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Two new species of *Pseudapis* Kirby, 1900 (Hymenoptera: Halictidae: Nomiinae) from Africa

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Abstract

Two previously unknown species of the genus *Pseudapis* Kirby, 1900 are described and illustrated: *Pseudapis neumayeri* Bossert & Pauly, **sp. nov.** (♂, ♀, Kenya, Tanzania), and *P. crassivertex* Bossert & Pauly, **sp. nov.** (♂, ♀, Mali, Mauritania, Niger, Senegal). We provide diagnoses for the new species and report all currently available records. Lastly, we present a revised identification key for the African species of the genus.

Key words: bees, systematics, identification key, nomenclature

Introduction

Pseudapis Kirby, 1900 is a genus of halictid bees (Hymenoptera: Halictidae: Nomiinae) with a wide distribution in the Old World. As with many nomiine genera, there are two competing classifications of *Pseudapis*, which lead to differing numbers of included species. The widely used classification of Michener (2007) follows a conservative approach and regards the generic names *Nomiapis* Cockerell, 1919, *Stictonomia* Cameron, 1905, and *Ruginomia* Pauly, 1990 as synonyms of *Pseudapis* (= *Pseudapis* s. str.), whereas *Pachynomia* Pauly, 1980 represents a subgenus of *Pseudapis*. The atypical *Steganomus* Ritsema, 1873, which differs from all other Nomiinae by having only two submarginal cells (Michener 2007; Pauly 1990), is recognized as a distinct genus and is not explicitly associated with *Pseudapis*. In contrast, the classification based on the revisionary studies of Pauly (1980, 1990, 1991, 2009) regards all previously mentioned names as valid genera, yielding six separate taxonomic groups. This classification is supported by the cladistic analyses of Baker (2002), however, only species of *Pseudapis* s. str. and *Nomiapis* are included in his study. In fact, a sufficiently comprehensive phylogenetic investigation that includes all *Pseudapis*-related groups is currently not available. The present study follows the classification after Pauly (1990) and treats the primarily Paleotropical *Pseudapis* as distinct from the Palearctic *Nomiapis*.

Pseudapis sensu Pauly (1990) comprises 37 species, including the two additional taxa described herein. It is endemic to the Old World, with its greatest diversity in sub-Saharan Africa (now 22 species), 10 species in Northern Africa, and 9 species in the Oriental Region (Pauly 2009, 2013). The African species, including those occurring in Northern Africa and some from the Arabian Peninsula, are revised in Pauly (1990). Baker (2002) provides keys for most *Pseudapis* and *Nomiapis* from the Palearctic and the Oriental regions, and Astafurova & Pesenko (2006) give an annotated list of species from Russia and adjacent countries.

The *Pseudapis*-related bees are rather short and robust in their appearance, with several conspicuous morphological traits that delineate them from the remaining Nomiinae. Most notably, both sexes have enormously enlarged tegulae, with the posterior boarder of the tegulae extending behind the scutoscutellar suture (e.g., Fig. 1A, Fig. 3A). This character is conspicuous but not unique among Nomiinae: The subgenus *Tegumelissa* Pauly, 2014 (genus *Lipotriches* Gerstäcker, 1858; Pauly 2014) has enlarged tegulae as well. In contrast, *L.* (*Tegumelissa*) lacks the characteristic preoccipital carina on the genal area of all *Pseudapis*-related genera except *Steganomus*, and are

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significantly more slender and less robust in their overall body shape. They further differ by the shape of the female basitibial plate and the structure of the male genitalia. All species of *Pseudapis* are sexually dimorphic, and the males show a much higher degree of structural diversity. Many species have species-specific modifications, such as strongly developed hind leg structures (Fig. 1G), enigmatic spatulate hairs on the ventral side of the femur (e.g., Fig. 5F), and sterna bearing projections of various shapes (Baker 2002; Pauly 1990; Warncke 1976). Even though the function of these modifications is not at all understood, they are useful for species identification and delimitation.

With this study, we report the discovery of two previously unknown species of the genus *Pseudapis* s. str. from sub-Saharan Africa. We describe both sexes of the species and report the available information on their distribution, biology, phenology, and floral hosts.

Material and methods

The terminology used in this study essentially follows Michener (2007). For the description and the modified key, we used abbreviations for the following morphological structures: tergum (T), sternum (S), and flagellomere (F). We used the following acronyms for museum collections:

CAS	California Academy of Sciences, San Francisco, USA. Contact: W. J. Pulawski.
OÖL	Oberösterreichisches Landesmuseum, Linz, Austria. Contact: F. Gusenleitner.
RBINS	Royal Belgian Institute of Natural Sciences, Brussels, Belgium.
USNM	National Museum of Natural History, Smithsonian Institution, Washington D.C., USA.

Additionally, we included data from the following private collections: M. Schwarz (Ansfelden, Austria), F. La Roche (Santa Cruz de Tenerife, Spain), and D. Baldock (Milford, UK).

Photographs of *Pseudapis neumayeri* and *P. crassivertex* were taken with a Canon EOS 6D camera mounted on a Macropod Pro system. We used a Stackshot 3× Cognisys device and the Zerene focus stacking software to perform stacking of single photographs. The maps were designed using SimpleMappr (Shorthouse 2010). The phenological information of each species is based on the collection dates of the examined specimens. For the information on floral resources, we listed the plant taxa that were recorded on the collection labels of the examined specimens.

Taxonomy

Genus *Pseudapis* Kirby, 1900

Pseudapis neumayeri Bossert & Pauly, sp. nov.

(Figs 1–3)

Diagnosis. ♂: Medium-sized (6.4–8.1 mm). Similar to *Pseudapis usambarae* Pauly, 1990, *P. kenyensis* Pauly, 1990 and *P. riftensis* Pauly, 1990, and sharing the following characters: distitarsus of middle leg with a brush-like structure of black setae, underside of hind femur with dense setae, and medio-apical part of sternum 5 without longitudinal carina. Differs from the three aforementioned species by the less sclerotized transversal structure in the middle of sternum 5 and two submarginal transversal carinae (Fig. 2A). ♀: Medium-sized (7.6–7.8 mm). Morphologically not distinguishable from females of the *Pseudapis anthidioides* (Gerstäcker, 1857) group.

