventrite 2 0.70 mm long along midline, strongly declivous, ventrites 3–5 narrow, subequal in length, ascending. From front, procoxae broadly rounded-triangular with large tooth on inner margin. Meso- and metafemora with distinct tooth at distal 2/3.

Specimens examined: Holotype: Costa Rica: Prov. Heredia, 9 km NE Vara Blanca, 1450–1550 m, 10°14' N 84°06' W, INBio-OET-ALAS transect, 17.04.2005, 15/M/04/114, Finca Murillo (MNCR, INB0003672307). Paratypes: Costa Rica: Prov. Guanacaste, Rio San Lorenzo, Tierras Morenas, Z.P. Tenorio, 1050 m, L–N 287800, 427600, 10.1992, G. Rodriguez, Malaise de Cianuro (MNCR INBIOCR000836551); same data as holotype, 17.04.2005, 15/M/04/104, Finca Murillo (MNCR, INB0003670685), 17.04.2005, 15/TN/04/022, Finca Murillo (MNCR, INB0003676106).

Derivation of name: The name refers to the elongate golden scales on the tibiae. Other species share this character, but not as strikingly as on this largely black species.

Discussion: *Philenis auritibiae* is an upper middle elevation (1–2000 m) species and is the only essentially all black Central American species with a design of white scales dorsally. Three of the four individuals show small “multifurcate” scales (Figure 4a) on the pronotum discussed further below. Specimens vary in length from 4.80–5.80 mm, (\bar{x} = 5.47, N = 4).

Philenis brunnea Hespeneide new species

Figure 4e

<http://zoobank.org/urn:lsid:zoobank.org:act:CB39214A-F25E-4400-A3E8-DF115F0EE2EF>

Description: Holotype male: body size 4.70 mm long, 2.55 mm wide. Robust, elliptical, narrower anteriorly, pale reddish brown throughout, elytra darker, especially apical 1/4; mesosternum, epimeron, coxae, interior surface of metafemora, abdominal ventrites 3–4, and pronotum above procoxae black; more or less densely and uniformly covered with complex pattern of scales, except rostrum distal to antennal insertions glabrous: scales pale yellow on head; scales pale brownish-yellow dorsally on medial portion of disc and anterior 1/2 of pronotum; scales dark brown and inconspicuous on much of elytra; scales white on elytra along basal and apical margins, on elytral intervals 1–2 lateral to suture, in slightly oblique transverse band at basal 1/3, and in broader, irregular oblique band from middle to apical 2/3; scales white ventrally and on femora; and scales golden yellow on tibiae.

Head 1.00 mm wide, 0.50 mm long, very convex in dorsal view, eyes narrowly separated by 4 rows of semierect scales; rostrum slender, rounded-rectangular in cross section, widening slightly toward apex, from side slightly curved, 1.25 mm long, antennae inserted at basal 1/4. rostrum below antennal insertions micropunctate.

Pronotum 1.60 mm long, 1.70 mm wide at base, lateral margins weakly rounded to anterior collar, in lateral view gibbous at basal 1/3 and declivous anteriorly, posterior margin obliquely convergent, acute and slightly upturned anterior to scutellum. Scutellum small, rounded.

Elytra 1/2 wider than pronotum, humeri moderately prominent, widest at basal 1/3, intervals much broader than striae, somewhat flattened, striae linear.

Mesosternum deeply concave, deeply emarginate at posterior margin to receive apex of rostrum, with blunt, raised teeth at lateral margins interior to mesocoxae, anterior margin of metasternum

declivous. In lateral view abdominal ventrite 1 very weakly convex, 1.10 mm long and slightly depressed along midline, ventrite 2 ascending, 0.40 mm long along midline, weakly convex in lateral view, ventrites 3–5 narrow, subequal in length, ascending, From front, procoxae triangular with narrow tooth on inner margin. Metafemora with distinct acute tooth at distal 2/3. Genitalia as in Figure 4e.

Specimens examined: Holotype: Costa Rica, Prov. Heredia: 11 km SE La Virgen, 450–550m, 10°20' N 84°04' W, 11.03.2003, INBio-OET-ALAS transect, 05/M/03/033 (MNCR, INB0003243097). Paratype: Costa Rica, same data as Holotype (MNCR, INB0003243098).

Other specimen examined: Panamá: Prov. Colón, Achiote PN San Lorenzo, 09°11' N 79°58' W, Cafetal C, Dist 50 m 11–26.01.2008, A Mercado, Tr. Intercepción (CMNC).

Derivation of name: The species name refers to the generally pale brown overall coloration.

Discussion: This is the only completely pale brown species of *Philenis* in Central America. The color pattern of scales is similar to that of *P. costaricensis* (Figure 5). The two Costa Rican specimens are both males and equal in size. The specimen from Panama is probably a female and larger, 5.55 mm long, and has a few differences from the Costa Rican specimens - a stouter rostrum that is carinate at the base along the midline - but has the same distinctive albeit finer pattern of coloration.

