



## Monograph

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# The wasp genus *Sphex* in Sub-Saharan Africa (Hymenoptera: Sphecidae)

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**Abstract.** The Afrotropical species of the sphecid genus *Sphex* are revised. Forty-six taxa are recognized, of which fifteen are newly described: *Sphex abbotti nivarius* subsp. nov., *S. comorensis* sp. nov., *S. hades* sp. nov., *S. nefrens* sp. nov., *S. occidentalis* sp. nov., *S. pseudopraedator* sp. nov., *S. pseudosatanas* sp. nov., *S. pulawskii* sp. nov., *S. rufoclypeatus* sp. nov., *S. satanas memnon* subsp. nov., *S. schmideggeri* sp. nov., *S. schoutedeni malawicus* subsp. nov., *S. socotrensis* sp. nov., *S. stadelmanni rufus* subsp. nov. and *S. victoria* sp. nov. A new subgenus, *Menkeella* subgen. nov., is proposed for *S. paulinierii* Guérin Méneville, 1843.

Four former synonyms are resurrected: *Sphex pruinus* var. *haemorrhoidalis* Magretti, 1898, for which the replacement name of *S. feijeni* nom. nov. is proposed, *S. camerunicus* Strand, 1916, *S. cinerascens* Dahlbom, 1843 and *S. abbotti* W. Fox, 1891.

Nine of the previously valid names are shown to be junior synonyms: *Sphex haemorrhoidalis basuto* (Arnold, 1947) and *S. haemorrhoidalis kobrowi* (Arnold, 1928) = *S. umtalicus* Strand, 1916; *S. incomptus anonymus* Leclercq, 1955 = *S. nigrohirtus* Kohl, 1895; *S. neavei* (Arnold, 1928) = *S. abbotti* W. Fox, 1891; *S. observabilis* (R. Turner, 1918) = *S. ahasverus* Kohl, 1890; *S. rufiscutis* (R. Turner, 1918) and *S. mochii* Giordani Soika, 1942 = *S. jansei* Cameron, 1910; *S. rufiscutis laevigatus* Arnold, 1951 = *S. gaullei* Berland, 1927; and *S. stadelmanni integer* (Arnold, 1928) = *S. stadelmanni* Kohl, 1895. Three previously synonymized species are transferred as new synonyms to different species: *Sphex conradti* Berland, 1927 = *S. camerunicus* Strand, 1916; *S. kilimandjaroensis* Cameron, 1908 = *S. abbotti* W. Fox, 1891; and *S. nigripes* var. *pachyderma* Strand, 1916 = *S. umtalicus* Strand, 1916. For three species, the actual type localities are on different continents than their labels indicate: *Sphex ahasverus* Kohl, 1890, *S. castaneipes* Dahlbom, 1843 and *S. optimus* F. Smith, 1856, with the first occurring in Africa instead of Australia and the other two presumably occurring in South America instead of Africa.

The occurrence of the *argentatus* group in Sub-Saharan Africa is confirmed, and seven additional species groups are established, with all but one of them based on apomorphic morphological traits. A hypothesis on the phylogenetic relationships among the subgenera and species groups of *Sphex* is presented, and an identification key for both sexes as well as a placoid-based identification table for males are presented. Using Bayesian inference and maximum likelihood analysis on mitochondrial and nuclear sequence data generated from thirty-one of the recognized taxa, the monophyly of the proposed species groups is corroborated.

**Keywords.** *Sphex*, Afrotropic, phylogeny, barcoding.

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## Introduction

Until now, there has been no comprehensive revision of all species of *Sphex* Linnaeus, 1758 from the Afrotropical region, and only few partial revisions and identification keys have been published. The most important ones are: Kohl 1895 (worldwide revision of the genus), Arnold 1928 (revision of species from southern Africa), Berland 1956 (revision of Afrotropical species) and Leclercq 1961 (key to *haemorrhoidalis* group). However, they are partly outdated and they contain numerous errors and omissions of important diagnostic characters. Prior to this publication, 31 species and nine additional subspecies were recognized for Sub-Saharan Africa (Pulawski 2020). Except for *Sphex pruinosus* Germar, 1817 and *Sphex fumicatus* Christ, 1791, of which the voucher specimens were collected in the Palearctic region (Schmid-Egger *et al.* 2018), no DNA sequences of *Sphex* from the Afrotropical region were previously available. An intrageneric phylogeny of *Sphex* has never been published before.

After studying large amounts of material and assessing the majority of published species descriptions of *Sphex* from tropical Africa, we attempt to provide a complete revision for the region. Furthermore, we use an integrative approach based on morphology as well as sequence data from the mitochondrial CO1 region and two nuclear genes in order to investigate the phylogenetic relationships between the species of the genus.

## Species treated

In this publication, 42 species and four subspecies of African *Sphex* are recognized. Eleven species and all of the recognized subspecies were previously undescribed. They are native to the Afrotropical realm as defined by Udvardy (1975) or the region of southern Arabia and the islands of the Seychelles and Comoros, which are included here. Some species like *Sphex pruinosus* can also be found in the Palearctic.

We treat every valid species previously recorded from the Afrotropical region (Pulawski 2020). Two species are probably not of Afrotropical origin, namely *S. castaneipes* Dahlbom, 1843 and *S. optimus* F. Smith, 1856. The first was described based on a series allegedly collected at the Cape of Good Hope, the second based on a single individual supposedly from the Gambia. After having examined photographs of a syntype of *S. castaneipes* and the holotype of *S. optimus*, we conclude that these specimens were not actually collected in Africa, but possibly in the Neotropical region. They possess a markedly dense metanotal vestiture that completely obscures its surface, which is unknown in continental members of African *Sphex*, but present in several species from South America. *Sphex optimus* closely resembles *S. melanopus* Dahlbom, 1843 and could be synonymous with that species, although more thorough comparisons with Neotropical species are required to reach an informed decision. The status of *S. castaneipes* is dubious.

Many Afrotropical locality records of *Sphex* by previous authors were misidentifications. A list of all the corrections would be far too long, but any prior citation of material deposited in the IRSN, MRAC, NRS, OÖLM or ZMB (see list of abbreviations below) can be traced to the specimen list, as the African material of the genus present in these collections has been examined by us in its entirety. From the remaining collections, specimens with locality data already represented in the material list that belong to species which are very commonly found and which we classify as taxonomically unambiguous were not always included.

To our knowledge, three species with alleged Afrotropical records presumably do not occur in this region. Thus, they will not be treated in detail. The first is *S. argentatus* Fabricius, 1787. Primarily found in the Oriental and Australian regions, an updated description was published in Dörfel & Ohl (2015). Most African records are probably misidentifications of *S. fumicatus*, which is quite similar and occurs commonly almost everywhere in the region. We did come across two individuals of *S. argentatus* supposedly collected in the former Kasai province of the Democratic Republic of the Congo, though they may be mislabeled. It seems doubtful that the species occurs in Africa.

Kohl (1906) described from the Arabian island of Socotra what he believed to be the previously unknown female of *S. deplanatus* Kohl, 1895, an Oriental species. After examining Kohl's specimens and comparing them with material of *S. deplanatus*, we repudiate his assumption. In the collection of the BMNH, there are not only more females but also males of this Socotran taxon, which we describe as *S. socotrensis* sp. nov.

Finally, Dollfuss (2008) and several authors before him proposed that African records of *S. praedator* F. Smith, 1858, which were usually identified as its synonym *S. luteipennis* Mocsáry, 1883, pertain to a different, undescribed species. After having studied the holotype and several specimens of *S. praedator*, we agree with this assessment and describe them under the name *S. pseudopraedator* sp. nov.

### Species groups

In total, we divide the Afrotropical *Sphex* into eight species groups, seven of which are newly erected. The *argentatus* group was originally proposed by Hensen (1991) and previously mainly encompassed species from the Oriental and Australian regions. African members are distinguished by the same character combination as those from other regions.

The concept of the *haemorrhoidalis* group (occasionally called the *haemorrhoidalis-bohemanni* group), which was proposed by Arnold (1928) and treated in greater detail by Leclercq (1961), neglects important morphological characters. The group is clearly paraphyletic and is here replaced by an alternative group concept.

Nonetheless, we have chosen *S. bohemanni* Dahlbom, 1845 as the eponym for a new group because the species is easily recognizable and, unlike some other members of its group, does not have any synonyms widely-used in place of its actual valid name.

### Subspecies concepts and criteria

Previous authors working with Afrotropical *Sphex* have often neglected to explain their reasoning when classifying taxa as subspecies. Indeed, Mayr (1942) stated that “[...] in the absence of definite criteria it is, in many cases, equally justifiable to consider certain isolated forms as subspecies or as species, to consider a variable species monotypic or to subdivide it into two or more geographical races, to consider well-characterized forms as subspecies of a polytypic species or to call them representative species.” The final judgements are made by the taxonomists themselves, and most publications fail to provide standardized criteria for determining subspecific taxa (Haig *et al.* 2006).

Naturally, defining what constitutes a subspecies is directly tied to a species concept. One of the most well-known is the biological species concept (Mayr 1942), of which the central assumption is that populations of an animal species have the potential to interbreed with each other, but are reproductively isolated from populations of other species. While this definition places special emphasis on the importance of sexual reproduction, which is a key factor for speciation (Bernstein *et al.* 1985), a major difficulty regarding its practical application for taxonomists is the inability to directly observe and gather data on these interactions or lack thereof, at least in the majority of invertebrates. This is especially

problematic when dealing with allopatric populations, as their ability or inability to interbreed with each other exists only in theory.

The issue can be tackled by establishing a unified species concept, which acknowledges species as separately evolving metapopulation lineages (De Queiroz 2007). Contingent upon the decrease in gene flow between these lineages, secondary characters like morphological and genetic distinctiveness arise. Once the speciation has progressed far enough, these indirect indicators can be used as criteria. Regarding morphology, an essential property of subspecies and one of the main reasons that warrant their description as separate taxa instead of individual varieties is the presence of at least one fixed diagnosable character state in a population that differs from the state found in other populations of the same species (Mayr 1982; Braby *et al.* 2012). Attempts have been made to also provide definitions for genetic standards. For example, distance-based clustering with a threshold of 3% regarding CO1 sequences yields the most accurate results when comparing morphospecies in beetles (Astrin *et al.* 2012). Still, there is no indication that this specific value is universal among insects. The delimitation of criteria specific to the Afrotropical *Sphex* and their application is treated in more detail in the discussion.

### Unanswered questions

There remain several issues that need to be addressed in future studies. First and foremost, while six of the eight species groups that contain members in the Afrotropical region have been classified as well-supported pairs of sister taxa, the relationship between these as well as their affiliation with the two remaining groups is still mostly unclear. As useful morphological characters are limited, the most reliable way to solve this problem will be the generation of additional sequence data. A better taxon sampling would certainly be helpful, but the primary issue is the lack of coverage within the genomes of the sequenced species, as the methods we used are quite unreliable for museum material. Newer techniques like target enrichment of ultraconserved elements (UCEs) are more suited to analyzing specimens with fragmented DNA and recovering generic phylogenies, as the number of loci is also much greater (Faircloth *et al.* 2014; Blaimer *et al.* 2016).

Finally, *Sphex* needs to be revised in other biogeographic realms as well, especially the Oriental and Neotropical regions. As species groups were shown to span several continents in their distribution, there are doubtlessly other species in the world that belong to the newly erected groups. Their discovery will aid our understanding of the phylogenetic history of the genus.

### Morphology

The morphological characters used in this paper can be divided into three main groups:

- a. coloration of the integument
- b. coloration and other properties of the setae
- c. surface structures

In the African *Sphex*, the coloration of the integument (except for the wings) ranges between black and ferruginous. We found evidence that it is subject to climatic and geographic influences and generally shows a higher intraspecific variability than other structural characters. For example, males of *S. umtalicus* Strand, 1916 from southern Africa usually have the mandibular base black and a dark ferruginous stripe in the center of the mandible, whereas some individuals from eastern Africa have the basal half of the mandible bright ferruginous. Although coloration is a valuable diagnostic in some species, structural characters are preferred in the keys.

Setal characters are very important as diagnostics both at the species and the species group level. In particular, the orientation of the erect setae on the propodeal enclosure, which has been neglected in

previous publications, has been shown to be of high taxonomic significance. The setae face anteriorly, posteriorly, or perpendicularly to the propodeal surface.

Density and texture of the vestiture, particularly on the scutellum, is also an important diagnostic feature. In some cases, assessing density can be difficult, as many of the setae may have been lost due to abrasion, in which case only impressed regions of the integument might show the original condition. It must be determined whether a potential lack of vestiture is a result of abrasion, for example by checking the state of the wing apices or the mandibles of the specimen in question. Presumably because of their burrowing activity, female *Sphex* are much more affected by aging than males, although this can vary depending on species group or other, as yet unknown factors.

The coloration of the setae seems to be less subject to intraspecific variation than the color of the integument, although taxa which we, in concordance with previous authors, recognize as different subspecies are commonly distinguished only through the color of the vestiture on a single body region. Furthermore, some females can only be identified based on the luster of their appressed facial setae. This is visible in the vestiture on the lateral clypeal margins and on the paraocular area. At first glance, it looks primarily brown, black or transparent in some species, so these areas should be viewed from several different angles to determine whether the sheen of the setae has a different color, such as silvery, golden or ferruginous.

#### **Overview of character states**

The clypeal margin of female African *Sphex* often has at least one small medial notch, frequently three. A protruding tooth is only found in *S. cinerascens* Dahlbom, 1843. There can be a step-like structure above the free margin, or the transition to the convex main part of the clypeus can be gradual. Some males have a protruding tooth, and the free margin can be simple or subtly folded medially. Appressed setae may cover the entire clypeus, a central longitudinal line or parts of the lower half can be glabrous. In females, except of *S. paulinierii* Guérin-Méneville, 1843, the labrum is carinate.

The scutellum is convex or flat and can have a medial longitudinal impression in case of the former, though that seems to be intraspecifically variable. Scutellar vestiture can be coarse or fine and rarely nearly absent, not counting loss due to abrasion. The metanotum can be flat or raised and may be slightly or conspicuously bituberculate in the latter case.

The area anterior of the spiracle is often flat, though in some groups there is a swelling followed by a depression, which can give the upper metapleuron a concave appearance instead of a plane one.

As stated above, the erect propodeal setae are usually curved and can be oriented anteriorly, posteriorly or perpendicularly. The sculpture of the propodeal enclosure may be finely or more coarsely rugose, consisting of fine transversal lines or more or less distinct transversal ridges of varying number.

The male sternum can have fringes of long erect setae on sterna II–VII. Sternum VIII is densely but shortly pubescent. The posterior margin of sternum VII is sometimes notched, and the visible portion of sternum VIII may be triangular, rounded or emarginate. The penis valvae are partially or completely fused (the extent of fusion is not always constant within species), and the valvicepes are rounded and curved ventrally in their presumed unmodified state, but can be of various shapes.

Sexual dimorphism occurs in all species of *Sphex*. The most notable structures are mouthparts, clypeus, antenna, tarsal rake, mesosomal dorsum and apical metasomal segments, including genitalia.

As in the majority of Aculeata, male *Sphex* have 11 antennal flagellomeres, whereas females have 10. Placoids are sensory-cell-containing structures and are only found on the inner side of the male antenna

between flagellomeres I and VII. They can be extremely useful for species identification. Length, width and position of placoids can be a crucial recognition character to determine species groups. Nonetheless, placoid shape and number are subject to intraspecific variation, so they are sometimes unreliable characters.

Another sexually dimorphic body part is the mandible. In males, the mandible is much more slender and has a simple tooth on the inner margin. In the female, the mandible is much longer and broader, and there is a small second inner tooth just proximally of the first one. These dissimilarities are most likely the result of their differences in behavior, because only females use the mandibles for prey manipulation and nest construction. In males, no carina is present on the labrum.

The clypeus in male *Sphex* from Africa is narrower than in females, has the free margin concave in most species and nearly always covered with appressed silvery setae, regardless of the color of the vestiture in the female. The clypeus can be covered entirely by the appressed setae, or there can be a glabrous spot in the lower center. If present, tooth-like processes do not emerge from the visible outer side of the free margin, as it is the case in females, but rather from the inner one (which is near the labrum). In females, the free clypeal margin is slightly convex, the coloration of the clypeal setae varies, and on the lower half of the clypeus itself there can be a more or less distinct indentation, whereas on the upper half a small longitudinal carina may be present. In males, both of these structures are usually absent or barely visible, even when present in the respective female, except in the *nigrohirtus* group.

In contrast to males, female *Sphex* possess long spines on the outer side of the foretarsomeres. They are used for digging out the nest, and their relative length can be a useful diagnostic for identifying some species groups.

Scutellum and metanotum are generally modified in a similar way regarding surface convexity. The scutellum and metanotum of the female are usually slightly flatter than in the respective male. The color of the propodeal setae is not always identical in conspecific males and females, and the same applies to the prominence of potential transversal ridges on the propodeal enclosure.

Finally, males of many species have important diagnostic characters on the apical two sterna of the metasoma and on the genital apparatus, like the presence or absence of dense setal fringes, the shape of posterior sternal margins or the properties of the dorsal side of the inner paramera. However, while genital morphology differs markedly in some groups of African *Sphex*, the majority of them do not show significant differences in male genitalia. Interestingly though, species from other regions can be quite diverse in the shape of their penis valvae, like the Nearctic *Sphex* (Bohart & Menke 1963).

Females have no comparable attributes near the metasomal apex and are usually more difficult to identify, not least due to the lack of placoids.

## **Biology**

*Sphex* construct ground nests that are usually multicellular and vary in depth between 3 and 75 cm depending on species and other factors (Bohart & Menke 1976). As the female basitarsal rake is used for nest digging, the species-specific length and width of its spines is presumably an adaptation to the respective soil type. *Sphex* provision their larvae mainly with tettigoniids, occasionally also with gryllacridids. Nothing has been published so far on the specific nesting habits of any Afrotropical species, but we present a short list of *Sphex* that were observed or collected together with prey (Table 1).

Adults often visit flowers (Gess & Gess 2003).

**Table 1.** Known prey of Afrotropical *Sphex* Linnaeus, 1758, based on orthopterans collected in tandem with identified specimens and photographic observations (marked with asterisks) found at [http://www.waspweb.org/Apoidea/Sphecidae/Sphecinae/Sphecini/Sphex/Sphex\\_taschenbergi.htm](http://www.waspweb.org/Apoidea/Sphecidae/Sphecinae/Sphecini/Sphex/Sphex_taschenbergi.htm) and <https://www.inaturalist.org/observations/38705908>.

<i>Sphex</i> species	Prey taxon
<i>S. ahasverus</i> Kohl, 1890	Gryllacrididae
<i>S. torridus</i> F. Smith, 1873	<i>Tylopsis bilineolata</i> (Serville, 1838) (Phaneropterinae)
<i>S. meridionalis</i> (Arnold, 1947)	<i>Ruspolia</i> sp. (Conocephalinae)
<i>S. taschenbergi</i> Magretti, 1884*	<i>Terpnistria</i> sp. (Phaneropterinae)
<i>S. tomentosus</i> Fabricius, 1787*	<i>Terpnistria</i> sp. (Phaneropterinae)

## Material and methods

### Sources of material

The material used in this study comes from the following institutions (names of collection heads or managers who arranged loans are given in parentheses). Abbreviations of institution names mostly follow Pulawski (2020). All individuals are dried and pinned.

- AMG = Albany Museum, Grahamstown, South Africa (Terence Bellingan, Helen James and John Midgley)
- AMNH = American Museum of Natural History, New York, NY, USA (Christine LeBeau)
- BMNH = The Natural History Museum, formerly British Museum (Natural History), London, UK (David Notton)
- CAS = California Academy of Sciences, San Francisco, CA, USA (Wojciech Pulawski)
- DEI = Deutsches Entomologisches Institut, Müncheberg, Germany (Andrew Liston and Andreas Taeger)
- ICIPE = International Centre of Insect Physiology and Ecology, Nairobi, Kenya (Robert Copeland and Dominic Mogeni)
- IRSN = Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium (Wouter Dekoninck)
- MNHN = Muséum national d'histoire naturelle, Paris, France (Agnière Touret-Alby and Claire Villemant)
- MRAC = Musée royal de l'Afrique Centrale, Tervuren, Belgium (Stéphane Hanot)
- MSNG = Museo civico di Storia naturale di Genova, Genova, Italy (Maria Tavano)
- NHMW = Naturhistorisches Museum, Vienna, Austria (Dominique Zimmermann)
- NRS = Naturhistoriska Riksmuséet, Stockholm, Sweden (Hege Vårdal)
- OÖLM = Biologiezentrum Linz, Oberösterreichisches Landesmuseum, Linz, Austria (Fritz Gusenleitner)
- OUMNH = Hope Department of Entomology, Oxford, UK (James Hogan)
- RMNH = Naturalis Biodiversity Center (formerly Nationaal Natuurhistorisch Museum), Leiden, the Netherlands (Frederique Bakker)
- TMP = Ditsong Museum of Natural History (formerly Transvaal Museum), Pretoria, South Africa (Audrey Ndaba)
- USNM = United States National Museum (= National Museum of Natural History, Smithsonian Institution), Washington DC, USA (Seán Brady)
- ZMB = Museum für Naturkunde, Berlin, Germany
- coll. Jacobs = personal collection of Hans-Joachim Jacobs, Ranzin, Germany
- coll. Schmid-Egger = personal collection of Christian Schmid Egger, Berlin, Germany

The following are depositories of types that are mentioned in the species descriptions but have not been examined personally for this study, though some of them have provided photographs.

- ANSP = Academy of Natural Sciences, Philadelphia, PA, USA (Jason Weintraub)
- HALLE = Zoologisches Institut der Martin-Luther-Universität, Halle, Germany
- MZLU = Lund University Biological Museum (formerly Lund Museum of Zoology), Lund, Sweden
- SAM = South African Museum, Cape Town, South Africa
- TMB = Természettudományi Múzeum, Budapest, Hungary
- ZMUC = Zoological Museum (now Natural History Museum of Denmark), University of Copenhagen, Copenhagen, Denmark

In total, we have examined over 3800 pinned specimens of Afrotropical *Sphex*, originally collected in 44 countries. Those with information precise enough for determining coordinates are mapped in Fig. 129.

A Leica S8 APO stereoscopic microscope and a Leica KL 1500 H light source were used for optical examination. The measurements were done with an ocular micrometer.

Multi-focus photographs of specimens were taken with a Canon EOS 6D Mark II digital camera and a Canon Macro Ring Lite MR-14EX II flash device mounted on a Cognisys StackShot Macro Rail Set, and assembled using Helicon Remote ver. 3.9.9 W and Helicon Focus Pro ver. 7.

Images were edited and cleaned using Adobe Photoshop CS5.1 ver. 12.1 and arranged with Adobe Illustrator CS5.1, ver. 15.1.0.

### **Molecular methods**

We follow Field *et al.* (2011) in selecting mitochondrial cytochrome oxidase I (CO1), nuclear elongation factor-1 $\alpha$  (EF-1 $\alpha$ ) and nuclear long wavelength rhodopsin (LWR) for phylogenetic reconstruction.

The unspecific primer pairs LCO1490-For and H7005-Rev, LWRhFor and LWRhRev, and HaF2For1 and F2-rev1 were sufficient to amplify the target genes from the Nearctic species *Sphex ashmeadi* (Fernald, 1906) and *S. lucae* de Saussure, 1867 which were collected four months prior and preserved in 96% ethanol. However, our tests have shown that these primers were insufficient for amplifying DNA from pinned specimens even when they were collected less than ten years before, probably due to DNA degradation. Therefore, we designed primer pairs for amplifying the respective genes by targeting regions which encompass one half or a quarter of the complete sequence at a time.

In this study, all African specimens from which gene regions have been successfully sequenced were collected between 1984 and 2013. This resulted in a lack of viable material for species which appear to be rare or that occur in regions which have not been the target of collecting trips in the more recent past.

Presumably because of advanced age and suboptimal conservation status for molecular analyses of most of the available material, only approximately 50 % of the individuals in which an extraction was performed actually yielded usable DNA. Amplification of the selected regions proved to be difficult in most cases. For most samples that allowed amplification of the mitochondrial CO1 gene, attempts to amplify the nuclear genes LWR and EF-1 $\alpha$  were unsuccessful, and vice versa. Out of the overall 30 African taxa that yielded usable sequence data, there are merely ten for which we have data from regions of all three of the target genes, and for 12 we were only able to sequence regions from one of the genes (Table 2).

DNA extraction was done either by cutting open the thorax and removing the interior muscle tissue, or by removing one leg or tarsus, usually a hindleg, and then cutting it into very small pieces inside a reaction tube. Afterwards, the sample was processed using the Qiagen DNeasy® Blood & Tissue Kit



or the Qiagen QIAamp<sup>®</sup> DNA Investigator Kit in accordance with the respective protocol. Regarding isolation success, no significant differences between the two commercial products were observed.

DNA amplification was done using polymerase chain reaction (PCR) and a SensoQuest Labcycler Gradient, in volumes of 25 µl with the following composition:

- 17.8 µl purified H<sub>2</sub>O
- 2.5 µl 10 × reaction buffer
- 1 µl MgCl<sub>2</sub>
- 0.5 µl dNTPs
- 0.2 µl Taq
- 1 µl F-primer
- 1 µl R-primer
- 1 µl sample DNA

PCR conditions were as follows: 95°C, 2 min; [95°C, 1 min; Ta 1 min; 72°C, 1 min] × 40 cycles.

Primer synthesis was conducted by Metabion International AG. The following primer pairs were used:

EF-1α:

- HaF2For1 (5'-GGGYAAAGGWTCCCTTCAARTATGC-3') and F2-Rev1 (5'-AATCAGCAGCACCTTTAGGTGG-3'), Ta = 54°C (Danforth *et al.* 1999)
- EF1alpha-mini-For (5'-TAAGGAAGGCAAGGCTGAAGG-3') and EF1alpha-mini-Rev (5'-CGGTACCGATAACCACCGATT-3'), Ta = 58°C, 338 bp product

LWR:

- LWRhFor (5'-AATTGCTATTAYGARACNTGGGT-3') and LWRhRev (5'-ATATGGAGTCCANGCCATRAACCA-3'), Ta = 52°C (Danforth *et al.* 2004)
- LWR-1sthalf-For (5'-ATCTACGCGATGTTGGGCTC-3') and LWR-1sthalf-Rev (5'-TCCCTGCTGAAGTAGTCGGT-3'), Ta = 58°C, 345 bp product
- LWR-2ndhalf-For (5'-CCCAGAGGTAACATGACCG-3') and LWR-2ndhalf-Rev (5'-GGAGATGGTCATCAGGGCAA-3'), Ta = 58°C, 352 bp product
- LWR-quar1-F (5'-ATCTACGCGATGTTGGGCTC-3') and LWR-quar1-R (5'-GGGAGAAGAGCCAGATGCC-3'), Ta = 51.3°C, 160 bp product
- LWR-quar2-F (5'-AAATCCTGGGCATCTGGCTC-3') and LWR-quar2-R (5'-CCCTGCTGAAGTAGTCGGTG-3'), Ta = 58.7°C, 202 bp product

CO1:

- LCO1490-For (5'-GGTCAACAAATCATAAAGATATTGG-3') and H7005-Rev (5'-ACNACRTARTANGTRTCRTG-3'), Ta = 52°C (Folmer *et al.* 1994; Hafner *et al.* 1994)
- *Sphex*-MinibarF1 (5'-GGAACAGGTACAGGAACAGGA-3') and *Sphex*-MinibarR1 (5'-TCTCCTCCTCCGATAGGATCAA-3'), Ta = 52.7°C, 326 bp product
- CO1-start-For (5'-AGAATGTGAGCAGGAATAATAGGAT-3') and CO1-start-Rev (5'-TCAACCAGTTCCTGTTCTCCTGT-3'), Ta = 47.7°C, 312 bp product
- CO1-quar1-F (5'-TGAGCTGGAATAATAGGATCATCTC-3') and CO1-quar1-R (5'-ACTAATCAATTTCCAAATCCTCCA-3'), Ta = 45.9°C, 176 bp product
- CO1-quar2-F (5'-ATTGGAGGATTTGGAAATTGAT-3') and CO1-quar2-R (5'-AAAATAATATTAGATAGGGGTGGA-3'), Ta = 45°C, 188 bp product

**Table 2.** For each African taxon where DNA sequencing was successful, the total length of the recovered sequences is listed. Data obtained from BOLD or GenBank are marked with ‘ext.’ (external). Where sequences were obtained from multiple specimens, the respective gene region and voucher ID are represented by matching colors. In one case, CO1 sequence fragments from two specimens were combined into a single longer one (bicolored cell). Further data on each voucher specimen are listed in Supplementary file 1. The names of new species or subspecies are highlighted in bold.

Taxon	Accession numbers	Voucher ID	CO1	EF-1 $\alpha$	LWR
<i>abbotti abbotti</i>	MW538552; MW582289	THD-032-ICIPE	168 bp	–	560 bp
<i>abbottii nivarius</i>	MW538559	THD-016-OOLM	316 bp	–	–
<i>abyssinicus</i>	MW582276	THD-033-OOLM	–	–	560 bp
<b><i>pseudopraedator</i></b>	MW538560; MW582290	THD-000-ZMB + THD-027-ZMB	342 bp	–	573 bp
<i>schoutedeni malawicus</i>	MW538575; MW582287	THD-028-ZMB	593 bp	–	190 bp
<i>stadelmanni stadelmanni</i>	MW538556; MW582288	THD-008-ZMB + THD-009-ZMB	265 bp	–	542 bp
<i>stadelmanni rufus</i>	MW538562	THD-014-OOLM	327 bp	–	–
<i>ahasverus</i>	MW538553; MW582291	THD-011-ZMB	224 bp	–	673 bp
<i>incomptus</i>	MW582292	THD-035-OOLM	101 bp	–	326 bp
<i>nigrohirtus</i>	MW538567; MW582293	THD-013-OOLM	458 bp	–	192 bp
<i>camerunicus</i>	MW538563	THD-023-OOLM	329 bp	–	–
<i>erythrinus</i>	MW538558; MW558242; MW582282	THD-024-CAS	326 bp	338 bp	628 bp
<i>fumicatus</i>	MW538580; MW558245	GenBank: MH608968.1 / THD-007-ZMB	ext.	320 bp	–
<i>lanatus</i>	MW538579; MW558243; MW582281	THD-005-ZMB + THD-021-OOLM	613 bp	341 bp	604 bp
<i>taschenbergi</i>	MW538576; MW558244; MW582283	THD-004-ZMB	589 bp	153 bp	627 bp
<i>tomentosus</i>	MW538551; MW558239; MW582284	THD-006-ZMB	165 bp	162 bp	647 bp
<i>torridus</i>	MW538577	THD-017-OOLM	607 bp	–	–
<i>decipiens</i>	MW538566; MW558235; MW582286	THD-001-ZMB + THD-010-ZMB	445 bp	240 bp	533 bp
<i>jansei</i>	MW538561	THD-025-ZMB	325 bp	–	–
<i>pruinus</i>	MW538578; MW558236; MW582275	GenBank: MH610705.1 / THD-036-ZMB	ext.	281 bp	534 bp
<b><i>schmideggeri</i></b>	–	BOLD: BC-ZSM-HYM-30269-D07	ext.	–	–
<i>pseudosatanas</i>	MW538569; MW558238; MW582278	THD-029-BMNH	511 bp	358 bp	681 bp
<b><i>rufoclypeatus</i></b>	MW538570	THD-012-OOLM	552 bp	–	–
<i>satanas</i>	MW538568	THD-018-OOLM	524 bp	–	–
<i>haemorrhoidalis</i>	MW538572; MW538573	THD-020-OOLM + THD-034-OOLM	606 bp	–	–
<i>mweruenis</i>	MW538574	THD-019-OOLM	592 bp	–	–
<i>umtalicus</i>	MW538571; MW558237; MW582277	THD-002-ZMB	585 bp	334 bp	366 bp
<i>meridionalis</i>	MW538564; MW558240; MW582279	THD-003-ZMB + THD-026-ZMB	445 bp	337 bp	646 bp
<b><i>nefrens</i></b>	MW538565; MW558241; MW582280	THD-015-OOLM	451 bp	341 bp	646 bp
<b><i>comorensis</i></b>	MW538557	THD-030-MRAC	316 bp	–	–
<i>malagassus</i>	MW538555; MW582285	THD-022-RMNH	283 bp	–	192 bp
<i>cinerascens</i>	MW538554	THD-031-OOLM	271 bp	–	–

New primers were designed with the help of NCBI Primer-BLAST (<https://www.ncbi.nlm.nih.gov/tools/primer-blast/>) based on sequence data from *Sphex ichneumoneus* Linnaeus, 1758, accession numbers JF927357.1 (CO1), JF927399.1 (LWR) and JF927441.1 (EF-1 $\alpha$ ), and *S. fumicatus* Christ, 1791, accession number MH608968.1 (CO1). Optimal temperatures for annealing of these primers were determined through gradient PCRs.

PCR success was assessed on a 1% agarose gel using GelRed for staining and a Syngene G:BOX F3 with the software GeneSys ver. 1.6.9.0 for visualization. Sequencing was done by Macrogen, Inc.

We noticed that amplification of target regions was often less successful in members of the *bohemanni* group compared to individuals of other species, even when the specimens had been collected on the same day. Presumably, the reason for this is the larger body size and stouter build that characterize these species. One would have assumed that this might result in a greater amount of tissue being recoverable from the specimen and thus increase the chance of yielding intact DNA for a higher success rate of the PCR. However, it seems any positive effect which may have resulted from this factor was more than compensated by other negative influences. Since it is very likely that all specimens we examined were air-dried, we theorize that the greater mass and volume of the insect prolonged the time it took until all of the water (naturally contained in the body or as a component of the killing agent that was used) had evaporated from the body. As a result, DNA degradation processes, which are known to occur in the presence of free water (Lindahl 1993), continued for a longer period in these specimens than in smaller ones.

### Phylogenetic analysis

Sequence data were edited and joined using BioEdit ver. 7.1.3.0 (Hall 1999) and aligned with each other using Clustal Omega (<https://www.ebi.ac.uk/Tools/msa/clustalo/>). The data were combined into a single dataset using Sequence Matrix ver. 1.8 (<http://www.ggvaidya.com/taxondna/>) and partitioned accordantly to the three gene regions, which was reassessed using PartitionFinder ver. 2.2.1 (<http://www.robertlanfear.com/partitionfinder/>). Two separate analyses were conducted on the molecular data.

For Bayesian inference (BI) analysis, the substitution model, suitable for each gene partition, was calculated using PAUP\* ver. 4.0a166 (Swofford 2003) and MrModeltest ver. 2.4 (Nylander 2004). The following models were calculated to be ideal:

CO1: GTR+I+G4  
LWR: HKY+F+G4  
EF-1 $\alpha$ : TIM2e+G4

GTR stands for general time-reversible model (Tavaré 1986), which assumes unequal rates and unequal base frequencies, and the parameter combination +I and +G allows for a proportion of invariable DNA sites and varying rates across these according to a discrete gamma distribution with four rate categories (Yang 1994; Gu *et al.* 1995). HKY (Hasegawa *et al.* 1985) is a substitution model with unequal transition/transversion rates and unequal base frequencies, and the parameter +F results in an empirical assessment of base frequencies from the data. Finally, TIM2e is a transitional model with equal base frequencies (Posada & Crandall 1998).

BI analysis using 4 chains was conducted by setting generations to 4 million, trees were sampled every 100 generations, the first 25% generations were discarded as burn-in and posterior probabilities (PP) were then calculated from the posterior distribution of the retained Bayesian trees.

For maximum likelihood (ML) analysis, the substitution model for each partition was calculated using ModelFinder (Kalyaanamoorthy *et al.* 2017) as part of the analysis with W-IQ-TREE (Trifinopoulos *et al.* 2016). The suggested models were identical.

### Maps and locality data

All maps in this publication only contain data from specimens we examined personally, as potential misidentifications from previous records would otherwise distort the results. Exceptions are the type specimens of synonyms which we have not seen but can reasonably presume to be correctly identified. The maps were created with the help of SimpleMappr (<https://www.simplemappr.net>). Since coordinates had not been recorded for the majority of specimens examined, given localities in these cases were searched on [www.geonames.org](http://www.geonames.org) and in entomological or botanical locality lists (Bamps 1982; Bezdek *et al.* 2012). To retain discriminability of coordinates given on the label from those we added through retrospective research, the latter are given in square brackets in the material list. All localities which were deemed precise enough to reasonably pinpoint are present in the respective maps.

### Terminology

Morphological terms largely follow Bohart & Menke (1976). The term ‘appressed setae’ is used to distinguish the short setae from the longer erect ones on the same body area, even though in some cases the short setae may also be partially erect.

‘Paraocular area’ refers to the region between the dorsolateral clypeal margin and the compound eye.

Length ratios given in this paper are calculated as follows: for the petiole (Fig. 11), dorsal length is divided by medial width; for the tarsal rake (Fig. 12), the marked distance  $\beta$  on the outer side of the foretibia is divided by the length of the secant that intersects the base and tip of the antepenultimate spine (arrow).

### Keys

The first key is used to identify the species groups as well as individual species which are either incertae sedis or prone to be misplaced due to less conspicuous group-specific characters. The subsequent keys are for each of the eight species groups and contain all members, even if they were previously covered in the group key. Finally, we include a comparison table for male placoid configurations, as they often allow identification to at least group level (Table 3).

#### Key to species groups and ungrouped species of *Sphex* Linnaeus, 1758

1. Erect setae medially on propodeal enclosure extremely short ( $\leq 0.2$  mm); fore- and hindwing yellow with fuscous margin, scutellum and propodeal enclosure ferruginous (Fig. 39). Body length greater than 25 mm .....*S. paulinierii* Guérin-Méneville, 1843 (subgenus *Menkeella* subgen. nov.)
  - Length of most erect setae medially on propodeal enclosure at least 0.5 mm; color combination different .....2
2. Metanotum markedly raised, usually with distinct median impression (Fig. 7). Area between metapleural sulcus and upper spiracular groove concave, with bulge anterior to the spiracular groove (Fig. 9) .....*argentatus* group (Key A)
  - Metanotum not strongly raised, with indistinct impression or not impressed (Fig. 8), or area between metapleural sulcus and upper spiracular groove convex or plane and not bulging (Fig. 10)<sup>1</sup> .....3

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<sup>1</sup> In several species groups, the metanotum is raised but has very indistinct tubercles and no bulging near the spiracle is present. On the other hand, in the *satanas* group the bulging is present, but the metanotum is always flat.