Type material. Holotype: ♂, Tanzania, Tanga Region, 73 km NW of Korogwe [4°40.8′S, 38°06.4′E], 14–15 Jul 2001, leg. Omary S. Haji & W. J. Pulawski, deposited in CAS. Paratypes: 3♂, 2♀, Tanzania, Tanga Region, 73 km NW of Korogwe [4°40.8′S, 38°06.4′E], 14–15 Jul 2001, leg. Omary S. Haji & W. J. Pulawski, one pair (♂, ♀) dep. in RBINS, remaining specimens dep in CAS. 2♂, Tanzania, Tanga Region, 2 km NE Mkomazi [4°37.8′S, 38°05.5′E], 26 Dec 2002, leg. M. A. Prentice, dep. in CAS. 2♂, Tanzania, Tanga Region, Pangani River Camp, 86 km NW of Korogwe [4°37.3′S, 38°00.7′E], 18 Jul 2001, leg. Omary S. Haji & W. J. Pulawski, dep. in CAS. 1♂, Tanzania, Kilimanjaro Region, 18 km S. of Same [4°13.0′S, 37°46.0′E], 15 Jul 2001, leg. Omary S. Haji & W. J. Pulawski, dep. in CAS. 1♂, Kenya, Rift Valley Province, Lodwar road, 4 km N to Sigor [1°33.7′N, 35°27.7′E], 13 May 2000, leg. V. F. Lee & W. J. Pulawski, dep. in CAS. 1♂, Kenya, Rift Valley Province, Lodwar road, 24 km N

to Sigor [1°42.2′N, 35°29.5′E], 8 Jun 1999, leg. W. J. Pulawski & J. S. Schweikert, dep. in CAS. 3♂, Kenya, Rift Valley Province, Marich Pass Field Studies Centre [1°32.2′N, 35°27.4′E], 25–29 Jul 1999, leg. W. J. Pulawski & J. S. Schweikert, one specimen dep. in RBINS, two in CAS. 1♂, Kenya, Coast Province, Taita Hill, Discovery Centre [3°42.3′S 38°46.6′E], 13–14 Dec 2002, leg. M. A. Prentice, dep. in CAS. 1♂, Eastern Province, near Ewaso Ngiro River opposite Archer's Post [0°38.1′N, 37°40.4′E], 2–8 Dec 2002, leg. M. A. Prentice, dep. in CAS. 25♂, Kenya, Voi, Tsavo, 23 Mar–4 Apr 1997, leg. Ma. Halada, one specimen dep. in RBINS, remaining specimen in OÖL. 1♂, Kenya, Tsavo East, Galana River Lodge, 4 Feb 2010, leg. D. W. Baldock, dep. in col. Baldock.

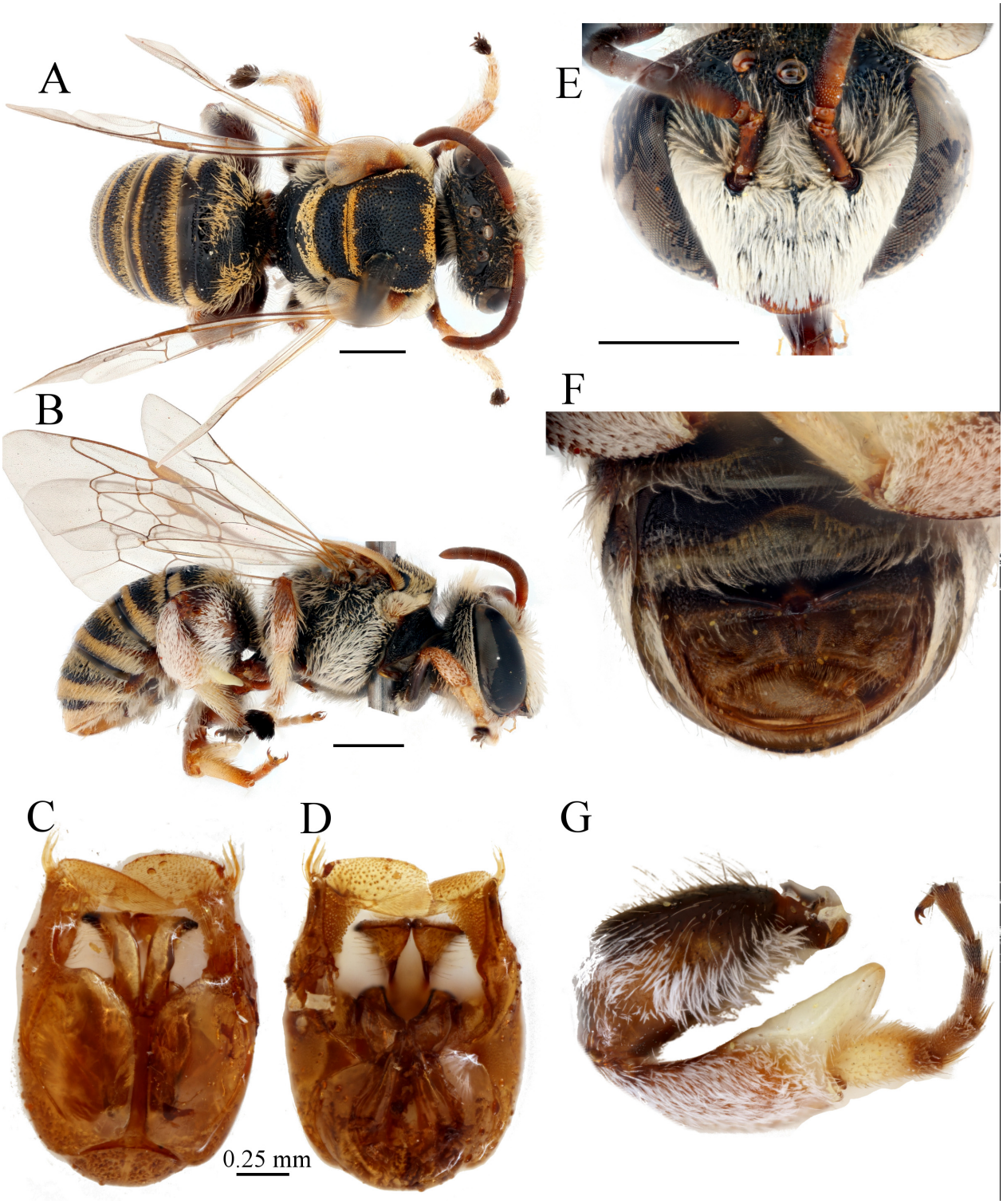

FIGURE 1. Male of *Pseudapis neumayeri* Bossert & Pauly, **sp. nov. A**. Habitus, dorsal view. **B**. Habitus, lateral view. **C.** Genital capsule, dorsal view. **D.** Genital capsule, ventral view. **E.** Head, frontal view. **F**. Metasomal sterna. **G.** Hind leg, lateral view. Scale bars shows 1 mm unless otherwise indicated.

