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Two new species of false click beetles  
(Coleoptera: Eucnemidae) from the Americas

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## Two new species of false click beetles (Coleoptera: Eucnemidae) from the Americas

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**Abstract.** Identifications of recently collected Eucnemidae (Coleoptera: Elateroidea) borrowed from two collections have resulted in the discovery of two **new species**: *Entomophthalmus abbreviatus* Otto (Cuba) and *Trigonopleurus cordobaalfaroi* Otto (Guatemala and Louisiana, USA). Images of the two newly described species along with two New World *Entomophthalmus* Bonvouloir species for comparative purposes are included.

**Key words.** Elateroidea, taxonomy, systematics, Cuba, Louisiana, Guatemala, *Entomophthalmus*, *Trigonopleurus*.

**Resumen.** Las identificaciones de Eucnemidae (Coleoptera: Elateroidea) recolectados recientemente tomados de dos colecciones han resultado en el descubrimiento de dos **nuevas especies**: *Entomophthalmus abbreviatus* Otto (Cuba) y *Trigonopleurus cordobaalfaroi* Otto (Guatemala y Louisiana, USA.). Se incluyen imágenes de las dos especies recientemente descritas junto con dos especies de *Entomophthalmus* Bonvouloir del Nuevo Mundo con fines comparativos.

**Palabras clave.** Elateroidea, taxonomía, sistemática, Cuba, Louisiana, Guatemala, *Entomophthalmus*, *Trigonopleurus*.

**ZooBank registration.** urn:lsid:zoobank.org:pub:E83B2AC6-33ED-4680-8F2E-4E455A26D4C8

### Introduction

While identifying false click beetles (Coleoptera: Eucnemidae) from two institutional collections, two new species were discovered, one from Louisiana, USA, and the other from Cuba. One additional specimen of the latter species was discovered in Guatemala. These discoveries continue to add to the faunal accounts for both the Nearctic and Neotropical regions. As more material is examined in the future, whether it be from the Nearctic, Caribbean or other regions around the world, many more new discoveries are expected. These new discoveries continue to add to our overall understanding of the family and the roles this unique family of beetles play in the natural world.

### Materials and Methods

Specimens were examined under a goose neck table lamp, through a Wild M3Z 6.4–40× zoom stereo binocular microscope with 20x oculars. Habitus and other structural images were taken with a JVC KY-F75U digital camera attached to a Leica® Z16 APO dissecting microscope with apochromatic zoom objective and motor focus drive, using a Synchroscope Auto-Montage® Pro System with software version 5.01.0005, resulting image stacks were processed using CombineZP®. All images were captured as TIFF files during the imaging process. Each image was modified through a paint program and Photoshop Elements 10® software on a Toshiba Satellite® C55 series laptop computer and all were collated into plates through the computer's paint program. The size of each plate was modified to 300 dpi.

Measurements were taken using a ruler. Habitus length was measured from the apex of the head to the apex of the elytra. Habitus width was measured across the humeri, just below the base of the pronotum. Pronotal lengths were measured across the midsection from the apex to the base above the scutellum. Pronotal widths were measured across the base of the pronotum above the elytral humeri.

The aedeagus was dissected following immersion of the sectioned abdomen in KOH for three hours at a concentration of one tablet in 40 ml of water. The aedeagus was suspended in Germ-X® hand-sanitizer for imaging. The sectioned abdomen was secured on cardstock and pinned beneath the corresponding specimen. The dissected aedeagus was stored in a microvial filled with glycerin and pinned beneath the sectioned abdomen and corresponding specimen.

The study was based on the examination of seven dry mounted and pinned specimens borrowed from a small number of collections and specimens deposited as noted below:

- CMNH** Carnegie Museum of Natural History, Pittsburgh, PA, USA  
**CUAC** Clemson University Arthropod Collection, Clemson, SC, USA  
**FSCA** Florida State Collection of Arthropods, Gainesville, FL, USA  
**GERP** Global Eucnemid Research Project, UW Dept. of Entomology, Madison, WI, USA  
**INHS** Illinois Natural History Survey, Champaign, IL, USA

Label data are presented verbatim, with text for each individual label placed inside quotation marks and separated from an underlying label by a slash (/). Each line on an individual label is separated by a semicolon (;). Metadata for some labels are placed inside parenthesis and/or brackets. Each specimen deposited in the collection of the Global Eucnemid Research Project (GERP) bears a green-framed white label, "Collection of the Global, Eucnemid Research Project, (Robert L. Otto)".

