

A REVISION OF THE AFRICAN SPECIES OF  
*PSEUDORHYNCHUS* SERVILE  
(ORTHOPTERA : TETTIGONIIDAE)



BY  
DAVID ROBERT RAGGE  
British Museum (Natural History)

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By D. R. RAGGE

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## SYNOPSIS

The African species of *Pseudorhynchus* Serville are fully revised and an identification key is given. Two new species and two new subspecies are described and one specific synonym is newly established.

## INTRODUCTION

IN 1967 Professor D. F. Owen of Fourah Bay College (University of Sierra Leone) sent me a collection of Orthoptera from Freetown for identification. Two of the specimens belonged to an undescribed species of *Pseudorhynchus* Serville and, as Professor Owen was studying colour polymorphism in this species, he asked me to publish a name for it. Not wishing to describe a single species in isolation I undertook the present study, which embraces all the African species of the genus.

The genus *Pseudorhynchus* was erected by Serville in 1838 for the three species *Ps. sicarius* Serville (synonymized in the present paper with *Ps. lanceolatus* (Fabricius)), *Ps. flavescens* (Serville) and *Ps. lessonii* Serville. No type-species was fixed at that time, but the first of these three species was later designated as such by Kirby (1906 : 237), who included 15 species (five African) in the genus. The latest list of the species of *Pseudorhynchus* is that of Karny (1912 : 25), who included 14 species (five African) without qualification and a further five doubtful ones (one African). The genus has not been fully revised since the work of Redtenbacher (1891 : 364), though a key to the species was given by Karny (1907a : 17). The present revision includes all the African species referred without qualification to *Pseudorhynchus* by Karny (1912); five species (of which two are newly described) and four subspecies (two newly described and one reduced in status from a species) are recognized and one specific synonym newly established.

All the holotypes and lectotypes of the specific names covered by this revision still exist and have been examined. The author's usual conventions are observed (see Ragge, 1957 : 124) and the wing-vein nomenclature is that of Ragge (1955).



The technique used in the examination of the stridulatory organ is described on p. 172. The length of the fastigium of the vertex was measured from the basal tooth to the tip.

#### ACKNOWLEDGMENTS

My sincere thanks are due to the following specialists, who have been kind enough to send me type-specimens or other material from their respective institutions:

Dr. P. Basilewsky, Dr. M. Beier, Dr. L. Chopard, Dr. M. Descamps, Dr. J. de A. Fernandes, Dr. Y. Gillon, Dr. K. K. Günther, Mr. A. U. Oboite, Dr. E. C. G. Pinhey, Dr. H. R. Roberts, Dr. C. H. Fraser Rowell, Dr. R. Roy, Dr. J. G. Rozen and the late Mr. V. van Straelen.

I am also most grateful to the following workers, who have very kindly sent me specimens collected by them personally:

Dr. and Mrs. R. W. Crosskey, Mr. R. A. Farrow, Miss J. M. McKay, Professor D. F. Owen and Mr. J. Phipps.

My thanks are due to Mr. W. J. Bailey, who kindly drew my attention to the replica technique for examining surface structure; this technique greatly facilitated the study of the stridulatory rib of the left male fore wing (see p. 172).

I should also like to thank Miss L. M. MacDonell for her assistance in measuring specimens and counting the hind tibial spines.

#### MATERIAL

In addition to the collection of *Pseudorhynchus* in the British Museum (Natural History) (often abbreviated in this paper to BMNH), material was lent by the institutions listed below, through the courtesy of the specialists mentioned above (the abbreviations used where the material is listed in detail are inserted in parenthesis).

Musée Royal de l'Afrique Centrale, Tervuren (MRAC); Naturhistorisches Museum, Vienna (NM); Institut de Recherche Scientifique de Madagascar, Tananarive (IRSM); Muséum National d'Histoire Naturelle, Paris (MNHN); Museu e Laboratório Zoológico e Antropológico, Lisbon (MLZA); Office de la Recherche Scientifique et Technique Outre-Mer, Centre d'Adiopodoumé, Abidjan, Ivory Coast (ORSTOM); Zoologisches Museum of the Humboldt-Universität, Berlin (ZMHU); University of Ibadan, Nigeria (Univ. Ibadan); National Museum, Bulawayo, Rhodesia (NMR); American Museum of Natural History, New York (AMNH); Makerere University College, Kampala, Uganda (MUC); Institut Fondamental d'Afrique Noire, Dakar, Senegal (IFAN); Institut des Parcs Nationaux, Brussels (IPN).

#### *PSEUDORHYNCHUS* Serville

*Pseudorhynchus* Serville, [1838] : 509. Type-species: *Pseudorhynchus sicarius* Serville (= *Ps. lanceolatus* (Fabricius)), by subsequent designation (Kirby, 1906 : 237).

Diagnosis. ♂ ♀. Fastigium of vertex separated from fastigium of frons, bearing ventral tooth or tubercle at base. Pronotum without lateral carinae. Prosternum with two well-developed spines. Meso- and metasternum with paired lobes, not produced into spines. Fore coxae with well-developed spine. Fore tibiae terete above, with slit-like tympanal opening on each side. Hind femora with ventral spines.



Discussion. The known African members of this Copiphorine genus are all easily recognized by their long, pointed "snout", formed by the fastigium of the vertex. There are shorter snouts in the two African genera *Lanista* Bolívar and *Plastocorypha* Karsch, but in both these genera the fastigium of the vertex is contiguous with the fastigium of the frons.

The African species of *Pseudorhynchus* fall into two quite distinct groups: *Ps. lanceolatus* (Fabricius) and *Ps. pungens* (Schaum), in which the fastigium of the vertex is sharply pointed and the male cerci have an internal spine at the base; and *Ps. hastifer* (Schaum), *Ps. robustus* sp. n. and *Ps. crosskeyi* sp. n., in which the fastigium of the vertex is bluntly pointed and the male cerci have no basal spine. Each of these two types of male cercus is common in the Copiphorinae, but it is unusual for both to occur in the same genus. The two types of male cercus also occur in the Oriental species of *Pseudorhynchus*, but the correlation between this feature and the sharpness of the fastigium of the vertex does not hold for these species: the fastigium is short and blunt in some Oriental species in which the male cerci have a basal spine. A thorough study of all the species of *Pseudorhynchus* might well show that some of them would be better regarded as a distinct genus, but it is unlikely that such a decision would affect any of the species covered by the present revision.

One of the most interesting features of this genus in Africa is the colour variation, both within and between species. Like many Copiphorinae, all the species occur in two principal colour forms, one mainly green and the other mainly brown. (The three known specimens of *Ps. crosskeyi* sp. n. are all green, but it may be safely assumed that a brown form exists.) In addition to this general body colour there is often a pattern of dark pigmentation on the head, particularly on the frons and the underside of the fastigium of the vertex; leaving aside *Ps. crosskeyi* sp. n., of which insufficient material is available, the development of dark pigmentation takes a different form in each species, as outlined below.

*Ps. lanceolatus* (Fabricius). The dark pigmentation always forms the same pattern and is independent of the green/brown polymorphism. There is little geographical variation.

*Ps. pungens* (Schaum). The dark pigmentation is independent of the green/brown polymorphism, but shows marked geographical variation, forming quite different patterns in different parts of Africa.

*Ps. robustus* sp. n. The dark pigmentation always forms the same pattern but is shown only by the brown colour variety. There is little geographical variation.

*Ps. hastifer* (Schaum). None of the specimens examined of either the green or the brown colour forms had any dark pigmentation on the underside of the head.

Since the genitalia of *Ps. hastifer* (Schaum), *Ps. robustus* sp. n. and *Ps. crosskeyi* sp. n. do not show clear-cut differences, it was thought worth making a closer examination of the stridulatory organ and, in particular, the shape of the stridulatory rib of the left male fore wing and the number of teeth on it. To avoid the difficulties



of examination with reflected light or the labour of making cleared preparations of the wing (both of which have severely limited the use of the microscopical structure of the stridulatory organ in Ensiferan taxonomy), a replica technique was used; this enabled the structure of the stridulatory rib to be examined without inconvenience and without removal of the fore wing from the specimen. The technique adopted is described below.

The left fore wing of each male specimen was relaxed locally by applying a small quantity of 10% ammonia solution to the wing-articulation with a hypodermic syringe or fine brush; any legs that would have obstructed the extension of the fore wing were relaxed at the base in the same way. As soon as it was relaxed (after no more than a few minutes) the fore wing was extended and, if necessary, the underside was allowed to dry. A small quantity of a strong solution of "Pyroxylin" (low viscosity nitrocellulose) in acetone was then applied to the underside of the cubito-anal area with a fine brush. After about two minutes the Pyroxylin replica, now dry, was peeled off the wing surface and placed between two microscope slides. If the replica was satisfactory the fore wing was returned to its flexed position on the insect, which thus resumed its previous appearance. This technique, which is essentially similar to the replica techniques described by several other authors (e.g. Sampson, 1961), has the advantages of being quick, leaving the specimen quite unharmed and being repeatable on the same specimen at any time. The resulting replicas are transparent and show the finest details of the surface structure of the wing; they can be easily examined using transmitted light and a number can be placed between each pair of slides for permanent storage. The self-adhesive binding strips used in making 7 × 7 cm. permanent mounts of photographic transparencies were found to provide a convenient way of binding the slides together.

Replicas of the stridulatory rib were taken in this way from all the male specimens available of all five species. They were used in preparing the diagrams of the stridulatory rib, in determining its length and in counting the number of stridulatory teeth; a number of tests failed to show any significant difference between the measurements taken from the replica and those taken from the actual wing. The small and sometimes rather irregular teeth that occur towards the end of the stridulatory rib in some of the specimens were included both in measuring the length of the rib and in counting the teeth. The results are given separately for each species and will be seen to show some well marked interspecific differences in spite of considerable intraspecific variation. The curvature of the stridulatory rib of *Ps. pungens* (Schaum) (Text-fig. 16) is characteristic, and the large number of stridulatory teeth in *Ps. crosskeyi* sp. n. marks it off well from *Ps. robustus* sp. n., which it resembles in many other respects.

Distribution. *Pseudorhynchus* is widespread in the Old World tropics, including most of the Oriental Region, Japan and Australia. Its range in Africa extends from near the northern limit of the grassland (at about latitude 15° N) to the eastern part of Cape Province in the south.

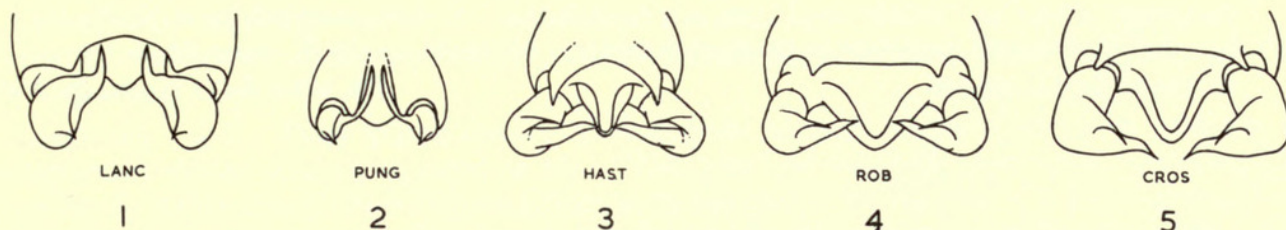
#### KEY TO THE AFRICAN SPECIES

##### MALES

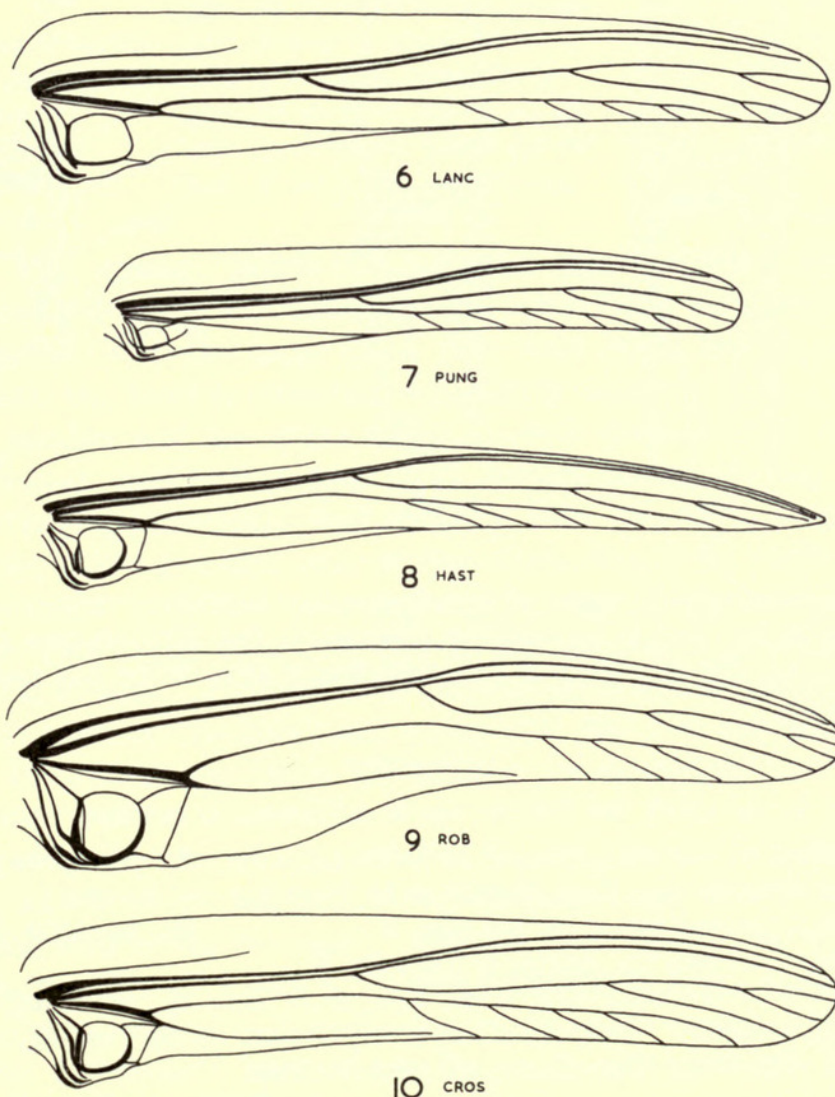
- |   |  |   |
|---|--|---|
| 1 | Cerci as in Text-figs. 1 or 2, with a basal, upwardly directed spine. Fastigium of the vertex sharply pointed (Text-figs 24-28). | 2 |
| - | Cerci as in Text-figs. 3, 4 or 5, without a basal spine. Fastigium of the vertex bluntly pointed (Text-figs. 29-32)              | 3 |



- 2 Cerci as in Text-fig. 1, with a short basal spine. Fore wings more than 42 mm. long  
*Ps. lanceolatus* (Fabricius) (p. 175)
- Cerci as in Text-fig. 2, with a long basal spine. Fore wings less than 41 mm. long  
*Ps. pungens* (Schaum) (p. 179)
- 3 Fore wings with a pointed tip, as in Text-fig. 8. Stridulatory region of the left fore wing as in Text-fig. 11, 1A as prominent as  $Cu_2$ . *Ps. hastifer* (Schaum) (p. 186)



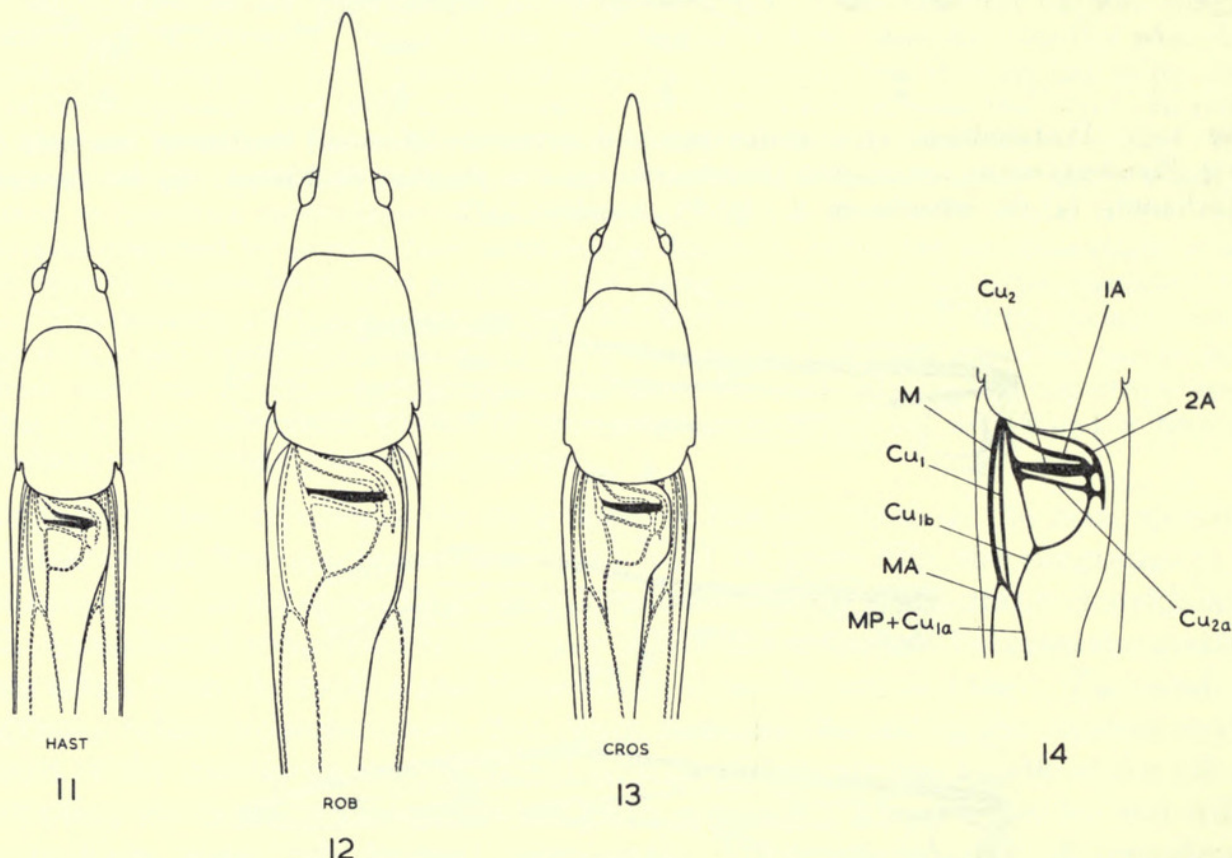
FIGS. 1-5. Posterodorsal view of the cerci and terminal abdominal tergites of the male of (1) *Pseudorhynchus lanceolatus* (Fabricius); (2) *Ps. pungens* (Schaum); (3) *Ps. hastifer* (Schaum); (4) *Ps. robustus* sp. n.; (5) *Ps. crosskeyi* sp. n.



FIGS. 6-10. The right male fore wing of (6) *Pseudorhynchus lanceolatus* (Fabricius); (7) *Ps. pungens* (Schaum); (8) *Ps. hastifer* (Schaum); (9) *Ps. robustus* sp. n.; (10) *Ps. crosskeyi* sp. n.



- Fore wings with a rounded tip, not as in Text-fig. 8. Stridulatory region of the left fore wing as in Text-figs. 12 or 13, 1A much less prominent than  $Cu_2$  . . . . . 4
- 4 Stridulatory region of the left fore wing as in Text-fig. 12; 1A well separated from  $Cu_2$ ; cubito-anal area broadened. Stridulatory rib as in Text-fig. 18, with fewer than 80 stridulatory teeth. Hind tibiae with fewer than 15 external dorsal spines  
*Ps. robustus* sp. n. (p. 187)
- Stridulatory region of the left fore wing as in Text-fig. 13; 1A contiguous for part of its length with  $Cu_2$ ; cubito-anal area not broadened. Stridulatory rib as in Text-fig. 19, with more than 80 stridulatory teeth. Hind tibiae with more than 15 external dorsal spines . . . . .  
*Ps. crosskeyi* sp. n. (p. 188)



FIGS. 11-14. The stridulatory organ of *Pseudorhynchus* Serville. 11-13. Dorsal view of the stridulatory organ of (11) *Ps. hastifer* (Schaum); (12) *Ps. robustus* sp. n.; (13) *Ps. crosskeyi* sp. n. 14. The venation of the stridulatory area of the left male fore wing of *Ps. robustus* sp. n.

#### FEMALES

*Ps. crosskeyi* sp. n., in which the female sex is unknown, is omitted from this key.

- 1 Ovipositor less than 16 mm. long, shaped as in Text-fig. 21 . *Ps. pungens* (Schaum) (p. 179)
- Ovipositor more than 18 mm. long, shaped as in Text-figs. 20, 22 or 23 . . . . . 2
- 2 Fore wings with a pointed tip, as in Text-fig. 8 . . . . . *Ps. hastifer* (Schaum) (p. 186)
- Fore wings with a rounded tip, not as in Text-fig. 8 . . . . . 3
- 3 Dark pigmentation of the underside of the head as in Text-fig. 24; fastigium of the vertex sharply pointed. Ovipositor relatively broad, as in Text-fig. 20. Hind tibiae usually with fewer than 7 external dorsal spines  
*Ps. lanceolatus* (Fabricius) (p. 175)
- Dark pigmentation of the underside of the head as in Text-fig. 31 or absent; fastigium of the vertex bluntly pointed. Ovipositor relatively slender, as in Text-fig. 23. Hind tibiae usually with more than 8 external dorsal spines *Ps. robustus* sp. n. (p. 187)



## DESCRIPTIONS OF THE AFRICAN SPECIES

*Pseudorhynchus lanceolatus* (Fabricius)

(Text-figs. 1, 6, 15, 20, 24, 36)

*Locusta lanceolatus* Fabricius, 1775 : 284. Holotype ♀, SIERRA LEONE (BMNH) (see below) [examined].

*Pseudorhynchus sicarius* Serville, 1838 : 510. Lectotype ♀, locality unknown (MNHN, Paris) [examined]. **syn. n.**

*Pyrgocorypha hastata* Bolívar, 1890 : 222. Lectotype ♂, locality unknown (MLZA, Lisbon) [examined].

Diagnosis. ♂ ♀. Dark pigmentation of underside of head distributed as in Text-fig. 24; fastigium of vertex sharply pointed at tip. Venation and shape of right male fore wing as in Text-fig. 6; stridulatory rib of left male fore wing shaped as in Text-fig. 15, with about 76–100 teeth (mean of 24 examined: 89); female fore wings similar except for cubito-anal area. Male cerci as in Text-fig. 1, with basal, upwardly directed spine. Ovipositor rather broad, shaped as in Text-fig. 20.

## MEASUREMENTS

	Males	Females
Total length	(36): 63.2–81.0, mean 72.00	(42): 72.5–89.4, mean 79.12
Length of fastigium of vertex	(42): 6.9–9.0, mean 8.18	(46): 7.5–10.8, mean 8.74
Median length of pronotum	(45): 9.2–11.8, mean 10.47	(52): 10.0–12.1, mean 11.02
Length of hind femur	(44): 18.0–23.6, mean 20.64	(50): 20.1–25.7, mean 22.33
Length of fore wing	(41): 43.1–55.0, mean 49.26	(50): 49.3–62.1, mean 54.13
Length of stridulatory rib	(24): 3.10–3.78, mean 3.45	
Length of ovipositor		(48): 20.6–27.6, mean 23.64

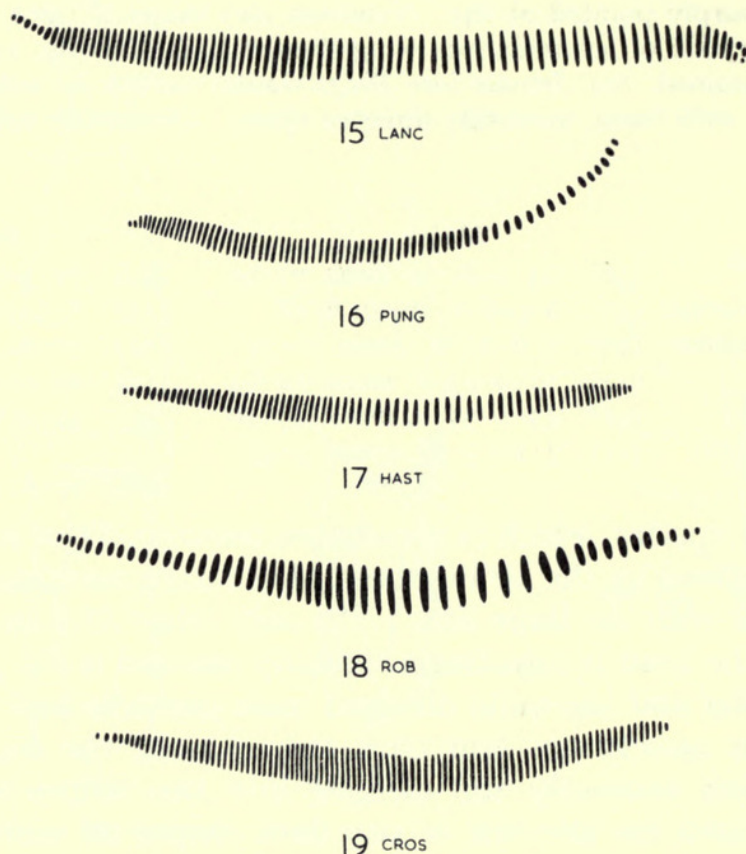
Discussion. This species, which is a common insect in West and Central Africa, may be easily recognized by the arrangement of the dark markings on the underside of the head together with the large size. The only other African species of *Pseudorhynchus* in which the head is sometimes similarly marked is *Ps. pungens* (Schaum), which is much smaller and has quite different male genitalia and ovipositor.

The brown colour variety has four dark stripes along the top of the head and pronotum, converging anteriorly and merging into two stripes at the level of the antennal sockets; there are also one or two dark stripes on each side of the head, extending posteriorly from the eyes and continuing along the lateral lobes of the pronotum. The fore wings have less clearly defined dark markings, also tending to form longitudinal stripes. Longitudinal striping of a similar nature is shown by the green variety, at least on the head and pronotum, but it is impossible to judge from dried material the extent to which the stripes are developed in this variety of the live insect.

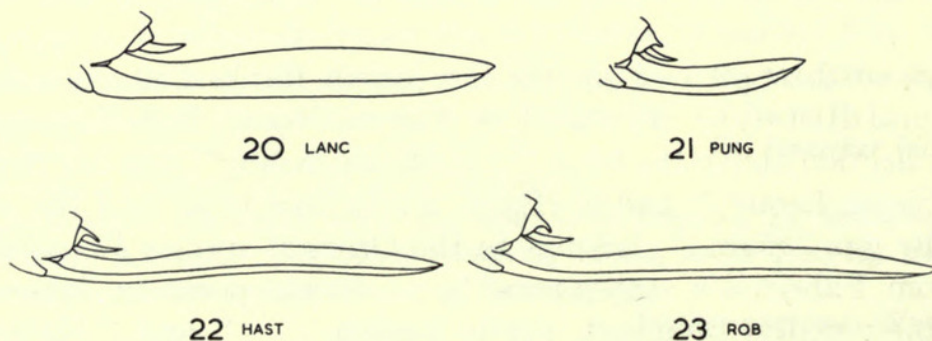
The holotype of this species is in the Sir Joseph Banks Collection in the British Museum (Natural History). As stated by Zimsen (1964 : 618) there are two specimens in this collection above the label “*Locusta lanceolata*”: one is a female (labelled on the pin “Sierra Leone”) and is clearly Fabricius’s type, and the other, a male (labelled on the pin “Siam”), belongs to the Oriental species *Ps. nobilis* (Walker). It is clear from Fabricius’s statements “. . . fronte porrecta, lanceolata . . .”, “. . . frons inter oculos prominet, capite longior . . .” and “Habitat in Sierra Leon Africae”, all of which are applicable only to the female, that it was on this specimen alone that the name and description of “*Locusta lanceolata*” were based



*Ps. sicarius* Serville was described on the basis of two female specimens from unknown localities, one in the collection of "M. le compte Dejean" and the other in the Muséum National d'Histoire Naturelle, Paris. The former specimen is now lost, but there is no doubt from Serville's description that it belonged to *Ps. pungens* (Schaum). The specimen in the Paris museum, for which Serville gave a brief separate description, still exists and I have been able to examine it: it clearly belongs to *Ps. lanceolatus* (Fabricius). In order that the name *Ps. sicarius* should be based on an existing and accessible specimen, I here designate the specimen in the Paris museum as the LECTOTYPE of this species and I have so labelled it.



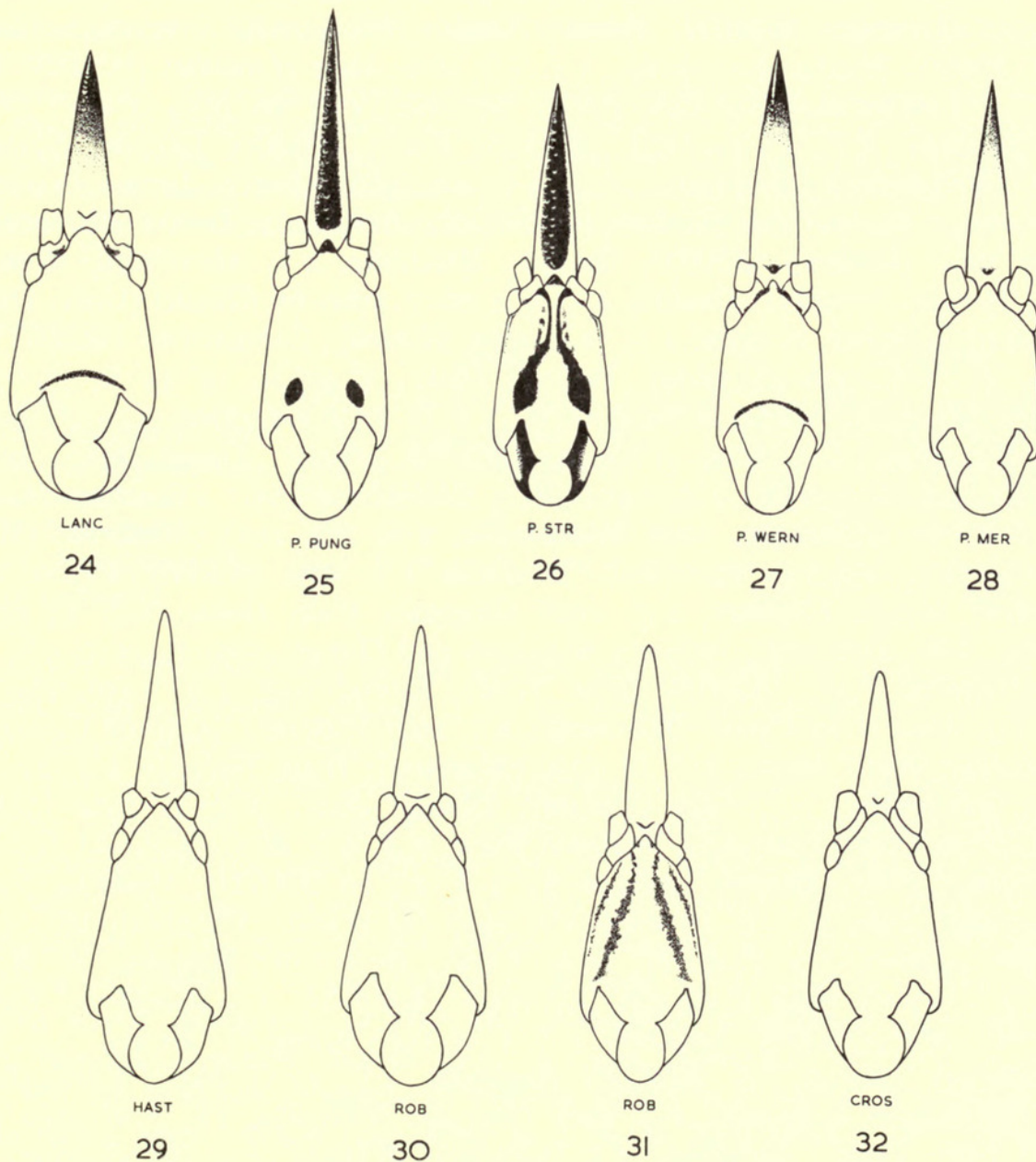
FIGS. 15-19. Diagrams showing the shape of, and arrangement of teeth in, the stridulatory rib of (15) *Pseudorhynchus lanceolatus* (Fabricius); (16) *Ps. pungens* (Schaum); (17) *Ps. hastifer* (Schaum); (18) *Ps. robustus* sp. n.; (19) *Ps. crosskeyi* sp. n.



FIGS. 20-23. Lateral view of the ovipositor of (20) *Pseudorhynchus lanceolatus* (Fabricius); (21) *Ps. pungens* (Schaum); (22) *Ps. hastifer* (Schaum); (23) *Ps. robustus* sp. n.



*Pyrgocorypha hastata* Bolívar was described from a single male and an unknown number of females in the Museu e Laboratório Zoológico e Antropológico, Lisbon; the type-locality is unknown. There are in that museum two males and three females (all without data) labelled, apparently in Bolívar's handwriting, as belonging to this species. The label bears an amendment, apparently in the same handwriting: "1 ♂ and 2 ♀♀" has been altered to "2 ♂♂ and 3 ♀♀" (information kindly supplied by Dr. J. de A. Fernandes). It would thus seem likely at first sight that a second specimen of each sex came to the attention of Bolívar after he had written his account of the species. However, Bolívar states in his description that the unique male



FIGS. 24-32. Ventral view of the head of (24) *Pseudorhynchus lanceolatus* (Fabricius); (25) *Ps. pungens pungens* (Schaum); (26) *Ps. p. striatus* ssp. n.; (27) *Ps. p. werner* Karny; (28) *Ps. p. meridionalis* ssp. n.; (29) *Ps. hastifer* (Schaum); (30) *Ps. robustus* sp. n. (green form); (31) *Ps. robustus* sp. n. (brown form); (32) *Ps. crosskeyi* sp. n.



lacked the terminal segments of its abdomen ("El único ♂ que he visto carece de los anillos terminales del abdomen . . ."), and in both the existing males the abdomen is intact. Although it is possible that Bolívar was mistaken I have thought it unwise to regard either male specimen as a syntype, but it seems highly probable that at least two of the females are syntypes and I have selected and labelled one of them as a LECTOTYPE.

Material examined. Holotype. SIERRA LEONE, ♀ (BMNH).

GUINEA: Nimba, 1000 m, 1 ♀, 11.vi.1942 (*Lamotte*) (IFAN, Dakar); Nimba, 1640 m, 1 ♂, xii.1951 (*Lamotte & Roy*) (IFAN, Dakar); Nimba, Ziéla, 1 ♂, 30-31.iii.1957 (*Lamotte, Amiet & Vanderplaetsen*) (IFAN, Dakar); Nimba, Yalanzou, 1 ♂, 15.iii.1942 (*Lamotte*) (MNHN, Paris); Nimba, Nion, 1 ♀, ii-iv.1942 (*Lamotte*) (MNHN, Paris); Nimba, Keoulenta, 3 ♂, 1 ♀, ii-iv.1942 (*Lamotte*) (MNHN, Paris); Conakry, 1 ♂ (*Bertrand*) (MNHN, Paris); Serédou, 1 ♂, xii.1959 (*Pujol*) (MNHN, Paris); Toulaya, 1 ♂, 23.xii.1951 (MNHN, Paris); SIERRA LEONE: Njala, 1 ♀, xii.1931 (*Hargreaves*); Freetown, 4 ♂, 3 ♀, xii.1966 (*Owen*); IVORY COAST: Mt. Tonkoui, 1 ♂, 15.iii.1964 (*Gillon*) (ORSTOM, Abidjan); TOGO: Bismarckburg, 2 ♀, i-iv.1891 (*Büttner*) (ZMHU, Berlin); Misahöhe, 1 ♀, 12.v.1894 (*Baumann*) (ZMHU, Berlin); NIGERIA: Ibadan, 4 ♂, 5 ♀, xii-v.1960-67 (*Oboite*) (Univ. Ibadan); near Ibadan, Gombar, at light, 1 ♀, 11.i.1965 (*Gerard*); CAMEROUN: Batouri Distr., savanna, 2 ♀, i-ii.1936 (*Merfield*); Batouri Distr., 3° 45' N, 13° 45' E, 750 m, 1 ♀, v-vi.1935 (*Merfield*); Abong M'Bang Distr., 1 ♀, iv.1936 (*Merfield*); CONGO (BRAZZAVILLE): Mayomba, 1 ♀, 1899 (*Vergues*) (MNHN, Paris); Djoué distr., between Brazzaville and Reneville, 1 ♂, 1912 (*Bel*) (MNHN, Paris); 1 ♀, 1909 (*Lebaudy*) (MNHN, Paris); M'Bamou, near Brazzaville, 2 ♂, 1 ♀, 1903 (*Montezer*) (MNHN, Paris); CENTRAL AFRICAN REPUBLIC: Boukoko, 1 ♀, 1952 (MNHN, Paris); CONGO (KINSHASA): Kasai, Lomami, 1 ♂, 1928 (*Mayné*); Uelé, Gabu, 1 ♂, 14.xii.1932 (*Vrydagh*); Uelé, Ekibondo, between Niangara and Dungu, 2650 ft., 5 ♂, 3 ♀, 1.vii.1935 (*Vanderbilt Exp.*) (AMNH, New York); Luluabourg, 1 ♂, 1936 (*Puissant*); Mayidi, 1 ♂, 1942 (*Van Eyen*); Bas-Congo, 2 ♀, 1927 (*Sjören*); Camp de Lukula, 1 ♂, 1911 (*Daniel*); Ituri, Bunia, 1 ♂, iii.1939 (*Maristes*); Ituri, Faradje, 1 ♀, 22.i.1930 (*Collart*); Elisabetha, 1 ♀, 1921 (*Tinant*); Ubangi distr., 1 ♂, ix.1910 (*Schubotz*) (AMNH, New York); Garamba National Park, 7 ♂, 9 ♀, iii-xii.1950-51 (*De Saeger & Verschuren*) (IPN, Brussels, except for 2 ♂, 2 ♀ in BMNH); Upemba National Park, Lusinga, 1760 m, 1 ♀, 18.vii-8.viii.1947 (*de Witte*); Elizabethville, in open high grass country, 1 ♀ (AMNH, New York); BURUNDI: Muyeha, R. Kishubi, 1700 m, 1 ♀, 13.vii.1952 (*Laurent*); UGANDA: Entebbe, 1 ♂ (*Gowdey*); Entebbe, 1 ♀, 27.viii.1911 (*Gowdey*); Entebbe, 1 ♂, 1.vi.1913 (*Gowdey*); Mwera, 1 ♂, 2.viii.1913 (*Gowdey*); Mengo, 1 ♀ (*Millar*); Kampala, 1 ♀, 13 ix.1918; Kampala, 1 ♀, ii.1934 (Johnston); Kampala, 1 ♂, 1908 (*Bayon*); Kampala, 1 ♀, 7.vi.1942 (*Rehn*) (AMNH, New York); Budongo, 1 ♀ (*Gowdey*); Kabule, 1 ♀, 19.vi.1909; Toro, Nyakasura, 1 ♂, 18.iii.1932 (*Shillito*); Kakindu, 2 ♂, 1 ♀, 1910 (*Bayon*); Bussu, 1 ♀, 1909 (*Bayon*); Busu-Hill, Busoga, 1 ♂, 1 ♀ (*Carl*) (ZMHU, Berlin); Jinja, 2 ♀, iii-iv.1932 (*van Someren*); Tororo distr., Sukulu, 1 ♀, 13.i.1961 (*Burt*); ETHIOPIA: 1 ♀, 1899 (*Michel*) (MNHN, Paris); TANZANIA: Mahari Peninsula, Kasoge, 2550 ft,



1 ♀, viii-ix. 1959 (2nd Oxford Univ. Exp.); ANGOLA: Lunda, Dundo, 2 ♂, 2 ♀, ii-vii. 1949 (Machado).

In the British Museum (Natural History) unless otherwise stated.

**Distribution.** This species occurs commonly over a large part of West and Central Africa, extending from Guinea to Ethiopia and southwards into northern Angola. It is typically a species of high-grass savanna.

### *Pseudorhynchus pungens* (Schaum)

(Text-figs. 2, 7, 16, 21, 25-28, 34, 35)

*Conocephalus pungens* Schaum, 1853: 778. Holotype ♀, MOZAMBIQUE (ZMHU, Berlin) [examined].

**Diagnosis.** ♂ ♀. Dark pigmentation of underside of head variable, but usually distributed as in Text-figs. 25-28; fastigium of vertex sharply pointed at tip. Venation and shape of right male fore wing as in Text-fig. 7; stridulatory rib of left male fore wing shaped as in Text-fig. 16, with about 50-87 teeth (mean of 16 examined: 66); female fore wings similar except for cubito-anal area. Male cerci as in Text-fig. 2, with basal, upwardly directed spine. Ovipositor relatively short, shaped as in Text-fig. 21.

#### MEASUREMENTS

	Males	Females
Total length	(28): 41.6-62.8, mean 53.02	(45): 50.4-71.9, mean 61.76
Length of fastigium of vertex	(29): 5.5-9.4, mean 7.65	(54): 6.0-10.9, mean 8.95
Median length of pronotum	(29): 6.2-8.3, mean 7.31	(56): 6.8-9.7, mean 8.36
Length of hind femur	(29): 12.0-17.9, mean 15.14	(51): 13.3-20.7, mean 17.44
Length of fore wing	(30): 25.8-40.2, mean 34.30	(52): 29.6-46.8, mean 39.82
Length of stridulatory rib	(24): 1.58-2.47, mean 1.95	
Length of ovipositor		(49): 9.1-14.2, mean 11.49

**Discussion.** The small size of this species, together with the characteristic male cerci and short ovipositor, enable it to be readily distinguished from the other African species of *Pseudorhynchus*.

In addition to showing the usual green and brown colour varieties, which doubtless both occur throughout its range, *Ps. pungens* (Schaum) has the dark pigmentation on the underside of the head and the side of the mesothorax distributed in four distinct ways. As far as is known at present these colour forms, which appear to be independent of the green/brown polymorphism, are allopatric (see Text-fig. 33) and I have considered it convenient to treat them as subspecies. There are some associated slight differences in size and abdominal terminalia, and when more material becomes available one or more of these forms may prove to be distinct species, but the evidence available at present agrees well with the treatment given to these forms here. When considered as a whole they form a well defined unit clearly separated from the remaining species of the genus.

**Distribution** (Text-fig. 33). *Ps. pungens* (Schaum) probably occurs throughout the savannas and grasslands of tropical Africa and extends southwards, in the form of *Ps. p. meridionalis* ssp. n., into the coastal savanna of eastern South Africa.



## KEY TO THE SUBSPECIES

- 1 Dark pigmentation of the underside of the head as in Text-figs 27 or 28, the fastigium of the vertex darkening towards the tip . . . . . 2
- Dark pigmentation of the underside of the head as in Text-figs 25 or 26, the fastigium of the vertex with a dark ventral stripe . . . . . 3
- 2 Mesothorax with a conspicuous dark spot on each epimeron (Text-fig. 38). (South Africa) . . . . . ***Ps. pungens meridionalis*** ssp. n. (p. 185)

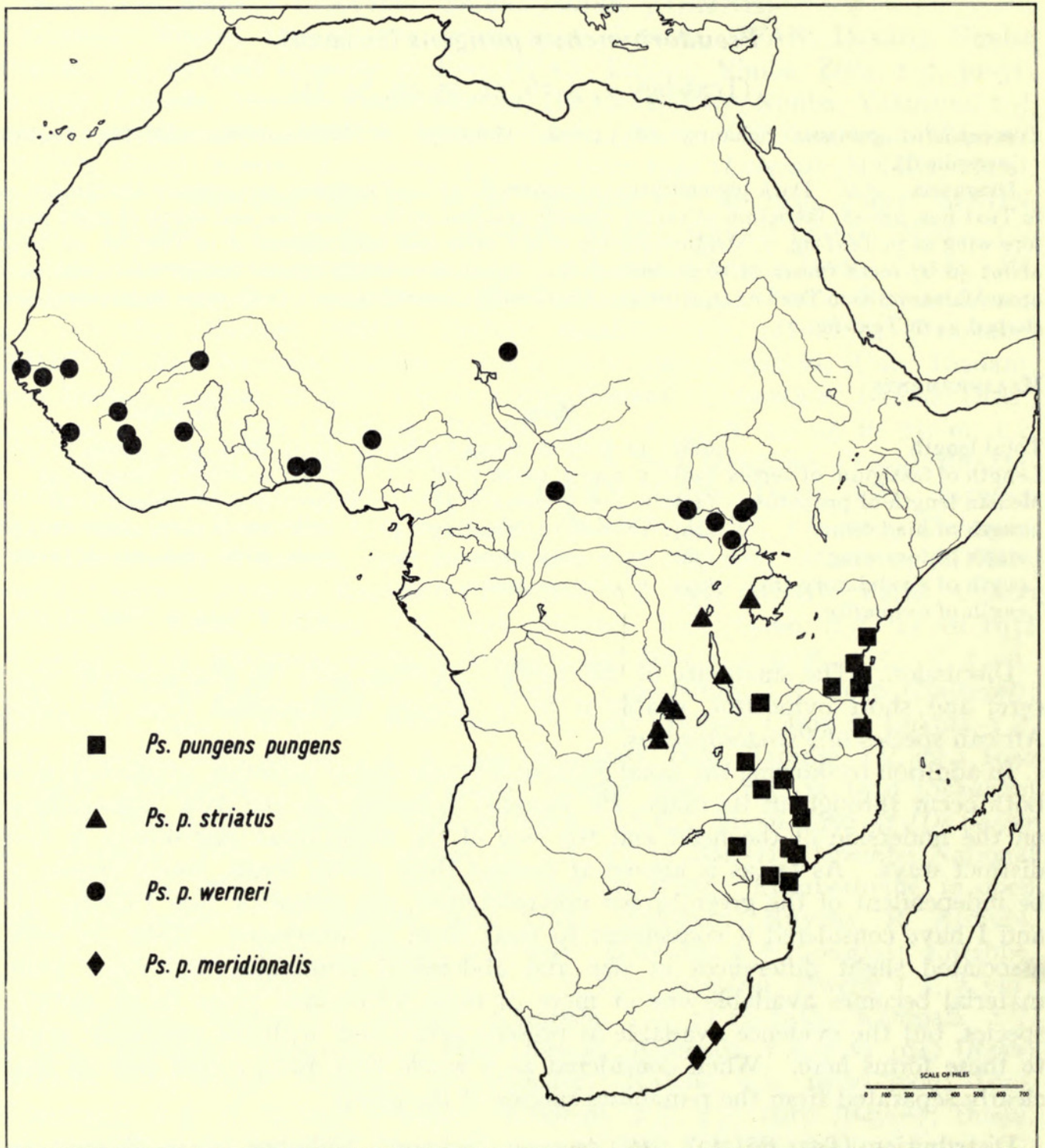


FIG. 33. Map showing the known distribution of the subspecies of *Pseudorhynchus pungens* (Schaum).



- Mesothorax without a dark spot on each epimeron. (West and Central Africa, north of the equator) . . . . . *Ps. pungens wernerii* Karny (p. 184)
- 3 Dark pigmentation of the frons as in Text-fig. 26, forming two longitudinal stripes, sometimes interrupted or restricted to the anterior end of the frons  
*Ps. pungens striatus* ssp. n. (p. 182)
- Dark pigmentation of the frons as in Text-fig. 25, forming two conspicuous dark spots near the mandibular articulations . . . . . *Ps. pungens pungens* (Schaum) (p. 181)

***Pseudorhynchus pungens pungens* (Schaum)**

(Text-fig. 25)

*Conocephalus pungens* Schaum, 1853 : 778.

Diagnosis. ♂ ♀. Dark pigmentation of underside of head as in Text-fig. 25; fastigium of vertex with dark ventral stripe; frons without longitudinal stripes but with dark spot on fastigium and two dark spots near anterior mandibular articulations. Epimera of mesothorax often with rather inconspicuous dark spot (position as in Text-fig. 37). Stridulatory rib of left male fore wing with about 61-76 teeth (mean of 8 examined: 69).

MEASUREMENTS

	Males	Females
Total length	(10): 52.9-62.8, mean 58.16	(18): 59.6-71.9, mean 66.62
Length of fastigium of vertex	(10): 7.5-9.3, mean 8.57	(20): 8.3-10.9, mean 9.48
Median length of pronotum	(10): 7.1-8.3, mean 7.79	(21): 8.0-9.7, mean 8.87
Length of hind femur	(9): 14.7-17.5, mean 16.28	(18): 16.2-20.7, mean 18.62
Length of fore wing	(10): 34.7-40.2, mean 37.86	(20): 39.5-46.8, mean 43.24
Length of stridulatory rib	(8): 1.97-2.24, mean 2.08	
Length of ovipositor		(17): 11.3-14.2, mean 12.74

Discussion. This subspecies may be recognized by the colour pattern on the underside of the head. All the males in the material examined had a dark spot of varying size and intensity on each mesothoracic epimeron (position shown in Text-fig. 37), but this feature was completely lacking in many of the females. As no two specimens of opposite sex had been collected in exactly the same locality, however, it cannot be established at present that the presence or absence of this spot is associated with sex in this subspecies. The spot is never as large or intense as in *Ps. p. meridionalis* ssp. n.

The known range of this subspecies comes nearest to that of *Ps. p. striatus* ssp. n. at Rukwa, from which a female was collected showing the dark band on the mandibles typical of that subspecies; however, this specimen has no dark stripes on the frons.

Material examined. Holotype. MOZAMBIQUE, ♀ (*Peters*) (ZMHU, Berlin).

KENYA: Rabai, 1 ♀, iv.1928 (*van Someren*); TANZANIA: Tanga Prov., Mlingano, 1 ♂, 4-12.iii.1950 (*Sweeney*); Tanga distr., 1 ♀, xii.1949 (*Phipps*); Mhindulo, 1 ♀, 8.xii.1926 (*Miller*); Kilosa, 2 ♂, xii.1925 (*Miller*); Tendaguru, 1 ♂, 14.xii.1924 (*Cutler*); Dar-es-Salaam, University College grounds, 1 ♀, 31.x.1964 (*Jago*); Sigi, Old Road, 1 ♀, 12.xi.1937 (*Burt*); C. Rukwa, Kafukola, 1 ♀, 12.xii.1953 (*Robertson*); Zanzibar, 1 ♀; ZAMBIA: Fort Jameson, Chizongwe, 1 ♂, v.1966 (*Brock*); Mpika, 1 ♀,



29.vi.1954 (*FitzGerald*); MALAWI: Fort Johnston, 1 ♂; Fort Johnston, 2 ♀ (*Rendall*); Zomba, 1 ♀ (*Lennon*); Kota Kota, 1 ♀; RHODESIA: Bindura, 1 ♀ (*Coghill*); MOZAMBIQUE: Nova Chopanga, 1 ♀, xii.1928-i.1929 (*Surcouf*) (MNHN, Paris); Gorongosa Prov., Tendo du Sungoué, 40 m, 1 ♀ (*Vasse*) (MNHN, Paris); Vila Pery, 1 ♀, 1928 (*Lesne*) (MNHN, Paris); Beira, Zimbiti, 1 ♀, 27.iv.1908 (*Sheppard*); Caia, 3 ♂, vi.1927 (*Bushby*).

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Distribution (Text-fig. 33). *Ps. p. pungens* (Schaum) no doubt occurs throughout a large part of the savanna of south-eastern Africa, extending northwards along the coastal belt into Kenya and southwards into Rhodesia and Mozambique. It is replaced to the west by *Ps. p. striatus* ssp. n., but the line along which the transition takes place cannot yet be accurately determined.

### *Pseudorhynchus pungens striatus* ssp. n.

(Text-figs. 26, 37)

Diagnosis. ♂ ♀. Dark pigmentation of underside of head as in Text-fig. 26; fastigium of vertex with dark ventral stripe; frons with darkened fastigium and with two longitudinal dark stripes, sometimes interrupted or restricted to anterior end of frons. Mandibles with exposed dark band next to clypeus or at least with dark mark in region of anterior articulation. Epimera of mesothorax with dark spot (Text-fig. 37), sometimes partially or completely covered by anterior margin of flexed fore wing. Stridulatory rib of left male fore wing with about 50-70 teeth (mean of 7 examined: 59).

#### MEASUREMENTS

	Males	Females
Total length	(7): 41.6-54.9, mean 45.53	(8): 50.4-59.1, mean 54.75
Length of fastigium of vertex	(7): 5.5-7.2, mean 6.27	(9): 6.0-8.6, mean 7.68
Median length of pronotum	(6): 6.7-7.4, mean 6.90	(9): 7.3-8.8, mean 8.10
Length of hind femur	(7): 13.2-15.4, mean 13.83	(8): 14.8-19.4, mean 16.71
Length of fore wing	(7): 25.8-35.8, mean 28.81	(9): 29.6-40.0, mean 35.39
Length of stridulatory rib	(7): 1.58-1.97, mean 1.73	
Length of ovipositor		(9): 10.4-11.5, mean 10.86

Discussion. This subspecies is characterized by the longitudinal dark stripes on the frons and the dark markings on the mandibles. The fullest development of this colour pattern is shown in Text-fig. 26, but the stripes are sometimes interrupted and occasionally restricted to the anterior end of the frons. Where the stripes are reduced in this way, dark spots always remain near the anterior mandibular articulations and the colour pattern approaches that of *Ps. p. pungens* (Schaum); however, all specimens showing any traces of dark stripes on the anterior part of the frons have been referred to the present subspecies. The two specimens showing the greatest reduction in the dark stripes were both females and were collected from Bukoba and the Mahari Peninsula in Tanzania; specimens with fully developed stripes were also collected at both these localities.

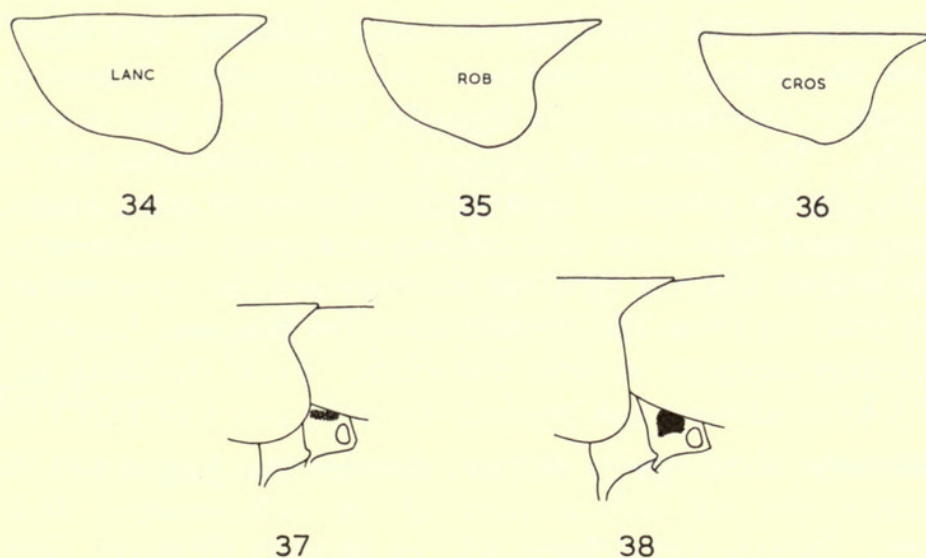


Material examined. Holotype. TANZANIA: Mahari Peninsula, Mugombazi Camp, by river, 2650 ft, ♂, 4.viii.1959 (2nd Oxford Univ. Exp.).

Paratypes. TANZANIA: Mahari Peninsula, Mugombazi Camp, by river, 2650 ft, 2 ♀, 4.viii.1959 (2nd Oxford Univ. Exp.); Mahari Peninsula, Lubugwe River, near Kasangazi, 4000 ft, leaf axil of wild banana, 1 ♂, 29.ix.1959 (2nd Oxford Univ. Exp.); Mahari Peninsula, Kasangazi, by river, 5500 ft, 1 ♀, 30.ix.1959 (2nd Oxford Univ. Exp.); Bukoba, 2 ♀, xii.1921 (Miller); CONGO (KINSHASA): Kivu, Bukavu, 1 ♀, 1.vi.1951 (Bomans) (MRAC, Tervuren); Katanga, Lubudi, 1 ♂, 1 ♀, vii-ix.1936 (Prinz) (MRAC, Tervuren); Katanga, Nyonga, 1 ♀, v.1925 (de Witte) (MRAC, Tervuren); Katanga, Kadia, 1 ♀, 4.iv.1925 (de Witte) (MRAC, Tervuren); Katanga, Kansenia, 1 ♂, 15.ix-15.x.1930 (de Witte) (MRAC, Tervuren); Upemba National Park, Pelenge Gorges, 1150 m, 8 ♂, 5 ♀, 6-20.vi.1947 (de Witte) (IPN, Brussels, except for 1 ♂, 1 ♀ in BMNH); Upemba National Park, Pelenge Gorges, 1150 m, 4 ♂, 3 ♀, 6-10.vi.1947 (IPN, Brussels, except for 1 ♂, 1 ♀ in BMNH); Upemba National Park, Pelenge Gorges, 1150 m, 3 ♀, 10-14.vi.1947 (de Witte) (IPN, Brussels); Upemba National Park, Pelenge Gorges, 1150 m, 1 ♂, 2 ♀, 18-20.vi.1947 (de Witte) (IPN, Brussels); Upemba National Park, Pelenge Gorges, 4 ♂, 1 ♀, 21-23.vi.1947 (de Witte) (IPN, Brussels); Upemba National Park, Pelenge Gorges, 2 ♀, 20-21.vi.1947 (de Witte) (IPN, Brussels); Upemba National Park, Kamitungulu, 1700 m, 1 ♂, 4.viii.1947 (de Witte); GABON: Ogooue, 1 ♀.

In the British Museum (Natural History) unless otherwise stated.

Distribution (Text-fig. 33). The available material suggests that the range of this subspecies extends from Gabon to western Tanzania over a large area of savanna to the south and east of the Congo Forest. It is replaced in south-eastern Africa by *Ps. p. pungens* (Schaum).



FIGS. 34-38. *Pseudorhynchus* Serville. 34-36. Lateral view of the pronotum of (34) *Ps. lanceolatus* (Fabricius); (35) *Ps. robustus* sp. n.; (36) *Ps. crosskeyi* sp. n. 37-38. Lateral view of part of the thorax of (37) *Ps. p. striatus* ssp. n. and (38) *Ps. p. meridionalis* ssp. n., showing the position of the mesepimeral spot.



*Pseudorhynchus pungens wernerii* Karny stat. n.

(Text-fig. 27)

*Pseudorhynchus Wernerii* Karny, 1907a : 279. Lectotype ♂, SUDAN: Gondokoro (NM, Vienna) [examined].

Diagnosis. ♂ ♀. Dark pigmentation of underside of head as in Text-fig. 27; underside of fastigium of vertex darkening towards tip and with darkened basal tooth; frons usually with dark markings near fastigium and with dark band, occasionally interrupted in middle, along frontoclypeal suture; fastigium of frons not or hardly darkened; antennal scrobes with dark markings. Mesothoracic epimera without dark spot. Stridulatory rib of left male fore wing with about 61–71 teeth (mean of 6 examined: 67).

## MEASUREMENTS

	Males	Females
Total length	(8): 45.8–57.2, mean 51.55	(15): 53.4–64.9, mean 60.75
Length of fastigium of vertex	(10): 5.8–9.4, mean 7.54	(20): 7.0–10.5, mean 9.17
Median length of pronotum	(10): 6.2–7.5, mean 6.87	(21): 6.8–8.6, mean 7.93
Length of hind femur	(10): 12.0–16.0, mean 14.34	(20): 13.3–17.7, mean 16.41
Length of fore wing	(10): 30.1–37.2, mean 33.63	(19): 35.3–42.7, mean 38.92
Length of stridulatory rib	(6): 1.69–1.93, mean 1.84	
Length of ovipositor		(18): 9.1–11.2, mean 10.66

Discussion. The colour pattern on the underside of the head of this subspecies is characteristic. Specimens in which the dark pigmentation is least developed, with the frontoclypeal band interrupted in the middle, approach *Ps. p. meridionalis* ssp. n. in the colouring of the head, but may be readily distinguished from it by the complete absence of the dark spot on the mesothoracic epimera.

The name of this subspecies (with the rank of species) was published twice by Karny in 1907, once (Karny, 1907a : 279) in the *Sber. Akad. Wiss. Wien* and once (Karny, 1907b : 18) in the *Verh. zool.-bot. Ges. Wien*. The former publication appeared much earlier in the year than the latter, however, and must therefore be taken to contain the original description of the subspecies. Karny (1907b) states that the type-locality, Gondokoro, is in Uganda, but it is in fact in southern Sudan, very near to Juba. The number of syntypes of this subspecies was not stated by Karny (1907a, b), but the ranges of measurements given (Karny, 1907a : 280) make it clear that there must have been at least two specimens of each sex. One female syntype is in the British Museum (Natural History) and I have examined two further syntypes, one of each sex, from the Naturhistorisches Museum, Vienna; it is possible that there are further syntypes in other museums. From the three syntypes that I have examined I have selected and labelled the male as a LECTOTYPE.

Material examined. Lectotype. SUDAN: Gondokoro, ♂, iii.1905 (*Werner*) (NM, Vienna).

Paralectotypes. SUDAN: Gondokoro, 1 ♀, 10.iii.1905 (*Werner*); Gondokoro, 1 ♀, 14.iii.1905 (*Werner*) (NM, Vienna).

GAMBIA: 1 ♀ (*Dudgeon*); SENEGAL: Niokola-Koba National Park, Badi, at light, 2 ♂, 23.xi.1959 (IFAN, Dakar); Niokola-Koba National Park, Badi, 1 ♂, 1 ♀, 23–25.vi.1967 (IFAN, Dakar); Niokola-Koba National Park, Badi, 1 ♀, iii–iv.1967 (IFAN,



Dakar); Casamance, Kolda, 3 ♂, 1 ♀, 4-24.xi.1963 (*Gaillard*) (IFAN, Dakar); GUINEA: Forécariah, 1 ♀ (*Mrázek*); Beyla, 1 ♂ (*Mrázek*); Kouroussa distr., 1 ♀, 1904 (*Pobéguin*) (MNHN, Paris); Kérouané, 1 ♀, xii.1920 (*Chabanaud*) (MNHN, Paris); MALI: Macina, Dari, 1 ♂, 28.xi.1963 (*Farrow*); IVORY COAST: Ferkéssédougou, 1 ♀ (ORSTOM, Abidjan); DAHOMEY: Zagnanado, 1 ♀, 8-14.v.1950 (*Villiers*) (IFAN, Dakar); NIGERIA: Ibadan, at light, 1 ♀, 4.xii.1964 (*Oboite*) (Univ. Ibadan); Ibadan, 1 ♂, 1 ♀, xi.1956 (*Ene*); Niger Province, Abuja, 1 ♀, vi.1955 (*Crosskey*); CHAD: Kanem, 1 ♀, 1904 (*Dupertuis*) (MNHN, Paris); CENTRAL AFRICAN REPUBLIC: Fort Sibut, 1375 ft, 1 ♀, 17.x.1934 (*Rehn*) (AMNH, New York); CONGO (BRAZZAVILLE): Grande Forêt de Mayombé, 1 ♀, 1937 (*de le Rue*) (MNHN, Paris); CONGO (KINSHASA): Uele, Doruma, 1 ♀, 1937 (*De Graer*) (MRAC, Tervuren); Ituri, Aru, 1 ♀, 1938 (*Bastiaens*) (MRAC, Tervuren); Garamba National Park, 1 ♀, xi.1949 (*De Saeger*); SUDAN: Lado Enclave, Rejaf, 1 ♀ (*Lankester*) (AMNH, New York); Juba (caught at Khartoum on aircraft from Juba), 1 ♀, 3.xi.1936.

In the British Museum (Natural History) unless otherwise stated.

Distribution (Text-fig. 33). This subspecies no doubt occurs throughout the belt of savanna and grassland extending across West and Central Africa, north of the forest, as far as southern Sudan. It is replaced south of the equator by *Ps. p. striatus* ssp. n.

### *Pseudorhynchus pungens meridionalis* ssp. n.

(Text-figs. 28, 38)

Diagnosis. ♂ ♀. Dark pigmentation of underside of head as in Text-fig. 28; underside of fastigium of vertex darkening towards tip and with darkened basal tooth; frons unmarked or with small dark mark on each side of frontoclypeal suture; fastigium of frons with slightly darkened tip. Mesothoracic epimera with large and conspicuous black spot (Text-fig. 38). Stridulatory rib of left male fore wing with about 77-87 teeth (mean of 3 examined: 69).

#### MEASUREMENTS

	Males	Females
Total length	(3): 55.0-60.8, mean 57.33	(2): 61.5-65.9, mean 63.70
Length of fastigium of vertex	(2): 8.1-8.8, mean 8.45	(3): 8.0-9.9, mean 8.77
Median length of pronotum	(3): 7.9-8.3, mean 8.03	(3): 8.7-8.9, mean 8.80
Length of hind femur	(3): 17.0-17.9, mean 17.47	(3): 18.6-20.0, mean 19.47
Length of fore wing	(3): 35.8-39.6, mean 37.50	(2): 41.8-42.3, mean 42.05
Length of stridulatory rib	(3): 2.26-2.47, mean 2.35	
Length of ovipositor		(3): 10.9-11.7, mean 11.40

Discussion. The large black spot on the side of the mesothorax and the lack of conspicuous dark pigmentation on the frons enable this subspecies to be easily recognized.

Material examined. Holotype. SOUTH AFRICA: Natal, Durban, ♂, 12.iv.1909 (*Leigh*) (AMNH, New York).

Paratypes. SOUTH AFRICA: Natal, Durban, 1 ♂, 30.iii.1909 (*Leigh*); Natal, Durban, 1 ♀, 3.iv.1909 (*Leigh*) (AMNH, New York); Pondoland, Port St. John,



1 ♂, 1-15.iv.1924 (*Turner*); Pondoland, Port St. John, 1 ♀, 5-30.iv.1923 (*Turner*); Pondoland, Port St. John, 1 ♀, v.1924 (*Turner*).

In the British Museum (Natural History) unless otherwise stated.

Distribution (Text-fig. 33). This subspecies probably occurs along most of the coastal savanna of south-eastern Africa. At what point it is replaced to the north by *Ps. p. pungens* (Schaum) and the extent to which it occurs inland cannot be determined until further material is available.

### *Pseudorhynchus hastifer* (Schaum)

(Text-figs. 3, 8, 11, 17, 22, 29)

*Conocephalos* [sic] *hastifer* Schaum, 1853 : 778. Holotype ♀, MOZAMBIQUE (ZMHU, Berlin) [examined].

Diagnosis. ♂ ♀. Underside of head without dark pigmentation; fastigium of vertex bluntly (rarely sharply) pointed at tip. Fore wings pointed at tip, venation and shape of right male fore wing as in Text-fig. 8 (female fore wings similar except for cubito-anal area); stridulatory region of left male fore wing as in Text-fig. 11, 1A strongly developed and contiguous for part of its length with  $Cu_2$ , stridulatory rib shaped as in Text-fig. 17, with about 57-74 teeth (mean of 5 examined: 66). Male cerci as in Text-fig. 3, with two inwardly directed spines at tip. Ovipositor relatively long and narrow, shaped as in Text-fig. 22.

#### MEASUREMENTS

	Males	Females
Total length	(3): 59.7-67.0, mean 63.80	(12): 63.8-90.3, mean 77.96
Length of fastigium of vertex	(5): 6.5-10.8, mean 8.26	(17): 7.0-12.2, mean 9.04
Median length of pronotum	(4): 9.3-12.0, mean 10.10	(18): 7.5-11.4, mean 9.44
Length of hind femur	(5): 21.0-28.4, mean 23.50	(17): 20.8-27.6, mean 24.25
Length of fore wing	(5): 47.3-60.0, mean 52.04	(14): 44.6-63.3, mean 55.06
Length of stridulatory rib	(5): 1.82-2.44, mean 2.16	
Length of ovipositor		(16): 23.9-28.9, mean 26.44

Discussion. This species may be recognized at a glance by its pointed wing-tips, which are unique in the genus. In none of the specimens examined was there any dark pigmentation on the underside of the head, in either the green or the brown colour varieties.

Material examined. Holotype. MOZAMBIQUE: ♀ (*Peters*) (ZMHU, Berlin).

CAMEROON: Serbewel, 1 ♀, 25.v.1935 (MNHN, Paris); CONGO (BRAZZAVILLE): Loukouléla, 1 ♀ (MNHN, Paris); SUDAN: "S. Sudan", 2 ♀, ix.1917 (Yardley) (AMNH, New York); Sobat R., 1 ♀, 1.ii.1914 (*Lowe*) (BMNH); CONGO (KINSHASA): Flandria, 1 ♀, iii.1931 (*Hulstaert*) (MRAC, Tervuren); Kashobwe, Luapula, 1 ♂, 6.i.1938 (*Bredo*) (MRAC, Tervuren); Kasai, Ipamu, 1 ♀, 1922 (*Vanderijst*) (MRAC, Tervuren); Katanga, Nyonga, 1 ♀, v.1925 (*de Witte*) (MRAC, Tervuren); TANZANIA: Tendaguru, 1 ♀ (*Janensch*) (ZMHU, Berlin); ANGOLA: Lac Colundo, 1 ♀, i.1955 (*Machado*) (BMNH); RHODESIA: Turk Mine, 1 ♀, xi.1957 (NM, Bulawayo); MOZAMBIQUE: Zambezi, Nova Choupanga, near Chemba, 1 ♀, v.1928 (*Lesne*) (MNHN, Paris); Beira, 1 ♀, ix.1928 (*Lesne*) (MNHN, Paris); Beira, 1 ♂, 1 ♀, 11-13.vi.1955 (*Brown*) (BMNH); SOUTH AFRICA: Transvaal, Loskop, 1 ♂, xii.1959 (*van Son*) (BMNH);



MADAGASCAR: south, Tulear, 1 ♂, 1957 (*Gruvel*) (IRSM, Tananarive); south-west, Banian, Ankazoabo, 2 ♀, vii. 1957 (*Andria*) (IRSM, Tananarive).

Distribution. *Ps. hastifer* (Schaum) appears to be widespread in the savannas and grasslands of central, eastern and south-eastern Africa, and occurs at least as far west as Lake Chad. It is the only species of the genus known at present from Madagascar.

### *Pseudorhynchus robustus* sp. n.

(Text-figs. 4, 9, 12, 18, 23, 31, 35)

Diagnosis. ♂ ♀. Underside of head of green variety without dark pigmentation; that of brown variety with frons striped as in Text-fig. 31; fastigium of vertex bluntly pointed and often darkened on underside in brown variety. Venation and shape of right male fore wing as in Text-fig. 9; stridulatory region of left male fore wing as in Text-fig. 12, 1A not prominent and well separated from  $Cu_2$ , stridulatory rib shaped as in Text-fig. 18, with about 46–69 teeth (mean of 13 examined: 53); female fore wings similar except for cubito-anal area. Male cerci as in Text-fig. 4, with two inwardly directed spines at tip. Ovipositor relatively long, shaped as in Text-fig. 23.

Description. ♂. Fastigium of vertex bluntly pointed, as in Text-figs. 30 and 31.

Lateral lobes of pronotum shaped as in Text-fig. 35. Fore femora usually with 1–3 internal ventral spines. Fore tibiae with about 4–7 external (and similar number of internal) ventral spurs. Mid femora with about 2–4 external ventral spines. Mid tibiae with about 6–7 external (and similar number of internal) ventral spurs. Hind femora with about 5–9 internal and 6–12 external ventral spines. Hind tibiae with about 12–16 internal and 7–14 external dorsal spines. Fore wings broadened towards base; shape and venation of right fore wing as in Text-fig. 9. Stridulatory region of left fore wing as in Text-fig. 12; 1A not prominent and well separated for most of its length from  $Cu_2$ ; stridulatory rib shaped as in Text-fig. 18, with about 46–69 teeth (mean of 13 examined: 53).

Tenth abdominal tergite and supra-anal plate shaped as in Text-fig. 4. Cerci as in Text-fig. 4, with two inwardly directed spines at tip.

General coloration green or brown, with labrum and exposed part of mandibles usually reddish. Brown form with dark longitudinal stripes on head (especially frons—see Text-fig. 31) and pronotum, and dark spots on legs and often fore wings.

♀. As male except for fore wings and genitalia. Tenth abdominal tergite produced posteriorly into two acute lobes. Ovipositor relatively long, shaped as in Text-fig. 23. Subgenital plate truncate or slightly emarginate at tip.

#### MEASUREMENTS

	Males	Females
Total length	(14): 48.9–79.3, mean 67.71	(12): 58.9–78.5, mean 72.37
Length of fastigium of vertex	(15): 4.7–7.5, mean 6.96	(14): 5.8–8.3, mean 7.51
Median length of pronotum	(17): 7.3–11.5, mean 10.38	(14): 7.4–10.2, mean 9.16
Length of hind femur	(16): 15.8–28.8, mean 25.00	(13): 19.8–27.4, mean 24.88
Length of fore wing	(16): 34.6–54.1, mean 50.04	(13): 41.7–56.8, mean 51.85
Length of stridulatory rib	(13): 2.34–2.89, mean 2.73	
Length of ovipositor		(15): 22.5–29.0, mean 26.99

Variation. The armature of the legs is variable, the fore femora occasionally being quite unarmed. The number of stridulatory teeth varies and is not proportional to the length of the stridulatory rib. The brown colour variety varies considerably in the extent and intensity of the dark markings. There is much variation



in size, the smallest specimens in the material examined coming from Lusinga in the Upemba National Park, Congo (Kinshasa).

**Discussion.** This species resembles *Ps. hastifer* (Schaum) and *Ps. crosskeyi* sp. n. in the genitalia and the blunt fastigium of the vertex, but may be readily distinguished from the former by the rounded wing-tips and from the latter by the longer fastigium of the vertex and the shape and structure of the stridulatory organ.

*Ps. robustus* sp. n. is of particular interest among the African species of *Pseudorhynchus* in that the dark pigmentation on the underside of the head is markedly affected by the green/brown polymorphism: the brown variety has characteristic dark stripes on the frons (Text-fig. 31) while the green variety has no dark pigmentation on the underside of the head (except, occasionally, for some darkening of the underside of the fastigium of the vertex).

**Material examined.** Holotype. SIERRA LEONE: Freetown, ♂, x.1967 (Owen).

**Paratypes.** SIERRA LEONE: Freetown, 1 ♂, 1 ♀, x.1967 (Owen); Freetown, Botanic Garden, 1 ♀, 24.x.1967 (Owen); Freetown, Mt. Aureol, 1000 ft, 1 ♀, x.1957 (Phipps); Njala, 1 ♂, 17.viii.1922 (Hargreaves); Gbangbama, 1 ♂, 10.x.1912 (Simpson); Loma Mtns., near Serelenkonko, 600 m, 1 ♀ (nymph), 22.ix.1964 (IFAN, Dakar); NIGERIA: Ibadan, 1 ♀, 2.ii.1967 (Oboite) (Univ. Ibadan); Ibadan, 1 ♂, 1 ♀, 8.ix.1964 (Oboite) (♂ in Univ. Ibadan, ♀ in BMNH); Ibadan, 1 ♀, 3.xii.1962 (Oboite); CONGO (KINSHASA): Kibale-Ituri Distr., Vube, 5 miles N. of Nepoko R. ferry, Avakubi-Niangara Rd., 1 ♂, 19.ix.1934 (Rehn) (AMNH, New York); Kibali-Ituri, Kilo, 1 ♂, xii.1933 (*du Soleil*) (MRAC, Tervuren); Kibali-Ituri, Kilo, 1 ♂, xii.1931 (*du Soleil*) (MRAC, Tervuren); Kibali-Ituri, Kilo, 1 ♀, x.1931 (*du Soleil*) (MRAC, Tervuren); Kilo, 1 ♂, xii.1934 (*du Soleil*) (MRAC, Tervuren); Bas Congo, Mangembo, 1 ♂, 1932 (*Zwolakowski*) (MRAC, Tervuren); Mayumbe, Luki, 1 ♂ (*Jieters*) (MRAC, Tervuren); Isangi, 1 ♂, 1929 (*Walkiers*) (MRAC, Tervuren); Kivu, Kadjudju, 1 ♂, 1 ♀, 1932 (*Babault*) (MNHN, Paris); Upemba National Park, Lusinga, 1760 m, 1 ♂, 29.iii.1947 (*de Witte*) (IPN, Brussels); Upemba National Park, Lusinga, 1760 m, 1 ♀, 22-23.iv.1949 (*de Witte*) (IPN, Brussels); Upemba National Park, Pelenge Gorges, 1150 m, 1 ♀, 21-23.vi.1947 (*de Witte*) (IPN, Brussels); Upemba National Park, Pelenge Gorges, 1150 m, 2 ♀, 6-20.vi.1947 (*de Witte*) (IPN, Brussels); UGANDA: Kampala, 1 ♂, 1.ix.1915 (*Gowdey*); Kampala, 12.ix.1918; Kampala, Makerere Hill, 1 ♀, iv.1968 (*McKay*) (MUC, Kampala).

In the British Museum (Natural History) unless otherwise stated.

**Distribution.** The available material comes from rather scattered localities but suggests that *Ps. robustus* sp. n. occurs widely in the moist savannas of West and Central Africa, extending from Sierra Leone to Lake Victoria and southwards as far as Katanga.

### *Pseudorhynchus crosskeyi* sp. n.

(Text-figs. 5, 10, 13, 19, 32, 36)

**Diagnosis.** ♂. Fastigium of vertex bluntly pointed and relatively short (Text-fig. 32), its ratio to median length of pronotum less than 0.6. Lateral pronotal lobes shaped as in Text-fig. 36, humeral angle not or hardly evident. Venation and shape of right fore wing as in Text-fig.



10; stridulatory region of left fore wing as in Text-fig. 13, 1A not prominent and contiguous for part of its length with  $Cu_2$ , stridulatory rib shaped as in Text-fig. 19, with about 93–103 teeth (mean of 3 examined: 96). Cerci as in Text-fig. 5, with two inwardly directed spines at tip.

♀ unknown.

Description. ♂. Fastigium of vertex bluntly pointed, as in Text-fig. 32.

Lateral pronotal lobes shaped as in Text-fig. 36, humeral angle not or hardly evident. Fore femora with about 2–4 internal ventral spines. Fore tibiae with about 6–8 external (and similar number of internal) ventral spurs. Mid femora with about 3–5 internal ventral spines. Mid tibiae with about 7–9 external (and similar number of internal) ventral spurs. Hind femora with about 8–12 internal and 11–14 external ventral spines. Hind tibiae with about 17–24 external (and similar number of internal) dorsal spines. Venation and shape of right fore wing as in Text-fig. 10. Stridulatory region of left fore wing as in Text-fig. 13; 1A not prominent and contiguous for part of its length with  $Cu_2$ ; stridulatory rib shaped as in Text-fig. 19, with about 93–103 teeth (mean of 3 examined: 96).

Tenth abdominal tergite and supra-anal plate shaped as in Text-fig. 5. Cerci as in Text-fig. 5, with two inwardly directed spines at tip.

General coloration green, with labrum and exposed part of mandibles reddish. [Brown variety no doubt also exists.]

♀ unknown.

#### MEASUREMENTS

##### Males

Total length	(3): 67.7–79.8, mean 72.03
Length of fastigium of vertex	(3): 4.2–5.8, mean 5.03
Median length of pronotum	(3): 9.4–10.5, mean 9.90
Length of hind femur	(3): 22.0–25.2, mean 23.67
Length of fore wing	(3): 42.5–47.4, mean 44.90
Length of stridulatory rib	(3): 2.42–2.76, mean 2.56

Variation. The armature of the legs is variable. The number of external dorsal spines of the hind tibiae is larger in the three specimens available than in any of the other African species of the genus, but the variability of the number of these spines in *Ps. crosskeyi* sp. n. cannot be assessed from these three specimens from the same locality.

No doubt a brown variety exists, but all three available specimens are almost uniformly green.

Discussion. *Ps. crosskeyi* sp. n. is one of the three known blunt-snouted African species of the genus; within this group it may be distinguished from *Ps. hastifer* (Schaum) by its rounded wing-tips and from *Ps. robustus* sp. n. by the shorter fastigium of the vertex, the shape and structure of the stridulatory organ (especially the large number of stridulatory teeth) and the more numerous dorsal spines on the hind tibiae.

It is unfortunate that the only three available specimens of this species should be of the same sex and colour variety and from the same locality. It is almost certain that a brown variety exists and it would be most interesting to know what kind of distribution of dark pigment it shows.

Material examined. Holotype. NIGERIA: Niger Province, Diko, in house, ♂, 1.ii.1958 (*Crosskey*).



Paratypes. NIGERIA: Niger Province, Diko, in house, 1 ♂, 1.ii.1958 (Crosskey); Niger Province, Diko, in house, 1 ♂, 2.xi.1958 (Crosskey).

All in the British Museum (Natural History).

Distribution. Known only from the type-locality.

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D. R. RAGGE, Ph.D., D.I.C., A.R.C.S.  
 Department of Entomology  
 BRITISH MUSEUM (NATURAL HISTORY)  
 CROMWELL ROAD  
 LONDON, S.W.7





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