



Revision of the African horntail genus *Afrotremex* (Hymenoptera: Siricidae)

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Abstract

Afrotremex is one of ten extant genera of Siricidae, known as horntails or woodwasps. Species are restricted to the central forested regions of Africa. Their biology and economic significance are unknown. However, the host of one species, *A. xylophagus*, is known. Their larvae are wood-boring insects. The genus consists of six species: *Afrotremex hyalinatus* (Mocsáry), *A. violaceus* Pasteels, *A. comatus* Goulet, n. sp., *A. opacus* Goulet, n. sp., *A. pallipennis* Goulet, n. sp., and *A. xylophagus* Goulet, n. sp. The genus is characterized, its phylogenetic placement is discussed, and a key to species is provided. For each species (if pertinent), the following are included: synonymy, diagnosis, comparative diagnosis, description, type material, origin of specific epithet, taxonomic notes, and range.

Key words: Ethiopian, Siricidae, horntails, *Afrotremex*, species key, phylogeny

Introduction

Afrotremex is a small genus of Siricidae restricted to central Africa. In the study of the Siricidae of the Western Hemisphere (Schiff *et al.* 2012), the genus was briefly discussed and characterized and included in a key to extant world genera. During that study, several questions arose when studying images of two *Afrotremex* specimens at the National Museum of Natural History, Smithsonian Institution (USNM). I discovered that the two specimens were clearly two different species, although both resembled the description of *A. hyalinatus* (Mocsáry). Did these specimens represent two new species or was one of them *A. hyalinatus*? The other problem was the identity of *A. violaceus* Pasteels. Was *A. violaceus* separated from *A. hyalinatus* only on wing color pattern, and were *A. hyalinatus* and *A. violaceus* just two discrete color forms of *A. hyalinatus*? Having in hand 12 specimens for study and the diagnostic characteristics of *A. hyalinatus*, I could then proceed with this study and answer these questions. Despite the very few specimens, I felt it was important to publish this work to clarify the species of the genus and to show that *Afrotremex* is probably a species rich genus within the Siricidae.

Material and methods

Materials. This study is based on 12 specimens. Holotypes, images of holotypes, and specimens studied are preserved in the following collections.

HNHM	Hungarian Natural History Museum, Budapest, Hungary. C. Csösz.
MRAC	Musée Royal de l’Afrique Centrale, Tervuren, Belgium. E. De Coninck.
USNM	National Museum of Natural History, Smithsonian Institution, Washington, DC, USA. D.R. Smith.
ZMHB	Museum für Naturkunde der Humboldt Universität, Berlin, Germany, F. Koch.

Methods. Images were prepared using two image capture systems: MZ16 Leica binocular microscope and an attached Leica DFC420. Some specimens were photographed using DSLR Canon Rebel T2i cameras with a 100 mm macro or a MPE-65 lens. Multiple images through a range of focal planes from top to bottom were taken of a structure and these combined using Combine ZM or ZP designed by Alan Hadley to produce a single, focused image. Specimens were illuminated with a 13 watt daylight fluorescent lamp or flash through a semi-transparent plastic surface and reflected with a matt aluminum surface or glossy photographic paper. The final combined image was improved using Adobe Photoshop 7 or CS6, and plates were designed using the same software. Corel Draw 9.0 was used to prepare separate neighbor-joining trees. The distribution map of the species was prepared with SimpleMappr (Shorthouse 2010).

All figures in text are coded as follows: “M number” for figure under morphology (*i.e.*, M4 refers to figure 4), “K number” for figure in key (*i.e.*, K25 refers to figure 25 in key), and “T taxon number. number” for taxa under “Taxonomic treatment” (*i.e.*, T2.4 refers to figure 4 of the second taxon, *A. comatus*). This is designed for easily locating of a figure and also for easier changes to plates when figures are added or removed.

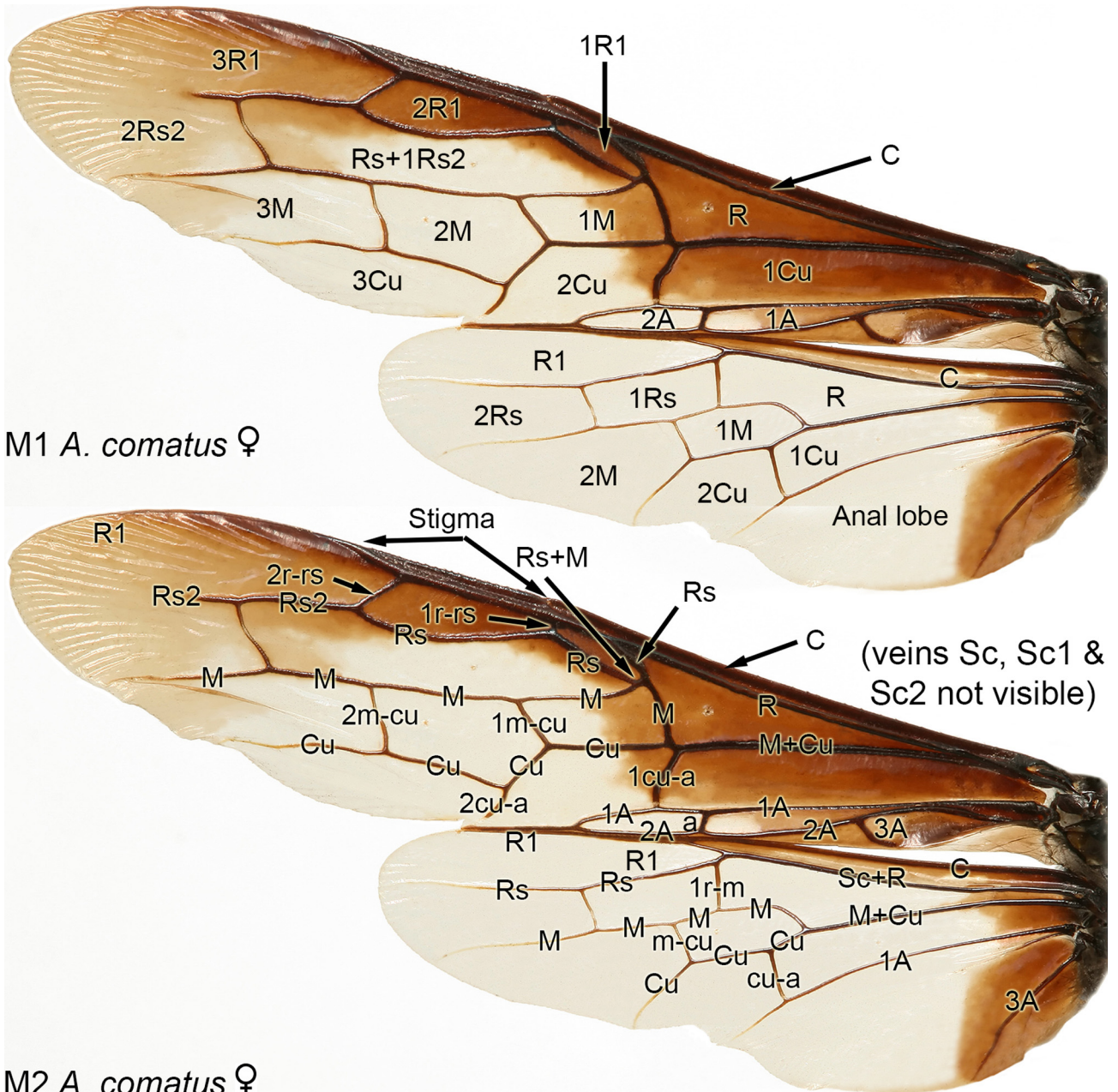
Morphology. Structural terms were discussed in Schiff *et al.* (2012). Only the structural terms used there are employed.

Wings. The characteristic wing cells and veins of the fore and hind wings of *Afrotremex* are illustrated in Fig M1 and M2.

Female abdomen. The female abdomen has ten terga (singular: **tergum**) dorsally and seven sterna (singular: **sternum**) ventrally (Fig. M4). Terga 8–10 are conspicuously modified. Tergum 8 is greatly enlarged and extended posteriorly (Fig M4 and M6). Tergum 9 is the largest tergum and has a deeply impressed dorsomedian impression, the **median basin** (Fig. M6), also known as the precornal basin. The lateral edges of the median basin are sharply outlined in anterior 0.8 (Fig. M6), its anterior edge is ridge-like, and its posterior edge is outlined by a furrow between terga 9 and 10. Lateral to median basin is a wide band of pit-like sculpticells without pits and setae (Fig. M6). In lateral view there is a longitudinal furrow sharply outlined from below lateral edge of tergum 8 to almost the posterior margin of tergum 9 (Fig. M4). Above the longitudinal furrow to the band of pit-like sculpticells (best seen in lateral view as in insert) is a long band of setae with clearly defined pits (Fig. M4a), or with indistinct pits and surface with widespread pit-like sculpticells and shiny tubercles (Fig. M4b). Tergum 10 is modified as a sharp horn-like projection, also known as the **cornus** (Fig M4 and M6); and at its apex is a short tube probably assisting the adult movement in their larval host tunnels while exiting out.

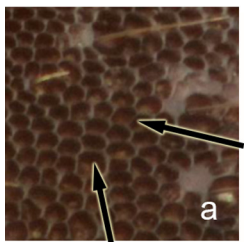
The abdomen posterior to sternum 7 has an **ovipositor** covered by two **sheaths** when not in use (Fig. M4).

- Each sheath consists of three parts: a small basal sclerite dorsally (valvifer 1), a long sclerite ventrally (valvifer 2), and an apical sclerite (valvula 3). In this work, the last two sclerites are referred to as **basal section** and **apical section** of the sheath (Fig. M4). The length of these two sections is compared to one another.
- The ovipositor consists of a fused pair of dorsal **lances** (valvula 2) and a pair of ventral **lancets** (valvula 1) (Fig. M5, apex). The part described in this work is the lancet, which is divided in numerous sections called annuli (singular: **annulus**). Lancet annuli are outlined by vertical to slanted ridges (Fig. M5, middle). Annuli are present at the base of the lancet (Fig. M5, base). The apex of the lancet consists of four annuli each with a large tooth (Fig. M5, apex). The last two anterior these four apical toothed annuli have no pit adjacent to the annulus ridge (Fig. M5, apex). Each annulus anterior to the above annuli has a clearly outlined pit (Fig. M5, middle). To photograph the lancet for the best range of tonalities the ventral edge of the lancet was oriented toward the light. Therefore contrary to standard practice, ovipositor images in lateral view are shown with the lancet at the top rather than at the bottom of the image.



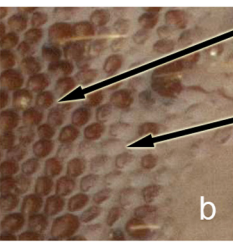
M1 *A. comatus* ♀

M2 *A. comatus* ♀



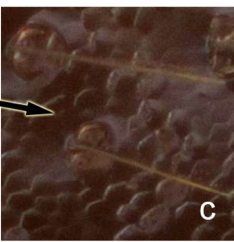
- deep pit-like sculpticells (surface very matt)
- net-like edges of pit are named "meshes",

-the space between meshes are named "sculpticells"

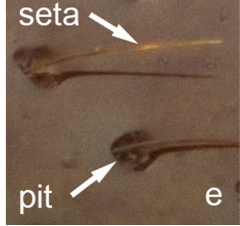


- shallow pit-like sculpticells (surface matt)

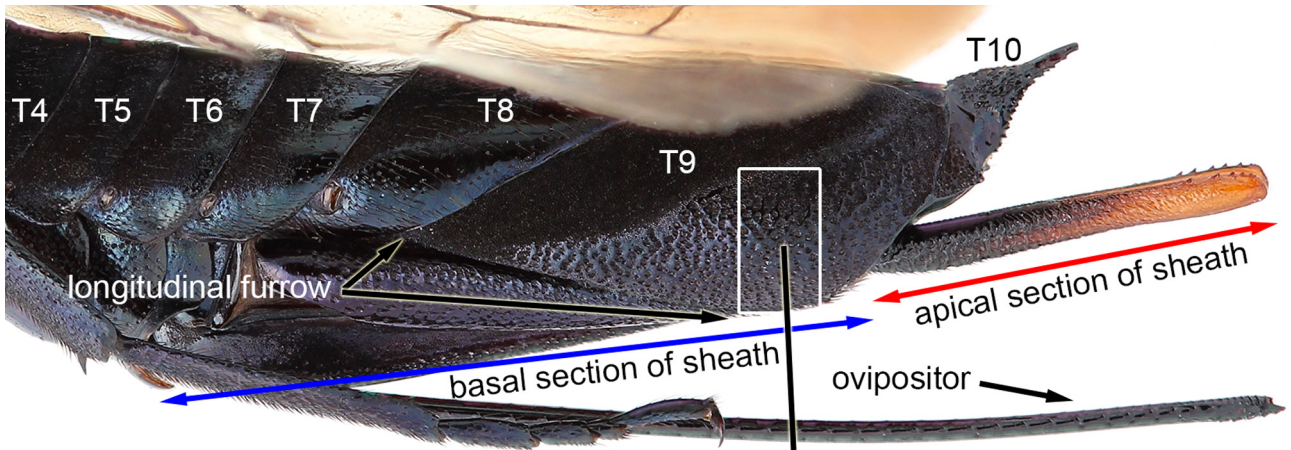
- meshes clearly outlined (surface shiny)
- meshes faint surface shiny)



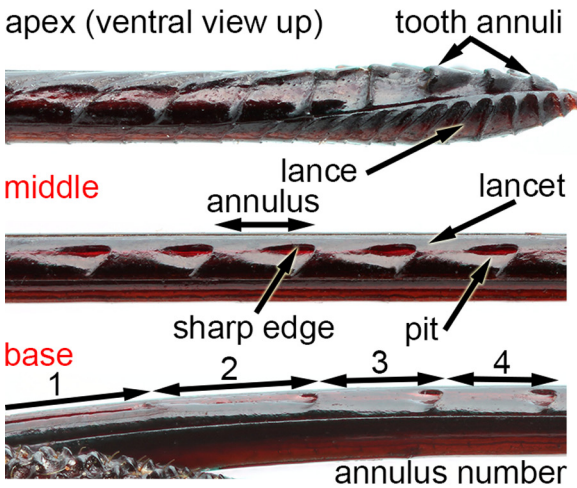
- microsculpture absent (surface shiny)



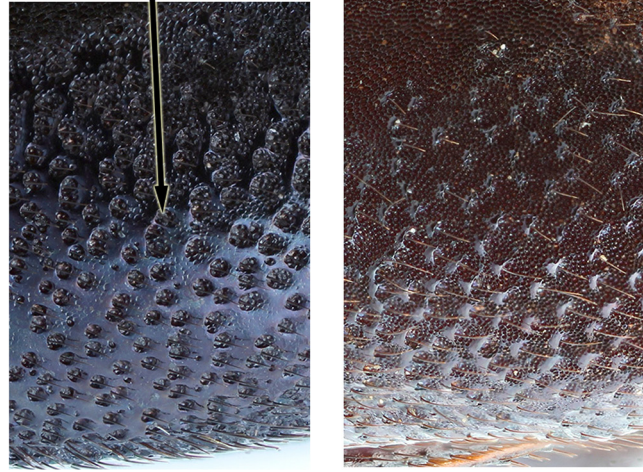
M3 *A. pallipennis* ♀



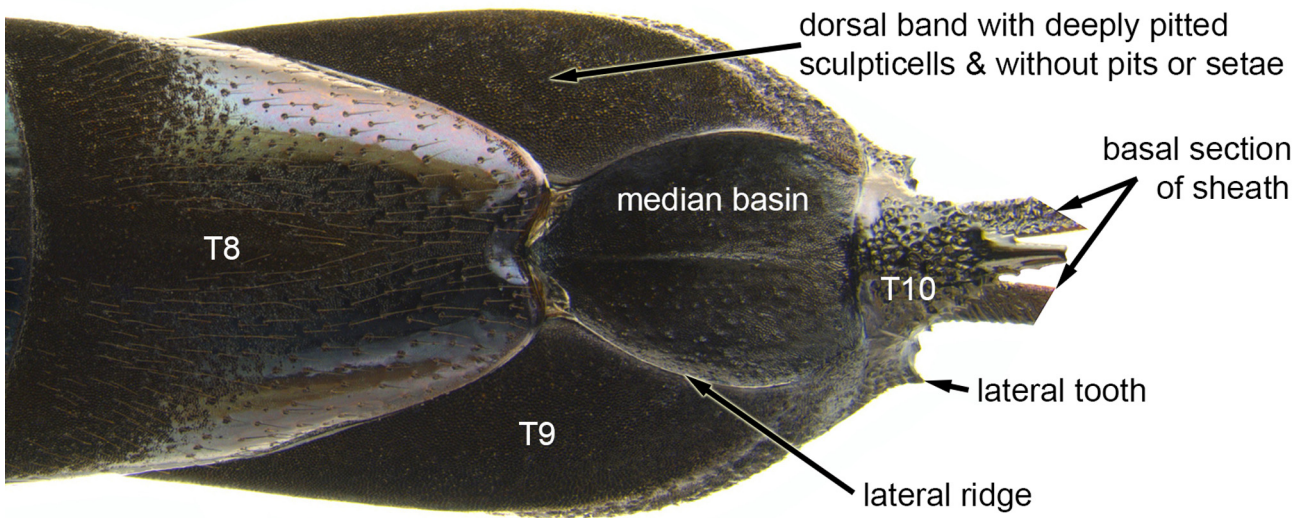
M4 *A. hyalinatus* ♀



M5 *A. comatus* ♀



M4a *A. hyalinatus* ♀ M4b *A. comatus* ♀



M6 *A. hyalinatus* ♀

Some terms designate surface features, such as **ridges** or carinae, **furrows** or sulci, **pits** or punctures, and **microsculpture**. We used terms in bold. The meaning of ridges and furrows are clear but pits and microsculpture require more discussion.

- Pits are concave, usually shiny impressions. Often, the concave surface consists of meshes of microsculpture (Fig T1.3, insert). Most pits are associated with a sensory cell. This sensory cell is a seta, a mechanoreceptor (Fig. M3e, seta). The word “pit” rather than the more common expression “puncture” is used because it refers to a concave impression. However, each seta is articulated to a puncture within the pit. The setigerous puncture is a hole through the cuticle to allow innervation of the seta. Pit sizes are compared to the maximum diameter of a lateral ocellus (e.g., for a small pit, the diameter may be 0.1 times lateral ocellus diameter whereas for a large pit it may be 0.5 times the lateral ocellus diameter), and the density is expressed as the number of typical pit diameters between pits (Fig T1.1, T1.2 and T1.3). Pits in *Afrotremex* are usually simple concave and round impressions, but those on the pronotum, mesoscutum and mesoscutellum may be very large and scallop-like (see Fig K4a and K4b).
- Microsculpture may be absent (Fig. M3e) or present and consisting of small cell sized imprints on the cuticle within which there is no sensory cell. Typical microsculpture of insects is roughly hexagonal. The edge of an imprint is usually outlined by sharp furrows that form a net-like pattern called “meshes” (Fig. M3a, meshes). The surface area delimited by the furrows or meshes is called a “sculpticell” (Allen and Ball, 1980) (Fig. M3a). A sculpticell surface may be flat (Fig. M3d), concave (Fig. M3c) or pit-like (Fig M3a, M3b and M3c). There are other shapes of sculpticells not yet recorded in *Afrotremex* such as convex, scale-like (i.e., surface is raised along the posterior or apical edge), or even seta-like. Each sculpticell is normally completely outlined by meshes. Sculpticells in *Afrotremex* are usually roughly hexagonal or isodiametric; though not recorded in *Afrotremex*, sculpticells can also be stretched laterally (e.g., transverse meshes may be 2 or more times as wide as long), or rarely longitudinally. Microsculpture is best observed at magnifications above 50 times under diffuse light. To reduce glare a translucent piece of plastic (e.g., tracing acetate) should be positioned between the light source and specimen, about 20 mm from the specimen. A 13-watt daylight fluorescent light source also gives good results.

Biology. Until the discovery of *A. xylophagus* nothing was known about the host preferences of *Afrotremex* species. The two specimens of *A. xylophagus* were from the wood of a tree. The handwritten label read as “éclos du bois [d'] Antricyon Klaineamum”. *Antrocaryon klaineamum* Pierre, an Anacardiaceae, is a common widespread tree in central Africa. We still do not know how host specific are species of *Afrotremex*. *Afrotremex* is closely related to *Tremex* and *Eriotremex*. *T. columba* and *E. formosanus* are known the oviposit on a moderately wide variety of angiosperm trees (Schiff *et al.* 2012).

The great rarity of *Afrotremex* specimens in collections may be due to their microhabitat. Several years ago, I observed a large swarm of *Tremex columba* (Linnaeus) on the crown of a large dying sugar maple. Therefore, *T. columba* is a species inhabiting normally the crown of trees. It is unusual to find *T. columba* below three meters above ground. *Tremex columba* is easily observed only if the dying tree limbs are about 1.5 meters above ground or if the tree has fallen down and left undisturbed. Presumably adults of *Afrotremex* also inhabit the crowns of trees. Canopy sampling is difficult to do and requires special equipment, and I suspect that fallen trees would be harvested very rapidly near any African communities, so the opportunity to collect *Afrotremex* is rare.

Key to species of *Afrotremex* based on females

Because so few specimens were available for study, the reliability of character states is questionable. It was therefore necessary to design a key with several characters per couplet and expand the list of significant characters for species or a group of species under the “Comparative diagnosis” of each species. I tried to use characters that have proven reliable in Siricidae (Schiff *et al.* 2012). But possibly some character states will prove to be unreliable.

If a key is based on one character per couplet, even a specimen of a new species not treated within this paper could be keyed to a named species. However, with many characters (5–6) per couplet, it is more likely in one couplet that one or more matching character states would occur in both alternates of the couplet, or even one or more characters would fit none of the states mentioned in the alternates. Therefore, it is important to look at all characters of the couplet while keying out specimens of *Afrotremex*. To help with the recognition of new species, I

have prepared a rather detailed “Comparative diagnosis” which lists characters of significance to look for in various descriptions. If a problem with the distribution of matching character states occurs then the “Comparative diagnosis” of one or more species needs a careful reading. For example if the problem is in couplet 1, the “Comparative diagnosis” of all species needs careful reading, in couplet 2, study those of *A. hyalinatus*, *A. pallipennis*, *A. violaceus* and *X. xylophagus*, in couplet 3, study those of *A. pallipennis* and *A. violaceus*, in couplet 4, those of *A. hyalinatus* and *A. xylophagus*, and finally in couplet 5, those of *A. comatus* and *A. opacus*. Finally, I have generously illustrated each taxon for a better understanding of each statement and for some careful comparisons of structures with the specimen under study.

Though the key is based entirely on females, in choosing characters for each couplet I gave priority to the head (antenna excluded) and notal characters as they are likely to apply also to males, based on my experience with other Siricidae (Schiff *et al.* 2012) and the single male of *Afrotremex* studied. For characters certainly associated with females, each character statement starts with “**in female**”. Remaining characters used are assumed to apply to both sexes. I kept the “Diagnosis” short. The user should not use the “Diagnosis” if the specimen identity is uncertain, but should read carefully the “Comparative diagnosis” as outlined above.

For important information on specimen cleanliness and preparation, recognition of sexes, lighting, key construction see “Use of Keys” in Schiff *et al.* (2102).

- 1** A) **In female**, flagellomere 2 in dorsal view with a sensory oval covering about 0.5 of flagellomere surface (Fig. K1).
 B) Mesoscutum with median longitudinal band (outlined by finer pits) with pits extending laterally posterior to submedian band (Fig. K3a).
 C) Mesoscutum with many (>10) often fused pits on anterolateral corner of lateral band (Fig. K4a).
 D) Mesoscutum with convex sculpticells on all or at least 0.7 of median surface of scutoscutellar furrow; surface with microsculpture with a clear metallic yellow green hue (Fig. K3a).
 E) **In female**, tergum 8 shiny (with no pitted sculpticells) at least along lateral margin in posterior 0.5 (Fig K5 and K6).
 F) **In female**, tergum 10 in dorsal view with pits extended medially to and not reaching posterior edge of median basin of tergum 9 or extended on 0.3 of edge medially (Fig K8 and K9).
 **2**
- a) **In female**, flagellomere 2 in inner view with a sensory oval covering less than 0.2 of flagellomere surface (Fig. K2).
 b) Mesoscutum with median longitudinal band (outlined by finer pits) with pits not extending posterior to submedian band (Fig. K3b).
 c) Mesoscutum with few pits (<10) usually isolated on anterolateral corner of lateral band (Fig. K4b).
 d) Mesoscutum without convex sculpticells at most with flat sculpticells on about 0.25 of median surface of scutoscutellar furrow; surface with microsculpture without a clear metallic hue (Fig. K3b).
 e) **In female**, tergum 8 completely matt (microsculpture deeply impressed, sculpticells pit-like) (Fig. K7).
 f) **In female**, tergum 10 in dorsal view with pits extended on about 0.7 of posterior edge of median basin of tergum 9 medially (Fig. K10).
 **5**
- 2(1)** A) Gena with pits very dense (usually polygonal in outline) and large (0.2–0.4 times as large as diameter of lateral ocellus) in ventral 0.7, and scattered and small pits (0.2–0.3 as large as diameter of lateral ocellus) in dorsal 0.3 (Fig. K11).
 B) Clypeus, frons and postocellar area with apex of setae clearly clubbed (club about 2 times as wide as setal shaft); and on frons setae 0.5–0.7 as long as diameter of lateral ocellus (Fig. K13).
 C) Mesoscutum with submedian band not sharply outlined laterally; in posterior 0.5 straight (Fig. K15).
 D) Mesoscutum with convex sculpticells on about 0.7 of median surface of scutoscutellar furrow (Fig. K17a).
 E) **In female**, tergum 10 in lateral view with teeth posterior to lateral tooth (Fig 18 and K19).
 F) **In female**, tergum 8 with deep pit-like sculpticells in basal 0.4–0.5 and medially reaching or not posterior edge, remaining surface shiny (without pitted sculpticells) (Fig K21 and K22).
 **4**
- a) Gena with less dense pits (usually circular in outline) and quite large (0.2–0.3 times as large as diameter of lateral ocellus) near mandible in ventral 0.2, and scattered and fine pits (at most 0.15 times as large as lateral ocellus) on dorsal 0.5 (Fig. K12).
 b) Clypeus, frons and postocellar area with apex of setae slightly clubbed or truncate (club about 1.5 times as wide as setal shaft); and on frons setae 1.5–2.0 as long as diameter of lateral ocellus (Fig. K14).
 c) Mesoscutum with submedian band sharply outlined laterally; in posterior 0.5 clearly curved inward (Fig. K16).
 d) Mesoscutum with convex sculpticells on all or almost all of median surface of scutoscutellar furrow. (Fig. K17b).
 e) **In female**, tergum 10 in lateral view without teeth posterior to lateral tooth (Fig. 20).
 f) **In female**, tergum 8 with pit-like sculpticells on basal 0.2–0.4 (surface matt), and shiny on apical 0.6–0.8 with a medial shiny triangle extended near base (partly dividing the transverse band with pitted sculpticells) (Fig. K23).
 **3**
- 3(2)** A) Mesoscutum on anterior 0.3 of median band without longitudinal row of large pits (Fig. K24a).
 B) **In female**, terga 4 and 5 with matt surface; tergum 6 shiny posteromedially on 0.25 of surface; tergum 7 shiny posteromedially

ally on 0.7 of surface (Fig. K25).

C) **In female**, tergum 8 shiny posteriorly on 0.6–0.7 of surface (Fig. K27).

D) **In female**, tergum 10 in dorsal view with pits spread about 0.5 times as wide as posterior edge of median basin of tergum 9 (Fig. K29); surface between pits smooth (Fig. K29, insert).

E) **In female**, tergum 10 in lateral view anterior lateral tooth surface with few large pits (Fig. K30).

F) **In female**, fore and hind wings darkly tinted (Fig. K33).

..... *Afrotremex violaceus* Pasteels

a) Mesoscutum on anterior 0.3 of median band with a longitudinal row of large pits (about 0.25 times as large as diameter of lateral ocellus) (Fig. K24b).

b) **In female**, tergum 4 shiny anteromedially on 0.25 of surface; tergum 5 shiny anteromedially on 0.5 of surface; tergum 6 shiny anteromedially on 0.8 of surface; tergum 7 shiny anteromedially on 0.9 of surface (Fig. K26).

c) **In female**, tergum 8 shiny posteriorly on about 0.85 of surface (Fig. K28).

d) **In female**, tergum 10 in dorsal view with pits spread about 0.75 times as wide as of posterior edge of median basin of tergum 9 (Fig. K30); surface between pits with meshes of microsculpture except centrally (Fig. K30, insert).

e) **In female**, tergum 10 in lateral view anterior lateral tooth surface with many small pits (Fig. K32).

f) **In female, fore wing** clear in central area; darkly tinted in the following cells: C, R, 1Cu (except for small clear spot posteriorly), 1A (except for clear spot in apical 0.5 – not visible in figure), 1M (small anterobasal spot), 2Cu (small anterobasal spot), 1R1, 2R1 (small basal spot), 3R1 (anterior 0.5 lightly tinted); Rs+1Rs2 (only near 1R1); 2Rs2 (lightly tinted in apical 0.5 (Fig. K23)); **hind wing** mainly clear; darkly tinted in the following cells: C (not visible in figure), R (dark spot in basal 0.4), 1Cu (dark spot in basal 0.4), most of anal lobe (except for clear central spot) (Fig. K34).

..... *Afrotremex pallipennis* n. sp

4(2) A) Gena with a row of pits with raised posterior edge extended from lower eye margin to occiput at about the eye middle height; pits fused and bottom striated (Fig. K35, insert).

B) Mesoscutum with lateral edge of submedian band parallel in anterior 0.5 (Fig. K37).