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3. Erect propodeal setae oriented posteriorly (Fig. 1) .....4  
 – Erect propodeal setae oriented anteriorly or perpendicularly (Figs 2–4) .....5
4. Female: appressed setae on face uniformly silvery (Fig. 13) or rich golden. Male: cellular wing area without yellow tinge; sternum VIII posterolaterally concavely emarginate .....  
 .....*nigrohirtus* group (Key B)  
 – Female: appressed setae on clypeus at least medially dark brown (Figs 14–18). Male: apical part of sternum VIII semicircular (Fig. 20) or rectangular (Fig. 25), if concavely emarginate then cellular wing area with conspicuous yellow tinge (Fig. 93) .....*bohemanni* group (Key C)
5. Petiole length more than  $3 \times$  its medial width; basal half of forewing with yellow tinge and yellowish veins (Fig. 38) .....6  
 – Petiole much shorter, its length at most  $2.8 \times$  its medial width. If longer, then wings without yellow tinge and wing veins dark brown (Fig. 100) .....7
6. Free clypeal margin in both sexes medially with distinct tooth-like process. Male: placoids on flagellomeres IV–VI, covering their entire length. Western Africa .....*S. cinerascens* Dahlbom, 1843  
 – Process at free clypeal margin broad and very short or absent. Male: placoids on flagellomeres V and VI, covering only their basal third. South and central Asia, Arabian Peninsula .....  
 .....*S. obscurus* Fabricius, 1804
7. Erect propodeal setae oriented anteriorly, especially laterally on propodeal enclosure (Fig. 2) ....8  
 – Erect propodeal setae oriented perpendicularly (Figs 3–4) .....9
8. Female: scutellum and metanotum markedly flat (Fig. 5). Male: clypeus uniformly black or at most free margin ferruginous; erect clypeal setae silvery; petiole length less than  $3 \times$  its medial width .....*satanas* group (Key D)  
 – Female: scutellum and metanotum convex (Fig. 6). Male: clypeus uniformly black or lower third or half ferruginous (Fig. 28); erect clypeal setae silvery, golden or black; petiole length in one species more than  $3 \times$  its medial width (Fig. 100) .....*gaullei* group (Key E)
9. Metanotum not raised medially, with silvery-golden vestiture (Figs 119–120). Longest erect setae in anterior center of propodeal enclosure at least 0.75 mm. Madagascar and surrounding islands .....*malagassus* group (Key F)  
 – Metanotum raised medially, with black vestiture (Figs 3–4). Longest erect setae in anterior half of propodeal enclosure no more than 0.65 mm. Continental Africa .....10
10. Female: scutellar vestiture coarse and dense (Figs 3–4); usually some erect setae (similar length as the long erect metanotal setae) present near scutellar center; propodeal sculpture discontinuously rugose; outer side of midtibial apex with distinctly curved spine. Male: free clypeal margin medially with distinct tooth-like process (Fig. 27) .....*umtalicus* group (Key G)  
 – Female: scutellar vestiture fine and less dense (Fig. 8); scutellar center without any long erect setae like the ones on the metanotum (with long erect setae only being present near posterolateral scutellar margin); propodeal sculpture with fine transverse continuous carinae; spines on outer side of midtibial apex straight. Male: free clypeal margin without tooth-like process (Fig. 28) .....11
11. Female: clypeus black except for ferruginous free margin (Fig. 101). Male: appressed facial setae silvery; free clypeal margin largely black, lower clypeal center sometimes ferruginous; basal half of mandible black with only a ferruginous stripe medially on mandible (Fig. 28) .....  
 .....*S. decipiens* Kohl, 1895  
 – Female: clypeus completely ferruginous (Figs 36–37). Male: appressed facial setae brassy or golden; free clypeal margin and basal half of mandible largely ferruginous .....*meridionalis* group (Key H)



**Figs 1–6.** 1–3. Dorsal view of propodeal setae in different orientation. 4. Lateral view of thoracic dorsum. 5–6. Lateral view of scutellum and metanotum. 1. *Sphex pseudopraedator* sp. nov., ♀. 2. *S. jansei* Cameron, 1910, ♂. 3–4. *S. umtalicus* Strand, 1916, ♀. 5. *S. rufoclypeatus* sp. nov., ♀. 6. *S. gaullei* Berland, 1927, ♀.

**Key A: Species of the *Sphex argentatus* group**

1. Erect propodeal setae brown or black .....2  
 – Erect propodeal setae silvery or golden .....5
2. Cellular wing area with yellow or ferruginous tinge; wing base not notably infusate (Figs 58–59). Madagascar and surrounding islands only .....3  
 – Cellular wing area without yellow tinge; wing base markedly fuscous (Figs 49, 52). Widespread .....4
3. Female: apical margin of fore- and hindwing completely fuscous (Fig. 58). Male: erect clypeal and paraocular setae uniformly black .....*S. torridus* F. Smith, 1873  
 – Female: apical margin of forewing only anteriorly with fuscous spot, apex of hindwing hyaline. Male: erect clypeal setae silvery intermixed with black ones; erect paraocular setae uniformly silvery-golden .....*S. voeltzkowii* Kohl, 1909
4. Erect clypeal setae entirely or largely silvery (Fig. 53) .....*S. fumicatus* Christ, 1791  
 – Erect clypeal setae black (Fig. 54) .....*S. taschenbergi* Magretti, 1884
5. Appressed and erect setae on face and propodeum rich golden, sometimes silvery. Hindfemur and most of hindtibia brightly ferruginous (Fig. 57) .....*S. tomentosus* Fabricius, 1787  
 – Erect setae on face silvery or silvery-golden, sometimes intermixed with black ones; erect setae on propodeum silvery (Figs 41–44, 50–51). Hindleg darker .....6
6. Erect clypeal setae at least partially black. Seychelles .....*S. rufinervis* Pérez, 1895  
 – Erect clypeal setae uniformly silvery .....7
7. Female: wings with yellow tinge (Fig. 41); petiole length less than  $1.7 \times$  its medial width. Male: very broad placoids (nearly width of segment) covering flagellomeres III–VI .....  
 .....*S. erythrinus* (Guiglia, 1939)  
 – Female: wings without yellow tinge (Figs 43, 50); petiole length more than  $1.7 \times$  its medial width. Male: placoid(s) more narrow (at most half as wide as segment), covering flagellomeres III–V or only V .....8
8. Female: lower part of clypeus brightly ferruginous; propodeal enclosure not obscured by vestiture, with 7–10 distinct transversal ridges (Fig. 43). Male: setae laterally on gonostyles hyaline (Fig. 46); mid- and hindlegs completely black; placoids covering entire length of flagellomeres III–V .....  
 .....*S. feijeni* nom. nov.  
 – Female: clypeus black; propodeal enclosure without any distinct ridges, posterior half obscured by appressed setae (Fig. 50). Male: gonostyles laterally with stout black setae (compare Fig. 45); mid- and hindlegs partially ferruginous; single placoid on proximal half of flagellomere V .....  
 .....*S. lanatus* Mocsáry, 1883

**Key B: Species of the *Sphex nigrohirtus* group**

1. Propodeal setae golden or silvery-golden, obscuring sculpture completely .....  
 .....*S. ahasverus* Kohl, 1890  
 – Propodeal setae black or silvery-white, leaving sculpture partially visible .....2



**Figs 7–12.** 7–8. Dorsal view of scutellum and metanotum. 9–10. Lateral view of upper metapleural area (anterior = left). 11. Dorsal view of petiole. 12. Basitarsal rake. 7. *Sphex tomentosus* Fabricius, 1787, ♂. 8. *S. meridionalis* (Arnold, 1947), ♀. 9. *S. torridus* F. Smith, 1873, ♂. 10. *S. nigrohirtus* Kohl, 1895, ♀. 11. *S. haemorrhoidalis* Fabricius, 1781, ♀. 12. *S. decipiens* Kohl, 1895, ♀.  $\alpha$ : defined as petiole length;  $\beta$ : defined as length of outer side of tarsomere I; arrow: antepenultimate spine.

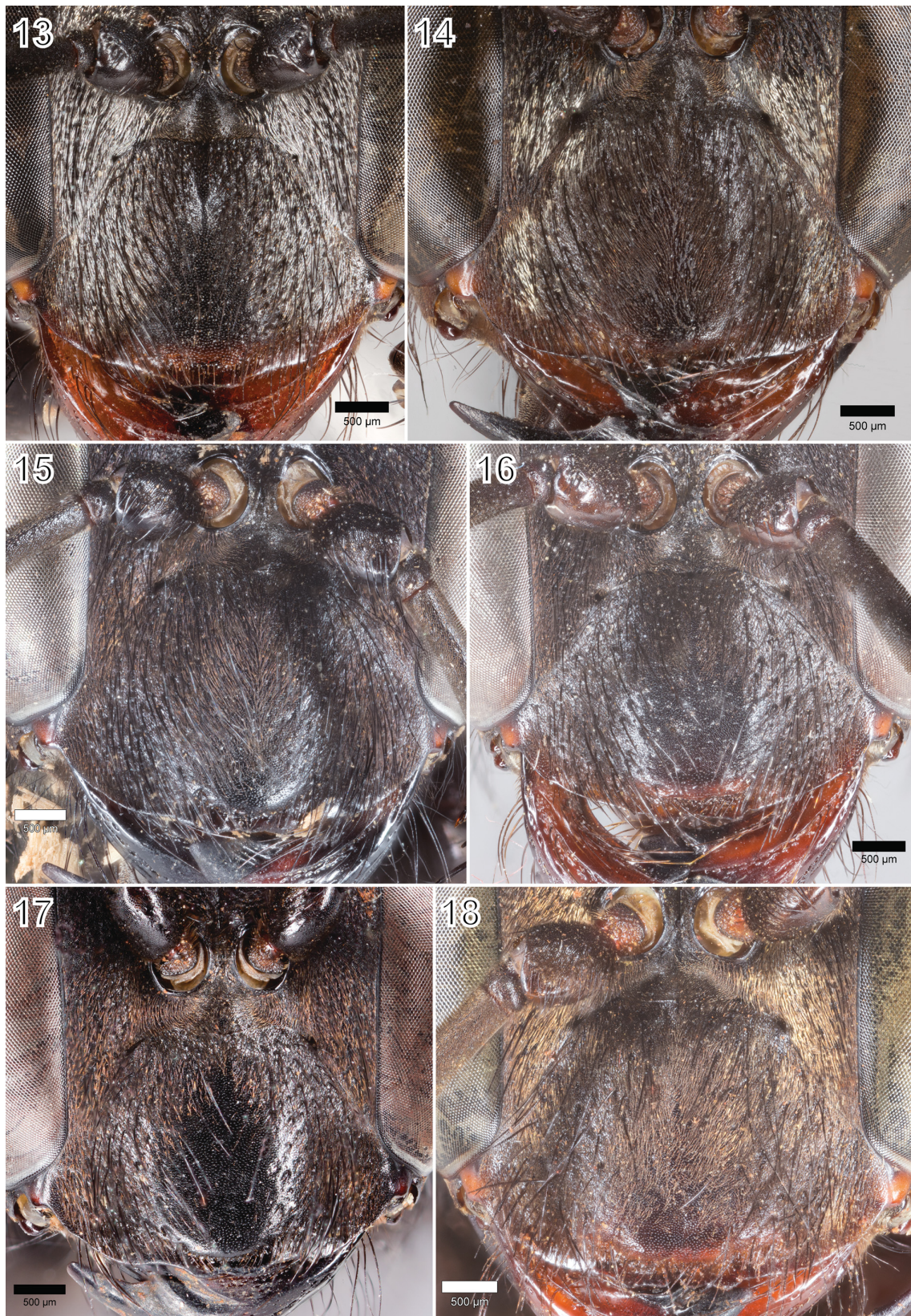


2. Female: body length > 28 mm; mandible black with only small dark ferruginous stripe centrally; conspicuous clypeal indentation. Male: flagellomeres IV–VII with broad placoids covering their entire length; apical part of penis valvae dorsolaterally with concave emargination (Figs 79–80) .....*S. camerunicus* Strand, 1916
  - Female: body length < 28 mm; basal half of mandible bright ferruginous; smaller clypeal indentation. Male: flagellomere V or VI with narrow placoid; apical part of penis valvae dorsolaterally flat or convex (Figs 81–82) .....3
3. Significant portion of erect setae on inner part of propodeal enclosure silvery (Fig. 85). Male: cellular wing area partially hyaline, with pale violet iridescence .....*S. incomptus* Gerstaecker, 1871
  - Erect setae on propodeal enclosure black, silvery near posterior margin at most (Fig. 86). Male: cellular wing area uniformly slightly fuscous, with conspicuous purple (Fig. 87) or cyan-violet iridescence .....4
4. Wings with cyan iridescence. Female: appressed setae posterolaterally on collar and propodeum and erect setae on posterior propodeal margin uniformly black (Fig. 84) .....*S. nigrohirtus* Kohl, 1895
  - Wings without any cyan iridescence. Female: appressed setae posterolaterally on collar and propodeum and erect setae on posterior propodeal margin silvery (Fig. 86). Male: iridescence on forewing Byzantium-colored (Fig. 87) .....*S. pulawskii* sp. nov.

**Key C: Species of the *Sphex bohemanni* group**

**Females**

1. Clypeus, trochanter, femora and tibiae largely ferruginous (Fig. 96) .....*S. stadelmanni rufus* subsp. nov.
  - Clypeus and legs almost entirely black .....2
2. Cellular wing area with yellow tinge (Fig. 93) .....*S. pseudopraedator* sp. nov.
  - Cellular wing area more or less fuscous, without yellow tinge .....3
3. Appressed clypeal and paraocular setae black, without differently-colored luster (Figs 15–16) ..
  - Appressed lateroclypeal and paraocular setae with silvery, golden or ferruginous luster (Figs 14, 17–18) .....5
4. Free clypeal margin black; mandible black with dark ferruginous stripe only in center (Fig. 15) .....*S. abbotti abbotti* W. Fox, 1891
  - Free clypeal margin and basal half of mandible dark ferruginous (Fig. 16) .....*S. stadelmanni stadelmanni* Kohl, 1895
5. Erect propodeal setae completely black .....6
  - Erect propodeal setae partially or entirely silvery .....7
6. Free clypeal margin black; mandible black with dark ferruginous stripe only in center (Fig. 17) .....*S. abyssinicus* (Arnold, 1928)
  - Free clypeal margin and basal half of mandible dark ferruginous (Fig. 18) .....*S. schoutedeni malawicus* subsp. nov.
7. Petiole length about 2 × its medial width .....*S. abbotti nivarius* subsp. nov.
  - Petiole length at most 1.7 × its medial width .....*S. schoutedeni schoutedeni* Kohl, 1913



**Figs 13–18.** Faces of females in frontal view. 13. *Sphex nigrohirtus* Kohl, 1895. 14. *Sphex abbotti nivarius* subsp. nov. 15. *S. abbotti abbotti* W. Fox, 1891. 16. *S. stadelmanni stadelmanni* Kohl, 1895. 17. *S. abyssinicus* (Arnold, 1928). 18. *S. schoutedeni malawicus* subsp. nov.

**Males**

1. Posterior margin of sternum VII with notable incision (Figs 19–20) .....2  
– Posterior margin of sternum VII without incision (Fig. 25) .....4
2. Depth of incision no more than half the visible part of sternum VII (Fig. 19) .....  
.....*S. bohemannii* Dahlbom, 1845  
– Depth of incision nearly as long as visible part of sternum VII (Fig. 20) .....3
3. Appressed and erect propodeal setae completely black (Fig. 88) .....*S. abbotti abbotti* W. Fox, 1891  
– Erect and sometimes appressed propodeal setae at least partially silvery (Fig. 89) .....  
.....*S. abbotti nivarius* subsp. nov.
4. Posterior margin of sternum VIII rectangularly truncate (Fig. 25) .....*S. abyssinicus* (Arnold, 1928)  
– Posterior margin of sternum VIII rounded or laterally concave .....5
5. Cellular wing area with yellow tinge (Fig. 93) .....*S. pseudopraedator* sp. nov.  
– Cellular wing area more or less fuscous, without yellow tinge .....6
6. Fused penis valvae laterally widened and entire; valviceps oriented obliquely (Figs 21–22) .....7  
– Fused penis valvae laterally not widened but notched; valviceps oriented perpendicularly (Figs 23–  
24) .....8
7. Clypeus and legs mostly black (Fig. 95); appressed facial setae silvery-white .....  
.....*S. stadelmanni stadelmanni* Kohl, 1895  
– Lower clypeal center, trochanters, femora and tibiae largely ferruginous (Fig. 97); appressed  
facial setae brassy .....*S. stadelmanni rufus* subsp. nov.
8. Erect propodeal setae at least partially silvery near center (Fig. 94) .....  
.....*S. schoutedeni schoutedeni* Kohl, 1913  
– Erect propodeal setae centrally black, golden at posterior margin .....  
.....*S. schoutedeni malawicus* subsp. nov.

**Key D: Species of the *Sphex satanas* group**

1. Female: scutellum and metanotum completely black (Figs 113–114). Male: cellular wing area at  
least partially fuscous; narrow placoids on proximal halves of flagellomeres IV–VI; free clypeal  
margin medially with folding (compare Fig. 28) .....2  
– Female: scutellum at least on posterior half and metanotum ferruginous (Figs 109–110, 116).  
Male: cellular wing area hyaline; placoids broader and covering entire length of flagellomeres  
III–VI or free clypeal margin without folding .....3
2. Female: propodeal setae silvery (Fig. 113) .....*S. satanas satanas* Kohl, 1898  
– Female: propodeal setae black (Fig. 114) .....*S. satanas memnon* subsp. nov.
3. Female: anterior half of scutellum black (Fig. 116). Male: at least femora bright ferruginous  
(Fig. 117). Socotra .....*S. socotrensis* sp. nov.  
– Female: scutellum entirely ferruginous (Figs 109–110). Male: legs completely black (Fig. 111).  
Mainland Africa .....4
4. Female: upper half of clypeus as well as complete scutum black (Fig. 109). Male: free clypeal  
margin without folding; narrow placoids on proximal halves of flagellomeres IV–VI .....  
.....*S. pseudosatanas* sp. nov.  
– Female: all of clypeus and anterior half of scutum ferruginous (Fig. 110). Male: free clypeal  
margin medially with folding (compare Fig. 28); broad placoids covering entire length of  
flagellomeres III–VI .....*S. rufoclypeatus* sp. nov.



**Figs 19–24.** 19–20. Ventral view of the two apical sterna in males of the *bohemanni* group. 21, 23. Dorsal view of apical third of penis valvae in males of the *bohemanni* group. 22, 24. Lateral view of penis valvae. 19. *Sphex bohemanni* Dahlbom, 1845. 20. *S. abbotti abbotti* W. Fox, 1891. 21–22. *S. stadelmanni stadelmanni* Kohl, 1895. 23–24. *S. schoutedeni* s. lat.

**Key E: Species of the *Sphex gaullei* group**

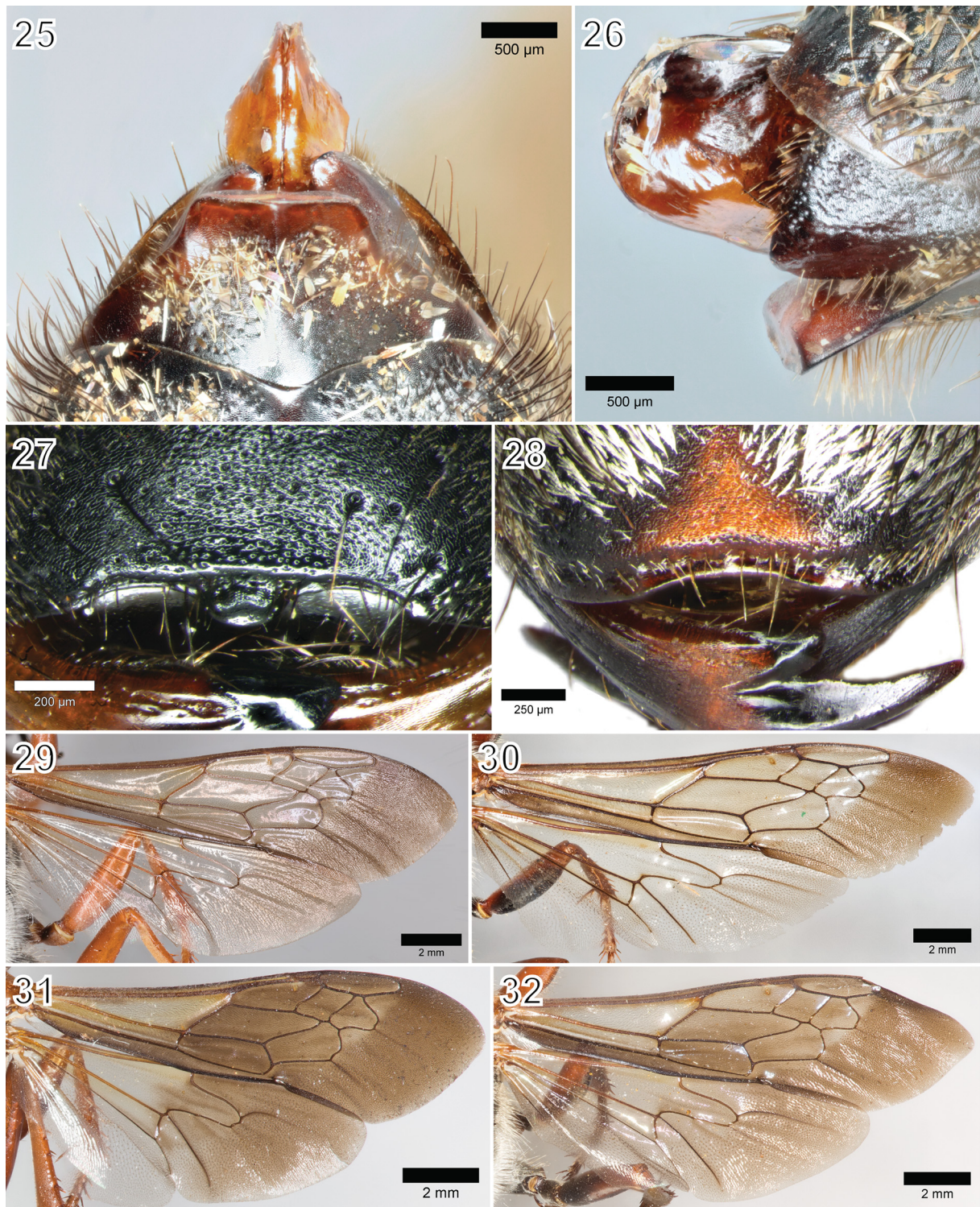
1. Female: scutellum and clypeus completely ferruginous (Figs 104, 106, 108). Male: at least lower/inner third of clypeus ferruginous; facial setae golden or silvery .....2
  - Female: scutellum and at least upper half of clypeus black (Figs 100–102). Male: clypeus nearly or completely black; facial setae never golden .....4
2. Petiole and metasomal segment I bright ferruginous (Fig. 108). Female: meso- and metapleurae ferruginous; basal half of forewing with conspicuous yellow tinge and cellular wing area not infuscate. Male: erect clypeal and paraocular setae silvery .....*S. schmideggeri* sp. nov.
  - Petiole and metasoma black (Figs 104–107). Female: meso- and metapleurae black; cellular area of forewing either hyaline and without yellow tinge or notably infuscate in apical part with at most inconspicuous yellow tinge near wing base. Male: erect clypeal and paraocular setae golden .....3
3. Female: cellular area of forewing hyaline (Fig. 29), usually without violet iridescence; pronotal lobe predominantly black. Male: hindwing and cellular area of forewing hyaline (Fig. 30) .....*S. jansei* Cameron, 1910
  - Female: apical half of forewing markedly infuscate (Fig. 31), with violet iridescence; pronotal lobe predominantly ferruginous. Male: cellular area of forewing infuscate in apical half, or at least apical margin of hindwing infuscate (Fig. 32) .....*S. gaullei* Berland, 1927
4. Wings hyaline. Erect facial and propodeal setae silvery (Figs 102–103). Petiole length more than  $3 \times$  its medial width .....*S. pruinus* Germar, 1817
  - Wings fuscous. Erect facial and propodeal setae black (Figs 100–101). Petiole length less than  $2.5 \times$  its medial width .....*S. decipiens* Kohl, 1895

**Key F: Species of the *Sphex malagassus* group**

1. Pronotum laterally and mesopleuron usually with ferruginous stripe. Female: appressed facial setae pale silvery. Male: clypeus entirely ferruginous (Fig. 120) .....*S. malagassus* de Saussure, 1890
  - Pronotum and mesopleuron black. Female: appressed facial setae rich golden. Male: clypeus black except for lower center (Fig. 119) .....*S. comorensis* sp. nov.

**Key G: Species of the *Sphex umtalicus* group**

1. Male: appressed clypeal setae black .....*S. hades* sp. nov.
  - Male: appressed clypeal setae silvery .....2
2. Wings with distinct green iridescence; erect propodeal setae entirely black (Fig. 63). 26–32 mm long .....*S. caeruleanus* Drury, 1773
  - Wings with violet or blue iridescence, or without any. If greenish, then erect propodeal setae at least partially silvery (Figs 64–65). Smaller .....3
3. Female: erect setae at posterior propodeal margin silvery (Fig. 64). Male: free clypeal margin ferruginous or black; erect propodeal setae largely silvery (Fig. 65); broad placoids cover entire length of at least flagellomeres V and VI .....*S. mweruensis* (Arnold, 1947)
  - Female: erect propodeal setae uniformly black (Figs 69, 72–73). Male: free clypeal margin black; erect propodeal setae black, if silvery then placoids narrow .....4



**Figs 25–32.** 25–26. Ventral and lateral view of sternum VIII and genitalia in male of *Sphex abyssinicus* (Arnold, 1928). 27–28. Frontal view of free clypeal margin in males. 29–32. Dorsal view of fore- and hindwing in males and females of the *gaullei* group. 27. *S. umtalicus* Strand, 1916. 28. *S. decipiens* Kohl, 1895. 29. *S. jansei* Cameron, 1910, ♀. 30. *S. jansei*, ♂. 31. *S. gaullei* Berland, 1927, ♀. 32. *S. gaullei*, ♂.

4. Female: clypeus black (Fig. 33), at most lower half ferruginous; legs black, rarely ferruginous (Fig. 72); appressed clypeal setae dark brown; appressed lateroclypeal and paraocular setae without ferruginous-golden luster (Fig. 33); at most basal half of flagellomere I ferruginous. Male: legs black or dark ferruginous, or rarely all tibiae and most of mid- and hindtarsi ferruginous; basal half of mandible black or ferruginous; mesosomal vestiture uniformly black .....  
 .....**S. umtalicus** Strand, 1916  
 – Female: clypeus and legs largely ferruginous, if clypeus predominantly black then appressed lateroclypeal and paraocular setae with ferruginous-golden luster (Fig. 34); flagellomeres black or partially ferruginous. Male: basal half of mandible bright ferruginous; hindtibia bright ferruginous with the remainder of the legs black; mesosomal vestiture silvery or black .....5
5. Female: appressed lateroclypeal and paraocular setae with ferruginous-golden luster (Fig. 34). Male: cellular area of fore- and hindwing only slightly fuscous; erect setae at least on scutum partially silvery (Fig. 70); narrow placoid on flagellomere V with at most small placoid structures on neighboring flagellomeres .....**S. haemorrhoidalis** Fabricius, 1781  
 – Female: appressed lateroclypeal and paraocular setae with silvery luster (Fig. 35). Male: wings conspicuously fuscous; erect setae on thoracical dorsum black (Fig. 74); broad placoids cover entire length of flagellomeres IV–VI .....**S. victoria** sp. nov.

**Key H: Species of the *Sphex meridionalis* group**

1. Female: scutellum ferruginous (Fig. 127). Male: at least flagellomeres I–IV ferruginous (Fig. 128) .....**S. occidentalis** sp. nov.  
 – Female: scutellum black (Figs 124–125). Male: at most part of flagellomere I ferruginous, remaining flagellomeres black (Fig. 126) .....2
2. Southern-central Africa. Female: appressed paraocular setae rich golden (Fig. 36) .....**S. meridionalis** (Arnold, 1947)  
 – Eastern Africa. Female: appressed paraocular setae pale silvery-golden (Fig. 37) .....**S. nefrens** sp. nov.

**Results**

Class Insecta Linnaeus, 1758  
 Order Hymenoptera Linnaeus, 1758  
 Family Sphecidae Latreille, 1802  
 Genus *Sphex* Linnaeus, 1758

Subgenus *Sphex (Menkeella)* subgen. nov.  
 urn:lsid:zoobank.org:act:757B17B9-BEA9-4588-93F6-CE6348CEBB14

***Sphex (Menkeella) paulinierii*** Guérin-Méneville, 1843  
 Figs 39–40, 47 (blue)

*Sphex paulinierii* Guérin-Méneville, 1843: 8, ♀ (holotype: ♀, Senegal, M. Paulinier leg., RMNH, not examined).

*Sphex eximius* Lepeletier de Saint Fargeau, 1845: 360, ♂ (holotype or syntype: ♂, Senegal (depository?), not examined). Synonymized with *Chlorion paulinieri* by R. Turner 1919: 397.

**Table 3** (continued on next page). Table for quick-identification of males based on placoid configuration. Each flagellomere is represented by three symbols, each of which describes the form of the placoid in the respective approximate third of the segment. If all subspecies have identical placoid configurations, they are combined as *sensu lato* ('s. lat.'). Notable, but unnamed variations are listed below the respective taxon as 'var.'. The presence of an arrow indicates that different specimens can vary between the states shown, with intermediate forms occurring. The names of new species are highlighted in bold. Legend: '-' = placoid absent; 'o' = placoid narrow; 'O' = placoid broad

Group	Species	Flagellomere							
		1	2	3	4	5	6	7	
argentatus	<i>erythrinus</i>	---	---	OOO	OOO	OOO	OOO	---	
	<i>fejjeni</i>	---	---	OOO	OOO	OOO	---	---	
	<i>fumicatus</i>	---	---	---	---	OOO	OOO	---	
	<i>fumicatus</i> var.	---	---	---	--- → ooo	Ooo	ooo	---	
	<i>lanatus</i>	---	---	---	---	oo-	---	---	
	<i>rufinervis</i>	---	---	---	---	Ooo	ooo	---	
	<i>taschenbergi</i>	---	---/OO-	OOO	OOO	OOO	OOO	---	
	<i>tomentosus</i>	---	---	---	---	OOO	OOO	---	
	<i>torridus</i>	---	---	---	---	OOO	OOO	---	
	<i>voeltzkowii</i>	---	---	---	---	OOO	OOO	---	
bohemanni	<i>abyssinicus</i>	---	---	---	OOO	OOO	OOO	---	
	<i>abbotti</i> s. lat.	---	---	---	OOO	OOO	OOO	---	
	<i>bohemanni</i>	---	---	---	ooo	Ooo	ooo	---	
	<i>bohemanni</i> var.	---	---	---	ooo	Ooo	--- → o--	---	
	<b><i>pseudopraedator</i></b>	---	---	---	OOO	OOO	OOO	---	
	<b><i>pseudopraedator</i></b> var.	---	---	---	OOO	OOO	OOO	OOO	
	<i>schoutedeni</i> s. lat.	---	---	---	OOO	OOO	OOO	---	
	<i>stadelmanni</i> s. lat.	---	---	---	OOO	OOO	OOO	---	
	nigrohirtus	<i>ahasverus</i>	---	---	---	OOO	OOO	OOO	---
		<i>camerunicus</i>	---	---	---	OOO	OOO	OOO	OOO
<i>incomptus</i>		---	---	---	---	oo-	---	---	
<i>nigrohirtus</i>		---	---	---	---	o-o	---	---	
<i>nigrohirtus</i> var.		---	---	---	---	ooo/oo-	---	---	
<b><i>pulawskii</i></b>		---	---	---	---	oo-	---	---	
<b><i>pulawskii</i></b> var.		---	---	---	---	ooo	-oo	---	
umtalicus	<i>caeruleanus</i>	---	---	---	OOO/---	OOO	OOO	---	
	<i>caeruleanus</i> var.	---	---	---	---	ooo	ooo	---	
	<b><i>hades</i></b>	---	---	---	---	oOo	o-- → oOo	---	
	<i>haemorrhoidalis</i>	---	---	---	---	oo-	o--	---	
	<i>haemorrhoidalis</i> var.	---	---	---	---	oo-	---	---	
	<i>mweruensis</i>	---	---	---	OOO	OOO	OOO	---	
	<i>umtalicus</i>	---	---	---	---	oOo	oOo	---	
	<i>umtalicus</i> var.	---	---	---	---	oOo	--- → o--	---	
	<b><i>victoria</i></b>	---	---	---	OOO	OOO	OOO	---	
	<b><i>victoria</i></b> var.	---	---	---	---	OOO	OOO	---	



**Table 3** (continued).

Group	Species	Flagellomere						
		1	2	3	4	5	6	7
meridionalis	<i>meridionalis</i>	---	---	---	---	ooo	---	---
	<i>nefrens</i>	---	---	---	---	ooo	---	---
	<i>occidentalis</i>	---	---	---	---	ooo	---	---
gaullei	<i>decipiens</i>	---	---	--- → ooo	ooo/o-o	--- → ooo	---	---
	<i>gaullei</i>	---	---	ooo/o-o	ooo	---	---	---
	<i>jansei</i>	---	---	o-o	ooo	---	---	---
	<i>pruinus</i>	---	---	OOO	OOO	OOO	OOO	---
	<i>schmideggeri</i>	---	---	ooo	ooo	---	---	---
satanas	<i>pseudosatanas</i>	---	---	---	o--	o--	o--	---
	<i>rufoclypeatus</i>	---	---	OOO	OOO	OOO	OOO	---
	<i>satanas</i>	---	---	---	o--	o--	o--	---
	<i>satanas</i> var.	---	---	---	o--	o--	---	---
	<i>socotrensis</i>	---	---	---	oo-	oo-	oo-	---
malagassus	<i>comorensis</i>	---	---	---	OOO	OOO	O--	---
	<i>malagassus</i>	---	---	---	OOO	OOO	OOO	---
incerta sedis	<i>cinerascens</i>	---	---	---	o-o	ooo	ooo	---
	<i>paulinierii</i>	--o	OOO	OOO	OOO	OOO	OOO	---

**Differential diagnosis**

Among the African *Sphex*, this species is very easy to recognize due to its short erect setae on the propodeal enclosure, the two swellings on each propodeal side (Fig. 40), and the conspicuous coloration (Fig. 39) and large body size.

**Etymology**

*Menkeella* is named in honor of Dr Arnold S. Menke.

**Material examined**

AFRICA • 1 ♂; “Congo”; MNHN.

BURKINA FASO – **Houet Province** • 1 ♂; Bobo-Dioulasso; [11°11' N, 4°17' W]; 30 Sep. 1967; J. Hamon leg.; USNM.

CHAD – **Logone Oriental** • 1 ♀; Bébédjia, 400 m from Moundou; [8°41' N, 16°34' E]; 4 Oct. 1970; J.H. and M. Lourens leg.; RMNH. – **Ouadaï** • 1 ♀; near Abecher [Abéché]; [13°49'45" N, 20°49'56" E]; H. Franz leg.; NHMW.

ETHIOPIA • 1 ♂; BMNH.

GAMBIA • 1 ♂; BMNH. – **Banjul** • 1 ♂; Banjul; [13°27'09" N, 16°34'40" W]; 10–23 Nov. 1983; K.M. Guichard leg.; BMNH.

GHANA – **Savannah Region** • 4 ♂♂, 2 ♀♀; Yapi [Yapei]; [9°09'08" N, 1°08'52" W]; J.J. Simpson leg.; BMNH.

MALI – **Mopti Region** • 2 ♂♂, 1 ♀; near Sofara; [14°01' N, 4°14' W]; 3 Sep. 1944; K.M. Guichard leg.; BMNH.

SENEGAL • 2 ♀♀; 1831; Audouin leg.; MNHN • 1 ♂, 1 ♀; Heudelot leg.; MNHN • 1 ♀; Lompoul; [15°24'32.9" N, 16°40'17.6" W]; 24 Oct. 1961; A. Villiers leg.; MNHN. – **Diourbel Region** • 1 ♀; M'Bambey [Bambey]; [14°43'12" N, 16°36'41" W]; 28 Oct.–6 Nov. 1939; M. Risbec leg.; MRAC.

UGANDA – **Eastern Region** • 1 ♂; Mbale–Kumi Road, 3700 ft S of Lake Salisbury; [1°33'33" N, 33°57'15" E]; BMNH.

## Description

### Female

SIZE. 34.1–42.5 mm.

COLOR. Black or dark brown except for the following, which are ferruginous: basal half of mandible, clypeus, scape, pedicel, flagellomeres I–VI, neck, collar, tegula, scutum except anterior margin and medial longitudinal stripe, scutellum, propodeum, petiole dorsally, metasomal segment I, metasomal segment II except posterior margin and legs from coxa onward excluding claw. Cellular wing area yellowish, apex including marginal cell and submarginal cell III of forewing fuscous.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure rich or pale golden. Erect propodeal setae oriented perpendicularly. Lower center of clypeus with glabrous spot. Scutellum finely and densely pubescent.

STRUCTURE. Free clypeal margin simple, stepped medially. Clypeus without indentation and carina. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with 15–20 distinct ridges. Foretarsomere I 2.5–2.6× length of antepenultimate spine. Petiole length 2.1–2.2× its medial width.

### Male

SIZE. 26.7–32.0 mm.

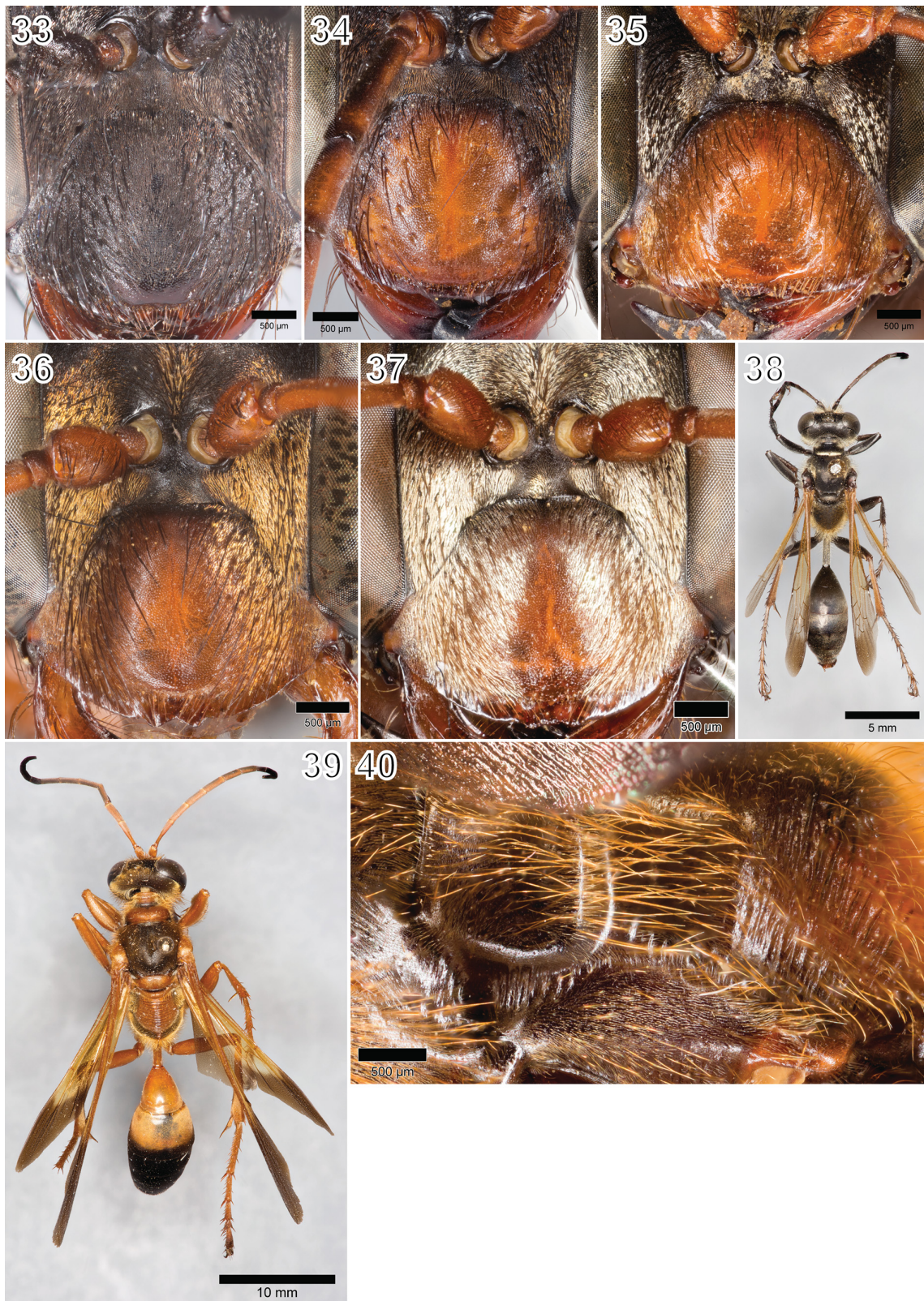
COLOR. Black or dark brown, except for the following which are ferruginous: basal half of mandible, clypeus, scape, pedicel, flagellomeres I–VI dorsally, neck and collar dorsally, tegula, scutum, scutellum, propodeal enclosure, petiole, metasomal segment I, metasomal tergum II except posterior margin, apical segment of metasoma and legs from coxa onward excluding claw. Cellular wing area yellowish, apical margin fuscous.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar and scutum golden, on propodeal enclosure silvery. Erect setae on propodeal margin golden. Erect propodeal setae oriented perpendicularly. Lower center of clypeus with glabrous spot. Scutellum finely and densely pubescent.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with 15–20 distinct ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII concavely emarginate. Penis valvae without conspicuous modifications. Petiole length 2.4–2.5× its medial width. Flagellomere I with broad placoid covering distal half, flagellomeres II–VI with broad placoids covering their entire length.