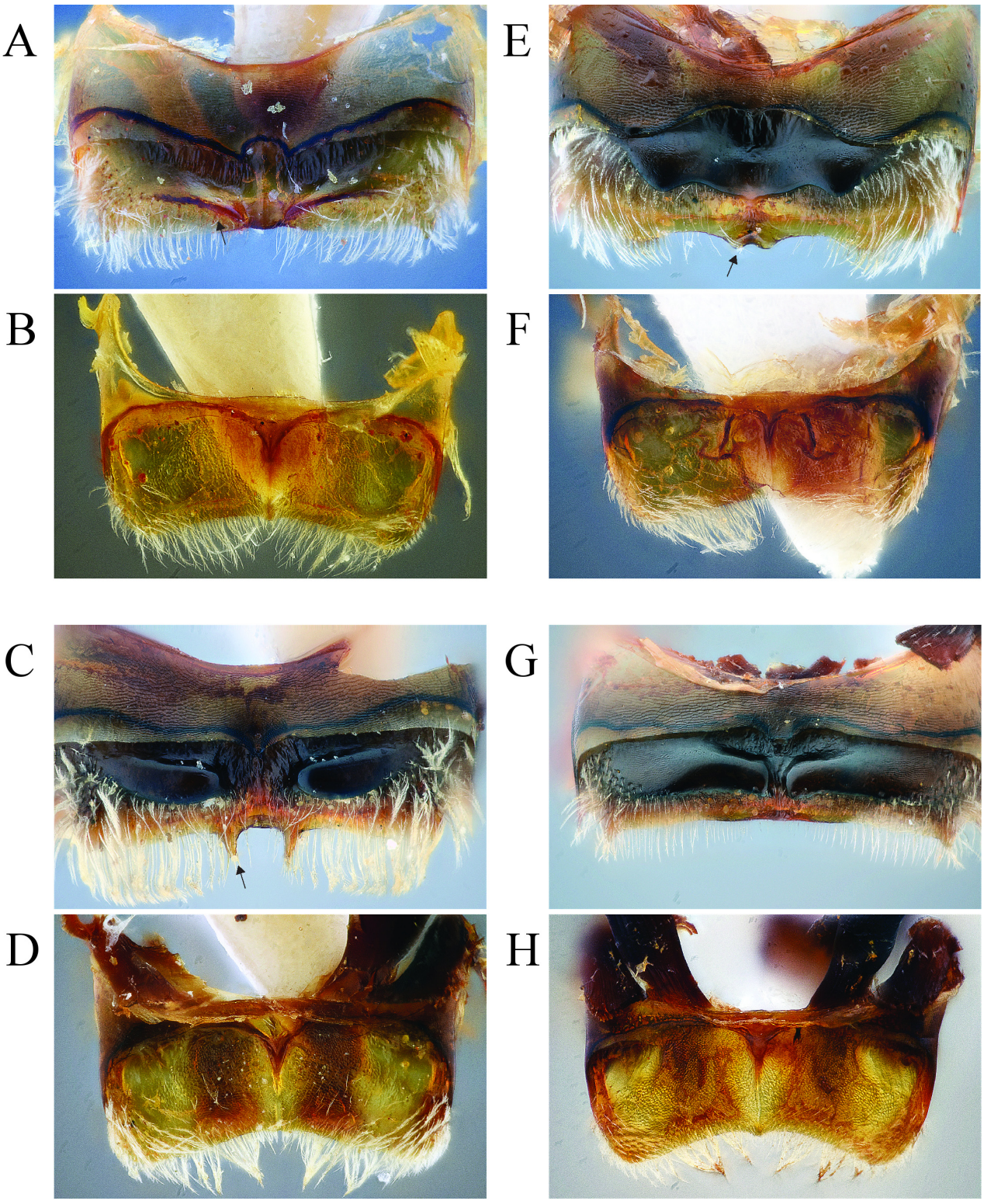

FIGURE 2. Sternal details of *Pseudapis* males. **A**. *P. neumayeri*, S5 **B**. *P. neumayeri*, S6 **C.** *P. riftensis*, S5. **D.** *P. riftensis*, S6. **E.** *P. kenyensis*, S5. **F**. *P. kenyensis*, S6. **G.** *P. usambarae*, S5. **H.** *P. usambarae*, S6.

Description. ♂: Head (Fig. 1E): Distinctly shorter than broad (width: 2.3–2.8 mm; length: 1.9–2.2 mm). Integument entirely dark brown to black. Dense white setae covering lower half of face, extending slightly above antennal sockets. Clypeus, after removal of setae, with coarse punctation and shiny interspaces; integument of apical margin reddish-brown. Mandible reddish-brown, 0.8–0.9 mm long, unidentate. Maxillary palp with six segments, labial palp with four. Genal area narrow, slightly less broad than half width of compound eye (Fig. 1B). Genal area

densely covered with white setae of two different types: area between preoccipital ridge and rim of compound eye covered with thick and short setae, contrasting the much more slender and longer setae on remainder of genal area. Malar distance linear. Supra-antennal area and vertex densely punctate, interspaces shiny; lateral patches near lateral ocelli without punctation. Antennal foramen located in center of face. Scape reddish-brown, slightly enlarged, imperceptibly broader than flagellomeres in frontal view. F1–F2 each as long as broad, F3–F11 homogeneously slightly longer than broad, none with lengths of more than 1.2× the width. Integument reddish-brown, ventral surface lighter colored than dorsal surface.

