A new key for the species of *Ateuchus* Weber (Coleoptera: Scarabaeidae: Scarabaeinae) occurring in Mexico, with a description of the first North American inquiline species from a rodent burrow (Rodentia: Geomydae) and new distribution records

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**Article Info**

**A B S T R A C T**

The first *Ateuchus* Weber (Scarabaeinae) species, *A. tzua* sp. nov., from a rodent burrow from North America is described. Diagnostic characters are presented; photographs of an adult male and illustrations of male genitalia are included. A key for all known Mexican *Ateuchus* Weber species is provided. *Ateuchus hornai* (Balthasar) is revalidated. New distribution records from Mexico and Central America are reported.

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**Introduction**

This work is a continuation of the study of the genus *Ateuchus* Weber for North America, first started in 1981 (Kohlmann, 1981, 1984; Kohlmann and Halffter, 1988), and thereafter extended to Mesoamerica (Kohlmann, 2000) and Costa Rica (Kohlmann, 1996–1997; Kohlmann and Solís, 2009, 2012). It describes the first known *Ateuchus* species from the burrow of a rodent collected in North America, *Ateuchus hornai* (Balthasar) is revalidated. This description and the present revalidation increase the number of previously known species from Mexico to fourteen. As a comparison, twelve species are known from Costa Rica (Kohlmann and Solís, 2012). This study also presents a key for the Mexican *Ateuchus* species. It also reports new *Ateuchus* records from Mexico and Central America.

**Materials and methods**

Most specimens studied came from the Entomology Section of the Zoological Collection of the *Universidade Federal de Mato Grosso*, Cuiabá, Brazil (CEMT) and the Entomological Collection at the Institute of Ecology (IEXA), Xalapa, Mexico. Other collections are cited only once and so no acronyms are used for them.

The specimens were studied using a Zeiss Stemi 2000-C stereozoom binocular microscope. Measurements were made to the nearest 0.1 mm using an ocular micrometer. Genital dissections and preparations were done following the techniques described by Zumino (1978). Genital structures were stored in microvials with glycerin. The structures of the internal sac were drawn using the freehand technique. Photographs were taken with a Zeiss AxioCam ICC1 camera. Photographs were processed using the Zeiss AxioVision 4 image processor. Morphological nomenclature follows Kohlmann (1984, 2000) and Genier (2015).

**Results**

*Key for the identification of Ateuchus Weber from Mexico (modified from Kohlmann, 1981, 2000)*

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1. Eyes viewed from above six times larger than wide .......................... 2
2. Anterior pronotal edge with complete margin; base of the head with a
   wrinkled area (Fig. 3) in the center; sternum forming a carina along the
   middle; inquiline of rodent burrows. Mexico (Veracruz) ........................ A. tuza
Kohlmann and Vaz de Mello, sp. nov.
   – Eyes viewed from above two or three times larger than wide .......... 4
   – Anterior pronotal edge with complete margin; base of the head with no
     wrinkled area; sternum not forming a carina along the midline;
     non-inquiline species ........................................ 3