C) Mesoscutum with a band of small pits (similar to those of median band) along lateral margin of submedian band in posterior 0.5 (Fig. K39a).

D) Axilla with medium size pits centrally (Fig. K40a, white arrows); with small pits (similar in size to those of median band) along anterior edge (Fig. 40a, black arrows); and pitted surface of submedian band not connected to anteromedian corner of axilla (at most some transverse wrinkles) (Fig. K40a, red arrow).

E) **In female**, tergum 8 broadly shiny in posterior 0.6 except for median matt extension not reaching posterior edge (Fig. K41).

F) **In female, fore wing** with more extensive clear membrane in following cells: apical spot of 1Cu, apical 0.7 of 1M, almost all of 2Cu, most of Rs+1Rs2, basal 0.3 of 3M, basal 0.7 of 3Cu, 2M, 2A (not visible in figure), and apical 0.25 of 1A (not visible in figure); **hind wing** clear in apical 0.5 (Fig. K43).

..... *Afrotremex hyalinatus* (Mocsáry, 1891)

a) Gena with a row of pits with raised posterior edge extended from lower eye margin to occiput at about the eye middle height; each pit round, not fused, and bottom smooth (Fig. K36, insert).

b) Mesoscutum with lateral edge of submedian band convergent in anterior 0.5 (Fig. K38).

c) Mesoscutum with some small pits (similar to those of median band) along lateral margin of submedian band in posterior 0.5 (Fig. 39b).

d) Axilla with many large pits (Fig. 40b, white arrows); without small pits (similar in size to those of median band) along anterior edge (Fig. 40b, black arrows); and pits surface of submedian band on posterior margin connected to anterior median 0.3 edge of axilla (Fig. 40b, red arrows).

e) **In female**, tergum 8 broadly shiny in posterior 0.5 along lateral margin, matt extension broad medially and reaching posterior edge (Fig. K42).

f) **In female, fore wing** with less extensive clear membrane in following cells: apical 0.5 of 1M, apical 0.5 of 2Cu, central area of Rs+1Rs2 near vein M, basal 0.5 of 3Cu, basal 0.75 of 2M; **hind wing** in apical 0.5 darkly tinted in following cells: R1, 2Rs, apical 0.5 of 2M, except for centre of 1Rs, apical corner of 2Cu, and apical margin of R (Fig. K44).

..... *Afrotremex xylophagus* n. sp.

5(1) A) Pronotum medially with numerous long setae medially (best seen in lateral view) (Fig. K45).

B) **In female**, tergum 4 shiny in central 0.25; tergum 5 shiny in central 0.5; tergum 6 shiny in central 0.7; tergum 7 shiny in posterior 0.5 (Fig. K47).

C) **In female**, tergum 9 with median basin slightly longer (maximum width/ maximum length: 0.85–0.97) (Fig. K49); setae about twice as long as tubercle (Fig. K49, insert).

D) **In female**, fore wing not as darkly tinted in following cell: apical 0.3 of 3M; hind wing clear at apex and darkly tinted on basal 0.5 of anal lobe (Fig. K51).

..... *Afrotremex comatus* n. sp.

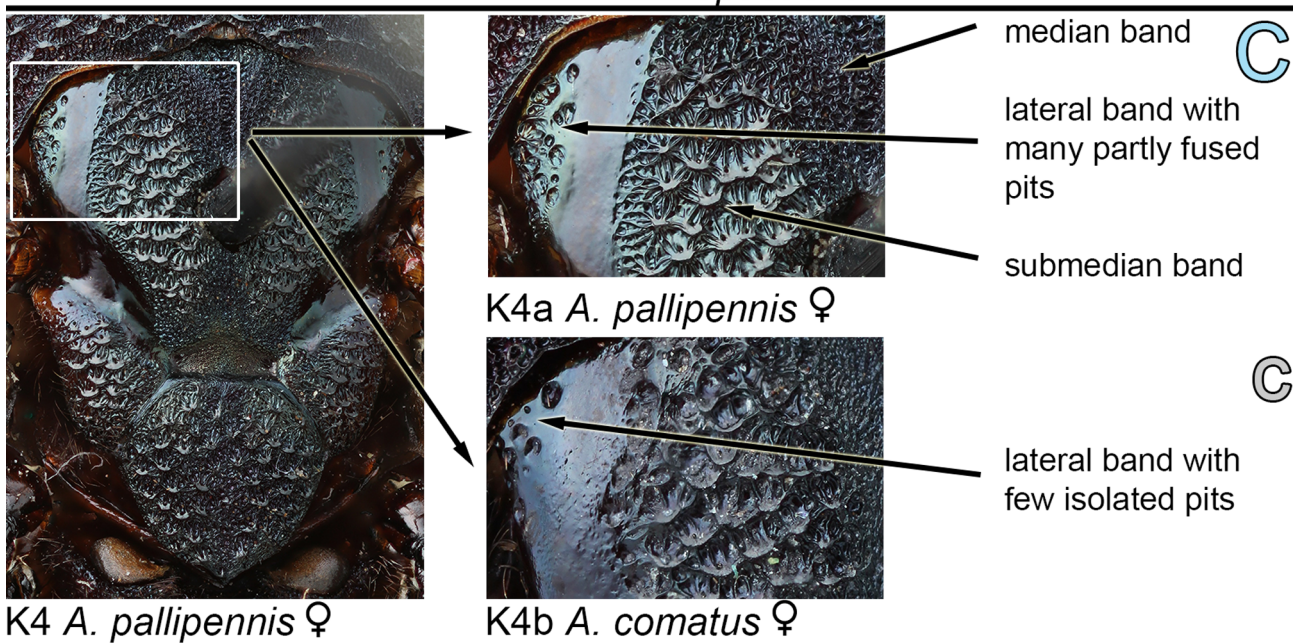
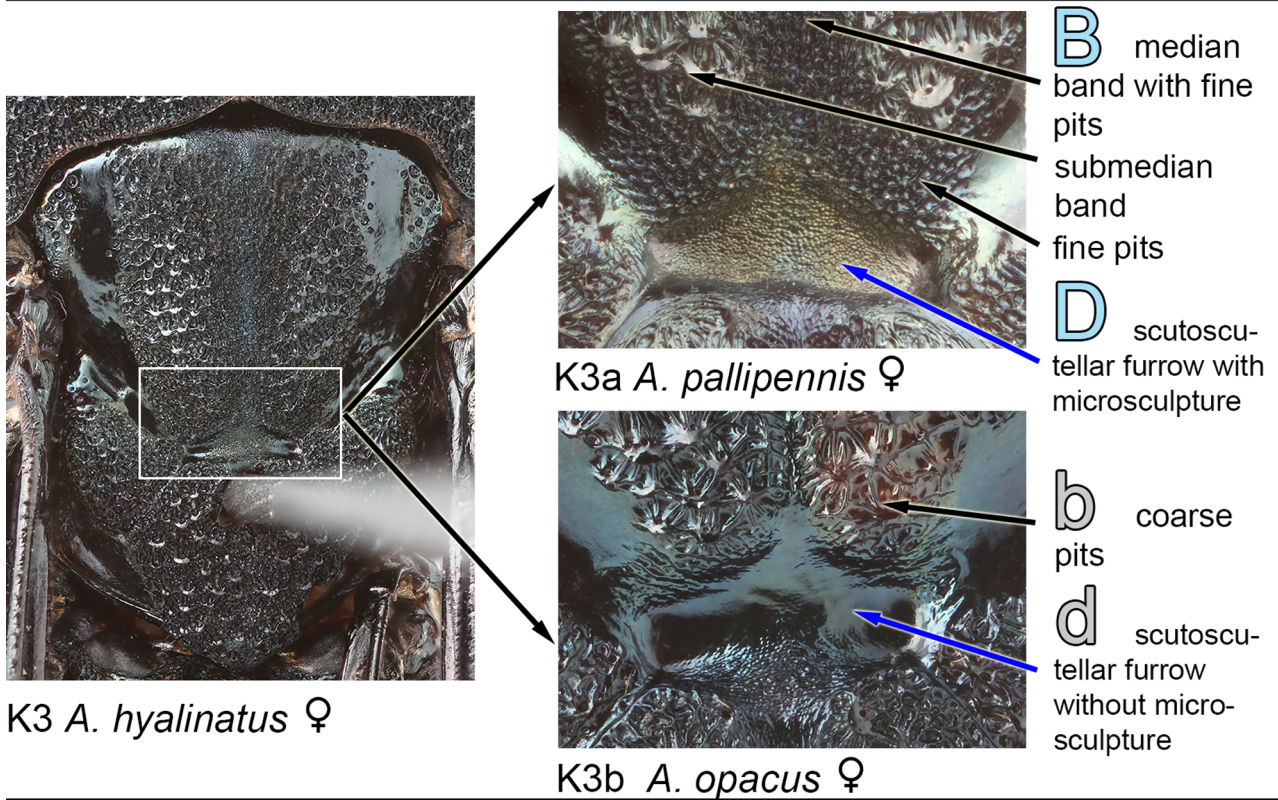
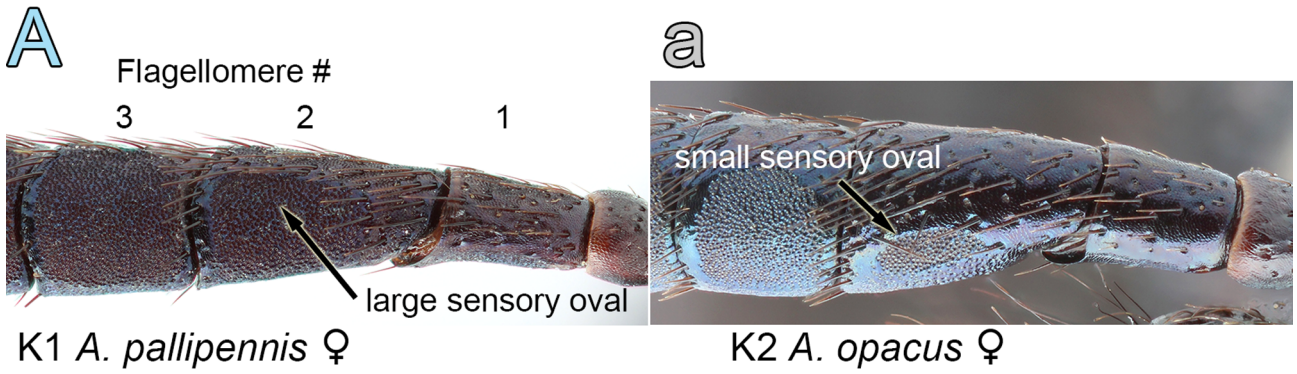
a) Pronotum medially without or with very few and very small setae (best seen in lateral view) (Fig. K46).

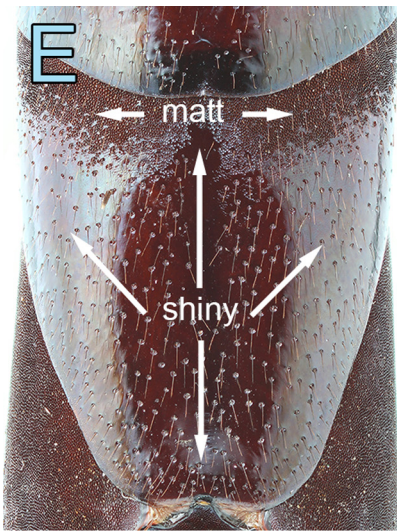
b) **In female**, tergum 4–6 not shiny; tergum 7 shiny on a small submedian area (Fig. K48).

c) **In female**, tergum 9 with median basin slightly wider (maximum width/ maximum median length: 1.05–1.07) (Fig. K50); setae about as long as tubercle (Fig. K50, insert).

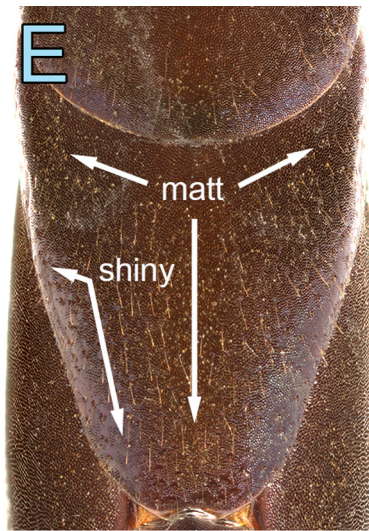
d) **In female**, fore wing not as darkly tinted in following cell: most 3M, and posterior margin of 3Cu; hind wing darkly tinted on most of anal lobe except for small more or less clear spot anteriorly and at apex in apical 0.3 of R1, 0.25 of 2RS, and posterior margin of 2M near its apex. (Fig. K52).

..... *Afrotremex opacus* n. sp.

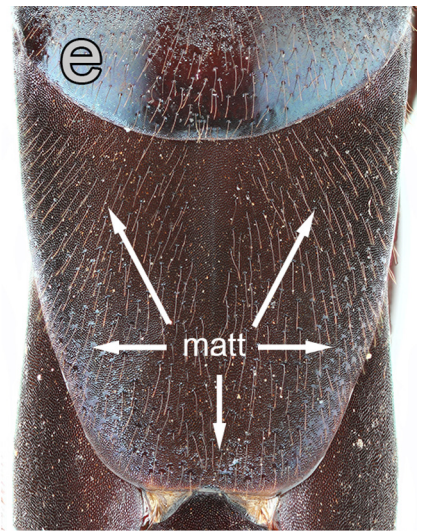




K5 *A. pallipennis* ♀



K6 *A. xylophagus* ♀



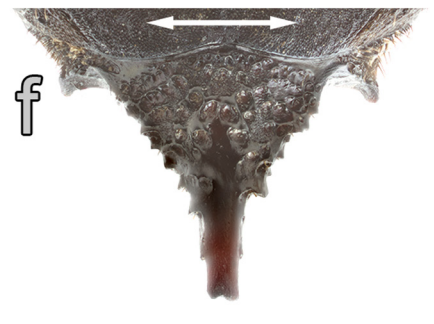
K7 *A. comatus* ♀



K8 *A. hyalinatus* ♀



K9 *A. xylophagus* ♀



K10 *A. comatus* ♀

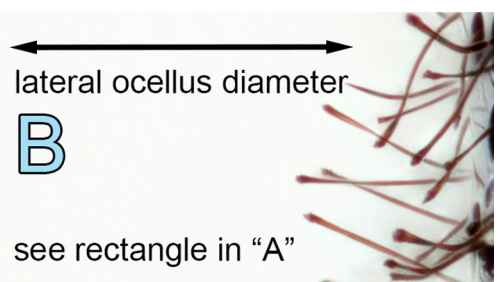
white arrow indicate
point of contact with
posterior edge of median
basin of tergum 9



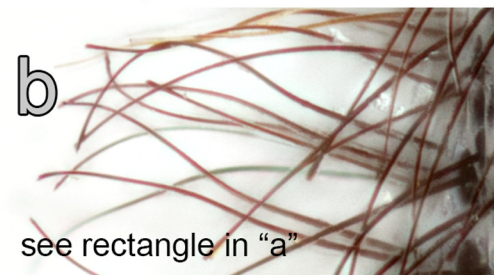
K11 *A. hyalinatus* ♀



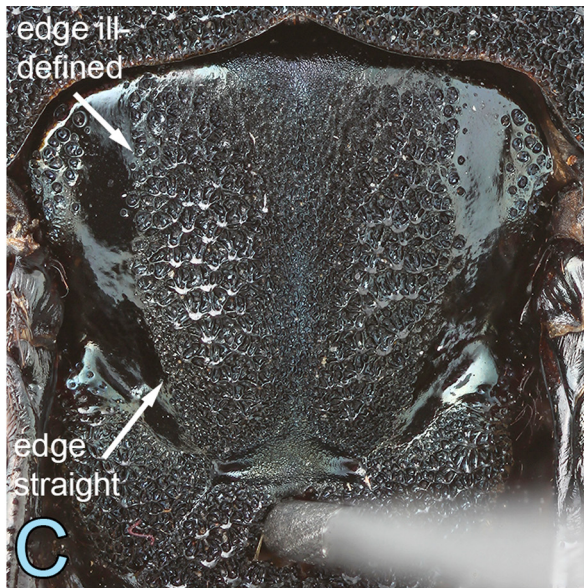
K12 *A. violaceus* ♀



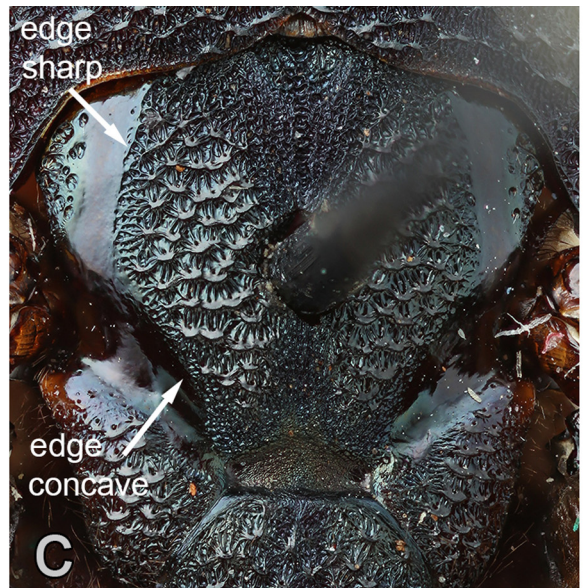
K13 *A. hyalinatus* ♀



K14 *A. comatus* ♀



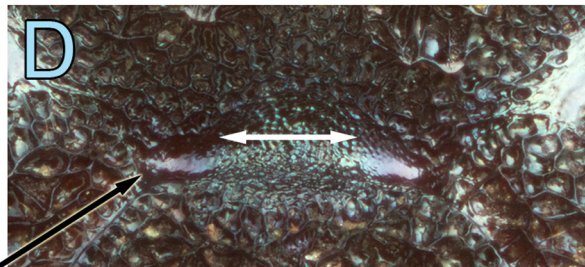
K15 *A. hyalinatus* ♀



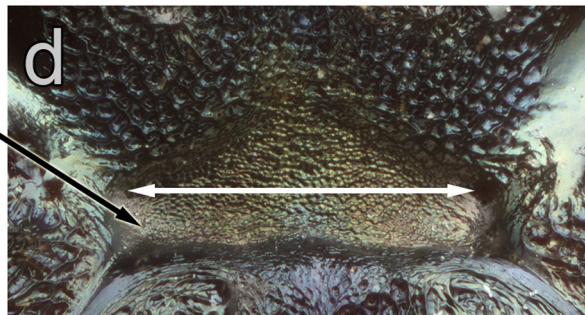
K16 *A. pallipennis* ♀



K17 *A. violaceus* ♀



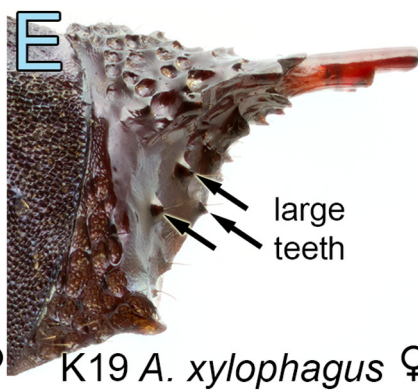
K17a *A. xylophagus* ♀



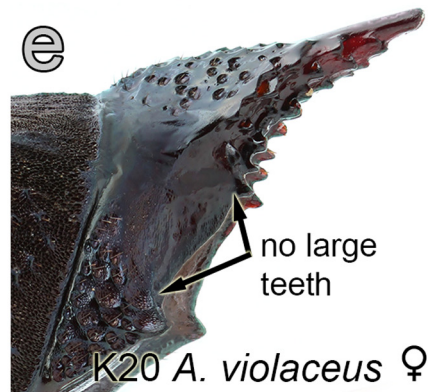
K17b *A. pallipennis* ♀



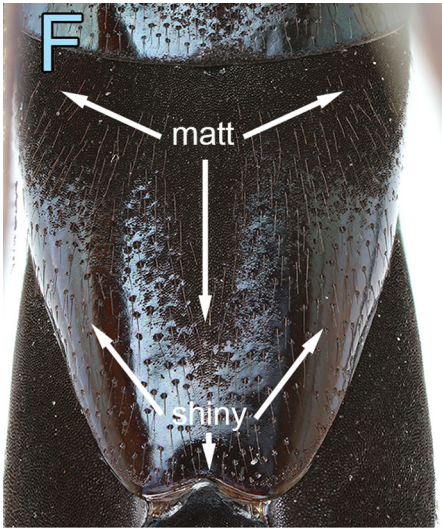
K18 *A. hyalinatus* ♀



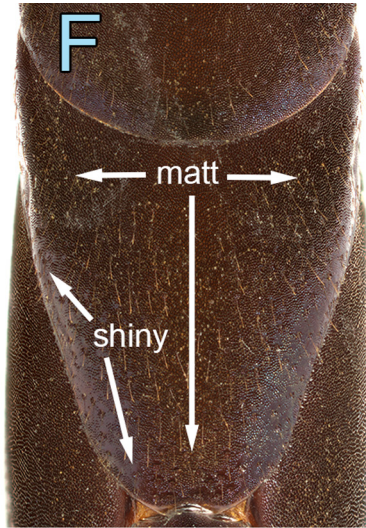
K19 *A. xylophagus* ♀



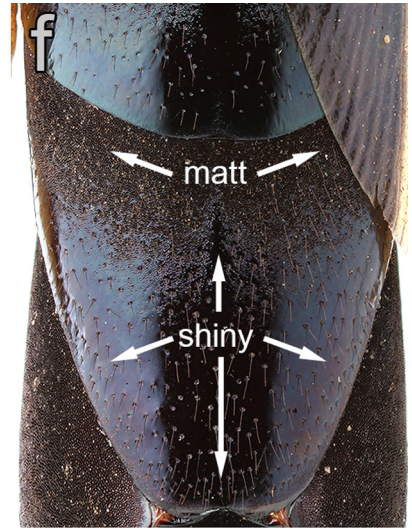
K20 *A. violaceus* ♀



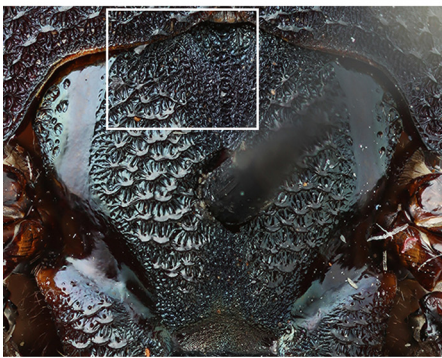
K21. *A. hyalinatus* ♀



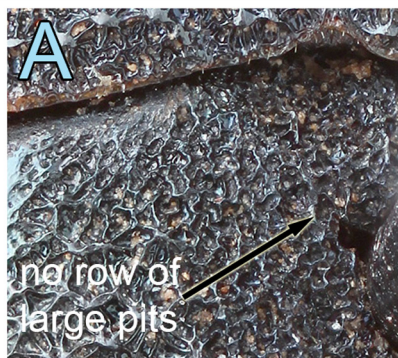
K22 *A. xylophagus* ♀



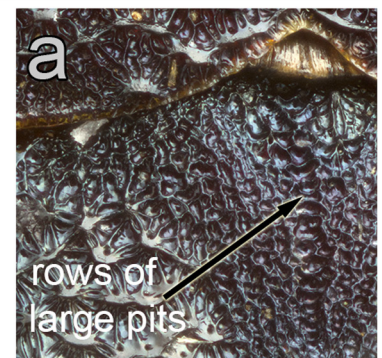
K23 *A. violaceus* ♀



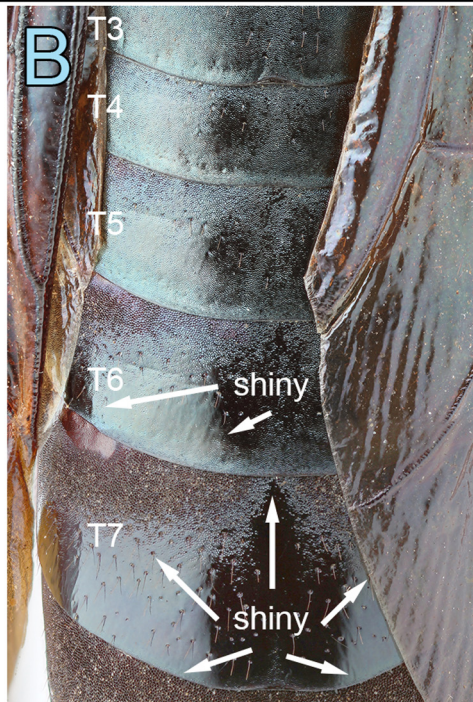
K24 *A. pallipennis* ♀



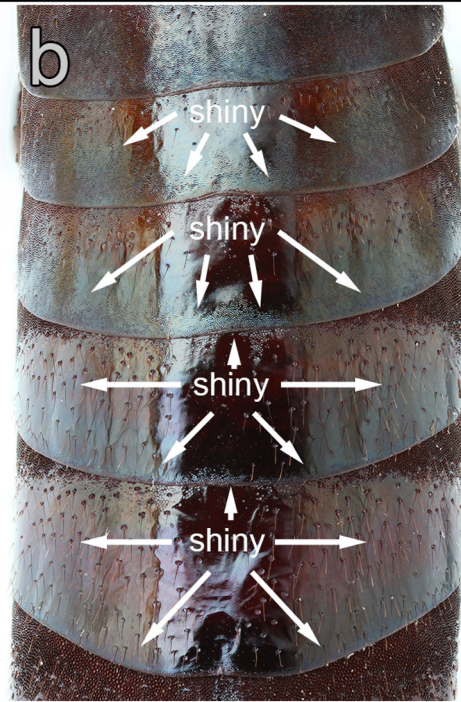
K24a *A. violaceus* ♀



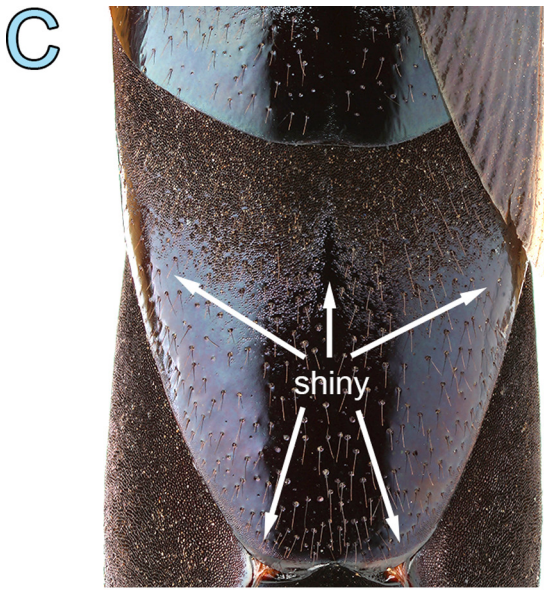
K24b *A. pallipennis* ♀



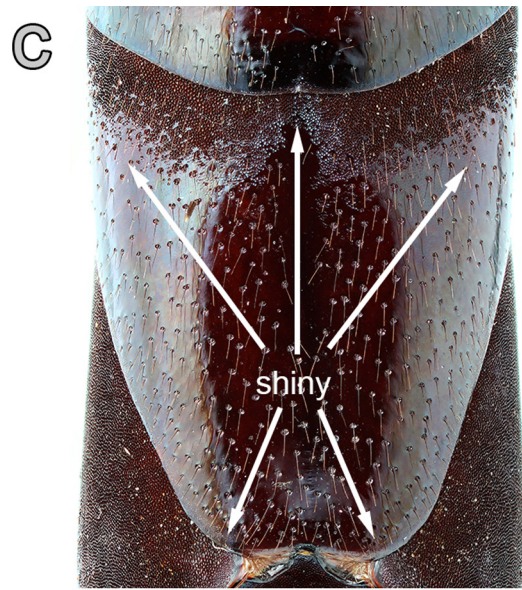
K25 *A. violaceus* ♀



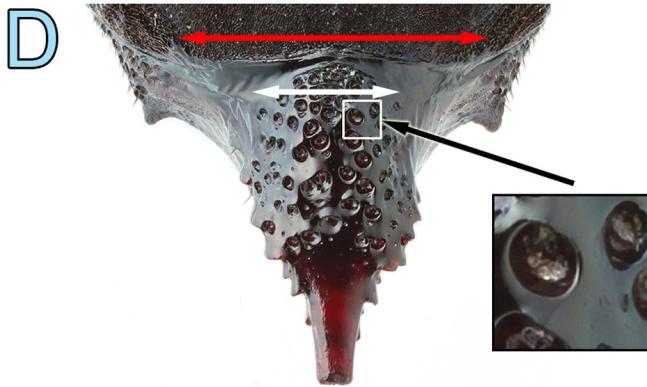
K26 *A. pallipennis* ♀



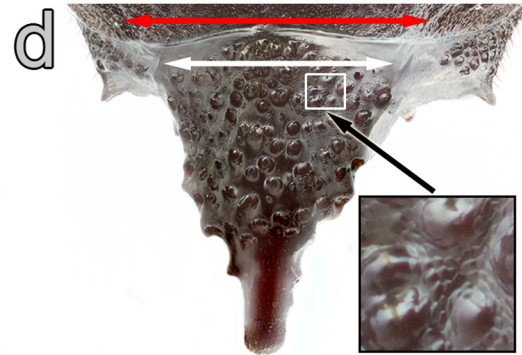
K27 *A. violaceus* ♀



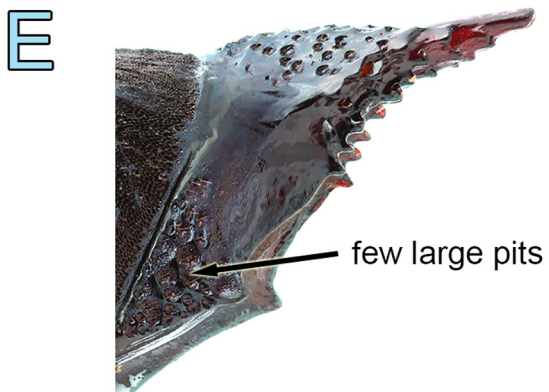
K28 *A. pallipennis* ♀



K29 *A. violaceus* ♀



K30 *A. pallipennis* ♀



K31 *A. violaceus* ♀



K32 *A. pallipennis* ♀

F

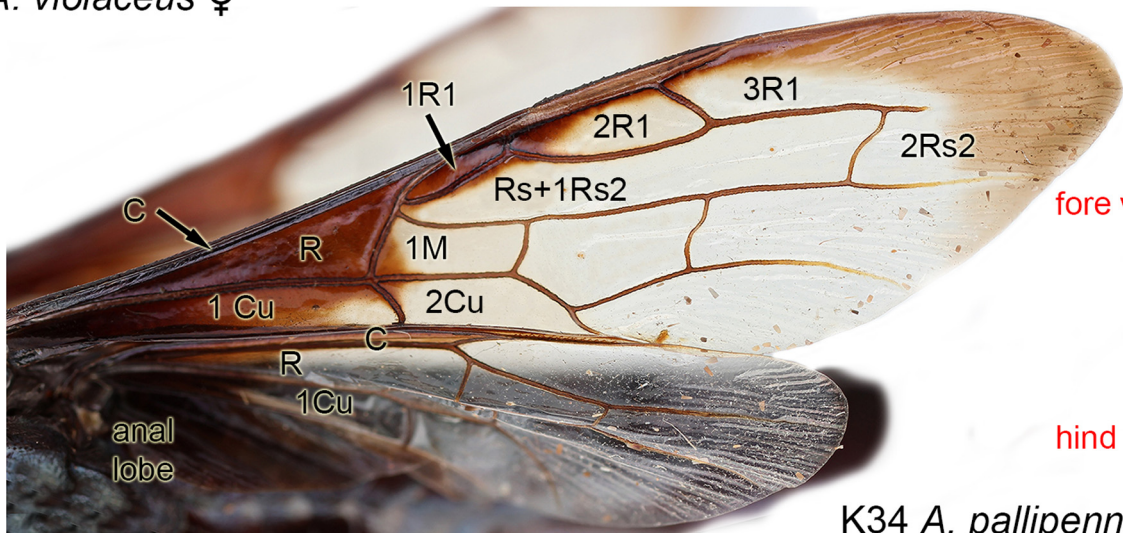


fore wing

hind wing

K33 *A. violaceus* ♀

f

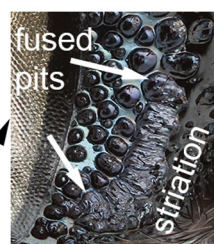
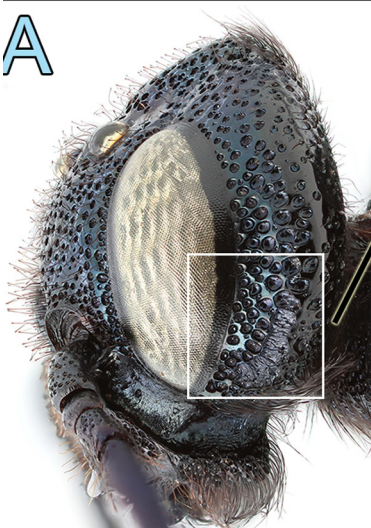


fore wing

hind wing

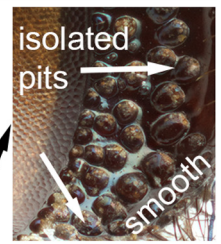
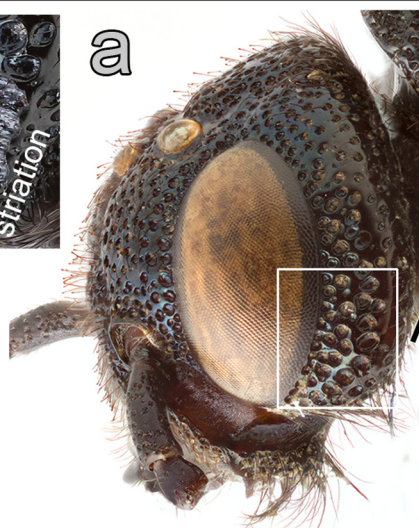
K34 *A. pallipennis* ♀