## Systematics

Subfamily Melasinae Fleming, 1821

Tribe Dirhagini Reitter, 1911

### Genus *Entomophthalmus* Bonvouloir, 1871

Fig. 1–12

**Diagnosis.** Apical margin of frontoclypeal region evenly rounded and more than twice as wide as distance between antennal sockets; compound eyes incised near antennal insertions; combined lengths of antennomeres II and III shorter than that of IV; notosternal antennal grooves present; male prothoracic tarsomere I simple, without sex combs; metathoracic coxal plate medially 3.0–6.0 times wider than laterally; last visible ventrite either rounded, acute or slightly emarginated; simple tarsal claws; lateral surfaces of mesothoracic and metathoracic tibiae with setae only; aedeagus dorsoventrally compressed, without secondary lateral lobes; median lobe simple, deeply and widely bifurcate apically; lateral lobes simple, longitudinally bilobed; flagellum complex; tubular (Otto 2016).

*Entomophthalmus* is superficially similar to *Brevisegmentus* Otto of Southeast Asia and Japan. The combined lengths of the pedicel and flagellomere I being shorter than flagellomere II along with the absence of dorsolateral ridge at the elytral humeri behind the pronotal hind angle will distinguish *Entomophthalmus* from *Brevisegmentus*. The combined lengths of both pedicel and flagellomere I being as long as flagellomere II along with the presence of dorsolateral ridge at the elytral humeri behind the pronotal hind angle are present in *Brevisegmentus*.

**Diversity.** *Entomophthalmus* is a moderately sized genus consisting of 24 species, with the majority distributed in the subtropical and tropical regions of the world. Nine species are distributed from Mexico south through South America, including the Caribbean region. Two other species are distributed along the eastern coastline of the Australian continent. Seven species are present in Southeast Asia as far east as the Philippines. Two species, including an unknown Japanese species mentioned by Hisamatsu (1955) are present in the Palearctic region. Four species are found on the African continent. The group is represented by a single species in the Nearctic region.

### *Entomophthalmus abbreviatus* Otto, new species

Fig. 7–10

**Diagnosis.** Generic characteristics will distinguish this eucnemid species from all known Caribbean species, except for *Entomophthalmus americanus* Bonvouloir taken in Guadeloupe. The new species differs from *E. americanus* (Fig. 1–3) by its shorter setae on each flagellomere along with serriform structures of the segments.





**Figures 1–6.** *Entomophthalmus* species. 1) *Entomophthalmus americanus*, dorsal view. 2) *Entomophthalmus americanus*, ventral view. 3) *Entomophthalmus americanus*, pronotum, lateral view. 4) *Entomophthalmus rufiolus*, dorsal view. 5) *Entomophthalmus rufiolus*, ventral view. 6) *Entomophthalmus rufiolus*, pronotum, lateral view. (Scale: 3, 6 = 0.5 mm; 1–2, 4–5 = 1.0 mm.)





**Figures 7–10.** *Entomophthalmus abbreviatus* Otto, sp. nov. 7) Male holotype, dorsal view. 8) Male holotype, ventral view. 9) Male holotype, antenna. 10) Male holotype, pronotum, lateral view. (Scale: 7–10 = 0.5 mm.)

*Entomophthalmus americanus* has filiform antennal structures with elongate, dense setae on each flagellomere. The new species is similar to the Nearctic *Entomophthalmus rufiolus* LeConte (Fig. 4–6). The new species differs by its lighter coloration of the habitus along with a sinuous, posteriorly directed anterolateral pronotal ridge. Darker reddish colored habitus along with a slightly inclined, ventrally directed anterolateral pronotal ridge is present in *E. rufiolus*.

**Type material. Male holotype:** “CUBA: Las Villas; Topes de Collantes; Sierra de Trinidad; 11 JUN 1959; M.W. Sanderson” / “**HOLOTYPE**;; *Entomophthalmus abbreviatus* ♂; Otto; Det. R.L. Otto; 2022” (red printed label) (INHS). Holotype is deposited in INHS. The catalog number associated with the specimen is: “INHS Insect Collection 1021687”.