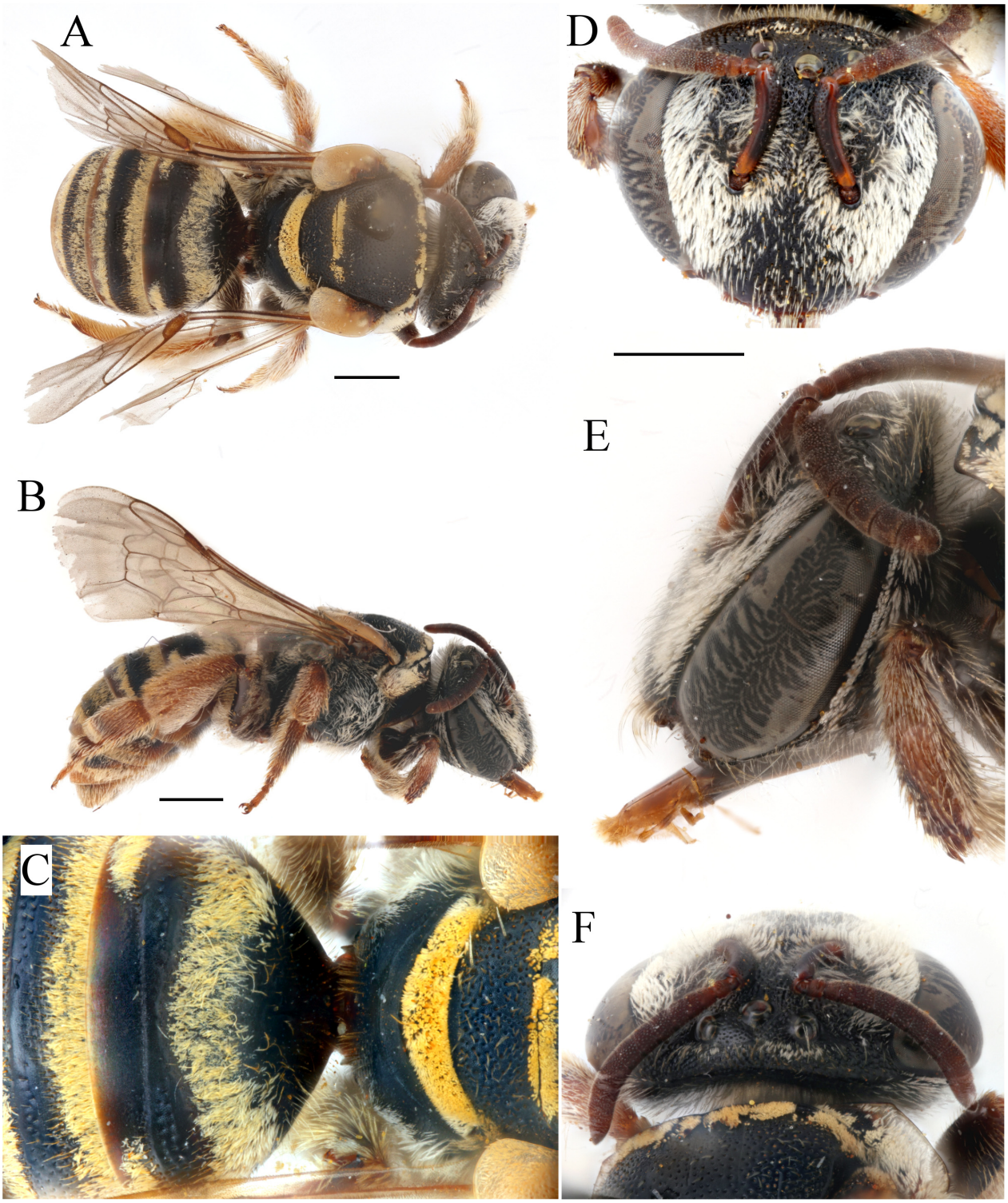

FIGURE 3. Female of *Pseudapis neumayeri* Bossert & Pauly, **sp. nov. A**. Habitus, dorsal view. **B**. Habitus, lateral view. **C.** Details of meso- and metasomal terga, dorsal view. **D**. Head, frontal view. **E.** Head, lateral view. **F.** Head, dorsal view. Scale bars show 1 mm.

Mesosoma: Integument largely black, except for produced dorsolateral angles of pronotum; these are pale yellow, slightly transparent. Pilosity creamy light yellow, with thick, short, scale-like setae on border between scutum and scutellum, border between scutum and pronotum, and metanotum (Fig. 1A). Setae on episterna and pronotum distinctly slenderer and long. Punctation on scutum and scutellum regular, coarse and dense. Interspaces shiny and narrow, smaller than size of pits. Punctation on propodeum less dense, shallower, irregular. Intertegular distance 1.5–1.8 mm, parapsidal line 0.29–0.34 mm. Tegula pale, with shallow punctation and white setae. Wing clear, venation light brown, stigma yellow-brown. Three submarginal cells. Coxa, trochanter, femur, and tibia of all legs with reddish-brown integument. Tarsal segments creamy white on lateral surface, inner surface reddish-brown. Fifth tarsal segments of fore- and midleg modified into dark-brown, brush-like structure (Fig. 1B). Apical area of hind tibia modified (Fig. 1G). Spatulate setae absent, pulvillus present.

FIGURE 4. Distribution of *Pseudapis neumayeri* Bossert & Pauly, **sp. nov.**

Metasoma: Surface of T1–T7 with very coarse, irregular punctation on tergal discs, interspaces shiny. Marginal zones without punctation, shiny. T2–T7 with dense basal and apical bands of creamy-white setae. Band on basal

area of T1 with erect setae forming tuft. Band on marginal zone broadly interrupted. S1–S4 unmodified, S2–S4 with sparse apical bands of long erect white setae. Margin of S5 elevated, forming two distinct rims (Fig. 2A). Genital capsule as in Fig. 1C–D.

♀: Head (Fig. 3D): Shorter than broad (width: 2.8–2.9 mm; length: 2.3–2.4 mm). Integument black. Face covered with highly branched white setae, most dense on paraocular area. Clypeus and supraclypeal area with coarse and irregular punctation, interspaces shiny. Punctation increasingly coarse on apical margin of clypeus. Mandible reddish-brown, tip black, 0.8–0.9 mm long, bidentate. Maxillary palp with six segments, labial palp with four. Genal area narrow, slightly less broad than half width of compound eye (Fig. 3E). Pubescence on genal area like in male. Malar distance linear. Supra-antennal area and vertex densely punctate, pits smaller around the ocelli. Patches without punctation lateral of the lateral ocelli smaller than in the male, surface shagreened (Fig. 3F). Antennal foramen slightly below center of face. Scape largely brown with reddish-brown integument at base (Fig. 3D). Scape slender, as broad as flagellomeres in frontal view. F1–F2 shorter than broad, F3–F9 as long as broad, F10 longer then broad. Integument reddish-brown.

Mesosoma: Integument black, except for produced dorsolateral angles of pronotum. These are whitish-transparent, with thick pubescence. Pilosity of mesosoma as in male (Fig. 3A, 3C). Punctation on scutum sparser and finer than in male, interspaces shagreened. Punctation denser along parapsidal line, and border between scutum and scutellum. Distances between punctation in the midline area up to 3× diameter of pits. Interspaces on scutellum slightly smaller than on scutum. Propodeum without clear punctation, shagreened. Intertegular distance 1.9–2.0 mm, parapsidal line 0.33–0.35 mm. Tegula largely pale, dark brown only at base, with punctation and white setae anteriorly. Wing clear, venation light brown, stigma yellow-brown. Three submarginal cells. Legs with reddish-brown integument, including tarsal segments. Setae of tibial scopa entirely white, with long distal branches (scopa type ‘scirpoïde sensu Pauly 2014). Setae on hind coxa with feather-like branches. Basitibial plate present, complete. Pulvillus present.

Metasoma: Surface of T1–T3 with very shallow, widely separated punctation, interspaces shagreened. Punctation on T4–T6 deeper and denser. Marginal zones without punctation. T2–T6 with dense basal and apical bands of creamy-yellow setae. Pubescence on basal area of T1 with erect setae forming a broad band. Band on marginal zone of T1 broadly interrupted (Fig. 3C). Sterna unmodified, with sparse apical bands on sternal margins.

Distribution. Eastern Africa (Kenya, Tanzania).

Phenology. Collected in II, III, IV, V, VI, VII, XII.

Host plants. Unknown.

Etymology. The species is named in honor of the melittologist and early mentor of the first author, Johann Neumayer.

Pseudapis crassivertex Bossert & Pauly, sp. nov.

(Figs 5–8)

= *Pseudapis* sp. 1 of Pauly, 1990: 68 (couplet 6 of the key to females), 78 (data).

Diagnosis. ♂: Very small (4.9–5.7 mm). Similar to *Pseudapis nubica* (Warncke, 1986), with distitarsus of middle leg black and enlarged but without dense brush of setae. Scutellum with two spines, hind femur with spatulate setae and sterna 1–4 not modified. Differs by the much more expanded apical lobe of hind tibia (Fig. 5F), and vertex more expanded than in *P. nubica* (Fig. 7A, Fig. 7C). ♀: Very small (6.1–6.4 mm). Easily distinguishable by the strongly expanded vertex and gena (Fig. 7B).