A

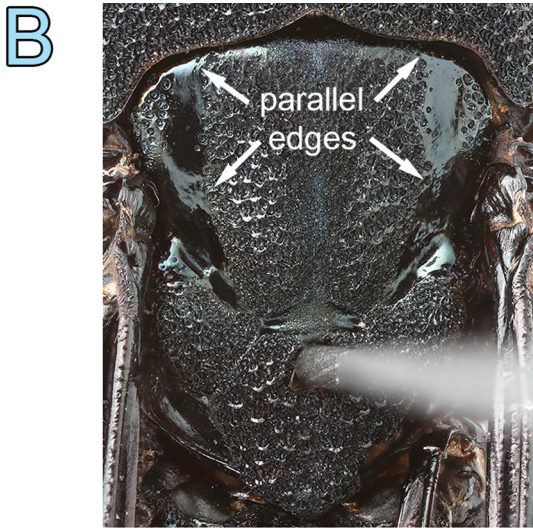


K35 *A. hyalinatus* ♀

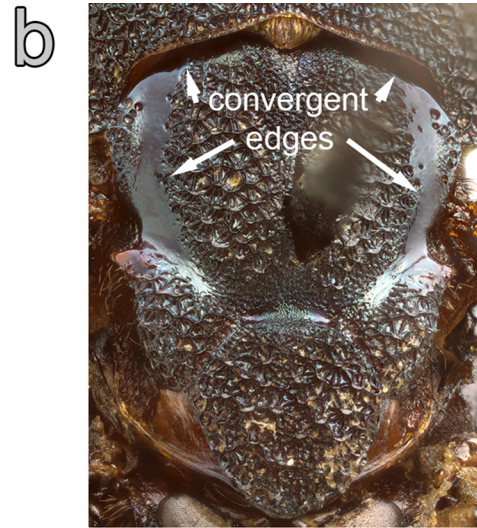
a



K36 *A. xylophagus* ♀



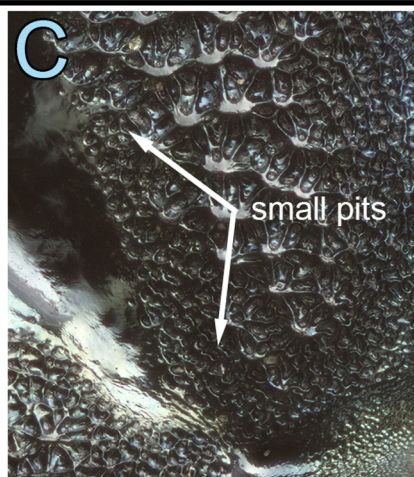
K37 *A. hyalinatus* ♀



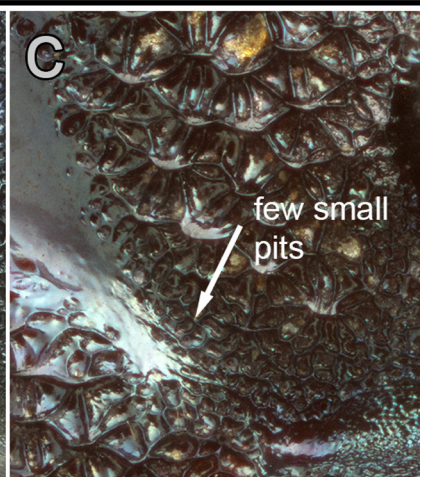
K38 *A. xylophagus* ♀



K39 *A. hyalinatus* ♀



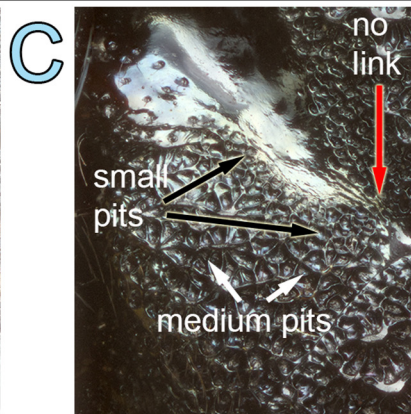
K39a *A. hyalinatus* ♀



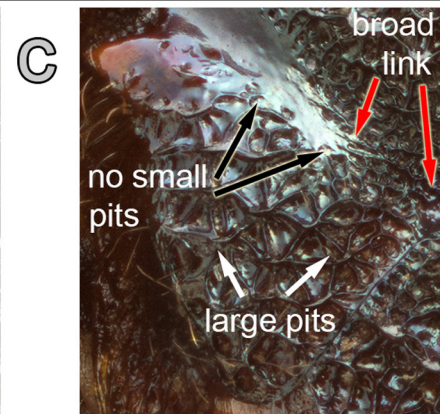
K39b *A. xylophagus* ♀



K40 *A. hyalinatus* ♀

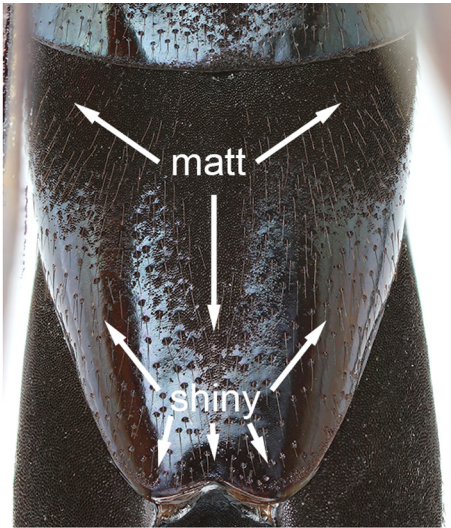


K40a *A. hyalinatus* ♀



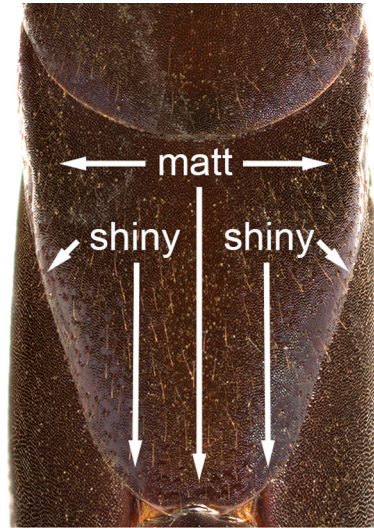
K40b *A. xylophagus* ♀

E



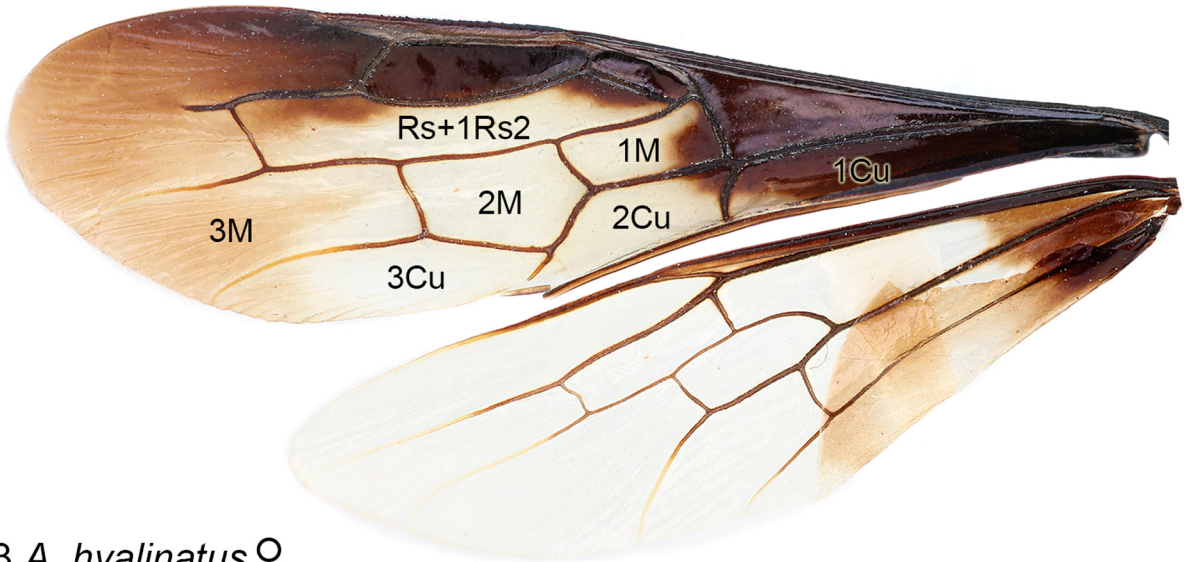
K41 *A. hyalinatus* ♀

e



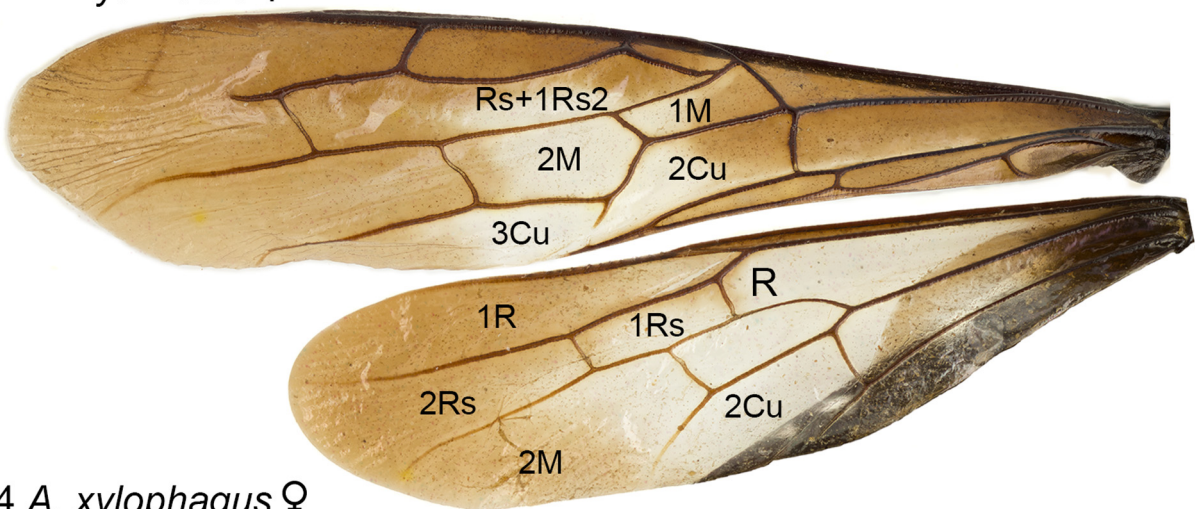
K42 *A. xylophagus* ♀

F



K43 *A. hyalinatus* ♀

f



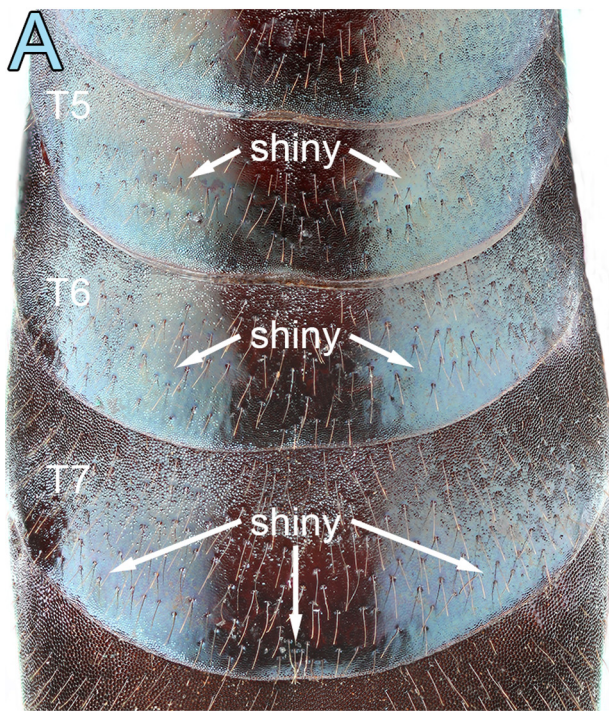
K44 *A. xylophagus* ♀



K45 *A. comatus* ♀



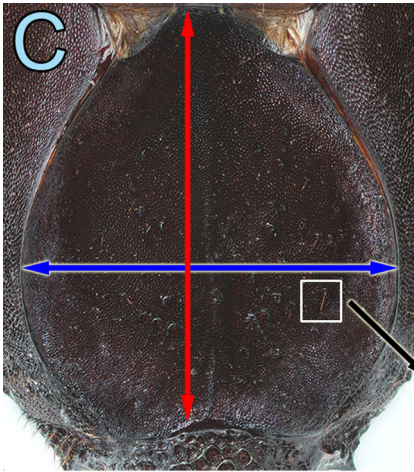
K46 *A. opacus* ♀



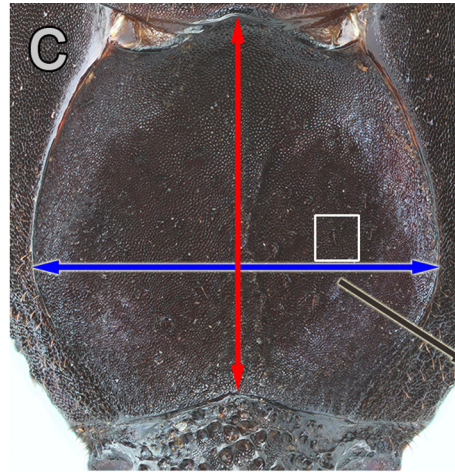
K47 *A. comatus* ♀



K48 *A. opacus* ♀

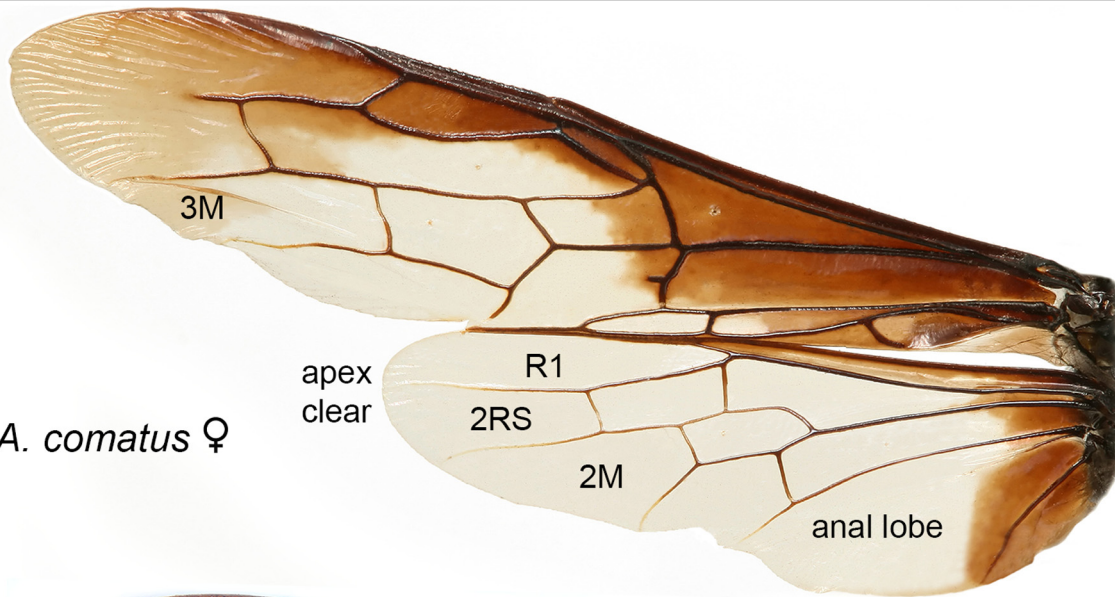


K49 *A. comatus* ♀



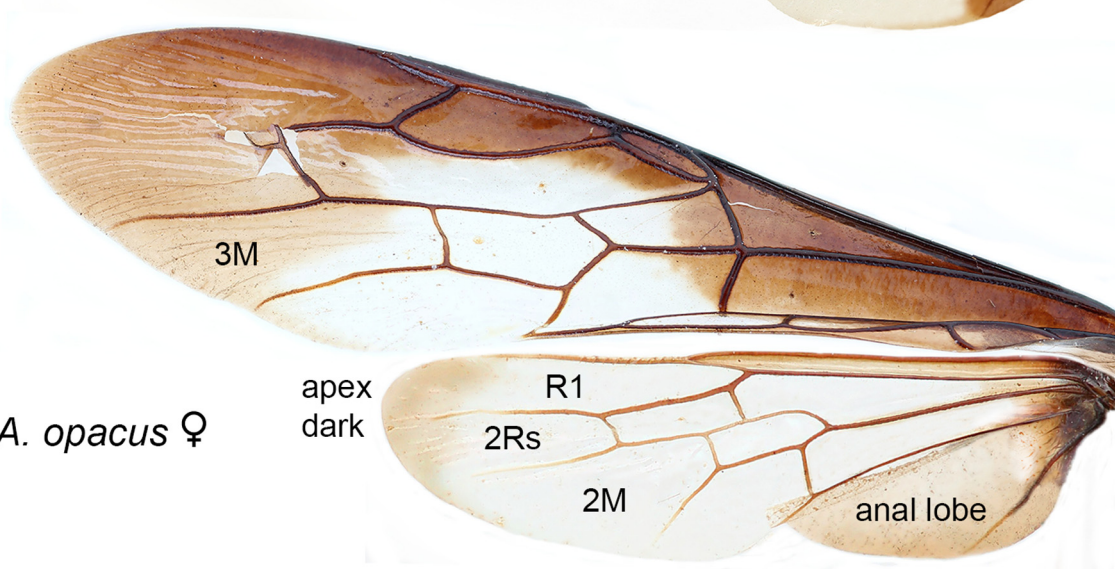
K50 *A. opacus* ♀

D



K51 *A. comatus* ♀

d



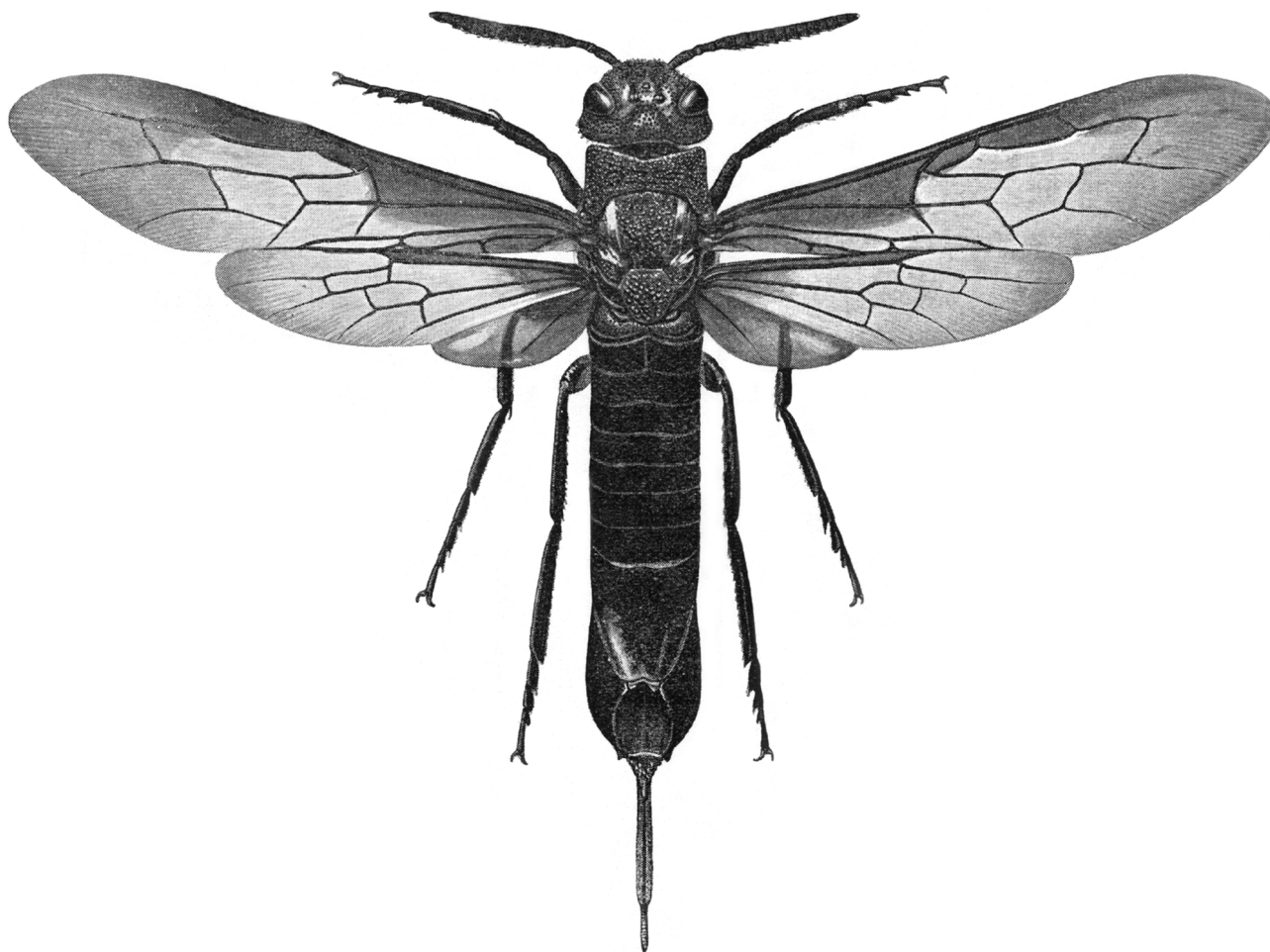
K52 *A. opacus* ♀

Taxonomic treatment

1. Genus *Afrotremex* Pasteels, 1951

Fig. T1.27 (habitus drawing by A. Baliani of the *Afrotremex hyalinatus* holotype, reproduced from Guiglia (1937)); T1.1–T1.25 (description)

Afrotremex Pasteels, 1951: 185–186. Type species: *Tremex hyalinatus* Mocsáry, 1891; original designation. Name accepted by Smith 1978: 90 (catalog), Taeger *et al.*, 2010: 106, Taeger and Blank 2011, Schiff *et al.* 2012.



T1.27 *Afrotremex hyalinatus* ♀ - holotype

Diagnosis. Adults of *Afrotremex* are distinguished from related genera (*Teredon*, *Eriotremex* and *Tremex*) by three clearly outlined longitudinal bands of sculpture on the mesonotum, and by the clubbed setae on the clypeus, frons and postocellar area. **Females** are easily recognized by the matt longitudinal band of deep pit-like sculpticells and the absence of pits on tergum 9 in dorsal view lateral to median basin, **and** by the large lateral tooth near the base of tergum 10 (cornus) in dorsal view (tooth also in *Eriotremex formosanus* Matsumura).

Description of female. COLOR. Body **in female** black with dark blue metallic reflections and **in male** (one specimen studied) body with black, brown, reddish brown and light reddish brown spots. **In female**, apical section of sheath reddish brown apically. Wings **in female** completely dark brown with purple metallic reflections, or dark brown with a clear central surface and **in male** (one specimen studied) mainly lightly tinted and a little darker anteriorly.