## Variation

Unknown.



**Figs 33–40.** 33–37. Frontal view of faces in females of the *umtalicus* and *meridionalis* group. 33. *Sphex umtalicus* Strand, 1916. 34. *S. haemorrhoidalis* Fabricius, 1781. 35. *S. victoria* sp. nov. 36. *S. meridionalis* (Arnold, 1947). 37. *S. nefrens* sp. nov. 38. *S. cinerascens* Dahlbom, 1843 habitus of ♂. 39–40. *S. paulinierii* Guérin-Méneville, 1843, ♂. 39. Habitus. 40. Mesosomal side (anterior = left).

### Distribution

Western and eastern Africa.

### Remarks

This species differs from the other *Sphex* s. str. through its absence of a complete spiracular groove. Instead, it possesses a sulcus that connects the lower metapleural pit with the anteroventral pit (Fig. 40). Similar to members of the *argentatus* group (Fig. 9), *S. paulinierii* also has a swelling anteroventrally of the spiracle, although it has an additional swelling posteriorly to it, laterally on the propodeal enclosure. This posterior swelling is unique, and *S. paulinierii* lacks the distinctly impressed, bituberculate metanotum that is characteristic for the *argentatus* group. Furthermore, its very short erect propodeal setae are unusual for *Sphex*, and no longitudinal carina is present on the female labrum. For these reasons, with particular emphasis on a complete spiracular groove being an extremely important defining character for the subgenus *Sphex* (Bohart & Menke 1976) and the lack of distinctive characteristics for species group assignment, we have decided to place *S. paulinierii* in a separate subgenus.

Subgenus *Sphex* (*Sphex*) Linnaeus, 1758

*Sphex cinerascens* Dahlbom, 1843

Figs 38, 47 (red)

*Sphex cinerascens* Dahlbom, 1843: 25, ♂.

### Differential diagnosis

This species has anteriorly-oriented erect propodeal setae as in members of the *gaullei* group, though genetic analyses show that it is more distantly related to the *gaullei* group than members of that group's presumed sister taxon, the *satanas* group. Thus, *S. cinerascens* is treated separately here.

Females can be distinguished from all other African *Sphex* by having a conspicuous process medially at the clypeal margin. Males possess a comparable structure, though those of the *umtalicus* group are also recognizable by having a tooth at the free clypeal margin. However, their erect propodeal setae are oriented perpendicularly, and their erect facial setae are black, whereas they are silvery in *S. cinerascens*. Both sexes are also characterized through the relative length of their petiole, which measures significantly more than 3.5× its width. In almost all other species, the ratio between petiole length and width is usually less than 3.2, except for *S. pruinosus* where this value can be up to 4, but that species is distinguished through its absence of a process at the free clypeal margin and having more or less distinct transversal ridges on the propodeum.

### Material examined

**Presumed syntypes** (photographs of MZLU specimen examined)

GUINEA • 1 ♂; Westermann leg.; MZLU • 1 ♂; Westermann leg.; ZMB.

### Other material

AFRICA • 1 ♀; W Nile lowlands; Sep. 1929; G.D.H. Carpenter leg.; BMNH.

BENIN – **Atlantique Department** • 1 ♂; Godomey; [6°22' N, 2°21' E]; 24 Jun. 1968; J. Hamon leg.; MNHN • 1 ♂; same collection data as for preceding but 29 Jun. 1968; MNHN. – **Littoral Department** • 1 ♂; Cotonou; [6°22' N, 2°26' E]; 5 Dec. 1988; G.G.M. Schulten leg.; RMNH. – **Zou Department** • 1 ♂; Zangnanado, Ouémé River; [7°12'59.2" N, 2°28'20.3" E]; 15 Apr. 2000; J. Halada leg.; THD-031-OOLM; GenBank CO1 gene: MW538554; OÖLM • 1 ♂; same collection data as for preceding; OÖLM.

BURKINA FASO – **Cascades Region** • 1 ♀; Tingréla, Banfora; [10°38'31.7" N, 4°49'50.9" W]; 20 Dec. 1967; J. Hamon leg.; MNHN. – **Hauts-Bassins Region** • 1 ♂; Koro; [11°09' N, 4°12' W]; 10 Dec. 1967;

J. Hamon leg.; MNHN • 1 ♀; same collection data as for preceding but 18 May 1968; MNHN. – **Sahel Region** • 2 ♂♂; 15 km SE of Gorom Gorom; 14°21.4' N, 0°7.9' W; 28 Jul. 2004; Sidiki Konaté and W.J. Pulawski leg.; CAS • 1 ♂; 30 km SE of Dori; 13°50.3' N, 0°08' W; 30 Jul. 2004; Sidiki Konaté and W.J. Pulawski leg.; CAS.

CHAD – **N'Djamena Region** • 1 ♂; N'Djamena; [12°06'47" N, 15°02'57" E]; 22 Jun.–6 Jul. 1978; G.G.M. Schulten leg.; RMNH.

GAMBIA – **Banjul** • 2 ♂♂, 3 ♀♀; Banjul; [13°27'09" N, 16°34'40" W]; 10–23 Nov. 1983; K.M. Guichard leg.; BMNH • 1 ♀; Fajara S.L.; [13°28'12" N, 16°41'47" W]; 10–23 Nov. 1983; K.M. Guichard leg.; BMNH.

GHANA – **Greater Accra Region** • 1 ♀; Accra; [5°33'21" N, 0°11'48" W]; 1941; K.M. Guichard leg.; BMNH • 3 ♂♂, 3 ♀♀; Labadi; [5°34'12" N, 0°09'21" W]; 27 Apr. 1941; K.M. Guichard leg.; BMNH.

MALI – **Mopti Region** • 3 ♂♂, 1 ♀; 10 km S of Mopti; [14°22'11.4" N, 4°08'56.3" W]; 7 Aug. 1991; M. Schwarz leg.; OÖLM • 2 ♂♂, 1 ♀; same collection data as for preceding but 8 Aug. 1991; OÖLM • 4 ♂♂; same collection data as for preceding but 10 Aug. 1991; OÖLM • 1 ♂; same collection data as for preceding but 20 Aug. 1991; OÖLM. – **Ségou Region** • 1 ♀; 60 km SW of Ségou; [13°00'44" N, 6°41'18.3" W]; 1 Aug. 1991; M. Schwarz leg.; OÖLM • 1 ♀; 70 km SE of Ségou; [12°59'29.6" N, 5°45'45.2" W]; 2 Aug. 1991; M. Schwarz leg.; OÖLM • 1 ♀; Markala, Niger River; [13°40'26" N, 6°04'30" W]; 11 Jul. 1968; J. Hamon leg.; MNHN.

NIGER – **Dosso Region** • 1 ♂; 100 mi. SE of Niamey; [12°32' N, 3°15'38.5" E]; 25 Oct. 1975; G. Popov leg.; BMNH.

REPUBLIC OF CÔTE D'IVOIRE – **Lagunes District** • 2 ♀♀; 40 km S of Toumodi; [6°10'37" N, 4°56'21" W]; 21 Jan. 1991; W.J. Pulawski leg.; CAS.

SENEGAL – **Fatick Region** • 1 ♀; G. de Bandiala; [13°39'40" N, 16°34'26" W]; 8–12 Dec. 1997; K.M. Guichard leg.; BMNH. – **Kaolack Region** • 1 ♂; Niore du Rip; [13°45' N, 15°48' W]; Aug. 1984; BMNH • 1 ♂; Saboya, Niore; 18 Sep. 1969; J. Hamon leg.; MNHN. – **Saint-Louis Region** • 1 ♀; Richard Toll; [16°28' N, 15°41' W]; Nov. 1967; A. Descarpentries, T. Leye and A. Villiers leg.; MNHN.

TOGO – **Maritime Region** • 1 ♀; Agbodrafo; [6°12'05" N, 1°28'44" E]; 10 Nov. 1990; G.G.M. Schulten leg.; RMNH • 1 ♀; Lomé, dunes; [6°07'55" N, 1°13'22" E]; 3 Apr. 1976; G.G.M. Schulten leg.; RMNH.

## Description

### Female

SIZE. 16.4–20.1 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, femora and mid- and hindlegs from tibia onward. Cellular wing area hyaline, basal wing half with yellow tinge, apical margin of forewing fuscous.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery-golden. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin medially with broad, gently notched tooth, not stepped above. Clypeus without indentation or carina. Scutellum convex. Metanotum slightly raised, not bituberculate. 2<sup>nd</sup>

recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.6–2.8× length of antepenultimate spine. Petiole length 3.8–4.1× its medial width.

#### **Male**

SIZE. 15.5–18.4 mm.

COLOR. Black except for the following, which are ferruginous: stripe in center of mandible and mid- and hindlegs from tibia onward. Cellular wing area hyaline, basal half with yellow tinge. Apical margin of forewing fuscous.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar and scutum silvery, on propodeal enclosure silvery-golden. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin with single tooth. Scutellum convex. Metanotum slightly raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 3.8–5.6× its medial width. Flagellomeres IV–VI with narrow placoids, comprising two disconnected parts on IV and being entire on V and VI.

#### **Variation**

Unknown.

#### **Distribution**

Western Africa.

#### **Remarks**

This species is very similar to the Oriental *S. obscurus* (Fabricius, 1804), with which it had previously been synonymized (van der Vecht 1961). However, locality records and a few characters specific to males suggest that they are actually two different species.

The syntypes of *S. cinerascens* in the collection of the ZMB and MZLU, both males and collected in Guinea by Westermann, along with specimens collected more recently at other Western African localities, differ from Oriental material of *S. obscurus* in two aspects. Firstly, the African form has a notable tooth medially on the free clypeal margin, which the Oriental species lacks. Secondly, while its placoid pattern seems to be variable, the African species has placoids that cover the entire length of flagellomeres V and VI, as well as a partial or entire placoid on flagellomere IV or sometimes one on flagellomere III that can be narrowed medially. In contrast, the placoid configuration in two examined Oriental specimens and several individuals from the Arabian Peninsula matches the description in van der Vecht (1961) of the lectotype of *S. obscurus*, with about the basal 30% of flagellomeres V and VI being covered.

### **Species of the *argentatus* group**

The *argentatus* group contains the following nine species: *Sphex erythrinus*, *S. feijeni* nom. nov., *S. fumicatus*, *S. lanatus*, *S. rufinervis*, *S. taschenbergi*, *S. tomentosus*, *S. torridus* and *S. voeltzkowii*.

This group was proposed by Hensen (1991), when it primarily encompassed species from the Australis and Orientalis regions. He correctly assigned the Afrotropical *S. fumicatus* to the group, and

Schmid-Egger (2014) added *S. taschenbergi* based on Palearctic records. The species treated here conform to Hensen's diagnostic character, a bituberculate metanotum (Fig. 7). In most species of the group, the tubercles are usually very distinct, but occasional specimens and particularly members of *S. erythrinus*, *S. feijeni* nom. nov. and *S. rufinervis* have them more indistinct. Therefore, we opted to rely on an additional character for species group assignment that was mentioned by Bohart & Menke (1976): the presence of a linear swelling in front of the upper part of the spiracular groove (Fig. 9). Only members of the *argentatus* group possess both of these traits, whereas others may have an indistinctly bituberculate metanotum but lack the spiracular swelling (Fig. 10). In the *satanas* group, the swelling is present, but the metanotum is always unmistakably flat.

Males in the *argentatus* group seem to have much greater intraspecific size variations than those of other groups. Length differences of up to  $\pm 20\%$  were observed. When sequenced, the differences in the CO1 gene for a small and a large individual of *S. lanatus* were minimal, so any size variations may simply be the result of differing amounts of available food during larval development.

In contrast to all other African species groups of *Sphex*, the orientation of the erect propodeal setae is not uniform within this group.

***Sphex erythrinus*** (Guiglia, 1939)

Figs 41–42, 45, 47 (yellow)

*Chlorion umbrosum* var. *erythrinum* Guiglia, 1939: 201, ♀, ♂ (authorship attributed to Magretti).

**Differential diagnosis**

*Sphex erythrinus* is similar to the other species of the *argentatus* group that have silvery mesosomal vestiture: *Sphex feijeni* nom. nov. (Figs 43–44), *S. lanatus* (Fig. 50) and *S. rufinervis* (Fig. 51). However, females of *S. erythrinus* can easily be identified through their yellow-tinged wings (Fig. 41). Regarding males, *S. rufinervis* is distinguished through its partially black erect facial setae, whereas *S. lanatus* has the glabrous hindtibial area ferruginous-brown, and only flagellomere V is partially covered by a placoid. In *S. erythrinus* and *S. feijeni* nom. nov., the integument of the legs is black (though, like in most *Sphex*, the setae on the inner part of the hindtibia are brighter), but the placoids of *S. erythrinus* cover flagellomeres III–VI and are almost as wide as them, whereas the placoids of *S. feijeni* nom. nov. are only half as wide as the flagellomeres and cover III–V.

**Material examined**

**Syntypes** (total series consists of 15 ♂♂, 7 ♀♀)

ERITREA – **Northern Red Sea Region** • 3 ♂♂, 3 ♀♀; Sabarguma [Sebar Guma]; [15°29'37" N, 39°07'32" E]; Mar. 1900; P. Magretti leg.; MSNG.

**Other material**

KENYA – **Taita-Taveta County** • 3 ♂♂; Voi; 3°24' S, 38°33.2' E; 21–22 May 2000; V.F. Lee and W.J. Pulawski leg.; THD-024-CAS; GenBank CO1 gene: MW538558; GenBank EF-1 $\alpha$  gene: MW558242; GenBank LWR gene: MW582282; CAS • 2 ♂♂; same collection data as for preceding; CAS.

**Description**

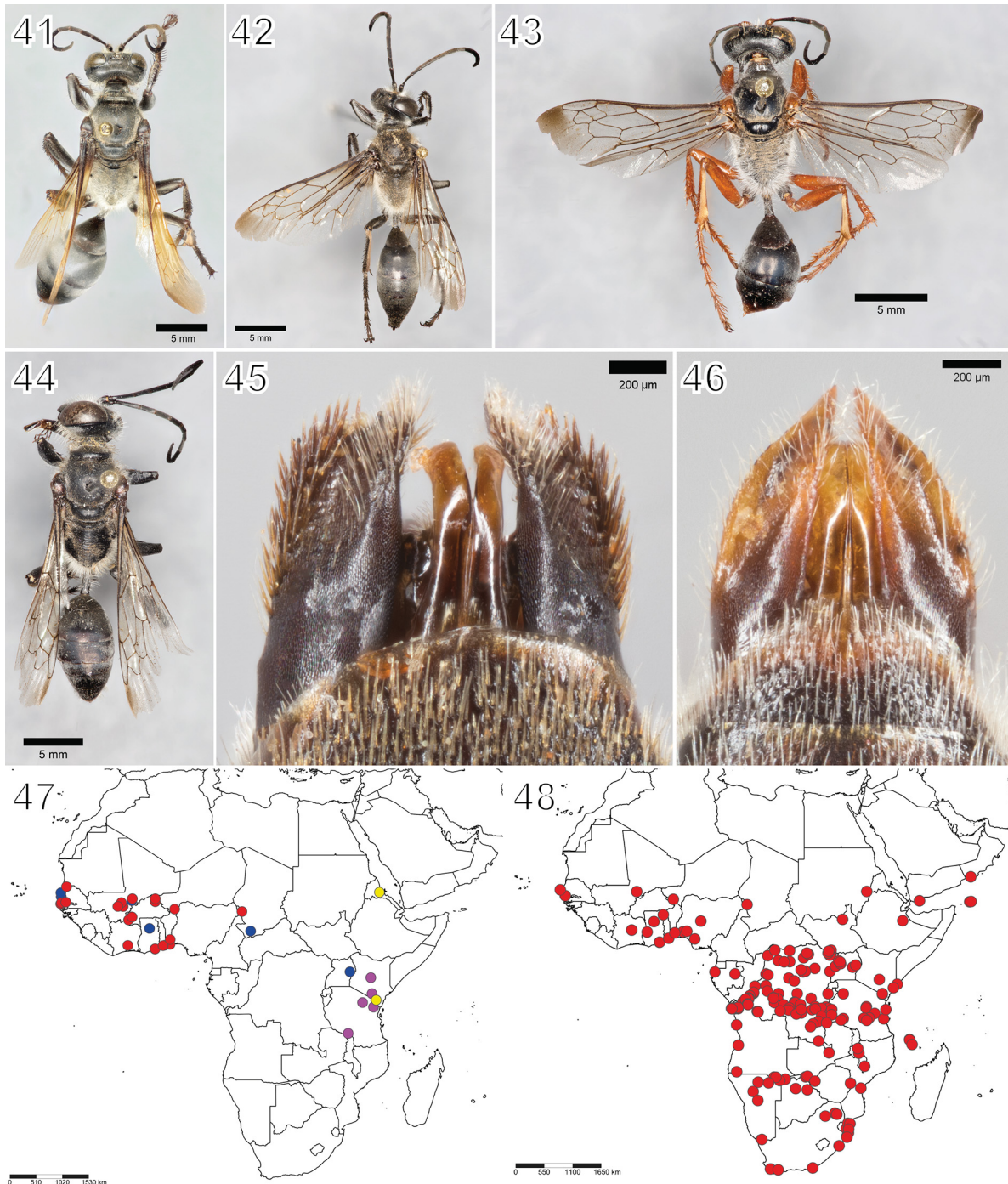
**Female**

SIZE. 28.3–31.1 mm.

COLOR. Black except for basal half of mandible, which is dark ferruginous. Cellular wing area hyaline with yellow tinge, base of fore- and hindwing infusate. Forewing with fuscous spot beyond marginal cell.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus medially with vertical glabrous stripe.

STRUCTURE. Free clypeal margin medially with broad indistinct process, not stepped. Clypeus without indentation or carina. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein



Figs 41–48. 41–42, 45. *Sphex erythrinus* (Guiglia, 1939). 43–44, 46. *Sphex feijeni* nom. nov. 41, 43. Habitus of ♀. 42, 44. Habitus of ♂. 45–46. Male genitalia. 47. Geographic distribution of *S. cinerascens* Dahlbom, 1843 (red), *S. paulinierii* Guérin-Méneville, 1843 (blue), *S. erythrinus* (yellow) and *S. feijeni* nom. nov. (purple). 48. Geographic distribution of *S. fumicatus* Christ, 1791.



joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I  $2.7\text{--}2.9\times$  length of antepenultimate spine. Petiole length  $1.4\text{--}1.6\times$  its medial width.

#### Male

SIZE. 19.9–23.7 mm.

COLOR. Black. Wings hyaline, apical margin of forewing slightly infusate.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae crimped, oriented anteriorly. Free clypeal margin medially with longitudinal glabrous stripe. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple, medially gently notched. Scutellum convex. Metanotum raised, slightly bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length  $2.2\times$  its medial width. Flagellomeres III–VI with broad placoids covering their entire length.

#### Variation

Unknown.

#### Distribution

Eastern Africa.

#### *Sphex feijeni* nom. nov.

urn:lsid:zoobank.org:act:41616206-05D1-429A-A33B-01189F6B71E7

Figs 43–44, 46, 47 (purple)

*Sphex pruinus* var. *haemorrhoidalis* Magretti, 1898: 44, ♀, junior primary homonym of *Sphex haemorrhoidalis* Fabricius, 1781.

#### Differential diagnosis

Together with *S. lanatus* (Fig. 50) and *S. erythrinus* (Figs 41–42), this is one of three species in the *argentatus* group with uniformly silvery-white clypeal and propodeal setae in both sexes. Interestingly, the setae on the propodeum are very attrite in all studied female specimens, leaving large portions of the propodeal enclosure bare. In contrast, *S. lanatus* and *S. erythrinus* have much of the propodeal sculpture obscured by dense appressed setae. Furthermore, there are several distinct transversal ridges on the propodeal dorsum of *S. feijeni* nom. nov. (Fig. 43), a characteristic that is unique among the African members of the *argentatus* group. What also separates it from the remainder of those species is the fact that in females, approximately the lower two-thirds of the clypeus are brightly ferruginous, whereas the others have it completely black.

The distinguishing characteristics of males (Fig. 44) are more subtle. From *S. lanatus*, they differ in having a notably shorter petiole, the length of which (see Introduction to measurements) reaches no more than 2.5 times its medial width instead of almost 3 times. *Sphex feijeni* nom. nov. also has a distinct placoid pattern, with placoids that are half as wide as the segments covering flagellomeres III–V. The very similar *S. erythrinus* has the placoids nearly as wide as the segments and covering flagellomere VI in addition to III–V, while *S. lanatus* has only a partial, narrow placoid on flagellomere V. Finally,

if genitalized, *S. feijeni* nom. nov. is easily distinguishable through its uniformly hyaline setae laterally on the gonostyles (Fig. 46), as both of the other species have the stout lateral setae black or dark brown (Fig. 45), with only the thin setae near the apex being silvery.

### Etymology

The species name is dedicated to Dr Hans R. Feijen, who collected the majority of the specimens examined here.

### Material examined

#### Holotype (photographs examined)

SOMALIA • ♀; MSNG.

#### Other material

KENYA – **Isiolo County** • 2 ♂♂, 3 ♀♀; Buffalo Springs National Reserve; [0°31'17.32" N, 37°37'2.53" E]; 15–18 Jul. 1987; H.R. Feijen leg.; RMNH • 1 ♂; same collection data as for preceding; ZMB. – **Makueni County** • 1 ♀; Makindu; [2°16'41" S, 37°49'07" E]; 5–7 Apr. 1911; S.A. Neave leg.; BMNH.

TANZANIA – **Manyara Region** • 1 ♂; Angleheardt Bridge, Tarangire National Park; 3°50' S, 36°10' E; 16 Mar. 1995; Lesio and Liseki leg.; AMNH. – **Mbeya Region** • 1 ♀; Langenburg [now Tukuyu]; [9°15' S, 33°39' E]; 25 May 1899; F. Fülleborn leg.; ZMB. – **Tanga Region** • 1 ♂; 2 km NE of Mkomazi; 4°37.8' S, 38°05.5' E; 29–31 Dec. 2002; W.J. Pulawski leg.; CAS.

### Description

#### Female

SIZE. 20.8–26.3 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, lower part of clypeus, scape, pedicel, basal half of flagellomere I anteriorly, legs from trochanter onward, terga V–VI and sterna V–VI. Cellular wing area hyaline, forewing with fuscous spot beyond marginal cell.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Central third of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin stepped. Clypeus without indentation or carina. Scutellum convex. Metanotum raised, slightly bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with approximately seven transversal ridges. Foretarsomere I 1.8–2.1 × length of antepenultimate spine. Petiole length 1.8–2.0 × its medial width.

#### Male

SIZE. 16.9–20.6 mm.

COLOR. Black except for ferruginous-brown stripe in center of mandible. Cellular wing area hyaline, forewing with fuscous spot beyond marginal cell.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus medially with vertical glabrous stripe. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin slightly stepped medially. Scutellum convex. Metanotum raised, slightly bituberculate. 2<sup>nd</sup> recurrent vein joins slightly to markedly proximal from interstitium between

submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII very slightly concavely emarginate. Penis valvae without conspicuous modifications. Petiole length 2.0–2.3 × its medial width. Flagellomeres III–V with moderately broad placoids covering their entire length.

### Variation

In the holotype, scutum and scutellum are ferruginous instead of black.

### Distribution

Eastern Africa.

### Remarks

Giordani Soika (1942) synonymised this species with *S. rufiscutis* (R. Turner, 1918), which is a synonym of *S. jansei* Cameron, 1910. The holotype of *S. pruinus* var. *haemorrhoidalis* Magretti, 1898 is in poor condition, but several characters clearly contradict Giordani Soika's assessment. Firstly, the type has the upper part of the clypeus black, the lower part ferruginous and the collar black, whereas female *S. jansei* have the entire clypeus as well as the collar ferruginous. Also, the free clypeal margin is largely straight in Magretti's species, while it is notably convex in *S. jansei*. The transversal ridges on the propodeum of *S. jansei* are very faint, but those of *S. pruinus* var. *haemorrhoidalis* are sharply distinct. Contrary to Magretti's assumption, the species is not closely allied with *S. pruinus*, as *S. pruinus* var. *haemorrhoidalis* has a distinctly shorter and wider petiole and a large glabrous spot on the lower part of the clypeus. While the members of the *gaullei* group have a somewhat raised and bituberculate metanotum as well, the presence of a swelling anterior to the spiracular groove shows that *S. pruinus* var. *haemorrhoidalis* is a member of the *argentatus* group. Since Magretti's name is an invalid junior homonym of *S. haemorrhoidalis* Fabricius, 1781, we propose *fejjeni* nom. nov. as a replacement name.

### *Sphex fumicatus* Christ, 1791

Figs 48–49, 53

*Sphex fumicatus* Christ, 1791: 295, sex not stated (holotype or syntypes: origin unknown, destroyed).

*Sphex albifrons* Fabricius, 1793: 207, sex not stated, junior primary homonym of *Sphex albifrons* de Villers, 1789 (holotype: ♀, Guinea, ZMUC, not examined). Synonymized with *Sphex metallicus* by van der Vecht 1961: 29.

*Sphex metallicus* Taschenberg, 1869: 414, ♀, ♂ (syntypes: Sudan, Khartoum State, Khartoum, HALLE, not examined). Synonymized with *Sphex fumicatus* by van der Vecht 1973: 344.

*Sphex magrettii* Gribodo, 1894: 136, ♀ (syntypes: 1 ♀, Mozambique, Inhambane Province, Inhambane River, Mus. Zool. Univ. Bologna; 1 ♀, Tanzania, Mjini Magharibi Region, Zanzibar, lost. Not examined).

*Sphex erebus* W.F. Kirby, 1900: 15, sex not stated (syntypes: Yemen, Socotra Governorate, Hadibu [Hadiboh] Plain, BMNH, not examined). Synonymized with *Sphex umbrosus* by Kohl 1906: 199.

*Chlorion davisii* Fernald, 1907: 267, ♀ (holotype: ♀, Argentina, Córdoba Province, Córdoba, in Museum of Comparative Zoology (Harvard University, Cambridge, MA, USA), but locality label in error (Menke 1962: 63), not examined). Synonymized with *Sphex metallicus* by Menke 1962: 63.

### Differential diagnosis

This species can easily be distinguished from other members of the *argentatus* group, characterized by their bituberculate metanotum, through the combination of notably infuscate forewing bases, black erect propodeal setae and uniformly silvery erect clypeal and paraocular setae (Figs 49, 53), though some of

the erect facial setae can occasionally have darkened tips. *Sphex taschenbergi* shares the fuscous wing base and is very similar (Fig. 52), but most or all of its erect clypeal and paraocular setae are entirely black in both sexes (Fig. 54).

### Material examined

AFRICA • 1 ♂; N of Boucle du Niger; Aug. 1910; J. Vuillet leg.; MNHN.

ANGOLA – **Benguela Province** • 1 ♂; Lobito; [12°21'51" S, 13°32'09" E]; 19–20 Mar. 1972; BMNH • 1 ♂; Lobito Bay; [12°21'51" S, 13°32'09" E]; 19–20 Jul. 1931; W.P. Cockerell leg.; BMNH. – **Luanda Province** • 1 ♀; Luanda; [8°50'18" S, 13°14'04" E]; 30 Nov. 1966; E.S. Ross and K. Lorenzen leg.; CAS.

BENIN – **Zou Department** • 2 ♂♂; Zangnanado, Ouémé River; [7°12'59.2" N, 2°28'20.3" E]; 15 Apr. 2000; J. Halada leg.; OÖLM.

BOTSWANA – **Central District** • 1 ♂; Makarikari Pans; 20°08' S, 25°32' E; 22–23 Apr. 1972; BMNH. – **North-West District** • 1 ♀; Island Safari Lodge, Maun; [19°55'27.7" S, 23°30'31.2" E]; Jan. 1997; M. Snižek leg.; OÖLM • 1 ♀; Kasane; 17°52.331' S, 25°14.167' E; 23 Mar. 2013; M. Heunis and A. Heunis leg.; ZMB.

CAMEROON • 1 ♀; M. Boulard leg.; MNHN.

CENTRAL AFRICAN REPUBLIC • 1 ♀; M. Boulard leg.; MNHN.

CHAD – **N'Djamena Region** • 1 ♀; Fort Lamy [now N'Djamena]; [12°06'24" N, 15°02'39" E]; 1 Oct. 1955; BMNH.

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♂; “Libengi”; Merdagh leg.; MRAC • 1 ♀; “Terr. Kasongo, Riv. Lumami”; Sep. 1959; P.L.G. Benoit leg.; MRAC • 1 ♀; “Ubangi: Nzali”; 3–4 Feb. 1932; H.J. Brédo leg.; MRAC • 2 ♀♀; “Ubangi: Tongu”; 4 Feb. 1932; H.J. Brédo leg.; MRAC • 1 ♀; Gilson leg.; MRAC • 1 ♀; Katanga, Kikva; Apr. 1931; H.J. Brédo leg.; MRAC • 1 ♀; Katanga, Luilu; Dec. 1925; Ch. Seydel leg.; MRAC. – **Bas-Uele** • 2 ♀♀; Api; [3°40' N, 25°27' E]; Nov. 1909; Laplume leg.; MRAC • 1 ♀; Bali; [2°51' N, 24°53' E]; 26 May 1912; Christy leg.; MRAC • 1 ♀; Bambesa; [3°28' N, 25°43' E]; Nov. 1930; J. Vrijdagh leg.; MRAC • 1 ♀; same collection data as for preceding but Oct. 1937; MRAC • 1 ♂; same locality as for preceding; 30 Oct. 1933; H.J. Brédo leg.; MRAC • 2 ♀♀; same collection data as for preceding but Dec. 1933; MRAC • 1 ♀; same locality as for preceding; 9 May 1938; P. Henrard leg.; MRAC. – **Haut-Katanga** • 1 ♂; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; Aug. 1958; J. Pasteels leg.; MRAC • 1 ♀; Mwema; [8°13' S, 27°28' E]; Jul. 1927; A. Bayet leg.; MRAC • 1 ♀; Pweto; [8°28' S, 28°54' E]; Oct. 1926; A. Bayet leg.; MRAC. – **Haut-Lomami** • 1 ♀; Kanonga (675 m), P.N.U. [Upemba National Park]; [9°09' S, 26°05' E]; 14–23 Feb. 1949; G.F. de Witte leg.; MRAC • 1 ♀; Mabwe (Lac Ubemba, R.E.), P.N.U. [Upemba National Park]; [8°39'10" S, 26°30'32" E]; 6 Mar. 1949; G.F. de Witte leg.; MRAC • 1 ♀; same collection data as for preceding but Mar. 1949; MRAC. – **Haut-Uele** • 1 ♀; “P.N.G., Miss. H. De Saeger” [Garamba National Park]; [4°00' N, 29°15' E]; 11 Nov. 1951; H. De Saeger leg.; MRAC • 1 ♀; same collection data as for preceding but 1 Mar. 1952; MRAC • 1 ♀; Faradje; 3°40' N, 29°40' E; Apr. 1911; Lang and Chapin leg.; AMNH • 2 ♀♀; same collection data as for preceding but Dec. 1912; AMNH • 4 ♀♀; same collection data as for preceding but Jan. 1913; AMNH • 1 ♀; Gangala-na-Bodio, Station élevage Elephants; [3°40'47" N, 29°08'05" E]; Nov. 1956; M. Poll leg.; MRAC • 2 ♂♂; Garamba National Park; 4°10' N, 29°40' E; Jun.–Jul. 1912; Lang and Chapin leg.; AMNH • 1 ♀; Vankerkhovenville; [3°18' N, 29°26' E]; Degreeef leg.; MRAC. – **Ituri Province** • 1 ♀; Lac Albert, Kasenyi; [1°23'31" N, 30°26'24" E]; 15 May 1935; H.J. Brédo leg.; MRAC • 1 ♀; same collection data as for preceding but Jun. 1935; MRAC • 1 ♀; Mahagi; [2°17'59" N, 30°59'30" E]; 1931; Ch. Scops leg.; MRAC • 1 ♂; Mahagi-Port; [2°08'16" N, 31°14'18" E];

Oct. 1934; H.J. Brédo leg.; MRAC • 1 ♂; same collection data as for preceding but Oct. 1935; MRAC. – **Kasai** • 2 ♀♀; Luebo; [5°20' S, 21°24' E]; 1 Apr. 1959; F. François leg.; MRAC • 3 ♂♂, 1 ♀; Tshikapa; [6°24' S, 20°48' E]; Mar. 1939; Mevr. Bequaert leg.; MRAC • 1 ♂, 1 ♀; same collection data as for preceding but Apr. 1939; MRAC • 3 ♀♀; same collection data as for preceding but Apr.–May 1939; MRAC – **Kasai-Central** • 1 ♀; Kasai, Tshisaka; [6°15'02" S, 22°16'30" E]; Apr. 1939; Mevr. Bequaert leg.; MRAC • 1 ♂, 1 ♀; same collection data as for preceding but Apr.–May 1939; MRAC • 1 ♂; Luluabourg [now Kananga]; [5°53'46" S, 22°24'59" E]; 14 Apr. 1933; J.J. Deheyn leg.; MRAC • 1 ♀; same locality as for preceding; 7–18 Mar. 1935; Gillardin leg.; MRAC • 6 ♂♂; same locality as for preceding; 17 May 1919; P. Callewaert leg.; MRAC • 1 ♂, 2 ♀♀; same collection data as for preceding; MRAC. – **Kasai-Oriental** • 1 ♂; Gandajika; [6°45' S, 23°57' E]; 31 Jan. 1951; P. de Francquen leg.; MRAC • 1 ♀; same collection data as for preceding but 1952; MRAC • 1 ♀; same collection data as for preceding but Dec. 1953; MRAC • 4 ♂♂; same collection data as for preceding but 1956; MRAC • 2 ♀♀; Station de Gandajika; [6°45' S, 23°57' E]; 1957; P. de Francquen leg.; MRAC. – **Kinshasa** • 1 ♀; Kinshasa; 4°20' S, 15°20' E; 27 May 1915; Lang and Chapin leg.; AMNH • 2 ♂♂; Leopoldville [now Kinshasa]; [4°19'39" S, 15°18'48" E]; 1933; A. Tinant leg.; MRAC • 1 ♀; same locality as for preceding; 24 Mar. 1912; A. Dubois leg.; MRAC • 1 ♀; same collection data as for preceding; MRAC • 1 ♂, 2 ♀♀; Limete (Léo); [4°19'39" S, 15°18'48" E]; 1958; A. Froidebise leg.; MRAC. – **Kongo Central** • 2 ♂♂; Banana; 6° S, 12°20' E; Aug. 1915; Lang and Chapin leg.; AMNH • 1 ♂, 2 ♀♀; same collection data as for preceding but Sep. 1915; AMNH • 1 ♀; Banana; [6°01' S, 12°24' E]; Apr. 1918; R. Verschueren leg.; MRAC • 3 ♂♂; Boma; [5°51' S, 13°03' E]; 1937; Schlessler leg.; MRAC • 1 ♀; same locality as for preceding; 24 Mar. 1913; Styczynski leg.; MRAC • 1 ♂; same locality as for preceding; 19 Jun. 1915; J. Bequaert leg.; MRAC • 1 ♀; same locality as for preceding; 16 Jan. 1946; J. Vrydagh leg.; MRAC • 1 ♂, 2 ♀♀; Boma; 6°00' S, 13°00' E; 14 Jun. 1915; Lang and Chapin leg.; AMNH • 1 ♂; same collection data as for preceding but 16 Jun. 1915; AMNH • 4 ♂♂; same collection data as for preceding but 17 Jun. 1915; AMNH • 13 ♂♂, 1 ♀; same collection data as for preceding but 18 Jun. 1915; AMNH • 2 ♂♂, 2 ♀♀; same collection data as for preceding but 19 Jun. 1915; AMNH • 2 ♀♀; Kanzi (Boma); [5°52' S, 12°38' E]; May 1933; Darteville leg.; MRAC • 1 ♀; Kimbanza; [4°50' S, 14°19' E]; Dec. 1934; P. Henrard leg.; MRAC • 1 ♂; Lemfu; [5°17'56" S, 15°13'21" E]; Dec. 1945; P.L. De Beir leg.; MRAC • 1 ♂; Matadi; 6°00' S, 13°30' E; 9 Jun. 1915; Lang and Chapin leg.; AMNH • 1 ♀; Matadi; [5°49' S, 13°27' E]; 24 Apr. 1946; Schlessler leg.; MRAC • 1 ♂; same locality as for preceding; 22 Jul. 1957; E.S. Ross and R.E. Leech leg.; CAS • 4 ♂♂; same locality as for preceding; Mar. 1937; Darteville leg.; MRAC • 4 ♂♂, 2 ♀♀; Mayidi; [5°11'13" S, 15°09'17" E]; 1942; R.P. Van Eyen leg.; MRAC • 1 ♂; Moanda; [5°56' S, 12°21' E]; 24 Aug. 1920; H. Schouteden leg.; MRAC. – **Kwango** • 1 ♀; Kasongo-Lunda; [6°28'42" S, 16°49'02" E]; Mar. 1971; V. Van Haelst leg.; MRAC • 1 ♂; Kingunda; [6°34' S, 16°58' E]; 17 Jan. 1939; Mevr. Bequaert leg.; MRAC. – **Kwilu Province** • 1 ♀; “Kwango: Atene”; Charlier leg.; MRAC • 2 ♀♀; Ipamu; [4°07' S, 19°37' E]; 1922; P. Vanderijst leg.; MRAC • 1 ♀; Mwilambongo (Idiofa); [4°56'36" S, 19°48'18" E]; 1947; Soeur Imelda leg.; MRAC. – **Lomami** • 1 ♀; Kabinda Terr.; [6°08' S, 24°29' E]; Dec. 1934; Gillardin leg.; MRAC • 1 ♂; Kanda-Kanda; [6°56' S, 23°37' E]; 19 Dec. 1925; Ch. Seydel leg.; MRAC • 1 ♀; Penge; [5°18'36" S, 24°20'24" E]; Jan. 1926; Ch. Seydel leg.; MRAC • 1 ♀; Tshaba; [6°46' S, 24°28' E]; Dec. 1925; Ch. Seydel leg.; MRAC. – **Mai-Ndombe Province** • 1 ♀; Bena Bendi; [4°18' S, 20°22' E]; May 1915; R. Mayné leg.; MRAC • 1 ♂, 3 ♀♀; Bumbuli; [3°24' S, 20°31' E]; Jan.–Apr. 1915; R. Mayné leg.; MRAC • 1 ♀; Kunungu, Nkele; [2°6' S, 16°26' E]; 1938; Schouteden leg.; MRAC • 2 ♀♀; Kwamouth; [3°10'57" S, 16°12' E]; 6 Jun. 1913; J. Maes leg.; MRAC • 2 ♀♀; Kwamouth; 3°20' S, 16°10' E; 24 May 1915; Lang and Chapin leg.; AMNH • 1 ♀; Lake Leopold II [now Lake Mai-Ndombe]; [2°00' S, 18°20' E]; Van Hollebeke leg.; MRAC • 2 ♀♀; Tolo; [2°57'14" S, 18°34'08" E]; Dec. 1913; J. Maes leg.; MRAC. – **Maniema** • 3 ♀♀; Nyangwe; [4°13'37" S, 26°11' E]; 14 May 1920; J. Ghesquière leg.; MRAC. – **Mongala Province** • 2 ♀♀; Bumba; [2°11' N, 22°28' E]; 1940; R.P. Lootens leg.; MRAC • 1 ♀; Lisala; [2°09' N, 21°30' E]; 1949; Leontowitch leg.; MRAC. – **Nord-Ubangi** • 2 ♀♀; Bosobolo; [4°11'23" N, 19°52'59" E]; 8–11 Jan. 1932; H.J. Brédo leg.; MRAC • 3 ♀♀; Yakoma; [4°05'53" N, 22°26'45" E]; 5–17 Feb. 1932; H.J.