Type material. Holotype: ♂, Mali, 7 km S of San, 22 Aug 1991, leg. W. J. Pulawski, dep. in CAS. Paratypes: 1♂, Mali, 60 km NE of San, 6 Aug 1991, leg. W. J. Pulawski, dep. in CAS. 2♀, Mali, 30 km W. of Gao, 15 Aug 1991, leg. W. J. Pulawski, dep. in CAS. 1♀, Mali, 45 km W. of Mopti, 9 Aug 1991, leg. W. J. Pulawski dep. in CAS. 1♂, 1♀, Senegal, near N’Dierba, 8 Oct 1978, leg. G. Hevel & J. Fortin, dep. in USNM. 1♀, Mauritania, 20 km NE of Aleg, 3 Nov 1993, leg. W. J. Pulawski, dep. in CAS. 3♀, Mauritania, 153 km NE of Nouakchott, 20 Oct 1993, leg. W. J. Pulawski, dep. in CAS and RBINS. 1♀, Mauritania, Oued Henné, 50 km NE of Moujéria, 2 Nov 1993, leg. W. J. Pulawski, dep. in CAS. 1♀, Mauritania, 25 km SW of Moujéria, 29 Oct 1993, leg. W. J. Pulawski, dep. in CAS. 1♀, Niger, Tsernaoua [13°53′N, 5°20′E], 13 Aug 1987, on flowers of *Sesamum* sp., leg. A. Pauly, dep. in

RBINS. 2♀, Mauritania, Oudâne, 8 Oct 2000, leg. La Roche. 1♀, Mauritania, Atar, plaine de Yaghref, 11 Oct 2000, n°1, leg. La Roche. 2♂, 1♀, Mali, 5 km S. of San, 22 Aug 1991, leg. & dep. M. Schwarz. 1♀, Mali, 30 km NE of San, 6 Aug 1991, leg. & dep. M. Schwarz. 1♂, Mali, 60 km NE of San, 6 Aug 1991, leg. & dep. M. Schwarz. 1♂, 1♀, Mali, 100 km NE of San, 21 Aug 1991, leg. & dep. M. Schwarz. 1♀, Mali, 30 km W. of Gao, 15 Aug 1991, leg. & dep. M. Schwarz.

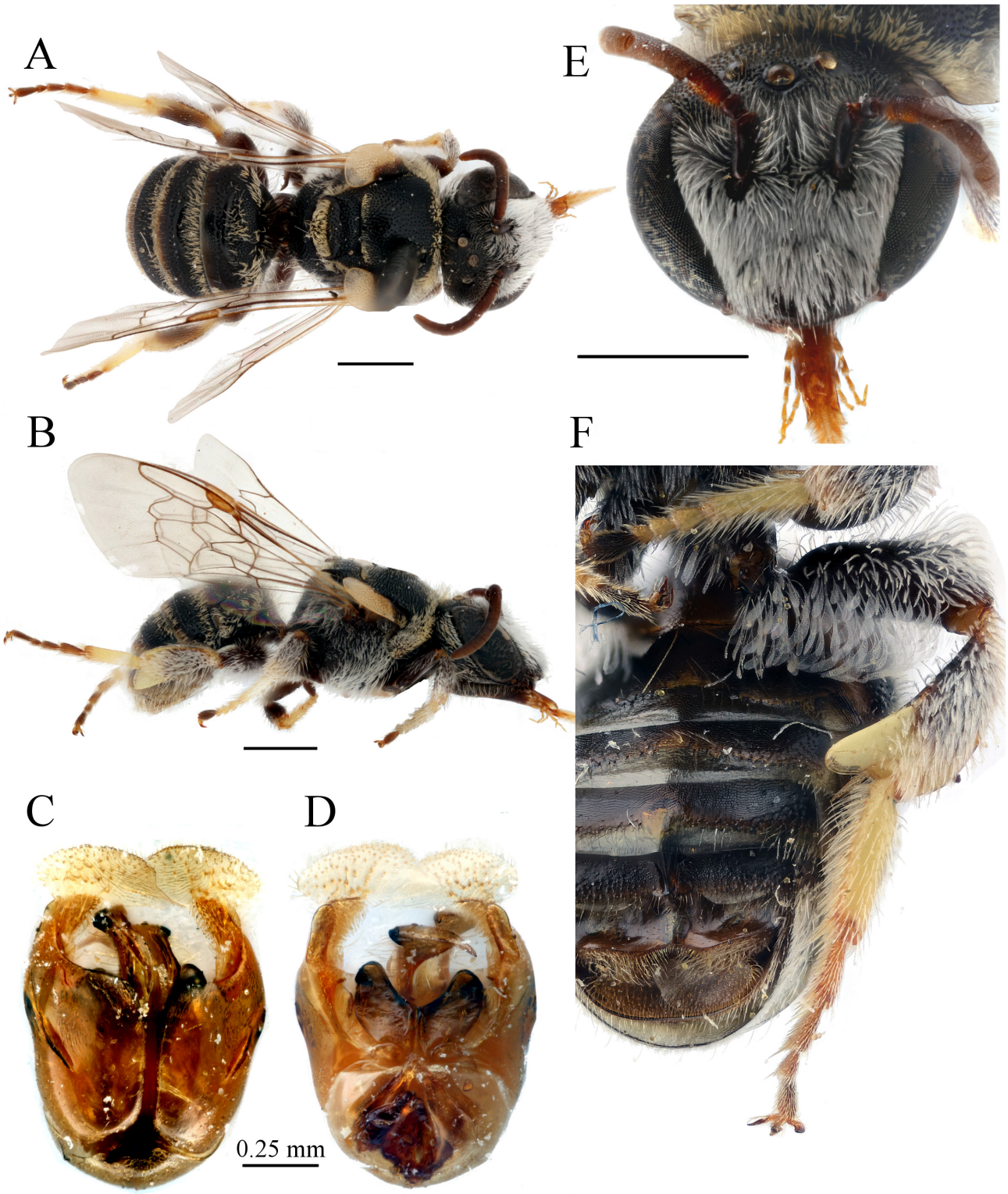

FIGURE 5. Male of *Pseudapis crassivertex* Bossert & Pauly, **sp. nov. A**. Habitus, dorsal view. **B**. Habitus, lateral view. **C.** Genital capsule, dorsal view. **D.** Genital capsule, ventral view. **E.** Head, frontal view. **F**. Metasomal sterna. **G.** Hindleg, lateral view. Scale bars indicate 1 mm.