HEAD. *Head capsule* in frontal view with minimum distance between inner edges of eyes 1.2 times as long as maximum eye height (Fig. T1.1, in white), distance between inner edges of antennal sockets 6.0 times distance between outer edge of antennal socket and nearest inner edge of eye (Fig. T1.1, in red), distance between inner edges of lateral ocelli 1.5–2.0 times as long as distance between outer edge of lateral ocellus and nearest edge of

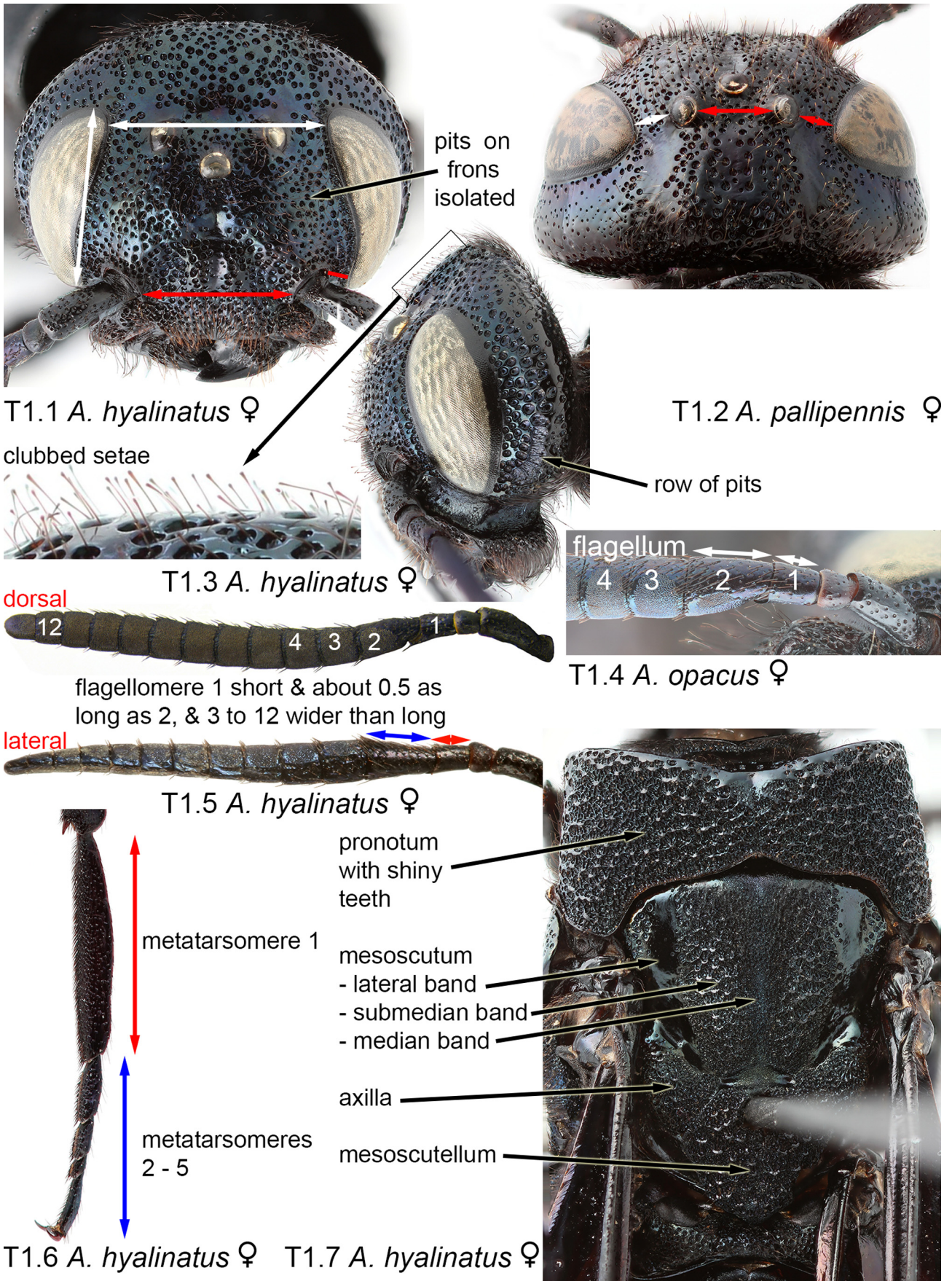
eye (Fig. T1.2, in white). Frons with pits usually not touching each other (Fig. T1.1). Clypeus, frons and postocellar area with clubbed setae, elsewhere setae sharp at apex (Fig. T1.3). Gena between lowest edge of eye and middle of eye with a row of pits with raised posterior margin extended from lowest margin of eye to posterior edge of gena (Fig. T1.3, T1.23 and T1.24). **Antenna in female** with 12–14 flagellomeres, flagellum flattened dorsoventrally (Fig. T1.5, lateral); and flagellomere 3 as wide as long and following flagellomeres to preapical one wider than long (Fig. T1.5, dorsal); flagellomere 1 0.5–0.65 times as long as flagellomere 2 (Fig. T1.4) and dorsally about 1.3 times as long as wide; and flagellomere 2 dorsally with a small or large sensory oval (Fig K1 and K2). **Antenna in male** (one specimen studied) with 10 flagellomeres, flagellum not flattened dorsoventrally (Fig. T1.21), and flagellomeres 3 to preapical one longer than wide (Fig. T1.21); flagellomere 1 0.9 times as long as flagellomere 2 (Fig. T1.21) and dorsally about 2.5 times as long as wide; and flagellomere 2 dorsally without a sensory oval (Fig. T1.21).

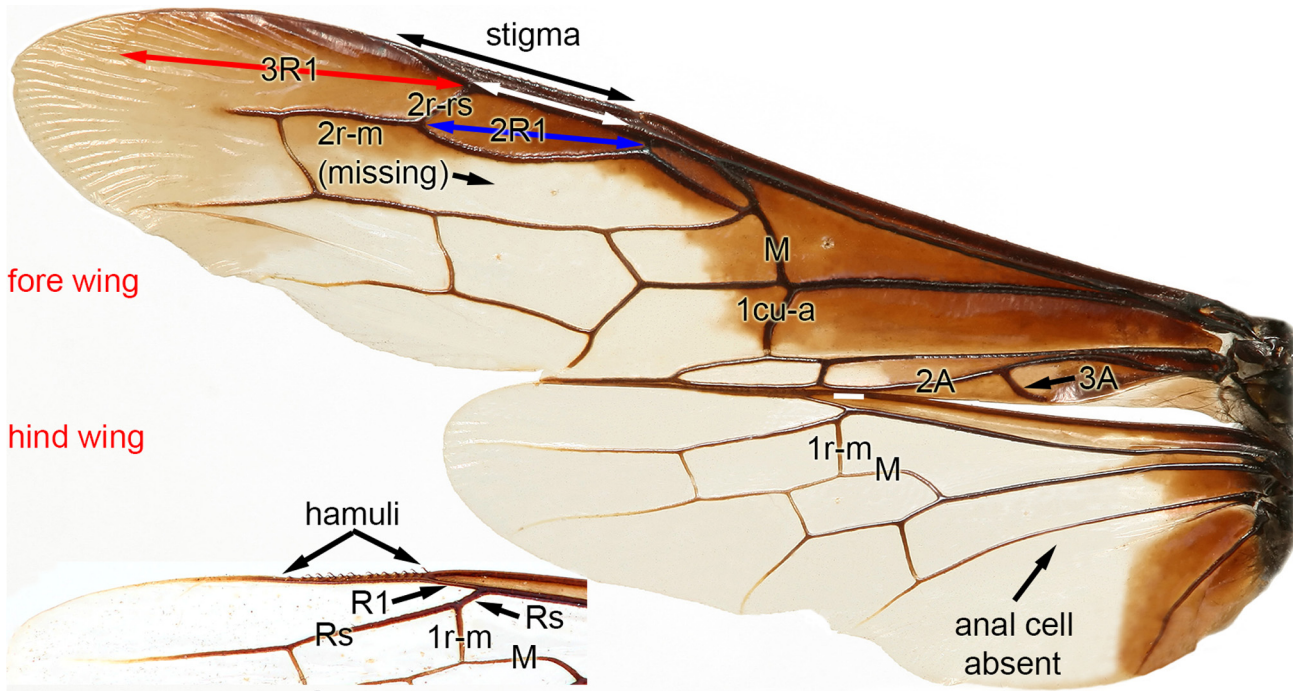
THORAX. **Pronotum** in dorsal view finely pitted with numerous prominent shiny teeth slanted posteriorly (Fig. T1.7); in lateral view setae absent (fig. K46) or small posterior to some prominent teeth, or with numerous long setae in median area (Fig. K47). **Mesoscutum** with median band quite wide at its narrowest (0.3–0.7 as wide as diameter of a lateral ocellus) and consisting of fine, dense pits; submedian band widest, with large scallop-like pits and numerous prominent shiny teeth slanted posteriorly; and lateral band usually very shiny or occasionally with meshes of microsculpture lightly impressed, and anterolateral corner with or without pits (Fig. T1.7). Mesoscutellum and axilla generally with sculptures similar to submedian band of mesoscutum (Fig. T1.7). Mesoscutum on submedian band and mesoscutellum in lateral view without setae or with very small setae (Fig K46 and K47). **Metatarsomere 1 in female** 1.1–1.2 times as long as combined length of metatarsomeres 2–5 (excluding claws) (Fig. T1.6) and **in male** as long as combined length of metatarsomeres 2–5 (Fig. T7.21). **Fore wing** without vein 2r–m, with vein 1cu–a aligned or almost aligned with vein M, with cell 2R1 0.55–0.98 times as long as cell 3R1 (Fig T1.8 red and blue arrows, T1.15 and T1.17), with vein 2r–rs joining stigma in apical 0.55–0.7 (Fig. T1.8, black and white arrows), with stigma parallel before junction with vein 2r–rs and beyond junction more steeply attenuated (Fig. T1.8), with vein 2A at or near posterior margin of wing only near vein a (Fig. T1.8), and with vein 3A sharply outlined and extending along wing margin (Fig. T1.8). **Hind wing** without anal cell 1A (Fig. T1.8), with hamuli present only apical to junction of veins R1 and C (Fig. T1.8, insert), with vein 1r–m straight and clearly shorter than vein M, and with vein M markedly curved (Fig. T1.8).

ABDOMEN. **Tergum 1** with deeply pitted sculpticells; terga 2–8 with pitted sculpticells ranging from none except at very base to present over almost entire tergum. **In female**, tergum 9 in dorsal view with deeply pitted sculpticells (including median basin), (Fig. M6); with median basin, about as long as wide (Fig. T1.13), its central surface flat with about 20 tubercles clearly raised on anterior or lateral edge, and with or without setae (Fig. M6). **In female**, tergum 9 dorsal view lateral to median basin with deep sculpticells and without pits and setae (Fig. M6), and in lateral view with longitudinal furrow about 0.9 times as long as length of tergum in lateral view (Fig. M4); its surface pitted Fig. T1.10). **In female**, tergum 10 0.60–0.75 times as long as median basin length (Fig. T1.9, red and blue arrows), large triangular tooth-like projection laterobasally (Fig. T1.9), and without cercus on lateroventral surface. **Sheath** with basal section 1.4–1.7 times as long as apical section (Fig. M4), about 0.9 times as long as fore wing length (Fig. T1.11); apical section with few teeth subdorsally in apical 0.25 (Fig. T1.12). **Ovipositor.** Lancet annuli starting at base, and each annulus with one pit, central annuli with medium to large size pit; the pit in basal annuli clearly smaller than or as large as those of apical annuli (Fig. M5).

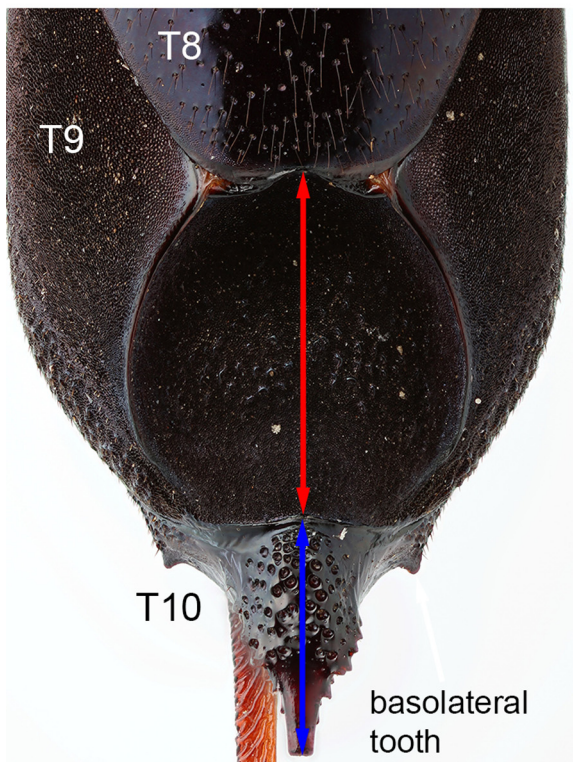
Taxonomic notes. In Schiff *et al.* (2012), the justification for retaining *Afrotremex* as distinct from *Tremex* was left unresolved. Both genera share the loss of cerci in female, but *Afrotremex* has a shorter fore wing cell 2R1 relative to cell 3R1. Benson (1943), while maintaining *T. hyalinatus* as part of *Tremex*, suggested that it should be put in its own genus. Pasteels (1951) agreed and proposed *Afrotremex* to include *T. hyalinatus* and added a new species, *A. violaceus*, for the same reasons brought up by Benson. Because I have seen more specimens and species of *Afrotremex*, had access to a recent illustrated review of *Eriotremex* by Smith (2010), a revision of *Eriotremex* by Maa (1949) and *Tremex* by Maa (1949), a review of Chinese species of Siricidae by Xiao *et al.*, (1992) with many illustrations, and a revision of the New World species of Siricidae with a key to extant world genera by Schiff *et al.* (2012), I have much better data to determine the generic status of *Afrotremex*.

The taxa of significance are *Teredon*, *Eriotremex*, *Afrotremex* and *Tremex*. Their relationships were discussed in Schiff *et al.* (2012). A summary of the shared and derived character states are: labial palp with 2 palpomeres; distance between inner edges of lateral ocelli 1.5–2.3 times greater than the distance between lateral ocellus and

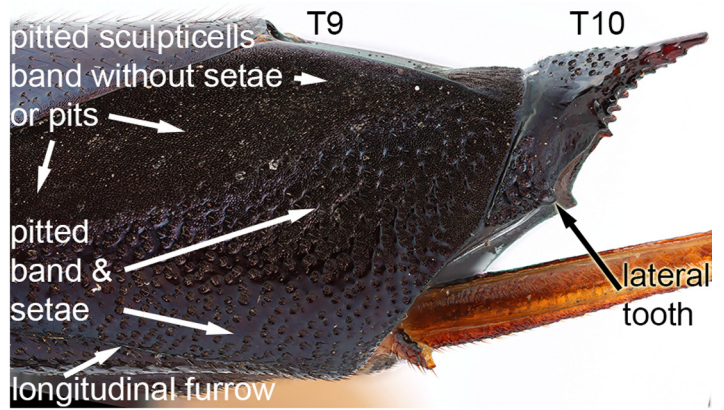




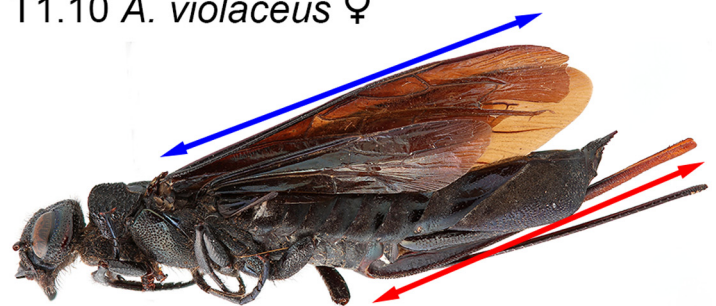
T1.8 *A. comatus* ♀



T1.9 *A. violaceus* ♀

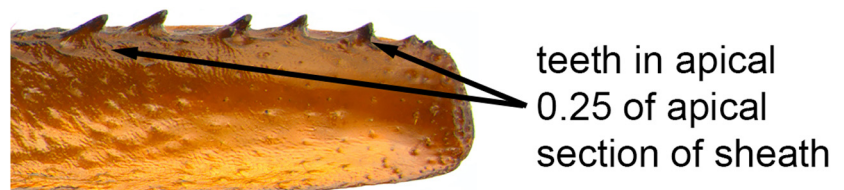


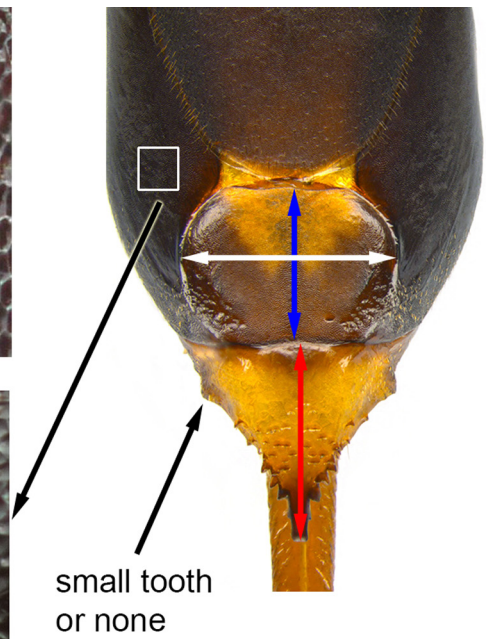
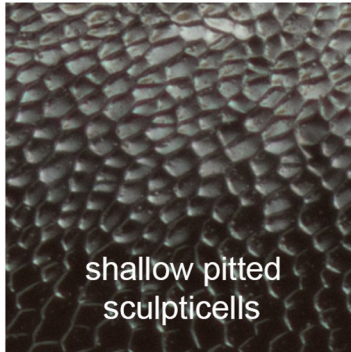
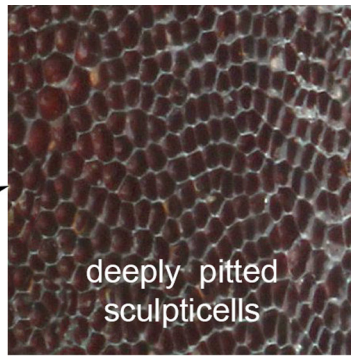
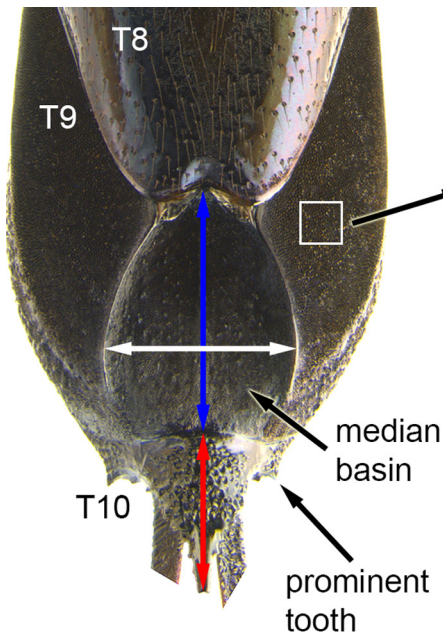
T1.10 *A. violaceus* ♀



T1.11 *A. violaceus* ♀

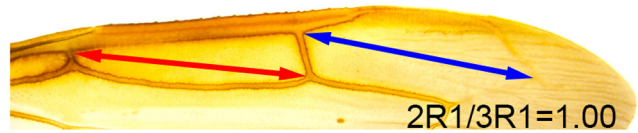
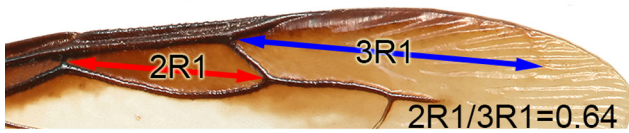
T1.12 *A. hyalinatus* ♀





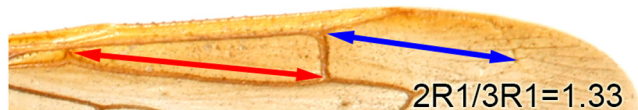
T1.13 *A. hyalinatus* ♀

T1.14 *Tremex columba* ♀



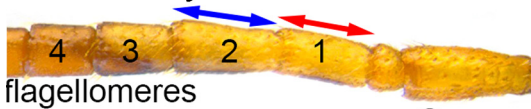
T1.15 *A. comatus* ♀

T1.16 *Tremex columba* ♀

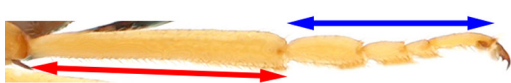


T1.17 *A. hyalinatus* ♀

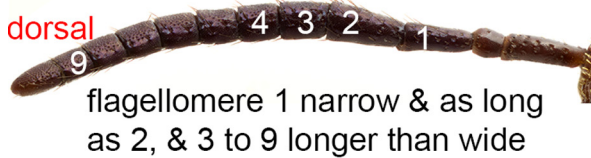
T1.18 *Tremex fuscicornis* ♀



T1.19 *Tremex columba* ♀

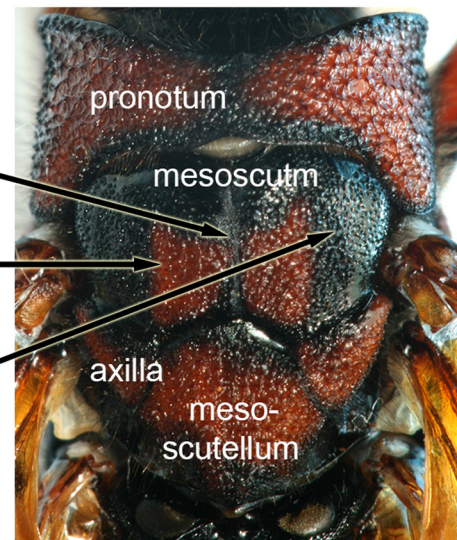


T1.20 *Tremex columba* ♀

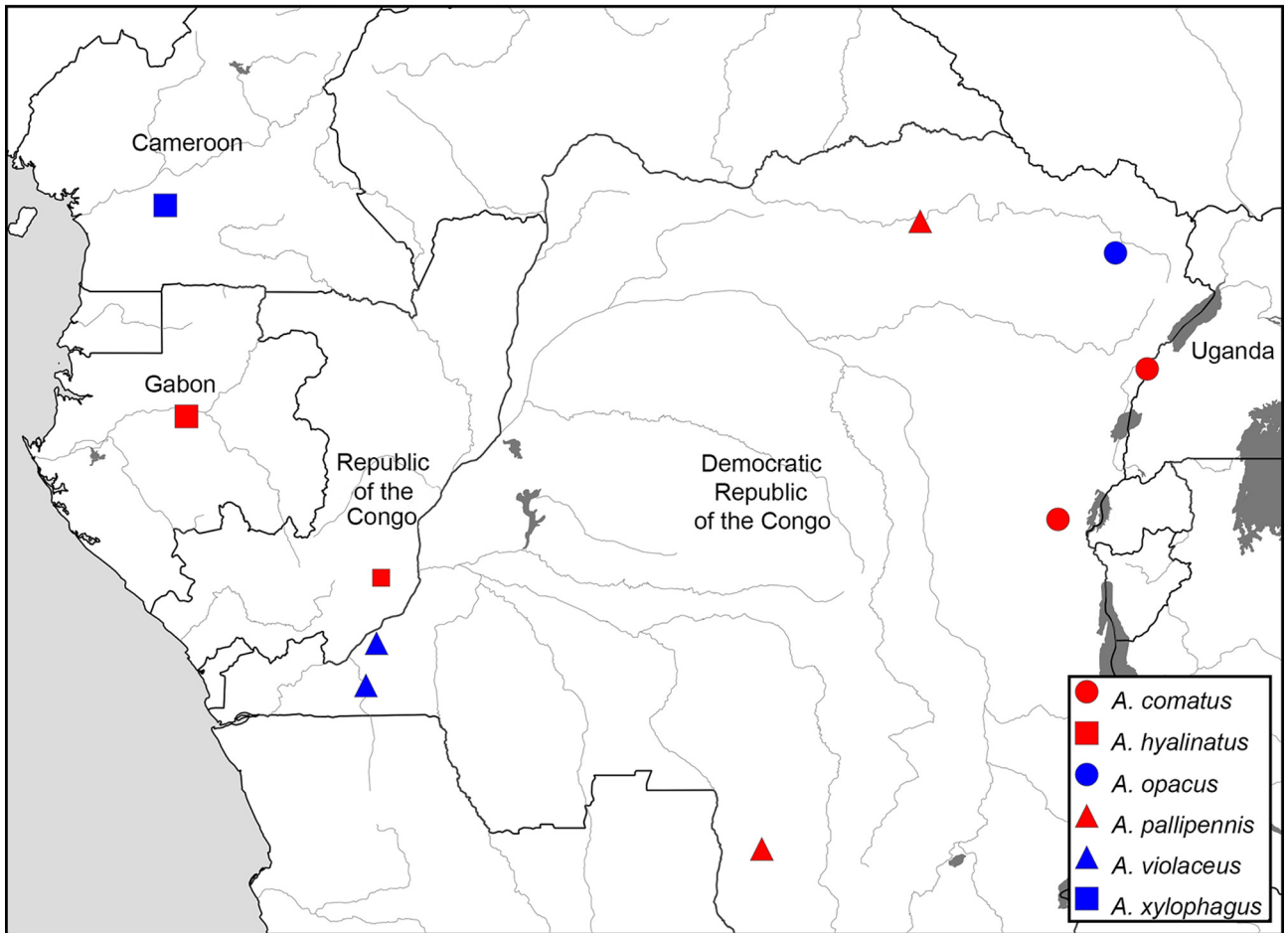
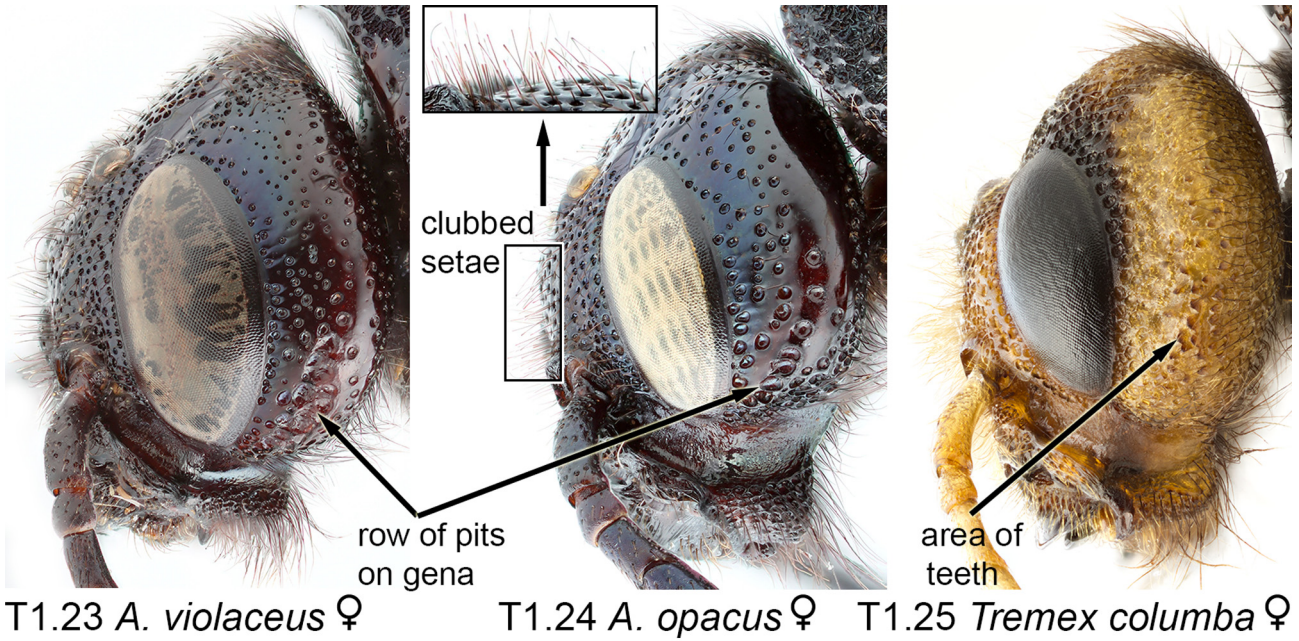


T1.21 *A. xylophagus* ♂

median furrow
central area with coarse pits
pits small in lateral third



T1.22 *Tremex columba* ♀



nearest edge of eye; metatarsomere 1 **in female** markedly compressed laterally (about 3 times as high as maximum ventral width) and in dorsal view the lateral surfaces twisted; hind wing vein M much longer than vein 1r-m and markedly curved; tergum 9 **in female** with median basin sharply outlined laterally for most of its length. The next clade consists of *Eriotremex*, *Afrotremex* and *Tremex*. The shared and derived character states are: fore wing vein

2r-m absent (Fig. T1.8); fore wing vein 1cu-a aligned or almost aligned with vein M (Fig. T1.8); hind wing with hamuli on R1 apical to junction of veins R1 and C (Fig. T1.8, insert). Finally, the last clade consists of *Afrotremex* and *Tremex*. The shared derived character state are: tergum 10 **in female** without a cercus; tergum 9 **in female** in dorsal view lateral to median basin with clearly impressed meshes of microsculpture, and without pits and setae (Fig T1.13, insert and T1.14, insert).

TABLE 1. Range of ratio values derived from surveyed species within each genus. The lower half of the table refers to the total number of species surveyed, based on measurements from specimens, from specimens in photos or inked illustrations for each ratio. “basin” = median basin of tergum 9, “T10” = tergum 10 or cornus in dorsal view, “basal” = basal section and “apical” = apical section of sheath, 2R1 and 3R1 are fore wing cells behind stigma. The name in parenthesis refers to the following source of images, photos or illustrations: “Schiff” = (Schiff *et al.* 2012), “Smith” = (Smith 2010), “Maa” = (Maa 1949), “Xiao” = (Xiao *et al.* 1992), and “Goulet” is from unpublished images.

Genus	Basin W/basin L	T10 L/basin L	Sheath basal L/ apical L	Fore wing 2R1 L/ 3R1 L	Metatarsus 1 / 2+5
<i>Teredon</i>	0.97	0.57	2.5	0.55–0.75	2.0
<i>Eriotremex</i>	0.9–1.23	0.52–0.81	1.55–2.75	0.49–0.65	1.4–1.6
<i>Afrotremex</i>	0.84–1.07	0.57–0.75	1.37–1.70	0.55–0.98	1.1–1.2
<i>Tremex</i>	1.1–2.28	0.75–1.5	1.13–1.63	0.95–1.43	1.2–1.6

Number of species per genus measured based on specimens or images					
<i>Teredon</i>					
# species	1	1	1	1	1
# specimens	1	1	1	2	2
# photos	1 (Schiff)	1 (Schiff)	1 (Schiff)	1 (Schiff)	2 (Schiff)
<i>Eriotremex</i>					
# species	6	6	6	1	6
# specimens	10	10	10	10	7
# photos	7 (Smith, Schiff)	7 (Smith, Schiff)	5 (Smith, Schiff)		7 (Smith, Schiff)
# illustrations	4 (Maa)	4 (Maa)			
<i>Afrotremex</i>					
# species	5	5	5	5	5
# specimens	10	10	10	10	10
# illustrations	1	1		1	
<i>Tremex</i>					
# species	12	12	6	4	5
# specimens	24	24	23	25	
# photos	7 (Schiff, Goulet)	7 (Schiff, Goulet)	3 (unpublished)	7 (unpublished)	7 (Schiff, Goulet)
# illustrations	17 (Maa, Xiao)	17 (Maa, Xiao)	2 (Maa, Xiao)	2 (Maa, Xiao)	

In **both sexes** of *Afrotremex*, the fore wing length of marginal cell 2R1 relative to the length of the cell 3R1, **in female** the median length of tergum 10 (cornus) relative to the median length of the median basin, and the maximum width of the median basin relative to the median length of the basin are the same as those of *Eriotremex* and *Teredon* (Table 1). The length of metatarsomere 1 relative to the length of combined metatarsomeres 2–5 (without claws) for **females** of *Afrotremex* is the shortest among the three genera (Table 1). There is a marked difference for three characters between *Afrotremex* and *Tremex* (for Basin W/basin L see Fig T1.13 and T1.14, white and blue arrows; for T10 L/basin L see Figs T1.13 and T1.14, blue and red arrows; for fore wing 2R1 L/ 3R1 L see Fig T1.15–T1.18, red and blue arrows). *Afrotremex* shows the ancestral state of these characters because they are shared with *Teredon* and *Eriotremex* whereas *Tremex* shows the derived state of these characters. Relative to

Tremex, *Afrotremex* is characterized by the following seven shared and derived character states: **in female** the flagellomere 1 is 0.5–0.6 times as long as flagellomere 2 (Fig T1.4 and T1.5 versus T1.19); the gena in ventral 0.5 has a row of large pits (fused or not) extending from the lowest edge of eye to occiput (Fig T1.3, T1.22 and T1.23 versus T1.25); the setae of clypeus, frons and postocellar area are clubbed at apex (Fig T1.3 versus T1.25); the mesoscutum is clearly divided into three longitudinal bands (a clearly outlined and quite wide median band of fine pits, a wide submedian band of large scallop-like pits, and a shiny lateral band with a few pits anterolaterally (Fig T1.7 versus T1.22)); **in female** the metatarsomere 1 is relatively shorter than combined metatarsomeres 2–5 (Fig T1.6 versus T.20); **in female** the tergum 9 in dorsal view lateral to median basin consists of deeply pitted sculpticells (Fig T1.13, insert, versus T1.14, insert), in lateral view the longitudinal furrow is very long and extends almost to posterior end (Fig. M4); and **in female** the tergum 10 has a large and prominent tooth basolaterally (Fig T1.9, T1.10 and T1.13 versus T1.14). Therefore, *Afrotremex* is retained as a distinct genus.

