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**Two new *Pantecphylus* males from Kassai province (Democratic Republic Congo), and the problem to select conspecific females (Insecta, Orthopteroidea, Ensifera, Tettigonoidea, Pseudophyllidae)**

**Abstract** - From the genus *Pantecphylus* Karsch (Orthopteroidea, Ensifera, Tettigonoidea, Pseudophyllidae), two males collected in the province Kassai last century, were found among the material preserved in the African Museum Tervuren (Belgium). Their genitalia showed different structures, not found in males of the genus studied before. Two new species were created, named *P. lueboensis* sp. n. and *P. konduensis* sp. n.. Conspecific females were not available. Including the new species, 16 species of the genus *Pantecphylus* were tabled.

**Zusammenfassung** - Zwei neue *Pantecphylus*-Männchen aus der Provinz Kassai (Demokratische Republik Kongo) und das Problem der Auswahl artgleicher Weibchen.

Von der Gattung *Pantecphylus* Karsch (Orthopteroidea, Ensifera, Tettigonoidea, Pseudophyllidae) wurden in der Sammlung des Afrikanischen Museums Tervuren (Belgien) zwei Männchen gefunden, die im letzten Jahrhundert gesammelt wurden und sich in der Genitalstruktur von den bisher beschriebenen unterscheiden. Sie werden als Holotypen der neuen Arten betrachtet und als *P. lueboensis* sp.n. und *P. konduensis* sp. n. bezeichnet. Gleichartige Weibchen standen nicht zur Verfügung. Die bisher bekannten 16 Arten der Gattung *Pantecphylus* werden tabellarisch aufgeführt.

**Riassunto** - Due nuovi maschi di *Pantecphylus* della provincia del Kassai (Rep. Democratica del Congo) e problemi per individuare le forme conspecifiche.

Due adulti appartenenti al genere *Pantecphylus* Karsch (Orthopteroidea, Ensifera, Tettigonoidea, Pseudophyllidae), raccolti nella provincia del Kassai (Repubblica Democratica del Congo) e conservati al Museo dell'Africa di Tervuren (Belgio), hanno evidenziato nei genitali caratteristiche morfologiche diverse da quelle delle altre specie del genere sino ad ora note. Vengono quindi descritte le due nuove specie *P. lueboensis* e *P. konduensis*.

Non è stato possibile esaminare le rispettive femmine. I dati relativi alle 16 specie del genere *Pantecphylus* sino ad ora note vengono riassunti in apposita tabella.

**Key words:** *Pantecphylus* Karsch, *Pantecphylus lueboensis*, *P. konduensis* new species (males), selection of conspecific females, Central Africa, Democratic Republic Congo, Ensifera, Pseudophyllidae.

## INTRODUCTION

Among the *Pantecphylus* Karsch specimens, preserved in Musée Royal de l' Afrique Centrale Tervuren, Belgium (African Mus. Tervuren), two males were found collected in Kassai province of Central Africa. The individuals showed morphological structures different from those found in Kivu province (Schmidt et al. 2004) and the northern part of the Democratic Republic Congo (Schmidt 2006b), as well as of Cameroon (Schmidt 2003). They were misdesignated as *P. cerambycinus* Karsch, 1891. Both males could not be attached to a species already known. Regarding as new species, the males were described here. The characteristic body parts were photographed and the measurements compared.

The new species were named after the locality where they were found. The research methods were the same as in Schmidt (2006b).

*Pantecphylus lueboensis* sp. n.

MATERIAL EXAMINED: 1 ♂, holotype, Kassai: Luebo [5°21' S, 21°25' E], 01.IV.1958, leg. F. François, Coll. Mus. du Congo Belge (African Mus. Tervuren, no. 33).

MALE: body length (mm) 21, pronotum 7.5, tegmen 16, hind femur 12.

Head: fastigium verticis more than twice as large as antennal base, furrowed, not surpassing bases of antennae; distance between scapes about as wide as one scape large; mouthparts grey.

Pronotum little upraised in metazona (Fig. 1 A), hind margin bearing 8 brown spines equally shaped, slightly smaller than almost black paranotal spine, prozonal elevation large, dark-brown, sulcated in midline, on disk of mesozona two warty humps, symmetrically arranged with two small elevations on metazona, behind last transverse sulcus.