Brédo leg.; MRAC. – **North Kivu** • 1 ♀; Beni; [0°29' N, 29°28' E]; Borgerhoff leg.; MRAC. – **Province of Équateur** • 1 ♂, 1 ♀; Coquilhatville [now Mbandaka]; [0°03' N, 12°57' E]; 1946; Ch. Scops leg.; MRAC • 3 ♀♀; Eala; [0°02'30" N, 18°20'06" E]; Nov. 1931; H.J. Brédo leg.; MRAC • 2 ♂♂; same collection data as for preceding but Mar. 1932; MRAC • 1 ♀; same locality as for preceding; Jun. 1932; A. Corbisier leg.; MRAC. – **Sankuru** • 1 ♀; Inkongo, Lusambo; [4°53' S, 23°18' E]; 1929; Wilson leg.; MRAC • 1 ♀; Komi (Lodja); [3°23' S, 23°46' E]; 27 Jan. 1930; J. Ghesquière leg.; MRAC • 1 ♀; Kondue; [4°58' S, 23°16' E]; 1934; Puissant leg.; MRAC • 1 ♂; same collection data as for preceding but Leonhard leg.; MRAC • 1 ♀; Lusambo; [4°58' S, 23°27' E]; Jan. 1926; Ch. Seydel leg.; MRAC • 1 ♂; Niengele; Jan. 1926; Ch. Seydel leg.; MRAC. – **South Kivu** • 3 ♀♀; Uvira; [3°24' S, 29°08' E]; Sep. 1958; J. Pasteels leg.; MRAC • 1 ♂; same locality as for preceding; 24–28 Dec. 1952; P. Basilewsky leg.; MRAC • 1 ♂; same collection data as for preceding but 16–23 Mar. 1953; MRAC • 1 ♀; same locality as for preceding; Oct. 1927; Ch. Seydel leg.; MRAC. – **Sud-Ubangi** • 5 ♀♀; Binga; [2°22' N, 20°29' E]; 5–12 Mar. 1932; H.J. Brédo leg.; MRAC • 5 ♀♀; Motenge-Boma; [3°14' N, 18°39' E]; 14 Dec. 1931; H.J. Brédo leg.; MRAC. – **Tanganyika** • 1 ♀; Albertville [now Kalemie]; [5°56'50" S, 29°11'40" E]; Dec. 1918; R. Mayné leg.; MRAC • 1 ♀; Kabalo; [6°03' S, 26°55' E]; 1 Jul. 1947; M. Poll leg.; MRAC • 1 ♀; Katombe; [6°11'55" S, 26°21'28" E]; 20 Dec. 1923; M. Bequaert leg.; MRAC • 1 ♀; Kiambi; [7°19'26" S, 28°00'50" E]; 23 Apr. 1931; G.F. de Witte leg.; MRAC • 1 ♂; same collection data as for preceding but 27 Apr. 1931; MRAC • 1 ♀; same collection data as for preceding but May 1931; MRAC • 2 ♀♀; Lukombe; [5°41'33" S, 28°45'55" E]; 7 Oct. 1908; A. Koller leg.; MRAC • 1 ♀; Moba; [7°04' S, 29°46' E]; Apr. 1954; H. Bomans leg.; MRAC • 1 ♀; Mpala; [6°43'56" S, 29°31'28" E]; Jul.–Aug. 1953; H. Bomans leg.; MRAC • 1 ♀; Nyunzu; [5°57' S, 28°01' E]; Jan.–Feb. 1934; H. De Saeger leg.; MRAC • 1 ♀; Vallée Lukuga; [5°39'31" S, 26°54'53" E]; Nov. 1911; Schwetz leg.; MRAC. – **Tshopo** • 1 ♀; Kamunionge; 1° N, 26°50' E; 24 May 1915; Lang and Chapin leg.; AMNH • 1 ♀; Stanleyville [now Kisangani]; 0°30' N, 25°10' E; Feb. 1915; Lang and Chapin leg.; AMNH • 1 ♂, 1 ♀; same collection data as for preceding but Apr. 1915; AMNH • 1 ♀; same collection data as for preceding but 10 Apr. 1915; AMNH • 1 ♀; same collection data as for preceding but 15 Apr. 1915; AMNH • 1 ♀; same collection data as for preceding but 17 Apr. 1915; AMNH • 1 ♀; Stanleyville [now Kisangani]; [0°30'55" N, 25°11'27" E]; Apr. 1915; J. Bequaert leg.; MRAC • 1 ♀; same locality as for preceding; 1 Aug. 1932; J. Vrydagh leg.; MRAC • 1 ♀; Yalikanda; [0°23' N, 24°47' E]; 20 Feb. 1971; M. Isy-Schwartz leg.; MNHN • 1 ♀; Yangambi; [0°46' N, 24°27' E]; May 1960; J. Decelle leg.; MRAC. – **Tshuapa** • 1 ♀; Bokuma; [0°06' S, 18°41' E]; Jan.–Feb. 1952; R.P. Lootens leg.; MRAC • 1 ♀; Bokungu; [0°41' S, 22°19' E]; 1950; M. Dupuis leg.; MRAC • 1 ♀; Ikela; [1°11' S, 23°16' E]; 1955; R.P. Lootens leg.; MRAC • 2 ♀♀; same collection data as for preceding but 1956; MRAC • 1 ♀; same locality as for preceding; Mar.–Jun. 1956; R. Deguide leg.; MRAC.

ETHIOPIA – **Harari Region** • 1 ♀; Harrar; [9°18'49" N, 42°07'05" E]; May 1911; R.E. Turner leg.; BMNH.

GABON • 1 ♂; Theorin leg.; NRS. – **Estuaire Province** • 1 ♀; Libreville; [0°23'24.36" N, 9°27'15.84" E]; 1936; MNHN.

GHANA – **Brong-Ahafo Region** • 1 ♂; Sunyani, Ashanti; [7°20'23" N, 2°19'36" W]; 8 Jun. 1913; J.J. Simpson leg.; BMNH. – **Greater Accra Region** • 1 ♂; Accra; [5°33'21" N, 0°11'48" W]; Dec. 1940; K.M. Guichard leg.; BMNH • 1 ♂; same collection data as for preceding but Aug.–Sep. 1941; BMNH • 1 ♂, 1 ♀; Labadi; [5°34'12" N, 0°09'21" W]; 12 Mar. 1941; K.M. Guichard leg.; BMNH. – **Savannah Region** • 2 ♀♀; Yapi [Yapei]; [9°09'08" N, 1°08'52" W]; Nov. 1916; J.J. Simpson leg.; BMNH.

KENYA – **Kitui County** • 2 ♂♂; E of Mwingi; [0°56' S, 38°03' E]; 14 May 2007; M. Halada leg.; OÖLM • 1 ♀; Mwingi, Kangonde vadi; [0°56' S, 38°03' E]; 18 Apr. 2007; M. Halada leg.; OÖLM. – **Lamu County** • 1 ♀; Boni Forest area, near Mangai Village; 1.74872° S, 41.17820° E; 10–12 Jun. 2013; J. Bukhebi and

R. Copeland leg.; ICIPE • 1 ♀; Uchweni Forest; [2°21'57" S, 40°30'29" E]; 1–2 Mar. 1912; S.A. Neave leg.; BMNH. – **Taita-Taveta County** • 1 ♀; Sagalla Swamp; [3°30'34" S, 38°34'34" E]; 1947; BMNH • 1 ♂; near Voi (Tsavo); [3°23'26" S, 38°34'37" E]; 22 Nov.–2 Dec. 1996; Mi. Halada leg.; OÖLM.

MALAWI – **Central Region** • 2 ♀♀; Nkhotakota; [12°56' S, 34°18' E]; 2 Jan. 2002; J. Halada leg.; OÖLM • 2 ♀♀; Salima, Lake Malawi; 13°45' S, 34°29' E; 4 Mar. 2001; F. Koch leg.; ZMB • 1 ♂; near Sani, beach; 13°01'53" S, 34°19'47" E; 4–8 Mar. 2008; J. Oehlke leg.; coll. Jacobs. – **Southern Region** • 1 ♀; Mlanje; [16°01'53" S, 35°30' E]; 10 Feb. 1914; S.A. Neave leg.; BMNH • 1 ♀; same collection data as for preceding but 13 Feb. 1914; BMNH.

MALI • 1 ♂; inundation zone of Niger River, Koundé-Saré; 20 Aug. 1945; BMNH. – **Mopti Region** • 1 ♂; 10 km S of Mopti; [14°22'11.4" N, 4°08'56.3" W]; 20 Aug. 1991; M. Schwarz leg.; OÖLM.

MOZAMBIQUE – **Manica Province** • 2 ♂♂; 45 km NW of Chimoio; [18°59'14.7" S, 33°02'54.1" E]; 12–20 Dec. 2003; J. Halada leg.; OÖLM. – **Maputo Province** • 1 ♂; Inhaca, hotel; [26°01' S, 32°57' E]; 28 Jan. 1979; H.R. Feijen leg.; RMNH • 5 ♂♂, 1 ♀; Maputo; [25°58' S, 32°35' E]; 12 Feb. 1994; G.G.M. Schulten leg.; RMNH. – **Sofala Province** • 2 ♂♂; Beira; [19°50'37" S, 34°50'20" E]; 2 Oct. 1939; A.H.N. leg.; BMNH • 3 ♂♂; same locality as for preceding; 3 Oct. 1954; L.F. Brown leg.; BMNH.

NAMIBIA – **Kavango East** • 1 ♂; 30 km E of Rundu; [17°56'42.2" S, 20°04'24.4" E]; 23 Jan. 1993; J. Gusenleitner leg.; OÖLM • 1 ♂, 4 ♀♀; Kaudom-Camp; 18°31' S, 20°43' E; 22–25 Nov. 1992; F. Koch leg.; ZMB • 1 ♂; Mahango Game Reserve; 18°17' S, 21°43' E; 4 Mar. 1997; F. Koch leg.; ZMB • 1 ♂; Rundu; [17°55' S, 19°46' E]; 17 Jan. 1993; J. Gusenleitner leg.; OÖLM • 1 ♂, 1 ♀; same collection data as for preceding but 19 Jan. 1993; OÖLM • 1 ♂; same collection data as for preceding but 22 Jan. 1993; OÖLM • 1 ♂; same collection data as for preceding but 23 Jan. 1993; OÖLM • 1 ♀; same collection data as for preceding but 29 Jan. 1993; OÖLM • 1 ♂; same collection data as for preceding but 30 Jan. 1993; OÖLM. – **Kunene Region** • 1 ♀; Kunene, Epupa Falls; 17°00' S, 13°15' E; 23 Feb. 1995; F. Koch leg.; ZMB. – **Oshikoto Region** • 1 ♂; Namutoni, Etosha National Park; [18°48' S, 16°59' E]; 23 Jan. 1993; F. Koch leg.; ZMB. – **Otjozondjupa Region** • 1 ♀; 100 km NE of Grootfontein; [18°56'32.9" S, 18°47'52.3" E]; 28 Jan. 1993; J. Gusenleitner leg.; OÖLM • 1 ♂; 35 km S of Outjo; [20°25'33.8" S, 16°06'26.6" E]; 25 Mar. 1979; J.G. Rozen leg.; AMNH • 1 ♀; Okahandja; [21°59' S, 16°55' E]; 2–4 Feb. 1972; BMNH.

NIGER – **Tillabéry Region** • 1 ♀; Say; [13°02'08" N, 2°13'16" E]; 10 Oct. 1976; K.M. Guichard leg.; BMNH.

NIGERIA – **Niger State** • 1 ♀; Izom; [9°14'36" N, 7°00'26" E]; 11 Dec. 1958; R.W. Crosskey leg.; BMNH. – **Osun State** • 1 ♀; Ile-Ife; [7°28'56" N, 4°33'37" E]; 28 Nov. 1968; J.T. Medler leg.; USNM. – **Oyo State** • 1 ♂, 1 ♀; Ibadan; [7°22'39" N, 3°54'21" E]; “x/vii/1947”; L.T. Davey leg.; BMNH • 1 ♀; same collection data as for preceding; BMNH.

OMAN – **Dhofar Governorate** • 1 ♀; Raysut; [16°57' N, 53°58'02" E]; 20 Aug. 1981; A.R. Pittaway leg.; BMNH.

REPUBLIC OF CÔTE D’IVOIRE – **Gôh Region** • 1 ♀; Gagnoa; [6°07'54" N, 5°57'02" E]; 2–4 Mar. 1984; M. Matthews leg.; BMNH. – **Vallée du Bandama District** • 4 ♂♂, 1 ♀; Bouaké; [7°41' N, 5°01' W]; Jun. 1977; P.M. Elsen leg.; MRAC.

REPUBLIC OF THE CONGO • 1 ♂; Route du Nord, km 17; 4 Nov. 1977; C. Morin leg.; MNHN. – **Brazzaville Department** • 1 ♀; near Brazzaville; [4°16'04" S, 15°17'31" E]; 1984; D. Bernaud leg.; MNHN. – **Kouilou Department** • 1 ♀; Zambi; 6° S, 12°50' E; 27 Jun. 1915; Lang and Chapin leg.;

AMNH. – **Pool Department** • 1 ♀; Foulakori River near Kinkala; [4°21'41" S, 14°45'52" E]; 18 Jan. 1973; J.F. Cornic leg.; MNHN • 1 ♀; Kintelé; [4°09' S, 15°20'32" E]; 9 Jan. 1977; G. Onore leg.; MNHN • 1 ♂, 1 ♀; Masa; [3°45'26" S, 15°30'45" E]; 6 Jan. 1976; G. Onore leg.; MNHN • 1 ♀; Voka; [4°40'16" S, 14°40'25" E]; 11 Nov. 1976; G. Onore leg.; MNHN.

SENEGAL • 1 ♀; Oct. 1976; G. Couturier leg.; MNHN. – **Dakar Region** • 1 ♀; Dakar; [14°41'34" N, 17°26'48" W]; Sep. 1967; A. Villiers leg.; MNHN. – **Fatick Region** • 2 ♀♀; G. de Bandiala; [13°39'40" N, 16°34'26" W]; 8–12 Dec. 1997; K.M. Guichard leg.; BMNH.

SOUTH AFRICA – **Eastern Cape** • 1 ♀; 10 km SE of Alexandria, National Park; [33°44'14.9" S, 26°28'5.9" E]; 28–31 Jan. 2000; J. Halada leg.; OÖLM. – **KwaZulu-Natal** • 1 ♂; Durban; [29°53' S, 31°03' E]; J. Bequaert leg.; MRAC • 4 ♂♂; Maputaland, SW of Manguzi; [27°00'48.5" S, 32°43'24.1" E]; 29 Jan. 2003; M. Snižek leg.; OÖLM • 1 ♀; Ndumo Game Reserve; 26°55' S, 32°19' E; 1 Feb. 1995; F. Koch leg.; ZMB • 1 ♂, 1 ♀; same collection data as for preceding but 2 Feb. 1995; ZMB • 1 ♀; Sodwana Bay National Park; 27°37' S, 32°41' E; 1 Feb. 1994; F. Koch leg.; ZMB • 5 ♂♂; same collection data as for preceding but 4 Feb. 1995; ZMB • 1 ♂, 1 ♀; same collection data as for preceding but 25 Feb. 1997; ZMB • 1 ♂, 1 ♀; St Lucia Estuary; [28°22'58.8" S, 32°25'1.2" E]; 4–6 Dec. 1966; J.G. Rozen and D.J. Brothers leg.; AMNH • 1 ♀; St Lucia Park (Charter's Creek); 28°12' S, 32°25' E; 7 Feb. 1995; F. Koch leg.; ZMB. – **Limpopo** • 3 ♀♀; 35 km W of Hoedspruit; 24°23' S, 30°40' E; 19 Dec. 2009; J. Halada leg.; RMNH • 1 ♀; Farm "Sericea", Nylstroom [now Modimolle]; 24°43' S, 28°39' E; 20–27 Mar. 2006; F. Koch leg.; ZMB • 1 ♀; Lekgalameetse Nature Reserve; 24°12' S, 30°20' E; 18 Dec. 1995; F. Koch leg.; ZMB. – **Northern Cape** • 1 ♀; Vioolsdrif, Orange River; [28°46'30" S, 17°37'30" E]; 9 Jan. 1993; F. Koch leg.; THD-007-ZMB; GenBank CO1 gene: MW538580; GenBank EF-1α gene: MW558245; ZMB. – **Western Cape** • 1 ♂, 1 ♀; Bontebok National Park, Swellendam; [34°04'06.8" S, 20°28'06.6" E]; 2–3 Jan. 1993; F. Koch leg.; ZMB • 1 ♀; Franschoek; [33°54'36.3" S, 19°07'33.7" E]; 17 Mar. 1988; H. Malicky leg.; OÖLM.

SOUTH SUDAN – **Greater Upper Nile Region** • 1 ♀; Malakal; [9°32' N, 31°39'37" E]; 1 Dec. 1960; B. Hocking leg.; BMNH.

SUDAN – **Al Qadarif** • 1 ♀; Showak; 14.24° N, 35.52° E; 6 Sep. 1946; C.E. Wilson leg.; BMNH.

TANZANIA • 1 ♂; Meru lowland; 1 Dec. 1905; Y. Sjöstedt leg.; NRS. – **Dodoma Region** • 1 ♀; 35 km E of Dodoma; 5°54' S, 35°45' E; 14 Dec. 2006; J. Halada leg.; OÖLM • 1 ♂; 70 km N of Dodoma; 5°40' S, 35°48' E; 16 Dec. 2006; J. Halada leg.; OÖLM. – **Iringa Region** • 1 ♀; 100 km NE of Iringa; 7°37' S, 36°17' E; 9 Jan. 2007; J. Halada leg.; OÖLM • 1 ♂, 1 ♀; 50 km NW of Iringa; 7°41' S, 35°22' E; 7 Jan. 2007; J. Halada leg.; OÖLM. – **Kigoma Region** • 1 ♀; Kasoge, Mahali Peninsula; [6°09' S, 29°46' E]; 20 Sep. 1959; BMNH. – **Mjini Magharibi Region** • 2 ♀♀; Zanzibar; NRS • 1 ♂; Zanzibar, near M'nazi Moya; [6°09'42" S, 39°11'28" E]; 20 Aug.–Sep. 1924; H.J. Snell leg.; BMNH. – **Morogoro Region** • 1 ♀; 50 km SW of Morogoro; 6°50' S, 37°15' E; 12 Jan. 2007; J. Halada leg.; OÖLM • 1 ♂; same collection data as for preceding but M. Kadlecová leg.; OÖLM • 1 ♀; NE of Mikumi, Camp; 7°23'24" S, 37°01'45" E; 26–27 Feb. 2008; J. Oehlke leg.; coll. Jacobs. – **Pwani Region** • 1 ♀; 15 km E of Utete; 8°03' S, 35°53' E; 16 Jan. 2007; J. Halada leg.; OÖLM • 1 ♀; 15 km W of Kibiti; 7°47' S, 38°49' E; 15 Jan. 2007; M. Kadlecová leg.; OÖLM. – **Rukwa Region** • 3 ♀♀; Rukwa; [8°00' S, 31°25' E]; Sep. 1952; F.O. Albrecht leg.; BMNH • 1 ♂; Ukia, Rukwa Rift; [7°44' S, 31°47' E]; 30 May 1950; BMNH. – **Shinyanga Region** • 1 ♀; 100 km NWW of Kahama; 3°25' S, 31°47' E; 24 Dec. 2006; J. Halada leg.; OÖLM • 1 ♂; same collection data as for preceding but M. Kadlecová leg.; OÖLM. – **Tanga Region** • 1 ♀; 4 Jun. 1905; Y. Sjöstedt leg.; NRS.

TOGO – **Maritime Region** • 1 ♂; Lake Togo, Kpené; [6°15' N, 1°25' E]; 23–30 Nov. 1980; G.G.M. Schulten leg.; RMNH. – **Savanes** • 1 ♀; Sansanné-Mango; [10°21'20" N, 0°28'32" E]; 1896–1902; Thierry leg.; ZMB.



UGANDA – **Eastern Region** • 1 ♂; Mbale–Kumi Road, 3700 ft S of Lake Salisbury; [1°33'33" N, 33°57'15" E]; 15–17 Aug. 1911; S.A. Neave leg.; BMNH • 2 ♀♀; SE shore of Lake Kioga; [1°12'43" N, 33°26'09" E]; alt. 3400 ft; 21 Aug. 1911; S.A. Neave leg.; BMNH. – **Northern Region** • 2 ♂♂; Zaipi, EMadi District; [3°24' N, 31°59' E]; 2 Jun. 1927; G.D. Hale Carpenter leg.; OUMNH. – **Western Region** • 1 ♂; Butiaba; [1°49' N, 31°19' E]; 20 Sep. 1937; H.J. Brédo leg.; MRAC • 1 ♂; valley of Kafu River, Unyoro; alt. 3400 ft; 23–28 Dec. 1911; S.A. Neave leg.; BMNH.

UNION OF THE COMOROS • 1 ♀; Scientific Institute, Mohéli; [12°15' S, 43°45' E]; Mar. 1960; R. Legrand leg.; MNHN. – **Grande Comore** • 3 ♂♂; La Galawa H.; [11°22'45" S, 43°18'26" E]; 22 Apr. and 5 May 1991; K.M. Guichard leg.; BMNH • 1 ♀; La Grille; [11°27' S, 43°20' E]; 23 Apr.–3 May 1991; K.M. Guichard leg.; BMNH.

YEMEN – **Abyan Governorate** • 2 ♂♂; 21 May 1967; K.M. Guichard leg.; BMNH. – **Aden Governorate** • 1 ♀; Aden; [12°46'46" N, 45°02'12" E]; 1930; E.B.C. Betts leg.; BMNH • 1 ♂; Al Huseini, near Lahej; [12°46'40" N, 45°02' E]; 26–29 Nov. 1937; K.M. Guichard leg.; BMNH. – **Socotra Governorate** • 1 ♀; Goba [Gubba] S.L.; [12°36'27" N, 53°47'04" E]; 25 Mar. 1967; K.M. Guichard leg.; BMNH • 1 ♀; Hadibo; [12°39' N, 54°01'10" E]; 21 Feb. 1953; G. Popov leg.; BMNH • 1 ♀; Hadibo Plain; [12°39' N, 54°01'10" E]; alt. 0–300 ft; 16 Apr. 1967; K.M. Guichard leg.; BMNH • 1 ♂; Hadibo Plain, S.L.; [12°39' N, 54°01'10" E]; 19 Mar. 1967; K.M. Guichard leg.; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 7 Apr. 1967; BMNH.

ZAMBIA – **Central Province** • 1 ♂, 1 ♀; 70 km NE of Kapiri Mposhi; 13°41' S, 29°18' E; 21 Nov. 2005; M. Halada leg.; OÖLM. – **Muchinga Province** • 2 ♂♂; “Mid. Chambezi Valley, Chinsali distr.”; alt. 4000 ft; 20 Apr. 1908; S.A. Neave leg.; OUMNH. – **Southern Province** • 1 ♀; 30 km W of Livingstone; [17°46'45" S, 25°33'17" E]; 19–22 Dec. 2002; M. Halada leg.; OÖLM.

ZIMBABWE • 1 ♀; Victoria Falls; Feb. 1935; NRS. – **Matabeleland North** • 1 ♀; Hwange National Park, Dete; [18°37'08" S, 26°51'33" E]; 11 Dec. 1997; J. Plass leg.; OÖLM.

## Description

### Female

SIZE. 25.1–32.0 mm.

COLOR. Black except for basal half of mandible, which is ferruginous. Cellular wing area hyaline, base of fore- and hindwing infuscate. Forewing with fuscous spot beyond marginal cell.

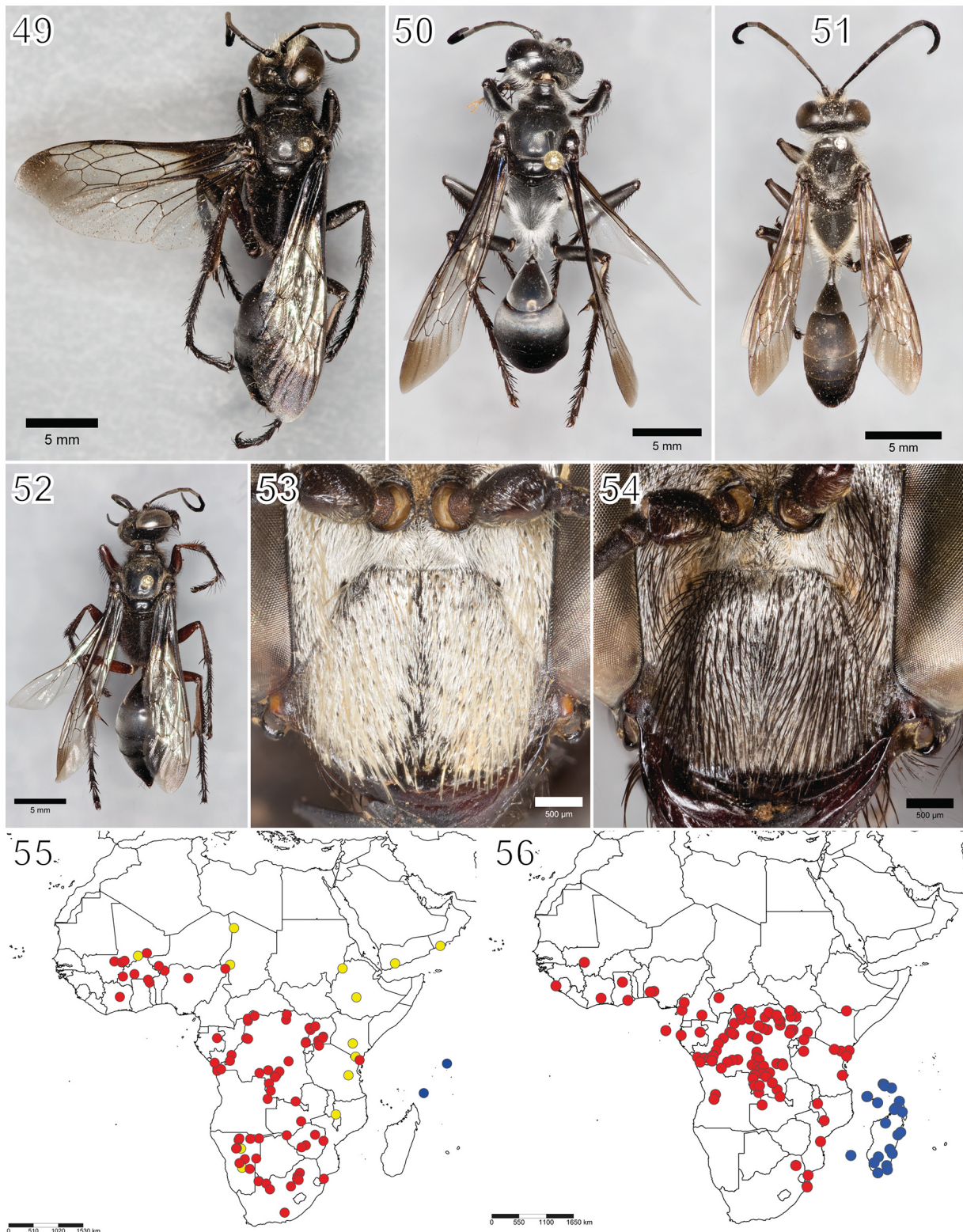
VESTITURE. Appressed and erect setae on clypeus and paraocular area silvery. Appressed setae on collar both silvery and black, erect setae black, appressed and erect setae on scutum and propodeal enclosure black. Erect propodeal setae crimped, oriented perpendicularly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin with short, broad, notched tooth, not stepped medially. Clypeus without indentation or carina. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.3–2.6 × length of antepenultimate spine. Petiole length 2.0–2.1 × its medial width.

### Male

SIZE. 17.4–26.2 mm.

COLOR. Black. Cellular wing area hyaline, base of fore- and hindwing infuscate. Forewing with fuscous spot beyond marginal cell.



**Figs 49–56.** 49. *Sphex fumicatus* Christ, 1791, habitus of ♀. 50. *S. lanatus* Mocsáry, 1883, habitus of ♀. 51. *S. rufinervis* Pérez, 1895, habitus of ♂. 52. *S. taschenbergi* Magretti, 1884, habitus of ♀. 53. *S. fumicatus*, frontal view of ♀. 54. *S. taschenbergi*, frontal view of ♀. 55. Geographic distribution of *S. lanatus* (red), *S. rufinervis* (blue) and *S. taschenbergi* (yellow). 56. Geographic distribution of *S. tomentosus* Fabricius, 1787 (red) and *S. torridus* F. Smith, 1873 (blue).

VESTITURE. Appressed and erect setae on clypeus and paracocular area silvery. Appressed setae on collar both silvery and black, erect setae black, appressed and erect setae on scutum and propodeal enclosure black. Erect propodeal setae crimped, oriented perpendicularly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple. Scutellum slightly convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 2.2–2.3 × its medial width. Flagellomeres V + VI with broad placoids, covering entire length of flagellomere V and proximal four-fifths of flagellomere VI.

### Variation

In some specimens, the legs are dark ferruginous to a varying degree.

### Distribution

Very widespread in Africa; also occurs in the eastern Mediterranean region.

### Remarks

Despite not having examined type material, we are certain that our interpretation of *S. fumicatus* is correct. The species occurs all over the African continent and is found on the Arabian Peninsula as well. It is one of, if not the most commonly collected *Sphex* from the Afrotropical region. Its diagnostic characters are easy to see and therefore commonly included in descriptions, which makes synonymization possible even for works from authors that are not especially knowledgeable about this genus.

### *Sphex lanatus* Mocsáry, 1883

Figs 50, 55 (red)

?*Sphex argentifer* Walker, 1871: 19, ♂ (holotype or syntype: ♂, Sudan, Red Sea, Akeek Island, destroyed). Synonymized with *Sphex umbrosus* by Kohl, 1890: 407.

*Sphex lanatus* Mocsáry, 1883: 34, ♂ (holotype: ♂, South Africa, “Transvaal”, TMB, not examined).

### Differential diagnosis

Within the *argentatus* group, *S. lanatus* is characterized through its entirely silvery vestiture. Females (Fig. 50) can be distinguished from those of *S. feijeni* nom. nov. (Fig. 43) through having the propodeal sculpture largely obscured by appressed setae, whereas the propodeal vestiture is more sparse in that species and leaves 7–10 distinct transversal ridges visible that are absent in *S. lanatus*. Females of *S. erythrinus* are distinguishable through their yellow-tinged wings (Fig. 41).

Males of *S. lanatus* are recognizable by their longer and more slender petiole, the length of which is greater than 2.7 times its medial width. This coefficient is notably smaller than 2.4 in males of *S. erythrinus* (Fig. 42) and *S. feijeni* nom. nov. (Fig. 44). Furthermore, *S. erythrinus* and *S. feijeni* nom. nov. have the placoids covering at least flagellomeres III–V, whereas *S. lanatus* has only a single placoid on flagellomere V. Finally, *S. rufinervis* is similar (Fig. 51), but its erect clypeal setae are partially or completely black in both sexes.

### Material examined

AFRICA • 1 ♂; Feb. 1895; ZMB • 1 ♂; “British SW Africa”; ZMB • 1 ♀; “SW Lake Albert, Buessa”; 12 Aug. 1891; ZMB • 1 ♀; “Tanganyika”; 1936; H.A. Lindeman leg.; BMNH.

BOTSWANA • 1 ♂, 1 ♀; “Kalahari desert, Sevorelela Kokot”; Oct.–Nov. 1904; L. Schultze leg.; ZMB. – **Ghanzi District** • 1 ♀; 42 mi. W of Kalkfontein [Tsootsha]; [22°13'48" S, 20°12'10" E]; 11–12 Apr. 1972; BMNH • 1 ♂, 1 ♀; Mongalatsela; 8 May 1924; J. Maurice leg.; BMNH.

BURKINA FASO – **Centre-Ouest Region** • 1 ♀; Pala; [11°53'55.1" N, 2°19'29.5" W]; 3 Jun. 1968; J. Hamon leg.; MNHN • 1 ♀; same collection data as for preceding but 8 Jun. 1968; MNHN. – **Hauts-Bassins Region** • 1 ♀; Samandéni; [11°27'09" N, 4°27'27" W]; 8 Jun. 1968; J. Hamon leg.; MNHN.

CAMEROON • 1 ♂; “Neu-Kamerun”; G. Tessmann leg.; ZMB. – **Far North Region** • 1 ♀; Lake Chad; [12°53'38.9" N, 14°29'19.4" E]; 6–12 Aug. 1909; Riggenbach leg.; ZMB.

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♀; “Tanganika”; Hecq leg.; MRAC. – **Bas-Uele** • 1 ♀; Bambesa; [3°28' N, 25°43' E]; 20 Sep. 1933; H.J. Brédo leg.; MRAC • 1 ♀; same locality as for preceding; 8 Jul. 1937; J. Vrydagh leg.; MRAC • 1 ♀; Tukpwo; [4°25'56" N, 25°50'50" E]; Jul. 1937; J. Vrydagh leg.; MRAC • 1 ♀; same collection data as for preceding but Aug. 1937; MRAC. – **Haut-Katanga** • 1 ♀; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; 29 May 1949; C. Seydel leg.; USNM • 1 ♀; same collection data as for preceding but May 1949; MRAC. – **Ituri Province** • 1 ♂; Bunia; [1°34' N, 30°15' E]; 15 Aug. 1934; J.V. Leroy leg.; MRAC • 1 ♀; Mahagi-Niarembe; [2°14'49" N, 31°06'41" E]; 1935; Ch. Scops leg.; MRAC • 1 ♂; Mongbwalu (Kilo); [1°56'40" N, 30°02'19" E]; 1939; Scheitz leg.; MRAC. – **Kasaï** • 1 ♀; Tshikapa; [6°24' S, 20°48' E]; Mar. 1939; Mevr. Bequaert leg.; MRAC • 1 ♂; same collection data as for preceding but Apr. 1939; MRAC. – **Kasaï-Central** • 1 ♂; Luluabourg [now Kananga]; [5°53'46" S, 22°24'59" E]; 18 May 1919; P. Callewaert leg.; MRAC • 1 ♂, 1 ♀; same collection data as for preceding; MRAC. – **Kasaï-Oriental** • 1 ♂, 1 ♀; Gandajika; [6°45' S, 23°57' E]; 1956; P. de Francquen leg.; MRAC • 1 ♂; same locality as for preceding; Dec. 1925; Ch. Seydel leg.; MRAC • 1 ♂; same locality as for preceding; Ch. Seydel leg.; MRAC. – **Kongo Central** • 1 ♂; Boma; 6°00' S, 13°00' E; 18 Jun. 1915; Lang and Chapin leg.; AMNH • 1 ♂; same collection data as for preceding but 19 Jun. 1915; AMNH • 1 ♀; Congo da Lemba; [5°42' S, 13°41'60" E]; 1912; R. Mayné leg.; MRAC • 1 ♀; Mayumbe; [4°30' S, 12°30' E]; R. Verschueren leg.; MRAC. – **Lomami** • 1 ♀; Kabinda; [6°08' S, 24°29' E]; Jan. 1926; Ch. Scops leg.; MRAC • 3 ♀♀; Kanda-Kanda; [6°56' S, 23°37' E]; 10 Dec. 1925; Ch. Seydel leg.; MRAC • 1 ♀; Luputa; [7°09'42" S, 23°42'02" E]; Jan. 1935; Bouvier leg.; MRAC. – **Lualaba** • 1 ♀; Kalinda; [11°11'28" S, 22°18'03" E]; Jan. 1926; Ch. Seydel leg.; MRAC • 1 ♀; Kapanga; [8°21' S, 22°34' E]; Dec. 1932; F.G. Overlaet leg.; MRAC • 1 ♀; same collection data as for preceding but Jan. 1933; MRAC • 1 ♂; Sandoa; [9°41' S, 22°53' E]; 2 Feb. 1919; F.G. Overlaet leg.; MRAC • 1 ♀; same collection data as for preceding but 20 Mar. 1919; MRAC. – **Maniema** • 3 ♂♂; Nyangwe; [4°13'37" S, 26°11' E]; Apr.–May 1918; R. Mayné leg.; MRAC. – **Nord-Ubangi** • 1 ♂, 2 ♀♀; Bosobolo; [4°11'23" N, 19°52'59" E]; 8–11 Jan. 1932; H.J. Brédo leg.; MRAC. – **North Kivu** • 1 ♂; Albert National Park: Kalinga (1082 m) à Bitshumbi; [0°50' S, 29°20' E]; 12 Nov. 1934; G.F. de Witte leg.; MRAC • 1 ♂; Vitschumbi, SW of Lake Edward; [0°41' S, 29°23' E]; 2 May 1901; ZMB. – **Province of Équateur** • 1 ♀; Coquilhatville [now Mbandaka]; [0°03' N, 12°57' E]; 10 May 1931; H.J. Brédo leg.; MRAC • 1 ♂, 3 ♀♀; Eala; [0°02'30" N, 18°20'06" E]; 2 Oct. 1931; H.J. Brédo leg.; MRAC • 1 ♂, 1 ♀; same collection data as for preceding but 6 Oct. 1931; MRAC • 2 ♀♀; same collection data as for preceding but 22 Nov. 1931; MRAC • 2 ♂♂; same collection data as for preceding but Mar. 1932; MRAC • 1 ♂; same collection data as for preceding but May 1932; MRAC • 1 ♀; same locality as for preceding; May 1935; J. Ghesquière leg.; MRAC. – **Sud-Ubangi** • 1 ♂; Libenge; [3°39'11" N, 18°38'08" E]; 10 Dec. 1931; H.J. Brédo leg.; MRAC • 1 ♂; same locality as for preceding; Apr. 1937; Leontowitch leg.; MRAC • 1 ♂, 3 ♀♀; Motenge-Boma; [3°14' N, 18°39' E]; Dec. 1931; H.J. Brédo leg.; MRAC • 1 ♀; Terr. Libenge, M'Paka; [3°39' N, 18°38' E]; Jul.–Aug. 1959; M. Pecheur leg.; MRAC. – **Tshuapa** • 1 ♀; Bokuma; [0°06' S, 18°41' E]; Jul. 1952; R.P. Lootens leg.; MRAC.