Zoogeographical evidence follows the same pattern as described above for the four preceding genera. The ranges of species of *Teredon* (Caribbean region), *Eriotremex* (Oriental region) and *Afrotremex* (Ethiopian region centered in the central Congolese forest) are centered in tropical regions, whereas those of *Tremex* (Palearctic almost exclusively Palearctic and Oriental, with one Nearctic species) are in temperate regions or in montane regions within the subtropics. Basically, their present centers of diversity are isolated between continents.

Diversity and distribution. Only two species of *Afrotremex* were known, *A. hyalinatus* from Gabon, and *A. violaceus* from the Congo basin (Smith 1978, Taeger & Blank 2011, Taeger *et al.* 2010). There are no keys, and the two species were segregated by Pasteels (1951) only on wing color pattern. I had access to twelve specimens from equatorial Africa between westernmost Uganda and Gabon (Fig. T1.26), but I distinguished six species and four of them as new. Because of numerous differences in structures, the genus is very likely much more speciose.

2. *Afrotremex comatus* n. sp.

Fig T2.1 (female habitus); M1–M2, M4b, M5 (morphology); K4b, K7, K10, K14, K45, K47, K49, K51 (keys); T1.8, T2.1–T2.7 (description).

Map T1.26, red circle

Type material. Holotype female (USNM) in perfect condition, labeled [White] “Bwamba Uganda May 1956 R. Carcasson”; [White] “Kenya Natl. Mus. exchange; [White] “*Tremex Jurine*”; [Red] “HOLOTYPE *Afrotremex comatus* ♀ H. Goulet, 2013”.

Paratype. 1 female. **Democratic Republic of the Congo.** Kivu: Route Kavumu à Kabunga, km 82 (Mingazi) v/vi.1951 (H. Bomans) (1 F, MRAC).

Diagnosis. Among species with few pits (<10) usually isolated on anterolateral corner of lateral band (*A. opacus*), adults of *A. comatus* are distinguished from those of *A. opacus* by the presence of numerous long setae on medial surface of the pronotum (best seen in lateral view).

Comparative diagnosis. *Afrotremex comatus* is most similar to *A. opacus*. It is unique in the following four features: size and number of setae on the median section of pronotum; and color pattern of some cells of the fore wing and on the anal lobe and apex of the hind wing.

Afrotremex comatus is distinguished from *A. opacus* by the unique attributes mentioned above and the following five features: size and number of setae on dorsal surface of the pronotum; extent of the tinted surface on the apex and the anal lobe of hind wing; extent of the shiny surface on terga 4–7; proportions of the median basin; and length of the pit and its ventral fold on annulus 10 of ovipositor.

Afrotremex comatus shares with *A. opacus* the following nine features: row of isolated pits in the lower 0.5 of gena; size of the sensory oval on the dorsal surface of flagellomere 2; relative width of the mesoscutal median band at its narrowest; presence of few pits anterolaterally on the lateral band of mesoscutum; absence of sculpticells on the scutoscutellar furrow; extent of pitted sculpticells on tergum 8; extent of pitted sculpticells in and between pits above the lateral longitudinal furrow on tergum 9; extent of pitted sculpticells around and partly within pits on the surface anterior to lateral tooth on tergum 10; and size and shape of the pit on annulus 2 of ovipositor.

Afrotremex comatus is distinguished from *A. hyalinatus* by the unique attributes mentioned above and the following 13 features: size of the sensory oval on the dorsal side of flagellomere 2; density and size of pits on gena; shape of the setae at their apex and their relative length on clypeus, frons and postocellar area; number and size of

setae on the dorsal surface of pronotum; width of the mesoscutal median band at its narrowest; extent of sculpticells on the anterior 0.3 of median and submedian bands; absence of extension of fine pits of the mesoscutal median band posterior submedian band; number of pits on anterolateral corner of the mesoscutal lateral band; distribution of sculpticells on the scutoscutellar furrow; color pattern on the fore and hind wings; number of shiny teeth and size of pits along the anterior margin of axilla; extent of shiny surface on terga 4–8; prominence of the median ridge in median basin of tergum 9; density and size of pits on sterna 2–6; and length and width of pit on annulus 2 of ovipositor.

Afrotremex comatus is distinguished from *A. xylophagus* by in all unique features mentioned above and the 14 following features: proportion of the pedicel; size of the sensory oval on the dorsal side of flagellomere 2; density and size of pits on gena; shape of setae at their apex and their relative length on clypeus, frons and postocellar area; width of the mesoscutal median band at its narrowest; number and size of setae on the dorsal surface of pronotum; absence of the lateral extension of the fine pits from the median band posterior to submedian band; number of pits on the anterolateral corner of the lateral band of mesoscutum; distribution of microsculpture on the scutoscutellar furrow; sculpture on axilla; color pattern on the fore and hind wings; extent of pitted sculpticells on tergum 6–8; distribution of pitted sculpticells in and around pits on the surface above the lateral longitudinal furrow on tergum 9; distribution of pits and pitted sculpticells on surface anterior to lateral tooth on tergum 10; and size and outline of the pit on annulus 2.

Afrotremex comatus shares with *A. xylophagus* the following feature: shape of pits with raised posterior edge in a row between the lower eye margin and occiput and sculpture at the bottom of each of these pits.

Afrotremex comatus is distinguished from *A. violaceus* and *A. pallipennis*, two similar species, by all unique features mentioned above and the twelve following features: size of the sensory oval on dorsal side of flagellomere 2; distribution and organization of pits in a row between the lower eye margin and the occiput and sculpture at the bottom of these pits; number of long setae on the median area of pronotum; sharpness of the lateral edge of the mesoscutal submedian band and its curvature in basal 0.5; lateral extension of fine pits from the mesoscutal median band posterior to submedian band; number of pits on the anterolateral corner of the mesoscutal lateral band; distribution of microsculpture on the scutoscutellar furrow; color pattern of the fore and hind wings; extent of the shiny surface on terga 5–8; width of the mesoscutal median band at its narrowest; distribution of pitted sculpticells in and around pits above the lateral longitudinal furrow on tergum 9; distribution of pits and pitted sculpticells on the surface anterior to the lateral tooth of tergum 10; extent of teeth along the lateral surface posterior to the laterobasal tooth on tergum 10; and size and outline of the pit on annulus 2 of the ovipositor.

Description of female. COLOR. **Fore wing** darkly tinted with a purple hue (may be difficult to see) in the following cells (cells codes in Fig. M1): C, R, 1Cu, 1A (except for clear spot in apical 0.1), 1M (spot in basal 0.5), 2Cu (small spot in basal corner), 1R1, Rs+1Rs2 (spot narrow along 1R1, and in apical 0.25 along cell 3R1, or more widely in cell), 2R1, 3R1, and 3M (spot in apical 0.3); apical 0.2 of wing lightly but clearly tinted, the remaining cells clear (Fig. K51). **Hind wing** darkly tinted with a purple hue (may be difficult to see) in the following cells (cells codes in Fig. M1): C, R (spot in basal 0.3), 1Cu1 (spot in basal 0.25), posterobasal spot on 0.5 of anal lobe; the remaining cells clear (Fig. K51). **Protrochanter** and mesotrochanter ventrally in apical 0.3 black or somewhat paler.

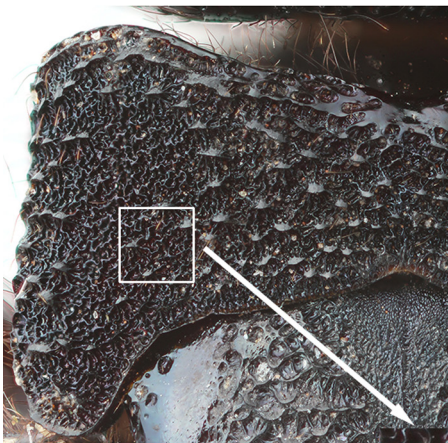
HEAD. **Gena** with large pits forming a curved row between lowest eye edge to occiput, the pits isolated and bottom of each pit shiny (as in Fig. T1.24); the remaining surface with pits more dense near mandible and scattered above, pits in ventral half 0.2–0.4 times and in dorsal half 0.1–0.2 times as large as lateral ocellus (as in Fig. T1.24). **Setae** on clypeus, frons and postocellar area truncate or very slightly enlarged apically (about 1.5 times as wide as setal shaft) and on frons 1.5–2.0 times as long as diameter of lateral ocellus (Fig. K14 and as in Fig. T1.24, insert). **Pedicel** about 0.9 times as long as wide (as in Fig. T1.4). **Flagellomere** 2 with sensory oval covering less than 0.2 of dorsal surface (as in Fig. T1.4).

THORAX. **Pronotum** with vertical lateral surface very densely pitted on all or almost all of surface (Fig. T2.2); dorsal surface sculpture around large shiny teeth with very few short ridges and mainly with deep and dense pits, pits with irregularly defined edges (worm-like) of various heights and about 0.1 as large as diameter of lateral ocellus (Fig. T2.3, insert); in lateral view, dorsal surface with numerous long setae (Fig. K45). **Mesoscutum** with median band generally finely sculptured, widest anteriorly, at its narrowest the band about 0.2 times as wide as diameter of lateral ocellus; surface with pitted sculpticells in anterior 0.1, with pits posterior to microsculpture area, pits small (at most 0.15 times as large as diameter of lateral ocellus), with shiny bottom, and not extended laterally around posterior end of submedian band (Fig. T2.4). Submedian band in anterior 0.1–0.3 without pitted sculpticells

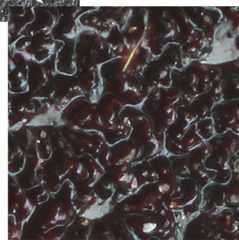


T2.1 *A. comatus* ♀

T2.2 *A. comatus* ♀



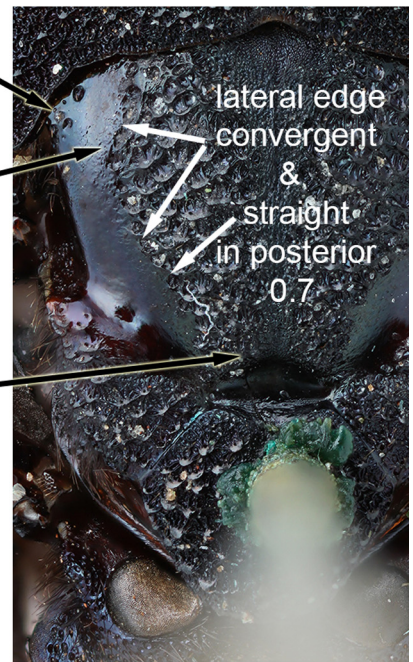
T2.3 *A. comatus* ♀



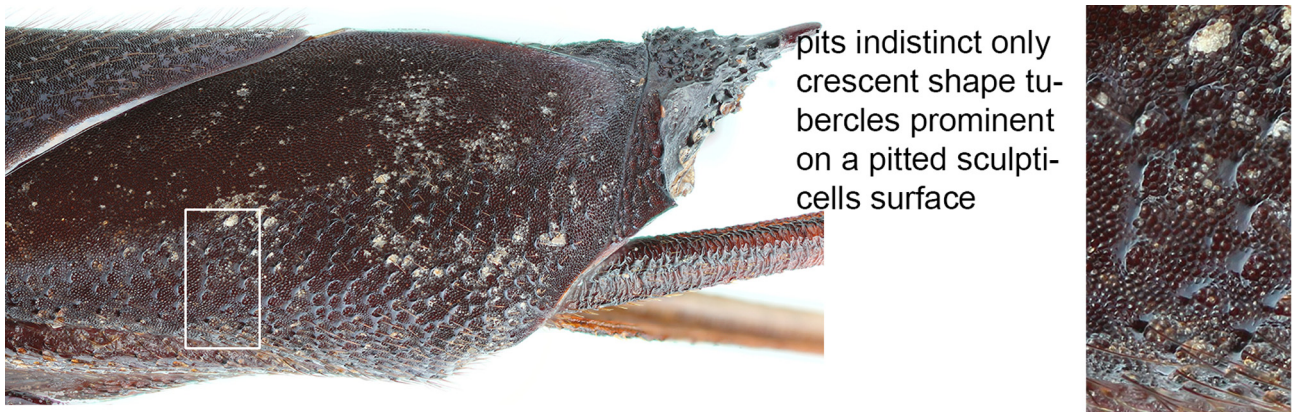
lateral band:
with few pits

submedian
band: lateral
edge ill-defined

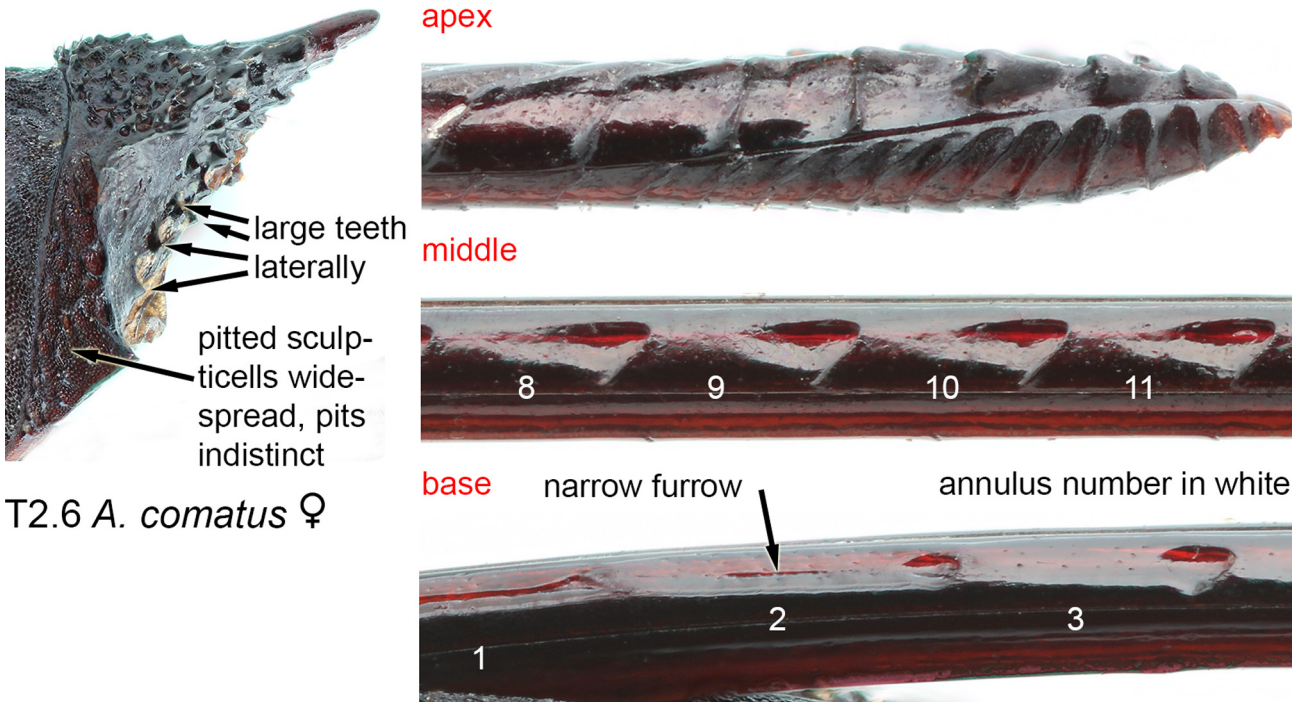
pits of median
band not exten-
ding laterally
posterior subme-
dian band



T2.4 *A. comatus* ♀



T2.5 *A. comatus* ♀



T2.6 *A. comatus* ♀

T2.7 *A. comatus* ♀

within pits; not sharply outlined along lateral edge; lateral edge in anterior 0.5 convergent, and in posterior 0.5 convergent and straight. Lateral band shiny with few pits (<10) usually isolated on anterolateral corner (Fig. K4b). Scutoscutellar furrow without sculpticells or with narrow band (0.2 of surface) of sculpticells on central surface (as in Fig. K3b). **Axilla** with large scallop-like pits similar to those on submedian band but somewhat smaller, not connected with submedian band along edge anteromedially (at most some wrinkles), and without small pits (similar to those of median band) along anterior margin (Fig. T2.4).

ABDOMEN. **Terga** 1–3 or 1–4 with deeply pitted sculpticells (surface matt) except for very narrow shiny transverse band along anterior median margin of tergum 2 (maybe covered by tergum 1). Terga 5–7 with shiny (microsculpture meshes absent or very lightly impressed) areas. Tergum 5 shiny in central 0.15 submedially; tergum 6 shiny in central 0.2 submedially; tergum 7 shiny in posterior 0.5 submedially (shiny surface partly fused medially) (Fig. K47); and tergum 8 without shiny surface (Fig. K7). Tergum 9 with median basin bearing about 20 shiny teeth on each side on central portion; each tooth with or without a setae; seta when present posterior to tooth about as long as distance between shiny teeth; longitudinal median ridge outlined but not prominent, suggested posteriorly, or absent, and without a small shiny central spot; maximum length slightly longer than wide (maximum

width/ maximum median length: 0.90) (Fig. K49). Tergum 9 in lateral view above longitudinal furrow (in section with setae) without pits instead with numerous crescent-like tubercles, each shiny tubercle anterior to a seta surrounded by pitted sculpticells (as in Fig. T2.5, insert). Tergum 10 in dorsal view widely pitted (Fig. K10); each pit with some pitted sculpticells (surface between pits with pitted sculpticells); pits extending widely to anterior edge (about 0.7–0.8 of median basin posterior edge) (Fig. T4.4); in lateral view surface anterior to lateral tooth with some microsculpture and with many large teeth (Fig. T2.6), and surface anterior to lateral tooth without distinct pits but with pitted sculpticells (Fig. T2.6). **Ovipositor** with annulus 2 very small (about 0.2 times as long as annulus 2), extended as a very narrow furrow to edge of annulus 1 (Fig. M5, base); annulus 10 with pit sharply outlined ventrally on about along 0.3–0.4 of annulus length; surface anterior to pit outlined by slightly convergent round folds forming a flat area not extended to anterior annulus; annulus without a long sharp ridge immediately ventral to pit (Fig. M5, middle).

Taxonomic notes. *Afrotremex comatus* has been confused in collections with *A. hyalinatus* probably because of the wing color pattern.

Origin of specific epithet. From Latin meaning “long hair”, referring to the many long setae on the median area of the pronotum.

3. *Afrotremex hyalinatus* (Mocsáry, 1891)

Fig T3.1, T1.27 (female habitus); M4, M4a, M6, (morphology); K3, K8, K11, K13, K15, K18, K21, K35, K37, K39, K39a, K40, K40a, K41, K43 (keys); T1.1, T1.3, T1.5–T1.7, T1.12, T1.13, T1.17, T3.1–T3.8 (description).

Map (T1.26), red square

Tremex hyalinatus Mocsáry, 1891: 158–159. Holotype female (HNHM), not examined but photographs of eight characters and their states compared with the type by Dr. F. Koch. Type locality: Gabon. Name accepted by Dalla Torre 1894: 382 (catalog), Konow 1898: 84, 86, 90, Konow 1905a: 8, Konow 1905b: 115–117, Guiglia 1937: 433–437, Hedicke 1938:29, Benson 1943: 35, Maa 1949: 163 (incertis sedis), Pasteels 1951: 196–197.

Afrotremex hyalinatus; Pasteels 1951: 196 (change of rank), Name accepted by Smith 1978: 90 (catalog), Taeger *et al.*, 2010: 106, Taeger and Blank 2011.

Diagnosis. Among species with large and dense pits on gena (*A. xylophagus*), adults of *A. hyalinatus* are distinguished from those of *A. xylophagus* by a linear row of fused pits with striation at the bottom.

Comparative diagnosis. *Afrotremex hyalinatus* is a rather distinct species. It is unique in having the following four features: size of sculpticells on the dorsal surface of the pronotum between large shiny teeth; presence of sculpticells on the anterior 0.3 of the median and submedian bands; reduction in pits size and shiny teeth on axilla and distribution of pits of similar size to those of median band along anterior margin of axilla; and extent and position of the shiny surface on terga 4–8.

Afrotremex hyalinatus is distinguished from *A. xylophagus* by the unique characters mentioned above and the following eight features: density of pits with raised posterior edge in a row along a line between lower eye margin and occiput, and sculpture at the bottom of these pits; convergence of the lateral edge of the submedian band of mesoscutum; microsculpture distribution in anterior 0.3 of the median and submedian bands of mesoscutum; pit size on anterior 0.5 of the median band of mesoscutum; pit size along anterior margin of axilla; extent and position of shiny surface on terga 6–8; and absence of a sharp ridge immediately ventral pit of annulus 10.

Afrotremex hyalinatus shares with *A. xylophagus* the following eleven features: size of the sensory oval surface on the dorsal surface of flagellomere 2; pit size and density on gena, vertex and postocellar area; level of expansion of the club at the apex of setae on clypeus, frons and postocellar area; degree of sharpness of the lateral edge of the submedian band of mesoscutum; curvature of the lateral edge in posterior 0.5 of the submedian band of mesoscutum; pits extension laterally around the posterior end of the submedian band and anteriorly along the lateral margin of submedian band in posterior 0.5; posterior extension of pitted sculpticells medially in posterior 0.5 of tergum 8; median carina prominence in the median basin of tergum 9; large teeth extension on dorsal and lateral surfaces of tergum 10; presence of teeth on surface posterior to lateral tooth of tergum 10; and shape of pit on annuli 2 and 10 of the ovipositor.

Afrotremex hyalinatus is distinguished from *A. pallipennis* and *A. violaceus*, two similar species, by all unique features mentioned above and the following seven features: sharpness of the outline of the lateral edge of the submedian band of mesoscutum; lack of convergence of the lateral edge of the submedian band in anterior 0.5, and

slight convergence of the lateral edge in posterior 0.5; width of median pits posterior to submedian band; size of teeth on axilla and the presence of pits of size similar to those of the median band of mesoscutum; fore wing color pattern; extent of the shiny surface on terga 5–8; and presence of large teeth on the lateral surface of tergum 10.

Afrotremex hyalinatus shares with *A. violaceus* and *A. pallipennis* the following ten features: row of fused pits in ventral 0.5 of gena; size of the sensory oval surface on the dorsal surface of flagellomere 2; relative width of the mesoscutal median band at its narrowest; lateral extension of pits of median band around posterior end of the submedian band on mesoscutum; presence of many pits anterolaterally on the lateral band of mesoscutum; presence of widespread sculpticells in the scutoscutellar furrow; absence or near absence of microsculpture around pits just above the lateral longitudinal furrow on tergum 9; absence of pitted sculpticells (meshes very lightly impressed along anterior margin only) in and around pits on median dorsal surface of tergum 10; distribution of pits on tergum 10; and shape of pit on annulus 2.

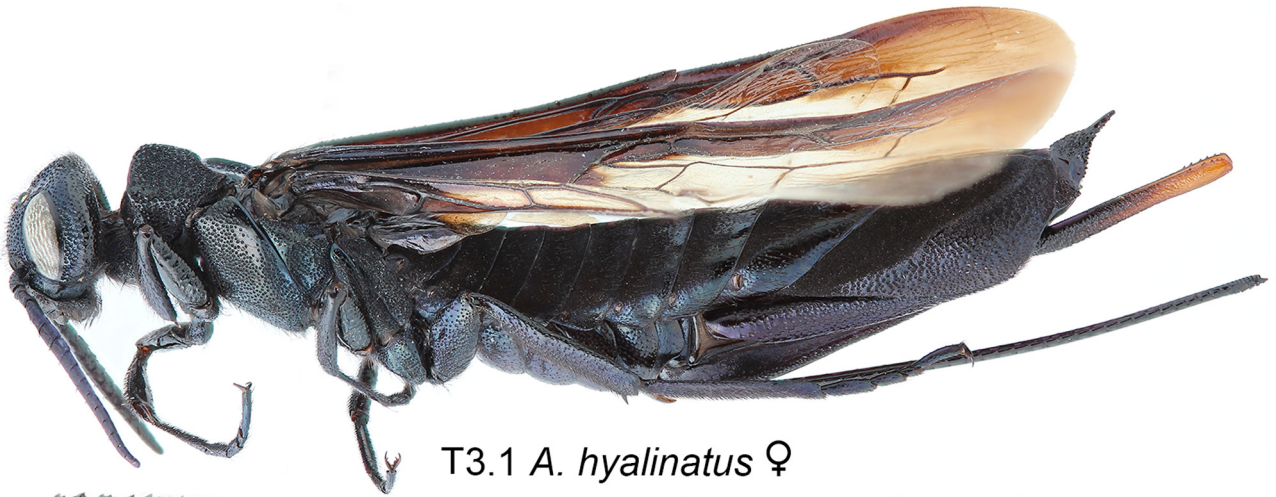
Afrotremex hyalinatus is distinguished from *A. comatus* and *A. opacus*, two similar species, by all unique features mentioned above and the following nine features: density of pits in a row along a line between lower eye margin and occiput, and the sculpture at the bottom of these pits; size of sensory oval on dorsal surface of flagellomere 2; the width of the mesoscutal median band at its narrowest; absence of the lateral extension of fine pits of the median band posterior to submedian band; number of pits on the anterolateral corner of the lateral band of mesoscutum; presence of microsculpture on the scutoscutellar furrow; extent of shiny surface on tergum 8; pitted sculpticells in and around pits on surface just above lateral longitudinal furrow of tergum 9; distribution of pits and pitted sculpticells along anterior surface of tergum 10, laterally on surface anterior lateral tooth; and the size and outline of pit on annulus 2 of the ovipositor.

Afrotremex hyalinatus shares with *A. comatus* and *A. opacus* the following feature: most of the fore wing color pattern (except the apex of 1Cu and 1A).

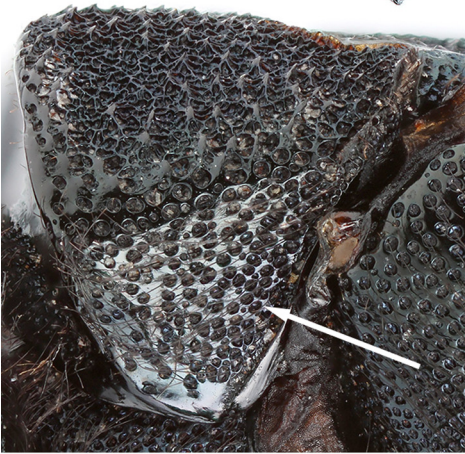
Description of female. COLOR. **Fore wing** darkly tinted with a purple hue (may be difficult to see) in following cells (cells codes as in Fig. M1): C, R, 1Cu (except for small apical clear spot posteroapically), 1A (except for clear spot in apical 0.5), 1M (spot in basal 0.3), 2Cu (small anterobasal spot), 1R1, Rs+1Rs2 (spot narrow along cell 1R1 and 3R1), 2R1, 3R1; remaining apical 0.2 of wing lightly but clearly tinted, the remaining cells clear (Fig. K43). **Hind wing** darkly tinted with a purple hue (may be difficult to see) in following cells (cells codes as in Fig. M1): C, R (spot in basal 0.4), 1Cu1 (spot in basal 0.4), C, and most of anal lobe (except for small clear spot anteriorly), the remaining cells clear (Fig. K43). **Protrochanter** and mesotrochanter ventrally in apical 0.3 black or somewhat paler.

HEAD. **Gena** with large pits forming a curved row between lowest eye edge to occiput, the pits fused completely and bottom of each pit consisting of irregular fine ridges (Fig. K35, insert); remaining surface with pits dense (usually polygonal in outline) in ventral 0.7 and scattered above, and in ventral two thirds 0.2–0.4 times and in dorsal third 0.2–0.3 times as large as diameter of lateral ocellus (Fig. K11). **Setae** on clypeus, frons and postocellar area clearly clubbed at apex (about 2 times as wide as setal shaft), and on frons 0.5–0.7 as long as diameter of lateral ocellus (Fig. K13 and T1.3, insert). **Pedicel** about 0.9 times as long as wide (as in Fig. T1.4). **Flagellomere 2** with sensory oval covering about 0.5 of dorsal surface (as in Fig. K1).