3. Ovoid body; pronotal punctures forming a semi-circle at the middle of the
   pronotal base; internal sac with a very developed spiny fascia and three
   copulatory spicules; punctures of the lower surface of the anterior femora fine
   and uniformly distributed. Mexico to Panama (Sinaloa to Azuero Peninsula) . . .
   rodriguezi (Pseudohermone de Borre)
   – Long body; pronotal punctures not forming a semi-circle at the middle
     part of its pronotal base; internal sac with a weakly developed spiny fascia
     and two copulatory spicules; punctures of the lower surface of the anterior
     femora moderate in size and uniformly distributed. Mexico (Higher reaches of
     the Balsas River Valley; Guerrero, Morelos, and Puebla) .................. halfferii Kohlmann
   – Apex of the elytral striae strongly impressed .............................. 5
5. Shagreen elytra; internal sac with a very well developed fascia; pygidium
   very convex and shagreen in its upper part. Mexico to Colombia (Oaxaca to
   Chocó). .................................................................................. condezei Harold
   – Elytra not shagreen; internal sac with a weakly developed fascia; pygidium
     flat and not shagreen. Mexico and Belize (Atlantic slope; Chiapas, Campeche
     and Orange Walk) ......................................................... laetitiae Kohlmann
6. Length larger than 8 mm, and ventral surface of anterior femur very finely
   punctate throughout, lacking any larger or coarser punctures (only one female
   known, 8.4 mm, Nacaxa, Puebla) ........................................... hormai (Balthisar)
   Either length shorter than 8 mm or ventral surface of anterior femur with
   areas of larger or coarser punctures ...................................... 7
7. Ventral surface of anterior femur finely punctate throughout, few larger
   punctures along posterior edge in some Texan individuals; spermapheretra
   tapering from the accessory gland insertion to apex. USA and Mexico (Texas to
   Veracruz) ............................................................................ texanus Robinson
   – Ventral surface of anterior femur coarsely punctate throughout or at its
     posterior edge or apex; spermapheretra uniformly thick throughout. Mexico
     to Honduras ...................................................................... 8
8. Ventral surface of anterior femur and pygidium with coarse punctures
   throughout ........................................................................ 9
   – Ventral surface of anterior femur with fine punctures throughout or coarse
     punctures at its apex or at its posterior edge; pygidium finely punctate .... 10
9. Spermapheretra ring-like at its base; primary copulatory spicule fine. Mexico
   (Pacific slope of the Transverse Volcanic System and Sierra Madre del Sur;
   Jalisco to Oaxaca) .................................................................. caroliniae Kohlmann
   – Spermapheretra not ring-like at its base; primary copulatory spicule massive.
     Mexico (Transverse Volcanic System; Michoacán to Veracruz) ....... hugi (Harold)
10. Anterior pronotal margin almost effaced; pronotal surface moderately to
    coarsely punctate; pygidium very convex; one of the copulatory hooks of the
    internal sac is a long and slender filament; one of the apical lamellae of the
    internal sac has a canoe-like form. Mexico to Nicaragua (Chiapas to Masaya)
    ....................................................................................... guatemalensis (Bates)
   – Anterior pronotal margin complete; pronotal surface finely punctate,
     sometimes with some coarse punctures lining the base and margins of the
     pronotum; pygidium flat to convex; none of the copulatory hooks of the
     internal sac is filament-like; none of the apical lamellae of the internal sac are
     canoe-like. Mexico to Honduras ............................................ 11
11. Small species (4.8–5.5 mm); secondary copulatory spicules of the internal
    sac very small. Mexico (Veracruz to Yucatán) ........................... pereceluei Kohlmann
   – Big species (6–8.5 mm); size of the secondary copulatory spicules of the
     internal sac small to big. Mexico to Honduras (Tamaulipas to La Paz) .... 12
12. Copulatory spicules of the internal sac subequal and spine-like; no spiny
    faces present around the copulatory spicules. Mexico (Chiapas) ......... gershensoni
    Kohlmann
   – Secondary copulatory spicules of the internal sac smaller than the primary
     one; spiny faces present or not around the copulatory spicules ........ 13
13. Elongate, convex and broad body (4.0–4.5 mm); eyes dorsally two times
    longer than wide. Mexico (Tamaulipas to Chiapas) ...................... illesem (Harold)
   – Oblong, very convex and broad body (5.0–5.5 mm); eyes seen dorsally
     three times longer than wide. Mexico to Honduras (Chiapas to La Paz)
     .............................................................. chrysopyggi (Bates)

Figures 1–3. Aeathus tuza sp. nov.; 1, dorsal habitus of holotype; 2, ventral habitus
of holotype; 3, wrinkled area at the base of the head of a male.