KENYA – **Kwale County** • 1 ♀; Kwali Forest, 20 mi. W of Mombasa; [4°00'34" S, 39°18'18" E]; 1 Jun. 1948; M. Steele leg.; BMNH.

MALI – **Gao Region** • 1 ♂; 50 km S of Gao; [15°47'17" N, 0°01'48" W]; Dec. 1977; G. Popov leg.; BMNH. – **Mopti Region** • 1 ♂; 10 km S of Mopti; [14°22'11.4" N, 4°08'56.3" W]; 8 Aug. 1991; M. Schwarz leg.; OÖLM • 1 ♀; 70 km SW of Mopti; [14°04'45.2" N, 4°41'3.3" W]; 21 Aug. 1991; M. Schwarz leg.; OÖLM. – **Ségou Region** • 1 ♂; Molodo; [14°14'15" N, 6°01'12" W]; 17 Jul. 1968; J. Hamon leg.; MNHN.

MOZAMBIQUE – **Maputo Province** • 1 ♀; Maputo Bay; [25°59' S, 32°42' E]; R. Monteiro leg.; ZMB.

NAMIBIA • 1 ♀; “German SW Africa”; 1901; Lübbert leg.; ZMB. – **Hardap Region** • 1 ♂; 23 km N of Rehoboth; [23°05'08.4" S, 17°06'11.4" E]; 17 Feb. 1990; M. Schwarz leg.; OÖLM • 1 ♂; 71 km E of Stampriet; 24°09' S, 19°00' E; 27 Mar. 2000; F.W. and S.K. Gess leg.; AMG. – **Kavango East** • 2 ♀♀; Kaudom-Camp; 18°31' S, 20°43' E; 22–25 Feb. 1992; F. Koch leg.; ZMB • 2 ♂♂; 100 km SW of Rundu; [18°35'48" S, 19°06'58.3" E]; 1 Feb. 1993; M. Schwarz leg.; OÖLM. – **Khomas Region** • 1 ♂; 40 km W of Witvlei; [22°21'29.7" S, 18°05'52" E]; 16 Feb. 1990; M. Schwarz leg.; OÖLM • 1 ♂, 1 ♀; S of Okasewa; 22°34'53" S, 18°11'15" E; 12–17 Feb. 2010; J. Oehlke leg.; coll. Jacobs. – **Oshikoto Region** • 2 ♂♂; ca 15 km from Oshivelo to Ondangwa; [18°31' S, 17°05' E]; 7 Apr. 1996; D.W. and G.T. Gess leg.; AMG • 2 ♀♀; Namutoni, Etosha National Park; 18°48' S, 16°56' E; 27 Feb. 1994; F. Koch leg.; THD-005-ZMB; GenBank EF-1α gene: MW558243; GenBank LWR gene: MW582281; ZMB. – **Otjozondjupa Region** • 1 ♂, 1 ♀; 15 km NW of Otjiwarongo; [20°19'26.8" S, 16°36'36.5" E]; 3 Mar. 1990; M. Schwarz leg.; OÖLM • 1 ♀; 15–20 km NW of Otjiwarongo; [20°23'02" S, 16°28'54" E]; 3 Mar. 1990; W.J. Pulawski leg.; CAS.

NIGER – **Dosso Region** • 2 ♂♂; 100 mi. SE of Niamey; [12°32' N, 3°15'38.5" E]; 25 Oct. 1975; G. Popov leg.; BMNH. – **Tillabéri Region** • 1 ♂; Liboré; [13°24'12" N, 2°11'31" E]; 2 Dec. 1984; J. Hamon leg.; MNHN.

NIGERIA – **Kaduna State** • 1 ♂, 1 ♀; Samaru; [11°09'39" N, 7°38'44" E]; 25 Jul. 1970; Ward leg.; BMNH.

REPUBLIC OF CÔTE D'IVOIRE – **Vallée du Bandama District** • 1 ♀; Bouaké; [7°41' N, 5°01' W]; Jul. 1977; P.M. Elsen leg.; MRAC.

REPUBLIC OF THE CONGO – **Pool Department** • 1 ♀; Inoni; [3°04'5.8" S, 15°38'10.8" E]; 15 Nov. 1976; G. Onore leg.; MNHN • 1 ♂; Kintelé; [4°09' S, 15°20'32" E]; Jan. 1978; C. Morin leg.; MNHN • 1 ♀; same collection data as for preceding but 3 Apr. 1978; MNHN • 1 ♂; same locality as for preceding; Mar. 1978; G. Onore leg.; MNHN.

SOUTH AFRICA – **Eastern Cape** • 1 ♂; Mountain Zebra Park; 32°15' S, 25°27' E; 12–16 Feb. 1988; A.J. Weaving leg.; AMG. – **Free State** • 2 ♂♂; Bothaville; [27°23' S, 26°37' E]; 25 Feb. 1899; H. Brauns leg.; TMP • 1 ♂; same collection data as for preceding; TMP • 1 ♂; same collection data as for preceding but 10 Mar. 1899; TMP. – **Gauteng** • 1 ♂; Johannesburg; [26°12'16" S, 28°02'44" E]; G. Kobrow leg.; ZMB • 1 ♀; Sterkfontein; [25°58'36" S, 27°44'27" E]; 1900; H.P. Thomasset leg.; BMNH. – **Limpopo** • 1 ♀; Plat River, Waterberg District; [24°53'16.3" S, 28°15'35.6" E]; 11 Jan. 1903; R. v. Jutrzencka leg.; TMP • 1 ♂; Waterberg District; 1898–1899; R. v. Jutrzencka leg.; TMP. – **North West** • 2 ♂♂, 1 ♀; Mamagalieskraal; [25°32' S, 27°49' E]; 31 Mar. 1926; W. Lingnau leg.; DEI. – **Northern Cape** • 1 ♂; Auob-Nossob Junction; [26°26'5.31" S, 20°37'33.59" E]; Apr. 1933; G. van Son leg.; TMP • 2 ♂♂; Kalahari Gemsbok National Park, Nossob R bed, 11 km NNE of Tweerivieren; [26°24' S, 20°40' E]; 8–11 Mar. 1990; F.W. and S.K. Gess leg.; AMG • 4 ♂♂, 3 ♀♀; Olifantshoek; [27°56' S, 22°44' E];

24 Mar. 1990; M. Schwarz leg.; OÖLM • 1 ♂; S of Kalahari Desert, Van Zylsrus; [26°52'1.2" S, 22°03' E]; 15 Jan. 2001; M. Snižek leg.; THD-021-OOLM; GenBank CO1 gene: MW538579; OÖLM • 8 ♂♂, 1 ♀; same collection data as for preceding; OÖLM.

TANZANIA – **Kagera Region** • 1 ♂, 2 ♀♀; Bukoba; [1°19'54" S, 31°48'44" E]; 9–11 Jun. 1912; C.C. Gowdey leg.; BMNH.

TOGO – **Savanes** • 1 ♀; “Tapuog” [Dapaong?]; [10°52' N, 0°12' E]; Aug. 1901; Thierry leg.; ZMB • 1 ♀; Sansanné-Mango; [10°21'20" N, 0°28'32" E]; Thierry leg.; ZMB.

UGANDA – **Central Region** • 1 ♀; Buddu, NW shores of Victoria Nyanza; [0°25' S, 31°40' E]; 12–15 Sep. 1911; S.A. Neave leg.; BMNH • 1 ♀; Entebbe; [0°03' N, 32°27'36" E]; 6–10 May 1912; C.C. Gowdey leg.; BMNH • 2 ♀♀; same collection data as for preceding but Aug. 1912; BMNH • 1 ♂; Kampala; [0°18'58" N, 32°34'55" E]; 17 Apr. 1913; C.C. Gowdey leg.; BMNH • 1 ♀; Msozi; [0°51' S, 31°42' E]; Feb. 1903; D. Radcliffe leg.; BMNH. – **Western Region** • 2 ♂♂, 1 ♀; valley of Kafu River, Unyoro; alt. 3400 ft; 23–28 Dec. 1911; S.A. Neave leg.; BMNH.

ZAMBIA – **Lusaka Province** • 1 ♀; 25 km E of Lusaka; 15°21' S, 28°30' E; 3 Mar. 1995; W.J. Pulawski leg.; CAS. – **Northern Province** • 1 ♂; “L. Chambezi V., Kasama distr.”; alt. 3900 ft; 4–6 May 1908; S.A. Neave leg.; OUMNH.

ZIMBABWE – **Bulawayo** • 1 ♀; Bulawayo; [20°09' S, 28°35' E]; Dec. 1903; G.A.K. Marshall leg.; BMNH. – **Harare Province** • 1 ♂; Salisbury [now Harare], Hillside; [17°50'15" S, 31°04'54" E]; Mar. 1926; H.S. Leeson leg.; BMNH. – **Manicaland** • 1 ♂; Umtali [now Mutare]; [18°58' S, 32°38' E]; A. Bodong leg.; DEI. – **Matabeleland North** • 1 ♂; Victoria Falls; 17°56' S, 25°50' E; 28–31 Mar. 1998; W.J. Pulawski leg.; CAS • 1 ♀; De Beer’s Ranch, Shangani; [19°47' S, 29°22' E]; May 1932; BMNH.

## Description

### Female

SIZE. 21.2–33.3 mm.

COLOR. Black except for the following, which are dark ferruginous: basal half of mandible and legs from trochanter onward, especially femur and tibia of mid- and hindlegs. Cellular wing area hyaline, base of fore- and hindwing infuscate, apical margin of forewing fuscous.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae crimped, oriented anteriorly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple, not stepped medially. Clypeus without indentation or carina. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.7–2.8 × length of antepenultimate spine. Petiole length 2.3–2.5 × its medial width.

### Male

SIZE. 17.6–23.8 mm.

COLOR. Black except for the following, which are dark ferruginous: stripe in center of mandible, hindtibia and often part of hindfemur. Cellular wing area hyaline, base of fore- and hindwing infuscate, forewing with fuscous spot beyond marginal cell.

**VESTITURE.** Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect setae on clypeus and paraocular area silvery intermixed with black ones, exclusively silvery on collar, scutum and propodeal enclosure. Erect propodeal setae crimped, oriented anteriorly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.

**STRUCTURE.** Free clypeal margin simple. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII very slightly concavely emarginate. Penis valvae without conspicuous modifications. Petiole length 2.8–3.0 × its medial width. Flagellomere V with narrow placoid covering its proximal two-thirds.

### Variation

Unknown.

### Distribution

Widespread in Africa.

***Sphex rufinervis* Pérez, 1895**  
Figs 51, 55 (blue)

*Sphex rufinervis* Pérez, 1895: 209, ♂, ♀.

### Differential diagnosis

This species (Fig. 51) is one of four within this group that have uniformly silvery propodeal setae. An easily visible character that distinguishes it from the other three, *S. erythrinus* (Figs 41–42), *S. feijeni* nom. nov. (Figs 43–44) and *S. lanatus* (Fig. 50), are the largely or completely black erect clypeal setae in both sexes of *S. rufinervis*. The other species mentioned have them uniformly silvery.

### Material examined

#### Lectotype

REPUBLIC OF SEYCHELLES • 1 ♀; Mahé; [4°40' S, 55°28' E]; 1892; Ch. Alluaud leg.; MNHN (designated by Menke in Bohart & Menke 1976: 116).

#### Paralectotypes

REPUBLIC OF SEYCHELLES • 1 ♂, 3 ♀♀; same collection data as for lectotype; MNHN.

#### Other material

REPUBLIC OF SEYCHELLES • 2 ♂♂; 1907; P.R. Dupont leg.; BMNH • 1 ♂, 5 ♀♀; BMNH • 1 ♂; same collection data as for lectotype; MNHN • 5 ♂♂, 1 ♀; same collection data as for lectotype but A. Merian leg.; ZMB. – **Outer Islands** • 1 ♂; North Island, Farquhar; [10°07'23" S, 51°10'38" E]; 16–17 Nov. 1952; E.S. Brown leg.; BMNH.

### Description

#### Female

SIZE. 23.4 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Cellular wing area hyaline, apical margin of forewing fuscous.

**VESTITURE.** Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect setae on clypeus black, on paraocular area black intermixed with silvery ones, on collar silvery intermixed with some black ones, on scutum and propodeal enclosure exclusively silvery. Erect propodeal setae oriented anteriorly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.

**STRUCTURE.** Free clypeal margin with two small teeth, not stepped medially. Clypeus without indentation or carina. Scutellum convex. Metanotum raised, slightly bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I  $2.0\text{--}2.3 \times$  length of antepenultimate spine. Petiole length  $2.0 \times$  its medial width.

#### **Male**

**SIZE.** 19.4–21.7 mm.

**COLOR.** Black, except for ferruginous stripe in center of mandible. Cellular wing area hyaline, forewing with fuscous spot beyond marginal cell.

**VESTITURE.** Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect setae on clypeus black and usually intermixed with silvery ones, on paraocular area silvery and usually intermixed with some black ones, exclusively silvery on collar, scutum and propodeal enclosure. Erect propodeal setae oriented anteriorly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.

**STRUCTURE.** Free clypeal margin simple. Scutellum convex. Metanotum slightly raised, slightly bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII concavely emarginate. Penis valvae without conspicuous modifications. Petiole length  $2.4 \times$  its medial width. Flagellomere V with narrow placoid covering its proximal four-fifths.

#### **Variation**

Unknown.

#### **Distribution**

Seychelles.

#### ***Sphex taschenbergi* Magretti, 1884**

Figs 52, 54, 55 (yellow)

*Sphex taschenbergi* Magretti, 1884: 581, ♀ (syntypes: Ethiopia, Amhara Region, Metemma, [12°57'17" N, 36°09'19" E], MSNG, not examined).

#### **Differential diagnosis**

This species (Fig. 52) shares many characteristics with *S. fumicatus*, like black erect propodeal setae and basally infusate but otherwise hyaline forewings. Among the African *argentatus* group members, this combination is found only in those two. From *S. fumicatus*, *S. taschenbergi* is distinguished through having uniformly black erect clypeal setae (Fig. 54) instead of silvery ones (Fig. 53) in both sexes.

#### **Material examined**

CHAD – **Lac Region** • 1 ♀; “N’Gouri, distr. de Kanem”; [13°38'11" N, 15°22'06" E]; Sep. 1958; P. Renaud leg.; MRAC. – **Tibesti Region** • 1 ♂; Zouarke; [20°25' N, 16°05' E]; 1 Apr. 1953; K.M. Guichard leg.; BMNH.



ETHIOPIA – **Oromia Region** • 2 ♀♀; Lake Langano; [7°36' N, 38°43' E]; 29–30 Apr. 2007; J. Halada leg.; OÖLM.

KENYA – **Kitui County** • 1 ♀; E of Mwingi; [0°56' S, 38°03' E]; 14 May 2007; M. Halada leg.; OÖLM.  
– **Taita-Taveta County** • 2 ♂♂, 2 ♀♀; Voi; [3°23'26" S, 38°34'37" E]; 16 May 2007; M. Halada leg.; OÖLM • 1 ♀; near Voi (Tsavo); [3°23'26" S, 38°34'37" E]; 8–18 Nov. 1996; Mi. Halada leg.; OÖLM • 1 ♀; same collection data as for preceding but 22 Nov.–2 Dec. 1996; OÖLM • 1 ♂; Voi River; [3°23'26" S, 38°34'37" E]; 14 Apr. 2007; M. Halada leg.; OÖLM.

MALAWI. – **Southern Region** • 1 ♂; Monkey Bay; [14°05' S, 34°55' E]; 23 Mar. 1975; H.R. Feijen leg.; RMNH.

MALI – **Mopti Region** • 1 ♀; 5 km E of Hombori; [15°17'4.4" N, 1°39'2.1" W]; 17 Aug. 1991; M. Schwarz leg.; OÖLM.

NAMIBIA – **Hardap Region** • 1 ♂; 15 km N of Kalkrand; [23°56'4.8" S, 17°35'22.6" E]; 13 Feb. 1990; M. Schwarz leg.; OÖLM. – **Otjozondjupa Region** • 1 ♀; Waterberg, Okatijikona; 20°24' S, 17°24' E; 27–28 Feb. 2010; F. Koch leg.; THD-004-ZMB; GenBank CO1 gene: MW538576; GenBank EF-1 $\alpha$  gene: MW558244; GenBank LWR gene: MW582283; ZMB • 1 ♀; same collection data as for preceding but 13–14 Mar. 2010; ZMB.

OMAN • 1 ♂; Barelmi; Feb.–Mar. 1943; D.V. Fitzgerald leg.; BMNH. – **Dhofar Governorate** • 1 ♂; “Aim Arzat“ [Ayn Razat]; [17°07'47" N, 54°14'11" E]; 18 Aug. 1981; A.R. Pittaway leg.; BMNH.

SUDAN – **Khartoum State** • 2 ♂♂; Omdurman; 4 Apr. 1901; NRS.

TANZANIA – **Morogoro Region** • 1 ♀; 50 km SW of Morogoro; 6°50' S, 37°15' E; 12 Jan. 2007; J. Halada leg.; OÖLM.

YEMEN – **Abyan Governorate** • 1 ♂; Lodar [Lawdar]; [13°52'58" N, 45°52'06" E]; 16 May 1967; K.M. Guichard leg.; BMNH.

ZIMBABWE • 1 ♂; C. Tyler leg.; USNM • 1 ♂; Victoria Falls; Feb. 1935; NRS.

## Description

### Female

SIZE. 22.7–28.1 mm.

COLOR. Black, femora and tibia dark ferruginous. Cellular wing area hyaline, base of fore- and hindwing infuscate. Forewing with fuscous spot beyond marginal cell.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae crimped, oriented perpendicularly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple, not stepped medially. Clypeus without indentation and carina. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.1–2.3 × length of antepenultimate spine. Petiole length 1.8–2.1 × its medial width.

### Male

SIZE. 18.9–22.6 mm.

**COLOR.** Black. Cellular wing area hyaline, base of fore- and hindwing infuscate. Forewing with fuscous spot beyond marginal cell.

**VESTITURE.** Appressed setae on clypeus, paraocular area and collar silvery, on scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae crimped, oriented perpendicularly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.

**STRUCTURE.** Free clypeal margin simple. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 2.1–2.3 × its medial width. Flagellomere II with or without broad placoid covering its proximal two-thirds, flagellomeres III–VI with broad placoid covering their entire length.

### Variation

In some specimens, the legs are dark ferruginous to a varying degree.

### Distribution

Chad, Ethiopia, Kenya, Mali, Namibia, Oman, Sudan, Tanzania, Yemen, Zimbabwe.

*Sphex tomentosus* Fabricius, 1787

Figs 56 (red), 57, 60–61

*Sphex tomentosus* Fabricius, 1787: 274 (holotype: ♂, Sierra Leone, Pflug leg., ZMUC, not examined).  
*Sphex tuberculatus* F. Smith, 1873: 291, ♀. Junior primary homonym of *Sphex tuberculatus* de Villers, 1789 (now in *Cerceris* Latreille, 1802). Synonymized with *Sphex tomentosus* by van der Vecht 1961: 29.

### Differential diagnosis

This species (Fig. 57) can easily be distinguished from other members of the *argentatus* group through the uniformly rich golden facial setae present in both sexes. Males also possess a distinct edge on tergum VII (Fig. 60) that is unique among all African *Sphex*, as well as conspicuously heart-shaped valvicepes (Figs 60–61).

### Material examined

AFRICA • 1 ♀; Jan. 1891; NRS • 2 ♀♀; Région des Lacs; Sagona leg.; MRAC.

ANGOLA – **Cuanza Sul Province** • 1 ♀; Congulu; [11°17'03" S, 15°45'08" E]; Apr. 1934; K. Jordan leg.; BMNH. – **Huambo Province** • 1 ♂; Mt Lubiri, 6 mi. NW of Alto Hama; [12°09'02" S, 15°29'35" E]; 7 Mar. 1972; BMNH.

CAMEROON – **Adamawa Region** • 1 ♀; SE of Ngaoundéré, ranch; [7°08' N, 13°42' E]; 9–12 May 2006; J. Oehlke leg.; coll. Jacobs. – **East Province** • 1 ♀; D'Ja Posten; 3.15° N, 13.30° E; 15 May–1 Jul. 1936; F.G. Merfield leg.; BMNH. – **Littoral Region** • 2 ♀♀; Douala; [4°03' N, 9°41' E]; v. Rothkirch leg.; DEI. – **West Region** • 2 ♀♀; Dschang; [5°27' N, 10°04' E]; v. Rothkirch leg.; DEI.

CENTRAL AFRICAN REPUBLIC • 1 ♀; M. Boulard leg.; MNHN. – **Ouham-Pendé** • 1 ♀; Bozoum; [6°19'02" N, 16°22'42" E]; 11–20 Apr. 1914; G. Tessmann leg.; ZMB • 1 ♀; same collection data as for preceding but 1–10 May 1914; ZMB.

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♀; “Kolo-Koilu-Madiata”; Sep. 1913; R. Verschueren leg.; MRAC • 1 ♀; “Kwango: Pangi”; 17 Feb. 1939; Mevr. Bequaert leg.; MRAC • 1 ♀; “Mulu sur Lua (Ubangi)”; 1931; Van Gils leg.; MRAC • 1 ♀; “Sankuru”; 1910; Abrassart leg.; MRAC • 1 ♀; Iringui [Kasai?]; Lindemans leg.; MRAC • 1 ♀; Katanga, Katampe; Jan. 1926; Ch. Seydel leg.; MRAC. – **Bas-Uele** • 1 ♀; Api; [3°40' N, 25°27' E]; 29 Oct. 1909; Laplume leg.; MRAC • 1 ♂; Bambesa; [3°28' N, 25°43' E]; 15 Sep. 1933; H.J. Brédo leg.; MRAC • 1 ♀; same collection data as for preceding but Feb. 1934; MRAC • 2 ♂♂; same locality as for preceding; 6 Jul. 1937; J. Vrydagh leg.; MRAC • 3 ♂♂; same collection data as for preceding but 29 Aug. 1943; MRAC • 1 ♀; same collection data as for preceding but 1 Sep. 1943; MRAC • 1 ♂; same locality as for preceding; 9 May 1938; P. Henrard leg.; MRAC • 1 ♂; same collection data as for preceding but May 1938; MRAC • 1 ♀; Buta; [2°48' N, 24°47' E]; 1932; R.F.J. Hutsebaut leg.; MRAC • 1 ♂, 21 ♀♀; Poko; 3°10' N, 26°50' E; Aug. 1913; Lang and Chapin leg.; AMNH • 1 ♀; same locality as for preceding; [3°09' N, 26°53' E]; Floridon leg.; MRAC. – **Haut-Katanga** • 1 ♂, 1 ♀; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; 16 Sep. 1932; de Loose leg.; MRAC • 2 ♂♂; same collection data as for preceding but Feb. 1933; MRAC • 1 ♀; same locality as for preceding; Jun. 1949; Ch. Seydel leg.; MRAC. – **Haut-Lomami** • 1 ♀; Kabongo; [7°19' S, 25°35' E]; 5 Jan. 1953; Ch. Seydel leg.; MRAC • 1 ♀; Kaniama; [7°31' S, 24°11' E]; 1931; R. Massart leg.; MRAC • 1 ♀; same collection data as for preceding but 1932; MRAC • 1 ♀; Kanonga (675 m), P.N.U. [Upemba National Park]; [9°09' S, 26°05' E]; 14–23 Feb. 1949; G.F. de Witte leg.; MRAC • 2 ♀♀; Mato; [8°01' S, 24°55'23" E]; 8 Dec. 1912; Ch. Seydel leg.; MRAC. – **Haut-Uele** • 1 ♀; “P.N.G., Miss. H. De Saeger” [Garamba National Park]; [4°00' N, 29°15' E]; 10 Oct. 1951; H. De Saeger leg.; MRAC • 1 ♀; same collection data as for preceding but Nov. 1951; MRAC • 1 ♀; Bafwabaca; 2°10' N, 27°30' E; Jan. 1910; Lang and Chapin leg.; AMNH • 1 ♀; Faradje; 3°40' N, 29°40' E; Nov. 1912; Lang and Chapin leg.; AMNH • 1 ♀; Medje; 2°25' N, 27°15' E; 19 Jul. 1910; Lang and Chapin leg.; AMNH • 4 ♂♂, 1 ♀; same collection data as for preceding but Sep. 1910; AMNH • 3 ♀♀; same collection data as for preceding but Jun. 1914; AMNH • 1 ♀; same collection data as for preceding but 9–15 Jul. 1910; AMNH • 1 ♀; Moto; [2°54'17" N, 29°27'22" E]; 1920; L. Burgeon leg.; MRAC. – **Ituri Province** • 1 ♀; Adranga [Aturu?]; [2°54'01" N, 30°25'14" E]; 8 Aug. 1931; H.J. Brédo leg.; MRAC • 2 ♀♀; Lula (Kasai); [7°43'51" S, 22°51'56" E]; 1958; A.J. Jobaert leg.; MRAC • 1 ♀; Luluabourg [now Kananga]; [5°53'46" S, 22°24'59" E]; Aug. 1956; M. Poll leg.; MRAC. – **Kasai-Oriental** • 1 ♀; Lukenge; [6°14' S, 23°26' E]; Fontainas leg.; MRAC. – **Kinshasa** • 1 ♀; Leopoldville [now Kinshasa]; [4°19'39" S, 15°18'48" E]; 1911; Mouchet leg.; MRAC • 1 ♀; same collection data as for preceding; MRAC. – **Kongo Central** • 1 ♀; “Mayumbe: Buende-Suindi”; 15 May 1926; A. Collart leg.; MRAC • 1 ♀; Camp de Lukula; [5°23' S, 12°57' E]; 1911; Daniel leg.; MRAC • 1 ♀; Kisantu; [5°07'29" S, 15°04'49" E]; P. Regnier leg.; MRAC • 1 ♀; Lukunga; [4°38'40" S, 13°47'16" E]; 28 Oct. 1968; P.M. Elsen leg.; MRAC • 4 ♀♀; Mayidi; [5°11'13" S, 15°09'17" E]; 1942; R.P. Van Eyen leg.; MRAC • 1 ♀; Mayumbe; [4°30' S, 12°30' E]; R. Verschueren leg.; MRAC. – **Kwango** • 1 ♀; Kasongo-Lunda; [6°28'42" S, 16°49'02" E]; Mar. 1971; V. Van Haelst leg.; MRAC. – **Kwilu Province** • 1 ♀; Gingungi; [5°24'17" S, 17°55'17" E]; 1931; MRAC • 1 ♀; Kikwit; [5°02' S, 18°49' E]; Nov. 1920; P. Vanderijst leg.; MRAC • 1 ♀; Mwilambongo (Idiofa); [4°56'36" S, 19°48'18" E]; 1947; Soeur Imelda leg.; MRAC. – **Lomami** • 1 ♀; Kabinda; [6°08' S, 24°29' E]; 1935; P. Henrard leg.; MRAC • 1 ♀; Kaniana; [6°46'23" S, 23°50'58" E]; Jan. 1931; R. Massart leg.; MRAC. – **Lualaba** • 1 ♀; Bunkeya; [10°24' S, 26°58' E]; Oct. 1907; S.A. Neave leg.; MRAC • 1 ♀; Kafakumba; [9°40'35.9" S, 23°45'40.3" E]; DEI • 1 ♂, 6 ♀♀; Kapanga; [8°21' S, 22°34' E]; Oct. 1932; F.G. Overlaet leg.; MRAC • 11 ♀♀; same collection data as for preceding but Nov. 1932; MRAC • 1 ♀; same collection data as for preceding but 3 Dec. 1932; MRAC • 2 ♀♀; same collection data as for preceding but 8 Dec. 1932; MRAC • 2 ♀♀; same collection data as for preceding but Jan. 1933; MRAC • 2 ♀♀; same collection data as for preceding but Feb. 1933; MRAC • 1 ♀; same collection data as for preceding but Oct. 1933; MRAC • 1 ♀; same collection data as for preceding but 1934; MRAC • 1 ♂; same collection data as for preceding but Feb. 1934; MRAC • 1 ♀; Lulua, Luashi; [10°55'41" S, 23°36'28" E]; 1935; F. Freyne leg.; MRAC • 1 ♀; same collection data as for preceding but 1936; MRAC • 1 ♀; Sandoa; [9°41' S, 22°53' E]; 20 Mar. 1919; F.G.

Overlaet leg.; MRAC. – **Mongala Province** • 1 ♀; Yambata; [2°25'44" N, 21°57'46" E]; Feb.–Mar. 1914; De Giorgi leg.; MRAC. – **Nord-Ubangi** • 1 ♂; Abumombazi; [3°41'17" N, 22°09'14" E]; 22 Feb. 1932; H.J. Brédo leg.; MRAC • 1 ♀; same collection data as for preceding but 23 Feb. 1932; MRAC • 1 ♀; same collection data as for preceding but 18–26 Feb. 1932; MRAC • 1 ♀; Bosobolo; [4°11'23" N, 19°52'59" E]; 8–11 Jan. 1932; H.J. Brédo leg.; MRAC • 1 ♀; Karawa; [3°19'55" N, 20°18'03" E]; 1936; Wallin leg.; MRAC. – **North Kivu** • 1 ♀; Beni; [0°29' N, 29°28' E]; Jul. 1911; Borgerhoff leg.; MRAC • 1 ♀; same locality as for preceding; Feb. 1931; L. Lebrun leg.; MRAC • 1 ♀; Mulo; [0°07'39" S, 29°16'02" E]; Apr. 1950; R.P. Celis leg.; MRAC • 1 ♀; Mutwanga, Semliki; [0°20'18" N, 29°44'46" E]; Jul. 1932; Van Hoof leg.; MRAC • 1 ♂, 1 ♀; W. Ruwenzori, Albert National Park; [0°29'19" N, 29°50'57" E]; Mar. 1937; Hackars leg.; MRAC. – **Province of Équateur** • 1 ♂; Coquilhatville [now Mbandaka]; [0°03' N, 12°57' E]; 1946; Ch. Scops leg.; MRAC • 1 ♀; same locality as for preceding; 10 May 1931; H.J. Brédo leg.; MRAC • 1 ♂; Eala; [0°02'30" N, 18°20'06" E]; 2 Oct. 1931; H.J. Brédo leg.; MRAC • 1 ♀; same collection data as for preceding but 3 Oct. 1931; MRAC • 1 ♀; same collection data as for preceding but 7 Oct. 1931; MRAC • 1 ♀; same collection data as for preceding but 13 Oct. 1931; MRAC • 1 ♀; same collection data as for preceding but 20 Oct. 1931; MRAC • 1 ♀; same collection data as for preceding but Nov. 1931; MRAC • 1 ♀; same collection data as for preceding but 5 Nov. 1931; MRAC • 2 ♀♀; same collection data as for preceding but 14 Nov. 1931; MRAC • 1 ♀; same collection data as for preceding but 21 Nov. 1931; MRAC • 2 ♀♀; same collection data as for preceding but Mar. 1932; MRAC • 2 ♀♀; same collection data as for preceding but Apr. 1932; MRAC • 1 ♀; same collection data as for preceding but 22 Apr. 1932; MRAC • 1 ♀; same collection data as for preceding but May 1932; MRAC • 2 ♂♂, 3 ♀♀; same locality as for preceding; Jun. 1932; A. Corbisier leg.; MRAC • 1 ♀; same collection data as for preceding but 7 Jul. 1932; MRAC • 1 ♂, 1 ♀; same locality as for preceding; May 1935; J. Ghesquière leg.; MRAC • 1 ♀; same collection data as for preceding but Jul. 1936; MRAC • 1 ♀; same collection data as for preceding but Aug. 1936; MRAC • 1 ♀; same collection data as for preceding but Dec. 1936; MRAC • 1 ♀; Flandria; [0°19'14" S, 19°05'34" E]; 23 Aug. 1930; R.P.G. Hulstaert leg.; MRAC • 1 ♀; same collection data as for preceding but 1935; MRAC • 1 ♀; Ikengé; [0°06' S, 18°46' E]; 1 Apr. 1914; R. Mayné leg.; MRAC • 1 ♀; Lukolela; [1°03'37" S, 17°10'55" E]; De Guide leg.; MRAC • 1 ♀; Nouvelle Anvers [now Makanza]; 1°40' N, 19°10' E; 24–31 Jul. 1909; Lang and Chapin leg.; AMNH. – **Sankuru** • 4 ♀♀; Batempas; [4°56' S, 23°42' E]; Jan. 1926; Ch. Seydel leg.; MRAC • 1 ♀; Komi; [3°34' S, 23°16' E]; Apr. 1930; J. Ghesquière leg.; MRAC • 2 ♀♀; same collection data as for preceding but May 1930; MRAC • 1 ♀; same collection data as for preceding but Jul. 1930; MRAC • 1 ♀; Lonkala, forest; [4°37' S, 23°13' E]; Apr. 1925; J. Ghesquière leg.; MRAC • 1 ♀; Niengele; Jan. 1926; Ch. Seydel leg.; MRAC. – **Sud-Ubangi** • 1 ♀; Binga; [2°22' N, 20°29' E]; Jan.–Mar. 1932; H.J. Brédo leg.; MRAC. – **Tanganyika** • 2 ♀♀; “Lukuga r. Njemba”; [5°40' S, 27°55' E]; Nov. 1917–Jan. 1918; Pons leg.; MRAC • 1 ♀; Nyunzu; [5°57' S, 28°01' E]; Jan.–Feb. 1934; H. De Saeger leg.; MRAC • 1 ♀; Vallée Lukuga; [5°39'31" S, 26°54'53" E]; Nov. 1931; Schwetz leg.; MRAC. – **Tshopo** • 1 ♀; Avakubi; 1°20' N, 27°31' E; 4–8 Oct. 1909; Lang and Chapin leg.; AMNH • 1 ♀; same collection data as for preceding but 12 Oct. 1909; AMNH • 1 ♀; Basoko; [1°13' N, 23°36' E]; 1927; H.J. Brédo leg.; MRAC • 1 ♀; Basoko, Jaebeo [?]; Apr. 1949; P.L.G. Benoit leg.; MRAC • 1 ♀; Stanleyville [now Kisangani]; 0°30' N, 25°10' E; 5 Sep. 1909; Lang and Chapin leg.; AMNH • 1 ♀; same collection data as for preceding but Mar. 1915; AMNH • 2 ♀♀; same collection data as for preceding but Apr. 1915; AMNH • 1 ♂; same collection data as for preceding but 4 Apr. 1915; AMNH • 1 ♀; same collection data as for preceding but 13 Apr. 1915; AMNH • 1 ♀; same collection data as for preceding but May 1915; AMNH • 1 ♀; Stanleyville [now Kisangani]; [0°30'55" N, 25°11'27" E]; Apr. 1915; J. Bequaert leg.; MRAC • 1 ♀; same locality as for preceding; 20 Feb. 1928; A. Collart leg.; MRAC • 1 ♂; same collection data as for preceding but Sep. 1928; MRAC • 1 ♂; same collection data as for preceding but 6–9 Sep. 1928; MRAC • 2 ♂♂; same collection data as for preceding but 10–13 Sep. 1928; MRAC • 1 ♀; same locality as for preceding; 10 Feb. 1932; J. Vrydagh leg.; MRAC • 1 ♀; same collection data as for preceding but Jun. 1932; MRAC • 1 ♂; same collection data as for preceding but 26 Jul. 1932; MRAC • 1 ♀; same locality as for preceding; Mar.

1926; J. Ghesquière leg.; MRAC • 1 ♀; Yangambi; [0°46' N, 24°27' E]; 17 Jun. 1948; P.L.G. Benoit leg.; MRAC • 1 ♀; same locality as for preceding; May 1960; J. Decelle leg.; MRAC. – **Tshuapa** • 1 ♀; Bokuma; [0°06' S, 18°41' E]; 1952; R.P. Lootens leg.; MRAC • 1 ♀; same collection data as for preceding but Mar. 1952; MRAC • 1 ♀; same collection data as for preceding but Jun. 1952; MRAC • 4 ♀♀; same collection data as for preceding but Jul. 1952; MRAC • 1 ♂, 1 ♀; same collection data as for preceding but 1953; MRAC • 1 ♀; same collection data as for preceding but Mar. 1954; MRAC • 1 ♀; Bokungu; [0°41' S, 22°19' E]; 1949; M. Dupuis leg.; MRAC • 2 ♀♀; Ikela; [1°11' S, 23°16' E]; 1955; R.P. Lootens leg.; MRAC • 1 ♀; Moma; [1°05' S, 23°23' E]; Jun. 1925; J. Ghesquière leg.; MRAC.

ERITREA • 1 ♀; DEI.

GABON – **Ogooué-Maritime Province** • 1 ♀; 100 km S of Libreville, Bassin de la Bilagore; [0°30'24.3" S, 9°30'48" E]; 1938; M. Dumez leg.; MNHN.

GHANA – **Eastern Region** • 1 ♀; Aburi; [5°50'52" N, 0°10'28" W]; W.H. Patterson leg.; BMNH. – **Savannah Region** • 1 ♂; Yapi [Yapei]; [9°09'08" N, 1°08'52" W]; 1916; J.J. Simpson leg.; BMNH.

KENYA – **Kilifi County** • 1 ♀; Gedi Ruins, Malindi; 3°17' S, 40°02' E; 8–12 Nov. 1989; A.J. Weaving leg.; AMG • 1 ♀; Rabai; [3°55'54" N, 39°34'13" E]; Jun. 1928; V.G.L. van Someren leg.; BMNH. – **Kwale County** • 1 ♀; Diani Beach; [4°16'47" S, 39°35'40" E]; Dec. 1951; N.L.H. Krauss leg.; BMNH. – **Taita-Taveta County** • 1 ♀; Voi River; [3°23'26" S, 38°34'37" E]; 14 Apr. 2007; M. Halada leg.; OÖLM.

MALAWI – **Central Region** • 1 ♂; Nkhotakota; [12°56' S, 34°18' E]; 2 Jan. 2002; J. Halada leg.; OÖLM. – **Southern Region** • 1 ♀; Mlanje; [16°01'53" S, 35°30' E]; 19 May 1913; S.A. Neave leg.; BMNH.

MALI – **Koulikoro Region** • 1 ♂; Kati 25 km N of Bamako; [12°44'48" N, 8°04'17" W]; 28 Jul. 1991; M. Schwarz leg.; OÖLM.

MOZAMBIQUE – **Maputo City** • 1 ♂; Maputo; [25°58' S, 32°35' E]; 12 Feb. 1994; G.G.M. Schulten leg.; RMNH. – **Sofala Province** • 1 ♀; Beira; [19°50' S, 34°51' E]; 1 Aug. 1903; P. Krantz leg.; TMP.

NIGERIA – **Osun State** • 1 ♀; Ile-Ife; [7°28'56" N, 4°33'37" E]; 25 Jan. 1974; J.T. Medler leg.; BMNH. – **Oyo State** • 1 ♂; Ibadan; [7°22'39" N, 3°54'21" E]; “ii/vii/47”; J.T. Medler leg.; BMNH.

REPUBLIC OF CÔTE D'IVOIRE – **Lagunes District** • 1 ♀; Lamto Ecological Research Station; [6°13'29.5" N, 5°02'4.8" W]; 15–30 Mar. 1994; C. Girard leg.; MNHN.