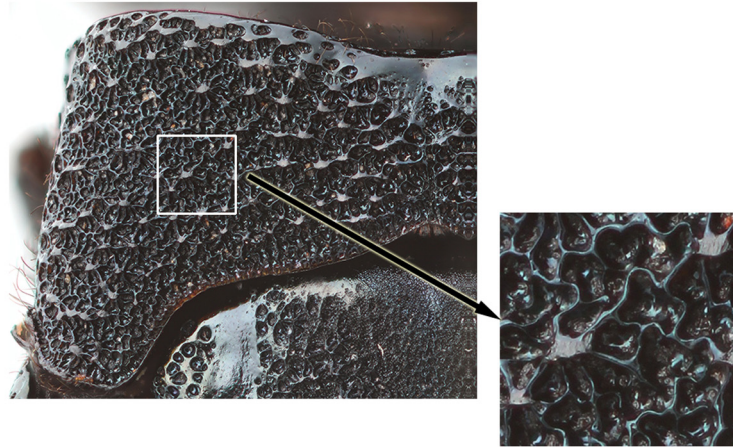
THORAX. **Pronotum** with vertical lateral surface very densely pitted in posterior 0.8 (Fig. T3.2); dorsal surface around large shiny teeth with few short ridges and mainly pits, the pits with irregularly defined edges (worm-like) and about 0.2 times as large as diameter of lateral ocellus (Fig. T3.3, insert); in lateral view, dorsal surface without long setae or with some very short setae (as in Fig. K46). **Mesoscutum** with median band generally finely sculptured, widest anteriorly, at its narrowest the band about 0.7 times as wide as diameter of lateral ocellus (Fig. K39); with pitted sculpticells in anterior 0.3, with pits gradually forming within microsculptured area, at first with pitted sculpticells at bottom of each pit then pit bottom becoming shiny in posterior 0.5 of band, and pits small (0.1–0.15 times as large as diameter of lateral ocellus) (Fig. T3.4, insert), pits extending laterally around posterior end of submedian band (as in Fig. K3a) and forward along lateral margin of submedian band in posterior 0.5 (Fig. K39a). Submedian band in anterior 0.1–0.3 with pitted sculpticells within pits (Fig. T3.4, insert); lateral edge not sharply outlined, in anterior 0.5 parallel (Fig. K37), and in posterior 0.5 slightly convergent and straight (Fig. K15). Lateral band shiny with many pits (>10) often fused on anterolateral corner (Fig. T3.4 and as in Fig. K4a). Scutoscutellar furrow with convex sculpticells (sculpticells area with metallic hue) over 0.7 central surface (Fig. T3.4 and as in Fig. 17a). **Axilla** with medium size pits without scallop-like pits as on submedian band, not connected along with small pits from submedian band along edge anteromedially, and with small pits (similar to those of median band) along anterior margin (Fig. K40a).



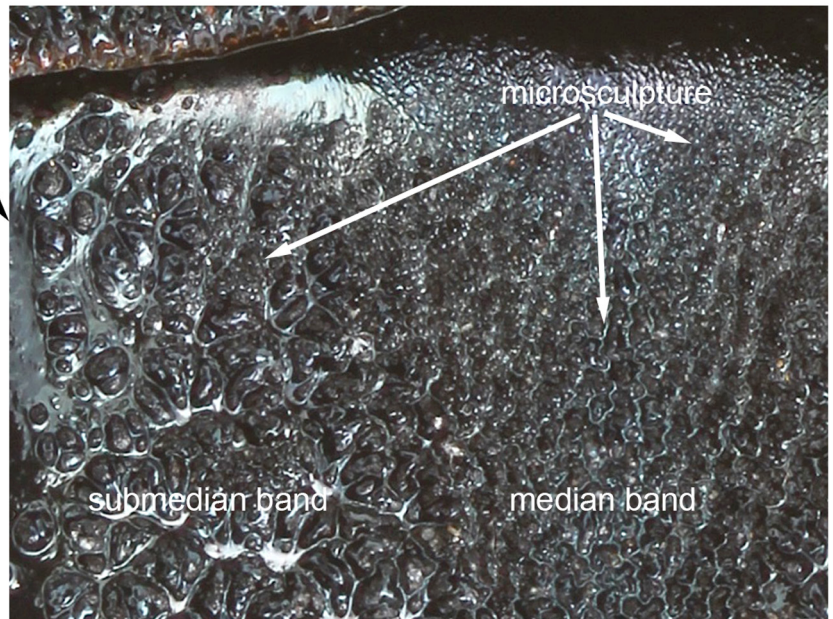
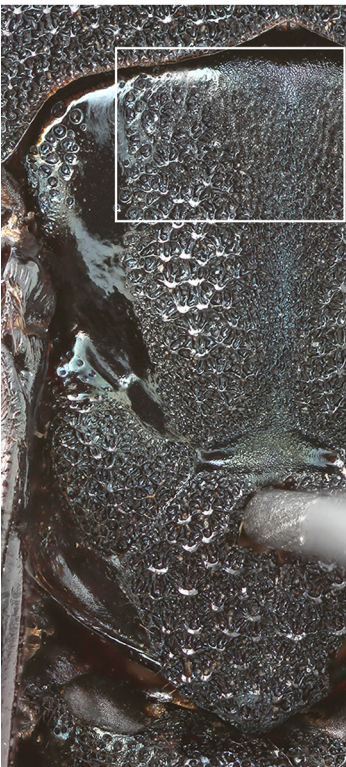
T3.1 *A. hyalinatus* ♀



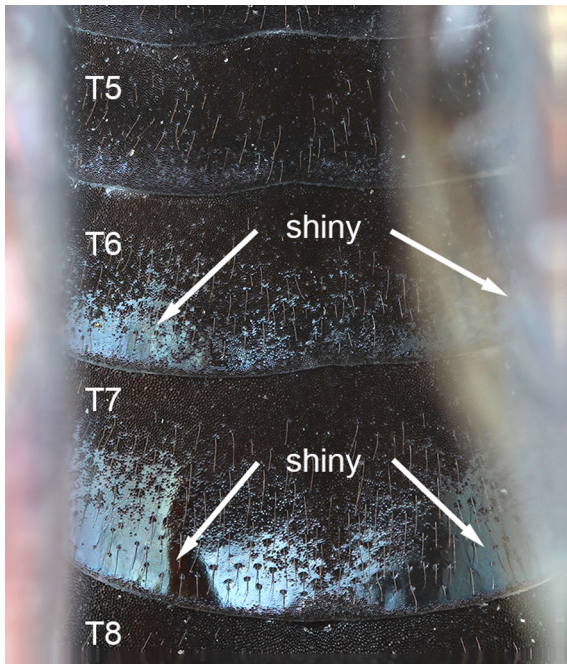
T3.2 *A. hyalinatus* ♀



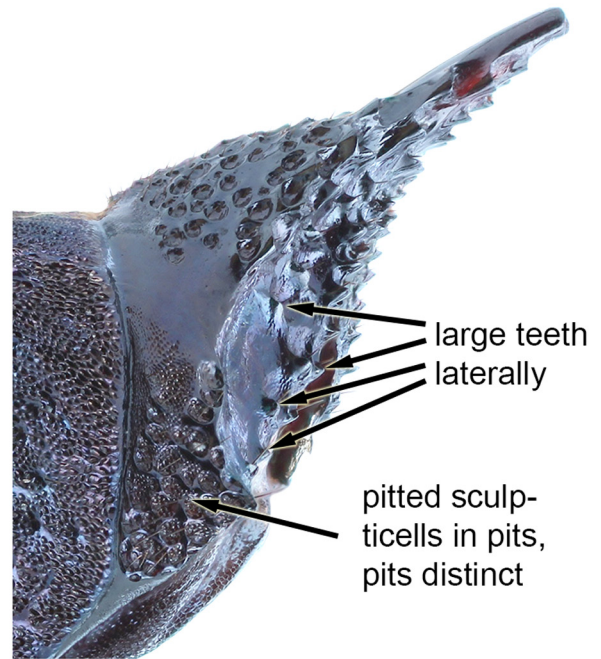
T3.3 *A. hyalinatus* ♀



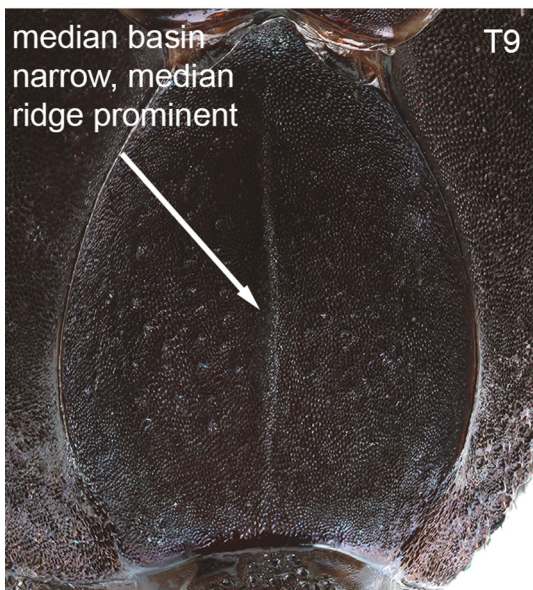
T3.4 *A. hyalinatus* ♀



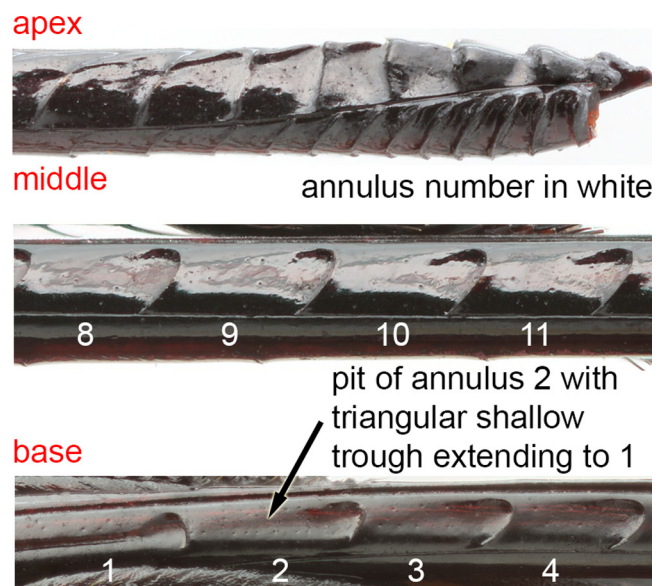
T3.5 *A. hyalinatus* ♀



T3.6 *A. hyalinatus* ♀



T3.7 *A. hyalinatus* ♀



T3.8 *A. hyalinatus* ♀

ABDOMEN. **Terga** 1–5 with deeply pitted sculpticells (surface matt). Terga 6–8 with shiny areas (microsculpture meshes absent or very lightly impressed). Tergum 6 shiny in posterior 0.2 medially; tergum 7 shiny in posterior 0.3 medially with a short anterior extension medially (Fig. T3.5); and tergum 8 matt in anterior 0.3 and medially in 0.7 otherwise shiny (Fig. K5 and K21). Tergum 9 with median basin bearing about 20 tubercle (not shiny apically) on each side; each tubercle without a setae; longitudinal median ridge prominent, and without a small shiny central spot; maximum length slightly longer than wide (maximum width/ maximum median length: 0.79–0.84) (Fig. M6 and T3.7). Tergum 9 in lateral view above longitudinal furrow in area with setae with pits in lower 0.75, pits deep clearly outlined by pitted sculpticells, and above this zone pits indistinctly outlined by pitted sculpticells (Fig. M4a). Tergum 10 in dorsal view widely pitted; each pit shiny at bottom (surface between pits shiny except along anterior margin); pits extending medially to but not reaching anterior edge (Fig. M6 and K8); in

lateral view surface posterior to lateral tooth shiny and with many large teeth (Fig. T3.6), and surface anterior to lateral tooth with distinctly outlined pits of moderate size and each pit with pitted sculpticells at bottom (Fig. T3.6). **Ovipositor** with annulus 2 wide, about 0.3 as long as annulus, and regularly tapered to edge of annulus 1 (Fig. T3.8, base); annulus 10 with large pit 0.3–0.4 as long as annulus; surface anterior to pit outlined by slightly convergent round fold forming a trough with shallow surface extending almost to anterior annulus; annulus without a long sharp ridge immediately ventral to pit (Fig. T3.8, middle).

Taxonomic notes. *Afrotremex hyalinatus* was the first species of *Afrotremex* to be discovered (originally described under *Tremex*). I did not see the holotype specimen that was with F. Koch (Berlin). He kindly compared the type with color photographs showing eight significant characters and their states based on specimens of five species at hand (flagellomere 2 sensory oval; row of pits on gena; size and density of pits on gena; setae shape and size on clypeus, frons and postocellar area; number of pits on lateral band of mesoscutum; fore and hind wing color pattern; sculpture on tergum 8; pit and sculpture above lateral longitudinal furrow of tergum 9). He matched perfectly the holotype from Gabon with the specimen from the Republic of the Congo. A study of the excellent habitus illustration of the *A. hyalinatus* holotype by A. Baliani (Guiglia 1937) (Fig. T1.26) shows six characters matching states of the specimen from the Republic of the Congo. Three of these characters were not compared with the type by F. Koch (parallel lateral edge of the mesoscutal submedian band in anterior 05; prominence of the median ridge in the median basin; and proportion of the length relative to the width of the median basin). All eleven characters match the specimen from the Republic of the Congo. Therefore, we consider the specimen from the Republic of Congo as *A. hyalinatus*.

Material examined. Republic of the Congo. Dept. Pool Iboubikro, Lesio-Louna Park 330 m 03°16.196'S 01528.167'E, vii–ix 2008 Breat & Sharkey (1 female, USNM).

4. *Afrotremex opacus* n. sp.

Fig. T4.1 (female habitus); K2, K46, K48, K50, K52 (keys); T1.4, T1.24, T4.2–T4.8 (description).

Map (T1.26), blue circle

Type material. Holotype female (MRAC) ovipositor above annulus 11 missing, labeled [White] “Musée du Congo, [Democratic Republic of the Congo] Haut Uelé: Moto 1920 L. Burgeon”; [White] “R. Det., DD 3284” [White] “*Afrotremex* ♀ *hyalinatus* Mocs. J. Pasteels det., 1950”; [Red] “HOLOTYPE *Afrotremex opacus* ♀ H. Goulet, 2013”.

Paratype. 1 female. **Democratic Republic of the Congo:** Haut Uelé: Moto (1 F, MRAC).

Diagnosis. Among species with few pits (<10) usually isolated on anterolateral corner of lateral band (*A. comatus*), adults of *A. opacus* are distinguished from those of *A. comatus* by the absence or the presence of few very small setae on medial surface of the pronotum (best seen in lateral view).

Comparative diagnosis. *Afrotremex opacus* is most similar to *A. comatus*. It is unique in following two features: absence of long and numerous setae on pronotum; and tinted color pattern on the basal lobe and tip of the hind wing.

Afrotremex opacus shares with *A. comatus* the following nine features: row of isolated and shiny pits in lower 0.5 of gena; size of the sensory ventral surface on flagellomere 2; relative width of the median band of mesoscutum at its narrowest; number of pits on the anterolateral corner of the lateral band of mesoscutum; lack of or very restricted presence of sculpticells in the scutoscutellar furrow; extent of pitted sculpticells on tergum 8; extent of pitted sculpticells in and around pits above the lateral longitudinal furrow on tergum 9; extent of pitted sculpticells around and in pits on anterior 0.25 of dorsal surface of tergum 10 (including surface anterior to the lateral tooth); size and shape of the pit on annulus 2 of the ovipositor.

Afrotremex opacus is distinguished from *A. comatus* by all the unique attributes mentioned above and the following two features: extent of the tinted surface on anal lobe of hind wing; proportion of the median basin of tergum 9; and size of pit and its ventral fold on annulus 10 of the ovipositor.

Afrotremex opacus is distinguished from *A. hyalinatus* by all the unique attributes mentioned above and the following nine features: density and size of pits on gena; shape of the setae at their apex and their relative length on clypeus, frons and postocellar area; size of the microsculpture on the dorsal surface of pronotum between shiny teeth; distribution of sculpticells on anterior 0.3 of median and submedian bands; the number of shiny teeth

centrally and pit size along the anterior margin of axilla; extent of the shiny surface on terga 6–8; prominence of the median ridge in the median basin of tergum 9; density and size of pits on sterna 2–6; and length and width of the pit on annulus 2 of the ovipositor.

Afrotremex opacus is distinguished from *A. xylophagus* by all the unique attributes mentioned above and the following eleven features: proportion of the pedicel; size of sensory oval on dorsal side of flagellomere 2; density and size of pits on gena; shape of the setae at their apex and their relative length on clypeus, frons and postocellar area; width of the median band of the mesoscutum at its narrowest; absence of the lateral extension of fine pits of the median band at posterior end of submedian band; number of pits on the anterolateral corner of the lateral band of mesoscutum; distribution of microsculpture on the scutoscutellar furrow; color of the fore and hind wings; extent of pitted sculpticells on terga 6–8; distribution of pitted sculpticells in and around pits on the surface just above the lateral longitudinal furrow of tergum 9; distribution of pits and pitted sculpticells along the anterior surface of tergum 10 (including surface anterior to the lateral tooth); and size and outline of the pit on annulus 2.

Afrotremex opacus shares with *A. xylophagus* the following feature: density of pits with raised posterior edge in a row between lower eye margin and occiput and the sculpture at the bottom of these pits.

Afrotremex opacus distinguished from *A. violaceus* and *A. pallipennis* by all the unique attributes mentioned above and the eleven following features: distribution and organization of pits in a row along a line between lower eye margin and occiput, and microsculpture at the bottom of these pits; size of sensory oval on the dorsal side of flagellomere 2; width of the median band of mesoscutum at its narrowest; sharpness and lack of curvature of the lateral edge of the submedian band of mesoscutum in basal 0.5; lack of lateral extension of fine pits of the median band of the mesoscutum posterior the submedian band; number of pits on the anterolateral corner of the lateral band of mesoscutum; distribution of microsculpture on the scutoscutellar furrow; color pattern of the fore and hind wings; extent of the shiny surface on terga 5–8; distribution of pitted sculpticells in and around pits above the lateral longitudinal furrow on tergum 9; distribution of pits and pitted sculpticells along the anterior 0.25 of tergum 10 (including the surface anterior lateral tooth); extent of teeth along lateral margin of tergum 10 posterior laterobasal tooth; and the size and outline of pit on annulus 2 of the ovipositor.

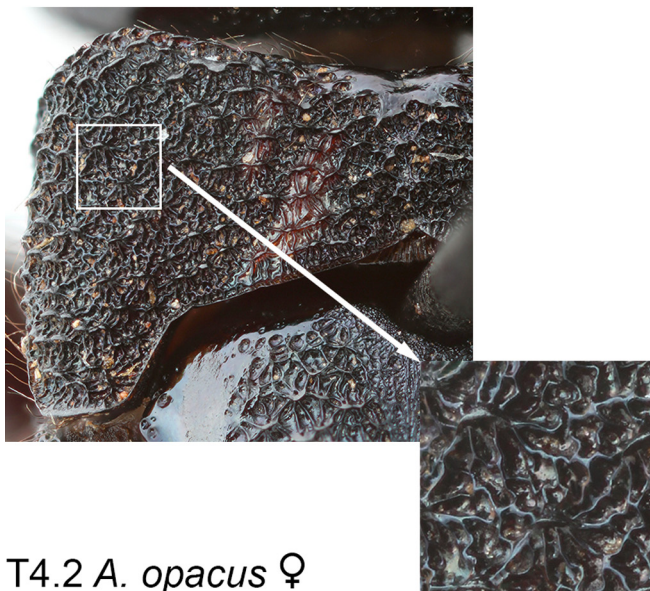
Description of female. COLOR. **Fore wing** darkly tinted with a dark purple hue (may be difficult to see) in the following cells (cells codes as in Fig. M1): C, R, 1Cu, 1A (except for clear spot in apical 0.1), 1M (spot in basal 0.5), 2Cu (small spot in basal corner), 1R1, Rs+1Rs2 (spot narrow along 1R1, and in apical 0.25 along cell 3R1, or more widely in cell), 2R1, 3R1, 3M (spot in apical 0.7), and 3Cu (along margin); apical 0.2 of wing lightly but clearly tinted, the remaining cells clear (Fig. K52). **Hind wing** darkly tinted with a dark purple hue (may be difficult to see) in the following cells (cells codes as in Fig. M1): C, R (spot in basal 0.3), 1Cu1 (spot in basal 0.25), most of anal lobe (except for small clear spot anteriorly), R1 (apical 0.3 along margin), 2Rs (apical 0.3 along margin), and margin at apex of 2M; the remaining cells clear (Fig. K52). **Protrochanter** and mesotrochanter ventrally in apical 0.3 black or somewhat paler.

HEAD. **Gena** with large pits forming a curved broad furrow between lowest eye edge to occiput, the pits isolated and bottom of each pit shiny (Fig. T1.24); the remaining surface with pits more dense near mandible and scattered above, pits in ventral half 0.2–0.4 times and in dorsal half 0.1–0.2 times as large as lateral ocellus (Fig. T1.24). **Setae** on clypeus, frons and postocellar area truncate or very slightly enlarged apically (about 1.5 times as wide as setal shaft or truncate), and on frons 1.5–2.0 times as long as diameter of lateral ocellus (Fig. T1.24, insert and as in Fig. K14). **Pedicel** about 0.9 times as long as wide (Fig. T1.4). **Flagellomere 2** with sensory oval covering less than 0.2 of dorsal surface (Fig. K2).

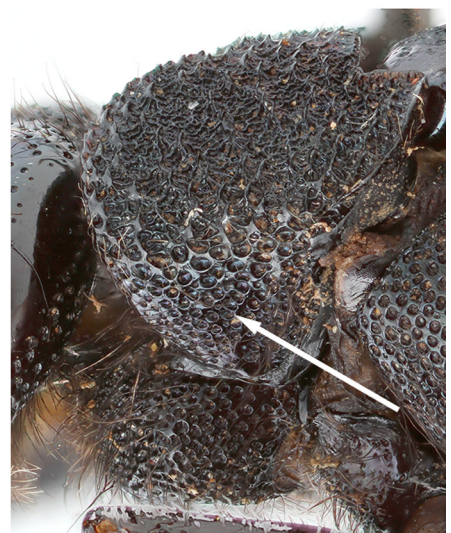
THORAX. **Pronotum** with most of vertical surface very densely pitted (Fig. T4.3); dorsal surface around major shiny teeth with some radiating small ridges with some coarse pits or with large ridges and no pits (Fig. T4.2); in lateral view, dorsal surface without long setae or with some very short setae (as in Fig. K46). **Mesoscutum** with median band generally finely sculptured, widest anteriorly, at its narrowest the band about 0.2 times as wide as diameter of lateral ocellus (Fig. T4.7); with pitted sculpticells in anterior 0.1 (as in Fig. T2.3), with pits present posterior to microsculptured area, pits small (at most 0.15 times as large as diameter of lateral ocellus), with shiny bottom, and not extending laterally posterior to submedian band (Fig. T4.7 and as in Fig. K3b). Submedian band in anterior 0.1–0.3 without pitted sculpticells within pits; band not sharply outlined along lateral edge (Fig. T4.7); lateral edge in anterior 0.5 convergent, and in posterior 0.5 convergent (Fig. T4.7). Lateral band shiny with few pits (<10) usually isolated on anterolateral corner (Fig. T4.7 and as Fig. K4b). Scutoscutellar furrow



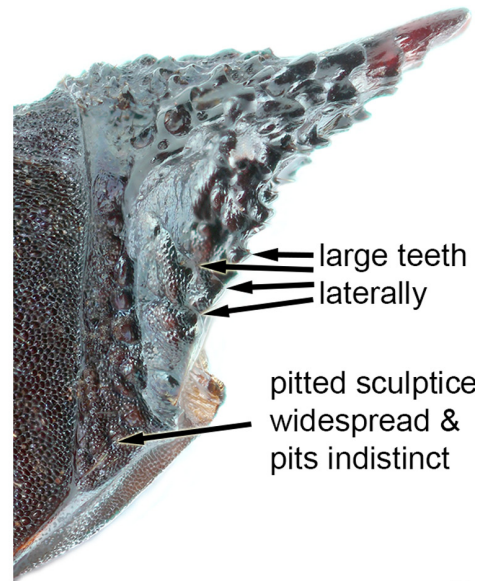
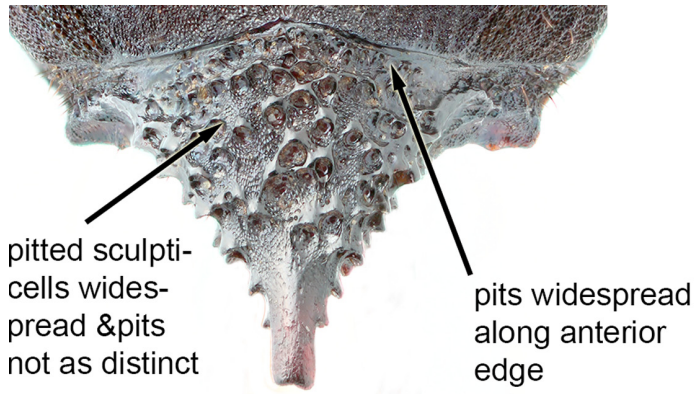
T4.1 *A. opacus* ♀



T4.2 *A. opacus* ♀

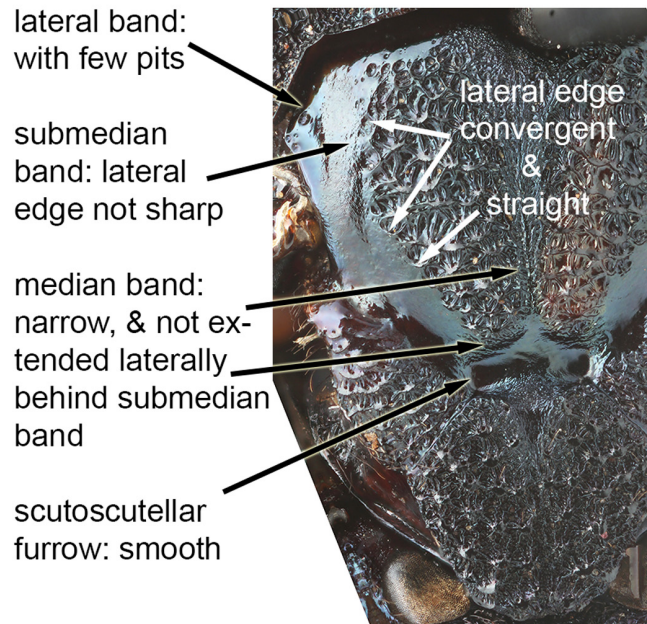
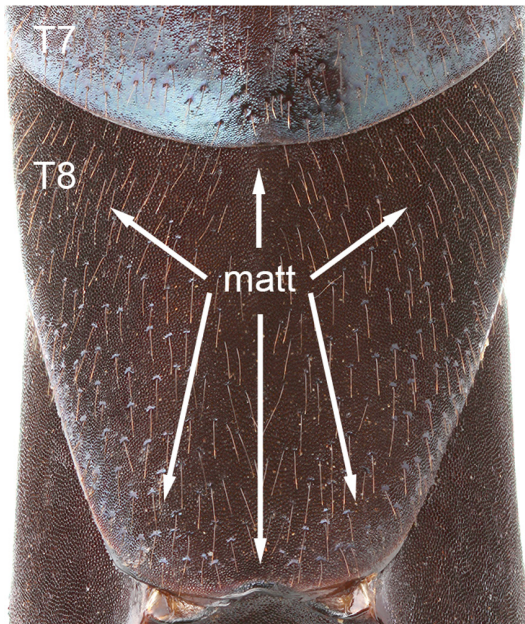


T4.3 *A. opacus* ♀



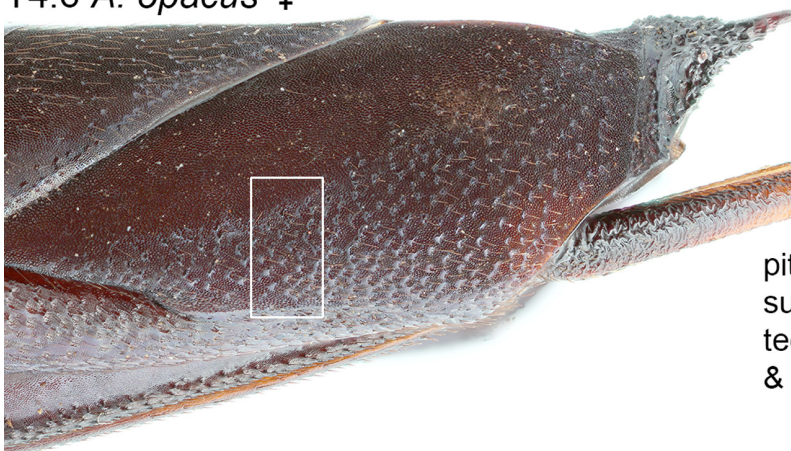
T4.4 *A. opacus* ♀

T4.5 *A. opacus* ♀

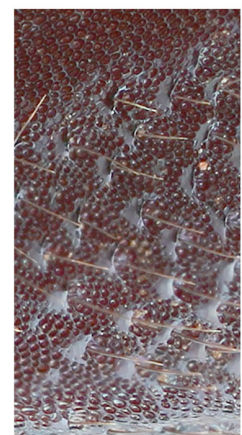


T4.6 *A. opacus* ♀

T4.7 *A. opacus* ♀



pits indistinct, surface with pitted sculpticells & shiny tubercles



T4.8 *A. opacus* ♀

without sculpticells (Fig. K3b and T4.7). **Axilla** with large, scallop-like pits similar to those on submedian band but somewhat smaller (Fig. T4.7), not connected with small pits from submedian band along edge anteromedially (Fig. K3b), and without small pits (similar to those of median band) along anterior margin (Fig. K3b, only small portion visible).