Ateuchus tuza Kohlmann and Vaz de Mello, sp. nov.
(Figs. 1–4)

Type locality: MEXICO: VERACRUZ, Dos Amantes (Catemaco), elev.
300–600 m (18° 29′ 21″ N, 95° 03′ 35″ W)

Diagnosis. This species is distinguished from other Ateuchus species
by the following combination of characters: Long and slender body;
dorsum glossy; clypeus bidentate; head simply convex, lacking
carina or tubercle; base of the head with a small wrinkled area in
the center; anterior border of pronotum continuous, posterior border
of pronotum with an area of dense and coarse punctures medially;
elytral lateral portion rounded; sternum forming a carina in the
middle; pygidium slightly convex, lightly shagreen, and inconspic-
uously punctate.

Description. Holotype male (Figs. 1–4). Body. Elongate (Figs. 1–2),
convex dorsally (Fig. 1). Size. Total length 10.0 mm. Maximum
width 5.5 mm. Color. Dark reddish brown to black, lacking metal-
lic sheen. Head. Clypeal margin anteriorly broadly V-shaped
(Figs. 1–2); anterior margin slightly upturned, gena and frons
coarsely wrinkled, vertex coarsely punctate, base of head with a
small wrinkled area in the center (Fig. 3), eyes viewed from above six times longer than wide. **Pronotum.** Transverse, strongly convex, surface glossy; anterior pronotal margin complete; midline weakly impressed at base; pronotal surface punctate throughout, a group of coarse punctures at the center of the pronotal base (Fig. 1); lateral pronotal fossae shallow. **Elytra.** (Fig. 1). Striae fine, shallowly impressed on disk, becoming well defined and deeply impressed on apical declivity; strial punctures elongate-crenulate, slightly wider than stria, separated by 2–3 diameters on disk and apical declivity. Interstriae slightly convex on disk, surface minutely punctate throughout. **Thoracic sternum.** (Fig. 2). Proepisternum excavate anteriorly, surface of excavated portion granulate, with fine and rather long setae, bordered posteriorly by a well-defined keel. Proepimeron finely wrinkled. Sternellum glabrous and forming a keel at its center. Mesometasternal suture arched medially, marginal bead fine. Mesosternum coarsely punctured forming rugae. Mesepisternum flat, surface-forming rugae. Metasternum evenly convex, disk evidently punctate, surface glossy between punctures, lateral lobes forming rugae; midline clearly impressed along three fourths of its length. **Legs.** (Figs. 1–2). Foretibia with four teeth on outer margin, the basal one weakly developed; foretibial spur expanded and truncate apically; foretibiae and fore femora long and slender; fore femur smooth, finely punctate throughout. Metatibiae obliquely truncate apically; apical spur spiniform. **Abdomen.** (Fig. 2). Sternites 3–7 crenately punctate along their anterior borders. Last abdominal segment slender. Pygidium slightly convex and lightly shagreen with indistinct punctuation; basal sulcus fine and deep throughout; marginal bead continuous. **Male genitalia.** Parameres simple, tapering to apex in lateral view, apical portion rounded in dorsal view. The internal sac of the aedeagus with three hooks, two spine-like and one spoon-like (Fig. 4).

**Allotype:** Female. Total length 9.5 mm. Maximum width 5.0 mm. Same as male with the following sexual differences: clypeal margin anteriorly, not so broadly V-shaped; lateral pronotal margin not arched; last abdominal segment broader medially; foretibiae and fore femora shorter and foretibial spurs slender and slightly bent at tip; pygidium not as long.

**Variation:** Total length 9.5–10 mm. Maximum width 5.0–5.5 mm. **Material examined** (34 specimens): **Holotype.** Male: México: Veracruz: Dos Amates (Cateceno), 8–1968, P. Reyes, M. Cabrera cols. Nido de tuza. Cámara de desechos (CEMT). **Allotype.** Female: ibi dem, one female. **Paratypes.** ibidem, six males, four females (three males and three females at CEMT; one male, Gonzalo Halffter personal collection, Coatepec, Mexico; one male and one female at Bert Kohlmann personal collection, Las Mercedes de Guáxico, Costa Rica; one male to be deposited at Canadian Museum of Nature, Ottawa, Canada); one male, one female, Entomological Collection at the Institute of Ecology, Xalapa, México (IEEXA). México: Oaxaca, Sta. María Chimalapas, 12-VI-2015, colecta directa, dentro de madruguera de tuza. J. Luis S. Huerta col.; five males, seven females, ibidem, 16-VI-2015; two males, two females, ibidem, 18-VI-2015; one male, one female, ibidem, 19-VI-2015; two females, ibidem, 22-VI-2015.

