

# INSECTA MUNDI

A Journal of World Insect Systematics

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0126

Three new species of *Paragnorimus* Becker from Central America  
(Coleoptera: Scarabaeidae: Cetoniinae: Trichiini)  
with a redefinition of the genus

Andrew B. T. Smith  
Research Division  
Canadian Museum of Nature  
P.O. Box 3443, Station D  
Ottawa, ON, K1P 6P4, CANADA

Date of Issue: June 18, 2010

Andrew B. T. Smith

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*Insecta Mundi* 0126: 1- 8

**Published in 2010 by**

Center for Systematic Entomology, Inc.

P. O. Box 141874

Gainesville, FL 32614-1874 U. S. A.

<http://www.centerforsystematicentomology.org/>

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As of 2007, **Insecta Mundi** is published irregularly throughout the year, not as quarterly issues. As manuscripts are completed they are published and given an individual number. Manuscripts must be peer reviewed prior to submission, after which they are again reviewed by the editorial board to insure quality. One author of each submitted manuscript must be a current member of the Center for Systematic Entomology.

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Printed Copy ISSN 0749-6737

On-Line ISSN 1942-1354

CD-ROM ISSN 1942-1362

Three new species of *Paragnorimus* Becker from Central America  
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Andrew B. T. Smith  
 Research Division  
 Canadian Museum of Nature  
 P.O. Box 3443, Station D  
 Ottawa, ON, K1P 6P4, CANADA  
 asmith@mus-nature.ca

**Abstract.** Three new species of *Paragnorimus* Becker are described: *Paragnorimus atratus* **n. sp.** from Guatemala, *P. hondurensis* **n. sp.** from Honduras and Nicaragua, and *P. howdeni* **n. sp.** from Guatemala. Based on the overlapping characters of these new species, the genus *Peltotrichius* Howden is placed in synonymy with *Paragnorimus*. *Paragnorimus* is given a broader definition to encompass the new species and the two species formerly placed in the genus *Peltotrichius*.

**Introduction**

Although Howden (1968, 1970, 1971, 1994) previously reviewed the genera *Paragnorimus* Becker and *Peltotrichius* Howden, there is still a limited understanding of the taxa involved. This is partly due to the low number of specimens that have ever been collected for most species. As a result, generic and species boundaries are still being determined and very little is known of their natural history. With the discovery of three new species, the boundary between *Paragnorimus* and *Peltotrichius* is further eroded. The purpose of this paper is to describe the three new species, place *Peltotrichius* in synonymy with *Paragnorimus* and refine the definition of the genus, and provide further groundwork for systematics and phylogenetics research on New World Trichiini.

**Materials and Methods**

More than 60 *Paragnorimus* specimens were examined to form the basis of this review. The following institution and private collections (curators in brackets) are cited in the text as depositories for type specimens.

- ABTS — Andrew B. T. Smith Collection, Ottawa, ON, Canada
- BDGC — Bruce D. Gill Collection, Ottawa, ON, Canada
- CDFA — California Department of Food and Agriculture, Sacramento, CA, USA (Charles Bellamy)
- CMNC — Canadian Museum of Nature, Ottawa, ON, Canada (includes the Henry and Anne Howden Collection) (François Génier, Robert Anderson)
- EAPZ — Escuela Agrícola Panamericana, Zamorano, Honduras (Ronald Cave)
- FSCA — Florida State Collection of Arthropods, Gainesville, FL, USA (Paul Skelley)
- UNSM — University of Nebraska State Museum, Lincoln, NE, USA (Brett Ratcliffe)
- UVGC — Universidad del Valle de Guatemala, Guatemala City, Guatemala (Jack Schuster)

**Key to the New World Trichiini genera**

(modified from Howden 1968, Delgado-Castillo and Morón 1991)

- 1. Pronotum without complete V-shaped or triangular impression ..... **2**
- Pronotum with complete V-shaped or triangular impression, impression often cretaceous. North America to South America ..... ***Trigonopeltastes* Burmeister**