ABDOMEN. **Terga** 1–5 with deeply pitted sculpticells (surface matt) except for very narrow shiny transverse band along anterior median margin of tergum 2 (maybe covered by tergum 1). Terga 6–7 without or with shiny areas present than on less than 0.15 of submedian area along posterior margin (Fig. K48); and tergum 8 without shiny surface (Fig. T4.6). Median basin of tergum 9 with about 20 shiny tubercles on each side on central portion; each tooth with or without a setae; setae when present posterior to tooth about as long as size of tubercle; longitudinal median ridge outlined but not prominent, suggested posteriorly, or absent; without a small shiny central spot; maximum length slightly wider than long (maximum width/ maximum median length: 1.05–1.08) (Fig. K50). Tergum 9 in lateral view above longitudinal furrow (in section with setae) without pits instead with numerous crescent-like tubercles, each shiny tubercle anterior to a seta surrounded by pitted sculpticells (as in Fig. T4.8, insert). Tergum 10 in dorsal view widely pitted (Fig. T4.4); each pit with some pitted sculpticells (surface between pits with pitted sculpticells except for prominent teeth); pits extending widely to anterior edge (about 0.7–0.8 of median basin posterior edge) (as in Fig. K10); tergum in lateral view with some microsculpture and shallow pits, and with many large teeth (Fig. T4.5); surface anterior to lateral tooth without distinct pits but with pitted sculpticells (Fig. T4.5). **Ovipositor** with annulus 2 very small (about 0.2 times as long as annulus 2), extending as a very narrow furrow to edge of annulus 1 (as in Fig M5, base and T2.7, base); annulus 10 with pit sharply outlined ventrally on about along 0.4–0.5 of annulus length; surface anterior to pit outlined by convergent round folds forming a flat surface or very shallow trough extended to anterior annulus; annulus without a long sharp ridge immediately ventral to pit (as in Fig M5, middle and T2.7, middle).

Taxonomic notes. *Afrotremex opacus* has been confused with *A. hyalinatus* probably because of the wing color pattern. Guiglia (1937) noticed marked difference in sculpture on the head and the abdominal terga between the holotype of *A. hyalinatus* and the two specimens from Moto. She chose to retain these specimens under the name *A. hyalinatus*. Pasteels (1951) saw these two specimens and accepted Guiglia's conclusion without additional comments.

Origin of specific epithet. From Latin meaning “dark” referring to the matt surface of abdominal terga 1–9.

5. *Afrotremex pallipennis* n. sp.

Fig. T5.1 (female habitus); M3a–M3e (morphology); K1, K3a, K4a, K5, K16, K17b, K24, K24b, K26, K28, K30, K32, K34 (keys); T1.2, T5.2–T5.7, T5.9 (description).

Map (T1.26), red triangle

Type material. Holotype female (MRAC) in good condition but antennomeres missing beyond 4 on the left and 7 on the right, labeled [White] “Musée du Congo, [Democratic Republic of the Congo] Bambesa 1-iv-1937 J. Vrydagh”; [White] “*Afrotremex* ♀ *hyalinatus* Mocs. J. Pasteels det., 1950; [Red] “HOLOTYPE *Afrotremex pallipennis* ♀ H. Goulet, 2013”.

Paratype. 1 female. **Democratic Republic of the Congo:** Lulua: Kapanga ix-1932 F. G. Overlaet (1 F, MRAC).

Diagnosis. Among species with concave outlined lateral edge of submedian band in posterior 0.5 (*A. violaceus*), adults of *A. pallipennis* are distinguished from those of *A. violaceus* by a longitudinal row of large pits (about 0.25 times as large as diameter of lateral ocellus) along the middle line in anterior 0.3 of median band, and **in female**, by a large and clear area at the centre of the fore and hind wings.

Comparative diagnosis. *Afrotremex pallipennis* is most similar *A. violaceus*. It is unique in the following 2 features: extent of the clear pattern of the fore and hind wings; and position and wide extent of the shiny surfaces on terga 4–8.

Afrotremex pallipennis shares with *A. violaceus* the following ten features: a row of fused pits in lower 0.5 of gena; size of the sensory oval on the dorsal surface of flagellomere 11; relative size of the median band at its narrowest; presence of many pits anterolaterally on the lateral band of mesoscutum; width of the lateral extension of small pits of the median band of the mesoscutum posterior to submedian band; presence of widespread

sculpticells in the scutoscutellar furrow; size of the shiny surface on tergum 8; absence of microsculpture around most pits on most of surface above the lateral longitudinal furrow of tergum 9; absence of pitted sculpticells between pits on the dorsal surface of tergum 10; distribution of teeth posterior to lateral tooth on lateral surface of tergum 10; and width and length of the pit on annulus 2.

Afrotremex pallipennis is distinguished from *A. violaceus* by all the unique attributes mentioned above and the four following features: extent of dense pits on the vertical lateral surface of pronotum; presence of large median row of large pits in the anterior 0.5 of the median band of mesoscutum; color pattern of the pro- and mesotrochanters in apical 0.3; extent of the clear pattern on the fore and hind wings; and position and extent of shiny surfaces on terga 4–8.

Afrotremex pallipennis is distinguished from *A. hyalinatus* by all the unique attributes mentioned above and the eleven following features: density and size of pits on gena; shape of setae at their apex and their relative length on clypeus, frons and postocellar area; size of sculpticells on the dorsal surface of pronotum between shiny teeth; sculpticells distribution on the anterior 0.3 of the median and submedian bands of mesoscutum; sharpness of the lateral edge of the submedian band, convergence of its edge in anterior and posterior 0.5, the curvature of its edge in posterior 0.5; size and number of shiny teeth centrally and size of pits along the anterior margin of axilla; position and extent of shiny surfaces on terga 5–8; extent of the shiny surface along the median area anteriorly on tergum 8; median ridge prominence in the median basin of tergum 9; density and size of pits on sterna 2–6; and length and width of pits on at least annulus 2 and 10 of the ovipositor.

Afrotremex pallipennis shares with *A. hyalinatus* the following nine features: size of the sensory oval surface on the dorsal surface of flagellomere 2; a row of fused pits in lower 0.5 of gena; size of the sensory oval on the dorsal surface of flagellomere 2; relative width of the median band at its narrowest; width and extent of the pitted surface of the median band of the mesoscutum posterior to submedian band; abundance of pits on anterolateral corner of the lateral band of mesoscutum; extent of sculpticells in the scutoscutellar furrow; absence of pitted sculpticells in pits on the median dorsal surface of tergum 10; distribution of pits on dorsal surface of tergum 10; and shape of the pit on annulus 2.

Afrotremex pallipennis is distinguished from *A. xylophagus* by all the unique attributes mentioned above and the six following features: organization of pits in a row along a line between the lower eye margin and the occiput, and of sculpture at the bottom of these pits; sharpness of the outline of the lateral edge of the submedian band of mesoscutum; curvature of the lateral edge of submedian band of mesoscutum in ventral 0.5; lateral extent of pitted surface of the median band of the mesoscutum posterior submedian band; extent and position of the shiny surface on terga 4–8; extent of shiny surface along the median area anteriorly on tergum 8; and median ridge prominence in the median basin of tergum 9.

Afrotremex pallipennis shares with *A. xylophagus* the following nine features: size of the sensory oval surface on the dorsal surface of flagellomere 2; relative width of the median band at its narrowest; lateral extension of the median band pits posterior to submedian band; presence of many pits on anterolateral corner of the lateral band of mesoscutum; presence of widespread sculpticells in the scutoscutellar furrow; absence of microsculpture laterally on tergum 8; absence of pitted sculpticells in and around pits on the median dorsal surface of tergum 10; distribution of pits anteriorly on tergum 10; and size of the pit on annulus 2 of the ovipositor.

Afrotremex pallipennis is distinguished from *A. comatus* and *A. opacus* by all the unique attributes mentioned above and the twelve following features: organization of pits in a row along a line between lower eye margin and occiput, and presence of sculpture at the bottom of these pits; size of sensory oval on the dorsal side of flagellomere 2; sharpness of the outline of the lateral edge of the submedian band of mesoscutum; curvature of the lateral edge of submedian band of mesoscutum in ventral 0.5; width of the median band of the mesoscutum at its narrowest; lateral extension of fine pits of the median band posterior to the submedian band of mesoscutum; number of pits on the anterolateral corner of the lateral band of the mesoscutum; extent of microsculpture on the scutoscutellar furrow; extent and position of the shiny surface on terga 5–8; pitted sculpticells in and around pits on most of surface of tergum 9 above the lateral longitudinal furrow; distribution of pits along the anterior surface of tergum 10; extent of pitted sculpticells on the dorsal surface of tergum 10; and length and width of the pit on annulus 2 of the ovipositor.

Description of female. COLOR. **Fore wing** darkly tinted with a dark purple hue (may be difficult to see) in the following cells (cells codes as in Fig. M1): C, R, 1Cu (except for a small clear spot posteroapically), 1A (except for clear spot in apical 0.5), 1M (small spot anterobasally), 2Cu (small spot anterobasally), 1R1, 2R1 (small basal

spot), 3R1 (anterior 0.5 lightly tinted); apical 0.2 of wing lightly tinted, the remaining cells clear (Fig. K34). **Hind wing** darkly tinted with a dark purple hue (may be difficult to see) in the following cells (cells codes as in Fig. M1): C, R (spot in basal 0.4), 1Cu (spot in basal 0.4), most of anal lobe (except for clear central spot); the remaining cells clear (Fig. K34). **Protrochanter** and mesotrochanter ventrally in apical 0.3 light reddish brown (Fig. T5.6).

HEAD. **Gena** with large pits forming a curved broad furrow between lowest eye edge to occiput, the pits fused completely and bottom of each pit consisting of irregular fine ridges (Fig. T5.4); the remaining surface with pits less dense near mandible and scattered in dorsal 0.5, pits in ventral half 0.2–0.3 times and in dorsal half at most 0.2 times as large as lateral ocellus (Fig. T5.4). **Setae** on clypeus, frons and postocellar area truncate or very slightly enlarged apically (about 1.5 times as wide as setal shaft or truncate), and on frons 1.5–2.0 times as long as diameter of lateral ocellus (as in Fig K14, insert). **Pedicel** about 0.9 times as long as wide (as in Fig. T1.4). **Flagellomere** 2 with sensory oval covering about 0.5 of dorsal surface (Fig. K1).

THORAX. **Pronotum** with vertical lateral surface very densely pitted in posterior 0.3 (Fig. T5.3); dorsal surface around major shiny teeth with short ridges followed by deep and dense pits, the pits with irregularly defined edges (worm-like) of various heights and about 0.1 as large as diameter of lateral ocellus (Fig. T5.2); in lateral view, dorsal surface without long setae or with some very short setae (as in Fig. K46). **Mesoscutum** with median band generally with fine microsculpture, widest anteriorly, and at its narrowest the band about 0.7 times as wide as diameter of lateral ocellus (Fig. K16); pits without microsculpture at bottom, very deep, their edges irregularly defined (worm-like), and 0.1–0.15 times as large as diameter of lateral ocellus; with large pits (about 0.25 times as large as diameter of lateral ocellus) on anterior margin and extending along middle line in anterior 0.3 (Fig. K24b), and with pits becoming slightly smaller (at most 0.1 times as large as diameter of lateral ocellus) in posterior 0.5 and extending laterally posterior to submedian band (Fig. K3a). Submedian band in anterior 0.1–0.3 without pitted sculpticells inside pits; band sharply outlined along lateral edge, edge convergent in anterior and posterior halves and clearly concave in posterior 0.5 (Fig. K16). Lateral band shiny with many pits (>10) fused on anterolateral corner (Fig. K4a). Scutoscutellar furrow with convex sculpticells (sculpticells clearly with metallic hue) over all of surface (Fig. K17b). **Axilla** with large scallop-like pits similar to those on submedian band but somewhat smaller, not connected with small pits from submedian band along edge anteromedially (at most with some wrinkles) (Fig. K3a), and without small pits (similar to those of median band) along anterior margin (Fig. K17b).

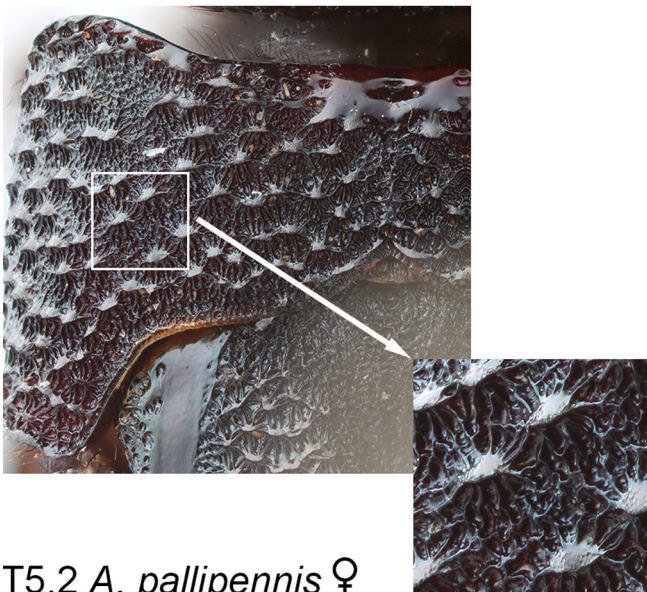
ABDOMEN. **Terga** 1–3 with deeply pitted sculpticells (surface matt). Terga 4–8 with shiny areas (microsculpture meshes absent or very lightly impressed). Tergum 5 shiny in anterior 0.25 medially; tergum 5 shiny in anterior 0.5 medially; tergum 6 shiny in anterior 0.8 medially; tergum 7 shiny in anterior 0.9 medially (Fig. K26); and tergum 8 shiny in posterior 0.85 with a short anterior extension medially (Fig K5 and K28). Tergum 9 with median basin of bearing about 20 crescent-shape teeth on each side on central portion, each tubercle with or without seta posteriorly; seta when present as small as size of shiny tubercle; longitudinal median ridge of median outlined but not prominent, suggested posteriorly, or absent; median basin with a small shiny central spot; median basin slightly longer than wide (maximum width/ maximum median length: 0.90–1.00) (Fig. T5.5). Tergum 9 in lateral view above longitudinal furrow (only surface with setae centrally) with clearly outlined pits smooth at bottom in ventral 0.3 and with some pitted sculpticells at bottom in dorsal 0.7 (Fig. T5.9). Tergum 10 in dorsal view widely pitted (about 0.75 times as wide as posterior width of median basin of tergum 9); each pit shiny at bottom (surface between pits with microsculpture except centrally); pitted surface extended medially to but reaching anterior edge (Fig. K30); lateral surface posterior to lateral tooth shiny and without large teeth (Fig. K32); surface anterior to lateral tooth with distinctly outlined pits bordered by shiny ridges, each pit small and with pitted sculpticells except at center of pit (Fig. K32). **Ovipositor** annulus 2 (Fig. T5.7, base) and probably annulus 10 [ovipositor missing after annulus 7, probably as in Fig. T6.8] each with one wide pit as long as annulus; each pit clearly folded dorsally and sharply ventrally, and hardly tapering anteriorly.

Taxonomic notes. Despite being very similar females of *A. violaceus* and of *A. pallipennis* show marked differences in wing color pattern. The wings of *A. pallipennis* have the largest extent of clear areas in the species studied whereas those of *A. violaceus* are darkly tinted throughout. Guiglia (1937) studied the specimen from Kapanga and noticed marked differences in the sculpture on the head and the abdominal terga between it and the holotype of *A. hyalinatus*. She chose to retain this specimen under the name *A. hyalinatus*. Pasteels (1951) saw this specimen and one more from Bambesa and accepted Guiglia's conclusion, without additional comments.

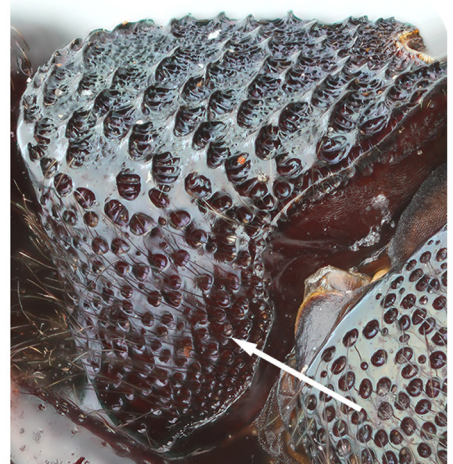
Origin of specific epithet. From Latin meaning “pale wing” referring to the large clear portion of the fore wing.



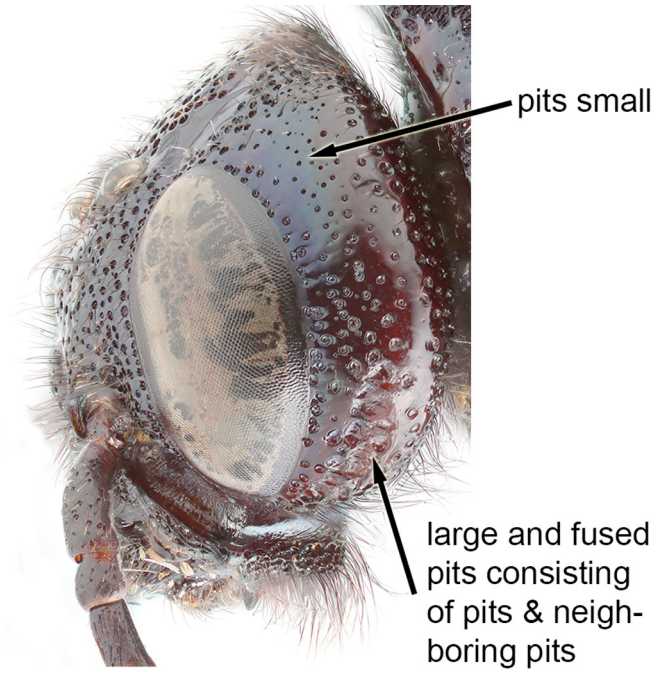
T5.1 *A. pallipennis* ♀



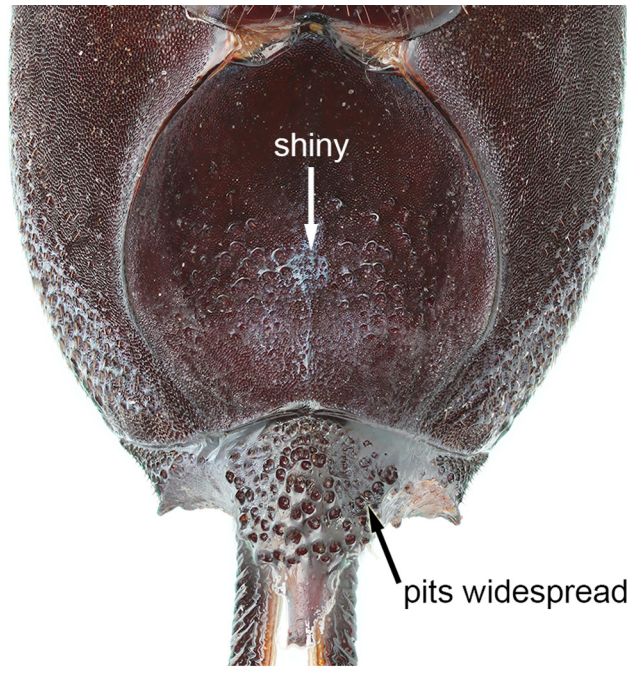
T5.2 *A. pallipennis* ♀



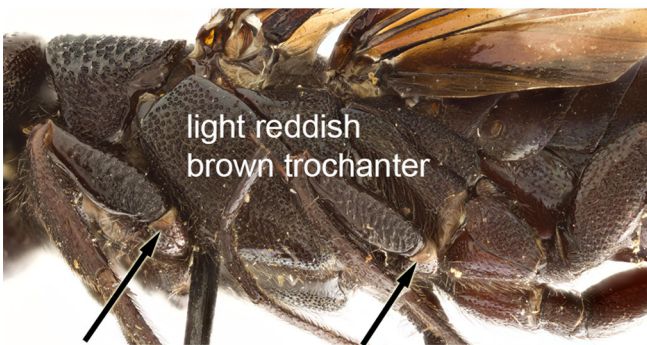
T5.3 *A. pallipennis* ♀



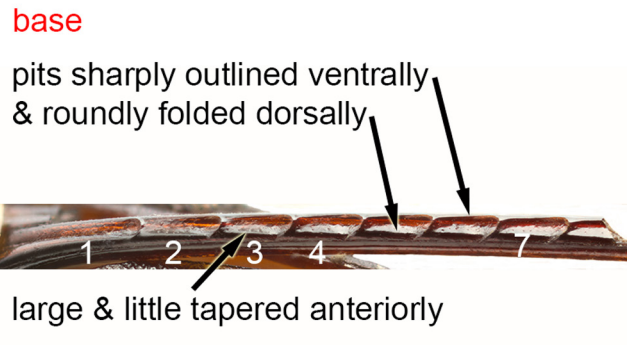
T5.4 *A. pallipennis* ♀



T5.5 *A. pallipennis* ♀



T5.6 *A. pallipennis* ♀



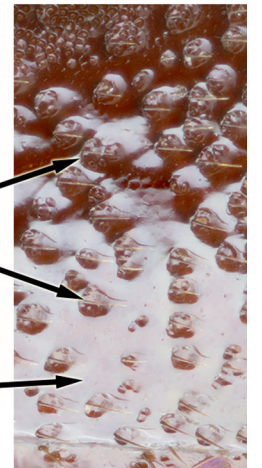
T5.7 *A. pallipennis* ♀



T5.8 *A. violaceus* ♀

pits with microsculpture in dorsal 0.3 & smooth in ventral 0.7

surface smooth between pits



T5.9 *A. pallipennis* ♀

6. *Afrotremex violaceus* (Pasteels, 1951)

Fig. T6.1 (female habitus); K12, K17, K20, K23, K24a, K25, K27, K29, K31, K33 (keys); T1.9, T1.10, T1.11, T1.23, T5.8, T6.2–T6.8 (description).

Map (T1.26), blue triangle

Afrotremex violaceus Pasteels, 1951: 196–197. Holotype female (MRAC) examined, right middle leg above coxa, left hind leg above coxa, and ovipositor missing, and labelled: [Red] "HOLOTYPUS *violaceus* Past."; [White] "Coll. Mus. Congo Mayidi 1945 Rév. P. Van Eyen"; [White] "R. DET. X. 5515"; [White] "Type"; [White] "*Afrotremex* ♀ *violaceus* n. sp. J. Pasteels det., 1950". Name accepted by Smith 1978: 90 (catalog), Taeger *et al.*, 2010: 106; and Taeger, and Blank 2011.

I studied two female paratypes from Mayidi and Bas Congo (Lemfu). Pasteels reported six females altogether from Mayidi (one holotype and three paratypes captured in 1942 and 1945) and Bas Congo (Lemfu) (two paratypes captured in xii. 1945).

Diagnosis. Among species with concave outlined lateral edge of submedian band in posterior 0.5 (*A. pallipennis*), adults of *A. violaceus* are distinguished from those of *A. pallipennis* by the absence of a longitudinal row of large pits (about 0.25 times as large as diameter of lateral ocellus) along the middle line in anterior 0.3 of median band, and **in female**, by the completely darkly tinted fore and hind wings.

Comparative diagnosis. *Afrotremex violaceus* is most similar to *A. pallipennis*. It is unique in the following three features: absence of a median row of pits on the anterior 0.3 of the median band of mesoscutum; darkly tinted fore and hind wings; and extent and position of the shiny surface on terga 4–8.

Afrotremex violaceus shares with *A. pallipennis* the following twelve features: a row of fused pits in lower 0.5 of gena; size of the sensory oval on the inner surface of flagellomere 2; relative size of the median band at its narrowest; number of pits on the anterolateral corner of the lateral band of mesoscutum; width of the lateral extension of small pits of the mesoscutal median band posterior to submedian band; presence of widespread sculpticells in the scutoscutellar furrow; size of the shiny surface on tergum 8; absence of microsculpture around pits on most of the surface above the lateral longitudinal furrow of tergum 9; absence of pitted sculpticells between pits on the dorsal surface of tergum 10; distribution of pits on tergum 10; distribution of teeth along lateral surface posterior to the lateral tooth of tergum 10; and width an length of the pit on annulus 2 of the ovipositor.

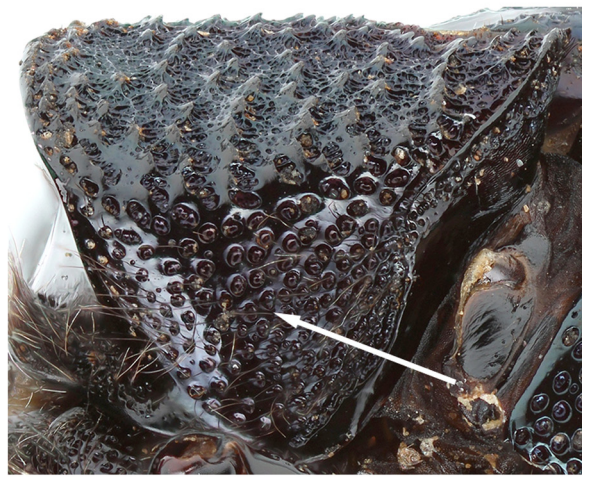
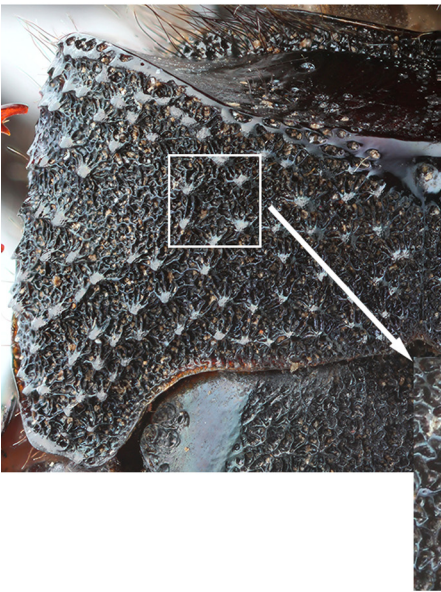
Afrotremex violaceus is distinguished from *A. pallipennis* by all the unique attributes mentioned above and the following five features: extent of the pit density on the vertical lateral surface of pronotum; absence of a median row of large pits in the anterior 0.3 of the median band of mesoscutum; color pattern of the pro- and mesotrochanters in apical 0.3; extent of the clear pattern of the fore and hind wings; and position and extent of shiny surfaces on terga 4–8.

Afrotremex violaceus is distinguished from *A. hyalinatus* by all the unique attributes mentioned above and the following twelve features: density and size of pits on gena; shape of the apex of setae and their relative length on clypeus, frons and postocellar area; size of sculpticells on the dorsal surface of the pronotum between shiny teeth; sculpticell distribution on the anterior 0.3 of the median and submedian bands of mesoscutum; sharpness of the lateral edge of the submedian band of mesoscutum, convergence of its edge in anterior and posterior 0.5, and curvature of its edge in posterior 0.5; width of the pitted surface of the median band of mesoscutum extended laterally posterior to submedian band; size and number of shiny teeth on axilla; absence of pits similar in size to those of the median band of mesoscutum on anterior edge of axilla; position and extent of shiny surfaces on terga 5–8; extent of shiny surface along the median area anteriorly on tergum 8; median ridge prominence in the median basin of tergum 9; density and size of pits on sterna 2–6; and length and width of pits on annuli 2 and 10 of the ovipositor.

Afrotremex violaceus shares with *A. hyalinatus* the following nine features: a row of fused pits in lower 0.5 of gena; size of the sensory oval on the dorsal surface of flagellomere 2; relative width of the median band at its narrowest; number of pits anterolaterally on the lateral band of mesoscutum; extent of sculpticells in the scutoscutellar furrow; lateral extension of pits of the median band of mesoscutum posterior to submedian band; absence of microsculpture around most pits above the lateral longitudinal furrow on tergum 9; absence of pitted sculpticells in pits on the median dorsal surface of tergum 10; distribution of pits on dorsal surface of tergum 10; and length of pit on annulus 2 of the ovipositor.



T6.1 *A. violaceus* ♀



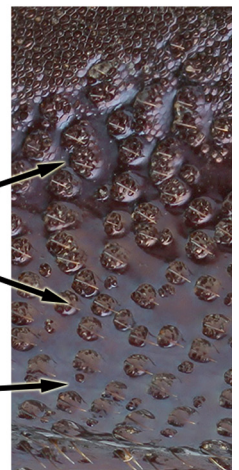
T6.2 *A. violaceus* ♀



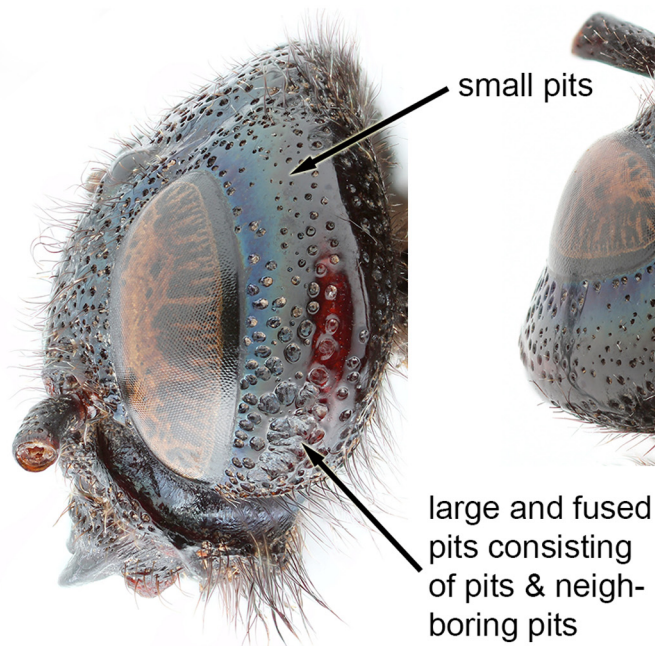
T6.3 *A. violaceus* ♀

pits with microsculpture in dorsal 0.5 & smooth in ventral 0.5.

surface smooth between pits



T6.4 *A. violaceus* ♀



T6.5 *A. violaceus* ♀



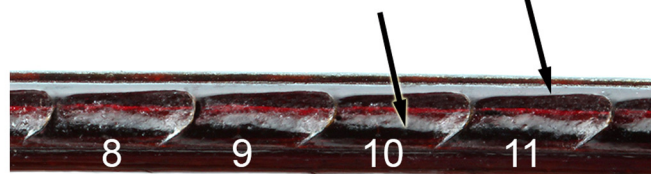
T6.6 *A. violaceus* ♀



T6.7 *A. violaceus* ♀

middle

pits sharply outlined ventrally & roundly folded dorsally



large & little tapered anteriorly

T6.8 *A. violaceus* ♀

Afrotremex violaceus is distinguished from *A. xylophagus* by all the unique attributes mentioned above and the seven following features: organization of pits in a row along a line between the lower eye margin and the occiput, and sculpture at the bottom of these pits; sharpness of the outline of the lateral edge of the submedian band of mesoscutum, and curvature of its edge in posterior 0.5; width of the pitted surface of the median band of the mesoscutum extended laterally posterior to submedian band; extent and position of the shiny surface on terga 4–8; extent of shiny surface along the median area anteriorly on tergum 8; median ridge prominence in the median basin of tergum 9; and distribution of pits anteriorly on tergum 10.