Philenis muscamimetica Hespeneheide new species

Figure 8

<http://zoobank.org/urn:lsid:zoobank.org:act:025E7530-EAB2-4D59-8549-ED2EA6F9A3E1>

Description: Holotype: body size 5.75 mm long, 3.00 mm wide. Moderately robust, elliptical, somewhat narrower anteriorly, black throughout, except elytral disc reddish brown; sparsely to somewhat densely covered with scales: scales orange-red on vertex of head posterior to eyes and on anterior 1/2 of pronotum dorsally extending on sides to middle of eyes; scales dense and yellowish on frons and on rostrum to antennal insertions; scales pale sparse brown on disc of pronotum; scales pale yellowish-brown on ventral 1/2 of procoxae, in narrow line on midline of basal 1/4 of pronotum, in narrow line along base of elytra, on interval 2 along suture for length of elytra, in narrow line along apices of elytra and in spots on intervals 9 and 10 at basal 1/4 of elytra and intervals 8–10 at apical 3/4 of elytra; scales white in broad irregular line from posterior angles of pronotum to posterior edge of red scales and along anterior edge of sides of pronotum to procoxae, on mesepisterna, dorsal 1/2 of epimera, middle 2/3 of metepisterna, and metasternum; scales white in broadly triangular area on sides of abdominal ventrite 1, on posterolateral 1/2 of ventrite 2, and on lateral 1/3 of ventrites 3–5, and on basal 1/2 of ventral surfaces of meso- and metafemora; elsewhere scales are dark brown or black or minute and inconspicuous.

Head 1.20 mm wide, 0.45 mm long, very convex in dorsal view, eyes narrowly separated by 2–4 rows of scales; rostrum narrowly carinate at and above antennal insertions, matte black below antennal insertions, widening slightly toward apex, from side slightly curved, 1.60 mm long, antennae inserted at basal 1/4.

Pronotum 1.95 mm long, 2.25 mm wide at base, lateral margins weakly rounded from base to indistinct anterior collar, in lateral view weakly convex at base and declivous anteriorly, posterior margin narrowly acutely rounded and slightly upturned anterior to scutellum. Scutellum small, rounded-triangular.

Elytra 1/2 wider than pronotum, humeri not prominent, widest at basal 1/4, intervals 2–3× broader than striae.

Mesosternum concave, deeply emarginate at posterior margin to receive apex of rostrum with slightly elevated, rounded lateral lobes internal to mesocoxae, prosternum strongly excavate anterior to forecoxae, anterior margin of metasternum declivous. In lateral view abdominal ventrite 1 weakly convex, 1.90 mm long along midline, ventrite 2 0.50 mm long along midline, strongly declivous at posterior margin, ventrites 3–4 narrow, subequal in length, ascending, ventrite 5 longer. From front, procoxae broadly oval with large tooth on inner margin. Metafemora with strong acute tooth at distal 2/3, mesofemora with small, distinct tooth at distal 3/5, profemora angulate at middle.



Figure 8. *Philenis muscamimetica*, dorsal and lateral habitus.

Specimen examined: Holotype: Panamá, Panamá Pr., 6–8 km N El Llano on El Llano-Carti Road, 6.06.1994, F. Andrews & A. Gilbert (CSCA).

Derivation of name: This species is named for its coloration, which is typical of conoderines in the putative fly mimicry complex [5,7] and is probably the same species mentioned by Anzaldo [4] as undescribed.

Discussion: As a putative fly mimic, *Philenis muscamimetica* stands uniquely apart from the other members in the genus treated here in terms of habitus.

Philenis chiriquiensis Hespenheide new species

Figure 4a,f and Figure 9

<http://zoobank.org/urn:lsid:zoobank.org:act:F26FA38B-8035-4F2D-BF12-7C2F1FD09C51>

Description: Holotype male: body size 5.60 mm long, 2.90 mm wide. Moderately robust, elliptical, somewhat narrower anteriorly, reddish brown throughout, ventral surface and femora nearly black; sparsely to somewhat densely covered with complex pattern of scales: scales dark brown or black on most of elytra and on disc and oblique lateral stripe on pronotum; scales brownish yellow on tibiae, head and antero-medial stripe on midline of pronotum; scales pale brownish-white on femora, in broad longitudinal stripes along lateral margins of pronotum, on interval 1 and along suture and apical margins of elytra, along basal margins of elytra connecting to weakly oblique fascia at basal 1/3 of elytra and in broad oblique fascia just beyond middle of elytra; laterally and ventrally scales moderately dense and white throughout (Figure 9).

Head 1.05 mm wide, 0.40 mm long, very convex in dorsal view, eyes narrowly separated by 2 rows of erect scales; rostrum weakly carinate at antennal insertions, polished below antennal insertions, widening from middle toward apex, from side slightly curved, 1.60 mm long, antennae inserted at basal 1/4.

Pronotum 1.70 mm long, 2.00 mm wide at base, lateral margins weakly rounded' from base to indistinct anterior collar, in lateral view weakly gibbous at basal 1/4 and declivous anteriorly, disc strongly shining, posterior margin narrowly acutely rounded and slightly upturned anterior to scutellum. Scutellum small, round.