- 2(1). Anterior border of clypeus rounded, truncate, or slightly emarginate. Color variable but not iridescent ..... 3  
 — Anterior border of clypeus deeply emarginate. Color at least partially iridescent ..... 6
- 3(2). Pronotal disc dorsally glabrous and immaculate with a cretaceous border. Body elongated. Pygidium length approximately 2x width in males and distinctly elongated in females. Mexico ..... ***Apeltastes* Howden**  
 — Pronotal disc setose (sometimes setae sparse or abraded), sometimes with cretaceous stripes or spots. Body ovate. Pygidium length roughly equal to width or wider than long ..... 4
- 4(3). Elytra glabrous. North America ..... ***Gnorimella* Casey**  
 — Elytra setose (setae sometimes sparse or abraded) ..... 5
- 5(4). Elytra shiny or each elytron with two shiny, slightly elevated intervals. North America ..... ***Trichiotinus* Casey**  
 — Elytra dull, without shiny elevated intervals. Mexico to Nicaragua .... ***Paragnorimus* Becker**
- 6(2). Body dorsally densely setose. Pronotum, pygidium, and venter completely iridescent. Mexico .... ***Iridisoma* Delgado-Castillo and Morón**  
 — Body dorsally glabrous or sparsely setose. Pronotum, pygidium, and venter partially iridescent ..... 7
- 7(6). Clypeus longer than wide, bilobed. Pronotum with three central, longitudinal sulci. Protibia of male unidentate. Mexico to Panama ..... ***Dialithus* Parry**  
 — Clypeus slightly wider than long and moderately emarginated. Pronotum with a single middle longitudinal sulcus. Costa Rica to Panama ..... ***Giesbertiolus* Howden**

### Genus *Paragnorimus* Becker

*Paragnorimus* Becker, 1910: 302 (type species *Coelocratus aenescens* Bates, by subsequent designation [Howden 1968]).

*Peltotrichius* Howden, 1968: 22 (type species *Trigonopeltastes linea* Burmeister, 1841 by original designation). **New synonymy.**

**Generic diagnosis** (Fig. 1-10). Dorsal and ventral surface shiny or matt, without iridescent coloration. Head setose, usually without cretaceous markings. Clypeus rounded to slightly emarginate, not deeply emarginated, length approximately equal to or slightly greater than width. Males with antennal club length approximately equal to antennomeres 2-7, club length sometimes shorter in females. Pronotum sometimes with transverse cretaceous band, never with complete, impressed V or triangle with cretaceous markings. Pronotum with marginal bead complete, evenly convex, uniformly setose. Elytra sparsely setose, sometimes with cretaceous bands, intervals not elevated or shiny. Pygidium length approximately equal to width, setose, often with cretaceous markings. Procoxae contiguous, mesocoxae separated by thin metasternal process. Abdominal sternites usually with cretaceous markings, without erect tufts of setae on segment 5. Protibiae with 2 teeth near apex. Mesotibiae often with broad tooth or blade-like projection along outside edge.

**Remark.** Howden (1968) described the genus *Peltotrichius* for a species with a transverse cretaceous (chalky white) band across the middle of the pronotum, distinct elytral markings, and subtle sexual dimorphism. This is opposed to the species he placed in the genus *Paragnorimus*, which have no cretaceous marks on the pronotal disc, reflexed clypeus, and very distinct sexual dimorphism. As new species were discovered, modifications were needed to the definitions of each genus (Howden 1970, 1971). The three new species described in this paper even more significantly bridge the gap between *Paragnorimus* and *Peltotrichius* to the point where Howden's diagnostic characters for each genus are no longer usable.

For example, *P. hondurensis* and *P. howdeni* both have the very distinct sexually dimorphic characters discussed by Howden (1968) for *Paragnorimus* (female pronotum more round and convex with coarse punctures) and the cretaceous markings on the pronotum characteristic of *Peltotrichius*. New species discovery inevitably fills in gaps between taxa and it is not surprising that modifications are needed for the generic concepts of poorly known groups such as Neotropical trichiines.