**Description. Male holotype:** Length, 4.0 mm. Width, 1.0 mm. Body subcylindrical, elongate; uniformly reddish; antennae dark reddish; legs including tarsi dark reddish; head, pronotum and elytra clothed with short, recumbent yellowish setae (Fig. 7). **Head:** Subspherical; integument closely punctate, shiny; frons convex, without fovea above frontoclypeal region; apical margin of frontoclypeal region rounded, more than 2 times wider than base; mandibles stout, bidentate, densely punctate. **Antenna** (Fig. 8): Weakly serriform from flagellomeres II–VIII, attaining about 1/2 the length of the body; flagellomere I much shorter than II, as long as the pedicel; flagellomeres II–VIII each sub-equal, longer than wide; flagellomere IX longer than wide, slightly longer than VIII. **Pronotum:** Integument shiny, with shallow, closely spaced punctures; quadrate, with moderate, sharp hind angles; lateral sides parallel-sided; anterolateral pronotal ridge (Fig. 9) short, sinuous and posteriorly directed; posterolateral pronotal ridge elongate, nearly reaching the anterior margin, directed dorsally; disc convex with delicate median groove extending to center of pronotum; base sinuous. **Scutellum:** Elongate, sub-triangular, setose and distally rounded. **Elytra:** Indications of very shallow striae present, deeper at elytral humeri; interstices flattened; integument shiny, shallowly punctate. **Legs:** First tarsomere as long as the combined lengths of the remaining four on mesothoracic and metathoracic tarsi; tibiae rounded in cross section; metathoracic tarsomeres I–III simple; metathoracic tarsomere IV excavate-emarginate; metathoracic tarsomere V short; pretarsal claws simple. **Venter** (Fig. 10): Very closely punctate, with short, recumbent yellowish setae; hypomeron with notosternal antennal grooves; antennal grooves well-developed on both sides; hypomeron deeply, coarsely punctate; metepisterna apically wider; elytral epipleura smooth; metathoracic coxal plates medially more than 3.0–6.0 times wider than laterally; last abdominal ventrite apically rounded.

**Distribution.** This newly described species is known from its type locality in Cuba.

**Biology.** Much of the biological information is unknown for the species, including its developmental stages.

**Etymology.** The specific epithet is derived from the Latin word *abbreviatus*, meaning shortened, in reference to the short anterolateral pronotal ridge present in the new species.

Subfamily Macraulacinae Fleutiaux, 1922

Tribe Nematodini Leiler, 1976

### Genus *Trigonopleurus* Bonvouloir, 1871

**Diagnosis.** Apical margin of frontoclypeal region feebly trilobed and more than twice as wide as the base; antennal grooves absent; male protarsomere I simple with basally curved sex combs; tarsal claws simple; tarsomere IV excavate-emarginate; metathoracic coxal plates medially 3.0–6.0 times wider than laterally; last visible ventrite strongly produced; lateral surfaces of mesothoracic and metathoracic tibiae with setae and transverse rows of spine combs; metathoracic episterna apically widened slightly; aedeagus dorsoventrally compressed, without secondary lateral lobes; median lobe simple, with moderately and narrowly bifurcate apices; lateral lobes simple, entire; flagellum simple (Muona 1993).

**Diversity.** *Trigonopleurus* is a small genus now consisting of three species. *Trigonopleurus alienus* Horn has been taken in both Nicaragua and Panama and may also be present in Costa Rica. *Trigonopleurus rugulosus* Bonvouloir is present on the Australian continent. The new species is present at a single locale in east central Louisiana, USA and also in Guatemala.



***Trigonopleurus cordobaalfaroi* Otto, new species**

Fig. 11–17

**Diagnosis.** Antennal flagellomeres II and III being longer than wide will readily distinguish *T. cordobaalfaroi* **new species** from the only other Central American species, *T. alienus*. The combined lengths of those flagellomeres are about as long as flagellomere I. *Trigonopleurus alienus*, however, has quadrate flagellomeres II and III, resulting in their combined lengths being shorter than flagellomere I.

**Type material. Male holotype:** “USA: LA: W. Feliciana Par.; Feliciana Preserve; N30.795, W-91.254; 4 June 2014; UV/MV blacklight - MFerro” / “**HOLOTYPE**;; *Trigonopleurus; cordobaalfaroi* ♂; Otto; det. R.L. Otto; 2022” (red printed label). **Female allotype:** “USA: LA: W. Feliciana Par.; Feliciana Preserve; N30.795, W-91.254; 4 June 2014; UV/MV blacklight - MFerro” / “**ALLOTYPE**;; *Trigonopleurus; cordobaalfaroi* ♀; Otto; Det. R.L. Otto; 2022” (yellow printed label). Holotype and allotype are transferred from CUAC and deposited in CMNH.