Elytra 1/3 wider than pronotum, humeri not prominent, widest at humeri, intervals 2–3× broader than striae.

Mesosternum somewhat concave, deeply emarginate at posterior margin to receive apex of rostrum with slightly elevated, narrowly rounded lateral margins, prosternum strongly excavate anterior to procoxae, anterior margin of metasternum declivous and weakly concave. In lateral view abdominal ventrite 1 weakly convex, 1.40 mm long along midline, ventrite 2 0.60 mm long along midline, strongly declivous at posterior margin, ventrites 3–4 narrow, subequal in length, ascending, ventrite 5 longer. From front, procoxae broadly rounded-triangular with large tooth on inner margin. Metafemora with distinct tooth at distal 2/3, mesofemora weakly angulate at middle. Genitalia as in Figure 4f.

Specimens examined: Holotype: Panamá: Chiriqui Prov., Reserva Fortuna, Continental Divide Trail, 26.05.1993, F. Andrews & A. Gilbert (CSCA). Paratypes: Costa Rica: Puntarenas Province, Monteverde, John Campbell property, 4.06.1992, F. Andrews & A. Gilbert (CSCA). Panamá: same data as holotype except 1.06.1993, F. Andrews & A. Gilbert (CSCA), La Fortuna, Cont. Divide Trail, 08°47'76" N 82°14'75" W, 1370 m, 7.09.2010, L. Sekerka, montane forest, beating (2, BMNH), La Fortuna, Continental Divide Trail, 08°47'07" N 082°12'49"–14' W, 1170–1300 m, 20.09.2007, L. Sekerka & D. Windsor, cloudy forest, beating (BMNH), Continental Divide Trail, 3–8.07.1997, J. Huether (CMNC).

Derivation of name: This species is named for the volcano and the Panamanian province on and in which most specimens have been collected.

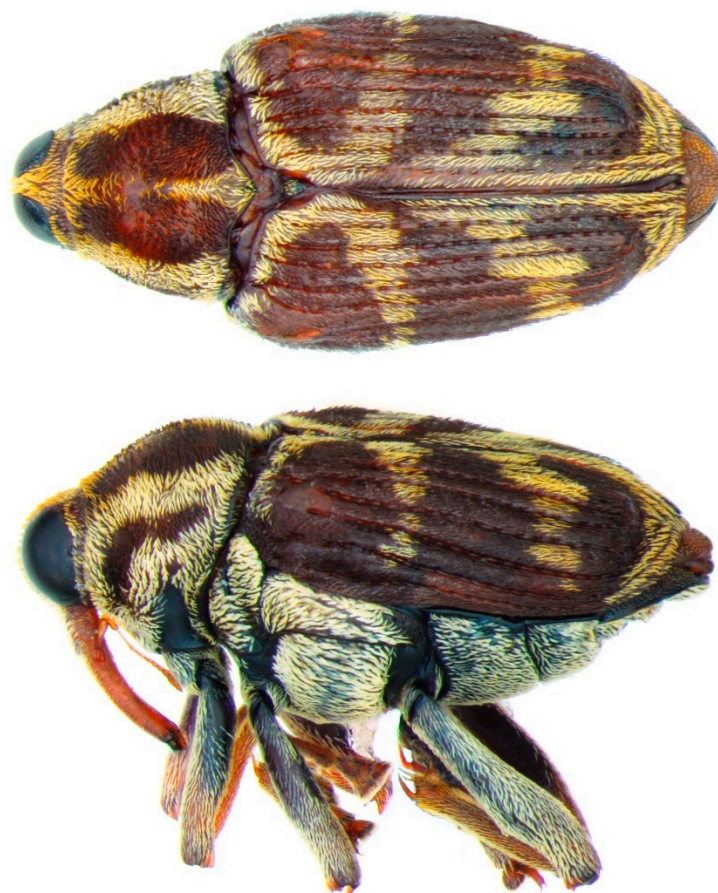


Figure 9. *Philenis chiriquiensis*, dorsal and lateral habitus.

Discussion: *Philenis chiriquiensis* is a relatively large, somewhat flattened, high elevation species, largely dark reddish brown in ground color dorsally and black ventrally, with a bold pattern of scales on the elytra. The Huether specimen is treated as conspecific but shows striking scales on the pronotum not shared by the other specimens. As with *P. auritibiae*, above, I term these scales “multifurcate” in that they branch separately and sequentially along the axis of the scale (Figure 4a), a character that is also shared by two somewhat different specimens from the Monteverde area in Costa Rica that may represent an undescribed species. These scales differ from “multifid” scales of Anzaldo [4] (also termed “pectinate” by Champion [1]; “plumose” by Lyal et al. [8]) in the genera *Philides* Champion and *Philinna* Champion, as well as in *Tachygonus* Schoenherr, where the separate “fingers” of the scales all arise from the base, rather than sequentially along the axis. Specimens vary in length from 4.80–6.10 mm, (\bar{x} = 5.50, N = 7).