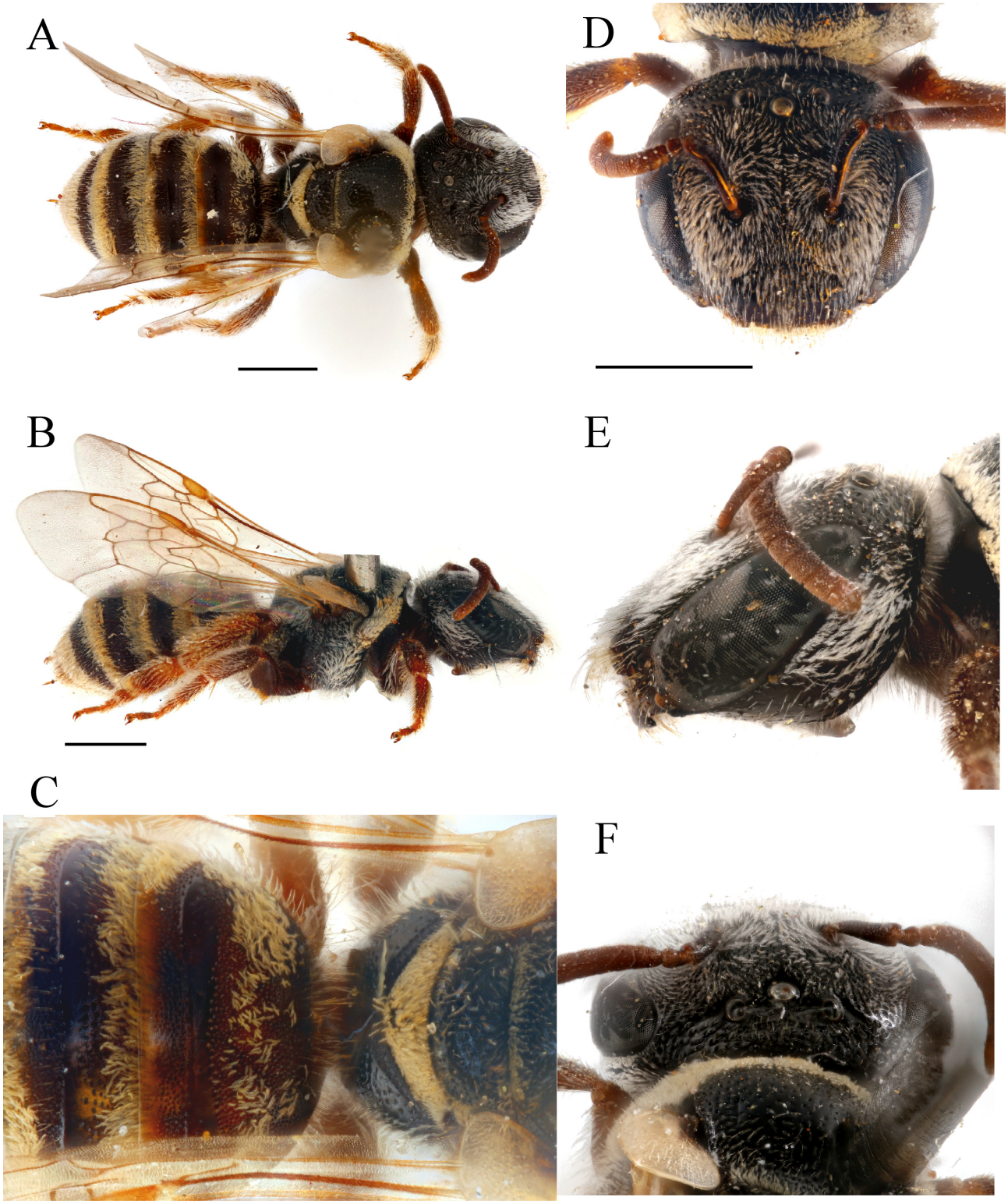

FIGURE 6. Female of *Pseudapis crassivertex* Bossert & Pauly, **sp. nov. A**. Habitus, dorsal view. **B**. Habitus, lateral view. **C.** Details of meso- and metasomal terga, dorsal view. **D**. Head, frontal view. **E.** Head, lateral view. **F.** Head, dorsal view. Scale bars indicate 1 mm.

Description. ♂: Head (Fig. 5E): Slightly shorter than broad (width: 1.7–2.0 mm; length: 1.6–1.8 mm). Integument black. Dense white setae covering lower two third of face, extending above antennal socket. Setae plumose. Clypeus, after removal of setae, with coarse irregular punctation, shiny interspaces. Mandible brown, tip reddish, 0.5–0.7 mm long, unidentate. Maxillary palp with six segments, labial palp with four (Fig. 5E). Genal area broad,

0.7× width of compound eye. Genal area densely covered with thick white setae, including area between preoccipital ridge and rim of compound eye. Malar distance linear. Supra-antennal area and vertex punctate, interspaces small, shiny. Two lateral patches at lateral ocelli without punctation, shiny. Antennal foramen located in center of face. Scape brown, slightly broader than flagellomeres in frontal view. F1–F2 slightly shorter than broad, F3 quadrate, F4–F10 slightly longer than broad or as long as broad, F11 longer than broad. Integument brown dorsally, orange ventrally.

Mesosoma: Integument largely black, except for produced dorsolateral angles of pronotum. Angle pale white, slightly transparent. Pilosity creamy white, with thick, short, scale-like setae on border between scutum and scutellum, border between scutum and pronotum, and on metanotum (Fig. 5A). Setae on episterna and pronotum distinctly longer and more slender. Punctation deep, regular. Interspaces shiny, about as broad as diameter of punctation, rarely more. Punctation on scutellum like on scutum but with smaller interspaces. Scutellum modified, with two conspicuous, posteriorly produced spines (Fig. 5A). Punctation on propodeum similar to scutum but more irregular. Intertegular distance 1.1–1.3 mm, parapsidal line 0.23–0.26 mm. Tegula largely white, dark brown at base, with punctation throughout dorsal surface. Wing clear, venation and stigma yellow. Three submarginal cells. Integument of coxa, trochanter, and femur brown. Tibia largely brown, but with creamy white patches basally and apically (Fig. 5F). Basitarsi creamy white. Terminal tarsal segments enlarged, brown. Apical area of hind-leg tibia modified (Fig. 5F). Spatulate setae present (Fig. 5F), pulvillus present.

Metasoma: Surface of T1–T7 with coarse, irregular punctation on tergal discs. Interspaces of irregular size, shiny. Marginal zones with finer and denser punctation, interspaces shiny. T2–T7 with basal and apical bands of creamy-white setae, basal bands stronger developed. Band on basal area of T1 with erect setae forming tuft, band on marginal zone broadly interrupted. S1–S4 unmodified, without apical bands. Margin of S5 slightly elevated, but less strongly modified than in other *Pseudapis* males (Fig. 5F). Genital capsule as in Fig. 5C–D.

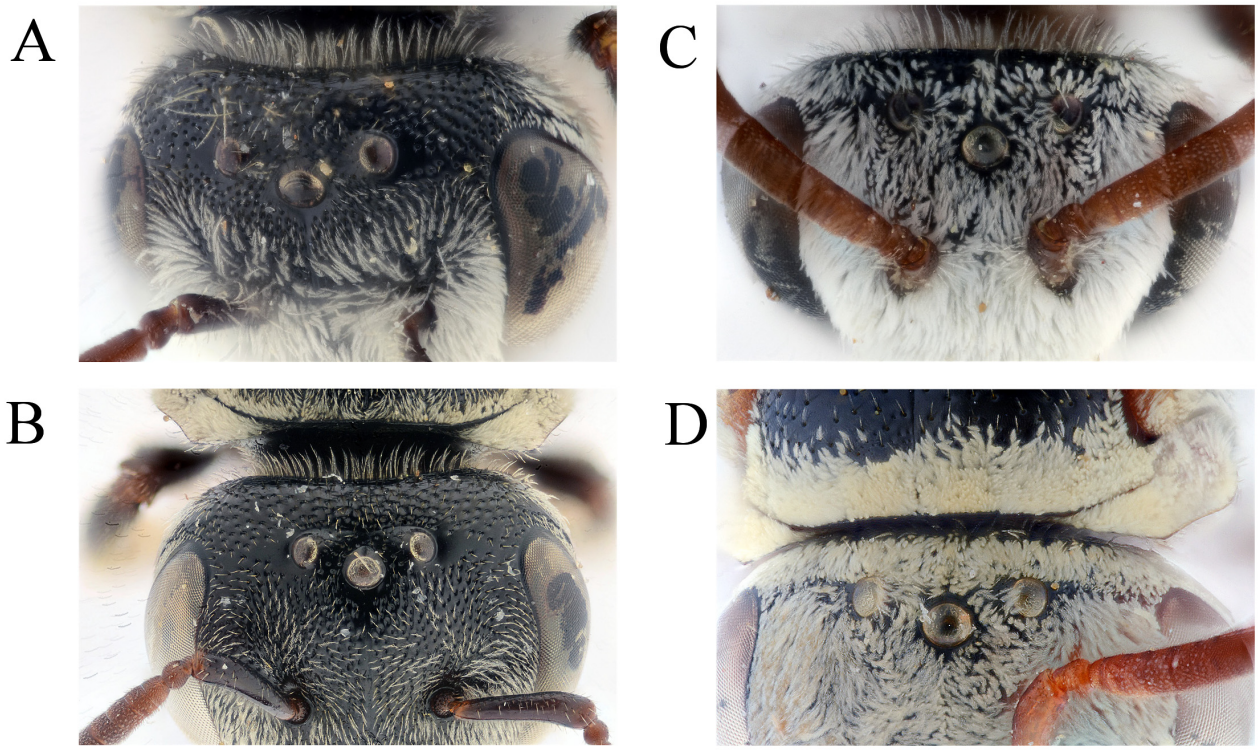

FIGURE 7. Comparison of *P. crassivertex* and *P. nubica*. **A**. *P. crassivertex*, male. **B**. *P. crassivertex*, female. **C.** *P. nubica*, male. **D.** *P. nubica*, female.

♀: Head (Fig. 6D): Slightly shorter than broad (width: 1.9–2.0 mm; length: 1.7–1.8 mm). Integument dark brown to black. Face sparsely covered with white setae, plumose, most dense on the paraocular area. Clypeus with coarse and irregular punctation, less dense in apical part. Interspaces shiny. Punctation on supraclypeal area coarse, slightly denser than on clypeus. Mandible dark reddish, tip darkened, 0.82–0.84 mm long, unidentate. Maxillary palp with six segments, labial palp with four. Genal area broad, as broad as or minutely narrower than width of com-

pound eye (Fig. 6E). Pubescence on genal area like in male. Malar distance linear. Supra-antennal area and vertex punctate, punctation coarser on vertex. Frontal line present. Patches without punctation lateral of lateral ocelli present, shiny (Fig. 6F). Antennal foramen below center of face. Scape brown, reddish-brown at base (Fig. 6D). Scape slender, as broad as flagellomeres in frontal view. F1–F3 shorter than broad, F4–F9 as long as broad, F10 longer then broad. Integument reddish-brown ventrally, darker dorsally.

FIGURE 8. Distribution of *Pseudapis crassivertex* Bossert & Pauly, **sp. nov.**

Mesosoma: Integument black, except for lamellate projections of the pronotum. These are whitish-transparent, with thick pubescence. Pilosity creamy white, thick, short, scale-like setae on border between scutum and pronotum, and on metanotum (Fig. 6A). Setae on episterna and pronotum longer and more slender. Punctation on scutum sparse, fine. Interspaces on midline area up to 6× the diameter of the pits, shiny. Punctation denser along parapsidal line and border between scutum and scutellum. Interspaces on scutellum slightly smaller than on scutum, up to 4× the pit diameter. Propodeum with shallow punctation, sparse, shagreened. Intertegular distance 1.1–1.2 mm, parapsidal line 0.25–0.26 mm. Tegula largely white-pale, partly transparent, dark brown at base, with punctation anteri-

orly. Without pubescence. Wing clear, venation yellow-brown, stigma yellow. Three submarginal cells. Legs with reddish-brown integument, including tarsal segments. Setae of tibial scopa white, with long distal branches. Setae on hind coxa with feather-like branches. Basitibial plate present, complete. Pulvillus present, dark brown.

Metasoma: Surface of T1 with dense, fine punctation. Interspaces not greater than 1× the diameter of pits. Marginal zone without punctation, less dense than on surface of disc. Punctation on surface of T2–T6 noticeably less dense and fine, shallow, irregular. Interspaces shagreened. Marginal zones with fine, dense punctation, contrasting discs. T2–T6 with dense basal and apical bands of creamy-yellow setae. Pubescence on basal area of T1 forming loose band. Band on marginal zone of T1 broadly interrupted (Fig. 6C). Sterna unmodified, S2–S5 with sparse apical bands on margins.

Distribution. Sahelian countries (Mali, Mauritania, Niger, Senegal).

Phenology. Collected in VIII, X, XI.

Host plants. The only recorded host plant is *Sesamum* sp.

Etymology. From Latin "crassus—"thick, dense", and "vertex"—"top" of the head.

Key to the species of *Pseudapis* (s. str.) from Africa

The presented identification key is based on Pauly (1990) and most figures referenced below refer to the illustrations of this publication. For efficient usage of the key, we recommend comparing characters and specimens with the illustrations on the Atlas-Hymenoptera entry of *Pseudapis* (Pauly, 2013: http://www.atlashymenoptera.net/page.asp?id=83), which includes detailed photographs of nearly all described species.

Males

1	Antenna capitate: last antennal segment distinctly broadened and with darker integument than the remaining flagellum; Egypt	*Pseudapis fayumensis* Baker, 2002
-	Antenna not capitate, last antenna segment not distinctly modified; all of Africa	2
2	Last tarsal segment of midleg unmodified (fig. 195) and of similar light color as the other tarsal segments	3
-	Last tarsal segment of midleg black or dark brown; modified into a broad disc (fig. 194) or with anterior and posterior brushes of dark bristles (figs. 196, 197)	5
3	Scutellum with a pair of pointed lateral projections (fig. 193); hind tibia as in fig. 157; sterna as in fig. 175; ventral side of hind femur with spatulate setae	*P. cinerea* (Friese, 1930)
-	Scutellum without such projections; tibia and sterna of different shape; ventral side of hind femur with or without spatulate setae	4
4	Ventral side of hind femur with spatulate setae; hind tibia as in fig. 158; sterna as in fig. 176; integument of tergal discs black, with broad bands of white setae but surface of tergal discs visible medially. *P. inermis* (Morawitz, 1894) (sensu Astafurova & Pesenko 2006, nec Baker 2002; *P. guichardi* Pauly, 1990 is regarded as jun. syn.)	
-	Hind femur without spatulate setae; hind tibia as in fig. 173; sterna as in fig. 191; integument of tergal discs reddish-brown, densely covered with thick white pubescence	*P. algeriensis* (Warncke, 1976)
5	Last tarsal segment of midleg with anterior and posterior brushes of dark bristles (figs. 196, 197)	6
-	Last tarsal segment of midleg modified into a broad dark disc (fig. 194)	16
6	Ventral side of hind femur with spatulate setae (fig. 5)	7
-	Hind femur without spatulate setae but there may be some short, non-spatulate bristles	15
7	Sterna 5–6 unmodified (fig. 177); spatulate setae on ventral side of hind femur rather short (figs. 159, 160, 174)	8
-	Sterna 5–6 modified (figs. 178–181); sternum 5 with a pair of protrusions; spatulate setae on ventral side of hind femur long (figs. 161, 162)	11
8	All tarsal segments of midleg with long, dark, bristle-like setae (fig. 197); spatulate setae on basal two-thirds of ventral side of hind femur	9
-	Setae on tarsal segments of midleg white or cream-colored, except for the dark last segment (fig. 196); ventral side of hind femur with spatulate setae over its entire length	10
9	Dark bristle-like setae on midleg rather long; punctation on scutum stronger; hind tibia as in fig. 159. Archipelago of Socotra	*P. anomala* Kirby, 1900
-	Dark setae on midleg shorter; punctation on scutum weaker as in *P. anomala*; hind tibia as in fig. 174. Sudan, Arabian Peninsula	*P. sudanica* (Warncke, 1980)
10	South-western Africa	*P. usakoa* (Cockerell, 1939)
-	Eastern Africa	*P. pandeana* (Strand, 1914)
11	Apical margin of sternum 5 with a longitudinal carina medially (fig. 178). Sahel, Arabian Peninsula, India.	*P. patellata* (Magretti, 1884)
-	Apical margin of sternum 5 without such a carina and/or with structures of different shape	12

12 Apical margin of sternum 5 without lamella or projection . . . 13
- Apical margin of sternum 5 with a bilobed lamella or two small projections (Figs 2C, 2E) . . . 14
13 Sternum 5 with two black transversal sclerotized structures and no submarginal carinae (Fig. 2G) . . . *P. usambarae* Pauly, 1990
- Sternum 5 with less sclerotized transversal structures and two submarginal transversal carinae (Fig. 2A) . . . *P. neumayeri* **sp. nov.**
14 Apical margin of sternum 5 with a lamella medially (fig. 181, Fig. 2E) . . . *P. kenyensis* Pauly, 1990
- Apical margin of sternum 5 with a paired projection as in Fig. 2C . . . *P. riftensis* Pauly, 1990
15 Femur of hindleg rather slender; tibia of hindleg distinctly weaker developed (fig. 163) . . . *P. anthidioides* (Gerstäcker, 1857)
- Femur of hindleg thicker; tibia of hindleg stronger developed (fig. 164) . . . *P. kingi* (Cockerell, 1931)
16 Scutellum without projections . . . 17
- Scutellum with a pair of pointed lateral projections (fig. 193) . . . 20
17 Apical margin of sternum 4 with two median lobes (fig. 184, 187) . . . 18
- Apical margin of sternum 4 unmodified . . . 19
18 Sternum 4 with two lateral carinae and two lobes on apical margin (fig. 184); tibia of hindleg enormously widened apically, flat (fig. 165) . . . *P. interstitinervis* (Strand, 1912)
- Sternum 4 without lateral carinae but with two lobes on apical margin of different shape (fig. 187); hindleg tibia weaker developed apically, shape as in fig. 166 . . . *P. edentata* (Morawitz, 1876)
19 Sternum 5 with a weak longitudinal carina medially (fig. 186); posterior margin of sternum 6 distinctly elevated over its entire length; pubescence largely ocher-colored; tibia of hindleg as in fig. 169 . . . *P. duplocincta* (Vachal, 1897)
- Sternum 5 with a longitudinal median carina which is somewhat indistinct at the base of the segment (fig. 185); posterior margin of sternum 6 only elevated laterally; pubescence largely whitish; tibia of hindleg as in fig. 167 . . . *P. innesi* (Gribodo, 1894)
20 Hind femur without spatulate setae but there may be some short, non-spatulate bristles . . . 21
- Ventral side of hind femur with spatulate setae . . . 22
21 Integument of femora largely yellow; only sternum 4 with two lobes on apical margin (fig. 188); femur and tibia of hind leg as in fig. 170. Yemen . . . *P. ocracea* Pauly, 1990
- Integument of femora dark; sterna 4–5 both with two lobes on apical margin (fig. 192); femur and tibia of hind leg as in fig. 172 . . . *P. dixica* (Warncke, 1976)
22 Apical lobe of hind tibia strongly developed and bilobed (fig. 168); sternum 4 with two tubercles on apical margin (fig. 190); larger species (≥ 9 mm) . . . *P. nilotica* (Smith, 1875) (following Baker 2002, = *P. armata* sensu Warncke 1976 and Pauly 1990, nec Olivier, 1812)
- Apical lobe of hind tibiae narrow; sternum 4 without such tubercles; smaller species (5–6.5 mm) . . . 23
23 Apical lobe of hind tibiae slightly more expanded (Fig. 5F); vertex clearly more produced (Fig. 7A) . . . *P. crassivertex* **sp. nov.**
- Apical lobe of hind tibia less expanded (fig. 171); vertex less expanded (Fig. 7C) . . . *P. nubica* (Warncke, 1976)

Females

The female of *P. fayumensis* is not known with certainty (Pauly, 2013), and the female of *P. algeriensis* is unknown.

1 Integument surface of scutum between punctation smooth and shiny . . . 2
- Integument surface of scutum between punctation tessellate . . . 8
2 Horizontal and vertical surfaces of propodeum not separated by a carina . . . 3
- Horizontal and vertical surfaces of propodeum separated by a carina . . . 4
3 Punctation on scutum sparse; shiny area on disc of tergum 1 right above apical margin without punctation. Arabian Peninsula, Asia . . . *P. edentata* (Morawitz, 1876)
- Punctation on scutum slightly denser; shiny area on disc of tergum 1 right above apical margin with punctation. South Africa . . . *P. cinerea* (Friese, 1930)
4 Punctation on scutum dense, interspaces of comparable size to individual pits; pubescence dense, scale-like and largely ocher-colored. Yemen . . . *P. ocracea* (Pauly, 1990)
- Punctation on scutum less dense; pubescence cream-colored, whitish (if ocher-colored, then not scale-like) . . . 5
5 Punctation on tergum 1 very fine, particularly dense on center of disc . . . 6
- Punctation on tergum 1 not particularly dense or fine . . . 7
6 Vertex and genal area strongly developed (Fig. 6E, Fig. 7B) . . . *P. crassivertex* **sp. nov.** (= *Pseudapis* sp. 1 in Pauly, 1990).
- Vertex and genal area less strongly developed (Fig. 7D) . . . *P. nubica* (Warncke, 1976)
7 Larger species, body size 8.5–9 mm; punctation on disc of tergum 2 weak, somewhat superficial; tergal bands of white setae thick and very broad, often entirely covering tergal discs if not too worn . . . *P. nilotica* (Smith, 1875)
- Smaller species (6–8 mm); punctation on disc of tergum 2 strong, deep; tergal bands of setae less broad and rather ocher-colored . . . inseparable females of *P. interstitinervis*, *P. dixica*, *P. duplocincta*
8 Punctuation of scutum stronger and denser than other species. Archipelago of Socotra . . . *P. anomala* (Kirby, 1900)
- Different locality . . . 9
9 South-western Africa; punctation on scutum rather sparse . . . *P. usakoa* (Cockerell, 1939)
- Different locality . . . 10

10 Eastern and Southern Africa . . . . . inseparable females of *P. anthidioides* group: *P. anthidioides*, *P. kenyensis*, *P. kingi*, *P. neumayeri* **sp. nov.**, *P. pandeana*, *P. patellata*, *P. riftensis*, *P. sudanica*, *P. usambarae*

- Western Africa, Sahara and Sahelian countries 11

11. Punctation of scutum rather sparse. . . . . *P. patellata* (Magretti, 1884)

- Punctation of scutum dense, space between punctures equal to a puncture width. . . . . *P. innesi* (Gribodo, 1894) (= *Pseudapis* sp. 2 in Pauly, 1990).

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