**Paratypes.** 2 ♂♂, 2 ♀♀: **GUATEMALA: PETÉN DEPARTMENT:** 1 ♂, “GUATEMALA: Petén; Ixpanpajul, Santa Ana, 180; m, 3-6-2015, J.B.; Heppner & E. Fuller” / “**PARATYPE**;; *Trigonopleurus; cordobaalfaroi* ♂; Otto; Det. R.L. Otto; 2023” (yellow printed label) (FSCA); **UNITED STATES of AMERICA: LOUISIANA: Feliciana Parish:** 1 ♂, 2 ♀♀, “USA: LA: W. Feliciana Par.; Feliciana Preserve; N30.795, W-91.254; 4 June 2014; UV/MV blacklight – MFerro” / “**PARATYPE**;; *Trigonopleurus; cordobaalfaroi* ♂ (or ♀); Otto; Det. R.L. Otto; 2022” (yellow printed label) (2, CUAC; 1, GERP). Paratypes are deposited in CUAC, FSCA and GERP.

**Description. Male holotype:** Length, 6.5 mm. Width, 1.5 mm. Body subcylindrical, elongate; uniformly pitch black; antennae dark reddish-brown; legs including tarsi dark reddish-brown; head, pronotum and elytra clothed with short, recumbent yellowish setae (Fig. 13). **Head:** Subspherical; integument rugose, dullish; frons convex, without fovea above frontoclypeal region; apical margin of frontoclypeal region weakly trilobed, about 2 times wider than base; mandibles stout, bidentate, densely punctate. **Antenna:** Filiform to weakly serriform from flagellomeres I–IX, attaining nearly 1/3 the length of the body; flagellomere I longer than II; flagellomeres II–III each sub-equal, longer than wide, each slightly shorter than IV; flagellomeres IV–VIII each sub-equal, longer than wide; flagellomere IX longer than wide, almost twice as long as VIII. **Pronotum:** Integument dullish, rugose; longer than wide, with moderate, sharp hind angles; parallel-sided, cranially arcuate; lateral pronotal ridge incomplete, cranial 1/2 obliterated; disc convex with deep median groove extending entire length of pronotum and 2 pairs of deep, small, circular fovea; base sinuous. **Scutellum:** Elongate, sub-triangular, setose, rugose and distally rounded. **Elytra:** Shallowly to indistinctly striate; interstices elevated; integument somewhat shiny, transversely rugose at basal 3/4, apical 1/4 shallowly punctate. **Legs:** First tarsomere as long as the combined lengths of the remaining four on mesothoracic and metathoracic tarsi; tibiae rounded in cross section; metathoracic tarsomeres I–III simple; metathoracic tarsomere IV excavate-emarginate; metathoracic tarsomere V somewhat short; pretarsal claws simple. **Venter** (Fig. 14): Very closely punctate, with short, recumbent yellowish setae; hypomeron with basally obliterated lateral antennal grooves; hypomeron deeply, closely punctate except lateral antennal groove; femoral ridge absent; metepisterna (Fig. 15) slightly wider cranially; elytral epipleura rugose; metathoracic coxal plates medially more than 3.0–6.0 times wider than laterally; last abdominal ventrite apically produced.

**Female (allotype)** (Fig. 16). Length, 9.0 mm. Width, 2.0 mm. Antennae filiform to weakly serriform, reaching at least 1/3 the length of the body; habitus similar to holotype; legs and antennae dark reddish-brown; flagellomere IX is slightly longer than flagellomere VIII; pronotum similar to holotype; integument similar to holotype.

**Aedeagus (paratype)** (Fig. 17). Basal piece slightly longer than wide, laterally parallel-sided, dorsally open, apically rounded; remaining parts elongate, constricted laterally just below the base of the parameres, laterally sinuous; parameres elongate, apically pointed, with triangular-shaped lateral tooth present near apices; median lobe elongate and narrow, apically pointed, deeply and narrowly bifid, slightly longer than parameres.