***Philenis guyanensis* Hespeneide new species**

Figure 10b,c

<http://zoobank.org/urn:lsid:zoobank.org:act:E7158A1E-15F6-499C-A322-2D275F0F3202>

Description: Holotype male: body size 4.40 mm long, 2.50 mm wide. Very robust, elliptical, narrower anteriorly, pale reddish brown throughout, anterior angles of pronotum paler, disc of pronotum and oblique transverse bands just posterior to base and at middle darker; metatibiae and apices of metafemora, and triangular areas at apices of elytra exterior to intervals 1–2 black; sparsely to somewhat densely covered with complex pattern of scales: scales black on metatibiae and in triangular black areas at elytral apices; scales dark brown on darker areas of pronotum and elytra or black on most of elytra and on disc and oblique lateral stripe on pronotum; scales golden yellow elsewhere; rostrum below antennal insertions glabrous, micropunctate (Figure 10b).

Head 0.95 mm wide, 0.55 mm long, very convex in dorsal view, eyes narrowly separated by 2 rows of scales; frons and rostrum carinate from lower 1/3 of eyes to antennal insertions, widening slightly from middle toward apex, from side slightly curved, 1.30 mm long, antennae inserted at basal 1/4.

Pronotum 1.30 mm long, 1.75 mm wide at base, lateral margins weakly rounded to distinct anterior collar, in lateral view gibbous at basal 1/3 and strongly rounded-declivous anteriorly, posterior margin rounded anterior to scutellum. Scutellum small, elliptical.

Elytra 1/3 wider than pronotum, humeri moderately prominent, widest at humeri, intervals broader than striae, intervals 4, 6 and 8 raised, subcarinate, striae linear.

Mesosternum concave, deeply emarginate at posterior margin to receive apex of rostrum with triangular lateral margins, anterior margin of metasternum declivous. In lateral view abdominal ventrite 1 weakly convex, 1.20 mm long and somewhat depressed along midline and weakly emarginate at posterior margin, ventrite 2 0.50 mm long along midline, strongly declivous at posterior margin, ventrites 3–5 narrow, subequal in length, ascending. From front, procoxae broadly rounded-triangular without tooth on inner margin. Metafemora with distinct tooth at distal 2/3, fore- and mesofemora with very small tooth at distal 2/3. Genitalia as in Figure 10c.

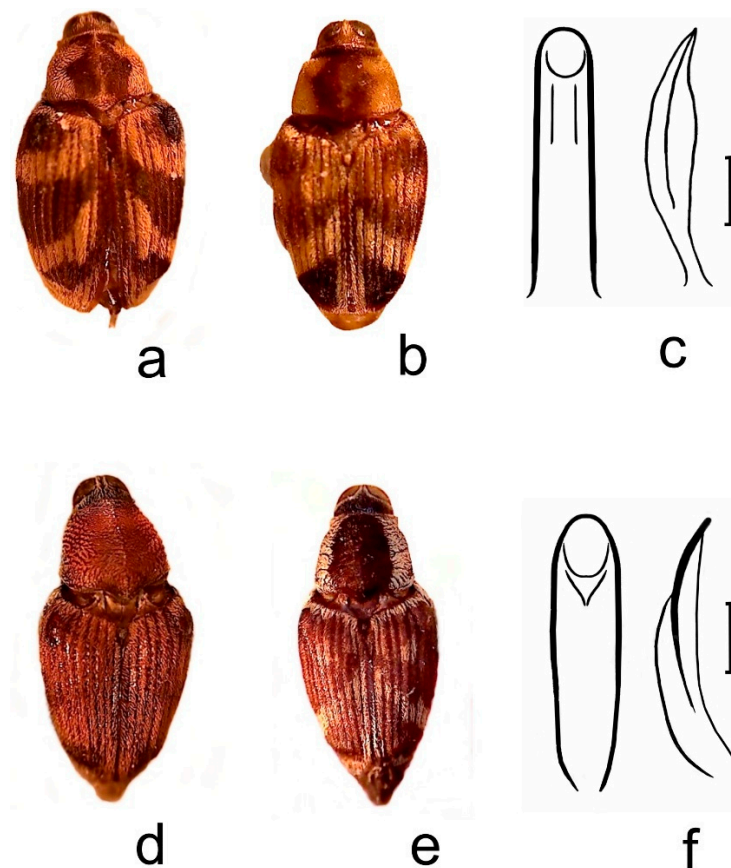


Figure 10. (a) *Philenis ferruginea*, dorsal habitus; (b) *P. guyanensis*, dorsal habitus; (c) *P. guyanensis*, male genitalia, dorsal and lateral views; (d) *P. howdeni*, dorsal habitus; (e) *P. kuscheli*, dorsal habitus; (f) *P. kuscheli*, male genitalia, dorsal and lateral views; scale bars = 0.2 mm.

Specimens examined: Holotype: French Guiana: Nouragues Saut-Pararé, 4°02'16.1" N, 52°40'21.1" W, 09.2009, S. Brulé, Window trap (BMNH(E) 2010-62). Paratypes: Same data as holotype (3, BMNH(E) 2010-62).

Derivation of name: This species is named for Guyane, also known as French Guiana, the overseas department of France in which all specimens have been collected.

Discussion: *Philenis guyanensis* has a pattern of scales that is similar to that of many Central American species, but is unusually robust, and generally pale reddish-brown, except for black triangular areas at the apices of the elytra and black metatibiae. Specimens vary in length from 4.30–4.70 mm, ($x = 4.51$, $N = 4$).

Philenis ferruginea Hespeneheide new species

Figure 10a

<http://zoobank.org/urn:lsid:zoobank.org:act:E07F6D73-28F6-4AEC-A807-393E136BB4E2>

Description: Holotype: body size 4.95 mm long, 3.05 mm wide. Very robust, elliptical, narrower anteriorly, complex pattern of ground color: black on scutellum and elytral humeri above, vertical spot on side of pronotum above procoxae, mesepimera, and epimeron, posterior 4/4 of metepimera, postero-lateral margin of abdominal ventrite 1, meso- and metacoxae, apex of metafemora and basal 1/2 of metatibiae; otherwise reddish brown throughout, hourglass shaped area on disc of pronotum, elytra, and posterior margin of abdominal ventrites 2 and 5 darker; sparsely to somewhat densely covered with brownish yellow scales: scales dark brown on darker area of pronotum or other darker

areas, black on elytra in oblique broadening fascia from basal 1/3 to posterior 2/3 and in irregular oblique fascia anterior to elytral apices; rostrum below antennal insertions glabrous, polished.

Head 0.95 mm wide, 0.30 mm long, rounded-truncate in dorsal view, eyes narrowly separated by 1 row of scales; rostrum not carinate, shallowly transversely depressed at base above antennal insertions, widening slightly from middle toward apex, from side strongly curved, 1.45 mm long, antennae inserted at basal 1/4.

Pronotum 1.35 mm long, 1.75 mm wide at base, lateral margins weakly rounded to distinct anterior collar, in lateral view strongly gibbous at basal 1/3 and rounded-declivous anteriorly, posterior margin projecting and rounded-triangular anterior to scutellum. Scutellum small, rounded-rectangular.

Elytra 5/7 wider than pronotum, humeri prominent, widest at basal 1/4, intervals broader than striae, interval 3 broader than others, striae narrow and punctate.

Mesosternum slightly concave posterior margin straight without projecting lateral angles, anterior margin of metasternum weakly declivous. In lateral view abdominal ventrite 1 weakly convex, 1.40 mm long, posterior margin broadly, shallowly rounded, ventrite 2 0.50 mm long along midline, strongly declivous at posterior margin, ventrites 3–4 narrow, subequal to ventrite 5, ascending. From front, forecoxae broadly rounded-triangular with short narrow, incurved tooth on inner margin. All femora with short distinct tooth.

Specimen examined: Holotype: Ecuador: Sucumbios, Sacha Lodge, 270 m, 0.5° S, 76.5° W, 3–13.04.1994, Hibbs, ex malaise (CMNC).

Derivation of name: This species is named for its generally dark reddish-brown ground coloration.

Discussion: *Philenis ferruginea* is one of the more distinct species treated here in being very robust with a reddish-brown ground coloration variegated with black, in the structure of the rostrum, and comparatively simple mesosternum. The type is probably a female.

Philenis howdeni Hespénheide new species

Figure 10d

<http://zoobank.org/urn:lsid:zoobank.org:act:214D0D67-3558-4C0D-AA40-13B5C77A76ED>

Description: Holotype: body size 5.60 mm long, 2.95 mm wide. Moderately robust and somewhat flattened dorsoventrally, elliptical, somewhat narrower anteriorly, elytra, dorsal portion of pronotum, protibiae, and rostrum below antennal insertions reddish brown, elytral humeri darker and with very dark spots on elytra on elytral intervals 4–9 anterior to elytral apices; head, scutellum, ventral surface and legs black; dorsally more or less uniformly densely covered with reddish scales; scales pale brownish yellow on head; ventrally and on femora more or less uniformly covered with greyish-white scales, denser on ventral portions of femora, metasternum and abdominal ventrite 5; rostrum below antennal insertions, elytral humeri and apical spots glabrous.

Head 1.15 mm wide, 0.45 mm long, rounded-truncate in dorsal view, eyes narrowly separated by 2 rows of small semi-erect scales; midline of head from lower 1/4 of eyes to antennal insertions rostrum carinate, polished below antennal insertions, widening slightly at apex, from side slightly curved, 1.55 mm long, antennae inserted at basal 1/3.

Pronotum 1.90 mm long, 2.10 mm wide at base, lateral margins weakly rounded' from base to indistinct anterior collar, in lateral view lightly gibbous at base and declivous anteriorly, indistinctly carinate long midline, posterior margin broadly, obtusely triangular and slightly upturned anterior to scutellum. Scutellum small, round.