**Remark.** The following nine species now compose the genus *Paragnorimus*:

- Paragnorimus aenescens* (Bates, 1889)  
*Paragnorimus atratus* n. sp.  
*Paragnorimus glaseri* (Howden, 1971) **new combination**  
*Paragnorimus guatemalensis* Howden, 1970  
*Paragnorimus hondurensis* n. sp.  
*Paragnorimus howdeni* n. sp.  
*Paragnorimus linea* (Burmeister, 1841) **new combination**  
*Trigonopeltastes quadrisignatus* Schaum, 1841 - synonym  
*Paragnorimus sambucus* Howden, 1970  
*Paragnorimus velutinus* Becker, 1910  
*Paragnorimus flohri* Becker, 1910 - synonym

#### Key to species of *Paragnorimus*

1. Pronotal disc with a distinct, transverse, cretaceous band (sometimes interrupted medially) (as in Fig. 1-2) ..... 2
- Pronotal disc either without a trace of a transverse, cretaceous line (as in Fig. 4-6) or with a very faint, broken line (as in Fig. 3)..... 4
- 2(1). Males and females with unicolored head, clypeus without longitudinal stripes. Pygidium more-or-less evenly convex in both sexes. Mexico ..... ***Paragnorimus linea* (Burmeister, 1841)**
- Males with distinctly bicolored or tricolored head, female with unicolored head; apex of clypeus and 3 longitudinal stripes extending to the eye (2 lateral and 1 medial) with a black, shiny, densely punctate surface; base of clypeus and vertex dull olive green, matt, with punctures obscured. Females with pygidial disc transversely concave or more-or less evenly convex, if pygidial disc is convex, then head with cretaceous markings pygidium of males more-or-less evenly convex. Guatemala, Honduras, and Nicaragua ..... 3
- 3(2). Head dorsally without cretaceous markings. Pronotum without oblique cretaceous markings posterior to the transverse cretaceous band. Honduras and Nicaragua ..... ***Paragnorimus hondurensis* n. sp.**
- Head with cretaceous markings. Pronotum with oblique cretaceous markings posterior to the transverse cretaceous band. Guatemala ..... ***Paragnorimus glaseri* (Howden, 1971)**
- 4(1). Clypeus rounded or truncate ..... 5
- Clypeus distinctly (sometimes weakly) emarginate ..... 6
- 5(4). Elytra with cretaceous markings ..... ***Paragnorimus velutinus* Becker, 1910**
- Elytra without cretaceous markings ..... ***Paragnorimus aenescens* (Bates, 1889)**
- 6(4). Elytra with distinct orange and dark green/black pattern (Fig. 3-4) ..... ***Paragnorimus howdeni* n. sp.**
- Elytra unicolored, some specimens with cretaceous markings ..... 7
- 7(6). Elytra light brown ..... ***Paragnorimus sambucus* Howden, 1970**
- Elytra black ..... 8





**Figure 1-6.** Oblique view. 1-2) *Paragnorimus hondurensis*. 1) Male. 2) Female. 3-4) *Paragnorimus howdeni*. 3) Male. 4) Female. 5-6) *Paragnorimus atratus*. 5) Male. 6) Female.

- 8(7). Head and pronotum black ..... *Paragnorimus atratus* n. sp.  
 — Head and pronotum dull olive green ..... *Paragnorimus guatemalensis* Howden, 1970

***Paragnorimus hondurensis* Smith, new species**

Fig. 1-2, 7

**Type locality.** Parque Nacional La Tigra, Francisco Morazán, Honduras

**Type series.** Holotype male at CMNC labeled a) “Honduras: Francisco / Morazan / Tegucigalpa. La Tigra / 19-V-1995. R.Morris.” (typeset), b) “H. & A. HOWDEN / COLLECTION / Ottawa, Canada” (typeset). Allotype female at CMNC labeled a) “HONDURAS: F. Morazán / La Tigra Nat. Park / NE Tegucigalpa / 29.VI.1994 1900m.” (typeset and handwritten), b) “Roberto / Cordero” (handwritten). One male paratype at UNSM labelled “Nica(Matagalpa): / Fuente Pura / 10-iv-94 / Col.J.M.Maes & / A.de la Fuente” (typeset). One male paratype at CDFA labeled “HONDURAS: Francisco / Morazán, Uyuca / 14°09.55N 87°04.18W / V-21-1996, 5900', F.G. / Andrews & A.J. Gilbert” (typeset). One female paratype at ABTS labeled a) “HONDURAS:Fco. Morazan / San Antonio de Oriente / Uyuca / 21 May 1990 / rcol R. Ortega” (typeset), b) “Trampa Malaise / bajo bosque / nubuloso” (typeset), c) “013.826 / EAPZ” (typeset, light blue label). One