**Variation.** Two male and 2 female paratypes were examined. The male paratypes measured 4.7–7.0 mm long and 1.0–1.5 mm wide. The female paratypes measured 8.0 mm long and 2.0 mm wide. Three of the four paratypes are longer than the holotype, but shorter than the female allotype. One of the male paratype is as wide as the holotype, but narrower than the allotype. The two female paratypes are wider than the holotype and just as wide as the female allotype. The male paratype from Guatemala is much shorter and narrower than both the holotype





**Figures 11–17.** *Trigonopleurus cordobaalfaroi* Otto, **sp. nov.** 11) Base of hypomeron. 12) Pronotum, lateral view. 13) Male holotype, dorsal view. 14) Male holotype, ventral view. 15) Male holotype, metaepisterna. 16) Female allotype, dorsal view. 17) Aedeagus (paratype), dorsal view. (Scale: 11–12, 15, 17 = 0.5 mm; 13–14, 16 = 1.0 mm.)

and allotype. The Guatemalan specimen have a much longer lateral pronotal ridge compared to the rest of the specimens in the series, but it remains cranially obliterated. There are no exoskeletal differences between these paratypes compared with the holotype or the allotype.

**Distribution.** This presumably rarely encountered eucnemid species is known from a single locale in east-central Louisiana and a single location in Guatemala.

**Biology.** All USA specimens in the series were taken from a combination UV and Mercury vapor light. Immature stages remain unknown.

**Etymology.** The specific epithet is dedicated in honor of my good friend, confidant and colleague, Jim Córdoba-Alfaro of Puerto Jiménez, Costa Rica; an entomologist, activist and conservationist who has devoted himself to protecting the remaining tracts of the Mesoamerican rainforest and its biodiversity in his country.

**Discussion.** Placement of *T. cordobaalfaroi* in the group was based on the comparisons between that species and *T. alienus* collected from Panama. Specimens of *T. rugulosus* were not available at the time of study to compare with the two New World species. The relationships for selected members of the tribe, including these three *Trigonopleurus* species are being evaluated for a potential revision of the tribe at the higher taxonomic level. As more data become available, especially for *T. rugulosus*, the new species will remain in *Trigonopleurus* until evaluations are completed.

Otto (2017b) distinguished *Trigonopleurus* from *Miruantennus* Otto in the identification key based on the combined lengths of antennomeres IV and V being shorter than III for *Trigonopleurus* (*Miruantennus* has antennomeres IV and V as long as III). The new species does not fit *Miruantennus* based on observed external morphology. The presence of cranially obliterated lateral pronotal ridge in the new species is more aligned with *T. alienus*. Based on the preliminary trends in the character matrix, characteristics of flagellomeres II and III may not be a strong state to distinguish *Trigonopleurus* from any other groups within the tribe. The cranially obliterated lateral pronotal ridge may be a strong enough state to distinguish the group. That character state somehow appears to have escaped the attention of Horn (1890) at the time he described his *T. alienus*. It is uncertain whether the character state is present in *T. rugulosus* and needs to be verified as it relates to the two New World species presently assigned in the group. Bonvouloir (1875) did not cover the lateral pronotal ridge in his original description of *Trigonopleurus* or his species, *T. rugulosus* (a roughly sculptured, bicolored species from Victoria, NSW Australia). Furthermore, the analysis at the higher level of classification may possibly paint a different picture for the status of these two species as relates to *T. rugulosus* (which serves as the genotype for *Trigonopleurus*) for these two species may belong to a new group.

*Trigonopleurus* sensu stricto (i.e., *T. rugulosus*) is very closely related to *Nematodes* Berthold and *Neomathion* Fleutiaux within the tribe. The group differs from both *Nematodes* and *Neomathion* based on the presence of caudally widened metathoracic episterna. The metathoracic episterna is parallel-sided in both *Nematodes* and *Neomathion*. Muona and Teräväinen (2020) have illustrated the head of *T. rugulosus*. In comparisons with the image from Muona and Teräväinen (2020) and that of the recently described larva of *Nematodes penetrans* (LeConte) provided by Otto (2017a), there seem to be some similarities between these two groups, particularly with the structures of the head and mandibles. Larvae of *Neomathion* still remain unknown. As more data become available for these groups in the future, the analysis will provide us with a better understanding in regards the relationships between these groups within the tribe Nematodini.

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