Elytra 1/2 wider than pronotum, widest at humeri, humeri moderately prominent, intervals equal to or slightly broader than striae, striae coarsely punctate.

Mesosternum concave, deeply emarginate at posterior margin to receive apex of rostrum with slightly elevated, narrowly rounded lateral margins, anterior margin of metasternum strongly declivous. In lateral view abdominal ventrite 1 weakly convex, 1.50 mm long along midline, ventrite 20.55 mm long along midline, strongly declivous at posterior margin, ventrites 3–5 narrow, subequal

in length, ventrite 5 slightly longer. From front, procoxae broadly oval with large tooth on inner margin. Metafemora with distinct tooth at distal 2/3, mesofemora with weaker tooth beyond middle, profemora with tiny distinct tooth at distal 2/3.

Specimen examined: Holotype: Ecuador: Pinchincha Prov., 15 km E Sto. Domingo Tinalandia, 700 m, 26.02.1981, H. F. Howden (CMNC).

Derivation of name: This species is named in honor of its collector, the late coleopterist Henry Howden.

Discussion: *Philenis howdeni* is unusual among the species treated here in the genus in being unpatterned and uniformly brownish-red dorsally and black ventrally.

***Philenis kuscheli* Hespeneide new species**

Figure 10e,r

<http://zoobank.org/urn:lsid:zoobank.org:act:3ECE76CB-A889-4883-A846-625F045104A4>

Description: Holotype female: body size 4.60 mm long, 2.40 mm wide. Moderately robust, elliptical, narrower anteriorly; head, ventral surface and femora black, rostrum, pronotum, elytra, and tibiae dark reddish brown; sparsely to somewhat densely and uniformly covered with complex pattern of scales: scales dark reddish-brown on disc of pronotum on lighter most of elytra; dorsally scales white along lateral margins of pronotum, in narrow bands at bases and apices of elytra, on elytral intervals 1–2 along apical 2/3 of elytral suture and in oblique fascia from apical 2/3 of elytra; scales white on frons and rostrum above antennal insertions and ventrally, denser on procoxae and on pronotum just above procoxae, on and mesepimeron and metepisternum; sides of pronotum and rostrum beyond antennal insertions glabrous. (Figure 10e)

Head 1.05 mm wide, 0.45 mm long, convex in dorsal view, eyes separated by 2 rows of small scales; rostrum weakly curved, polished below antennal insertions, somewhat flattened dorsoventrally, widening slightly at apex, 1.30 mm long, antennae inserted at basal 1/5.

Pronotum 1.50 mm long, 1.65 mm wide at base, lateral margins slightly convex from base to distinct anterior collar, in lateral view gibbous at basal 1/3 and declivous anteriorly. weakly carinate along medial 1/3 of midline, posterior margin extended posteriorly and rounded anterior to scutellum. Scutellum very small.

Elytra 0.5 wider than pronotum, humeri slightly prominent, intervals 1.5–2× broader than striae, rounded, striae coarsely punctate.

Mesosternum declivous, concave and deeply emarginate to receive apex of rostrum, lateral angles acute and weakly carinate, anterior margin of metasternum declivous. In lateral view abdominal ventrite 1 weakly convex, 1.50 mm long along midline, ventrite 2 0.45 mm long along midline, declivous at posterior margin, ventrites 3–5 narrow, subequal in length, ascending. From front, procoxae oval with large tooth on inner margin. Meso- and metafemora with distinct tooth at distal 2/3.

Allotype male. As holotype, except body size 3.80 mm long, 1.90 mm wide. Anterior and posterior elytral fasciae indistinct, possibly abraded. Genitalia as in Figure 10f.

Specimens examined: Holotype: Ecuador: Rio Palenque, 47 km S St. Domingo, 700', 22–27.02.1976, H. & A. Howden (CMNC). Allotype: Ecuador: Rio Palenque R.S., 200 m, 4.02.1983, Masner & Sharkey (CMNC). Paratype: Colombia: Narino, Barbacoas, 2–6.05.1976, M. Cooper (BMNH).

Derivation of name: This species is named in honor of Guillermo (“Willi”) Kuschel and his extensive study of the Curculionidae, including the Conoderinae, and his residence in South America.

Discussion: The sharp, nearly linear contrast between the dark disc of the pronotum and the white scales of the sides is distinctive. The pattern of scales on the elytra is similar to that of several Central American species, but the uniformly black ventral coloration is not. This is the smallest South American species treated here; specimens vary in length from 3.80–4.60 mm, ($x = 4.11$, $N = 3$).