**Figure 7-10.** Male genitalia of the new species of *Paragnorimus*. **7)** Parameres of *Paragnorimus hondurensis*. **8)** Parameres of *Paragnorimus howdeni*. **9)** Parameres of *Paragnorimus atratus*. **10)** Lateral view of *Paragnorimus howdeni*.

female paratype at EAPZ labeled a) “HONDURAS: Fco. Morazán / El Zamorano / Mayo – Julio / Estudiante EAP” (typeset), b) “013.827 / EAPZ” (typeset, light blue label). One female paratype at FSCA labeled “HONDURAS: Dept. Francisco / Morazon Cerro Uyuca / 6300ft., 6-VI-1993 / coll. M.C. Thomas” (typeset). One male and one female paratype at BDGC labeled “HONDURAS: F. Morazán / La Tigra Nat. Park / NE Tegucigalpa / 4.VI.1994 2125 m / B.D. Gill” (typeset). All types listed above also bear my red or yellow type label.

**Description of holotype.** Male. Length 11.5 mm, width 4.5 mm. Color: dorsal surface of head (excluding apical half of clypeus), pronotum, scutellum olive green; clypeus dark brown with dull orange along the apex; elytra with dull orange and dull black pattern (Fig. 1). Ventral surface shiny dark green on thorax and shiny dark brown on abdomen and pygidium. Legs tan on profemur, mesofemur, inside edge of protibia and mesotibia; otherwise dark brown. *Head.* Surface glabrous, shiny, densely punctate on apical half of clypeus and on 3 longitudinal strips extending to the eye (2 lateral and 1 medial); basal half of clypeus and vertex surface setose (mostly abraded in holotype) with dull-green matt, punctures obscured. Clypeus weakly emarginated, apical margin not elevated, slightly longer than wide. Head without cretaceous markings. Antennae with 10 antennomeres, club length approximately equal to length of antennomeres 2-7. Maxillae with long, thin brush protruding beyond clypeus in dorsal view. Mentum thickly setose, obscuring surface. *Pronotum.* Surface setose with dull-green matt, punctures obscured. Marginal bead complete; with cretaceous markings in 1 thin band on each side directly behind apical bead, 1 thin basal band following inside of basal bead. Transverse medial cretaceous band prominent, indented into surface. *Elytra.* Surface sparsely setose, matt. Cretaceous band (1 on each side) thin, transverse, medial, extending from near lateral margin to inside the humeral line. Elytral striae well defined with punctures and weak indentations, especially closer to elytral suture. *Pygidium.* Surface rugose,



densely setose, with inverted U-shaped cretaceous band along basal and lateral surfaces of disc. Disc strongly, evenly convex. *Venter*. Proepisternum and prosternum with cretaceous markings. Sternum densely setose with long setae obscuring surface. Abdominal sternites 2-5 with transverse cretaceous bands thick medially, thin laterally. *Legs*. Protibiae with 2 teeth near apex. Mesotibiae outer edge bowed outward. Tibial spurs acute, unmodified. Tarsi with ventral tufts of setae. *Parameres*. Apex slightly flared with lateral tooth; subapically with a broad, rounded lateral tooth (Fig. 7).

**Variation.** Males: length 10.5-11.5 mm, width 4.5-5.0 mm. Male paratypes match the holotype description.

**Sexual dimorphism.** Females: length 10.0-12.0 mm, width 5.5-6.0 mm. Female allotype and paratypes differ in the following characters: Color: dorsal surface of head, pronotum, scutellum black; clypeus black with green reflections; elytra with different dull orange and dull black pattern (Fig. 2). Legs almost completely tan or tan with stripes or patches of black with green reflections. *Head*. Surface of basal half of clypeus and vertex with distinct punctures or longitudinal striae. *Pronotum*. Surface moderately to densely punctate. Marginal bead with cretaceous markings around entire bead or slightly interrupted apicolaterally. *Pygidium*. Disc transversely concave. *Venter*. Cretaceous markings more prominent on thorax. Abdominal sternites 2-5 with transverse cretaceous bands of even thickness but sometimes interrupted medially. *Legs*. Mesotibiae and metatibiae with tooth on outer edge. Metatibiae with 1 spur with a spatulate tip, unmodified. Tarsi without ventral tufts of setae.