REPUBLIC OF THE CONGO – **Brazzaville Department** • 1 ♀; Brazzaville; [4°16'04" S, 15°17'31" E]; 21 Mar. 1966; MNHN. – **Plateaux Department** • 1 ♀; Batéké, M'Po; [2°00'43.8" S, 16°18'30.7" E]; 10–14 Jan. 1977; S. Kellner-Pillaut leg.; MNHN. – **Pool Department** • 1 ♀; Kintélé; [4°09' S, 15°20'32" E]; 11 May 1978; G. Onore leg.; MNHN • 1 ♀; Mbé; [3°18'13.68" S, 15°53'51" E]; 27 Apr. 1973; C. Morin leg.; MNHN • 1 ♀; Voka; [4°40'16" S, 14°40'25" E]; 11 Nov. 1976; G. Onore leg.; MNHN.

SÃO TOMÉ AND PRÍNCIPE • 1 ♂, 2 ♀♀; Ile San Thomé; [0°20'11" N, 6°43'38" E]; 14 Sep. 1924; H. De Saeger leg.; MRAC • 1 ♀; same collection data as for preceding but 19 Sep. 1924; MRAC • 1 ♀; same collection data as for preceding but 1932; MRAC • 2 ♂♂, 5 ♀♀; same collection data as for preceding; MRAC • 1 ♂; same locality as for preceding; 1919–1921; H.J. Snell leg.; BMNH.

SIERRA LEONE • 1 ♀, holotype or syntype of *Sphex tuberculatus* F. Smith, 1873; BMNH • 1 ♀; Bumbumbo; 15 Aug. 1912; J.J. Simpson leg.; BMNH. – **Western Area** • 1 ♀; Freetown; [8°29'04" N, 13°14'04" W]; E.E. Austen leg.; BMNH.

SOUTH AFRICA – **Eastern Cape** • 1 ♂; Sundays River; 25 Feb. 1901; O’Neil leg.; TMP. – **KwaZulu-Natal** • 1 ♀; Fannies Island; 28°06’ S, 32°26’ E; AMG • 1 ♀; Lake St Lucia, False Bay; 27°58’ S, 32°23’ E; 27 Jan.–2 Feb. 1993; A.J. Weaving leg.; AMG • 1 ♀; Lake St Lucia, Fannies Island; 28°06’ S, 32°26’ E; 4–5 Mar. 1987; A.J. Weaving leg.; AMG. – **Limpopo** • 1 ♀; Lekgalameetse Nature Reserve; 24°11’ S, 30°21’ E; 30 Oct.–3 Nov 2010; F. Koch leg.; THD-006-ZMB; GenBank CO1 gene: MW538551; GenBank EF-1 $\alpha$  gene: MW558239; GenBank LWR gene: MW582284; ZMB • 1 ♀; Sikororo [Ga-Sekororo]; [24°12’27.6” S, 30°24’33.3” E]; Jul. 1922; G.P.F. v. Dam leg.; TMP.

TANZANIA – **Kagera Region** • 1 ♂; Bukoba; [1°19’54” S, 31°48’44” E]; 9–11 Jun. 1912; C.C. Gowdey leg.; BMNH. – **Kilimanjaro Region** • 1 ♂; Kilimanjaro; [3°04’33” S, 37°21’12” E]; Y. Sjöstedt leg.; NRS. – **Pwani Region** • 1 ♀; 15 km W of Kibiti; 7°47’ S, 38°49’ E; 15 Jan. 2007; J. Halada leg.; OÖLM. – **Shinyanga Region** • 2 ♂♂; 100 km NWW of Kahama; 3°25’ S, 31°47’ E; 24 Dec. 2006; J. Halada leg.; OÖLM.

UGANDA – **Central Region** • 1 ♂; Entebbe; [0°03’ N, 32°27’36” E]; 2 Apr. 1910; BMNH • 1 ♂; same locality as for preceding; 15–22 Jun. 1912; C.C. Gowdey leg.; BMNH.

ZAMBIA – **North-Western Province** • 2 ♂♂, 3 ♀♀; 150 km S of Mwinilunga; 13°11’ S, 24°14’ E; 18 Oct. 2008; M. Halada leg.; OÖLM.

## Description

### Female

SIZE. 23.9–28.8 mm.

COLOR. Black except for the following, which are ferruginous: hindcoxa ventrally, hindtrochanter ventrally, hindfemur and proximal four-fifths of hindtibia. Cellular wing area hyaline, forewing with slightly fuscous spot beyond marginal cell.

VESTITURE. Appressed and erect setae on clypeus and paraocular area golden, on collar and scutum brownish-golden. Appressed setae on propodeal enclosure silvery, erect setae silvery-golden. Erect propodeal setae crimped, oriented posteriorly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.

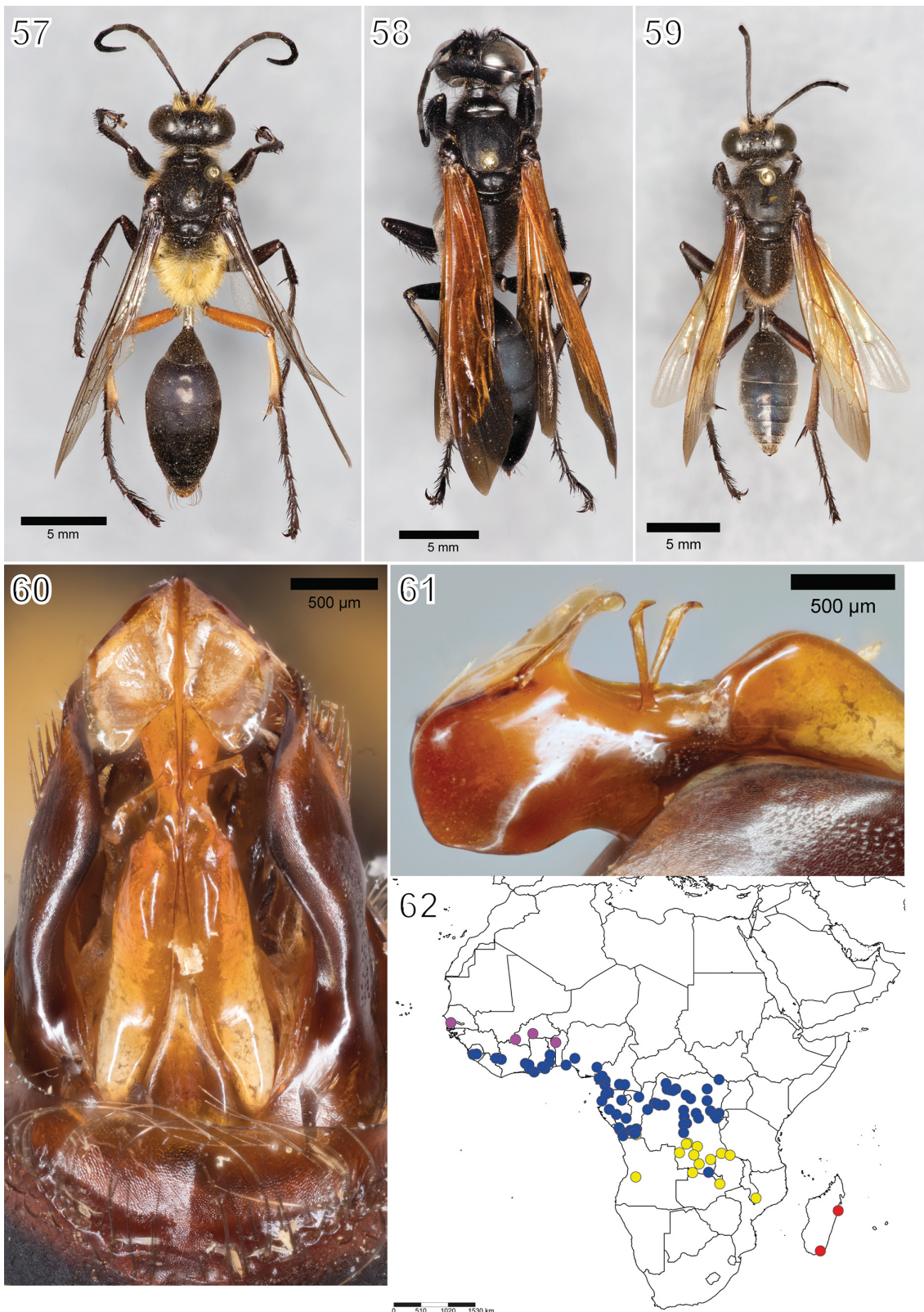
STRUCTURE. Free clypeal margin with broad, shovel-like process medially, not stepped above. Clypeus without indentation and carina. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.1–2.6 × length of antepenultimate spine. Petiole length 3.4–3.6 × its medial width.

### Male

SIZE. 21.8–24.1 mm.

COLOR. Black except for the following, which are ferruginous: hindcoxa ventrally, hindtrochanter ventrally, hindfemur and proximal four-fifths of hindtibia. Cellular wing area hyaline, forewing with slightly fuscous spot beyond marginal cell.

VESTITURE. Appressed and erect setae on clypeus and paraocular area golden, on collar and scutum brownish-golden. Appressed setae on propodeal enclosure silvery, erect setae silvery-golden. Erect propodeal setae crimped, oriented posteriorly. Clypeus without glabrous stripe. Scutellum densely and finely pubescent.



**Figs 57–62.** 57, 60–61. *Sphex tomentosus* Fabricius, 1787, ♂. 58. *S. torridus* F. Smith, 1873, habitus of ♀. 59. *S. voeltzkowii* Kohl, 1909, habitus of ♂. 57. Habitus. 60. Dorsal view of genitalia. 61. Lateral view of penis valvae. 62. Geographic distribution of *S. voeltzkowii* (red), *S. caeruleanus* Drury, 1773 (blue), *S. mweruensis* (Arnold, 1947) (yellow) and *S. hades* sp. nov. (purple).

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Metasomal tergum VII dorsally stepped, with curved long setae, its posterior margin convex. Posterior margin of metasomal sternum VII simple. Metasomal sternum VIII concave towards center, its posterior margin triangular. Penis valvae fused, dorsoventrally S-shaped, mediolaterally with long and thin process. Valviceps broadened, dorsally open and elongated towards anterior. Petiole length 3.4–3.6 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.

### Variation

In some males, the facial and propodeal setae are on the verge of being silvery.

### Distribution

Western to eastern and southeastern Africa.

*Sphex torridus* F. Smith, 1873

Figs 56 (blue), 58

*Sphex torridus* F. Smith, 1873: 291, ♀.

### Differential diagnosis

Within the *argentatus* group, this species (Fig. 58) can be recognized through its ferruginous or yellow-brownish wings and the erect setae on the face and propodeum being uniformly black. Females of *S. voeltzkowii* also have black erect facial and propodeal setae, but their wings are hyaline with a yellow tinge, and the coloration of the wing apices is different as well: forewing and hindwing margins are completely infusate in *S. torridus*, whereas *S. voeltzkowii* only has a fuscous spot on the anterior part of the forewing apex, with the apical hindwing margin being hyaline. Additionally, males of *S. voeltzkowii* (Fig. 59) have a significant portion of the erect setae on the clypeus and paraocular area silvery or silvery-golden, while these are uniformly black in males of *S. torridus*. *Sphex taschenbergi* also has erect clypeal and propodeal setae that are black (Figs 52, 54), but its wings are basally infusate and otherwise hyaline.

### Material examined

#### Syntypes

MADAGASCAR • 2 ♀♀; BMNH.

#### Other material

FRANCE – **Mayotte** • 1 ♀; Tsoundzou, 7 km S of Mamoudzou; [12°46'50.16" S, 45°13'408" E]; Sep. 1986; R. and A. Viossat leg.; MNHN. – **Mozambique Channel** • 2 ♂♂, 1 ♀; Europa Island; [22°22'06" S, 40°21'48" E]; 22 Jul. 1967; Brunhes leg.; MNHN • 8 ♂♂; Europa Island; [22°22'06" S, 40°21'48" E]; A. Voeltzkow leg.; ZMB.

MADAGASCAR • 1 ♂, 2 ♀♀; ZMB. – **Anosy Region** • 1 ♀; 9 km NE of Pt Dauphin, Forêt de Mandena; 24°57' S, 47°00' E; Feb. 2004; P. Bulirsh leg.; OÖLM • 1 ♀; Mt Belomotra 22 km NE of Esira; 24°13' S, 46°53' E; Feb. 2004; P. Bulirsh leg.; OÖLM. – **Atsimo-Andrefana Region** • 1 ♀; Beza Mahafaly Reserve, Parcelle I near research station; 23°41.19' S, 44°35.46' E; 20–24 Dec. 2002; R. Harin'Hala leg.; AMNH. – **Atsinanana Region** • 1 ♂; Toamasina; [18°09' S, 49°25' E]; DEI. – **Boeny Region** • 1 ♀; 40 km S of Marovoay; [16°28'17.2" S, 46°39'21.5" E]; 12 Mar. 1963; E.D. Cashatt leg.; USNM. – **Diana Region** • 1 ♀; Amber Mountain National Park; 12°31.13' S, 49°10.45' E; 29 Jan.–11 Feb. 2001; M. Irwin and R. Harin'Hala leg.; AMNH • 1 ♀; same collection data as for preceding; MNHN • 1 ♀; near



Ambodidimaka, E of Ambanja; [13°45' S, 48°29' E]; 16 Dec. 2002; J. Jeniš leg.; OÖLM • 1 ♀; Beraty, Base du Manongarivo; [14°01' S, 48°15' E]; Feb. 1960; P. Griveaud leg.; MNHN • 1 ♀; Marovato village, Sambirano River; [25°32' S, 45°16' E]; 5–12 Dec. 2001; J. Horák leg.; OÖLM • 6 ♂♂, 3 ♀♀; Moravato, 30 km E of Ambanja; [13°40'1.7" S, 48°43'50.9" E]; 1 Dec. 2001; Pljushich leg.; OÖLM • 1 ♂; same collection data as for preceding; THD-017-OOLM; GenBank CO1 gene: MW538577; OÖLM. – **Ihorombe Region** • 2 ♂♂; near Isalo National Park, in dry wash E of Interpretive Center; 22°37.60' S, 45°21.49' E; 6–14 Dec. 2002; M. Irwin and R. Harin' Hala leg.; AMNH. – **Melaky Region** • 1 ♀; Antsingy Nature Reserve, Antsalova; [18°38' S, 48°54' E]; 9 Jan. 1975; A. Peyrieras leg.; MNHN. – **Sava Region** • 1 ♀; Marojejy, Res nat int. XII, Anjanaharibe N; [14°27' S, 49°42' E]; Feb. 1960; P. Soga leg.; MNHN. – **Vatovavy-Fitovinany Region** • 1 ♀; Manakara, Ifaho; [22°01' S, 47°53' E]; 1969; Brunhes leg.; MNHN • 6 ♂♂, 3 ♀♀; same collection data as for preceding but 1970; MNHN • 1 ♀; Ranomafana (km 402); [21°15' S, 47°27' E]; alt. 650 m; 26 Mar.–1 Apr. 1955; H. de Toulgoët leg.; MNHN.

REPUBLIC OF SEYCHELLES – **Outer Islands** • 1 ♂, 3 ♀♀; Aldabra, Picard; [9°22'58" S, 46°13'02" E]; 13 Apr. 1977; N. Waloff leg.; BMNH • 1 ♂; Aldabra, South Island, Dune Jean-Louis; [9°26'43" S, 46°23'21.5" E]; 13–20 Mar. 1968; B. Cogan and A. Hutson leg.; BMNH • 1 ♀; Aldabra, West Island, near settlement; [9°22'58" S, 46°13'02" E]; 7–12 Mar. 1968; B. Cogan and A. Hutson leg.; BMNH • 1 ♀; Assumption Island; [9°43'43" S, 46°30'58" E]; 1907; P.R. Dupont leg.; BMNH • 1 ♀; Astove Island; [10°06' S, 47°45' E]; 1907; P.R. Dupont leg.; BMNH.

UNION OF THE COMOROS – **Grande Comore** • 3 ♀♀; Chomoni; [11°38'35" S, 43°23'09" E]; 23 Apr.–3 May 1991; K.M. Guichard leg.; BMNH • 2 ♂♂, 6 ♀♀; Itsandra H.; [11°40'16" S, 43°15'17" E]; 23 Apr.–3 May 1991; K.M. Guichard leg.; BMNH.

## Description

### Female

SIZE. 18.5–28.3 mm.

COLOR. Black except for basal half of mandible, which is ferruginous. Cellular wing area ferruginous-brown, apical margin fuscous.

VESTITURE. Appressed setae on clypeus, paraocular area and collar silvery, on scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar and scutum black, on propodeal enclosure brown or black. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin slightly notched medially, not stepped above. Clypeus without indentation or carina. Scutellum convex. Metanotum raised, notably bituberculate. Propodeal enclosure finely transversely carinate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.1–2.2 × length of antepenultimate spine. Petiole length 1.7–2.0 × its medial width.

### Male

SIZE. 22.0–25.5 mm.

COLOR. Black, except for ferruginous stripe in center of mandible. Cellular wing area yellowish-brown, base of fore- and hindwing infusate. Forewing with fuscous spot beyond marginal cell.

VESTITURE. Appressed setae on clypeus, paraocular area and collar silvery, on scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar and scutum black, on propodeal enclosure

brown or black. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum raised, notably bituberculate. Propodeal enclosure finely transversely carinate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 2.7–3.0 × its medial width. Flagellomeres V + VI with broad placoids covering their entire length.

### Variation

Unknown.

### Distribution

Comoros, Europa Island, Madagascar, Seychelles.

### *Sphex voeltzkowii* Kohl, 1909

Figs 59, 62 (red)

*Sphex umbrosus* var. *voeltzkowii* Kohl, 1909: 370, ♂, ♀.

### Differential diagnosis

Within the *argentatus* group; both sexes of this species can be recognized through the combination of the erect setae on the clypeus and the propodeum being at least partially black and the wings being slightly yellowish and basally not infusate (Fig. 59). Similarly, *S. taschenbergi* and *S. torridus* have the erect clypeal and propodeal setae uniformly black, but the wings of *S. taschenbergi* are fuscous near the base and otherwise hyaline (Fig. 52), whereas the cellular wing area of *S. torridus* is markedly ferruginous-brown (Fig. 58). Females of *S. voeltzkowii* are furthermore unique within the *argentatus* group regarding their more or less distinct elevation near the dorsal clypeal margin.

### Material examined

#### Lectotype (designated here)

MADAGASCAR – **Atsinanana Region** • ♀; Tamatave [now Toamasina]; [18°08'57" S, 49°24'08" E]; Nov. 1904; ZMB.

#### Paralectotype

MADAGASCAR – **Atsinanana Region** • 1 ♂; same collection data as for lectotype; ZMB.

#### Other material

AFRICA • 1 ♀; BMNH.

MADAGASCAR – **Anosy Region** • 2 ♀♀; Behara; [24°57' S, 46°23' E]; Jan. 1938; A. Seyrig leg.; MNHN • 1 ♂, 1 ♀; same collection data as for preceding but Nov. 1938; MNHN.

### Description

#### Female

SIZE. 25.7–26.8 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible and hindfemur posterodorsally. Cellular wing area yellowish. Forewing with fuscous spot beyond marginal cell.

VESTITURE. Appressed setae on clypeus, paraocular area and collar silvery, on scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae crimped, oriented perpendicularly and slightly curved towards anterior. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin with three notches medially, not stepped. Clypeus without indentation, with elevation near dorsal margin. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I  $2.6\text{--}2.8 \times$  length of antepenultimate spine. Petiole length  $1.6\text{--}2.0 \times$  its medial width.

#### Male

SIZE. 22.1–23.5 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Cellular wing area yellowish. Forewing with fuscous spot beyond marginal cell.

VESTITURE. Appressed setae on clypeus, paraocular area and collar silvery, on scutum silvery-golden, on propodeal enclosure brownish-golden. Erect setae on clypeus, scutum and propodeal enclosure black and brownish-golden, on paraocular area and collar black, brownish-golden and silvery. Erect propodeal setae crimped, oriented perpendicularly and slightly curved towards anterior. Clypeus with glabrous spot in lower center. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum raised, notably bituberculate. 2<sup>nd</sup> recurrent vein nearly joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length  $2.0\text{--}2.5 \times$  its medial width. Flagellomere II with or without broad placoid covering its proximal two-thirds, flagellomeres V + VI with broad placoids covering their proximal four-fifths.

#### Variation

Unknown.

#### Distribution

Madagascar.

### Species of the *umtalicus* group

The *umtalicus* group contains the following six species: *Sphex caeruleanus*, *S. hades* sp. nov., *S. haemorrhoidalis*, *S. mweruensis*, *S. umtalicus* and *S. victoria* sp. nov.

The members of this group can be recognized mainly through a combination of the following two characters: The erect propodeal setae are oriented more or less perpendicularly or slightly curved toward anterior (Fig. 3–4), and the scutellum (which is often markedly impressed) is always covered with coarse and dense appressed setae, in contrast to the fine setae that are characteristic for the *meridionalis* group, of which the members sport similarly oriented erect propodeal setae. Species of the *malagassus* group are somewhat similar in that their erect propodeal setae are perpendicular, but without curvature, and can be distinguished through their appressed silvery-golden setae on the scutum and metanotum. In addition, they only occur on Madagascar and the surrounding islands, respectively.

Males in the *umtalicus* group are additionally characterized by having a conspicuous process medially at the free clypeal margin. The only other species with a comparable structure are *S. cinerascens* and *S. abyssinicus*.

Species delimitation within the group is very difficult, since intraspecific variation is high and hybrid forms seem to be quite common, even though most of the taxa are apparently genetically distinct. Color-related characters are of greater diagnostic importance within this group, and the geographical origin of the specimen should always be taken into consideration to help with identification.

***Sphex caeruleanus* Drury, 1773**  
Figs 62 (blue), 63, 67

*Sphex caeruleanus* Drury, 1773: 74, pl. 39 fig. 4, ♀ (holotype: ♀, Africa, Bite of Benin, destroyed?).

*Sphex pulchripennis* Mocsáry, 1883: 35, ♀ (holotype or syntype: ♀, Ghana, Ashanti Region, no specific locality, TMB, not examined). Synonymized with *Sphex caeruleanus* by Menke in Bohart & Menke 1976: 114.

**Differential diagnosis**

This species is characterized by its large size, predominantly greenish wing iridescence and uniformly black erect mesosomal setae (Fig. 63). All other members of the group have a body length of less than 26 mm, and most of the time their wing iridescence is mainly violet or cyan-violet. Furthermore, female specimens are identifiable through their largely black clypeus, which is often ferruginous medially near the free margin and covered with appressed silvery setae (Fig. 67). *Sphex victoria* sp. nov. (Fig. 35) and *S. mweruensis* (Fig. 68), both of which sport silvery appressed clypeal setae in the female sex, have the clypeus almost or entirely ferruginous.

Males of *S. caeruleanus* differ from other group members in having the width of the process at the free clypeal margin  $0.15\text{--}0.2\times$  the distance between the inner orbits at the clypeal center and concavely emarginate apically. *Sphex mweruensis* is similar in the shape of its free clypeal margin and process, and can have the wings with a notable greenish iridescence as well, but is distinguishable through its silvery erect propodeal setae and because the width of the clypeal process is only around  $0.1\times$  the distance between the inner orbits.

**Material examined**

AFRICA • 1 ♀; DEI • 1 ♀; IRSN • 1 ♀; ZMB.

CAMEROON • 1 ♀; 6 Aug. 1923; AMNH • 5 ♀♀; L. Conradt leg.; DEI • 1 ♀; P. Preuss leg.; ZMB • 4 ♀♀; Y. Sjöstedt leg.; NRS • 1 ♀; “Esudan-Mamfe”; Guillemain leg.; ZMB. – **East Region** • 2 ♀♀; Batouri District; 3.45° N, 13.45° E; 1 May–6 Jun. 1935; F.G. Merfield leg.; BMNH • 3 ♀♀; D’Ja Posten; 3.15° N, 13.30° E; 15 May–1 Jul. 1936; F.G. Merfield leg.; BMNH. – **Littoral Region** • 3 ♀♀; Nlobe-Ndonga between Edéa and Douala; [3°50’41.3” N, 10°00’07.8” E]; Schäfer leg.; ZMB. – **South Region** • 1 ♀; Ekok, 24 mi. E of Tekmo; [3°12’19” N, 12°25’25” E]; 11–12 Oct. 1966; E.S. Ross and K. Lorenzen leg.; CAS • 1 ♀; Longji; [3°04’40.7” N, 9°58’29.1” E]; H. Paschen leg.; ZMB. – **Southwest Region** • 1 ♂; “Johann-Albrechts-Höhe” [Government Station Johann Albrecht Mountain]; Mar. 1896; L. Conradt leg.; ZMB • 2 ♀♀; Bibundi; [4°13’09” N, 8°59’15” E]; 1–15 Feb. 1905; G. Tessmann leg.; ZMB • 1 ♀; same collection data as for preceding but 15–30 Apr. 1905; ZMB • 1 ♀; Mukonye Farm; [4°34’39” N, 9°30’24” E]; R. Rohde leg.; IRSN • 7 ♀♀; Victoria [now Limbe]; [4°01’ N, 9°13’ E]; P. Preuss leg.; ZMB.

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♀; Goosens leg.; MRAC • 1 ♀; “Kasai”; L. Achten leg.; MRAC • 1 ♀; same collection data as for preceding; MRAC • 1 ♀; “Ubangi: Tongu”; 4 Feb. 1932; H.J. Brédo leg.; MRAC • 1 ♀; Bokote “Bolete Wa Bondele”; 24 Jan. 1926; R.P.G. Hulstaert leg.; MRAC • 1 ♀; Eala-Bokatora-Bikolo; Sep.–Oct. 1930; P. Staner leg.; MRAC • 1 ♀; Kasai, Lotima; 28 Jan. 1906; Waelbroeck leg.; MRAC. – **Haut-Katanga** • 1 ♀; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; 18 Mar. 1923; RMNH. – **Haut-Uele** • 1 ♀; Medje; 2°25' N, 27°15' E; 1–12 Jul. 1910; Lang and Chapin leg.; AMNH. – **Kinshasa** • 1 ♀; Leopoldville [now Kinshasa]; [4°19'39" S, 15°18'48" E]; L. Achten leg.; MRAC. – **Kongo Central** • 1 ♀; Ganda-Sundi, Mayumbe; [4°52' S, 12°52' E]; 1915; R. Mayné leg.; MRAC • 1 ♀; Kinkewa (Inkisi); [5°05'14" S, 14°55'35" E]; Mar. 1946; V. Drachousoff leg.; MRAC • 1 ♀; Mangembo; [4°35'04" S, 14°16'20" E]; 1932; Zwolakowski leg.; MRAC • 10 ♀♀; Mayumbe; [4°30' S, 12°30' E]; 1917; R. Mayné leg.; MRAC • 1 ♀; Sanda near Kisantu; [5°07'32.51" S, 15°04'22.47" E]; IRSN • 1 ♀; Temvo; [5°29'44" S, 13°00'23" E]; 1935; Van Alstein leg.; MRAC • 2 ♀♀; Zobe; [5°21' S, 13°01' E]; Jan. 1916; R. Mayné leg.; MRAC. – **Maniema** • 1 ♀; Lokandu, Ile Biawa; [2°31' S, 25°47' E]; Jul. 1939; Vissers leg.; MRAC. – **Mongala Province** • 1 ♀; Likélé; [2°13'38" N, 21°01'58" E]; 12 Jun. 1936; J. Ghesquière leg.; MRAC • 2 ♀♀; Yambata; [2°25'44" N, 21°57'46" E]; Feb.–Mar. 1914; De Giorgi leg.; MRAC. – **Nord-Ubangi** • 2 ♀♀; Karawa; [3°19'55" N, 20°18'03" E]; 1937; Wallin leg.; MRAC. – **North Kivu** • 1 ♀; Okondo (Buhunde); [1°17'08" S, 27°48'18" E]; 19 Sep. 1929; A. Collart leg.; MRAC • 1 ♀; Oso River; [4°00' N, 29°15' E]; 18 Jan. 1915; J. Bequaert leg.; MRAC. – **Province of Équateur** • 1 ♀; Bamania; [0°01' N, 18°19' E]; 1934; R.Fr. Longinus leg.; MRAC • 5 ♀♀; Eala; [0°02'30" N, 18°20'06" E]; 1932; A. Corbisier leg.; MRAC • 2 ♀♀; same collection data as for preceding but Mar. 1932; MRAC • 1 ♀; same collection data as for preceding but Jun. 1932; MRAC • 1 ♀; same collection data as for preceding but Jul. 1932; MRAC • 3 ♀♀; same collection data as for preceding but Apr. 1933; MRAC • 1 ♀; same collection data as for preceding but Mar. 1935; MRAC • 1 ♀; same locality as for preceding; Oct. 1929; H.J. Brédo leg.; MRAC • 1 ♀; same collection data as for preceding but 5 Nov. 1931; MRAC • 1 ♀; same collection data as for preceding but Apr. 1932; MRAC • 1 ♀; same collection data as for preceding but 4 Apr. 1932; MRAC • 1 ♀; same collection data as for preceding but May 1932; MRAC • 4 ♀♀; same locality as for preceding; May 1935; J. Ghesquière leg.; MRAC • 1 ♀; same collection data as for preceding but Jan. 1936; MRAC • 1 ♀; same collection data as for preceding but Apr. 1936; MRAC • 1 ♀; same collection data as for preceding but Jul. 1936; MRAC • 1 ♀; same collection data as for preceding but Aug. 1936; MRAC • 1 ♀; same collection data as for preceding but Oct. 1936; MRAC • 1 ♀; same collection data as for preceding but Nov. 1936; MRAC • 1 ♀; Eala, Boyeka; [0°02'30" N, 18°20'06" E]; 30 Nov. 1929; H.J. Brédo leg.; MRAC • 1 ♀; Equator station [Bolenge]; [0°00'0.36" N, 18°13'0.12" E]; A. van Gèle leg.; IRSN • 1 ♀; Flandria; [0°19'14" S, 19°05'34" E]; Jan.–Feb. 1948; R.P.G. Hulstaert leg.; MRAC • 1 ♀; Ikengé; [0°06' S, 18°46' E]; 1 Apr. 1914; R. Mayné leg.; MRAC • 1 ♀; Lukolela; [1°03'37" S, 17°10'55" E]; Nov. 1934; Ledoux leg.; MRAC • 2 ♀♀; same locality as for preceding; Oct.–Dec. 1941; Breulheid leg.; MRAC. – **Sankuru** • 4 ♀♀; Apr. 1925; J. Ghesquière leg.; MRAC • 1 ♀; Komi; [3°34' S, 23°16' E]; 14 Mar. 1930; J. Ghesquière leg.; MRAC • 1 ♀; same collection data as for preceding but 26 Mar. 1930; MRAC • 1 ♀; same collection data as for preceding but Apr. 1930; MRAC • 1 ♀; same collection data as for preceding but Apr.–May 1930; MRAC • 11 ♀♀; same collection data as for preceding but May 1930; MRAC • 7 ♀♀; same collection data as for preceding but Jul. 1930; MRAC • 1 ♀; Komi (Lodja); [3°23' S, 23°46' E]; 17 Feb. 1930; J. Ghesquière leg.; MRAC • 1 ♀; same collection data as for preceding but Mar. 1930; MRAC • 2 ♀♀; Kondue; [4°58' S, 23°16' E]; Leonhard leg.; MRAC • 1 ♀; Lomela; [2°16'49" S, 23°21'57" E]; 1955; Hanotier leg.; MRAC. – **South Kivu** • 1 ♀; Costermansville [now Bukavu]; [2°31' S, 28°51' E]; 1939; Hautmann leg.; MRAC • 7 ♀♀; Kavumu à Kabunga km82 (Mingazi); [2°01' S, 28°31' E]; 1951; H. Bomans leg.; MRAC. – **Sud-Ubangi** • 1 ♀; Binga; [2°22' N, 20°29' E]; Jan.–Mar. 1932; H.J. Brédo leg.; MRAC. – **Tshopo** • 1 ♀; Banguru/Bafwasende, Stanleyville; [0°25'44" N, 27°13'54" E]; 1952; Abbeoos leg.; MRAC • 1 ♀; Basoko, Yamabuki; [1°23' N, 23°42' E]; 16 Mar. 1948; P.L.G. Benoit leg.; MRAC • 2 ♀♀; Lukungu; [1°42' S, 25°23' E]; Ch. Haas leg.; IRSN • 2 ♀♀; Yangambi; [0°46' N, 24°27' E]; 1940; MRAC. – **Tshuapa** • 1 ♀; Bokuma; [0°06' S, 18°41' E]; 1951; R.P. Lootens leg.;

MRAC • 1 ♀; same collection data as for preceding but Dec. 1951; MRAC • 1 ♀; same collection data as for preceding but 1952; MRAC • 16 ♀♀; same collection data as for preceding but Jul. 1952; MRAC • 3 ♀♀; same collection data as for preceding but 1953; MRAC • 1 ♀; Ikela; [1°11' S, 23°16' E]; Oct. 1959; N. Leleup leg.; MRAC • 1 ♀; Terr. Boende; Yanga; [0°18' S, 20°03' E]; 5 Nov. 1949; E. Pauquet leg.; MRAC.

EQUATORIAL GUINEA – **Centro Sur** • 1 ♀; Monte Alén, Benito River; [1°31'48" N, 10°06'36" E]; 16–31 Dec. 1906; G. Tessmann leg.; ZMB • 1 ♀; same collection data as for preceding but 1–14 Jan. 1907; ZMB • 2 ♀♀; Uelleburg; [1°49' N, 10°36' E]; Jun.–Aug. 1908; G. Tessmann leg.; ZMB.

GABON – **Estuaire Province** • 1 ♀; Libreville and environs; [0°23'24.36" N, 9°27'15.84" E]; MNHN. – **Ngounié Province** • 2 ♀♀; “Chûtes de Samlia; Rivière N’Gami” [Ngounié River, chute de Samba]; [1°02'59.9" S, 10°42' E]; A. Mocquerys leg.; IRSN. – **Ogooué-Ivindo** • 1 ♀; Ipassa Research Station; [0°30'47" N, 12°48'10" E]; 20 Apr.–16 May 1974; M. Donskoff and J. Le Breton leg.; MNHN.

GHANA – **Eastern Region** • 2 ♀♀; Aburi; [5°50'52" N, 0°10'28" W]; 1912–1913; W.H. Patterson leg.; BMNH • 2 ♀♀; Kili District, Mt Atewa; [6°09'48" N, 0°36'41" W]; 15 Mar. 1969; O.W. Richards leg.; BMNH. – **Western Region** • 1 ♀; 7 miles N of Sefwi Asempanaye; 6°30' N, 2°53' W; 17 May. 1972; M.S. Hoogmoed leg.; RMNH • 1 ♀; Enchi; [5°49'20" N, 2°49'20" W]; 1923; B.D. Peake leg.; BMNH • 1 ♀; Tamsu; [5°16'46" N, 2°00'03" W]; 1900; BMNH.

NIGER • 1 ♀; 1897?; Crosse leg.; BMNH.

NIGERIA • 1 ♂; 1919; BMNH. – **Cross River State** • 1 ♀; Ikom; [6°05' N, 8°37' E]; 4 Apr. 1975; J.T. Medler leg.; BMNH. – **Lagos State** • 1 ♀; Lagos; [6°27'14" N, 3°23'40" E]; Nov. 1944; K.M. Guichard leg.; BMNH. – **Osun State** • 1 ♀; Erin-Odo; [7°35' N, 4°53' E]; 9 Dec. 1973; J.T. Medler leg.; BMNH.

REPUBLIC OF CÔTE D’IVOIRE – **Indénié-Djuablin Region** • 1 ♂; Abengourou; [6°44' N, 3°29' W]; Sep. 1965; Brunhes leg.; MNHN. – **Montagnes District** • 1 ♀; Man; [7°24'45" N, 7°33'13" W]; 7 Oct. 1961; J. Decelle leg.; MRAC • 1 ♀; Mt Nimba; [7°36'09" N, 8°28'5.6" W]; 24 Jun. 1958; P. Etuys leg.; RMNH.

REPUBLIC OF THE CONGO • 2 ♀♀; “Les sanas = yirard”; 27 Jan. 1977; J.-P. Grillot and C. Morin leg.; MNHN. – **Brazzaville Department** • 1 ♂; Djoumouna; [4°22'34" S, 15°09'36" E]; 11 Mar. 1975; C. Morin leg.; MNHN. – **Kouilou Department** • 2 ♂♂; Dimonika; [4°11'55.8" S, 12°21'19.7" E]; Jan. 1964; A. Descarpentries and A. Villiers leg.; MNHN • 1 ♀; same locality as for preceding; 20 Jan. 1977; J.-P. Grillot and C. Morin leg.; MNHN • 4 ♀♀; same collection data as for preceding but 18 May 1977; MNHN • 1 ♂, 1 ♀; same locality as for preceding; 7 Feb. 1978; C. Morin leg.; MNHN • 1 ♀; same collection data as for preceding but 8 Feb. 1978; MNHN • 2 ♀♀; same collection data as for preceding but 20 Feb. 1978; MNHN • 1 ♀; same locality as for preceding; 23 Feb. 1978; J.-J. Menier leg.; MNHN • 3 ♀♀; Dimonika, Makaba; [4°07'59" S, 12°21' E]; 11 Feb. 1978; Bitsindou leg.; MNHN • 1 ♀; Dimonika, Piste de Kolela; [4°11'55.8" S, 12°21'19.7" E]; 8 Feb. 1978; J.-J. Menier leg.; MNHN • 1 ♀; Dimonika, Piste de Makaba; [4°07'59" S, 12°21' E]; 7 Feb. 1978; J.-J. Menier leg.; MNHN. – **Lékoumou Department** • 3 ♂♂, 2 ♀♀; Mbouloupambou; [2°32'26.16" S, 13°32'45.96" E]; 20 Feb. 1980; C. Morin leg.; MNHN. – **Sangha Department** • 3 ♀♀; Ngongo; [1°02'58" N, 15°41'16" E]; 25 Feb. 1970; J.-P. Grillot leg.; MNHN.

RWANDA – **Western Province** • 1 ♀; Kissenyi [Gisenyi]; [1°42' S, 29°15' E]; 1 May 1921; Van Saceghem leg.; MRAC.

SIERRA LEONE – **Eastern Province** • 1 ♂; Tungea; 12 Sep. 1912; J.J. Simpson leg.; BMNH. – **Southern Province** • 1 ♀; Gbangbama; [8°14'50" N, 12°19'47" W]; 10 Oct. 1912; J.J. Simpson leg.; BMNH • 2 ♂♂, 1 ♀; Mongheri; [8°19'14" N, 11°44'03" W]; 15 Sep. 1912; J.J. Simpson leg.; BMNH.

TOGO • 1 ♀; “Togo Hinterland”; 12 Jun. 1889; E. Kling leg.; ZMB • 2 ♀♀; same collection data as for preceding; ZMB. – **Centrale Region** • 1 ♀; Bismarckburg [near Yégué]; [8°10'32.74" N, 0°41'09.42" E]; 21–22 Apr. 1893; L. Conradt leg.; ZMB • 1 ♀; same collection data as for preceding but 28 May–12 Jun. 1893; ZMB • 3 ♀♀; same collection data as for preceding but 30 Jun.–3 Jul. 1893; ZMB • 1 ♀; same collection data as for preceding; ZMB. – **Plateaux Region** • 1 ♀; Misahöhe; [6°57' N, 0°35' E]; 16 Jun 1894; E. Baumann leg.; ZMB.