3.1.2. Key to Species of *Philenis*

1	Pronotum broad with transverse fascia of yellow setae, species more robust in shape; associated with plants in Araceae	2
1A	Pronotum with longitudinal stripes of setae, often noticeably narrower than elytra; species more elongate and slender, plant associations unknown	3
2	Apices of elytra black posterior to posterior transverse fascia; Costa Rica and Panamá	<i>P. flavipes</i>
2A	Elytra uniformly reddish brown with apical triangular areas of yellowish scales; Costa Rica and Panamá	<i>P. anzaldoi</i>
3	Pronotum in dorsal view and elytra uniformly reddish brown without complex pattern of scales; black ventrally; Ecuador	<i>P. howdeni</i>
3A	Pronotum and elytra with more or less complex variation in ground coloration and pattern of scales dorsally and ventrally	4
4	Pronotum dorsally with lateral stripes of pale scales on posterior 1/2 and covered with red scales on anterior 1/2, elytra simply marked with pale scales along suture and anterior and posterior margins Panamá	<i>P. muscamimetica</i>
4A	Pronotum dorsally with lateral stripes of pale scales for entire length, some species with medial stripe, elytra marked with transverse and/or oblique bands of scales	5
5	Species essentially all black dorsally and ventrally except pale brown tibiae, scales white dorsally, strong medial stripe on pronotum; Costa Rica	<i>P. auritibiae</i>
5A	Species largely brown dorsally, at least on most of elytra	6
6	Species completely or largely lighter or darker brown dorsally	7
6A	Pronotum all or mostly black, elytra completely brown or marked with black	10
7	Species completely lighter or darker brown dorsally, including elytra; Central America	8
7A	Species with black areas on elytra; South America	9
8	Species lighter brown dorsally and mostly brown ventrally except area black around mesocoxae and abdominal ventrites 3–4, pronotum matte, covered with small scales; Costa Rica and Panamá	<i>P. brunnea</i>
8A	Species darker brown dorsally and black ventrally, pronotum medially mostly glabrous medially, shining, Chiriqui highlands, Panama	<i>P. chiriquiensis</i>
9	Elytral humeri black, patches of black ventrally on mesocoxal area, metepimera and abdominal ventrite 1; Ecuador	<i>P. ferruginea</i>
9A	Elytra with apical triangular areas black, ventrally brown; Guyane	<i>P. guyanensis</i>
10	Elytra uniformly dark brown	11
10A	Elytra red brown, usually black posterior to posterior oblique fascia	12
11	Ornamented dorsally and ventrally with bright yellow scales, pronotum with medial stripe of scales, 4.9–6.5 mm long, Costa Rica	<i>P. laselvaensis</i>
11A	Ornamented dorsally and ventrally with pale tan or white scales, pronotum without medial stripe of scales 3.80–4.60 mm long, Colombia, Ecuador	<i>P. kuscheli</i>
12	Pronotum moderately gibbous, not conspicuously narrower than elytra at base, metafemoral tooth strong, in lateral view line from eyes to rostrum nearly straight, size 5.00–5.70 mm long; Costa Rica	<i>P. costaricensis</i>
12A	Pronotum declivous in lateral view, usually conspicuously narrower than elytra at base, metafemoral tooth minute or absent, in lateral view line from eyes to rostrum angulate, size 3.75–4.80 mm long, Costa Rica and Panamá	<i>P. fuscifemorata</i>

3.2. Ecology

Hosts: Although nothing is known about the plant hosts of most of the species reported here, *Philenis anzaldoi* has been cut from a gall on a liana in the Araceae in Panamá, probably in the genus *Philodendron* Schott, and an adult *P. flavipes* has been associated with a species of Araceae in Costa Rica. Aroids have a relatively high plant diversity in Neotropical regions. with 778 species in 26 genera known from Central America [9]. At least one other genus of conoderine weevils, *Hoplocopturus* Heller, is associated with species of *Xanthosoma* Schott in the Araceae (Hespenheide, unpublished), one of which makes galls on an undetermined terrestrial species (Kenji Nishida, unpublished). Several undescribed species are associated with aerial roots of species in the genus *Monstera* Adanson [10].

Sampling: The Arthropods of La Selva (ALAS) project used a variety of standardized sampling techniques—Malaise, light and pitfall trapping, and canopy fogging—to sample the fauna at La Selva over 11 years [3] and then for several weeks of sampling during one of four years at sites along an altitudinal transect on the slopes of Volcan Barva to the south and west of La Selva. Samples were taken year-round at La Selva and only for several weeks during the dry season at 250–350 m, 450–550 m, 1050–1150 m, and 1450–1550 m along the altitudinal transect. A total of 123 specimens of *Philenis*

were collected by standardized sampling, plus 8 additional specimens collected non-systematically by hand. Of the specimens collected by passive trapping, most (118) were collected by Malaise traps, 4 by light traps, one by one of the few flight intercept trap samples, and none by canopy fogging or pitfall trapping. From the ALAS sampling program alone, clearly Malaise trapping is by far the best way to collect specimens of *Philenis*. This pattern is similar to that of the genus *Microzygops* Champion [2]—species that are rarely collected by hand can be rather common in Malaise traps. Conoderine weevils are usually day-active, so the specimens taken in light traps are few but significant, three of *P. fuscifemorata* and one of *P. laselvaensis*.

Of the 56 specimens collected by others than the ALAS project, 46 are from Central America and 10 from South America. Of the South American specimens, 3 were taken in Malaise traps, 4 in window traps and 3 by hand. Of the Central American specimens, 9 are labeled from flight intercept traps, and 7 from Malaise traps. Of the remaining 30 specimens, most were collected by parataxonomists collecting for the former Instituto Nacional de Biodiversidad. I suspect many of these were collected by Malaise traps but not labelled as such.

The 43 specimens collected by year-round standardized sampling at La Selva give interesting ecological information about habitat and seasonal phenology. Only one specimen was collected in an early successional area; the rest were collected in secondary forest (11), primary forest (16), at tree falls (7), or in other situations (9). Phenological data is best for *P. laselvaensis* which accounted for 32 of the 47 specimens, including the hand collected ones. Most (24 of 32, or 75%) were collected during the dry season, January–April and 5 in September. Specimens of other species were not so concentrated, but no *Philenis* were collected May or July; and only one in each of June, November, and December. All transect samples were made in February to April during the dry season and cannot give information on year-round phenology.

In terms of the altitudinal distribution of *Philenis* species along the Barva transect, 47 were collected at La Selva (50–150 m in elevation), which was also the most intensively sampled site over 10 years. The other sites were each visited in only a single one of four years for similar amounts of time. At these, 39 *Philenis* were collected at the 250–350 m site, 40 at the 450–550 m site, 5 at the 1050–1150 m site, and 3 at the 1450–1550 m site, all of one species, *P. auritibiae*. *Philenis* thus appears to be a genus most characteristic of lower middle elevations.

Mimicry: Probably because they are often medium to large day-active species, mimicry is common among conoderine weevils [5,10]. Perhaps the most frequent putative models are flies [5,7,11], and *Philenis muscamimetica* is an example of that type of mimicry. On the other hand, mimicry of social Hymenoptera other than ants [12] is very infrequent among conoderines, and the putative examples of *Philenis flavipes* and *P. anzaldoi* with their coloration of variegated yellow, brown and black are the only ones known to me. The bold coloration of *Philenis fuscifemorata* and *P. costaricensis* (Figures 3 and 5) may indicate that they are also involved in mimicry, but the models are less obvious.

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Conflicts of Interest: The author declares no conflict of interest.

References

1. Champion, G.C. Curculionidae, Curculioninae, Zygopina. In *Biologia Centrali-Americana, Insecta, Coleoptera, Volume IV, 5*; Godman, F.D., Salvin, O., Eds.; R. H. Porter: London, UK, 1906; pp. 1–130.
2. Hespenheide, H.A. A review of *Microzygops* Champion, 1906, with description of a new species (Coleoptera: Curculionidae: Conoderinae). *Coleopt. Bull.* **2018**, *72*, 113–117. [[CrossRef](#)]

3. Longino, J.T.; Colwell, R.K. Biodiversity assessment using structured inventory: Capturing the ant fauna of a tropical rainforest. *Ecol. Appl.* **1997**, *7*, 1263–1277. [[CrossRef](#)]
4. Anzaldo, S.S. Review of the genera of Conoderinae (Coleoptera, Curculionidae) from North America, Central America, and the Caribbean. *ZooKeys* **2017**, *683*, 58–138. [[CrossRef](#)] [[PubMed](#)]
5. Hespenheide, H.A. Mimicry in the Zygopinae (Coleoptera: Curculionidae). *Mem. Entomol. Soc. Wash.* **1995**, *14*, 145–154.
6. Philaenis. Available online: <https://en.wikipedia.org/wiki/Philaenis> (accessed on 29 June 2018).
7. Hespenheide, H.A. A novel mimicry complex: Beetles and flies. *J. Entomol. Ser. A-Gener.* **1973**, *48*, 49–56. [[CrossRef](#)]
8. Lyal, C.H.C.; Douglas, D.A.; Hine, S.J. Morphology and systematic significance of sclerolepidia in the weevils (Coleoptera: Curculionoidea). *Syst. Biodivers.* **2006**, *4*, 203–241. [[CrossRef](#)]
9. Ortiz, O.O.; Croat, T.B.; Baldini, R.M. Current status of aroid species diversity in Panama, including new records for the country. *Webbia* **2018**, 1–13. [[CrossRef](#)]
10. Hespenheide, H.A. The role of plants in structuring communities of mimetic insects. In *Neotropical Biodiversity and Conservation*; Gibson, A., Ed.; Mildred Mathias Botanical Garden: Los Angeles, CA, USA, 1996; pp. 109–126.
11. Hespenheide, H.A. Weevils of the genera *Archocopturus* Heller and *Zygopsella* Champion, sibling species, and mimetic homoplasy (Coleoptera: Curculionidae: Conoderinae). *Proc. Entomol. Soc. Wash.* **2005**, *107*, 671–685.
12. Hespenheide, H.A. Mimicry of ants of the genus *Zacryptocerus* (Hymenoptera: Formicidae). *J. N. Y. Entomol. Soc.* **1986**, *94*, 394–408.



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