**Etymology.** This species is named for Honduras, the country where most of the type series was collected.

**Distribution.** HONDURAS - Francisco Morazán (8): Cerro Uyuca, El Zamorano, Parque Nacional La Tigra, San Antonio de Oriente. NICARAGUA - Matagalpa (1): Hotel Fuente Pura (near Reserva Natural El Arenal).

**Temporal data.** April (1), May (3), June (4).

***Paragnorimus howdeni* Smith, new species**

Fig. 3-4, 8, 10

**Type locality.** Cerro de Mono (2275 m), Zacapa, Guatemala.

**Type series.** Holotype male and allotype female at UNSM labeled "GUATEMALA, Zacapa / Cerro de Mono, 2275m / May 25-28, 1997 / E. Giesbert, coll." (typeset). Eleven male paratypes at ABTS (2), CMNC (3), UNSM (5), UVGC (1) all with identical data labels to the holotype and allotype. All types listed above also bear my red or yellow type label.

**Description of holotype.** Male. Length 10.0 mm, width 5.0 mm. Color: dorsal surface of head, pronotum, scutellum dark olive green; elytra with dull orange and dark olive green pattern (Fig. 3). Ventral surface shiny dark green. Legs shiny dark green with tan tarsi. *Head*. Surface setose with dull-green matt, punctures obscured. Clypeus weakly emarginated, apical margin not elevated, length approximately equal to width, constricted basally at antennal insertion. Head without cretaceous markings. Antennae with 10 antennomeres, club length shorter than length of antennomeres 2-7. Maxillae with long, thin brush protruding beyond clypeus in dorsal view. Mentum thickly setose, obscuring surface. *Pronotum*. Surface setose with dull-green matt, punctures obscured. Marginal bead complete; with cretaceous markings along apical bead (interrupted medially), basolateral bead, basal bead. Transverse medial cretaceous band almost obscured but represented by short, thin marks on either side of disc; transverse band not indented into surface. *Elytra*. Surface sparsely setose, matt. Cretaceous bands (2 on each side) thin, transverse; band 1 short, located post-humerally; band 2 more than twice as long, located medially. Elytral striae weakly defined near elytral suture with punctures and weak indentations, obscured laterally. *Pygidium*. Surface densely setose; disc completely covered by cretaceous markings, evenly convex. *Venter*. Thorax



with numerous patches of cretaceous markings. Sternum densely setose with long setae obscuring surface. Abdominal sternites 2-5 with thick, transverse, cretaceous bands covering almost entire surface. *Legs*. Protibiae with 2 teeth near apex. Mesotibiae outer edge with a blade-like protrusion in the basal 2/3rds. Tibial spurs acute, unmodified. Tarsi with ventral tufts of setae. *Parameres*. Parameres highly modified apically with 2 distinct lateral teeth (Fig. 8, 10).

**Variation.** Males: length 9.5-12.0 mm, width 4.5-5.0 mm. Male paratypes match the holotype description except some paratypes vary in the cretaceous markings of the pronotum. The transverse band in some specimens absent and markings along marginal bead sometimes reduced.

**Sexual dimorphism.** Female allotype: length 12.0 mm, width 5.5 mm. The female allotype differs in the following characters: Color: dorsal surface of head, pronotum, scutellum black; elytra with dull orange and black pattern (Fig. 4). Ventral surface and legs black. *Head*. Surface shiny, sparsely setose, densely punctate. Clypeus distinctly emarginated. *Pronotum*. Surface shiny, sparsely setose, densely punctate. Marginal bead complete; with cretaceous markings isolated to small patches along basal bead. Transverse medial cretaceous band absent. *Pygidium*. Surface moderately setose; disc covered by cretaceous markings only in basal half, weakly convex. *Venter*. Thorax with isolated traces of cretaceous markings. Sternum moderately setose with long setae not obscuring surface. Abdominal sternites 2-5 with broken, transverse, cretaceous bands covering only a thin part of the apex. *Legs*. Mesotibiae without blade-like protrusion on outer edge. Tarsi without ventral tufts of setae.