## Description

### Female

SIZE. 26.6–31.7 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, lower part of clypeus (in most specimens), scape ventrally, foreleg from femur onward except for dark brown stripe ventrally on femur, and mid- and hindlegs from femur onward. Wings fuscous, with greenish or purple-greenish iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area brassy, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with broad notched tooth, stepped above. Clypeus convex, without indentation or carina. Scutellum convex. Metanotum slightly raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.9–3.3 × length of antepenultimate spine. Petiole length 2.2–2.3 × its medial width.

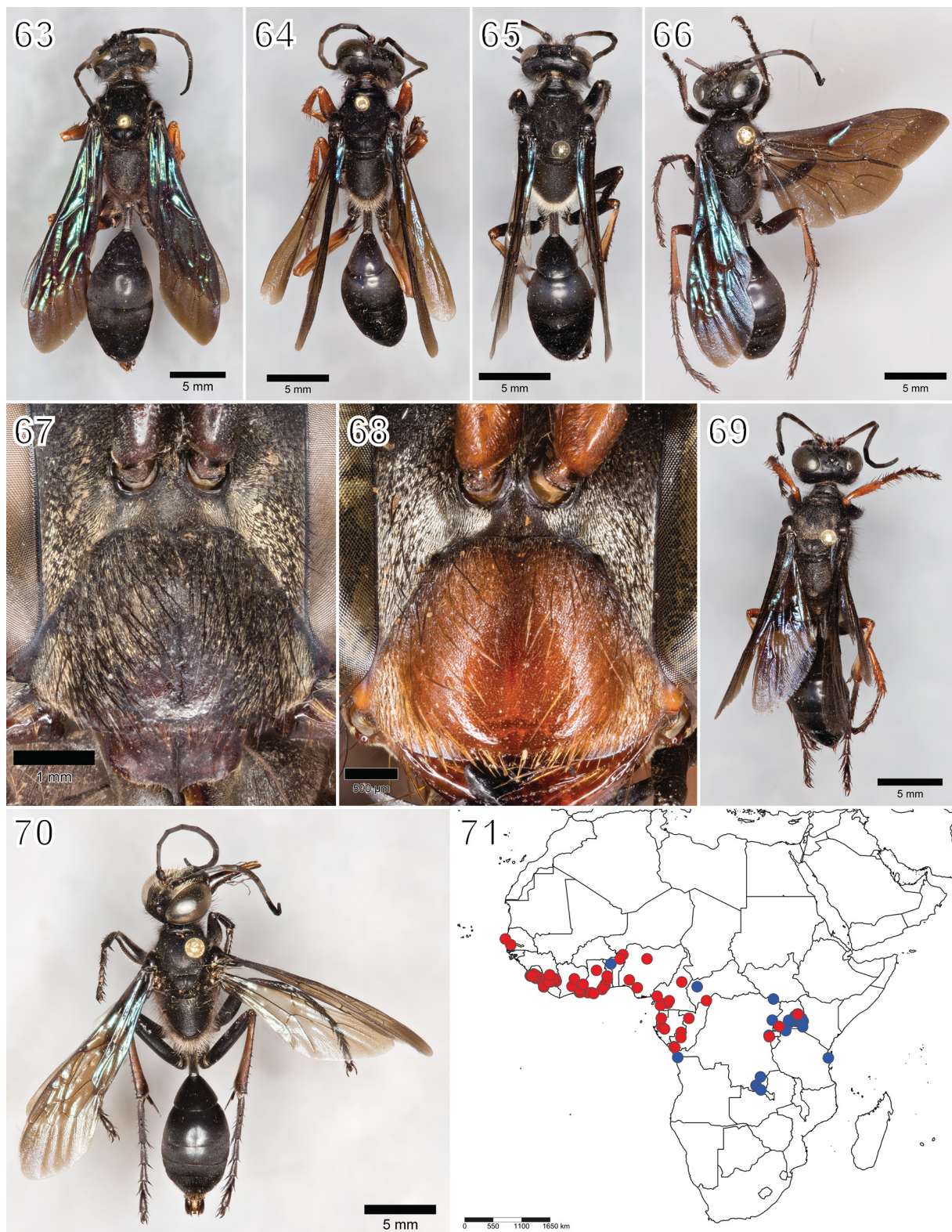
### Male

SIZE. 27.4–28.3 mm.

COLOR. Black except for basal half of mandible, which is ferruginous. The following can be ferruginous as well: apical half of forefemur, basal half of foretibia, apical half of mid- and hindfemur, mid- and hindtibia, and hindtarsomeres I–III. Wings fuscous, with greenish iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin with concavely truncated broad tooth originating behind free margin. Scutellum convex. Metanotum slightly raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspecific modifications. Petiole length 2.0–2.1 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length, or flagellomeres V–VI with moderately broad placoids covering their entire length.



**Figs 63–71.** 63, 67. *Sphex caeruleanus* Drury, 1773. 64–65, 68. *S. mweruensis* (Arnold, 1947). 66. *S. hades* sp. nov. 69–70. *S. haemorrhoidalis* Fabricius, 1781. 63–64, 69. Habitus of ♀. 65–66, 70. Habitus of ♂. 67–68. Frontal view of ♀. 71. Geographic distribution of *S. haemorrhoidalis* (red) and *S. victoria* sp. nov. (blue).



**Variation**

Males of *S. caeruleanus* seem to be highly variable regarding leg coloration and placoid pattern. The midleg can be ferruginous from the apical half of the femur onwards, with the hindfemur, hindtibia and first few tarsomeres also being ferruginous. Other specimens have only the inner side of the hindtibia dark ferruginous, or all legs black. Broad placoids can be present on flagellomeres IV–VI or V–VI, or narrow placoids on V–VI.

**Distribution**

Western to central Africa.

**Remarks**

Unfortunately, the holotype of *S. caeruleanus* could not be located and has probably been destroyed. The original description of this species is naturally quite vague, and it does not mention the conspicuous greenish iridescence which is present on the wings. However, Menke in Bohart & Menke (1976) synonymized *S. caeruleanus* with *S. pulchripennis*, and we do not feel that there is enough evidence to disprove his assumption.

Regarding the identity of *S. pulchripennis*, we are confident that our interpretation of the species matches that of the original author. The description mentions the female clypeus being ferruginous at the apex and the wings shining green, the combination of which is unique among the African *Sphex*. Furthermore, the stated body length of 27 mm exceeds that of the other members of the group.

*Sphex hades* sp. nov.

urn:lsid:zoobank.org:act:6F6FF34B-032A-457F-A32A-1B83A1337A51

Figs 62 (purple), 66

**Differential diagnosis**

What separates this species from all other African *Sphex* is the fact that its males have the appressed clypeal setae black. Regarding other characters, *S. hades* sp. nov. (Fig. 66) resembles *S. victoria* sp. nov. (Fig. 74) in having the hindtibia and a substantial part of the mandible ferruginous, and the erect mesosomal setae as well as the wings being dark.

**Etymology**

'Hades' is an Ancient Greek noun in apposition and the name of the mythological Greek god of the underworld.

**Material examined****Holotype**

BURKINA FASO – **Cascades Region** • ♂; Tourni; [10°46' N, 5°09' W]; 25 May 1968; J. Hamon leg.; MNHN.

**Paratypes**

BENIN – **Atakora Department** • 1 ♂; Gorgoba; [10°16'3.2" N, 1°39'37.6" E]; 13 Jul. 1969; J. Hamon leg.; MNHN.

BURKINA FASO – **Cascades Region** • 1 ♂; same collection data as for holotype; MNHN. – **Centre-Ouest Region** • 1 ♂; Tiaré; [11°46' N, 2°13' W]; Jun. 1953; MNHN.

SENEGAL – **Kaolack Region** • 1 ♂; Saboya, Nioro; [13°37'10" N, 16°04'58" W]; 1 Aug. 1967; MNHN.

## Description

### Female

Unknown.

### Male

SIZE. 19.5–22.6 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible and hindtibia. Wings fuscous, with cyan-violet iridescence.

VESTITURE. Appressed setae on clypeus, collar, scutum and propodeal enclosure black, on paraocular area silvery. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with tooth emerging from inner side. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 2.0–2.6 × its medial width. Flagellomere V with moderately broad placoid covering its proximal four-fifths, flagellomere VI with moderately broad placoid covering between its proximal fifth and its proximal two-thirds.

## Variation

Unknown.

## Distribution

Western Africa.

*Sphex haemorrhoidalis* Fabricius, 1781  
Figs 34, 69–70, 71 (red)

*Sphex haemorrhoidalis* Fabricius, 1781: 443, sex not stated [♀].

*Sphex nigripes* var. *volubilis* Kohl, 1895: 64, ♀, ♂. Synonymized with *Sphex haemorrhoidalis* by R. Turner 1912: 369.

## Differential diagnosis

Theoretically, females of *S. haemorrhoidalis* (Fig. 69) can be recognized through their ferruginous-golden appressed paraocular and lateroclypeal setae (Fig. 34). As this is not always perfectly visible, the combination of a largely ferruginous clypeus and the absence of a silvery luster in the appressed paraocular setae can be used for recognition as well. The silvery luster is present in females of *S. victoria* sp. nov. (Fig. 35) and in those of *S. caeruleanus* (Fig. 67) and *S. mweruensis* (Fig. 68). Females of *S. umtalicus* (Fig. 33) have at most a small area on the paraocular area with a silvery luster that differs from the basic color of their black appressed paraocular and clypeal setae, and their clypeus is entirely black, with the exception of rare cases that have up to the lower clypeal half ferruginous.

Males (Fig. 70) are identifiable through the combination of at least some of the erect scutal setae being silvery, the clypeus being entirely black and the wings only slightly fuscous. In males of *S. victoria* sp. nov. (Fig. 74), *S. caeruleanus* and *S. umtalicus*, all scutal and propodeal setae are black. While

the majority of the erect mesosomal setae are silvery in males of *S. mweruensis* (Fig. 65), they differ from those of *S. haemorrhoidalis* in usually having the clypeal margin ferruginous. Furthermore, male *S. haemorrhoidalis* differ from those of the other species within the group in usually having almost the entire clypeus covered with appressed setae, except the area near the free margin, instead of the glabrous spot being medially at least 15% of the total clypeal height.

## Material examined

### Holotype

AFRICA • ♀; tropical Africa [probably West Africa]; BMNH, coll. Banks.

### Other material

AFRICA • 1 ♀; “Congo”; 1888; Thollon leg.; MNHN • 1 ♂, 1 ♀; same collection data as for preceding; MNHN.

BENIN – **Alibori Department** • 1 ♀; Kandi, near Saa; [11°07'43" N, 2°56'13" E]; Jun. 2001; F. Kantner leg.; THD-020-OOLM; GenBank CO1 gene: MW538572; OÖLM.

CAMEROON • 1 ♀; 12 Mar. 1892; H. Brauns leg.; TMP • 1 ♀, paralectotype of *Sphex nigripes* var. *volubilis* Kohl, 1895; Schäfer leg.; ZMB • 1 ♀, paralectotype of *Sphex nigripes* var. *volubilis* Kohl, 1895; “Sanaga”; Heim leg.; ZMB. – **Adamawa Region** • 1 ♀; SE of Ngaoundéré, ranch; [7°08' N, 13°42' E]; 9–12 May 2006; J. Oehlke leg.; coll. Jacobs. – **Centre Region** • 1 ♀; Biyan; [3°24' N, 11°14' E]; Dec. 1956; Mouchet leg.; MNHN • 1 ♀; Yaoundé; [3°52' N, 11°31' E]; Apr. 1953; J.-P. Adam and J. Rageau leg.; MNHN • 2 ♀♀; same collection data as for preceding but Oct. 1953; MNHN • 68 ♀♀; same locality as for preceding; Molez leg. [all?]; MNHN • 33 ♂♂; same collection data as for preceding; MNHN. – **South Region** • 1 ♂, 1 ♀; 36 mi. N of Kribi; [3°25'36" N, 10°07'24" E]; 19 Oct. 1966; E.S. Ross and K. Lorenzen leg.; CAS • 1 ♀; Longji; [3°04'40.7" N, 9°58'29.1" E]; Apr. 1904; H. Paschen leg.; ZMB • 1 ♀; same collection data as for preceding; ZMB • 1 ♀; Nkoemvon; [2°49' N, 11°08' E]; 13 Jul.–24 Aug. 1980; D. Jackson leg.; BMNH. – **Southwest Region** • 1 ♂, lectotype of *Sphex nigripes* var. *volubilis* Kohl, 1895 (designated here); Barombi Station; P. Preuss leg.; ZMB • 4 ♀♀, paralectotypes of *Sphex nigripes* var. *volubilis* Kohl, 1895; same collection data as for lectotype of *Sphex nigripes* var. *volubilis* Kohl, 1895; ZMB.

CENTRAL AFRICAN REPUBLIC • 1 ♀; M. Boulard leg.; MNHN. – **Lobaye** • 1 ♀; La Maboke [near M'Baiki]; [3°53' N, 18°00' E]; 21 Aug. 1969; P. Teocchi leg.; MNHN.

ETHIOPIA – **Amhara Region** • 1 ♀; Jowaha, N of Debra Sina; 7 Aug. 1946; K.M. Guichard leg.; BMNH.

GABON – **Estuaire Province** • 1 ♂, 1 ♀; Crystal Mountains, Komo; [0°49'45.6" N, 10°08'5.7" E]; 1–15 Oct. 1969; A. Villiers leg.; MNHN • 1 ♂; Crystal Mountains, Muni; [0°49'45.6" N, 10°08'5.7" E]; 15–31 Oct. 1969; A. Villiers leg.; MNHN. – **Haut-Ogooué Province** • 1 ♀; Franceville; [1°38' S, 13°35' E]; 1888; P.S. de Brazza leg.; MNHN. – **Moyen-Ogooué Province** • 1 ♀; Lambaréné; [0°41'18" S, 10°13'55" E]; 1912; R. Ellenberger leg.; MNHN • 2 ♀♀; Ziéle [lake near Lambaréné]; [0°41'18" S, 10°13'55" E]; 22 May 1993; MNHN. – **Ngounié Province** • 1 ♀, paralectotype of *Sphex nigripes* var. *volubilis* Kohl, 1895; “Chûtes de Samlia, Rivière N'Gami” [actually chute de Samba, Ngounié River]; A. Mocquerys leg.; IRSN.

GHANA – **Eastern Region** • 1 ♀; 6 km E of Akosombo; 6°15' N, 0°05' E; 28 Aug. 2012; M. and J. Schwarz leg.; OÖLM • 1 ♀; same collection data as for preceding but 30 Aug. 2012; THD-034-OOLM; GenBank CO1 gene: MW538573; OÖLM • 2 ♀♀; Aburi; [5°50'52" N, 0°10'28" W]; Dec. 1941; K.M. Guichard leg.; BMNH • 2 ♂♂; same collection data as for preceding; BMNH. – **Savannah Region** • 1 ♀; Yapi [Yapei]; [9°09'08" N, 1°08'52" W]; J.J. Simpson leg.; BMNH. – **Volta Region** • 1 ♀; Kpeve;

[6°41'20" N, 0°20'01" E]; Jun. 1942; K.M. Guichard leg.; BMNH. – **Western Region** • 1 ♀; Ankasa Forest Reserve; [5°17' N, 2°39' W]; 9 Apr. 1969; O.W. Richards leg.; BMNH • 1 ♀; Daboasi; [5°08' N, 1°39' W]; 24 Feb. 1980; K.M. Stewart leg.; USNM • 1 ♀; Tamsò; [5°16'46" N, 2°00'03" W]; BMNH.

GUINEA • 1 ♀; Westermann leg.; ZMB. – **Nzérékoré Region** • 1 ♂; near Diéké; [7°20'54" N, 8°57'15" W]; 8–9 Feb. 2003; J. Oehlke leg.; coll. Jacobs • 1 ♀; Kéoulenta; [7°40'46" N, 8°18'51" W]; 2 Jun. 1942; M. Lamotte leg.; MNHN • 1 ♀; Nzo; [7°40'46" N, 8°18'51" W]; 2 Jun. 1942; M. Lamotte leg.; MNHN • 1 ♀; Sérédou; [8°23' N, 9°18' W]; 2 Mar. 1958; R. Pujol leg.; MNHN • 1 ♂, 3 ♀♀; Yalanzou; [7°43' N, 8°41' W]; 2 Jun. 1942; M. Lamotte leg.; MNHN.

KENYA • 1 ♀; valley of Upper Nzoia River, N of Kavirondo; 5–7 Jun. 1911; S.A. Neave leg.; MNHN.

LIBERIA • 2 ♀♀; Dingano; 10 Aug. 1953; W. Peters leg.; BMNH • 1 ♀; Varh; 3 Aug. 1953; W. Peters leg.; BMNH. – **Bong County** • 1 ♂; 10 mi. NE of Gbanga [Gbarnga]; [7°09'30" N, 9°27'07" W]; 11 Aug. 1966; E.S. Ross and K. Lorenzen leg.; CAS • 1 ♂; Kpaine; [7°10' N, 9°07' W]; 17 Aug. 1953; W. Peters leg.; BMNH • 1 ♀; Kpaine; [7°10' N, 9°07' W]; 17 Aug. 1953; W. Peters leg.; BMNH. – **Margibi County** • 1 ♂; Harbel, Firestone Plantation; [6°17' N, 10°21' W]; 27 Jul. 1966; E.S. Ross and K. Lorenzen leg.; CAS • 1 ♂; Kakatown [now Kakata]; [6°31'48" N, 10°21'06" W]; 20 Aug. 1926; J. Bequaert leg.; MRAC.

NIGER – **Dosso Region** • 1 ♀; Gaya; [11°53'03" N, 3°26'57" E]; 17 Oct. 1976; BMNH.

NIGERIA • 1 ♂; Koya; Jan. 1975; J.T. Medler leg.; BMNH. – **Kaduna State** • 1 ♀; Samaru; [11°09'39" N, 7°38'44" E]; 25 Aug. 1970; Ward leg.; BMNH • 1 ♀; same collection data as for preceding but 4 Sep. 1970; BMNH • 1 ♀; Samaru, Fadama; [11°09'39" N, 7°38'44" E]; 15 Jul. 1970; BMNH. – **Osun State** • 1 ♂; Ile-Ife; [7°28'56" N, 4°33'37" E]; 6 Mar. 1975; J.T. Medler leg.; BMNH.

REPUBLIC OF CÔTE D'IVOIRE • 1 ♂; 1957; J. de Wilde leg.; RMNH. – **Abidjan District** • 2 ♂♂; Adiopodoumé; [5°20'29.2" N, 4°07'59.2" W]; 1967; P.J. Hummelen leg.; RMNH • 1 ♂; same locality as for preceding; 30 Aug. 1962; J. von Dinther leg.; RMNH • 1 ♂; same locality as for preceding; 17 Nov. 1967; Gillon leg.; MNHN • 1 ♀; Banco National Park; [5°23' N, 4°03' W]; R. Paulian and C. Delamare leg.; MNHN • 1 ♂; Bingerville; [5°21' N, 3°54' W]; 1916; G. Melou leg.; MNHN. – **Gôh Region** • 3 ♂♂, 2 ♀♀; Gagnoa; [6°07'54" N, 5°57'02" E]; 2–4 Mar. 1984; M. Matthews leg.; BMNH. – **Gôh-Djiboua District** • 1 ♀; Oumé; [6°23' N, 5°25' W]; 20 Jan. 1991; W.J. Pulawski leg.; CAS. – **Indénié-Djuablin Region** • 1 ♀; Abengourou; [6°44' N, 3°29' W]; May 1965; Brunhes leg.; MNHN • 1 ♀; same collection data as for preceding but Jun. 1965; MNHN. – **Lagunes District** • 1 ♀; 40 km NW of Abidjan; [5°46'27" N, 4°07'34" W]; 6 Jan. 1991; W.J. Pulawski leg.; CAS • 1 ♀; Nidiza [N'Douci or Nzida?]; 2 Aug. 1955; Pesson leg.; MNHN. – **Montagnes District** • 1 ♀; Danané; [7°16' N, 8°10' W]; Jan. 1939; L. Chopard leg.; MNHN • 1 ♀; same locality as for preceding; Dec. 1930–Apr. 1931; Ch. Alluaud and P.A. Chappuis leg.; MNHN. – **Vallée du Bandama District** • 1 ♀; Bouaké; [7°41' N, 5°01' W]; 1977; P.M. Elsen leg.; MRAC.

REPUBLIC OF THE CONGO • 2 ♂♂, 1 ♀; Odzala-Kokoua National Park; [0°48' N, 14°55'59.88" E]; Oct. 1963; A. Descarpentries and A. Villiers leg.; MNHN. – **Kouilou Department** • 1 ♂; Dimonika, Makaba; [4°07'59" S, 12°21' E]; 28 Feb. 1978; J.-J. Menier leg.; MNHN • 1 ♀; Mvouti; [4°14'47" S, 12°29'20" E]; 17 Feb. 1978; J.J. Menier leg.; MNHN. – **Lékoumou Department** • 1 ♀; Mbouloupambou; [2°32'26.16" S, 13°32'45.96" E]; 22 Apr. 1980; C. Morin leg.; MNHN.

RWANDA – **Western Province** • 1 ♀; Ishwa, Lake Albert; [2°23'04" S, 28°55'58" E]; Sep. 1935; H.J. Brédo leg.; MRAC.

SENEGAL – **Kaolack Region** • 3 ♀♀; Saboya, Nioro; [13°37'10" N, 16°04'58" W]; 1 Aug. 1967; MNHN. – **Thiès Region** • 1 ♀; Ft. de Bandia; [14°37'25" N, 17°01'40" W]; 4 Oct. 1967; MNHN.

SIERRA LEONE • 1 ♀; W.G. Clements leg.; BMNH • 1 ♂; ZMB • 1 ♀; Dumballa; 7 Sep. 1912; J.J. Simpson leg.; BMNH • 1 ♀; Yorke; 30 Sep. 1912; J.J. Simpson leg.; BMNH. – **Eastern Province** • 2 ♀♀; Hangha; [7°56'23" N, 11°08'28" W]; 3 Jul. 1912; J.J. Simpson leg.; BMNH. – **Northern Province** • 1 ♂; Kumrabai; [8°32'02" N, 12°05'33" W]; 21 Sep. 1912; J.J. Simpson leg.; BMNH. – **Southern Province** • 1 ♀; Bo; [7°57'53" N, 11°44'18" W]; 2 Sep. 1912; J.J. Simpson leg.; BMNH • 1 ♀; Mongheri; [8°19'14" N, 11°44'03" W]; 15 Sep. 1912; J.J. Simpson leg.; BMNH • 1 ♀; Moyamba; [8°09'32" N, 12°25'54" W]; 26 Sep. 1912; J.J. Simpson leg.; BMNH • 2 ♀♀; Rotifunk; [8°14' N, 12°41' W]; 14 Oct. 1912; J.J. Simpson leg.; BMNH • 2 ♀♀; Sembahun; [7°46'36" N, 11°43'38" W]; 28 Sep. 1912; J.J. Simpson leg.; BMNH • 3 ♀♀; Senahu; [8°08'48" N, 12°36'23" W]; 13 Oct. 1912; J.J. Simpson leg.; BMNH.

TOGO • 2 ♀♀, paralectotypes of *Sphex nigripes* var. *volubilis* Kohl, 1895; “Togo Hinterland”; 8 and 15 May 1889; E. Kling leg.; ZMB. – **Centrale Region** • 1 ♀, paralectotype of *Sphex nigripes* var. *volubilis* Kohl, 1895; Bismarckburg (near Yégué); 30 Jun.–3 Jul. 1893; L. Conradt leg.; ZMB. – **Plateaux Region** • 1 ♀; Ikavi-Kopé, Ekébe River; 7°36'10" N, 0°44'31" E; 21 Apr. 2008; J. Oehlke leg.; coll. Jacobs.

UGANDA – **Eastern Region** • 1 ♀; Mbale–Kumi Road, 3700 ft S of Lake Salisbury; [1°33'33" N, 33°57'15" E]; 15–17 Aug. 1911; S.A. Neave leg.; MNHN. – **Western Region** • 1 ♀; Fort Portal Road, Mbarara, Southern Toro; [0°36'48" S, 30°39'30" E]; 22–24 Oct. 1911; S.A. Neave leg.; MNHN.

## Description

### Female

SIZE. 24.3–24.9 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus, scape, pedicel, legs from apical fourth of femur onward excluding apical half of claw and apical metasomal segment. Wings fuscous, with violet-bluish iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area ferruginous-golden, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with broad, notched tooth, stepped above. Clypeus without distinct indentation or carina. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.9–3.3 × length of antepenultimate spine. Petiole length 2.5–2.6 × its medial width.

### Male

SIZE. 19.2–23.5 mm.

COLOR. Black except for basal half of mandible and hindtibia, which are ferruginous. Fore- and hindwing slightly, their apical margin more conspicuously fuscous, forewing with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar black, on scutum and propodeal enclosure silvery or black. Erect setae on clypeus, paraocular area and collar black, on scutum usually silvery, on propodeal enclosure black or sometimes silvery. Erect propodeal setae oriented

perpendicularly, slightly curved towards anterior. Clypeus glabrous only near free margin. Scutellum densely and coarsely pubescent.

**STRUCTURE.** Free clypeal margin medially with tooth emerging from inner side. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Petiole length 2.1–2.4 × its medial width. Flagellomere V with narrow placoid covering its proximal four-fifths.

### Variation

The female clypeus, flagellum, tarsi and metasomal apex can be ferruginous or black to a varying extent. In males, the erect scutal and propodeal setae are silvery or black to a varying extent, though there are always at least some silvery scutal setae.

### Distribution

Western to central Africa.

### Remarks

Kohl did not properly label the types of *S. nigripes* var. *volubilis*, and they are only indicated by the locality notes in the original description, where twelve specimens from four more or less well-defined areas are mentioned (Cameroon, Togo Hinterland, “Chûtes de Samlia”, “Grand Bana”). We were able to find a few specimens from matching regions that have identification labels by Kohl, and in conjunction with the remaining specimens of this species in the ZMB from the same series, or other specimens there that were collected before 1895 in Cameroon or Togo, their number amounts exactly to ten. There is only one specimen from the type series (from “Chûtes de Samlia”) in the IRSN, and under the assumption that there was only one from “Grand Bana” as well (the specimen was thought to be deposited in the NHMW, but is apparently not there), those ten ZMB specimens would likely constitute the remainder of the syntypes.

*Sphex mweruensis* (Arnold, 1947)  
Figs 62 (yellow), 64–65, 68

*Chlorion haemorrhoidalis* var. *mweruensis* Arnold, 1947: 146, ♀, ♂.

### Differential diagnosis

Females of this species are easy to recognize, as they are the only ones within the *umtalicus* group that have silvery erect setae on the posterior propodeal margin (Fig. 64). In males, the extent of the dorsal silvery setae is greater, as they cover all of the propodeal enclosure and occasionally parts of the scutum as well (Fig. 65). Males of *S. haemorrhoidalis* (Fig. 70) can be very similar, but always have the free clypeal margin black and only slightly concave, and the appressed setae barely leave a glabrous spot on the clypeus. Those of *S. mweruensis* have a glabrous spot in the lower clypeal center, the free margin is often (though not always) ferruginous and has a gentle but conspicuous concave emargination on either side of the medial process, which is apically concave itself. Males of *S. caeruleanus* have the free clypeal margin and the process shaped similarly, but the process is approximately twice as wide. Moreover, they are easily distinguished through their uniformly black erect propodeal setae.

### Material examined

**Lectotype** (designated here)  
ZAMBIA • ♀; “Seremani Mweru”; 27 Jan. 1944; IRSN.

**Paralectotype**

ZAMBIA – **Northern Province** • 1 ♂; Mpulungu; 2 May 1944; IRSN.

**Other material**

ANGOLA – **Huambo Province** • 1 ♀; Luimbale, Mt Moco; [12°27'43" S, 15°10'36" E]; Mar. 1934; BMNH.

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♀; “Lulua”; 1929; Walker leg.; MRAC • 2 ♂♂; “Lulua: Juele River”; 1929; Walker leg.; MRAC • 2 ♀♀; Kibombo; Oct. 1930; H.J. Brédo leg.; MRAC. – **Haut-Katanga** • 1 ♀; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; Jan. 1938; H.-J. Brédo leg.; IRSN • 1 ♂; same collection data as for preceding but 10 Jan. 1938; IRSN • 1 ♀; same locality as for preceding; May 1949; Ch. Seydel leg.; MRAC • 1 ♀; Mwelushi; [9°30' S, 27°50' E]; Feb. 1931; H.J. Brédo leg.; MRAC. – **Haut-Lomami** • 1 ♂; Kabongo; [7°19' S, 25°35' E]; 5 Jan. 1953; Ch. Seydel leg.; MRAC • 1 ♀; Kamina; [8°44' S, 25°00' E]; 27 Nov. 1925; Ch. Seydel leg.; MRAC. – **Kasaï-Oriental** • 2 ♂♂, 1 ♀; Gandajika; [6°45' S, 23°57' E]; 1956; P. de Francquen leg.; MRAC • 1 ♂; Station de Gandajika; [6°45' S, 23°57' E]; 1957; P. de Francquen leg.; MRAC. – **Kongo Central** • 1 ♂, 1 ♀; Kisantu; [5°07'29" S, 15°04'49" E]; 1927; R.P. Vanderyst leg.; MRAC • 1 ♂; same collection data as for preceding but 1932; MRAC • 5 ♂♂, 6 ♀♀; Lemfu; [5°17'56" S, 15°13'21" E]; Jan. 1945; P.L. De Beir leg.; MRAC • 1 ♀; same collection data as for preceding but May 1945; MRAC • 2 ♀♀; same collection data as for preceding but Jun. 1945; MRAC • 2 ♂♂, 5 ♀♀; same collection data as for preceding but Dec. 1945; MRAC. – **Lomami** • 1 ♂; Kambaye-Lupula; [6°53' S, 23°44' E]; 1930; R. Collart leg.; IRSN • 1 ♂; Lomami, Kambaye; [6°52'38" S, 23°44'09" E]; Oct. 1930; P. Quarré leg.; MRAC. – **Lualaba** • 6 ♂♂; Ditanto; [10°15' S, 25°53' E]; Oct. 1925; Ch. Seydel leg.; MRAC • 3 ♀♀; Kapanga; [8°21' S, 22°34' E]; Oct. 1932; F.G. Overlaet leg.; MRAC • 1 ♂; same collection data as for preceding but Dec. 1932; MRAC.

MALAWI – **Southern Region** • 1 ♀; Mlanje; [16°01'53" S, 35°30' E]; 11 Dec. 1913; S.A. Neave leg.; BMNH.

ZAMBIA – **Central Province** • 1 ♂; “Mkushi env. E”; [13°37'18.5" S, 29°23'41.9" E]; 16–18 Dec. 2004; M. Snížek leg.; OÖLM. – **Northern Province** • 3 ♀♀; Kaputa; [8°28' S, 29°40' E]; 8 Jan. 1944; IRSN. – **North-Western Province** • 1 ♂; 50 km E of Mwinilunga; 11°43' S, 24°47' E; 2 Nov. 2008; M. Halada leg.; THD-019-OOLM; GenBank CO1 gene: MW538574; OÖLM.

**Description****Female**

SIZE. 22.2–24.5 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus, scape, pedicel, foreleg from apical half of femur, and mid- and hindlegs from femur onward excluding apical half of claw. Wings fuscous, with violet luster.

VESTITURE. Appressed setae on clypeus silvery-golden laterally, black otherwise, on paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus ferruginous laterally, black otherwise, on paraocular area, collar, scutum and propodeal enclosure black, on posterior margin of propodeum silvery. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Central third of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with broad, notched tooth, slightly stepped above. Clypeus without indentation or carina. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein nearly joins interstitium between submarginal cells II and III. Propodeal enclosure

without any notable ridges. Foretarsomere I  $2.7\text{--}3.4\times$  length of antepenultimate spine. Petiole length  $1.9\text{--}2.8\times$  its medial width.

#### Male

SIZE. 21.5–24.8 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, free clypeal margin, midtibia anteriorly, midtarsomere I, hindtibia, hindtarsomeres I–II and basal half of claw. Wings fuscous, forewing with violet luster.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area and collar black, on scutum black or black and silvery, on propodeal enclosure silvery. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with tooth emerging from inner side, and distinctly concave next to process. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length  $2.1\text{--}2.5\times$  its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.

#### Variation

In some males, the free margin can be black instead of ferruginous, the erect scutal setae can be uniformly black or partially silvery, and the propodeal enclosure can have erect black setae as well.

#### Distribution

Central Africa.

#### Remarks

The two specimens we consider part of the type series that are owned by the IRSN had both been labeled “paratype”. We believe the labels were added later, possibly by Leclercq, and do not constitute an official designation by Arnold. Since we could not locate any publication that designates a lectotype for either of these two species, we treat them as syntypes and designate a lectotype here.

*Sphex umtalicus* Strand, 1916

Figs 3–4, 27, 33, 72, 77 (red)

*Sphex umtalicus* Strand, 1916: 105, ♂.

*Sphex nigripes* var. *pachyderma* Strand, 1916: 106, ♀. **Syn. nov.**

*Chlorion haemorrhoidalis* var. *kobrowi* Arnold, 1928: 367, ♀ (holotype: ♀, South Africa, Gauteng, Johannesburg, TMP, not examined). **Syn. nov.**

*Chlorion haemorrhoidalis* var. *basuto* Arnold, 1947: 146, sex not stated (holotype or syntypes: Lesotho, Berea District, Mamathes, SAM, not examined). **Syn. nov.**

#### Differential diagnosis

In most cases, specimens of *S. umtalicus* are easily identifiable within the species group through their black clypeus, uniformly black legs and fuscous wings with cyan-violet iridescence (Fig. 72). However, we observed intraspecific variations in this species as well as in *S. haemorrhoidalis* that can cause



confusion between the two of them. Females of *S. haemorrhoidalis* normally have the clypeus ferruginous (Fig. 34), though it can also be black to a varying extent, sometimes almost completely. While the tibiae and part of the femora and tarsi are always ferruginous in female *S. haemorrhoidalis* (Fig. 69) and *S. victoria* sp. nov. (Fig. 73), a southern African population of *S. umtalicus* (previously described as var. *basuto/kobrowi*) also has these areas ferruginous, as well as the lower part of the female clypeus. The best way to differentiate between these females is the color of the appressed clypeal and paraocular setae, which is always dark brown in *S. umtalicus* and can have a slight silvery shimmer on the paraocular area (Fig. 33). The appressed clypeal setae of female *S. haemorrhoidalis* are inconspicuous, but the appressed lateroclypeal and paraocular setae have a ferruginous-golden shimmer (Fig. 34).

Males of the southern African population of *S. umtalicus* are characterized by having the wings mostly hyaline and all tibiae ferruginous, whereas those of the other species in the group have only the hindtibia ferruginous. Like all males of the species, they have silvery appressed clypeal setae and uniformly black erect mesosomal setae.

## Material examined

### Holotype

ZIMBABWE – **Manicaland** • ♂; Umtali [now Mutare]; A. Bodong leg.; DEL.

### Other material

AFRICA • 1 ♀; “Afr. or. All. de”; MNHN • 1 ♀; “East Africa”; IRSN • 1 ♀; “Eersteleng”; BMNH • 3 ♂♂; “Lake Kivu”; R. Kandt leg.; ZMB • 1 ♂; “Tanganyika”; H.A. Lindeman leg.; BMNH • 1 ♀; German East Africa; 1912; MNHN • 1 ♀; same collection data as for preceding; MNHN.

ANGOLA – **Cuanza Sul Province** • 1 ♀; Congulu; [11°17'03" S, 15°45'08" E]; Apr. 1934; K. Jordan leg.; BMNH.

DEMOCRATIC REPUBLIC OF THE CONGO – **Haut-Katanga** • 1 ♀; Sakania; [12°45' S, 28°33'36" E]; 15 Mar. 1938; IRSN • 1 ♀; Sakania (marais Lukabungu); [12°45' S, 28°34' E]; 15 Mar. 1938; H.J. Brédo leg.; MRAC • 1 ♀; Tera; [12°08' S, 28°34' E]; Feb. 1948; R. Mouchamps leg.; MRAC. – **Haut-Lomami** • 1 ♂; “Upemba National Park, Kankunda (rive dr. Lupiala)”; [8°30' S, 26°30' E]; alt. 1300 m; 13–27 Nov. 1947; G.F. de Witte leg.; IRSN • 1 ♂; Lemfu; [5°17'56" S, 15°13'21" E]; May 1945; P.L. De Beir leg.; MRAC • 1 ♀; Thysville [now Mbanza-Ngungu]; 5°30' S, 15°00' E; 2 Jun. 1915; Lang and Chapin leg.; AMNH. – **Kongo Central Province** • 2 ♂♂; Mayumbe; Nov. 1938; IRSN.

ETHIOPIA – **Amhara Region** • 1 ♂; Jowaha, N of Debra Sina; 7 Aug. 1946; K.M. Guichard leg.; BMNH.

KENYA – **Kilifi County** • 1 ♂, 2 ♀♀; Rabai; [3°55'54" N, 39°34'13" E]; Apr. 1928; V.G.L. van Someren leg.; BMNH. – **Kwale County** • 3 ♂♂; Funzi Island, near Funzi workshop; 4.57749° S, 39.43825° E; 4–10 Jul. 2012; ICIPE/NMK leg.; ICIPE • 1 ♀; Funzi Island, near Mliani; 4.53577° S, 39.46042° E; 6 Jul. 2012; ICIPE/NMK leg.; ICIPE • 1 ♀; Funzi Island, near swimming pool; 4.58463° S, 39.43916° E; 9 Jul. 2012; ICIPE/NMK leg.; ICIPE • 1 ♂; Shimba Hills; 4°12.3' S, 39°25' E; 15 Dec. 2003; W.J. Pulawski leg.; CAS • 1 ♂; Shimba Hills (nr. Kwale); [4°16'31" S, 39°23'45" E]; 13 May 1979; R. Murphy leg.; BMNH • 1 ♂; Tiwi Beaches, ca 17 km S of Mombasa; 4°14.4' S, 39°36.2' E; 24–26 Jul. 1999; W.J. Pulawski and J.S. Schweikert leg.; CAS. – **Makueni County** • 1 ♂; Makueni, Ukamba; [1°48' S, 37°37' E]; May 1947; V.G.L. van Someren leg.; BMNH. – **Nairobi County** • 1 ♀; near Nairobi, Vte. de Pongins et Cte de Lambertye; [1°17' S, 36°49' E]; MNHN. – **Taita-Taveta County** • 4 ♀♀; Kasigau; [3°49' S, 38°40' E]; Nov. 1938; BMNH • 1 ♀; near Voi, Taita Hills; [3°23'26" S, 38°34'37" E]; 16–18 Nov. 1921; H.E. Box leg.; BMNH • 1 ♀; Voi; [3°23'26" S, 38°34'37" E]; 23 Nov. 1997; M. Snižek leg.; OÖLM • 3 ♀♀; Wundanyi; [3°23'54" S, 38°21'37" E]; 19–21 Nov. 1996; Mi. Halada leg.; OÖLM •

10 ♂♂, 1 ♀; same locality as for preceding; 5–10 Apr. 1997; Ma. Halada leg.; OÖLM • 3 ♂♂, 1 ♀; same collection data as for preceding but 18–22 Mar. 1997; OÖLM.