Tegmen grey-brown, right overlapping left, reduced file on left tegmen; alae slightly shorter than tegmina, infumated, fan-shaped, bearing strengthened anal veins.

Spination of legs: fore femur with 5 ventro-anterior spines; fore tibia above, 3 minute spines exteriorly and, two small spines interiorly, short-haired; auditorial foramen split-shaped; mid femur and tibia deflected or absent; hind femur below, 8 spines, located mainly in distal half; hind tibia above, 9 spines interiorly, 10 spines exteriorly, below 3 small spines, short-haired.

Abdomen: last 5 tergites reduced in size, telescopic, hind border of tergites dark-brown ringed and ridged, last tergite triangularly excised, lobes yellow and broadly rounded (Fig. 1 H).

SAP sandy-grey, as long as wide, folded back, rounded behind, reaching hind margin of SGP (viewed from above).

Cercus length 1.60 mm, yellow, hairy, slightly truncated and rhombic, at tip brown tooth incurved, longer than SAP, in situ reaching hind margin of SGP.

SGP length 2.76 mm, dark sclerotized, at base weak-convexly rounded (0.27 mm),

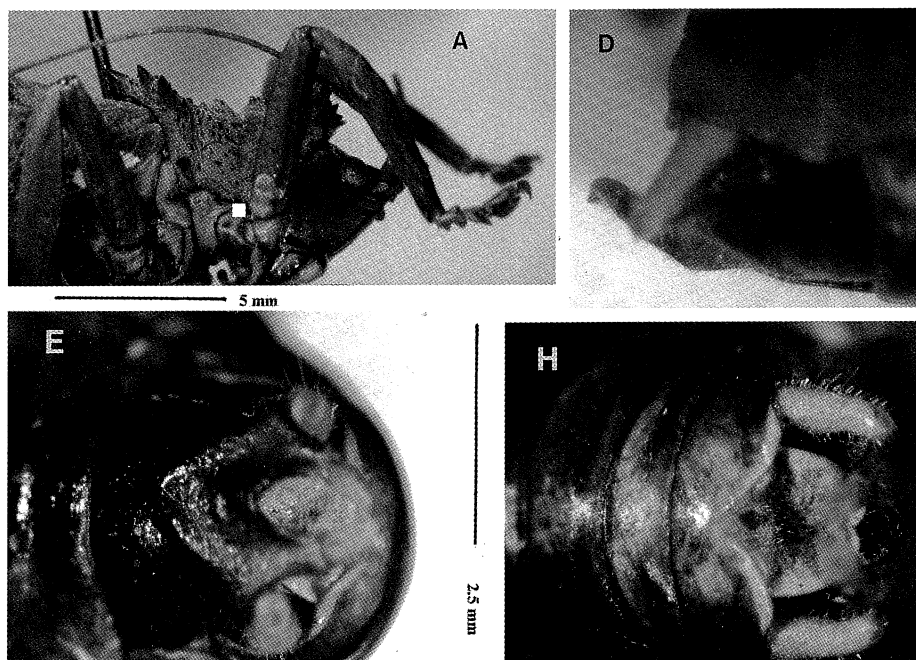


Fig. 1 - *Pantecphylus lueboensis* sp. n., male, type (African Mus. Tervuren, no.33); A: head, pronotum, fore and middle legs, right side view, D: tip of abdomen: cerci and SGP with styli, right side view, E: SGP with up- and incurved styli, and tips of yellow cerci, viewed from below, H: tip of abdomen: last tergite excised, SAP, cerci, and tips of styli up- and incurved; same magnification for D, E, and H.

proximal part almost straight (Figs. 1 D, 3), a bit haired, slightly keeled in midth, rounded below; distal part pressed in, a bit keeled in midth, side lobe black and steeply sloped to behind, upraised and constricted behind, broader and shorter than proximal part; both parts round-angularly connected (Fig. 1 E), hind margin angularly excised, slightly deeper than length of stylus (0.74 mm).

Styli up- and incurved, at base broad, strongly constricted at distal half to acute tip, sickle-shaped, shorter than depth of SGP excision, light brown, long-haired.

FEMALE: unknown.

LOCAL DISTRIBUTION: Kassai - Occidental region.

### *Pantecphylus konduensis* sp. n

MATERIAL EXAMINED: 1 ♂, holotype, Kassai: Kondue [4°57' S, 23°21' E], leg. Leohard, Mus. du Congo Belge (African Mus. Tervuren, no. 30), no date.

MALE: body length (mm) 20, pronotum 7, tegmen 16, hind femur 11.

Head: fastigium verticis conical, bit surpassing bases of antennae, twice as large as antennal base; distance between scapes, directed parallel, as wide as scape large; mouthparts brown-black.

Pronotum: pro- + mesozona shorter than metazona, slightly upraised, hind margin bearing 8 grey spines of equal size, paranotal spine dark brown to black, more slender and little longer than outest spine on hind margin.

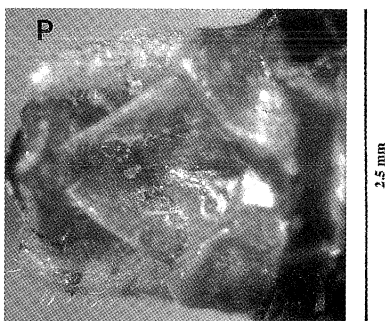
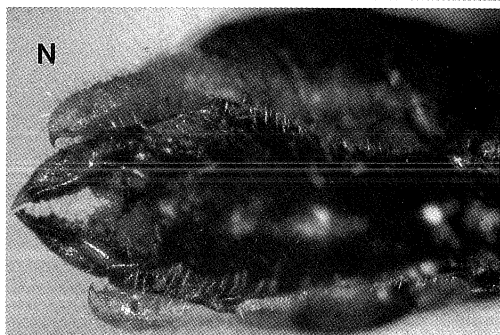
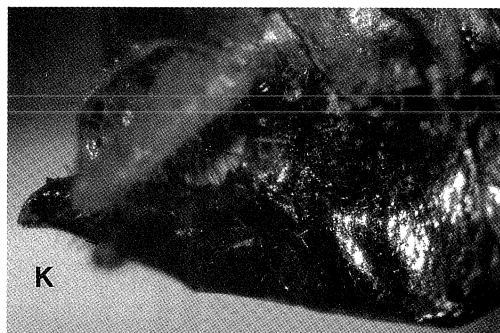


Fig. 2 - *Pantecphylus konduensis* sp. n., male, type (African Mus. Tervuren, no. 30); K: SGP and cercus, right side view, N: SGP, cerci and styli from below, P: tip of abdomen: SAP and cerci, from above.

Tegmen grey-brown, left overlapping right; alae infumated, almost as long as tegmina, fan-shaped, bearing strengthened anal veins with pegs for stridulation.

Spination of legs: fore femur with 3-4 ventro-anterior spines, on outer margin; fore tibia above, 3 minute spines exteriorly, and one interiorly, short-haired; auditorial foramen split-shaped; mid femur below, 2 spines + 2 small ones exteriorly; mid tibia above, 4 small spines exteriorly and interiorly; hind femur below, 8 spines, distally accumulated; hind tibia above, two rows of 7 spines, below short-haired.

Abdomen dark-brown, last tergite deeply excised, large yellow lobes rounded.

SAP trapezoidally shaped, as long as large, poorly haired, yellow, folded back, in situ shorter than cerci (Fig. 2 P).

Cercus length 1.64 mm, yellow-brown, hairy, in situ longer than SAP and SGP, reaching almost tip of styli, apically rounded, most distally black tooth incurved, more cylindrical than conical.

SGP length 2.73 mm (in midth) and 2.96 mm (on side), black sclerotized, side lobes steeply sloped to behind, proximal part short-keeled, length 1/5 of distal part (Figs. 2 K,N,

3), at base angularly excised (0.23 mm deep), below straight and rounded; distal part prolonged, long-keeled, from base narrowed to behind, slightly depressed and upraised, roundly connected with proximal part, hind margin roundly excised, not as deep as length of stylus (0.85 mm).

Styli grey-black, at base large, constricted to acute tip, on inner side tooth-like elevations, long-haired, except on most distal fifth (Fig. 2 N).

FEMALE: unknown.

LOCAL DISTRIBUTION: Kassai - Oriental, Sankuru river

## DISCUSSION

The main differences of the two new species were summarised in Table 1. The fastigium verticis is short in both species, surpassing a bit the bases of antennae in *P. konduensis*. In the latter, the SGP is much longer than in *P. lueboensis*, resulting in a longer distal part. The SAP of the *konduensis*- male is trapezoidly shaped, similar as in a female collected in Kivu province (Ter 20) about 1000 km apart (Schmidt *et al.*, 2004). Showing tooth-elevations of styli, *P. lueboensis* resembles *P. sudanensis* (Schmidt, 2006b). The subgenital plates are so differently structured (Fig. 3), that the males clearly belong to different species. Conspecific females could not be found.

Table 1 - Male features, most characteristic for the identification of the new species; fastigium verticis:  $\wedge$  coical, slightly longer than bases of antennae,  $\square$  rhombic, short, not surpassing bases of antennae; SGP base:  $\cup$  broad-concavely excised,  $\sim$  slightly excised, — straight.

Species	<i>P. lueboensis</i> sp. n.	<i>P. konduensis</i> sp. n.			
Body3 length (mm)	21	22	proximal / distal part	$\langle$	$\langle\langle$
Tegmen (mm)	16	17	excision of hind margin	angular, bit deeper than 0.74 mm	angular, bit deeper than 0.93 mm
Fastigium verticis		$\square$	SAP-shape	rounded behind	trapezoid
Quotient a/s	=	=	-haired	poor	poor
Pleural spine	brown-black	black	Cerci-length (mm)	1.60	1.57
SGP-base	—	—	-shape	rhombic	conical
-length-mm	2.76	3.33	Styli	tooth-like elevations	long-haired only

## SGP of male

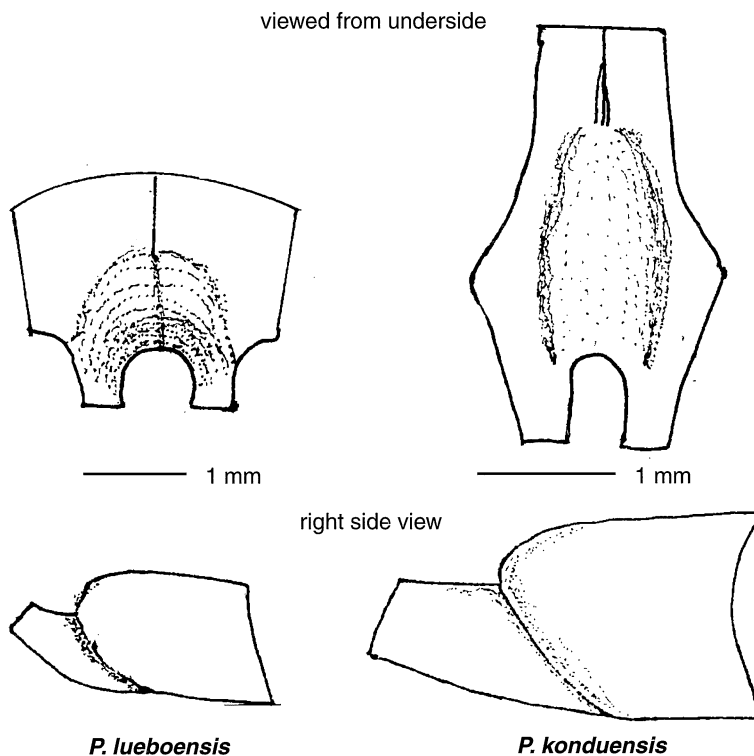


Fig. 3 - The structural difference of the male subgenital plate of the two species described.

## THE PROBLEM TO SELECT CONSPECIFIC FEMALES

In the genus *Pantecphylus*, there is a key useful for differentiation of males only (Schmidt *et al.*, 2004; Schmidt, 2006a,b). Comparative female characters are rare and often not significant. Conspecific females can be received most certainly, if both sexes are collected at the same locality and time, indicated by **bold** figures in Table 2. In 16 species described, - *P. major* Griffini, 1909 not included, - mostly an isolated male was found and a conspecific female is lacking. In six cases only, the male holotype was collected together with the female allotype. Additionally, pairs of *P. cerambycinus*, *P. kamerunus*, and *P. congoensis* were found at the same places.

A problem exists, when two species of the genus are found close to each other, as it happened in Cameroon (Schmidt, 2003). In this case, the female was **red** labeled as type of *P. cerambycinus*. The male used for the description of *P. cerambycinus* Karsch, 1891 was moved from Stettin to the Museum and Institute of Zoology PAS; Warsaw, after World War II, reported by Liana (1999). Both sexes were collected in Cameroon,

Table 2 - Size of male and female (body length) of all *Pantecphylus* species described (holo- and allotype). If both sexes were collected at the same site, together in almost the same time, the figures were printed in bold.

Species	Collection site	Male (mm)	Female (mm)	Author
<i>P. bambesai</i>	Bambesa [3°28' N, 25°43' E]	18	30	Schmidt (2006)
<i>P. bangwensis</i>	Equateur: Bangu [0°03' N, 19°12' E]	23-24	?	Schmidt (2006)
<i>P. banzyvillei</i>	Yasanyama [4°18' N, 21°11' E]	19- <b>21</b> -23	<b>25</b>	Schmidt (2006)
<i>P. cerambycinus</i>	Cameroon, Barombi-Stat. [04°39' N, 9°24' E].	17-22	24- <b>32</b>	Karsch (1891), Schmidt & Stelzer (2004)
<i>P. congoensis</i>	Yangambi [0°47' N, 24°28' E], Stanleyville [0°30' N, 25°12' E]	<b>22</b> -24	24- <b>29</b>	Schmidt (2006)
<i>P. aequatori</i>	Equateur: Flandria [0° 20' S, 19° 06' E]	22	?	Schmidt (2006)
<i>P. kamerunus</i>	Cameroon: Mukonje-Farm [04°37' N, 9°30' E]	23- <b>26</b>	23- <b>31</b>	Schmidt (2003)
<i>P. kivuensis</i>	Kivu, Cerr Nowengo, Kitutu Foom. [3°17' S, 28°05' E]	19	?	Schmidt, Stelzer & Marshall (2004)
<i>P. kondoensis</i> sp. n.	Kassai: Kondue [4°57' S, 23°21' E]	20	?	present paper
<i>P. irangii</i>	Kivu: Irangi [01°54' S, 28°27' E]	24	?	Schmidt, Stelzer & Marshall (2004)
<i>P. helleri</i>	Kivu: Irangi, about 100 km W Bukavu	23	?	Schmidt, Stelzer & Marshall (2004)
<i>P. kwangoensis</i>	Kwango: Gingungi [5°24' S, 17°56' E],	<b>22</b>	24- <b>32</b> -34	Schmidt (2006)
<i>P. lueboensis</i> sp. n.	Kassai: Luebo [5°21' S, 21°25' E]	21	?	present paper
<i>P. meshei</i>	Kivu: Meshe, 1000 m [01°30' S, 28°26' E]	22	?	Schmidt, Stelzer & Marshall (2004)
<i>P. manyemai</i>	Kivu, Congostaat: Manyema, 01°11' S, 28°37' E.	<b>20</b>	<b>27</b>	Schmidt, Stelzer & Marshall (2004)
<i>P. sudanensis</i>	Sudan: Iado, equiment [5° 10' N, 31° 32' E]	19	?	Schmidt (2006)

but at different places and by various persons (no paralectotypes), only the female was designated as type. In spite of this fact, M. Beier (1954, 1962) incorrectly used the term 'syntypes', because at that time only one *Pantecphylus* species was known from Cameroon. Therefore, the author requested Dr A. Liana to compare the SGP of the male with that reported by Schmidt (2003) and Schmidt & Stelzer (2004). Receiving the result on 15.07.2005, the male used by Karsch (1891) for description of *P. cerambycinus* was different in size and structure. The body length was larger (28 mm) and the SGP was deep-concavely (0.8 mm) rounded at base, similar as in *P. congoensis*, *P. irangii* and *P. kivuensis*, but showing a prolonged fastigium verticis as in female type (Schmidt, *et al.* 2004; Schmidt, 2006b). The conspecific male preserved in the Museum für Naturkunde, 2. Zoologische Abteilung, Wien (Mus. Vienna) (Coll. Brunner v. W., 'Kamerun') can serve as 'allolectotype' of *P. cereambycinus* (Schmidt, 2003). The author suggests that the small differences among the collected females did not encourage the recent orthopterologists to do taxonomic studies in the specimens of the genus *Pantecphylus*.

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