**Etymology.** It is my pleasure to name this species for Henry Howden. The dedication of this species is in honor of Henry's tremendous body of work on New World trichiines and for his collegiality and mentorship to me over the years.

**Distribution.** GUATEMALA - Zacapa (13): Cerro de Mono.

**Temporal data.** May (13).

### ***Paragnorimus atratus* Smith, new species**

Fig. 5-6, 9

**Type locality.** Cerro de Mono (2275 m), Zacapa, Guatemala.

**Type series.** Holotype male and allotype female at UNSM labeled "GUATEMALA, Zacapa / Cerro de Mono, 2275m / May 25-28, 1997 / E. Giesbert, coll." (typeset). Two male paratypes at ABTS (1), CMNC (1) both with identical data labels to the holotype and allotype. All types listed above also bear my red or yellow type label.

**Description of holotype.** Male. Length 11.0 mm, width 6.0 mm. Color: dorsal and ventral surface black (Fig. 5). *Head*. Surface setose with black matt, punctures obscured; apical half of clypeus shiny black with distinct punctures. Clypeus weakly emarginated, apical margin elevated, length approximately equal to width, constricted basally at antennal insertion. Head without cretaceous markings. Antennae with 10 antennomeres, club length approximately equal to length of antennomeres 2-7. Maxillae with long, thin brush protruding beyond clypeus in dorsal view. Mentum thickly setose, obscuring surface. *Pronotum*. Surface setose with black matt, punctures obscured, without any cretaceous markings or bands. Marginal bead complete. *Elytra*. Surface sparsely setose, matt. Cretaceous band (1 on each side) thin, transverse, located medially. Elytral striae weakly defined to obscured. *Pygidium*. Surface rugose, moderately setose; disc without cretaceous markings, evenly convex. *Venter*. Thorax with scattered traces of cretaceous markings. Sternum densely setose with long setae obscuring surface. Abdominal sternites 2-5 without cretaceous bands. *Legs*. Protibiae with 2 teeth near apex. Mesotibiae with outer edge bowed medially. Tibial spurs acute, unmodified. Tarsi with ventral tufts of setae. *Parameres*. Apex dorsolaterally flattened, without teeth or processes (Fig. 9).

**Variation.** Males: length 10.5-12.5 mm, width 5.5-6.0 mm. Male paratypes match the holotype description except both have a weak hint of a transverse pronotal band and some cretaceous markings on the abdominal sternites.

**Sexual dimorphism.** Female allotype: length 12.0 mm, width 5.5 mm. The female allotype (Fig. 6) differs in the following characters: *Head*. Entire surface shiny black with distinct punctures. Clypeus apical margin not elevated. Antennal club length shorter than antennomeres 2-7. *Pronotum*. Surface shiny black with distinct punctures, with cretaceous markings along basal bead. *Elytra*. Surface with a second small cretaceous band located post-humerally. *Pygidium*. Surface rugose, moderately setose; disc flat, with cretaceous markings in basal half. *Venter*. Thorax with larger patches of cretaceous markings. Sternum densely setose with long setae not obscuring surface. Abdominal sternites 2-5 with thin cretaceous bands. *Legs*. Protibiae with 2 teeth near apex. Mesotibiae with weak tooth medially. Tarsi without ventral tufts of setae.

**Etymology.** The name *atratus* is Latin meaning “clothed in black.” This is in reference to the black coloration of this species.

**Distribution.** GUATEMALA - Zacapa (4): Cerro de Mono.

**Temporal data.** May (4).

### Acknowledgments

I thank Henry Howden and Brett Ratcliffe for useful discussions and advice on the classification of these new species plus other matters concerning New World trichiines. Thanks to all the curators and collections managers listed in the Materials and Methods section for loaning specimens to me. Henry Howden and François Gènier graciously provided critical reviews of earlier manuscript versions of this paper.

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Received March 26, 2010; Accepted April 19, 2010.