LESOTHO – **Berea District** • 1 ♀; Mamathes; [29°08' S, 27°51' E]; 28 Dec. 1946; C.F. Jacot-Guillarmod leg.; BMNH • 1 ♂; same collection data as for preceding but 1 Jan. 1947; BMNH.

MALAWI • 1 ♀; NW shore of Lake Nyasa, between Florence Bay and Karonga; 30 Jun.–6 Jul. 1910; S.A. Neave leg.; BMNH. – **Central Region** • 1 ♀; 100 km S of Kasungu; [13°57'37.2" S, 33°28'16.5" E]; 29 Dec. 2001; J. Halada leg.; OÖLM • 1 ♀; Dedza, 85 km SE of Lilongwe; [14°20' S, 34°20' E]; 17–19 Dec. 2001; J. Halada leg.; OÖLM. – **Northern Region** • 1 ♀; Karonga; [9°56' S, 33°56' E]; 7–11 Jul. 1910; S.A. Neave leg.; BMNH. – **Southern Region** • 1 ♀; Mlanje; [16°01'53" S, 35°30' E]; 23 Jan. 1912; S.A. Neave leg.; BMNH • 2 ♂♂; same collection data as for preceding but 4 Dec. 1912; BMNH • 2 ♂♂; same collection data as for preceding but 6 Dec. 1912; BMNH • 1 ♀; same collection data as for preceding but 11 Dec. 1912; BMNH • 1 ♂; same collection data as for preceding but 12 Dec. 1912; BMNH • 3 ♂♂, 1 ♀; same collection data as for preceding but 14 Dec. 1912; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 23 Dec. 1912; BMNH • 1 ♂; same collection data as for preceding but 26 Dec. 1912; BMNH • 3 ♂♂, 2 ♀♀; same collection data as for preceding but 6 Jan. 1913; BMNH • 6 ♂♂, 1 ♀; same collection data as for preceding but 8 Jan. 1913; BMNH • 1 ♂, 2 ♀♀; same collection data as for preceding but 13 Jan. 1913; BMNH • 1 ♂; same collection data as for preceding but 14 Jan. 1913; BMNH • 2 ♂♂, 1 ♀; same collection data as for preceding but 15 Jan. 1913; BMNH • 1 ♂, 2 ♀♀; same collection data as for preceding but 17 Jan. 1913; BMNH • 1 ♂; same collection data as for preceding but 17 Jan. 1913; BMNH • 1 ♂; same collection data as for preceding but 21 Jan. 1913; BMNH • 3 ♂♂; same collection data as for preceding but 22 Jan. 1913; BMNH • 1 ♂; same collection data as for preceding but 24 Jan. 1913; BMNH • 1 ♂, 2 ♀♀; same collection data as for preceding but 27 Jan. 1913; BMNH • 1 ♀; same collection data as for preceding but 29 Jan. 1913; BMNH • 1 ♀; same collection data as for preceding but 1 Feb. 1913; BMNH • 2 ♂♂, 1 ♀; same collection data as for preceding but 4 Feb. 1913; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 6 Feb. 1913; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 8 Feb. 1913; BMNH • 1 ♀; same collection data as for preceding but 11 Feb. 1913; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 14 Feb. 1913; BMNH • 5 ♀♀; same collection data as for preceding but 17 Feb. 1913; BMNH • 1 ♀; same collection data as for preceding but 24 Feb. 1913; BMNH • 2 ♀♀; same collection data as for preceding but 27 Feb. 1913; BMNH • 2 ♂♂, 3 ♀♀; same collection data as for preceding but 3 Mar. 1913; BMNH • 2 ♂♂, 1 ♀; same collection data as for preceding but 5 Mar. 1913; BMNH • 1 ♀; same collection data as for preceding but 20 Mar. 1913; BMNH • 1 ♂, 2 ♀♀; same collection data as for preceding but 26 Mar. 1913; BMNH • 1 ♀; same collection data as for preceding but 17 Apr. 1913; BMNH • 1 ♀; same collection data as for preceding but 10 May 1913; BMNH • 2 ♀♀; same collection data as for preceding; BMNH • 3 ♂♂, 2 ♀♀; same collection data as for preceding but 6 Dec. 1913; BMNH • 1 ♂, 5 ♀♀; same collection data as for preceding but 21 Dec. 1913; BMNH • 1 ♀; same collection data as for preceding but 29 Dec. 1913; BMNH • 3 ♀♀; same collection data as for preceding but 20 Jan. 1914; BMNH • 2 ♂♂, 6 ♀♀; same collection data as for preceding but 27 Jan. 1914; BMNH • 1 ♂, 2 ♀♀; same collection data as for preceding but 10 Feb. 1914; BMNH • 2 ♂♂; same collection data as for preceding but 13 Feb. 1914; BMNH • 6 ♀♀; same collection data as for preceding but 16 Feb. 1914; BMNH • 6 ♂♂, 1 ♀; side of Mt Mlanje; [16°01'53" S, 35°30' E]; 3 Dec. 1913; S.A. Neave leg.; BMNH • 2 ♂♂, 1 ♀; same collection data as for preceding but 11 Dec. 1913; BMNH • 1 ♀; side of Mt Mlanje; [16°01'53" S, 35°30' E]; alt. 3000–4000 ft; 2 Dec. 1913; S.A. Neave leg.; MNHN • 5 ♀♀; SW of Lake Chilwa; [15°24'01" S, 35°34'47" E]; 9 Jan. 1914; S.A. Neave leg.; BMNH • 1 ♀; Zomba; [15°23'09" S, 35°19'07" E]; Nov. 1913; H.S. Stannus leg.; BMNH • 1 ♀; same collection data as for preceding but Dec. 1913; BMNH • 2 ♀♀; same collection data as for preceding but Jan. 1914; BMNH • 1 ♀; same locality as for preceding but Dec. 1896; BMNH • 1 ♀; Zomba Mt; [15°17' S, 35°17' E]; alt. 5500 ft; 18 Feb. 1910; S.A. Neave leg.; BMNH.

MOZAMBIQUE • 1 ♀; valley of Kola River, near E Mt Chiperone; 3 Apr. 1913; S.A. Neave leg.; BMNH • 1 ♀; same collection data as for preceding but 6 Apr. 1913; BMNH • 2 ♀♀; same collection data as for preceding but 7 Apr. 1913; BMNH. – **Manica Province** • 1 ♀; 65 km W of Chimoio; [18°57'51" S, 32°50'10.1" E]; 10–11 Feb. 2003; J. Halada leg.; OÖLM • 1 ♀; Amatongas Forest; [19°11' S, 33°45' E]; Feb. 1917; NRS • 1 ♀; near Andrada, Valee du Revoué; [18°53'42.6" S, 32°51'16.7" E]; 1905; G. Vasse leg.; MNHN • 1 ♂; Vila Pery (now Chimoio); [19°06'59" S, 33°29' E]; 1928; P. Lesne leg.; MNHN. – **Tete Province** • 1 ♂; 65 km S of Vlóngné; 15°13' S, 34°19' E; 8 Feb. 2005; J. Halada leg.; OÖLM. – **Zambezia Province** • 2 ♂♂; Ruo Valley; alt. 2000 ft; 1 Apr. 1913; S.A. Neave leg.; BMNH • 1 ♀; same collection data as for preceding; MNHN • 1 ♂; same collection data as for preceding but 14 Dec. 1913; BMNH.

NAMIBIA – **Kunene Region** • 1 ♀; 38 km NW of Outjo; [19°49'53" S, 15°55'33" E]; 6 Mar. 1990; W.J. Pulawski leg.; CAS. – **Otjondjupa Region** • 1 ♀; Otavi; [19°39' S, 17°20' E]; 2 Feb. 1993; M. Schwarz leg.; OÖLM.

SOUTH AFRICA • 1 ♀; Pienaars River; 1898; R. v. Jutrzencka leg.; TMP. – **Eastern Cape** • 1 ♀; Gonubie; 32°55'49.40" S, 28°01'5.41" E; 21 Jan. 2013; C.P. Fielding leg.; ZMB • 1 ♂; Port St John, Pondoland; [31°37'22" S, 29°32'41" E]; Nov. 1923; R.E. Turner leg.; BMNH • 1 ♂; same collection data as for preceding but Jan. 1924; BMNH • 1 ♀; same collection data as for preceding but 6–25 Feb. 1924; BMNH. – **Gauteng** • 1 ♀; Boukenhoutkloof; 18 Dec. 1910; J.V. Niekerk leg.; TMP • 2 ♂♂; Pretoria; [25°44'46" S, 28°11'17" E]; 21 Dec. 1926; W. Lingnau leg.; DEI • 1 ♀; same locality as for preceding; O. Ulbrich leg.; ZMB • 1 ♀; same locality as for preceding; W. Lingnau leg.; DEI • 2 ♂♂, 7 ♀♀; same locality as for preceding; W.L. Distant leg.; BMNH • 1 ♀; Pretoria City; [25°43'32" S, 28°14'38" E]; 12 Feb. 2000; J. Halada leg.; OÖLM. – **KwaZulu-Natal** • 1 ♂; MNHN • 1 ♀; 10 miles W of Durban; [29°50'08.5" S, 30°51'2.4" E]; 4 Dec. 1966; J.G. Rozen and D.J. Brothers leg.; AMNH • 1 ♂; 20 km NE of Ixopo; 30°00' S, 30°12' E; 15 Jan. 2010; J. Halada leg.; OÖLM • 2 ♂♂, 2 ♀♀; 20 km S of Bergville; [28°54'49.2" S, 29°21'10.7" E]; 5 Feb. 2001; M. Snižek leg.; OÖLM • 4 ♂♂; 20 km S of Newcastle; [27°56'09.7" S, 29°58'12" E]; 28 Nov. 2002; Ma. Halada leg.; OÖLM • 6 ♂♂, 2 ♀♀; 20 km W of Port Shepstone; [30°46'50.9" S, 30°12'38" E]; 2 Feb. 2000; J. Halada leg.; OÖLM • 5 ♂♂; 20 km W of Vryheid; [27°46'28.8" S, 30°34'19.7" E]; 29 Nov. 2002; Ma. Halada leg.; OÖLM • 1 ♂, 2 ♀♀; 35 km N of Port Edward; 30°45' S, 30°09' E; 28 Dec. 2009; J. Halada leg.; OÖLM • 1 ♀; Drakensberge, Royal Natal National Park; 28°43' S, 28°53' E; 9 Feb. 1994; F. Koch leg.; ZMB • 1 ♂; Durban; [29°53' S, 31°03' E]; J. Bequaert leg.; MRAC • 1 ♂; same collection data as for preceding; AMNH • 1 ♀; same collection data as for preceding; BMNH • 1 ♀; Durban, Congella; [29°53' S, 31°03' E]; 2 May 1908; G.F. Leigh leg.; TMP • 1 ♀; Estcourt; [29°00' S, 29°53' E]; 5 Mar. 1963; H.N. Empey leg.; RMNH • 1 ♀; Hluhluwe Game Reserve; 28°02' S, 32°05' E; 10 Feb. 1995; F. Koch leg.; ZMB • 1 ♀; same collection data as for preceding but 5 Dec. 1995; ZMB • 2 ♂♂, 9 ♀♀; Howick; [29°28'40" S, 30°13'50" E]; 1904; J.P. Cregoe leg.; BMNH • 1 ♂, 1 ♀; Ingogo, N of Newcastle; [27°34'40.8" S, 29°54'43.2" E]; 28 Nov. 2002; Ma. Halada leg.; OÖLM • 1 ♂; Ithala Game Reserve; 27°30' S, 31°20' E; 28–30 Jan. 1995; F. Koch leg.; THD-002-ZMB; GenBank CO1 gene: MW538571; GenBank EF-1α gene: MW558237; GenBank LWR gene: MW582277; ZMB • 1 ♂; same collection data as for preceding; ZMB • 1 ♂, 2 ♀♀; same collection data as for preceding but 19 Feb. 1997; ZMB • 2 ♂♂, 4 ♀♀; Ithala Game Reserve, Louwsburg; [27°32'48.14" S, 31°18'48.71" E]; 10–23 Dec. 1993; F. Koch leg.; ZMB • 2 ♀♀; Ithala Game Reserve, sports ground; 27°30' S, 31°20' E; 5 Apr. 2001; F. Koch leg.; ZMB • 1 ♀; Lake St Lucia, False Bay; 27°58' S, 32°23' E; 5–15 Feb. 1992; A.J. Weaving leg.; AMG • 1 ♂, 4 ♀♀; Malvern; [29°53'06" S, 30°55'30" E]; 1904; J.P. Cregoe leg.; BMNH • 1 ♂; Maputaland, SW of Manguzi; [27°00'48.5" S, 32°43'24.1" E]; 29 Jan. 2003; M. Snižek leg.; OÖLM • 2 ♂♂; Mkuze Game Reserve; 27°40' S, 32°19' E; 22 Nov. 1999; F. Koch leg.; ZMB • 1 ♀; Ndumo Game Reserve; 26°55' S, 32°19' E; 19 Nov. 1999; F. Koch leg.; ZMB • 1 ♀; Pinetown; [29°49'14" S, 30°53'12" E]; 18 Mar. 1909; G.F. Leigh leg.; OUMNH • 1 ♂; Pongola; [27°22'41" S, 31°37'08" E]; 10 May 1951; H.W. Bedford leg.; BMNH •

3 ♂♂, 3 ♀♀; St Lucia Park (Charter's Creek); 28°12' S, 32°25' E; 7 Feb. 1995; F. Koch leg.; ZMB • 1 ♀; Stanger [now KwaDukuza]; [29°20' S, 31°17'30" E]; 14 Mar. 1963; H.N. Empey leg.; RMNH • 8 ♂♂; Utrecht; [27°39'36" S, 30°19'48" E]; 28 Nov. 2002; M. Snižek leg.; OÖLM • 1 ♀; Weenen; [28°50'57" S, 30°04'38" E]; Jan.–Mar. 1927; H.P. Thomasset leg.; BMNH. – **Limpopo** • 1 ♂, 2 ♀♀; 35 km W of Hoedspruit; 24°23' S, 30°40' E; 19 Dec. 2009; J. Halada leg.; OÖLM • 1 ♂, 1 ♀; Lekgalameetse Nature Reserve; 24°12' S, 30°20' E; 25–31 Mar. 2001; F. Koch leg.; ZMB • 1 ♀; Moorddrift; [24°16'5.8" S, 28°57'52.3" E]; Oct. 1909; C.J. Swierstra leg.; TMP • 4 ♂♂, 3 ♀♀; N of Nylstroom [now Modimolle]; 24°40' S, 28°30' E; 14 Jan. 2008; M. Halada leg.; OÖLM • 1 ♂; Thabazimbi; [24°36' S, 27°24' E]; 21 Dec. 2008; M. Snižek leg.; OÖLM. – **Mpumalanga** • 1 ♂, 1 ♀; 20 km NW of Nelspruit [now Mbombela]; [25°20'09" S, 30°49'35.5" E]; 26 Nov. 2003; J. Halada leg.; OÖLM • 1 ♀; 20 km SE of Nelspruit [now Mbombela]; [25°36'41.7" S, 31°05'35.3" E]; 5–6 Jan. 2004; J. Halada leg.; OÖLM • 2 ♀♀; Barberton; [25°47'18" S, 31°03'11" E]; P. Rendall leg.; BMNH • 1 ♀; Nwaswitshaka Camp, Kruger National Park; [24°59'45" S, 31°35'31" E]; 21 Dec. 1994; C.L. Bellamy leg.; AMNH • 1 ♀; Waterval River; 8 Jan. 1903; J. Breyer leg.; TMP. – **North West** • 1 ♂, 2 ♀♀; Rustenburg; [25°40'03" S, 27°14'31" E]; BMNH • 1 ♂; Sun City; 32°37' S, 19°07' E; 24 Jan. 2006; A.R. Davidson leg.; AMNH.

TANZANIA • 1 ♀; Tabora-Kigoma; Stamper leg.; MRAC. – **Dar es Salaam Region** • 1 ♀; Dar es Salaam; [6°48' S, 39°17' E]; 1896; H. Mayer leg.; IRSN. – **Katavi Region** • 1 ♂, 1 ♀; 30 km NNW of Mpanda; 5°54' S, 30°56' E; 30 Dec. 2006; M. Kadlecová leg.; OÖLM. – **Kigoma Region** • 1 ♂; 25 km SSE of Kasulu; 4°44' S, 30°11' E; 28 Dec. 2006; J. Halada leg.; OÖLM. – **Kilimanjaro Region** • 1 ♀; Kilimanjaro, Obstgarten-Steppe; [3°05'5.9" S, 37°20'38.5" E]; 24 Mar. 1905; Y. Sjöstedt leg.; BMNH. – **Lindi Region** • 3 ♀♀; Lindi; [9°59'49" S, 39°42'59" E]; F. Fülleborn leg.; ZMB. – **Mbeya Region** • 1 ♀; Langenburg [now Tukuyu]; [9°15' S, 33°39' E]; end of Feb.–beginning of Mar. 1898; F. Fülleborn leg.; ZMB • 1 ♂; same collection data as for preceding but 3 Sep–3 Oct. 1898; ZMB • 1 ♂; Manow; [9°15' S, 33°48' E]; MNHN • 1 ♂; Mbeya city; [8°54' S, 33°27' E]; 5 Jan. 2007; J. Halada leg.; OÖLM. – **Mjini Magharibi Region** • 2 ♀♀; Zanzibar; [6°08' S, 39°20' E]; 1872–1874; Hildebrandt leg.; ZMB • 1 ♀; same locality as for preceding; Dec. 1932; A. Seyrig leg.; MNHN. – **Rukwa Region** • 2 ♀♀; Msamwia, S of Ufipa, S Tanganyika; [8°25' S, 31°50' E]; 10–12 Feb. 1909; Fromm leg.; ZMB. – **Ruvuma Region** • 1 ♀, lectotype of *Sphex nigripes* var. *pachyderma* Strand, 1916 (designated by Oehlke & Wudowenz 1973: 424); Kigonsera, Konow; DEI. – **Singida Region** • 1 ♂; 20 mi. SW of Itigi; [5°53'32" S, 34°16'02" E]; 28 Jan. 1970; M.E. Irwin and E.S. Ross leg.; CAS. – **Songwe Region** • 1 ♂; 70 km NW of Tunduma; 8°58' S, 32°25' E; 2 Jan. 2007; J. Halada leg.; OÖLM. – **Tanga Region** • 1 ♀; “Mnoa”; F. Fischer leg.; ZMB • 1 ♀; Tanga; [5°04'08" S, 39°05'55" E]; 16 Dec. 1917; W.A. Lamborn leg.; OUMNH. – **Unguja North Region** • 1 ♂; Nungwi, Zanzibar; [5°43'33.6" S, 39°17'45.6" E]; 18 Jun. 1985; G.G.M. Schulten leg.; RMNH.

UGANDA – **Eastern Region** • 1 ♂; between Jinja and Busia or Mbwago's E Busora (Some Forest); [0°15'44" N, 33°35'17" E]; 28 Jul.–1 Aug. 1911; S.A. Neave leg.; BMNH • 1 ♂; Mt Kokanjero, SW of Elgon; [1°07'48" N, 34°33' E]; 7–9 Aug. 1911; S.A. Neave leg.; BMNH.

ZAMBIA • 1 ♀; “Mpika – Fort Jameson”; Jan. 1908; S.A. Neave leg.; MRAC • 1 ♀; Chingola–Solwezi Road; 2 Dec. 2004; M. Snižek leg.; OÖLM. – **Central Province** • 2 ♂♂; 100 km NE of Kapiri Mposhi; [13°36'29.5" S, 29°31'49.3" E]; 4–7 Dec. 2002; J. Halada leg.; OÖLM • 1 ♂; 60 km NW of Kapiri Mposhi; [13°32'08.4" S, 28°18'42.6" E]; 8 Dec. 2002; J. Halada leg.; OÖLM • 1 ♂; 70 km NE of Kapiri Mposhi; [13°41' S, 29°18' E]; 21 Nov. 2005; M. Snižek leg.; OÖLM • 1 ♀; Broken Hill [now Kabwe]; [14°26'48" S, 28°26'47" E]; 27 Feb. 1910; Silverlock leg.; BMNH. – **Copperbelt Province** • 1 ♀; 45 km SE of Kitwe; [13°08'36.7" S, 28°32'54.4" E]; 12–15 Jan. 2003; J. Halada leg.; OÖLM • 3 ♂♂, 1 ♀; 50 km W of Chingola; [12°25'06.3" S, 27°23'50.9" E]; 9–11 Dec. 2002; J. Halada leg.; OÖLM • 2 ♀♀; same collection data as for preceding but 1–2 Jan. 2003; OÖLM • 1 ♂; 80 km W of Chingola; [12°30'33.2" S, 27°06'11.2" E]; 12 Dec. 2002; F. Kantner leg.; OÖLM • 1 ♂; Tanga Farm, 35 km W of

Chingola; [12°32'27.7" S, 27°31'59.4" E]; 6 Nov. 2005; M. Snižek leg.; OÖLM. – **Eastern Province** • 1 ♂; “Mid. Luangwa Valley”; alt. 1700 ft; 26 Feb. 1908; S.A. Neave leg.; OUMNH • 2 ♂♂, 1 ♀; same collection data as for preceding but 27 Feb. 1908; OUMNH • 4 ♀♀; “On road Ft. Jameson to Lundazi”; 7–14 Jun. 1910; S.A. Neave leg.; BMNH • 1 ♀; “Up. Luangwa Valley”; alt. 1800–2000 ft; 30 Mar. 1908; S.A. Neave leg.; OUMNH • 2 ♀♀; same collection data as for preceding but 31 Mar. 1908; OUMNH • 1 ♂; same collection data as for preceding but 1 Apr. 1908; OUMNH • 1 ♀; 6 km E of Sinda; 14°12' S, 31°49' E; 5 Mar. 1998; W.J. Pulawski leg.; CAS • 1 ♀; Petauke; [14°14'28" S, 31°19'11" E]; 2 Feb. 1905; S.A. Neave leg.; OUMNH. – **Lusaka Province** • 3 ♀♀; 25 km E of Lusaka; 15°21' S, 28°30' E; 3 Mar. 1995; W.J. Pulawski leg.; CAS. – **Muchinga Province** • 2 ♀♀; “Mid. Chambezi Valley, Chinsali distr.”; alt. 4000 ft; 25 Apr. 1908; S.A. Neave leg.; OUMNH • 1 ♀; same collection data as for preceding but 27 Apr. 1908; OUMNH • 1 ♀; same collection data as for preceding but 29 Apr. 1908; OUMNH • 1 ♀; Chinsali and neighbourhood; [10°32'29" S, 32°04'53" E]; alt. 4300 ft; 9 Apr. 1908; S.A. Neave leg.; OUMNH. – **Northern Province** • 1 ♀; “L. Chambezi V.; Kasama distr.”; alt. 3900 ft; 10 May 1908; S.A. Neave leg.; OUMNH • 1 ♀; 5 mi. S of Senga Hill; [9°26'44" S, 31°13'21" E]; 1 Feb. 1970; M.E. Irwin and E.S. Ross leg.; CAS • 1 ♂; Abercorn [now Mbala]; [8°50' S, 31°28' E]; 23 Dec. 1950; F.O. Albrecht leg.; BMNH • 1 ♂; same collection data as for preceding but 10 Jan. 1951; BMNH. – **Southern Province** • 1 ♂; 10 km SW of Choma; [16°51'57" S, 26°54'06.3" E]; 18 Dec. 2002; J. Halada leg.; OÖLM • 1 ♀; 100 km NE of Livingstone; [17°06'21.1" S, 26°24'21" E]; 26 Dec. 2002; J. Halada leg.; OÖLM • 1 ♀; 30 km SE of Choma; [16°54'09.4" S, 27°15'54.8" E]; 27 Dec. 2002; J. Halada leg.; OÖLM.

ZIMBABWE • 1 ♂; “Murntree”; 21 Jan. 1912; G. Arnold leg.; BMNH • 1 ♀; Victoria Falls; Feb. 1935; NRS. – **Harare Province** • 1 ♀; near Harare; [17°49'45" S, 31°03'08" E]; 20 Jan. 1998; Ma. Halada leg.; OÖLM • 1 ♀; Salisbury [now Harare]; [17°49'45" S, 31°03'08" E]; Apr. 1899; G.A.K. Marshall leg.; BMNH • 2 ♂♂, 1 ♀; same collection data as for preceding but Jan. 1900; BMNH • 1 ♀; same collection data as for preceding but 13 Dec. 1902; OUMNH • 3 ♀♀; same locality as for preceding; A. Watsham leg.; BMNH. – **Mashonaland Central** • 1 ♀; 10 mi. E of Pakasa [Bakasa]; [16°25'39" S, 30°50'32" E]; 28 Jan. 1911; Silverlock leg.; BMNH • 5 ♂♂; Mavhuradonha Saf., 15 km SE of Muzarabani; [16°33'33" S, 31°14'22.8" E]; 17 Dec. 1998; J. Halada leg.; OÖLM. – **Mashonaland East** • 2 ♀♀; Chishawasha, near Salisbury [now Harare]; [17°46'14" S, 31°15'11" E]; Mar. 1978; A. Watsham leg.; BMNH • 1 ♀; same collection data as for preceding but Dec. 1978; BMNH • 1 ♀; same collection data as for preceding but Feb. 1979; BMNH • 1 ♂; same collection data as for preceding but Dec. 1981; BMNH. – **Mashonaland West** • 2 ♂♂, 1 ♀; Lion and Cheetah Park 24 km W of Harare; 17°50' S, 30°49' E; 17–18 Dec. 1995; W.J. Pulawski leg.; CAS. – **Midlands** • 1 ♀; Selukwe [now Shurugwi]; [19°40' S, 30°00' E]; 1911; A. Ellenberger leg.; MNHN.

## Description

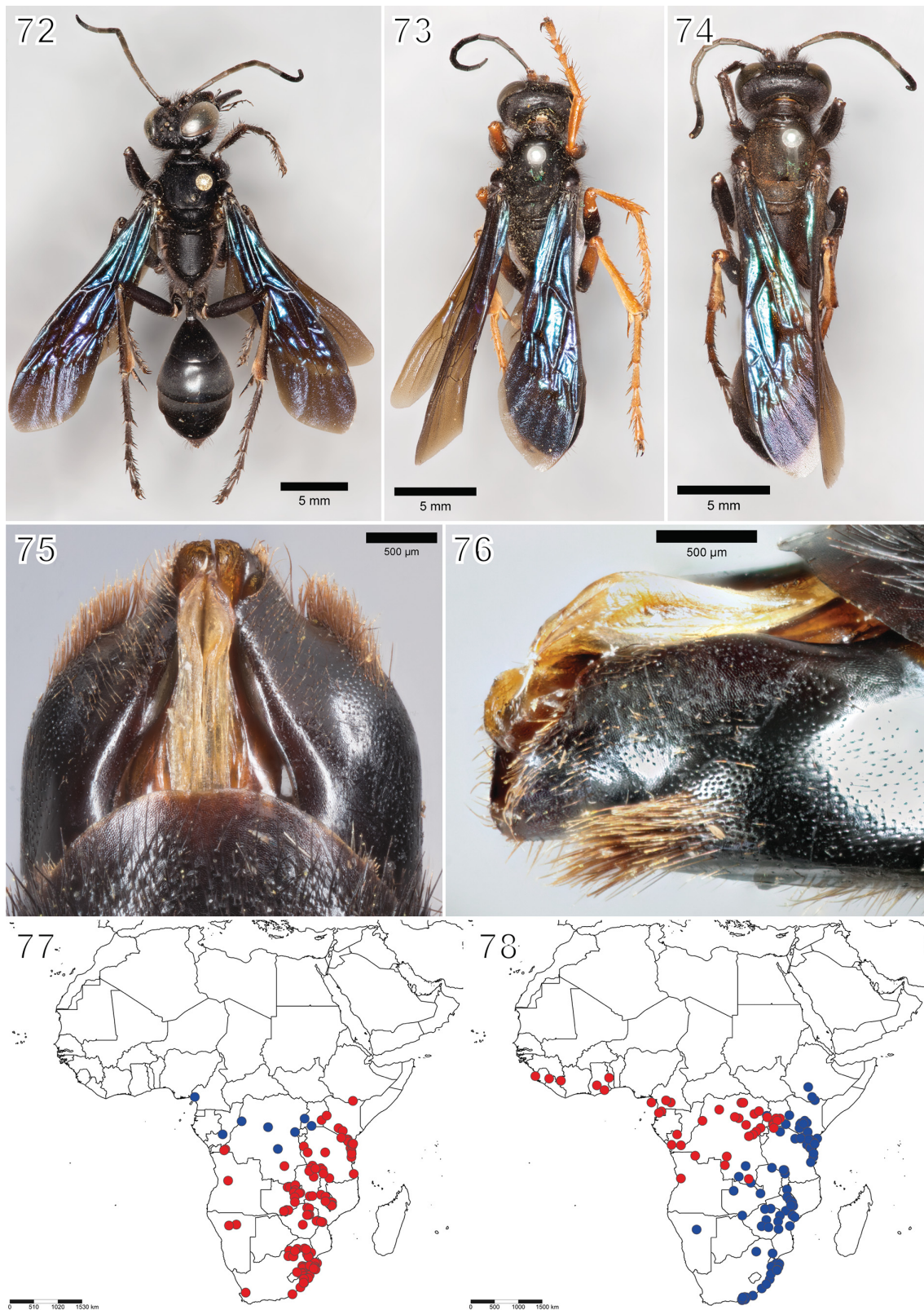
### Female

SIZE. 22.1–25.8 mm.

COLOR. Black except for basal half of mandible, which is ferruginous. Wings fuscous, with cyan-violet iridescence.

VESTITURE. Appressed setae on clypeus black, on paraocular area silvery with brown luster, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Central and lower part of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with broad, notched tooth, stepped above. Clypeus without indentation or carina. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins at interstitium between submarginal cells II and III. Propodeal enclosure without



**Figs 72–78.** 72. *Spheg umtalicus* Strand, 1916. 73–74. *S. victoria* sp. nov. 75–76. *S. ahasverus* Kohl, 1890, male genitalia. 72–73. Habitus of ♀. 74. Habitus of ♂. 75. Dorsal view. 76. Lateral view. 77. Geographic distribution of *S. umtalicus* (red) and *S. ahasverus* (blue). 78. Geographic distribution of *S. camerunicus* Strand, 1916 (red) and *S. nigrohirtus* Kohl, 1895 (blue).

any notable ridges. Foretarsomere I  $2.7\text{--}3.6 \times$  length of antepenultimate spine. Petiole length  $1.9\text{--}2.5 \times$  its medial width.

#### Male

SIZE. 19.6–24.3 mm.

COLOR. Black, except for ferruginous stripe in center of mandible. Wings fuscous, with cyan-violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with tooth emerging from inner side. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins interstitium between submarginal cells II and III or slightly proximally. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Petiole length  $2.0\text{--}2.8 \times$  its medial width. Flagellomere V and often VI with moderately broad placoid covering their entire length and tapering toward base and apex.

#### Variation

Specimens from Lesotho and Gauteng Province (var. *basuto/kobrowi*) can vary as follows:

#### Female

COLOR. Black except for the following, which are ferruginous: basal half of mandible, lower part of clypeus, scape, pedicel, fore and midlegs from apical half of femur, hindleg from femur onward, excluding apical half of claw, and apical metasomal segment. Wings fuscous, with violet luster.

VESTITURE. Appressed setae on clypeus brassy-ferruginous, on paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus ferruginous near free margin, black otherwise, on paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with broad, notched tooth, stepped above. Clypeus with indistinct indentation in lower center, without carina. Scutellum convex. Metanotum raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I  $2.8\text{--}2.9 \times$  length of antepenultimate spine. Petiole length  $1.70\text{--}1.83 \times$  its medial width.

#### Male

COLOR. Black except for the following, which are ferruginous: basal half of mandible, femora apically, tibiae, and mid- and hindtarsomeres I–III. Wings hyaline, with yellowish tinge, apical margin of forewing infusate.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar and scutum black, on propodeal enclosure brownish-gray. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with tooth emerging from inner side. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein nearly joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Petiole length 1.5–1.6 × its medial width. Flagellomere V with moderately broad placoid covering its proximal four-fifths.

### Distribution

Eastern, southeastern and southwestern Africa.

### Remarks

As van der Vecht (1961) correctly stated, the name *Sphex haemorrhoidalis* Fabricius, 1781, which Arnold (1928) used for black-legged specimens, is in fact linked to a red-legged taxon from western Africa. Other authors like Leclercq (1955, 1961), Berland (1956) and Dollfuss (2008) have based their identifications on Arnold's mistake, and therefore many locality records and previous synonymizations were erroneous.

Although we were unable to examine the types of *S. kobrowi* (despite our request, it was apparently not included in the loan from TMP) or *S. basuto*, we nonetheless feel that our opinion on their synonymy is justified. First and foremost, we did study specimens which matched the descriptions and were most likely from the same collecting series as the types of both taxa, as they shared their locality, time frame and presumed collector. Labels indicated that Arnold had examined some of them as well. Secondly, we would have proposed to synonymize *S. basuto* with *S. kobrowi* even without additional evidence beyond their original descriptions. Judging from Arnold's diagnosis, both resemble each other very much and are only distinguished through *S. basuto* having "thinner" propodeal pubescence and a slightly different interocular distance as well as flagellomere length. The measurements for the varieties of *S. haemorrhoidalis* in Arnold (1947) all seem quite dubious, especially in the case of *S. basuto* and *S. kobrowi*, with differences in length of less than 4% being used to differentiate between them. In addition, the actual numbers given are virtually useless for identifications without material for comparison, as they are highly dependent on the angle from which the measurements are taken and the how the boundaries between areas are perceived, yet these details are nowhere mentioned.

Though distinct in coloration and with a slightly different ratio of petiole length to width, *S. kobrowi* appears to be genetically identical to *S. umtalicus*. A comparison of parts of the CO1 sequences of specimens conforming to both taxa showed their complete congruence.

### *Sphex victoria* sp. nov.

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Figs 71 (blue), 73–74

### Differential diagnosis

Females of *S. haemorrhoidalis* (Fig. 69) and *S. victoria* sp. nov. (Fig. 73) cannot always be distinguished satisfactorily. Especially in specimens from central Africa, where their populations overlap, it is often difficult to decide what color the luster of the appressed paraocular and clypeal setae is, which is one of the only useful diagnostics. The coloration of the legs can also be somewhat helpful, but is variable as well. Thus, the character states mentioned represent the more distinct manifestations that occur mostly in eastern and western Africa for *S. victoria* sp. nov. and *S. haemorrhoidalis*, respectively.

In the female of *S. haemorrhoidalis*, the appressed setae laterally on the clypeus and on the paraocular area have a ferruginous luster (Fig. 34). In contrast, it has a silvery luster in *S. victoria* sp. nov.



(Fig. 35). Furthermore, *S. victoria* sp. nov. has at least the apical half of the hindfemora ferruginous, whereas in *S. haemorrhoidalis* the hindfemora are predominantly black. Females of *S. mweruensis* are distinguishable through having the erect setae at the posterior propodeal margin silvery (Fig. 64), while those of *S. umtalicus* have the clypeus (Fig. 33) and most of the body black (Fig. 72), and both sexes of *S. caeruleanus* can be recognized through their very distinctly green wing iridescence (Fig. 63).

Males (Fig. 74) are identifiable through the combination of having uniformly black setae on the thoracal dorsum, the mandibular base brightly ferruginous and the hindtibia at least partially ferruginous. Those of *S. haemorrhoidalis* (Fig. 70) and *S. mweruensis* (Fig. 65) have a substantial number of erect mesanotal setae silvery, and *S. umtalicus* has the legs uniformly black.

### Etymology

This species was named after Lake Victoria, as most of the material was collected in its vicinity.

### Material examined

#### Holotype

UGANDA – **Central Region** • ♀; Kampala, [0°18'58" N, 32°34'55" E]; 17 Apr. 1913; C.C. Gowdey leg.; BMNH.

#### Paratypes

AFRICA • 1 ♀; “British East Africa”; 1906; Maurice de Rothschild leg.; MNHN.

BENIN – **Atakora Department** • 1 ♀; Tiakalakou, Natitingou; [10°18' N, 1°22' E]; 16 Jul. 1969; J. Hamon leg.; MNHN.

CENTRAL AFRICAN REPUBLIC – **Ouham-Pendé** • 1 ♂, 1 ♀; Bozoum; [6°19'02" N, 16°22'42" E]; 1–10 Jun. 1914; G. Tessmann leg.; ZMB • 1 ♀; same collection data as for preceding but 11–20 Jun. 1914; ZMB.

DEMOCRATIC REPUBLIC OF THE CONGO – **Haut-Katanga** • 1 ♀; “Basse Pande”; 15 Apr. 1944; IRSN • 1 ♀; 4 mi. S of Sampwe; [9°23'54" S, 27°24'17" E]; 20 Jan. 1958; E.S. Ross and R.E. Leech leg.; CAS • 1 ♀; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; Dec. 1925; Van Saceghem leg.; MRAC • 1 ♀; Kakontwe; [10°59' S, 26°40' E]; 6 Jun. 1965; Coussement leg.; DEI • 1 ♀; Kambove; [10°52' S, 26°38' E]; 13 Feb. 1907; BMNH. – **Haut-Uele** • 1 ♂; Garamba National Park; 4°10' N, 29°40' E; Jun.–Jul. 1912; Lang and Chapin leg.; AMNH • 1 ♂, 4 ♀♀; same collection data as for preceding but Jul. 1912; AMNH. – **Kongo Central** • 1 ♀; Boma; 6°00' S, 13°00' E; 17 Jun. 1915; Lang and Chapin leg.; AMNH. – **North Kivu** • 1 ♂; Beni; [0°29' N, 29°28' E]; Feb. 1931; L. Lebrun leg.; MRAC. – **South Kivu** • 1 ♀; Kadjudju; [2°09' S, 28°54' E]; 1931; G. Babault leg.; MNHN.

KENYA • 3 ♀♀; Kakumga [Kakamega] Forest; [0°17'30" N, 34°51'22" E]; 21–28 May 1911; S.A. Neave leg.; MNHN • 1 ♀; Kisima to Mumias Road; Aug. 1912; A.D. Milne leg.; MNHN • 1 ♀; Mogorr River; May 1913; A.O. Luckman leg.; BMNH • 2 ♀♀; Upper Kuja Valley; S of Kavirondo; alt. 4200 ft; 5–8 May 1911; S.A. Neave leg.; BMNH • 8 ♂♂, 13 ♀♀; Yala River, S edge of Kakumga [Kakamega] Forest; 21–28 May 1911; S.A. Neave leg.; BMNH. – **Bungoma County** • 3 ♀♀; S foot and slopes of Mt Elgon; [0°47'46" N, 34°35'57" E]; 8–13 Jun. 1911; S.A. Neave leg.; BMNH. – **Kakamega County** • 10 ♀♀; Maramas Dist., Ilala, 14 mi. E of Mumias; [0°20'13" N, 34°41'31" E]; 18–21 Jun. 1911; S.A. Neave leg.; BMNH • 2 ♀♀; Mumias; [0°20'05" N, 34°29'16" E]; 15 Jun. 1911; S.A. Neave leg.; BMNH. – **Kisii County** • 1 ♀; Kisii District, S Kavirondo; [0°40' S, 34°45' E]; 9–12 May 1911; S.A. Neave leg.; BMNH.

TANZANIA • 1 ♂; Kidichi-Zanzibar; [6°05' S, 39°14' E]; Nov. 1960; B.H. Hyde-Wyatt leg.; BMNH. – **Kagera Region** • 2 ♀♀; