Jumping plant-lice of the family Phacopteronidae (Hemiptera: Psylloidea) from Cameroon

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(Accepted 13 June 2007)

Abstract
Nine species of the family Phacopteronidae are recorded from Cameroon. All are assigned to the large pan-tropical genus Pseudophacopteron. Eight species are described as new, and P. electum Capener is redescribed. The species are diagnosed and illustrated, and keys for the identification of adults and fifth instar larvae are provided. Information is given on distribution, host plants, and biology. Eight species are associated with plants of the order Rutales/Sapindales (three Sapindaceae, one Burseraceae, one Burseraceae or Anacardiaceae, one Meliaceae, one Rutaceae, and one Anacardiaceae/Simaroubaceae); host plants of one species remain unknown. Four species, namely P. electum, P. fuscivenosum sp. n., P. lecaniodisci sp. n., and P. morion sp. n., induce nut or pit galls on the leaves.

Keywords: Afrotropical, galls, Pseudophacopteron, Sapindales, taxonomy

Introduction
The Phacopteronidae constitutes a small, morphologically well-defined family of jumping plant-lice. The family is pan-tropical in distribution and is associated with plants of the order Rutales/Sapindales (Anacardiaceae, Burseraceae, Meliaceae, and Sapindaceae) and with Apocynaceae (Gentianales) (Hollis 2004). Some phacopteronids are gall-inducers. Five species have been described from the Afrotropical Region (including the Arabian Peninsula): three from South Africa (Capener 1973), one from Tanzania and Togo (Aulmann 1912), and one from Yemen and Kenya (Burckhardt and van Harten 2006). Unidentified material in the Natural History Museum, London, the Naturhistorisches Museum, Basel, and other institutions suggests that the family contains at least six times as many species in this biogeographical realm. All five described Afrotropical phacopteronid species belong to the genus Pseudophacopteron which is also known from the Australian
(Hollis 2004), Oriental (Hodkinson 1986), and Neotropical (Brown and Hodkinson 1988) biogeographical regions.

There are no published records of Phacopteronidae from Cameroon, and information on the phacopteronid fauna of other Central and West African countries is also insufficient. *Pseudophacopteron zimmermanni* Aulmann was listed from Togo in the original description (Aulmann 1912) and was also recorded from Nigeria (Medler 1980). Unidentified *Pseudophacopteron* species were further reported from Nigeria (Eastop 1958) and West Africa (Brunck 1965). The plant diversity in Western Africa is very high. As psyllids are highly host specific, a rich psyllid fauna can be expected in this region. Recent field work in Cameroon confirms this, as nine *Pseudophacopteron* species were collected. Here we describe these species, provide keys for their identification, and give information on host plants and galls.

**Material and methods**

The morphological terminology follows Hollis (1976, 1984) and Ossiannilsson (1992). The following abbreviations are used in the descriptions and keys.

Adult psylloid: HW, head width; AL, antenna length; TS, length of antennal segments 9 and 10 together; T1, length of longer terminal antennal seta; T2, length of shorter terminal antennal seta; WL, fore wing length; WW, fore wing width; CS, length of line connecting base of vein C+Sc and apex of vein R1; CB, length of line connecting base of vein C+Sc and costal break; a, length of line connecting the touching point of veins Rs and M$_{1+2}$ and apex of Rs; b, length of line connecting the touching point of veins Rs and M$_{1+2}$ and apex of M$_{1+2}$; c, length of line connecting apices of veins Rs and M$_{1+2}$; d, length of line connecting apices of veins Cu$_{1a}$ and Cu$_{1b}$; e, length of line connecting base and apex of vein Cu$_{1b}$; TL, metatibia length; MP, male protiger length; PL, paramere length; DL, length of distal segment of aedeagus; FP, female protiger length; SL, female subgenital plate length.

Fifth instar larva: BL, body length; BW, body width; AL, antenna length; FL, fore wing-pad length; TL, metatibiotarsus length; CL, caudal plate length; CW, caudal plate width; RW, outer circumanal ring width.

Measurements are given in mm and were made from slide-mounted specimens. Slides were photographed using a digital camera mounted on a microscope, scaled, and measured by an image analyser (Olympus QuickPHOTO PRO). The nomenclature of host plants follows Lebrun and Stork (1992).

The material is conserved dry, in 70% ethanol, or mounted on slides in Canada balsam. It is deposited in, or recorded from, the Natural History Museum, London (BMNH), the Laboratoire de Zoologie, Université de Yaoundé I, Yaoundé (LZUY), the Museum Alexander König, Bonn (MAKB), the Muséum d’histoire naturelle, Genève (MHNG), the Moravian Museum, Brno (MMB), the National Collection of Insects, Plant Protection Research Institute, Pretoria (NCIP), the Naturhistorisches Museum, Basel (NHMB), the National Museum of Natural History, Smithsonian Institution, collections deposited in the Systematic Entomology Laboratory USDA, Beltsville, MD (USNM), and the Institut für Systematische Zoologie, Museum für Naturkunde, Humboldt-Universität, Berlin (ZMB).

**Taxonomy**

*Pseudophacopteron* Enderlein

*Pseudophacopteron* Enderlein 1921, p 116; Brown and Hodkinson 1988, p 168. Type species: *Pauropsylla tuberculata* Crawford, 1912, by original designation.
**Chineura** Tuthill 1964, p 358. Type species: *Chineura latipennis* Tuthill, 1964, by original designation. Synonymized by Yang and Li 1983, p 128.

Brown and Hodkinson (1988) provided a detailed generic description for adult *Pseudophacopteron*. The last instar larvae are described for some species (e.g. Capener 1973; Yang and Tsay 1980; Burckhardt and Brown 1992) but there exists no generic description to date. Because of a considerable morphological variety in some characters, e.g. the form of the circumanal ring and the antenna segmentation, the key to genera of larval Phacopteronidae by White and Hodkinson (1985) does not apply to all known *Pseudophacopteron* spp.

**Key to *Pseudophacopteron* from Cameroon**

**Adults**

1. Fore wing with a dark band along distal half of posterior margin (Figure 6G–I).
   - Fore wing without a dark band along distal half of posterior margin (Figure 6A–F).

2. Fore wing with distinct dark brown patches on apices of veins R₁ and Rs, in the middle of veins R and M, and on the junction of Rs and M₁+₂ (Figure 6G). Antenna with terminal setae markedly differing in length (Figure 5I). Male proctiger long, slender (Figure 8G), MP=0.16–0.17; paramere, in profile, slender, truncate apically (Figure 9H). Female subgenital plate, in profile, pointed apically (Figure 12D); in ventral view, apex subacute (Figure 13G). Body large, WL=1.28–1.53. .. lecaniodisci sp. n.
   - Fore wing without distinct dark brown patches in anterior half. Antenna with terminal setae subequal (Figure 5D, E). Male proctiger short, robust (Figure 8H, I), MP=0.11–0.13; paramere, in profile, stout, apex in lateral view rounded (Figure 9I, J). Female subgenital plate, in profile, blunt apically (Figure 12E, F); in ventral view, apex indented (Figure 13H, I). Body small, WL=0.84–1.34. .. pusillum sp. n.

3. Outer anterior margin of fore wing angular; membrane in anterior half clear (Figure 6H). Antenna short, AL/HW<1.3, weakly serrate; segments 4–9 short, each distinctly widening apically (Figure 4G). Paramere, in profile, stout, from the middle slightly narrowing to apex (Figure 9I). Female subgenital plate, in ventral view, relatively broad subapically (Figure 13H) .. eastopi sp. n.
   - Outer anterior margin of fore wing evenly curved; membrane in anterior half irregularly infuscate (Figure 6I). Antenna long, AL/HW>1.3, slender, segments 4–9 cylindrical, weakly widening apically (Figure 4H). Paramere, in profile, narrower and parallel-sided (Figure 9I). Female subgenital plate, in ventral view, with a narrow apical extension (Figure 13I) .. eastopi sp. n.

4. Fore wing with brown patches on apices of veins Rs, M₁+₂, M₃₊₄₅ and Cu₁a₂, and on the junction of Rs and M₁+₂ (Figure 6A–C).
   - Fore wing membrane clear near apices of veins Rs, M₁+₂, M₃₊₄₅ and Cu₁a (Figure 6D–F).

5. Fore wing strongly widening towards apex, broad, WL/WW<1.8; costal break in apical third of vein C+Sc (Figures 6A, 7A). Antennal segments 3–8 bearing multiple rhinaria (Figure 3A, B), segment 9 with one rhinarium. Metafemur not
constricted medially. Metatibia with simple setae laterally, different from apical spurs. Dorsal margin of male subgenital plate strongly angular (Figure 8A); paramere, in profile, sickle-shaped (Figure 9B), in posterior view indented subapically with sclerotized tooth (Figure 9A). Body dirty yellow, with hardly any dark markings, except for sides of abdominal sternites... cuniculus sp. n.

- Fore wing weakly widening to apex, narrow, WL/WW > 2.0; costal break in apical sixth of vein C+Sc. Antenna with a single subapical rhinarium on each of segments 4–9 (Figure 3C, D). Metafemur constricted medially. Metatibia with stout setae laterally, similar to apical spurs. Dorsal margin of male subgenital plate straight (Figure 8B, C); paramere different. Body with extensive dark markings... 6

Fore wing pattern expanded as in Figure 6B. Head, in frontal view, dorso-ventrally flattened (Figure 1D). Paramere long (Figure 9C), PL = 0.14... kala sp. n.

- Fore wing pattern reduced as in Figure 6C. Head, in frontal view, not dorso-ventrally flattened (Figure 1F). Paramere short (Figure 9D), PL = 0.11–0.12... nothospondiadis sp. n.

Fore wing with infuscation extending along veins R, basal half of M, entire Cu1b, and basal half of Cu1a (Figure 6D). Paramere robust, posterior margin, in profile, convex (Figure 9E); apical dilation of distal aedeagal portion angular basally (Figure 10D). Female subgenital plate, in ventral view subacute apically (Figure 13D)... fuscivenosum sp. n.

- Fore wing with infuscation restricted to a narrow band along vein Cu1b (Figure 6E, F). Paramere, in profile, parallel-sided; apical dilation of distal aedeagal portion gradually widening from base to apex (Figure 10E, F). Female subgenital plate, in ventral view, incised at the apex (Figure 13E, F)... 8

Body large, WL > 1.6. Antenna robust, weakly serrate; segments 4–9 short, distinctly widening apically (Figure 4D). Paramere, in profile, obliquely truncate apically (Figure 9F). Female subgenital plate, in profile, truncate apically (Figure 12B), in ventral view, broadly triangular (Figure 13E)... electum Capener

- Body small, WL < 1.2. Antenna slender; segments 4–9 cylindrical, weakly widening apically (Figure 4E). Paramere, in profile, rounded apically (Figure 9G). Female subgenital plate, in profile, pointed apically (Figure 12C), in ventral view, broadly rectangular, apex with two obliquely truncate lobes (Figure 13F)... morion sp. n.

Fifth instar larvae (larvae of P. kala and eastopi unknown)

1 Anus in ventral position (Figures 16–19). Inducing pit or nut galls... 2

- Anus in terminal position (Figures 14, 15, 20). Not gall inducing... 5

2 Circumanal ring small, its width less than distance from its posterior margin to posterior abdominal margin... 3

- Circumanal ring large, its width more than distance from its posterior margin to posterior abdominal margin... 4

3 Circumanal ring oval (Figure 18). Body margin bearing truncate lanceolate setae. Antenna lacking distinct division, bent in a right angle, with apex directed...
forwards, outer surface basally serrate. On Santiria trimera; inducing pit galls on leaves

– Circumanal ring triangular (Figure 19). Body covered with long simple setae, lanceolate setae lacking. Antenna seven-segmented, slightly bent backwards, its surface smooth. On Lecaniodiscus cupanioides; inducing nipple galls on leaves (Figure 22C)

4 Antenna lacking distinct divisions (Figure 17). Caudal plate with stout lanceolate setae near margin. On Ekebergia benguelensis, E. capensis; inducing pimple-shaped galls on leaves

– Antenna six-segmented (Figure 16). Caudal plate bearing minute lanceolate setae near margin and on disc, as well as long simple setae along margin. On Deinbollia sp.; inducing nut galls on leaves (Figure 22A, B)

5 Body large, BL>1.5. Antenna long, AL>0.5, AL/FL>0.9. Circumanal ring widely extending on to dorsal surface of caudal plate (Figure 14). On Blighia unijugata, Blighia sp.

– Body small, BL<1.5. Antenna short, AL<0.5, AL/FL<0.9. Circumanal ring hardly or not extending on to dorsal surface of caudal plate (Figures 15, 20)

6 Antenna six-segmented, short, AL<0.3, AL/FL<0.7. Body covered with pointed lanceolate setae (Figure 15). Caudal plate broad, truncate apically. On Nothospondias staudtii

– Antenna nine-segmented, long, AL>0.3, AL/FL>0.7. Body lacking lanceolate setae except for 1 + 1 blunt lanceolate setae on caudal plate margin (Figure 20). Caudal plate narrow, irregularly rounded apically. On Teclea afzelii, ?T. nobilis

**Pseudophacopteron cuniculus** sp. n.
(Figures 1A–C, 3A, B, 4A, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 13A, 14, 21A)

**Description**

*Adult.* Colour: body grey yellow, light grey in alcohol-preserved specimens. Darker markings on head and thorax almost absent, vertex and pronotum sometimes orange or light brown laterally and in depressions, mesoscutum yellow with four pale grey bands. Genae, frons, and clypeus uniformly yellow or off-white. Antenna off-white, segments 3–8 dark brown or black apically, segments 9–10 entirely black, terminal setae white. Legs dirty pale yellow with light to dark brown markings on all femora and metacoxae; apex of metafemora dorsally narrowly black; metatibiae weakly infuscated at base. Fore wing membrane clear, transparent, with brown pattern consisting of large patches in cell cu1, around apical parts of the veins Rs and M$_{1+2}$ and their touching point, a distinct narrow brown infuscation along basal half and apical third of M$_{3+4}$ and an indistinct light brown infuscation across Cu$_1$ and M close to their branching (Figure 6A). Veins light, off-white, C+Sc dark brown in median part between base and junction of R$_1$, anal vein brown basally, and small, well-delimited dark brown or black spots medially or in apical half of R+M+Cu$_1$, at the base of R immediately after the branching off of M+Cu$_1$, on the M fork and the Cu$_1$ fork, the touching point of Rs and M$_{1+2}$, at the apices of R$_1$, Cu$_{1a}$, Cu$_{1b}$, and two or three spots on M$_{1+2}$, M$_{3+4}$, Cu$_{1a}$ and anal vein. Hind wing clear, transparent, veins C+Sc and A fuscous. Abdominal tergites yellow, with orange
brown and brown markings dorsally, forming a dorsal median band. Sternites pale yellow with dark brown markings of variable extent, especially on sides of first visible sternite. Male terminalia with subgenital plate pale yellow, brown apically, proctiger yellow or ochreous, parameres brown. Female terminalia with yellow proctiger, brown dorsally and apically.
Morphology: head, in dorsal view, slightly wider than mesoscutum, subglobular (Figure 1A). Vertex with microsculpture, matt, 1.7 times as wide as long along midline, rounded down in front; in frontal view, relatively flat (Figure 1B). Coronal suture distinct in basal and apical thirds, reduced in the middle. Median ridge on vertex weakly raised, indistinct. Vertex with large anterior tubercle on either side of midline. Lateral ocelli lying in the same plane as vertex. Occiput in dorsal view narrowly triangular. Preoccipital sclerite narrow, eyes not stalked, in frontal view, subglobular. Genae distinctly swollen. Tubercle below torulus pointed, forming almost a right angle (Figure 1C). Frons narrowly pentagonal. Clypeus subglobular. Antenna long, slender, segments cylindrical, weakly widening to apex (Figure 4A); with following numbers of rhinaria: segment 3: five to eight, segment 4: four or five, segment 5: three or four; segments 6 and 7: two, segments 8 and 9: one; rhinaria elongate, lacking cuticular spines (Figure 3A, B); terminal setae subequal, the longer seta slightly longer than segments 9 and 10 together (Figure 5A). Fore wing very broad, strongly widening towards apex which is truncate. Surface spinules present in all cells, densely spaced especially in the apical part, only a few spinules present in cell c+sc (Figure 7A). Costal break in apical third of C+Sc. Hind legs long and robust. Meracanthus relatively long, acute, pointed. Metafemur not constricted medially. Metatibia bearing an
open crown of 17–20 densely spaced slender, unsclerotized apical spurs, lacking similar spurs laterally. Metabasitarsus bearing two black sclerotized spurs. Dorsal margin of abdomen in profile forming large hump, with tergite 4 medially swollen and forming highest point; posterior margins of tergites 3 and 5 dorsally straight, not swollen into prominent tubercular process. Male terminalia as in Figure 8A. Proctiger relatively long, cylindrical. Subgenital plate, in profile, higher than long, dorsal margin strongly angular. Paramere, in profile, curved, narrowing to apex which is turned backwards (Figure 9B); apex forming small, strongly sclerotized tooth; in posterior view, inner margin straight, strongly indented subapically (Figure 9A); inner surface covered in fine setae. Basal segment of aedeagus narrow; apical segment moderately long, with elongate, narrow, apically rounded, slightly pyriform head; sclerotized end tube of ductus ejaculatorius relatively short, sinuate (Figure 10A). Female terminalia as in Figure 11A. Proctiger relatively long, with dorsal margin weakly sinuate, almost straight, apical process long, parallel-sided; circumanal ring with two rows of pores, pores of outer row contiguous. Subgenital plate relatively short, in profile with dorsal margin strongly concave, ventral margin straight; apex narrowly triangular, pointed; in ventral view narrowly triangular, apical process with concave margins and narrow, truncate apex (Figure 13A). Dorsal and ventral valvulae lacking lateral teeth. Measurements and ratios in Tables I–III.

Fifth instar larva (Figure 14). Uniformly pale yellow, two apical segments of antenna dark brown. Body relatively slender, with long limbs. Body margin with following numbers of slender lanceolate setae, narrowly truncate at apex (one side only): head in front of insertion of antenna: two to three; cephalothorax behind eyes: four; fore wing pad: eight; hind wing pad:
three; abdomen: (1–2) + (3–4) + 3 + (3–4) + (6–7) + (8–14); lanceolate setae on abdominal margin arranged in groups situated on small tubercles. Lanceolate setae on body margin alternating or accompanied by short simple setae. A small simple seta present in anterior half of ocular region. Eye with ca 50 distinct ommatidia. Anterior margin of head forming two shallow lobes. Antenna straight, relatively long, with nine segments; a single rhinarium apically on each of segments 7 and 8. Tarsal arolium very small relative to claws, with a triangular pad and indistinct petiole (Figure 21A). Abdomen dorsally weakly sclerotized, with six hardly noticeable sclerites, caudal plate incompletely fused; apex of abdomen truncate. Anus in terminal position. Circumanal ring large and strongly sinuate, widely extending on to dorsal and ventral surface of caudal plate. Measurements and ratios in Table IV.

**Host plant**

*Blighia unijugata, Blighia* sp. (Sapindaceae).
Figure 5. *Pseudophacopteron* spp. (A) *P. cuniculus*; (B) *P. kala*; (C) *P. nothospondiadis*; (D) *P. pusillum*; (E) *P. eastopi*; (F) *P. fuscivenosum*; (G) *P. electum*; (H) *P. morion*; (I) *P. lecaniodisci*. (A–I) Antennal segments 9 and 10.
Figure 6. *Pseudophacopteron* spp. (A) *P. cuniculus*; (B) *P. kala*; (C) *P. nothospondiadis*; (D) *P. fuscivenosum*; (E) *P. electum*; (F) *P. morion*; (G) *P. lecaniodisci*; (H) *P. pusillum*; (I) *P. eastopi*. (A–I) Fore wing pattern. Scale bars: 0.4 mm (A, B, E); 0.3 mm (C, D, G, H); 0.2 mm (F, I).
Biology

*P. cuniculus* does not induce galls on the host. The eggs are laid on the upper leaf surface along the median vein. The sucking of the larvae distorts the leaves which become necrotic in parts. The leaves dry up a few days after the emergence of the adults.

Figure 7. *Pseudophacopteron* spp. (A) *P. cuniculus*; (B) *P. kala*; (C) *P. nothospondiadis*; (D) *P. fusivenessum*; (E) *P. electum*; (F) *P. morion*; (G) *P. lacanidisci*; (H) *P. pusillum*; (I) *P. eastopi*. (A–I) Fore wings, distribution of surface spinules (delimited by dashed lines).

Biology

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Figure 8. *Pseudophacopteron* spp. (A) *P. cuniculus*; (B) *P. kala*; (C) *P. nothospondiadis*; (D) *P. fuscivenosum*; (E) *P. electum*; (F) *P. morion*; (G) *P. lecaniodiscī*; (H) *P. pusillum*; (I) *P. eastopi*. (A–I) Male terminalia, in profile. Scale bars: a (A); b (B–E, G–I); c (F).
Figure 9. *Pseudophacopteron* spp. (A, B) *P. cuniculus*; (C) *P. kala*; (D) *P. nothospondiadis*; (E) *P. fuscivenosum*; (F) *P. electum*; (G) *P. morion*; (H) *P. lecaniodisci*; (I) *P. pusillum*; (J) *P. eastopi*. (A) Paramere, in posterior view; (B–J) paramere, in profile, inner surface. Scale bars: a (A, B); b (C–E, H–J); c (F); d (G).
Distribution

Angola, Cameroon, Kenya, Nigeria, Tanzania, Uganda.

Material examined

Holotype: ♂, Cameroon: Centre Province, Soa, 3°57’N, 11°36’E, 725 m, 25 March 2004, secondary forest, *Blighia unijugata* (J. L. Tamesse). Dry-mounted (NHMB). Paratypes: Angola: 1♂, 3♀♀, 7 miles W Gabela, 16–18 March 1972, at light (D. Hollis); 1♂, 1♀♀, same data but beaten from *Albizzia* spp.; 1♂, 3 miles SW Salazar, 15 March 1972, at light (D. Hollis). Cameroon: 1♂, 6♀♀, 34 larvae, same data as holotype. Kenya: 1♀♀, Kakamega Forest, 18 December 1970 (A. E. Stubbs); 3♂, 8♀♀, Kakamega Forest, 0°22’N 34°50’E,

Figure 10. *Pseudophacopteron* spp. (A) *P. cuniculus*; (B) *P. kala*; (C) *P. nothospondiadiis*; (D) *P. fuscivenosum*; (E) *P. electum*; (F) *P. morion*; (G) *P. lecaniodisci*; (H) *P. pusillum*; (I) *P. eastopi*. (A–I) Distal segment of aedeagus, in profile. Scale bars: a (A–E, G–I); b (F).
1600 m, 7–11 February 1999, rain forest, canopy fogging, *Teclea nobilis* (Rutaceae) (T. Wagner). **Nigeria**: 2♂, 1♀, Ibadan, June 1956 (V. F. Eastop); 4♂, 3♀, Ibadan, 18 March 1957, trapped (V. F. Eastop); 1♂, Ibadan, 25 March 1959 (F. A. Squire); 1♂, same data but April 1959; 1♂, 1♀, same data but April 1960; 1♀, same data but June 1960; 1♂,
Figure 12. Pseudophacopteron spp. (A) *P. fuscivenosum*; (B) *P. electum*; (C) *P. morion*; (D) *P. lecaniodisci*; (E) *P. eastopi*; (F) *P. pusillum*. (A–F) Female terminalia, in profile. Scale bars: a (A, B, D–F); b (C).
Ibadan, Moor Plantation, 9–10 April 1961 (F. A. Squire); 1♂, Ibadan, DFR Arboretum, 14 January 1964, yellow tray (M. J. White).

Tanzania: 5♂, 7♀, S. Pare Mountains, hillside above Gonja, ca 3000 feet, 12–16 June 1974, beaten from Blighia sp. (D. Hollis).

Uganda: 3♂, 2♀, District Masindi, Budongo Forest near Sonso, 1°45′N, 31°35′E, 21–30 July 1995, secondary forest, canopy fogging, Rinorea beniensis (Violaceae) (T. Wagner); 2♀, same data but Trichilia rubescens (Meliaceae); 1♂, same data but 15–21 January 1997, Cynometra alexandri (Caesalpiniaceae); 3♂, 1♀, and ca 200 adult specimens in alcohol, same data, but Rinorea beniensis, at night. Dry- and slide-mounted, and preserved in alcohol (BMNH, LZUY, MAKB, MHNG, MMB, NHMB, USNM).

Etymology

The Latin noun *cuniculus* = rabbit is used in apposition. The habitus of *P. cuniculus* is reminiscent of a rabbit because of the fore wing shape and maculation.
Figure 14. *Pseudophacopteron cuniculus*, fifth instar larva: left dorsal and right ventral surfaces.
Figure 15. *Pseudophacopteron nothospondiadiis*, fifth instar larva: left dorsal and right ventral surfaces.
Figure 16. *Pseudophacopteron fuscivenosum*, fifth instar larva: left dorsal and right ventral surfaces.
Comments

*P. cuniculus* sp. n. resembles *Pseudophacopteron caffariense* Capener, 1973, a species known so far only from South Africa, in the body colour, the fore wing maculation with dark
brown spots on the veins, the relatively flat vertex with weakly raised and indistinct median ridge and a pair of large anterior tubercles, the relatively broad pentagonal frons, the multiple rhinaria on antennal segments 4–8, the relatively long and acute meracanthus, the unconstricted metafemur, the metatibia lacking lateral spurs, the angular dorsal margin of the male subgenital plate, the shape of apical dilation of distal segment of aedeagus, the relatively long female proctiger, and the absence of teeth on the dorsal and ventral valvulae. *P. cuniculus* sp. n. differs from *P. caffariense* in the larger size, the very broad fore wing, the

Figure 18. *Pseudophacopteron morion*, fifth instar larva: left dorsal and right ventral surfaces.
Figure 19. *Pseudophacopteron lecaniodisci*, fifth instar larva: left dorsal and right ventral surfaces.
clear fore wing membrane near apex of vein R₁, the separated patches on apex of vein Rs and touching point of Rs and M₁+₂, the medially reduced coronal suture on vertex, the pointed tubercle on genae below torulus, the presence of multiple rhinaria on antennal segment 3, the terminal setae on antenna subequal and as long as or slightly longer than segments 9 and 10 together, the sickle-shaped paramere, and the host-plant association.

Figure 20. *Pseudophacopteron pusillum*, fifth instar larva: left dorsal and right ventral surfaces.
In *P. caffrariense* the fore wing dimensions are as follows: WL = 1.42–1.77, WL/WW = 2.11–2.32, the fore wing membrane bears a dark brown macula across vein R₁, and the maculae on apex of vein Rs and touching point of Rs and M₁+₂ are fused, the coronal suture on vertex is distinct throughout, the tubercle on genae below torulus is blunt, the antennal segment 3 lacks rhinaria, the terminal antennal setae differ markedly in length and are shorter than segments 9 and 10 together, the paramere in profile is stout, evenly convex anteriorly, straight posteriorly and not sickle-shaped, and the host-plant is *Pappea capensis* (Sapindaceae). Material of *P. caffrariense* examined: paratypes, 8♂, 6♀, South Africa, Cape Province, Steytlerville, 16 and 18 February 1966 (A. L. Capener) (NCIP, BMNH, dry- and slide-mounted).

![Figure 21. *Pseudophacopteron* spp. (A) *P. cuniculus*; (B) *P. nothospondiadis*; (C) *P. fuscivenosum*; (D) *P. electum*; (E) *P. morion*; (F) *P. lecaniodisci*; (G) *P. pusillum*. (A–G) Fifth instar larva; tibiotarsus apex.](image-url)
Figure 22. *Pseudophacopteron* spp. (A) *P. fuscivenosum*, galls on *Deinbollia* sp., upper leaf surface; (B) *P. fuscivenosum*, galls on *Deinbollia* sp., lower leaf surface; (C) *P. lecaniodisci*, galls on *Lecaniodiscus cupanioides*, upper leaf surface; (D, E) *P. morion*, deformations on *Santiria trimera*; (F) *P. nothospondiadis*, deformations on *Nothospondias staudtii*. 

*Phacopteronidae from Cameroon* 1901
### Table I. Measurements (in mm) of adult *Pseudophacopteron* species.

| Species       | N     | HW    | AL    | T1    | T2    | WL    | WW    | TL    | MP    | PL    | DL    | FP    | SL    |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| *cuniculus*   | 8♂, 9♀ | 0.54–0.62 | 0.78–0.93 | 0.11–0.13 | 0.08–0.09 | 1.62–2.09 | 1.00–1.21 | 0.49–0.60 | 0.22–0.24 | 0.21–0.24 | 0.14–0.15 | 0.51–0.56 | 0.23–0.32 |
| *eastopi*     | 2♂, 2♀ | 0.35–0.41 | 0.46–0.57 | 0.06–0.08 | 0.06–0.07 | 0.90–1.26 | 0.37–0.57 | 0.31–0.40 | 0.11–0.13 | 0.09   | 0.09   | 0.29–0.30 | 0.18–0.21 |
| *electum*     | 6♂, 7♀ | 0.47–0.60 | 0.47–0.59 | 0.14–0.17 | 0.12–0.16 | 1.31–1.77 | 0.60–0.78 | 0.42–0.57 | 0.17–0.20 | 0.15–0.17 | 0.11–0.13 | 0.29–0.32 | 0.17–0.21 |
| *fuscivenosum* | 2♂, 3♀ | 0.53–0.59 | 0.58–0.68 | 0.07–0.11 | 0.05–0.07 | 1.26–1.59 | 0.55–0.68 | 0.37–0.42 | 0.2    | 0.15   | 0.1    | 0.24–0.25 | 0.13–0.15 |
| *kala*        | 1♂, 1♀ | 0.45–0.46 | 0.67    | 0.08   | 0.07   | 1.28–1.32 | 0.58–0.61 | 0.39–0.41 | 0.15   | 0.14   | 0.13   | 0.37   | 0.27   |
| *lecaniodisci*| 6♂, 3♀ | 0.44–0.51 | 0.56–0.64 | 0.12–0.16 | 0.04–0.06 | 1.28–1.53 | 0.55–0.67 | 0.36–0.46 | 0.16–0.17 | 0.13–0.14 | 0.12–0.13 | 0.28–0.29 | 0.20–0.22 |
| *morion*      | 3♂, 2♀ | 0.31–0.37 | 0.42–0.52 | 0.06–0.08 | 0.05–0.07 | 0.83–1.08 | 0.39–0.51 | 0.24–0.27 | 0.10   | 0.09–0.10 | 0.07   | 0.15–0.16 | 0.11–0.13 |
| *nothospondiadis* | 5♂, 6♀ | 0.41–0.46 | 0.58–0.70 | 0.06–0.08 | 0.05–0.08 | 1.24–1.43 | 0.53–0.65 | 0.38–0.47 | 0.14–0.16 | 0.11–0.12 | 0.11–0.12 | 0.32–0.37 | 0.27–0.29 |
| *pusillum*    | 7♂, 7♀ | 0.31–0.42 | 0.35–0.53 | 0.07–0.11 | 0.07–0.10 | 0.83–1.34 | 0.35–0.59 | 0.26–0.38 | 0.11–0.13 | 0.08–0.11 | 0.08–0.10 | 0.24–0.33 | 0.17–0.21 |

### Table II. Ratios of adult *Pseudophacopteron* species.

| Species       | AL/HW | T1/TS | T1/T2 | WL/HW | WL/WW | CB/CS | a/b | a/c | d/e |
|---------------|-------|-------|-------|-------|-------|-------|-----|-----|-----|
| *cuniculus*   | 1.42–1.67 | 1.00–1.44 | 1.22–1.50 | 2.95–3.51 | 1.57–1.76 | 0.64–0.73 | 0.69–0.82 | 0.55–0.72 | 1.55–1.95 |
| *eastopi*     | 1.31–1.39 | 0.86–1.14 | 1.00–1.14 | 2.43–3.15 | 2.16–2.43 | 0.82–0.85 | 0.43–0.60 | 0.45–0.61 | 2.45–2.75 |
| *electum*     | 0.96–1.07 | 1.88–2.25 | 1.07–1.23 | 2.47–2.89 | 2.01–2.45 | 0.81–0.88 | 0.74–0.85 | 0.63–0.76 | 1.67–2.70 |
| *fuscivenosum* | 1.09–1.15 | 0.88–1.57 | 1.40–1.57 | 2.38–3.00 | 2.25–2.39 | 0.82–0.88 | 0.76–0.81 | 0.68–0.76 | 2.17–2.75 |
| *kala*        | 1.49   | 1.00   |       | 1.14   | 2.78–2.93 | 2.16–2.21 | 0.79–0.86 | 0.70–0.72 | 0.81–0.90 | 1.93–2.00 |
| *lecaniodisci*| 1.15–1.33 | 2.00–2.67 | 2.67–3.50 | 2.73–3.08 | 2.19–2.39 | 0.70–0.82 | 0.81–0.87 | 0.81–0.91 | 1.81–2.00 |
| *morion*      | 1.20–1.45 | 1.00–1.33 | 1.14–1.33 | 2.68–2.92 | 2.12–2.28 | 0.86–0.88 | 0.53–0.66 | 0.48–0.64 | 2.11–2.57 |
| *nothospondiadis* | 1.41–1.55 | 0.69–1.00 | 1.00–1.40 | 2.88–3.40 | 2.17–2.34 | 0.79–0.86 | 0.67–0.70 | 0.69–0.77 | 2.20–2.46 |
| *pusillum*    | 1.10–1.27 | 1.00–1.29 | 1.00–1.43 | 2.59–3.27 | 2.12–2.37 | 0.68–0.78 | 0.53–0.71 | 0.50–0.71 | 2.00–2.56 |
Table III. Ratios of adult *Pseudophacopteron* species.

| Species         | TL/HW | MP/HW | PL/HW | DL/HW | FP/HW | SL/FP |
|-----------------|-------|-------|-------|-------|-------|-------|
| *cuniculus*     | 0.88–1.07 | 0.39–0.42 | 0.38–0.42 | 0.25–0.27 | 0.87–0.98 | 0.42–0.62 |
| *eastopi*       | 0.84–1.00 | 0.30–0.37 | 0.24–0.26 | 0.24–0.26 | 0.71–0.75 | 0.62–0.70 |
| *electum*       | 0.88–0.96 | 0.32–0.38 | 0.32–0.34 | 0.21–0.26 | 0.53–0.57 | 0.53–0.72 |
| *fuscinosum*    | 0.66–0.79 | 0.36–0.38 | 0.27–0.28 | 0.18–0.19 | 0.42–0.45 | 0.54–0.63 |
| *kala*          | 0.85–0.91 | 0.33 | 0.30 | 0.28 | 0.82 | 0.73 |
| *lecaniodiscii* | 0.75–0.90 | 0.33–0.39 | 0.27–0.32 | 0.25–0.30 | 0.56–0.57 | 0.71–0.76 |
| *morion*        | 0.73–0.77 | 0.30–0.32 | 0.26–0.32 | 0.23 | 0.41–0.46 | 0.69–0.87 |
| *nothospondiadis* | 0.90–1.05 | 0.34–0.37 | 0.26–0.29 | 0.26–0.29 | 0.73–0.81 | 0.78–0.91 |
| *pusillum*      | 0.67–0.93 | 0.31–0.36 | 0.23–0.31 | 0.21–0.28 | 0.57–0.71 | 0.61–0.75 |

Table IV. Measurements (in mm) and ratios of fifth instar larvae of *Pseudophacopteron* species.

| Species         | N   | BL  | BW  | AL  | FL  | TL  | CL  | CW  | RW  | BL/BW | AL/FL | CW/CL | CW/RW |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|-------|
| *cuniculus*     | 9   | 1.52–1.94 | 0.98–1.18 | 0.57–0.65 | 0.48–0.54 | 0.21–0.34 | 0.35–0.72 | 0.38–0.45 | 1.54–1.72 | 0.98–1.10 | 2.12–2.86 | 1.33–1.63 |
| *electum*       | 6   | 0.97–1.31 | 0.62–0.87 | 0.28–0.29 | 0.45–0.51 | 0.31–0.34 | 0.24–0.31 | 0.43–0.55 | 0.20–0.22 | 1.30–1.82 | 0.55–0.59 | 1.66–1.79 | 2.32–2.40 |
| *fuscinosum*    | 8   | 1.31–1.45 | 0.65–0.76 | 0.22–0.28 | 0.45–0.51 | 0.30–0.33 | 0.39–0.48 | 0.47–0.61 | 0.14–0.22 | 1.81–2.20 | 0.44–0.60 | 1.15–1.49 | 2.55–3.05 |
| *lecaniodisci*  | 10  | 1.17–1.36 | 0.69–0.79 | 0.26–0.34 | 0.41–0.50 | 0.31–0.34 | 0.31–0.36 | 0.46–0.62 | 0.05–0.06 | 1.51–1.86 | 0.54–0.73 | 1.39–1.81 | 8.00–12.40 |
| *morion*        | 3   | 0.88–0.99 | 0.46–0.66 | 0.18–0.19 | 0.30–0.38 | 0.19–0.22 | 0.24–0.28 | 0.35–0.46 | 0.04 | 1.50–1.91 | 0.50–0.63 | 1.25–1.64 | 8.75–11.50 |
| *nothospondiadis* | 10  | 1.01–1.23 | 0.61–0.77 | 0.20–0.24 | 0.34–0.41 | 0.28–0.30 | 0.23–0.29 | 0.39–0.48 | 0.21–0.29 | 1.40–1.74 | 0.54–0.65 | 1.46–1.73 | 1.50–1.96 |
| *pusillum*      | 9   | 1.04–1.42 | 0.63–0.82 | 0.31–0.36 | 0.43–0.43 | 0.27–0.31 | 0.15–0.21 | 0.26–0.41 | 0.21–0.28 | 1.40–2.09 | 0.76–0.86 | 1.69–2.60 | 1.08–1.57 |
Pseudophacopteron eastopi sp. n.
(Figures 4H, 5E, 6I, 7I, 8I, 9J, 10I, 12E, 13I)

Description

Adult. Colour (alcohol-preserved specimens): vertex, pronotum, mesopraescutum, and mesoscutum in males entirely black, in females lighter brown with a pale ochreous midline. Genae, frons, and clypeus in males dark brown to black, in females ochreous. Lateral sclerites of thorax in both sexes dark brown to black. Antenna off-white, segments 4–8 dark brown or black apically, segments 9–10 entirely black, terminal setae white. Legs off-white or dirty yellow, metacoxa with a dark brown spot at apical margin, profemur and mesofemur with dark brown streaks near apex and base, metafemur with an oblique dark brown streak near apex, metatibia dark brown basally. Fore wing membrane clear, transparent, with pattern consisting of a dark brown band along distal half of posterior margin (from distal half of cell cu1 to the posterior tip of cell r2, leaving two small transparent crescents at wing margin in m1 and m2), smaller dark brown patch along distal half of the vein Cu1b, and irregular light brown infuscations extending across the veins M+Cu1, M, Cu1, and the basal portion of M1+2, and in cell cu2 close to fore wing base (Figure 6I). Veins off-white, except for dark brown or black spots medially on R+M+Cu1, the base of R immediately after the branching off of M+Cu1, the M+Cu1 fork and Cu1 fork, and two spots on anal vein, which is also brown basally. Hind wing clear, transparent, veins C+Sc and A fuscous. Abdominal tergites light brown to dark brown. Sternites off-white to dirty yellow, the first visible sternite laterally with a narrow dark brown patch. Male terminalia dark brown, with parameres and apices of subgenital plate and proctiger off-white. Female terminalia dark brown, with subgenital plate basally and proctiger in apical half ochreous.

Morphology: head, in dorsal view, slightly wider than mesonotum, subglobular. Vertex in males smooth and shiny, in females with microsculpture and matt, about twice as wide as long along midline, rounded down in front. Coronal suture reduced throughout. Median ridge on vertex raised, distinct. Vertex on either side of median ridge convex, slightly bulging. Lateral ocelli lying on small tubercles slightly above plane of vertex. Occiput and preoccipital sclerite narrow, eyes not stalked, in frontal view subglobular. Genae slightly swollen. Tubercle below torulus pointed, forming an acute angle. Frons narrow, parallelsided. Clypeus subglobular. Antenna elongate, slender, segments cylindrical, weakly widening to apex (Figure 4H); a single rhinarium on apices of segments 4–9; rhinaria elliptic with a wreath of cuticular spines; terminal setae more or less equal, approximately as long as the segments 9 and 10 together (Figure 5E). Fore wing moderately elongate, outer anterior margin more or less evenly curved; apex unevenly rounded. Vein Rs relatively short. Surface spinules present in cells cu2, cu1, m2, m1, and distal part of r2, arranged in fields along posterior wing margin (Figure 7I). Costal break in apical sixth or seventh of C+Sc. Hind legs relatively long and robust. Meracanthus short, acute, pointed. Metafemur constricted medially. Metatibia bearing an open crown of eight unsclerotized apical spurs and a few additional similar spurs laterally. Metabasitarsus bearing two black sclerotized spurs. Dorsal margin of abdomen, in profile, serrate; posterior margin of tergites 4 and 5 medially swollen into a prominent tubercular process. Male terminalia as in Figure 8I. Proctiger relatively long, slightly narrowing to apex. Subgenital plate, in profile, as long as high, dorsal margin straight. Paramere, in profile, relatively narrow, parallels-sided, rounded apically; in posterior view, inner and outer margins parallel-sided; inner surface covered in
fine setae and three stouter setae subapically, apex forming a sclerotized sinuate edge with a small tooth (Figure 9J). Basal segment of aedeagus stout; apical segment with a slightly hooked head, broad and rounded at apex; sclerotized end tube of ductus ejaculatorius relatively long, sinuate (Figure 10I). Female terminalia as in Figure 12E. Proctiger relatively long, dorsal margin sinuate, weakly concave, apical process long; circumanal ring with two rows of pores, pores of outer row more or less contiguous. Subgenital plate, in profile, moderately long, dorsal margin slightly concave, ventral margin slightly sinuate, apex blunt; in ventral view, relatively broad basally, from the middle abruptly narrowing into apical process, apex with a small indentation (Figure 13I). Dorsal and ventral valvulae lacking lateral teeth. Measurements and ratios in Tables I–III.

Fifth instar larva and biology
Unknown.

Host plant
Adults of the type series, including teneral specimens, were collected on Dacryodes edulis (Burseraceae) which is a possible host plant. We examined another series including young larvae collected on Sorindeia grandifolia (Anacardiaceae) (see the comments).

Distribution
Cameroon.

Material examined
Holotype: ♂, Cameroon: West Province, Titié (Foto), Dschang, 10°04’N, 5°26’E, 26 May 2006, Dacryodes edulis (J. L. Tamesse and V. J. Dzokou). Dry-mounted (NHMB). Paratypes: Cameroon: 5♀, same data as holotype; 2♂, 2♀, South Province, Nkolandom, Ebolowa, 11°09’N, 2°55’E, 583 m, 26 May 2006, Dacryodes edulis (J. L. Tamesse and Y. P. Mveyo); 1♂, 1♀, South-West Province, Mamfe, 9–10 February 1957 (V. F. Eastop); 1♀, same data, but January 1957. Dry- and slide-mounted, and preserved in alcohol (BMNH, LZUY, MHNG, MMB, NHMB).

Material not included in the type series: Cameroon: 3♂, 3♀, seven larvae, two larval skins, West Province, Santchou (Menoua), 11 February 2006, Sorindeia grandifolia (J. L. Tamesse and V. J. Dzokou). Dry-mounted and preserved in alcohol (NHMB).

Etymology
Named in honour of the British hemipterist and leading aphidologist Victor F. Eastop who collected the species for the first time.

Comments
Pseudophacopteron eastopi sp. n. is similar to P. verrucifrons Burckhardt and van Harten, 2006, P. lecaniodisci sp. n., and P. pusillum sp. n. in having a dark band along distal half of posterior fore wing margin, the broad and more or less hooked apical dilation of the distal
segment of the aedeagus, and the relatively long female subgenital plate. *P. eastopi* differs from the three species in the darker head and thorax in males, as well as in the fore wing shape (outer anterior margin more evenly curved) and pattern (membrane in anterior half irregularly infuscate). *P. eastopi* is similar to *P. pusillum* in the small size, the head shape, the lack of dark brown patches in anterior half of fore wing and the shape of the female terminalia, but differs in the long and slender antenna with segments 4–9 cylindrical and weakly widening apically, the shorter terminal setae, the more robust hind legs, the smaller size of the dark brown patch on sides of the first visible abdominal sternite, the narrower and parallel-sided parameres, the narrower head of apical segment of aedeagus, the shape of female subgenital plate in ventral view and the lack of lateral teeth on dorsal and ventral valvulae.

The series collected on *Sorindeia* differs from the type series in the slightly more expanded fore wing pattern. This is interpreted here as intraspecific variation but more material and confirmed host plant data are needed for a conclusive answer.

*Pseudophacopteron electum* Capener
(Figures 4D, 5G, 6E, 7E, 8E, 9F, 10E, 12B, 13E, 17, 21D)

*Pseudophacopteron electum* Capener 1973, p 43; holotype ♀, South Africa, Pretoria North, 12 September 1972 (A. L. Capener) (NCIP, dry-mounted, not examined).

Included on the basis of one doubtfully identified specimen from Cameroon (see the comments).

**Description**

A description of adults, eggs, and larvae is given also by Capener (1973).

Adult. Colour: body ochreous or orange brown, often extensively marked with dark brown to black. Vertex with an off-white midline, laterally and along the midline brown orange to dark brown. Genae, frons, and clypeus ochreous or orange brown to dark brown. Antenna off-white, segments 4–8 slightly infuscate apically, segments 9–10 entirely black, apical setae white. Pronotum brown orange to dark brown or black, with midline and tubercles behind eyes pale. Mesopraescutum with two large orange to dark brown triangular markings anteriorly or almost entirely dark brown to black. Mesoscutum with four orange to dark brown bands, dark markings often coalescent. Lateral sclerites of thorax dark brown to black. Legs off-white to ochreous, metacoxa and metafemur often almost entirely dark brown, fore and mid femora with dark brown markings near apex and base, metatibia dark brown basally, hind tarsus infuscate. Fore wing membrane transparent, clear, except for a dark brown infuscation along full length of vein Cu1b (Figure 6E). Fore wing veins off-white to ochreous, except for C+Sc, Cu1b, basal half or two-thirds of R, basal half of M, the M+Cu fork, a spot medially on R+M+Cu1, and two spots on apical vein, which are all dark brown to black. Hind wing clear, transparent, C+Sc dark brown. Abdominal tergites entirely dark brown to black, or dark brown with orange dorsum. Sternites brown to dark brown. Male terminalia with subgenital plate dark brown, apical half of proctiger and parameres off-white to ochreous. Female terminalia ochreous with subgenital plate basally and proctiger apical process dark brown, or entirely dark brown to black.

Morphology: head, in dorsal view, slightly wider than mesonotum, subglobular. Vertex with microsculpture, matt, about twice as wide as long along midline, rounded down in front. Coronal suture reduced throughout. Median ridge on vertex raised, distinct. Vertex
on either side of the median ridge convex, distinctly bulging. Lateral ocelli situated on small tubercles slightly above plane of vertex. Occiput in dorsal view narrowly triangular. Preoccipital sclerite narrow, eyes not stalked, in frontal view subglobular. Genae slightly swollen. Tubercle below torulus pointed, forming an acute angle. Frons narrow, parallel-sided. Clypeus broadly pyriform. Antenna robust, weakly serrate; segments 4–9 short, widening apically (Figure 4D); a single subapical rhinaria on each of segments 4–9; rhinaria elliptic with a wreath of cuticular spines; terminal setae subequal, the longer seta about twice as long as segments 9 and 10 together (Figure 5G). Fore wing moderately elongate, widening towards apex; apex unevenly rounded. Vein Rs relatively long. Surface spinules present in cells r1, apical part of r2, m2, and cu2 (Figure 7E). Costal break in apical sixth or seventh of C+Sc. Hind legs long and slender. Meracanthus short, acute, pointed. Metafemur constricted medially. Metatibia bearing an open crown of 10–13 unsclerotized apical spurs and additional two rows of five to six similar spurs laterally. Metabasitarsus bearing two black sclerotized spurs. Dorsal margin of abdomen, in profile, serrate; posterior margin of tergites 3 and especially 4 and 5 medially swollen into a prominent tubercular process. Male terminalia as in Figure 8E. Proctiger relatively long, slightly narrowing to apex. Subgenital plate, in profile, as long as high, dorsal margin straight. Paramere, in profile, relatively long, parallel-sided, obliquely truncate apically; in posterior view, inner margin parallel-sided with outer margin; inner surface covered in fine setae and ca five stouter setae subapically, apex forming a small sclerotized tooth situated anteriorly (Figure 9F). Basal segment of aedeagus stout; apical segment with head gradually widening from base to apex, which is broadly rounded (Figure 10E); sclerotized end tube of ductus ejaculatorius relatively short, sinuate. Female terminalia as in Figure 12B. Proctiger relatively short, with dorsal margin weakly sinuate, almost straight, apical process short; circumananal ring with two rows of pores, pores of outer row contiguous. Subgenital plate, in profile, short, dorsal margin more or less straight, ventral margin convex; apex truncate; in ventral view, broadly triangular, apex sinuate, with a small indentation (Figure 13E). Dorsal and ventral valvulae with a few (two or three) distinct lateral teeth at apex. Measurements and ratios in Tables I–III.

Fifth instar larva (Figure 17). Pale yellow, tergal sclerites on abdomen black. Body broad, compact, ovoid, strongly convex ventrally, flat dorsally. Stout lanceolate setae, blunt or narrowly truncate at apex, present on abdomen margin in number (1–2) + (2–3) + (4–5) + (6–7) + (9–13), and in three groups of four to seven setae close to margin, in the outer quarter of disc of segments composing caudal plate. Margins of cephalothorax behind eyes and fore wing pad with a few minute, hardly visible simple setae. A minute simple seta present in ocular region. Eyes with ca 50 distinct ommatidia. Antenna oriented obliquely backwards, bent over the upper body surface, gradually narrowing to apex, lacking distinct divisions, with two rhinaria. Tarsal arolium large relative to claws, with a broad pad and indistinct petiole (Figure 21D). Abdomen dorsally on each side with five free sclerites and an incompletely fused caudal plate consisting of three distinct sclerites; apex of caudal plate broadly rounded. Anus in ventral position. Outer circumananal ring wide, fore and hind margin close together, composed of a single row of pores, slightly sinuate laterally. Measurements and ratios in Table IV.

Host plant

Ekebergia benguelensis, E. capensis (Meliaceae).
Biology

A detailed description of the biology is provided by Capener (1973). *P. electum* induces galls on the leaves. The eggs are laid usually on the upper leaf surface along the median vein. The young larva migrates to the lower leaf surface where it establishes itself, gradually sinking into the leaf as a pit gall forms around it. First it is fully exposed dorsally, later it becomes almost entirely enclosed by gall tissue. Then the gall assumes a pimple-like shape with a small round aperture at the apex into which the larva thrusts its exuviae as a plug. As the larva reaches maturity the aperture at the peak of the gall cracks open crosswise and parts of the wall curl outwards. The larva emerges backwards and rests on the top where the eclosion of the adult takes place. The upper surface of infested leaves becomes blotched with purplish brown and there is a slight convexity over the site of the gall which remains green. Natural enemies of *P. electum* seem to be mainly mites and chrysopid larvae which attack the young larval stages not yet entirely enclosed in galls.

Distribution

Angola, Cameroon, Kenya, South Africa.

Material examined

**Angola:** 1♂, Chianga, 22 August 1970, *Ekebergia benguelensis* (van Harten); 1♀, same data; 1♂, same data but 31 August 1970; 2♂, 2♀, same data but 16 September 1970; 2♂, 2♀, same data but 4 July 1970. **Cameroon:** 1♂, North-West Province, Bamenda, 5000 feet, 23–31 January 1957 (V. F. Eastop). **Kenya:** 2♂, 5♀, South end Ngong Hills, ca 6500 feet, 26 July 1974, beaten from *Ekebergia capensis* (D. Hollis). **South Africa:** 9♂, 10♀, nine larvae paratypes, Pretoria North, 12 September 1972, on *Ekebergia capensis* (A. L. Capener). Dry- and slide-mounted (BMNH, NCIP).

Comments

The single specimen known from Cameroon is a male which is slide-mounted (BMNH). The specimen resembles specimens from Angola, Kenya, and South Africa with respect to size and details of antenna and fore wing. The terminalia of *P. electum*, in particular the paramere and the distal portion of the aedeagus, are very characteristic in a strict lateral view. As the abdomen in the specimen from Cameroon is twisted the terminalia are preserved in a rear view. In Angola, in addition to *P. electum*, two more species were collected on *Ekebergia*. One of them is distinctly larger, has more slender antennal segments and a distinct, dark fore wing pattern. The second species resembles *P. electum* in size, in the colourless fore wing and the robust antennal segments, but differs in the pointed female subgenital plate and the larva bearing marginal lanceolate setae on head and wing pads. The male of the latter species is unknown.

*Pseudophacopteron fuscivenosum* sp. n.

(Figures 1G, H, 4C, 5F, 6D, 7D, 8D, 9E, 10D, 12A, 13D, 16, 21C, 22A, B)

Description

Adult. Colour: body off-white to ochreous. Vertex and pronotum laterally and on either side of median line with dark brown markings. Mesopraescutum with two oblong diverging
dark brown macules in anterior two-thirds. Mesoscutum with four dark bands. Genae, frons, and clypeus uniformly ochreous to light brown. Antenna off-white, segments 4–8 infuscated or dark brown apically, segments 9–10 entirely black, terminal setae white. Legs off-white to ochreous with dark markings on femora and tibiae; metacoxa, metafemur, and basal half of metatibia frequently almost entirely dark brown; metatarsus infuscate to brown. Fore wing membrane clear, transparent, except for dark brown infuscation extending along veins R, basal half of M, entire Cu1b, and basal half of Cu1a, and indistinct infuscations in the cells c+sc and basal half of cu2 (Figure 6D). Veins light, off-white, except for portions covered by the infuscation, C+Sc, apical half of R+M+Cu1, base and two spots on anal vein, which are dark brown. Hind wing clear, transparent, C+Sc fuscous. Abdominal tergites entirely dark brown to black, with orange markings on dorsum of tergites 4–5. Stermites dark brown to black, caudal margins slightly lighter. Male terminalia ochreous, ventral side of subgenital plate and base of proctiger dark brown. Female terminalia dark brown to black.

Morphology: head, in dorsal view, slightly wider than mesonotum, subglobular. Vertex with microsculpture, matt, about twice as wide as long along midline, rounded down in front (Figure 1G). Coronal suture reduced throughout. Median ridge on vertex raised, distinct. Vertex on either side of the median ridge convex, distinctly bulging. Lateral ocelli lying on small tubercles slightly above the plane of vertex. Occiput in dorsal view narrowly triangular. Preoccipital sclerite narrow, eyes not stalked, in frontal view subglobular. Genae slightly swollen (Figure 1H). Tubercle below torulus pointed, forming an acute angle. Frons narrow, parallel-sided. Clypeus broadly pyriform. Antenna moderately elongate, slender, segments cylindrical, weakly widening to apex (Figure 4C); a single subapical rhinarium on each of segments 4–9; rhinaria elliptic with a wreath of cuticular spines; terminal setae subequal, the longer seta distinctly longer than segments 9 and 10 together (Figure 5F). Fore wing moderately elongate, almost parallel-sided in apical half, anterior margin in outer half more or less straight; apex unevenly rounded. Vein Rs relatively long. Surface spinules present in all cells except for basal part of r2, densely arranged especially in the apical part, only a few spinules present in cells c+sc and r1 (Figure 7D). Costal break in apical sixth or seventh of C+Sc. Hind legs relatively short and robust. Meracanthus short, acute, pointed. Metafemur constricted medially. Metatibia bearing an open crown of 10–12 unsclerotized apical spurs and additional two rows of five to seven similar spurs laterally. Metabasitarsus bearing two black sclerotized spurs. Dorsal margin of abdomen, in profile, serrate; posterior margin of tergites 3 and especially 4 and 5 medially swollen into a prominent tubercular process. Male terminalia as in Figure 8D. Proctiger relatively long, slightly narrowing to apex. Subgenital plate, in profile, longer than high, dorsal margin straight. Paramere, in profile, relatively short, robust, anterior margin straight, posterior margin convex, apex blunt; in posterior view, narrowing to apex; inner surface covered in many more or less regularly arranged setae, subapical setae slightly thicker and longer (Figure 9E). Basal segment of aedeagus stout; apical segment relatively short, with a more or less parallel-sided, apically broadly rounded head, its dorsal margin angular basally; sclerotized end tube of ductus ejaculatorius relatively short, sinuate (Figure 10D). Female terminalia as in Figure 12A. Proctiger relatively short, with dorsal margin weakly sinuate, almost straight; apical process short; circumanal ring with two rows of pores, pores of outer row contiguous. Subgenital plate, in profile, relatively short, dorsal margin more or less straight in apical half, ventral margin strongly convex, abruptly narrowing, apex forming a small pointed tooth; in ventral view, broadly pointed apically (Figure 13D). Dorsal and ventral valvulae with a few (two or three) distinct lateral teeth at apex. Measurements and ratios in Tables I–III.
Fifth instar larva (Figure 16). Uniformly pale yellow. Body narrow, more or less parallel-sided. Body margin with simple setae on head in front of antennal insertion, cephalothorax behind eyes, humeral region of fore wing pad, hind wing pad, and abdomen. Many small pointed lanceolate setae present near caudal plate margin and in irregular rows over entire width of disc of caudal plate and preceding free tergal sclerite. A simple seta present in ocular region. Eyes with ca 50 distinct ommatidia. Antenna straight, with six distinct segments; two rhinaria on segment 6. Tarsal arrolium large relative to claws, with a broad pad and indistinct petiole (Figure 21C). Abdomen dorsally on each side with five free sclerites and a completely fused caudal plate; apex of caudal plate slightly truncate. Anus in ventral position. Outer circum-anal ring wide, anterior and posterior margin close together, composed of a single row of pores, laterally narrowly sinuate. Measurements and ratios in Table IV.

Host plant
Deinbollia sp. (Sapindaceae).

Biology
Inducing nut galls on the leaves (Figure 22A, B). Eggs are laid on the young leaves. After eclosion, the larva establishes itself along a secondary vein on the lower leaf surface and gradually sinks into the leaf with gall tissue growing around it. With the leaf development the size of the gall increases, becoming subglobular and closed, except for a minute aperture on the lower leaf surface. At the adult moult, the gall opens as the apical aperture widens becoming a round hole letting the adult escape. Often several galls are present on a single leaf which becomes severely distorted.

Distribution
Cameroon.

Material examined
Holotype: 5, Cameroon: Centre Province, Mbalmayo, 40 km S Yaoundé, 3°30’N, 11°30’E, 660 m, 15 November 2005, Deinbollia sp. (D. Burckhardt). Dry-mounted (NHMB). Paratypes: Cameroon: 35, 8♀, 25 larvae, same data as holotype; 55, 5♀, six larvae, South Province, Nkouemvone, Ebolowa, 2°55’N, 11°09’E; 583 m, 22 May 2004, Deinbollia sp., degraded primary forest (J. L. Tamesse). Dry- and slide-mounted, and preserved in alcohol (BMNH, LZUY, MHNG, MMB, NHMB).

Etymology
From the Latin adjective fuscus = dark-coloured and the noun vena = the vein, referring to the darkened veins on the fore wing.

Comments
P. fuscivenosum sp. n. is close to Pseudophacopteron zimmermanni (Aulmann, 1912) in sharing a similar size, the body colour, a clear fore wing membrane near apices of veins R1,
Rs, M_{1+2}, M_{3+4}, \text{and } Cu_{1a}, \text{ the head shape, the robust paramere with convex posterior margin and the inner face with many stout setae, the apical basally angular dilation of the distal segment of aedeagus, the relatively short female proctiger and subgenital plate, the latter, in profile, with strongly convex ventral margin, abruptly narrowing to apex and forming a small pointed tooth, and the dorsal and ventral valvulae with a few distinct lateral teeth at apex. } P. fuscovenosum \text{ differs from } P. zimmermanni \text{ as follows: fore wing membrane along veins } R, \text{ basal half of } M, \text{ entire } Cu_{1b}, \text{ and basal half of } Cu_{1a} \text{ infuscated; terminal setae on antenna slightly shorter; paramere longer and narrower, posterior margin of paramere, in profile, more evenly curved; ventral margin of female subgenital plate, in profile, less convex; in the host plant association.}

\textit{P. zimmermanni} \text{ is characterized by the following characters: veins } R, \text{ basal half of } M, \text{ basal half of } Cu_{1a} \text{ and base and apex of } Cu_{1b} \text{ are dark but the infuscation is not extended to the membrane; } T1=0.11–0.13; PL=0.12–0.14; \text{ paramere, in profile, broader and posterior margin more angular; ventral margin of female subgenital plate, in profile, more convex; the host plant is } Khaya senegalensis \text{ (Meliaceae). Material of } P. zimmermanni \text{ examined: syntypes, 3♂, 1♀, Tanzania: Amani, } Khaya senegalensis \text{ (Marshall). 102♂, 130♀, Uganda: District Masindi, Budongo Forest North Sonso, 1°45’N, 31°35’E, 19 June to 30 July 1995 and 15–25 January 1997, canopy fogging (T. Wagner). Dry- and slide-mounted, and preserved in alcohol (BMNH, MAKB, MHNG, MMB, NHMB, ZMB).}

\textit{Pseudophacopteron kala} \text{ sp. n.}

(Figures 1D, 5B, 6B, 7B, 8B, 9C, 10B, 11B, 13B)

\textit{Description}

\textbf{Adult.} Colour (alcohol-preserved specimens): body brown to dark brown. Vertex with a pale ochreous midline. Mesopraescutum with a narrow pale ochreous triangle in the middle. Mesoscutellum light ochreous. Antenna off-white, segments 4–8 dark brown or black in apical half, segments 9–10 entirely black, terminal setae white. Legs dirty pale yellow, metacoxae with dark brown markings, profemur and mesofemur dark brown near apex and base, metafemur almost entirely dark brown, only lighter apically, tibia dark brown basally. Fore wing membrane clear, transparent, with extended dark brown pattern consisting of bands along the entire length of the veins R, R_{1}, R_{1}+Cu_{1}, M_{1}+2, large patches around Cu_{1a}, Cu_{1b}, and the apical part of Rs, and a small patch around the apex of M_{3+4}; a light brown infuscation on the fore wing base (Figure 6B). Veins dark brown, only the outer half of wing margin off-white, anal vein off-white with two black or dark brown spots. Hind wing clear, transparent, veins C+Sc and A dark brown. Abdomen brown.

Morphology: head, in dorsal view, slightly wider than mesonotum, subcylindrical; in frontal view distinctly dorso-ventrally flattened (Figure 1D). Vertex with fine microsculpture in front, smooth and shiny dorsally, about twice as wide as long along midline, rounded down in front. Median ridge on vertex raised, distinct, narrow. Vertex on either side of the median ridge flat in front, not bulging; posterior margin concave. Lateral ocelli lying in the same plane as vertex. Coronal suture reduced throughout. Occiput broadly triangular. Preoccipital sclerite relatively broad; eyes prominent, slightly stalked, in frontal view subangular. Genae indistinctly swollen. Tubercle below torulus small, rudimentary, pointed, forming an acute angle. Frons narrow, parallel-sided. Clypeus narrowly pyriform. Antenna relatively long, slender, segments subcylindrical, weakly widening to apex; a single subapical rhinarium on each of segments 4–9; terminal setae subequal, the longer seta
approximately as long as segments 9 and 10 together (Figure 5B). Fore wing moderately
elongate, outer anterior margin more or less evenly curved, apex truncate. Surface spinules
present in apical part of cell r_2 and cells cu_1 and cu_2 (Figure 7B). Costal break in apical
sixth of C+Sc. Hind legs long and slender. Meracanthus short, acute, pointed. Metafemur
constricted medially. Metatibia bearing an open crown of eight or nine stout, unsclerotized
apical spurs, and a few (one to five) similar spurs laterally. Metabasitarsus bearing two
black sclerotized spurs. Male terminalia as in Figure 8B. Proctiger relatively long, slightly
narrowing to apex. Subgenital plate, in profile, as long as high, dorsal margin straight.
Paramere, in profile, relatively long, parallel-sided, in the middle slightly bent anteriorly,
apex broadly rounded; in posterior view, inner margin and outer margins parallel-sided;
inner surface, covered in fine setae and three or four stouter setae subapically, apex forming
small sclerotized tooth (Figure 9C). Basal segment of aedeagus stout; apical segment with
elongate, apically hooked head, narrow at apex, its dorsal margin slightly angular basally;
sclerotized end tube of ductus ejaculatorius relatively long, sinuate (Figure 10B). Female
terminalia as in Figure 11B. Proctiger relatively long, with dorsal margin weakly concave,
apical process long, narrowing to apex; circumanal ring in anterior half with one row of
pores, in posterior half with two rows of pores, pores of outer row contiguous. Subgenital
plate, in profile, relatively long, dorsal margin slightly concave, ventral margin straight;
apex narrowly triangular, truncate; in ventral view, parallel-sided basally, from the middle
abruptly narrowing into apical process, apex relatively broad, truncate, with a small
indentation (Figure 13B). Dorsal valvula lacking lateral teeth, ventral valvula with a few
indistinct lateral teeth at apex. Measurements and ratios in Tables I–III.

Fifth instar larva, host plant, and biology
Unknown.

Distribution
Cameroon.

Material examined
Holotype: ♀, Cameroon: Centre Province, 15 km W Yaoundé, Mt Kala, 3°50’N, 11°21’E,
800–1100 m, 17 November 2002, degraded primary forest (J. L. Tamesse). Dry-mounted
(NHMB). Paratype: Cameroon: 1♂, same data as holotype. Slide-mounted (NHMB).

Etymology
Named after the type locality, Mt Kala near Yaoundé.

Comments
P. kala sp. n. is similar to P. nothospondiadis sp. n. in size, the brown patches on apices of the
fore wing veins and on the touching point of veins Rs and M_1+2, the elongate fore wing with
outer anterior margin more or less evenly curved, the distribution of surface spinules on the
fore wing membrane, the vertex concave at posterior margin and flat in front, not bulging
on sides of a relatively sharp and narrow median ridge, the antenna, the apical hooked
dilation of the distal segment of aedeagus, the relatively long female proctiger and subgenital plate, and the dorsal and ventral valvulae lacking distinct teeth at apex. *P. kala* differs from *P. nothospondiadis* in the more expanded dark pattern on the fore wing, the dorsoventrally flattened subcylindrical head, the longer paramere, the longer distal segment of aedeagus with a narrower apical dilation, and the shape of female subgenital plate.

**Pseudophacopteron lecaniodisci** sp. n.
(Figures 2C, D, 4F, 5I, 6G, 7G, 8G, 9H, 10G, 12D, 13G, 19, 21F, 22C)

**Description**

**Adult.** Colour (alcohol-preserved specimens): body ochreous. Head including vertex, genae, frons, and clypeus with hardly any dark markings. Pronotum laterally dark brown, tubercles behind eyes with light ochreous points. Mesopraescutum with two triangular dark brown macules in anterior two-thirds. Mesoscutum often with four dark bands or entirely ochreous. Metapostnotum ochreous. Lateral sclerites of thorax dark brown. Antenna off-white to ochreous, segment 3 narrowly light brown apically, segments 4–7 narrowly dark brown apically, segment 8 almost entirely pale, segments 9–10 entirely black, terminal setae white. Legs off-white to ochreous, metacoxa with extensive dark brown markings, profemur and metafemur with dark brown streaks near apex and base, metafemur almost entirely dark brown, only lighter apically, metabasal dark brown basally. Fore wing membrane clear, transparent, with dark brown pattern consisting of a band along distal half of posterior margin (from distal half of the cell cu₁ to the posterior tip of cell r₂, leaving two small transparent crescents at wing margin in m₁ and m₂), brown patches adjacent to veins R₁, basal two-thirds of R₄ and apical part of Rs₄, smaller patches along Cu₁₁b, across medial part of M and on the touching point of Rs and M₁₋₂; wing base indistinctly irregularly infuscate (Figure 6G). Veins off-white to ochreous, except for C+Sc, basal three-quarters of R, and dark brown spots in the middle of R+M+Cu₁, the M+Cu₁ fork, M fork, and Cu₁ fork, the touching point of Rs and M₁₋₂, and two spots on anal vein. Hind wing clear, transparent, vein C+Sc dark brown. Abdominal tergites light brown, laterally and on tubercles on dorsum darker brown. Sternites dark brown. Male terminalia with subgenital plate and base of proctiger dark brown, apex of proctiger and parameres ochreous. Female terminalia brown, subgenital plate lighter apically.

**Morphology:** head, in dorsal view, slightly wider than mesonotum, subglobular. Vertex with microsculpture, matt, about twice as wide as long along midline, rounded down in front (Figure 2C). Coronal suture reduced throughout. Median ridge on vertex raised, distinct. Vertex on either side of the median ridge convex, distinctly bulging. Lateral ocelli lying on small tubercles slightly above the plane of vertex. Occiput in dorsal view narrowly triangular. Preoccipital sclerite narrow; eyes not stalked, in frontal view subglobular. Genae slightly swollen (Figure 2D). Tubercle below torulus pointed, forming an acute angle. Frons narrow, parallel-sided. Clypeus broadly pyriform. Antenna long, slender, segments cylindrical, weakly widening to apex (Figure 4F); a single subapical rhinarium on each of segments 4–9; rhinaria elliptic with a wreath of cuticular spines; terminal setae markedly differing in length; longer setae more than twice as long as segments 9 and 10 together, shorter seta as long as or shorter than segments 9 and 10 together (Figure 5I). Fore wing moderately elongate, almost parallel-sided in apical half, anterior margin in outer half more or less straight, apex truncate. Vein Rs relatively long. Surface spinules present in all cells except for c+sc (Figure 7G). Costal break in apical fifth of C+Sc. Hind legs relatively long.
and robust. Meracanthus short, acute, pointed. Metatibia bearing an open crown of 13–14 unsclerotized apical spurs and two rows of five to seven additional similar spurs laterally. Metabasitarsus bearing two black sclerotized spurs. Dorsal margin of abdomen, in profile, serrate; posterior margin of tergites 4 and 5 medially swelled into a tubercular process. Male terminalia as in Figure 8G. Proctiger relatively long, narrow. Subgenital plate, in profile, slightly longer than high, dorsal margin straight. Paramere, in profile, relatively long and narrow, slightly turned backwards in the middle, truncate apically; in posterior view, inner and outer margins parallel-sided; inner surface covered in fine setae and ca three stouter setae subapically, apex forming a small sclerotized tooth situated posteriorly (Figure 9H). Basal segment of aedeagus stout; apical segment relatively long, with a slightly hooked head, almost pointed at apex, dorsal margin of aedeagal head convex; sclerotized end tube of ductus ejaculatorius relatively short, sinuate (Figure 10G). Female terminalia as in Figure 12D. Proctiger relatively short, dorsal margin sinuate, apical process short; circumanal ring with two rows of pores, pores of outer row contiguous. Subgenital plate, in profile, relatively long, dorsal margin weakly concave, ventral margin more or less straight, apex narrowly triangular, pointed; in ventral view, rectangular with a relatively long subacute apical process (Figure 13G). Ventral valvulae with a few indistinct lateral teeth at apex. Measurements and ratios in Tables I–III.

Fifth instar larva (Figure 19). Uniformly pale yellow. Body relatively slender. Body covered with simple setae, which are long especially on abdomen; lanceolate setae lacking. A simple seta present in anterior half of ocular region. Eyes prominent, with ca 10 distinct ommatidia. Antenna slightly bent backwards, relatively short, with seven segments; two rhinaria on segment 7. Tarsal arolium large relative to claws, with a broad pad and indistinct petiole (Figure 21F). Abdomen dorsally on each side with five free sclerites and a completely fused caudal plate; apex of caudal plate broadly rounded. Anus in ventral position. Circumanal ring very small, triangular, composed of a single row of pores. Measurements and ratios in Table IV.

Host plant

*Lecaniodiscus cupanioides* (Sapindaceae).

Biology

Larvae live on the lower leaf surface and induce nipple galls, similar to the galls of *P. fuscivenosum* in structure, but smaller in size. Often several dozens of galls are present on a single leaf (Figure 22C).

Distribution

Cameroon.

Material examined

Holotype: ♂, **Cameroon**: Centre Province, 20 km E Yaoundé, Soa, 3°57’N, 11°36’E, 725 m, 15 May 2004, secondary forest, *Lecaniodiscus cupanioides* (J. L. Tamesse). Dry-mounted (NHMB). Paratypes: **Cameroon**: 18♀, 6♂, 46 larvae, same data as holotype; 1♀,
Soa, 3°59’N, 11°35’E, 630 m, 14 November 2005, *Lecaniodiscus cupanioides* (D. Burckhardt). Dry- and slide-mounted, and preserved in alcohol (BMNH, LZUY, MHNG, MMB, NHMB, USNM).

**Etymology**

Named after its host genus *Lecaniodiscus*.

**Comments**

*Pseudophacopteron lecaniodisci* sp. n. is similar to *P. verrucifrons* Burckhardt and van Harten, 2006, from Yemen and Kenya (see also Burckhardt and Mifsud, 1998) in the fore wing colour, the broad and slightly hooked apical dilation of the distal segment of aedeagus, the relatively long female subgenital plate which is, in profile, apically pointed, and the ventral valvulae with a few indistinct lateral teeth at apex. *P. lecaniodisci* differs from *P. verrucifrons* in the following characters: the larger body dimensions; the presence of a large patch on the fore wing adjacent to vein R1 and of a small patch across medial part of M, the larger size of patch adjacent to apex of Rs, the absence of a macule on M fork; the absence of anterior tubercles on vertex; the long terminal setae on antenna, which are markedly different in length; the long and narrow paramere with apex slightly turned backwards; the female proctiger relatively shorter; the circumanal ring with two rows of pores; the female subgenital plate, in ventral view, rectangular with long subacute apical process; the host plant association.

*P. verrucifrons* is characterized as follows: WL=0.93–1.09; fore wing membrane at apex of vein R1 and in the middle of M is clear, patch at apex of Rs is small, there is a small patch on M fork; vertex anteriorly bearing two tubercles; terminal setae on antenna subequal and shorter than segments 9 and 10 together; paramere short and stout (PL=0.11) with posterior margin more or less straight; female proctiger relatively long; circumanal ring with only one row of pores; female subgenital plate, in ventral view, narrow triangular, more or less regularly narrowing to a truncate apex; host plant is *Commiphora africana* (Burseraceae). Material of *P. verrucifrons* examined: holotype, ♂, Yemen, Al Kadan, May 2002, in light trap (A. van Harten and T. Abdul-Haq) (NHMB, dry-mounted); paratypes: 2♂, 2♀, Al Lahima, 1 January to 9 June 2001, in Malaise trap (A. van Harten); 1♂, 1♀, same data but 9 April to 5 June 2001; 2♂, 1♀, Al Rujum, 9 April to 5 June 2001, in Malaise trap (A. van Harten); 2♀, 12 km NW Mannakhah, 27 March to 5 May 2002, Malaise trap (A. van Harten); 1♂, Taizz, 26–28 May 1998, in light trap (A. van Harten and A. Awad); 1♀, Taizz, 20 October 1991 (A. van Harten); 3♂, 1♀, Kenya: Namanga, S slope of Ol Doinya Orok, 5–6 June 1974, ca 5500 feet, beaten from *Commiphora africana* (D. Hollis). Dry- and slide-mounted (BMNH, MHNG, NHMB).

*Pseudophacopteron morion* sp. n.

(Figures 2A, B, 4E, 5H, 6F, 7F, 8F, 9G, 10F, 12C, 13F, 18, 21E, 22D, E)

**Description**

*Adult.* Colour: body dark brown to black. Vertex in front and along midline, genae, frons, and clypeus usually lighter brown. Pronotum dark brown to black. Mesopraescutum dark brown to black or with a smaller lighter, orange brown triangular patch at posterior margin.
Mesoscutum orange brown, with four dark brown bands or entirely dark brown to black. Metapostnotum orange brown to dark brown. Lateral sclerites of thorax dark brown to black. Antenna off-white to ochreous, segment 3 light brown apically, segments 4–8 dark brown in apical half, segments 9–10 entirely black, terminal setae white. Legs dirty yellow, metacoxa with extensive dark brown markings, femora with dark brown markings near apex and base, tibia basally dark brown. Fore wing membrane clear, transparent, nearly a narrow band along vein Cu₁b dark brown (Figure 6F). Veins rusty or orange brown, C+Sc, R, Rs₁, Cu₁b, basal half of M, a spot on touching point of Rs and M₁₂, a spot in the middle of R+M+Cu₁, and two spots on anal vein dark brown to black. Hind wing clear, transparent, vein C+Sc dark brown. Abdominal tergites and sternites dark brown to black. Male terminalia with subgenital plate dark brown to black, proctiger and parameres ochreous. Female terminalia dark brown to black, proctiger medially and apical process of subgenital plate ochreous to light brown.

Morphology: head in dorsal view, slightly wider than mesonotum, subglobular. Vertex with microsculpture, matt, about twice as wide as long along midline, rounded down in front (Figure 2A). Coronal suture reduced throughout. Median ridge on vertex raised, distinct. Vertex on either side of the median ridge convex, distinctly bulging. Lateral ocelli lying on small tubercles slightly above the plane of vertex. Occiput in dorsal view narrowly triangular. Preoccipital sclerite narrow, eyes not stalked, in frontal view subglobular. Genae slightly swollen. Tubercle below torulus pointed, forming an acute angle (Figure 2B). Frons narrow, parallel-sided. Clypeus broadly pyriform. Antenna long, slender, segments cylindrical, weakly widening to apex (Figure 4E); a single subapical rhinarium on each of segments 4–9; rhinaria elliptic with a wreath of cuticular spines; terminal setae subequal, the longer seta slightly longer than segments 9 and 10 together (Figure 5H). Fore wing moderately elongate, anterior margin in outer half more or less straight; apex unevenly rounded. Vein Rs relatively short. Surface spinules absent (Figure 7F). Costal break in apical seventh of C+Sc. Hind legs relatively short and slender. Meracanthus short, acute, pointed. Metafemur constricted medially. Metatibia bearing an open crown of seven or eight unsclerotized apical spurs and a few (three or four) additional similar spurs laterally. Metabasitarsus bearing two black sclerotized spurs. Dorsal margin of abdomen, in profile, serrate; posterior margin of tergites 4 and 5 medially swollen into a tubercular process. Male terminalia as in Figure 8F. Proctiger relatively short, cylindrical. Subgenital plate, in profile, as long as high or slightly higher than long, dorsal margin straight. Paramere, in profile, narrow, more or less parallel-sided, rounded apically; in posterior view, inner and outer margins parallel-sided; inner surface, covered in fine setae and three or four stouter setae subapically, apex forming a sclerotized sinuate edge with two small teeth (Figure 9G). Basal segment of aedeagus stout; apical segment short, with narrow head weakly, gradually widening from base to apex, dorsal margin straight; sclerotized end tube of ductus ejaculatorius relatively long, sinuate (Figure 10F). Female terminalia as in Figure 12C. Proctiger relatively short, dorsal margin strongly sinuate, apical process short; circumanal ring with two rows of pores, pores of outer row not contiguous. Subgenital plate, in profile, with dorsal margin more or less straight, ventral margin strongly convex, sinuate; apex triangular, pointed; in ventral view, broadly rectangular, apex with two obliquely truncate tooth-like lobes and U-shape indentation separating them (Figure 13F). Dorsal and ventral valvulae with a few (two to four) distinct lateral teeth at apex. Measurements and ratios in Tables I–III.

Fifth instar larva (Figure 18). Uniformly pale. Body margin with following numbers of robust truncate lanceolate setae (one side only): head in front of antennal insertion: eight;
humeral region of fore wing pad: two to five; abdomen: 1 + (3–4) + (23–26). Following numbers of minute narrow clavate setae present on cephalothorax behind eyes: three; fore wing pad margin: 12; hind wing pad margin: two. A small robust clavate seta present in anterior half of ocular region. Eyes with ca four distinct ommatidia. Antenna bent in a right angle, with apex directed forwards, lacking distinct divisions; outer surface basally with 8–12 sharp cuticular teeth; two distinct rhinaria. Tarsal arolium large relative to claws, with a broad pad and indistinct petiole (Figure 21E). Abdomen dorsally on each side with five free sclerites and a completely fused caudal plate; apex of caudal plate broadly rounded. Anus in ventral position. Outer circumanal ring small, oval, composed of a single row of pores. Measurements and ratios in Table IV.

Host plant

*Santiria trimera* (Burseraceae).

Biology

Inducing pit galls on the lower side of the leaves which become brown and distorted when heavily attacked (Figure 22D, E).

Distribution

Cameroon.

Material examined

Holotype: ♀, **Cameroon**: Centre Province, Nkomekoui, Mt Nkomilong, 10 km W Yaoundé, 3°51′N, 11°20′E, 670–1150 m, 10–11 November 2005, *Santiria trimera* (D. Burckhardt). Dry-mounted (NHMB).

Paratypes: **Cameroon**: 15 ♀, 9♂, 19 larvae, same data as holotype; 1♂, Centre Province, 20 km E Yaoundé, Soa, 3°59′N, 11°35′E, 630 m, 14 November 2005, *Blighia* sp. (D. Burckhardt); 1♂, Centre Province, 15 km W Yaoundé, Mt Kala, 3°50′N, 11°21′E, 800–1100 m, 9–12 November 2005 (D. Burckhardt); 4♂, 3♀, Centre Province, Mefou and Akono, Bankomo (Nkomilong), 29 August 2006 (J. L. Tamesse and W. Yana). Dry- and slide-mounted, and preserved in alcohol (BMNH, LZUY, MHNG, MMB, NHMB).

Etymology

From the Greek noun τό μόριον = particle, referring to its minute body size.

Comments

*Pseudophacopteron morion* sp. n. is close to *P. electum* Capener and *P. pretoriense* Capener, 1973 in the clear fore wing membrane except for a narrow dark brown infuscation along vein Cu1b, the head shape, the apical dilation of distal segment of aedeagus which is gradually widening from base to apex, the relatively short female proctiger, the larval antenna which lacks distinct divisions, the presence of stout truncate lanceolate setae on body margin, and the larval circumanal ring which is in a ventral position. *P. morion* differs
from *P. electum* in the characters indicated in the key. From *P. pretoriense*, adults of *P. morion* differ in the smaller body dimensions, darker body, relatively shorter terminal setae on antenna, slender and parallel-sided paramere, narrow apical dilation of distal segment of aedeagus, relatively short female subgenital plate with ventral margin, in profile, strongly convex and sinuate, in ventral view broadly rectangular with two apical truncate tooth-like lobes and U-shaped indentation; larvae of *P. morion* differ from *P. pretoriense* in the narrower and less compact body; they lack truncate lanceolate setae on margins of eye, cephalothorax behind eye, fore wing pad except for the humeral region, and hind wing pad; the antenna forms a right angle and its apex is directed forwards; the outer circumanal ring is small and oval. Differences are also found in the host plant association and the gall shape.

Adult *P. pretoriense* are characterized as follows: WL = 1.33–1.62; the extent of dark brown or black markings on body is smaller; T1/TS = 1.67–2.00; the paramere is robust, in profile, club-shaped with convex margins; the apical dilation of distal segment of aedeagus is broader; the female subgenital plate is relatively long with ventral margin, in profile, more or less straight, regularly narrowing to a pointed apex, in ventral view, narrowly triangular, regularly narrowing to a rounded apex; the larvae are oval and compact, bordered by truncate lanceolate setae on the whole body margin; the antenna is slightly bent and obliquely directed backwards; the outer circumanal ring is wide and narrow; the larvae develop on *Harpephyllum caffrum* (Anacardiaceae) and induce pit galls on the upper leaf surface. Material of *P. pretoriense* examined: paratypes, 8♂, 6♀, seven larvae, South Africa: Pretoria, Groenkloof Park, 13 October 1965, on *Harpephyllum caffrum* (A. L. Capener); 1♂, same data, but 13 September 1972; 1♂, 1♀, Pretoria, 20 October 1971 (H. D. Catling). Dry- and slide-mounted (NCIP, BMNH).

**Pseudophacopteron nothospondiadis** sp. n.

(Figures 1E, F, 3C, D, 4B, 5C, 6C, 7C, 8C, 9D, 10C, 11C, 13C, 15, 21B, 22F)

**Description**

*Adult.* Colour: body dark brown. Head, including genae, frons, and clypeus usually lighter brown, vertex with a pale ochreous midline. Pronotum dark brown, small convexities behind eyes with light ochreous points. Mesopraescutum with a narrow pale ochreous triangle in the middle and two broader light brown ones laterally or entirely dark brown. Mesoscutum with four light brown bands or entirely dark brown. Mesoscutellum light ochreous to dark brown. Antenna off-white, segment 3 (and sometimes 4) entirely pale, segments 4–8 dark brown to black in apical half, segments 9–10 entirely black, terminal setae white. Legs dirty pale yellow with dark brown markings on all femora near base and apex, and on metacoxa; metatibia dark brown in basal half. Fore wing membrane clear, transparent, with dark brown pattern consisting of patches along veins Cu₁₄ and Cu₁₅, apical parts of veins R₁, R₅, M₁₂₃, and M₃₄, and at the touching point of Rs and M₁₂. An irregular light to dark brown infuscation in the fore wing base and across the basal part of the vein R and veins M+Cu₁ and M (Figure 6C). Veins rusty brown, C+Sc, M+Cu₁, R₁, basal two-thirds of R, apical half of Rs and apical half of Cu₁₅, dark brown to black, as well as a spot on Cu₁ fork, M fork, and the touching point of Rs and M₁₂, and two spots on anal vein. Hind wing clear, transparent, vein C+Sc dark brown. Abdomen entirely dark brown, tergites sometimes with light brown markings dorsally. Male terminalia with subgenital plate dark brown, proctiger in apical half and parameres ochreous. Female terminalia dark brown.
Morphology: head, in dorsal view, slightly wider than mesonotum, subcylindrical. Vertex with microsculpture, matt, about twice as wide as long along midline, rounded down in front (Figure 1E). Median ridge on vertex raised, distinct, narrow. Vertex on either side of the median ridge relatively flat in front, not bulging; posterior margin deeply concave (Figure 1F). Lateral ocelli lying slightly above the plane of vertex on indistinct tubercles. Coronal suture reduced throughout. Occiput in dorsal view narrowly triangular. Preoccipital sclerite narrow; eyes not stalked, in frontal view subglobular. Genae slightly swollen. Tubercle below torulus pointed, forming an acute angle. Frons narrow, parallel-sided. Clypeus pyriform. Antenna long, slender, segments cylindrical, weakly widening to apex (Figure 4B); a single subapical rhinarium on each of segments 4–9; rhinaria elliptic with a wreath of cuticular spines (Figure 3C, D); terminal setae subequal, the longer seta approximately as long as or slightly shorter than segments 9 and 10 together (Figure 5C). Fore wing moderately elongate, outer anterior margin more or less evenly curved, apex truncate. Surface spinules present in small fields in apical part of cell r2 and cells cu1 and cu2 (Figure 7C). Costal break in apical sixth of C+Sc. Hind legs long and slender. Meracanthus short, acute, pointed. Metatibia bearing an open crown of eight or nine stout, unsclerotized apical spurs, and a few (one to five) similar spurs laterally. Metabasitarsus bearing two black sclerotized spurs. Dorsal margin of abdomen, in profile, slightly serrate; posterior margin of tergites 4 and 5 medially swollen into a tubercular process. Male terminalia as in Figure 8C. Proctiger relatively long, slightly narrowing to apex. Subgenital plate, in profile, as long as high, dorsal margin straight. Paramere, in profile, relatively short and stout, medially slightly constricted and narrowing towards a broadly rounded apex; in posterior view, inner margin parallel-sided with outer margin; inner surface, covered in fine setae and three or four slightly stouter setae subapically, apex forming small sclerotized tooth (Figure 9D). Basal segment of aedeagus stout; apical segment, with elongate head, which is apically widening, slightly hooked and broadly rounded, its dorsal margin angular basally; sclerotized end tube of ductus ejaculatorius relatively long, sinuate (Figure 10C). Female terminalia as in Figure 11C. Proctiger relatively long, with dorsal margin weakly concave, apical process long, narrowing to apex; circumanal ring with two rows of pores, pores of outer row not contiguous. Subgenital plate, in profile, relatively long, dorsal margin slightly concave, ventral margin straight; apex narrowly triangular, pointed; in ventral view, narrowly triangular, gradually narrowing into apical process with more or less straight margins, apex relatively broad and truncate (Figure 13C). Dorsal and ventral valvulae lacking lateral teeth. Measurements and ratios in Tables I–III.

Fifth instar larva (Figure 15). Dorsum dirty yellow to light brown, venter pale yellow. Body flat, relatively slender, parallel-sided. Body marginally and dorsally covered with many pointed lanceolate setae. A pointed lanceolate seta present in anterior half of ocular region. Eyes with ca five distinct ommatidia. Antenna straight, short, with six segments; a single rhinarium apically on each of segments 5 and 6. Tarsal arolium moderately large relative to claws, with a broad pad and indistinct petiole (Figure 21B). Abdomen dorsally on each side with five free sclerites and a completely fused caudal plate; apex of caudal plate broad, truncate. Anus in terminal position. Circumanal ring sinuate, situated apically, extending on to ventral abdominal surface. Measurements and ratios in Table IV.

Host plant

*Nothospondias staudtii* (Simaroubaceae/Anacardiaceae).
Biology

Free-living. The eggs are laid on the young leaves. The larvae live openly on the leaf surface and produce large quantities of honeydew on which sooty mould grows producing local necrosis on the leaves (Figure 22F).

Distribution

Cameroon.

Material examined

Holotype: ♂, Cameroon: Centre Province, Nkomekoui, Mt Nkomilong, 10 km W Yaoundé, 3°51’N, 11°20’E, 670–1150 m, 10–11 November 2005, Nothospondias staudtii (D. Burckhardt) (NHMB). Dry-mounted. Paratypes: Cameroon: 7♀, 10♂, four larvae, same data as holotype; 14♂, 30♀, 44 larvae, Centre Province, Soa, 3°57’N, 11°36’E, 725 m, 15 May 2004, secondary forest, Nothospondias staudtii (J. L. Tamesse); 2♂, 4♀, 15 larvae, Centre Province, 15 km W Yaoundé, Mt Kala, 3°50’N, 11°21’E, 800–1100 m, 9–12 November 2005 (D. Burckhardt). Dry- and slide-mounted, and preserved in alcohol (BMNH, LZUY, MHNG, MMB, NHMB, USNM).

Etymology

Named after its host plant genus Nothospondias.

Comments

P. nothospondiadis sp. n. is close to P. kala sp. n. (see the comment under the latter). P. nothospondiadis differs from P. kala in the more reduced fore wing pattern (the membrane along the distal half of veins R and M, and the basal half of vein M1+2 is clear), the higher and more globular head, the shorter paramere, the shorter distal segment of aedegus with a broader apical dilation, and the form of the female subgenital plate.

Pseudophacopteron pusillum sp. n.
(Figures 2E, F, 4G, 5D, 6H, 7H, 8H, 9I, 10H, 12F, 13H, 20, 21G)

Description

Adult. Colour: body ochreous. Vertex and pronotum laterally and on either side of the median line with dark brown markings or, especially in males, entirely dark brown with a pale ochreous midline. Genae ochreous. Frons dark brown. Clypeus ochreous to dark brown. Pronotum dark brown, tubercles behind eyes with light ochreous points, sometimes the entire posterior pronotal margin lighter. Mesopraescutum with two triangular dark brown macules in anterior two-thirds or almost entirely dark brown with ochreous posterior margin. Mesoscutum often with four dark bands or entirely ochreous. Metapostnotum ochreous. Lateral sclerites of thorax dark brown to black. Antenna off-white to ochreous, segments 4–7 narrowly dark brown apically, segment 8 entirely pale, segments 9–10 entirely black, terminal setae white. Legs off-white or dirty yellow, metacoxa with a dark brown spot at apical margin, profemur and mesofemur with dark brown streaks near apex and base, metafemur with a dark brown streak medially, metatibia dark brown basally. Fore
wing membrane clear, transparent, with pattern consisting of a dark brown band along distal half of posterior margin (from distal half of cell cu1 to the posterior tip of cell r2, leaving two small transparent crescents at wing margin in m1 and m2) and a smaller brown patch along the vein Cu1b, especially on its inner side (Figure 6H). Veins off-white to ochreous, except for dark brown or black spots medially on R+M+Cu1, at base of R immediately after branching off of M+Cu1, on the M+Cu1 fork and Cu1 fork, the touching point of Rs and M1+2, and two spots on anal vein, which is also brown basally. Hind wing clear, transparent, vein C+Sc dark brown. Abdominal tergites light brown, laterally and on tubercles on dorsum darker brown. Sternites off-white to dirty yellow, only the first visible sternite laterally largely dark brown to black. Male terminalia entirely dirty yellow. Female terminalia dirty yellow, with subgenital plate and proctiger basally dark brown.

Morphology: head, in dorsal view, slightly wider than mesonotum, subglobular. Vertex in males slightly shiny, in females with microsculpture, matt, about twice as wide as long along midline, rounded down in front (Figure 2E). Coronal suture reduced throughout. Median ridge on vertex raised, distinct. Vertex on either side of median ridge convex, slightly bulging. Lateral ocelli lying on small tubercles slightly above plane of vertex. Occiput in dorsal view narrowly triangular. Preoccipital sclerite narrow, eyes not stalked, in frontal view subglobular. Genae slightly swollen. Tubercle below torulus pointed, forming an acute angle (Figure 2F). Frons narrow, parallel-sided. Clypeus broadly pyriform. Antenna robust, weakly serrate; segments 4–9 short, widening apically (Figure 4G); a single subapical rhinarium on each of segments 4–9; rhinaria elliptic with a wreath of cuticular spines; terminal setae equal, approximately as long as or slightly longer than the segments 9 and 10 together (Figure 5D). Fore wing moderately elongate, weakly widening in apical half, anterior margin in outer half almost straight, apex truncate. Vein Rs relatively short. Surface spinules present in apical part of cell r2, in cells m1, m2, cu1, and cu2, arranged in small fields along apical and posterior wing margin (Figure 7H). Costal break in apical fourth of C+Sc. Hind legs moderately long and slender. Meracanthus short, acute, pointed. Metafemur constricted medially. Metatibia bearing an open crown of eight unsclerotized apical spurs and two rows of two to seven additional similar spurs laterally. Metabasitarsus bearing two black sclerotized spurs. Dorsal margin of abdomen, in profile, serrate; posterior margin of tergites 3 and especially 4 and 5 medially swollen into a prominent tubercular process. Male terminalia as in Figure 8H. Proctiger relatively short, cylindrical, robust. Subgenital plate, in profile, slightly longer than high, dorsal margin straight. Paramere, in profile, relatively short and stout, from the middle slightly narrowing to apex, apex narrowly rounded; in posterior view, inner and outer margins parallel-sided; inner surface covered in fine setae and ca four stouter setae subapically, apex forming a small sclerotized tooth (Figure 9I). Basal segment of aedeagus stout; apical segment with a hooked head, broad and truncate at apex, dorsal margin convex; sclerotized end tube of ductus ejaculatorius relatively long, sinuate (Figure 10H). Female terminalia as in Figure 12F. Proctiger relatively long, dorsal margin sinuate, apical process long; circumanal ring with two rows of pores, pores of outer row not contiguous. Subgenital plate, in profile, relatively long, dorsal margin weakly concave, ventral margin more or less straight, apex blunt; in ventral view, broad and almost parallel-sided, apex sinuate with a small indentation (Figure 13H). Dorsal and ventral valvulae with several (three to five) distinct lateral teeth at apex. Measurements and ratios in Tables I–III.

Fifth instar larva (Figure 20). Uniformly pale yellow, apical segment of antenna darker. Body relatively slender. Body margin with a few short simple setae and 1+1 slender blunt
lanceolate setae on caudal plate. A small simple seta present in anterior half of ocular region. Eyes with more than 50 ommatidia. Antenna straight, relatively long, with nine segments; a single rhinarium apically on each of segments 7 and 8. Tarsal arolium very small relative to claws, with a more or less rounded pad and indistinct petiole (Figure 21G). Abdomen dorsally weakly sclerotized, with six indistinct segments, caudal plate incompletely fused; abdomen narrowing to apex, margin of caudal plate concave subapically; apex narrow, irregularly rounded. Anus in terminal position. Circumanal ring large, sinuate, situated laterally, slightly extending on to ventral surface of abdomen. Measurements and ratios in Table IV.

Host plant

Teclea afzelii, probably also T. nobilis (Rutaceae).

Biology

The larvae induce distortions on the leaves. The eggs are laid on the upper leaf surface along the median vein.

Distribution

Cameroon, Uganda.

Material examined

Holotype: ♂, Cameroon: Centre Province, Yaoundé, Mt Eloundem, 3°51’N, 11°31’E, 759 m, 17 November 2002, Teclea afzelii, secondary forest (J. L. Tamesse). Dry-mounted (NHMB). Paratypes: Cameroon: 12♂, 10♀, 15 larvae, same data as holotype; 2♂, 2♀, West Province, Titié (Foto), Dschang, 10°04’N, 5°26’E, 27 March 2006, Dacryodes edulis (J. L. Tamesse and V. J. Dzokou); 1♂, South Province, Mvila, Ebolowa (Nkouevome), 29 January 2006, Albizia cf. altissima (J. L. Tamesse and Y. P. Mveyo). Uganda: 8♂, 35♀, District Masindi, Budongo Forest near Sonso, 1°45’N, 31°35’E, 19–30 June 1995, canopy fogging, swamp forest, Teclea nobilis (T. Wagner); 67♂♂, 81♀, same data but 11–20 July 1995; 2♂, 6♀, same data but 21–30 July 1995. Dry- and slide-mounted, and preserved in alcohol (BMNH, LZUY, MAKB, MHNG, MMB, NHMB, USNM).

Etymology

From the Latin adjective pusillus = tiny, referring to its small size.

Comments

Pseudophacopteron pusillum sp. n. is similar to P. verrucifrons Burckhardt and van Harten, 2006, from Yemen and Kenya, in the small size, the dark band along distal half of posterior fore wing margin, the relatively short and stout paramere, the broad and more or less hooked apical dilation of the distal segment of aedeagus, and the relatively long female subgenital plate. P. pusillum differs from P. verrucifrons in the following characters: fore wing membrane in anterior half clear; the absence of anterior tubercles on vertex; the longer
terminal setae on antenna; the short and robust male proctiger; the paramere, in profile, with apex narrowly rounded; the circumanal ring with two rows of pores; the form of female subgenital plate; the dorsal and ventral valvulae with several distinct lateral teeth at apex; the host plant association.

*P. verrucifrons* is characterized as follows: fore wing membrane with dark patches around the apex of vein Rs, at the touching point of veins Rs and M$_{1+2}$ and at the M+Cu fork; vertex anteriorly bearing two tubercles; terminal setae on antenna shorter (T1 = 0.04–0.05; T2 = 0.03–0.04; T1/TS = 0.80–0.83); male proctiger slightly longer and slender (MP = 0.13); paramere, in profile, with truncate apex; circumanal ring with only one row of pores; female subgenital plate, in ventral view, narrowly triangular, more or less regularly narrowing to truncate apex; dorsal valvulae lacking lateral teeth; host plant is *Commiphora africana* (Burseraceae). See also the comments under *P. eastopi* sp. n. and *P. lecaniodisci* sp. n.

**Discussion and conclusions**

The monophyletic genus *Pseudophacopteron* was redefined by Brown and Hodkinson (1988) on the basis of the fore wing venation, the ridging of the vertex, the angled margin of the metacoxa, the thorn-like meracanthus and the long, slender, characteristically structured saltatorial spurs. The new species described here from Cameroon agree with this definition. The genus contains many additional undescribed taxa in Africa, tropical America, and the Indo–Australian Region (collections of BMNH, MHNG, NHMB, and others). Its internal phylogenetic relationships have not been analysed to date. From the Afro-tropical species, *P. caffrariense* Capener and *P. cuniculus* share a number of characters, some of them probably constituting synapomorphies (e.g., multiple rhinaria on antenna, angular dorsal margin of male subgenital plate) and together with another undescribed species from Kenya (BMNH data) might form a monophyletic group. *P. fuscivenosum* is probably closely related to *P. zimmermanni* Aulmann, based on the robust paramere shape, the basally angular apical dilation of the distal segment of the aedeagus and the form of the female subgenital plate. Both species probably belong to a larger group characterized by the clear outer half of fore wing which includes also *P. electum*, *P. morion*, and *P. pretoriense* Capener, and which may also be related to the Asian *P. tuberculatum* (Crawford). *P. eastopi*, *P. lecaniodisci*, *P. pusillum*, and *P. verrucifrons* Burckhardt and van Harten possibly are closely related based on the presence of a dark band along the posterior fore wing margin which resembles the condition in the Panamanian *Pseudophacopteron* sp. A of Brown and Hodkinson (1988). Finally, *P. kala* and *P. nothospondiadis* appear to be sister species based on the similar fore wing shape and pattern as well as male and female terminalia.

Except for a few (two named, three unnamed) *Pseudophacopteron* species from the Oriental, Australian, and Neotropical Realms which develop on Gentianales: Apocynaceae (Hodkinson 1986; Brown and Hodkinson 1988; Hollis 2004), phacopteronids are associated with members of the Sapindales in the sense of Gadek et al. (1996) and the Angiosperm Phylogeny Group (2003), i.e. including the more narrowly defined order Rutales of some authors. Phacopteronid species have been recorded from a single plant species or genus from the families Anacardiaceae, Burseraceae, Meliaceae, and Sapindaceae (Aulmann 1912; Capener 1973; Hodkinson 1986; Burckhardt and Brown 1992; Navasero 1998; Burckhardt and van Harten 2006). The association of the Phacopteronidae with the Sapindales is also supported by the material from Cameroon and other African countries (BMNH, MHNG, NHMB data). From the eight Cameroon
Pseudophacopteron species for which the host plant data are available, three are monophagous on Sapindaceae (*Pseudophacopteron cuniculus*, *P. fuscivenosum*, *P. lecaniodisci*), one each on Burseraceae (*P. morion*), Meliaceae (*P. electum*), Rutaceae (*P. pusillum*), and Anacardiaceae/Simaroubaceae (*P. nothospondiadis*), and one is perhaps narrowly oligophagous on Anacardiaceae and Burseraceae (*P. eastopi*). The Sapindales are usually trees or shrubs rich in secondary compounds (alkaloids, biflavonoids, triterpenes, phenolic compounds, saponins, resins, ethereal oils etc.) and specialized herbivores are found on many of them (Stevens 2006). Feeding on Rutales/Sapindales is an ancestral feature retained by disjunct groups of Psylloidea (White and Hodkinson 1985). Besides the Phacopteronidae, this plant order is likely to be the primary host association of the Rhinocolinae (Psyllidae) and Calophyidae (Burckhardt and Lauterer 1989; Burckhardt and Basset 2000).

Within the Psylloidea, Phacopteronidae is one of the groups with a high proportion of gall-inducing species (Burckhardt 2005). The different morphological types of galls formed by Psylloidea were reviewed by Hodkinson (1984). As described for *Tainarys* spp. (Psyllidae: Rhinocolinae) and *Calophya* spp. (Calophyidae) associated with the temperate Neotropical plant genus *Schinus* (Anacardiaceae) (Burckhardt and Basset 2000), the effects of *Pseudophacopteron* feeding can range from a simple distortion of the leaves to the formation of structurally complex galls. Three of the species described from Cameroon (*P. cuniculus*, *P. nothospondiadis*, and *P. pusillum*) are free-living on young leaves. The larvae induce at most distortions of the leaf lamina, part of which may eventually become necrotic. The other four species with known biology induce localized galls on the leaf lamina. The larvae of *P. morion* live in deep but open pit galls which leave their dorsum exposed. Open pit galls are also known in the related *P. pretoriense* Capener from South Africa (Capener 1973) as well as the Oriental *Neophacopteron euphoriae* Yang and *Pseudophacopteron album* (Yang and Tsay) (Yang 1984). In *P. electum*, *P. fuscivenosum*, and *P. lecaniodisci* the larva starts feeding in a pit on the lower leaf surface. The plant tissue then gradually grows across the mouth of the pit to form a closed chamber, except for a small aperture at the apex, which contains the feeding larva. This kind of conspicuous, nearly closed, gall is also induced by the Afrotropical *P. zimmermanni* Aulmann on *Khaya senegalensis* and the Oriental *P. tuberculatum* (Crawford) and its possible synonym *P. alstonium* Yang and Li on *Alstonia scholaris* (Aulmann 1912; Mani 1935; Yang and Li 1983). The most advanced type of gall in Phacopteronidae is produced by *Phacopteron lentiginosum* Buckton in South-East Asia which generates a completely closed nut-like saccular structure on the leaves of *Garuga pinnata* Roxburgh (Burseraceae), dehiscent when the adults hatch (Raman 1987).

Several phacopteronid species are known pests of economically important fruit or timber trees, especially in South-East Asia. *Cornegenapsylla sinica* Yang and Li injures shoots and leaves of longan (*Dimocarpus longan*) and seems to be a vector of a filamentous virus, agent of the witches’ broom disease in China (Chen et al. 2001; Xu et al. 2001). *Pseudophacopteron canarium* Yang and Li is a serious pest of Chinese olive (*Canarium album*) in South China, necessitating control (Lu and Liu 2001). Heavy infestations of *Pseudophacopteron callilungae* Navasero damage the inflorescences of pili nut (*Canarium ovatum*) in the Philippines (Navasero 1998). *Pseudophacopteron tuberculatum* (Crawford) and *P. alstonium* Yang and Li cause economic loss in plantations of white cheese-wood (*Alstonia scholaris*) in the Philippines, Indonesia, and China (Braza and Calilung 1981; Yang and Li 1983). From the Afrotropical Region so far only *Pseudophacopteron zimmermanni* has been reported as a pest of African mahogany (*Khaya senegalensis*) by Aulmann (1912) and an undescribed *Pseudophacopteron* species damages *Aucoumea*
*klaineana* in nurseries and young plantations in West Africa (Brunck 1965; BMNH data). The host plants of the species described here, i.e. *Blighia unijugata*, *Deinbollia* spp., *Ekebergia benguelensis*, *E. capensis*, *Lecaniodiscus cupanioides*, *Nothospondias staudtii*, *Santiria trimera*, and *Sorindeia* spp. are widely used in traditional medicine throughout tropical Africa and there is interest in researching their qualities for biochemical extracts and modern medicine (Gelfand et al. 1985; Chavez et al. 2001; Taylor et al. 2001; Tennyson et al. 2002; Martins et al. 2003; Muregi et al. 2004; Owoloye et al. 2004; Fasola and Egunyomi 2005). The leaves of *Blighia unijugata*, the host of *P. cuniculus*, are also sometimes cooked as a vegetable. *Dacryodes edulis* or safou (also known as African plum, African pear, or bush butter), the supposed host plant of *P. eastopi*, is a multipurpose tree presently undergoing domestication in central Africa and the countries bordering the Gulf of Guinea. Its fruits are an important item in local diets and are widely marketed (Okorie et al. 2000; Schreckenberg et al. 2002).

The plant diversity of Western Africa in general, and Cameroon in particular, is very high (White 1983; Linder 2001). It is therefore not surprising to also find a rich psyllid fauna. However, to analyse the correlation of species numbers of plants and associated phytophages, e.g. for estimating the total number of existing species in a particular region, additional information on host plant ranges is necessary which will require a lot more field work.

**Acknowledgements**

We are obliged to Jürgen Deckert (ZMB), David Hollis, Jon Martin (BMNH), Ian M. Millar (NCIP), and Thomas Wagner (Universität Koblenz-Landau) for loans or gifts of material. The SEM photographs were prepared in the Zentrum für Mikroskopie, Universität Basel and we thank Daniel Mathys for his valuable help. We are also grateful to Denise Wyniger (Naturmuseum Luzern), Roland Mühlethaler (Naturhistorisches Museum Basel), Jiří Kolibáč (Moravian Museum Brno), and Jaromír Vaňhara (Masaryk University Brno) for various help. The comments by David Hollis and Andrew Polaszek improved the manuscript. This work was partially funded by a fellowship from the Eidgenössische Stipendienkommission für ausländische Studierende, Bern (to Igor Malenovský) and a grant from the Swiss National Science Foundation (Project No. 3170A0-109221/1 to Daniel Burckhardt and J. L. Tamesse).

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