**Remarks:** This is the first North American inquiline *Ateuchus* species collected from a pocket gopher burrow.

**Etymology:** The name *tuza*, a name in apposition, is the hispanized common name of the indigenous nahuatl word *tuazan*, given to the beaver-looking subterranean rodent, where the new *Ateuchus* species was found.

**Geographical distribution:** The new species is so far only known from the locality of Dos Amates, Cateceno, in the state of Veracruz, and the locality of Santa María Chimalapas, Oaxaca, Mexico.

**Habitat:** The new species was collected in the waste chamber of a pocket gopher (Rodentia: Geomyidae) burrow during the month of May. Although the rodent of the original collection site was not identified at the time, it is most likely that the specimens were found inside the nest of *Orthogeomyx hispidus* (Le Conte).

**Chorological affinities:** Interestingly, this new *Ateuchus* species is found under similar ecological conditions, a lowland tropical area, as *Ateuchus cujichi* Génier, the other known inquiline rodent burrow *Ateuchus* species from Bolivia (Génier, 2015). *A. cujichi* was collected in a *Ctenomys* burrow, a rodent belonging to a different family, Ctenomyidae, as the one collected in Mexico.

**Taxonomic relationships:** The shape of the body of this species resembles the South American species *apicatum* (Harold, 1867) and is clearly not related to the known body shape of the North or Central American *Ateuchus* species. The new species will key to couplet 23/24 (*apicatum*) in Balthasar’s (1939) key. It can be easily separated from *A. apicatum* because of the presence of the small rugose area at the center of the base of the head and the presence of coarse punctures at the middle of the pronotal base. This taxonomic relationship would suggest that *Ateuchus* species derived from South American lines have adapted to and colonized lowland gopher nests in North America; whereas, in the mountainous areas of North America it is species of the genus *Onthophagus*, which has adapted to colonizing gopher nests (*Anuaguia* and Halffter, 1991; Lobo and Halffter, 1994; Zunino and Halffter, 2007).

This new species shows adaptations to living in an environment devoid of light, like the subterranean gopher nest. First, the dorsal eye area is very small. Second, the aforementioned rugose area at the base of the head is a stridulation mechanism, similar to those found at the base of the head of *Uroxyx*, as found in *U. microcularis* Howden and Young, *U. micro Bates* and *U. platypygga* Howden and Young (Delgado and Kohlmann, 2007; Solís and Kohlmann, 2013),

![Figures 4–5. *A. tuza* sp. nov.: 4, drawing of the internal sac, line equals 1 mm; 5, *A. hornai* (Balthasar, 1939), dorsal habitus of the female holotype.](image-url)
and most probably helps in the communication process of this species.

**New distribution records of and notes on Ateuchus Weber from Mexico and Central America**

_Ateuchus guatemalensis_ (Bates), 1887

This species has been recorded from Chiapas, Guatemala and Honduras. It is here recorded for the first time from Nicaragua.


_Ateuchus hornai_ (Balthasar, 1939), new combination (valid species) (Fig. 5)

This species was previously considered a synonym of _A. illaeus_ based on the original description, since the holotype was not available for study at the time (Kohlmann, 1984). The examination of the female holotype found in the Natural History Museum in Prague, Czech Republic (Bezdek and Hajek, 2011), allowed us to consider it a valid species, distinguishable by the characters in the key presented herein. We suspect the type locality (Necaxa, Puebla, México) to be wrong, and we hope that a male will be collected in order to prepare a more thorough description of this interesting species.

**Conflicts of interest**

The authors declare no conflicts of interest.

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**References**