Afrotremex violaceus shares with *A. xylophagus* the following eight features: size of the sensory oval surface on the dorsal surface of flagellomere 2; relative width of the median band at its narrowest; lateral extension of the

median band pits posterior to submedian band; number of pits anterolaterally on the lateral band of mesoscutum; presence of widespread sculpticells in the scutoscutellar furrow; absence of microsculpture laterally on tergum 8; absence of pitted sculpticells in and around pits on median dorsal surface of tergum 10; and size of the pit on annulus 2 of the ovipositor.

Afrotremex violaceus is distinguished from *A. comatus* and *A. opacus* by all the unique attributes mentioned above and the following eleven features: organization of pits in a row along a line between the lower eye margin and the occiput and presence of microsculpture at the bottom of these pits; size of sensory oval on the dorsal side of flagellomere 2; sharpness of the outline of the lateral edge of the submedian band of mesoscutum, and curvature of the its edge in posterior 0.5; width of the median band of the mesoscutum at its narrowest; lateral extension of fine pits of the median band of mesoscutum extended laterally posterior to submedian band; number of pits on the anterolateral corner of the lateral band of mesoscutum; extent of microsculpture on the scutoscutellar furrow; extent and position of the shiny surface on terga 5–8; pitted sculpticells in and around pits on most of the surface of tergum 9 above the lateral longitudinal furrow; distribution of pits along the anterior surface of tergum 10; extent of pitted sculpticells on the dorsal surface of tergum 10; and length and width of the pit on annulus 2 of the ovipositor.

Description of female. COLOR. Fore and hind wings darkly tinted with a purple hue (may be difficult to see) in all cells (Fig. K33). **Protrochanter** and mesotrochanter ventrally in apical 0.3 black or somewhat paler.

HEAD. Gena with large pits forming a curved row (row including some pits laterally) between lowest eye edge to occiput, the pits fused completely and bottom of each pit with irregular fine ridges (Fig. T1.23); the remaining surface with pits larger (0.2–0.3 times as large as lateral ocellus) and quite dense in ventral 0.5, and scattered in dorsal 0.5 and small (at most 0.15 times as large as lateral ocellus) and less dense (Fig T1.23, T6.5 and T6.6). **Setae** on clypeus, frons and postocellar area truncate or very slightly enlarged apically (about 1.5 times as wide as setal shaft or truncate), and on frons 1.5–2.0 times as long as diameter of lateral ocellus (Fig K14 and as in T1.24, insert). **Pedicel** about 0.9 times as long as wide (as in Fig. T1.4). **Flagellomere** 2 with sensory oval covering about 0.5 of dorsal surface (as in Fig. K1).

THORAX. Pronotum with vertical lateral surface very densely pitted in posterior 0.5 (Fig. T6.3); dorsal surface around shiny teeth with very short ridges changing into deep and dense pits, the pits with irregularly defined edges (worm-like) of various heights and about 0.1 as large as diameter of lateral ocellus (Fig. T6.2); in lateral view, dorsal surface without or with some very short setae (as in Fig. K46). **Mesoscutum** with median band generally finely sculptured, widest anteriorly, at its narrowest the band about 0.7 times as wide as diameter of lateral ocellus (Fig. K17); pits without microsculpture at bottom, very deep, their edges irregularly defined (worm-like), and 0.15–0.2 times as large as diameter of lateral ocellus, without large pits along middle line in anterior 0.3 (Fig. K24a), and with pits becoming smaller (at most 0.1 times as large as diameter of lateral ocellus) in posterior 0.5 and extended laterally posterior to submedian band (Fig. K17 and as Fig. 3a). Submedian band in anterior 0.1–0.3 without pitted sculpticells within pits; lateral edge sharply outlined and convergent in anterior 0.5, and convergent and clearly concave in posterior 0.5 (as in Fig. K16). Lateral band shiny with many pits (>10) fused on anterolateral corner (as in Fig. K4a). Scutoscutellar furrow with convex sculpticells (sculpticells clearly with metallic hue) over all of central surface (as in Fig. K3a). **Axilla** with large scallop-like pits similar to those on submedian band but somewhat smaller, not connected with small pits from submedian band along edge anteromedially (some wrinkles present), and without small pits (similar to those of median band) along anterior margin (Fig. K17).

ABDOMEN. Terga 1–5 with deeply pitted sculpticells (surface matt). Terga 6–8 with shiny areas (microsculpture meshes absent or very lightly impressed). Tergum 6 shiny in posterior 0.5 medially; tergum 7 shiny in posterior 0.7 medially with a short anterior extension medially (Fig. K25); and tergum 8 shiny in posterior 0.7 with a short anterior extension medially (Fig K23 and K27). Tergum 9 with median basin bearing about 20 crescent-shape tubercles on each side on central portion, each tubercle with or without seta posteriorly, and the seta when present as small as size of shiny tubercle; longitudinal median ridge in median basin outlined but not prominent, suggested posteriorly, or absent; median basin without a small shiny central spot; median basin slightly longer than wide (maximum width/ maximum median length: 0.90–1.00) (Fig T1.9 and T6.7). Tergum 9 in lateral view above longitudinal furrow (only surface with setae at center) in ventral 0.5 with clearly outlined pits, pits smooth at bottom and surface smooth between pits, in dorsal 0.5 pits distinctly or indistinctly outlined with pitted sculpticells at bottom and surface smooth between most pits (as in Fig. T6.4). Tergum 10 in dorsal view narrowly pitted (about 0.75 times as wide as posterior width of median basin of tergum 9); each pit shiny at bottom (surface

between pits shiny); pits extended medially to but not reaching anterior posterior edge of median basin (Fig. K29); lateral surface posterior to lateral tooth shiny and without large teeth (Fig. K20); surface anterior to lateral tooth with distinctly outlined pits partly bordered by shiny ridges, each pit large and with pitted sculpticells at bottom (Fig. K31). **Ovipositor** annuli 2 and 10 each with one wide pit as long as annulus (as in Fig. T5.7, base and Fig. T6.8); each pit clearly folded dorsally and sharply ventrally, and hardly tapering anteriorly.

Taxonomic notes. Pasteels (1951) distinguished this species from *A. hyalinatus*, the only species known to him, only on the color pattern of the fore and hind wings.

7. *Afrotremex xylophagus* n. sp.

Fig. T7.1 (female habitus); K6, K9, K17a, K19, K22, K36, K38, K39b, K40b, K42, K44 (keys); T7.3–T7.9 (description).

Fig. T7.2, (male habitus); T1.21, T7.10–21 (description).

Map T1.26, blue square

Type material. Holotype female (ZMHB), perfect condition, labeled [White, hand written] “N'kolbisson [Yaoudé] Éclos du bois Antricyon Klaineamum [= *Antrocaryon klaineamum* Pierre: Anacardiaceae]” 6-v-65; [White] “Muséum Paris CAMEROUN”; [White] “Lacourt”; [White, printed in blue] “Zool. Mus. Berlin” [Red] “HOLOTYPE *Afrotremex xylophagus* ♀ H. Goulet, 2014”.

Paratype. 1 male. **Cameroon:** N'kolbisson, 29-vi-65 (1 M, ZMHB).

Diagnosis. Among species with dense and large pits on gena and vertex (*A. hyalinatus*). Adults of *A. xylophagus* are distinguished from those of *A. hyalinatus* by the presence on the gena between the ventral edge of the eye and the occiput of a row of round pits with a raised posterior edge and a smooth bottom.

Comparative diagnosis. *Afrotremex xylophagus* is a rather distinct species. It is unique in the following four features: pedicel proportions; fore and hind wings color pattern; size and distribution of shiny surface on tergum 8; and presence of a sharp ridge immediately ventral to the pit on annulus 3–15.

Afrotremex xylophagus is distinguished from *A. hyalinatus* by all unique attributes mentioned above and the following six features: density of pits with raised posterior edge in a row along a line between lower eye margin and occiput, and the sculpture at the bottom of these pits; convergence of the lateral edge of the submedian band of mesoscutum in anterior 0.5; microsculpture distribution in anterior 0.3 of the median and submedian bands of mesoscutum; pit size on anterior 0.5 of the median band of mesoscutum; size of pits along the anterior margin of axilla; and size and distribution of shiny surface on terga 6–8.

Afrotremex xylophagus shares with *A. hyalinatus* the following eleven features: size of the sensory oval surface on the dorsal surface of flagellomere 2; pit size and density on gena, vertex and postocellar area; degree of expansion of the club at the apex of the setae on clypeus, frons and postocellar area; sharpness of the lateral edge of the submedian band of mesoscutum; curvature of the lateral edge in posterior 0.5 of the submedian band of mesoscutum; width of the pit surface of the median band extended laterally posterior to submedian band; posterior extension of pitted sculpticells medially in posterior 0.5 of tergum 8; median carina prominence in the median basin of tergum 9; large teeth extension on lateral surface of tergum 10 posterior to lateral tooth; pits distinctness on anterior surface of lateral tooth of tergum 10; and shape and length of pit on annuli 2 and 10 of the ovipositor.

Afrotremex xylophagus is distinguished from *A. pallipennis* and *A. violaceus*, two similar species, by all unique attributes mentioned above and the following six features: sharpness of the lateral edge of the submedian band of mesoscutum; curvature of the lateral edge in posterior in 0.5 of the submedian band of mesoscutum; width of the mesoscutellar median band of pits extended laterally posterior to submedian band; size of pits along the anterior margin of axilla; extent of the shiny surface on terga 5–8; and presence of large teeth on the lateral surface of tergum 10 posterior to lateral tooth.

Afrotremex xylophagus shares with *A. violaceus* and *A. pallipennis* the following nine features: size of the sensory oval surface on the inner surface of flagellomere 2; relative width of the median band at its narrowest; lateral extension of the pits of the mesoscutellar median band posterior to submedian band; number of pits anterolaterally on the lateral band of mesoscutum; presence and extent of widespread sculpticells in the scutocutellar furrow; absence of microsculpture laterally on tergum 8; absence of pitted sculpticells in and around pits on the dorsal surface of tergum 10; distribution of pitted surface near posterior edge of median basin on tergum 10; and size of the pit on annulus 2 of the ovipositor.



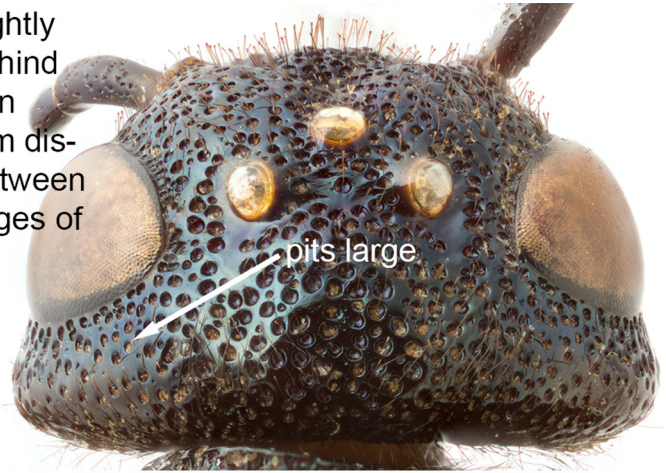
T7.1 *A. xylophagus* ♀



T7.2 *A. xylophagus* ♂

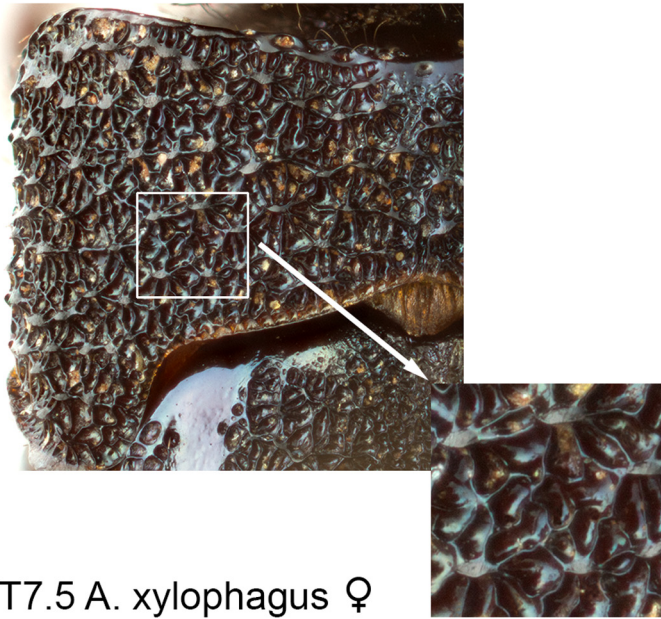


head slightly wider behind eyes than maximum distance between outer edges of eyes



T7.3 *A. xylophagus* ♀

T7.4 *A. xylophagus* ♀



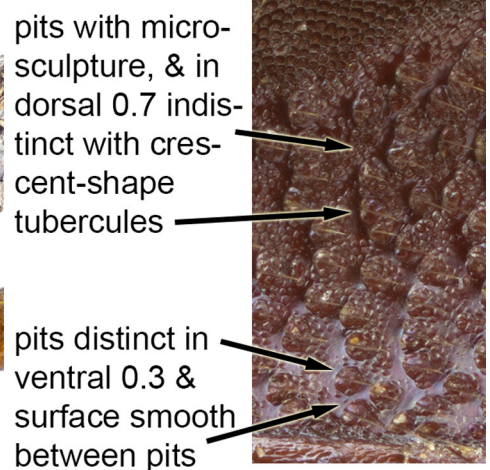
T7.5 *A. xylophagus* ♀



T7.6 *A. xylophagus* ♀

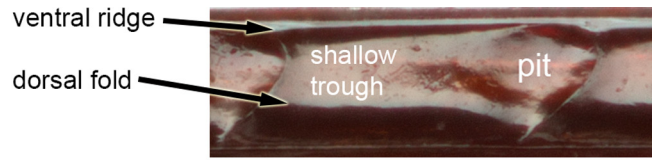


T7.7 *A. xylophagus* ♀



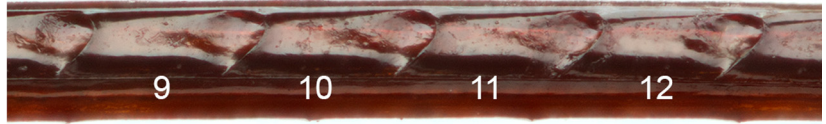


T7.8 *A. xylophagus* ♀

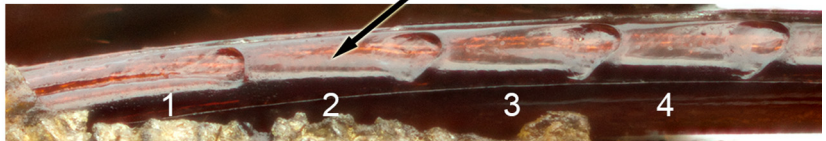


annulus 9

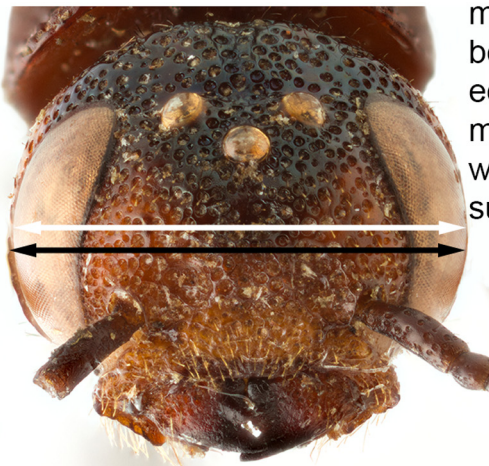
middle



base



T7.9 *A. xylophagus* ♀



T7.10 *A. xylophagus* ♂

maximum distance between outer eye edges equal maximum distance between head capsule edges



T7.11 *A. xylophagus* ♂

large pits



T7.12 *A. xylophagus* ♂

row of large pits with raised posterior edge

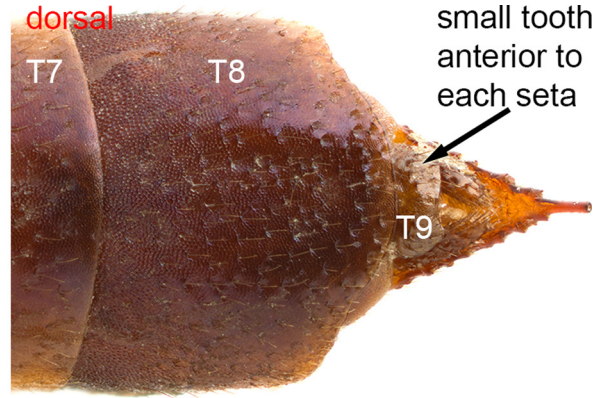


T7.13 *A. xylophagus* ♂

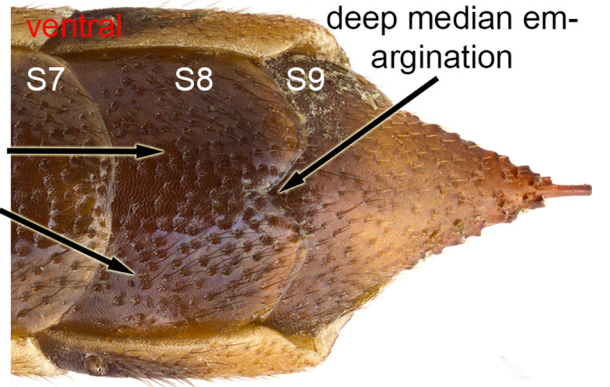
color pattern of thorax and legs



T7.14 *A. xylophagus* ♂



T7.15 *A. xylophagus* ♂



T7.16 *A. xylophagus* ♂



T7.17 *A. xylophagus* ♂



T7.18 *A. xylophagus* ♂



T7.19 *A. xylophagus* ♂



T7.20 *A. xylophagus* ♂



T7.21 *A. xylophagus* ♂

Afrotremex xylophagus differs from *A. comatus* and *A. opacus*, two similar species, by all unique attributes mentioned above and the following eleven features: size of the sensory oval on the dorsal surface of flagellomere 2; width of the median band of mesoscutum at its narrowest; absence of extension of fine pits of the mesoscutal median band posterior to submedian band; number of pits on the anterolateral corner of the lateral band of mesoscutum; absence or restricted presence of microsculpture on the scutoscutellar furrow; size of pits along anterior margin of axilla; extent of pitted sculpticells on tergum 8; pitted sculpticells in and around pits on central surface above lateral longitudinal furrow on tergum 9; distribution of pits and pitted sculpticells along anterior surface of tergum 10; presence of pits on the surface anterior to lateral tooth on tergum 10; and size and outline of pit on annulus 2 of the ovipositor.

Afrotremex xylophagus shares with *A. comatus* and *A. opacus* the following feature: density of pits with raised posterior edge in a row between the lower eye margin and the occiput, and sculpture at the bottom of these pits.

Description of female. COLOR. **Fore wing** darkly tinted with a dark purple hue (may be difficult to see) in the following cells (cells codes as in Fig. M1): C, R, 1Cu, 1A, 2A, 1M (in basal 0.5), 2Cu (in basal 0.5), 1R1, Rs+1Rs2 (broadly along apical, basal and anterior margins), 2R1, 3R1; 2Rs2, 3M, 3Cu (in apical 0.5), and 2M (in apical 0.25); remaining portion of cells (1M, 2Cu, Rs+1Rs2, 2M, and 3Cu) clear forming a small clear spot centrally (Fig. K44). **Hind wing** darkly tinted with a dark purple hue (may be difficult to see) in apical 0.3 and in the following cells in basal 0.5 (cells codes as in Fig. M1): C, R (in basal 0.25 and along apical margins), 1Cu1 (spot in basal 0.25), and most of anal lobe (with more or less clear spot anteriorly), R1, 1Rs (along apical, basal and anterior margins), 2Rs, 2M (in apical 0.5), 2Cu (extreme apex); remaining cells or part of cells (R, 1Cu, Anal lobe, 1M, 1Rs, 2M and 2Cu) clear (Fig. K44). **Protrochanter** and mesotrochanter ventrally in apical 0.3 reddish brown.

HEAD. **Gena** with large pits forming a curved row between lowest eye edge to occiput; pits 0.4–0.5 as long as diameter of lateral ocellus; each pit with raised posterior edge, isolated, and with shiny bottom (Fig. K36, insert); pits dense (usually polygonal in outline) in ventral 0.7, and less dense and round above; pits in ventral two thirds 0.3–0.5 times and in dorsal third 0.1–0.3 times as large as diameter of lateral ocellus (Fig. K36, T7.3 and T7.4). **Setae** on clypeus, frons and postocellar area clearly clubbed at apex (about 2 times as wide as setal shaft), and on frons 0.5–0.7 as long as diameter of lateral ocellus (as in Fig. K13 and T1.3, insert). **Pedicel** about 1.2 times as long as wide. Flagellomere 3 as long as wide and flagellomeres 4–11 clearly wider than long. **Flagellomere 2** with sensory oval covering about 0.5 of dorsal surface (as in Fig. K1).

THORAX. **Pronotum** with vertical lateral surface densely pitted on all or almost all of surface (Fig. T7.6); dorsal surface sculpture around shiny teeth with ridges and with few deep pits, pits with irregularly defined edges (worm-like) of various heights and about 0.1 as large as diameter of lateral ocellus (Fig. T7.5, insert); in lateral view, dorsal surface without or with some very short setae (as in Fig. K46). **Mesoscutum** with median band generally with fine pits, widest anteriorly, at its narrowest the band about 0.7 times as wide as diameter of lateral ocellus; surface with pitted sculpticells only along anterior margin, with pits posterior to microsculpture area, pits small (at most 0.15 times as large as diameter of lateral ocellus), with shiny bottom, and quite narrowly extended laterally posterior to submedian band and very hardly extended anteriorly along lateral edge of submedian band (Fig. K38, and K39b). Submedian band in anterior 0.1–0.3 without pitted sculpticells within pits; not sharply outlined along lateral edge (Fig. K38); lateral edge in anterior 0.5 slightly convergent, and in posterior 0.5 convergent and straight (Fig. K38). Lateral band shiny with many pits (>10) often partly fused on anterolateral corner (Fig. K38 and as in Fig. K4a). Scutoscuteellar furrow with convex sculpticells (clearly with metallic hue) over 0.7 central surface (Fig. K17a). **Axilla** with large pits but without shiny teeth as those on submedian band, broadly connected with small pits from submedian band along edge anteromedially, and without small pits (similar to those of median band) along anterior margin (Fig. K40b).

ABDOMEN. **Terga 1–7** with deeply pitted sculpticells (surface matt) at least at base. Tergum 8 generally matt but with shiny surface along lateral margin in posterior 0.5 (Fig. K6). Tergum 9 with median basin bearing about 20 shiny teeth on each side of median ridge; each tooth without a seta; median basin with longitudinal median ridge outlined and prominent, without a small shiny central spot, and slightly longer than wide (maximum width/maximum median length: 0.85–0.97) (Fig. T7.8). Tergum 9 in lateral view above longitudinal furrow in (central surface with setae) with pits in lower 0.5, pits not deep but outlined by pitted sculpticells, in dorsal 0.5 pits not outlined but with numerous crescent-like shiny tubercles anterior to a seta surrounded by pitted sculpticells (Fig. T7.7). Tergum 10 in dorsal view widely pitted; each pit shiny at bottom (surface between pits shiny except along anterior margin); pits extended to anterior edge only medially (contact about 0.3 times as wide as posterior edge of median basin) (Fig. K9); lateral surface posterior to lateral tooth shiny and with many large teeth (Fig. K19); surface anterior to lateral tooth with indistinctly outlined pits partly bordered by shiny ridges, each pit moderate in size and covered with pitted sculpticells (Fig. K19). **Ovipositor** with annulus 2 wide, extended and tapered to edge of annulus 1 (Fig. T7.9, base); annulus 10 with large pit as long as most of annulus, pit sharply outlined ventrally along 0.3–0.4 of annulus length (Fig. T7.9, middle); surface anterior to pit outlined by slightly convergent with round fold forming a trough-like, shallow surface extended to anterior annulus (Fig. T7.9, base and T7.9, middle); annulus with a long sharp ridge immediately ventral to pit (Fig. T7.9, insert).

Description of male. COLOR. Head. Capsule mainly reddish brown with occiput except posterior to margin adjacent to gena, vertex, postocellar area, and frons posterior to a line anterior to ocelli and top of eyes black with blue metallic reflections (Fig. T7.10–T7.12). Antenna black with purple reflections (Fig. T1.21). **Thorax.** Pronotum generally reddish brown with median triangle and diffused spot submedially black with blue metallic reflections (Fig. T7.14). Propleuron black. Mesonotum with most of mesoscutum and central spot on axilla black with blue metallic reflections, with submedian area of mesoscutum (an anterior and posterior diffused spot), most of axilla, and all of mesoscutellum reddish brown (Fig. T7.14); mesepisternum with most of lateral surface reddish brown but black ventrally (Fig. T7.13). Metascutum with black with blue metallic reflections but metascutellum reddish brown (Fig. T7.14). Metapleuron reddish brown laterally but black ventrally (Fig. T7.13). **Legs.** Fore and middle legs with coxae black, with femur ventrally, apical 0.6–0.7 of tibia and tarsus reddish brown, and with basal 0.3–0.4 of tibia light reddish brown (Fig. T7.13). Hind leg with coxa, femur, apical 0.5 of tibia and tarsomeres 2–5 dark brown, with basal 0.3 of tibia, and on basal 0.3 and dorsal 0.7 of tarsomere 1 reddish brown (Fig. T7.21). **Wings.** Fore wing generally light brown tinted but clear in apical 0.8 of cells R and 1Cu, and a little darker in cells 1R1, 2

R1, and basal 0.3 of 3R1 (Fig. T7.20). Hind wing clear in basal 0.5 and light brown tinted in apical 0.5 and along margin of anal lobe (Fig. T7.2). **Abdomen.** Generally brown to dark brown; terga 2–8 with lateral triangular reddish brown spot becoming light reddish brown to white along lateral margin (Fig. T7.15, T7.17 and T7.19); sternum 8 with posterior margin before median excision and apical 0.7 of sternum 9 reddish brown (Fig. T7.16); sterna 4–8 along lateral margin in apical 0.5 light reddish brown (Fig. T7.18).

HEAD. Head narrower than in female: flagellomere 1 0.9 as long as flagellomere 2, flagellomere 2 1.6 times as long as wide, and flagellomeres 3–10 longer than wide. Setae on clypeus, frons and postocellar area clearly clubbed at apex, and on frons 0.2–0.3 as long as diameter of lateral ocellus (Fig. T1.3, insert).

THORAX. Hind leg short and thick and in outline quite typical of siricid males; metatibia 4.7 times as long as wide and 1.3 times as long as metatarsomere 1; metatarsomere 1 3.6 times as long as wide and as long as metatarsomeres 2–5 combined (excluding claws); metatarsomere 5 as long as combined metatarsomeres 2 and 3.

ABDOMEN. Abdomen narrow and segments about equally long medially (segment 8 slightly longer) and in outline quite typical of siricid males. Tergum 9 visible and with obvious teeth anterior each long seta. Harpes with a tooth anterior to long setae. Surface of terga with numerous medium-sized setae. The microsculpture varies between each tergum: tergum 1 and 2 completely matt with deeply pitted sculpticells; tergum 3 mainly matt but shiny (sculpticells either scale-like or flat) in posterior 0.1; tergum 4 and 5 matt and shiny in posterior 0.3–0.4; terga 6 and 7 matt in basal 0.5 and shiny in apical 0.5; and tergum 8 matt in basal 0.2 and shiny in apical 0.8. Sternum densely pitted and surface between pits with isodiametric meshes with flat sculpticells; pits with pitted sculpticells. Posterior edge of sternum 8 deeply excised, excision about 2 times as wide as long; and sternum about 0.5 as long as length of sternum 9.

Host. The two specimens were reared from *Antrocaryon klaineum* (Anacardiaceae) a tree from central Africa.

Origin of specific epithet. From Greek meaning “wood eater” referring the emergence of the specimens from the wood of *Antrocaryon klaineum* (Anacardiaceae) as noted on the label.

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Specimens of *Afrotremex* are extremely rarely collected, though they may be common in the crowns of trees. I am most thankful for the loan of eight specimens from E. De Coninck (MRAC), two from D. R. Smith (USNM) and two from F. Koch (ZMHB). I am especially thankful to F. Koch who kindly compared eight characters and their states with the holotype of *A. hyalinatus* before returning it to Budapest, Hungary. His contribution was pivotal in allowing this research project to proceed. I also want to thank C. Csösz (HNHM) in figuring out the whereabouts of the *A. hyalinatus* holotype.

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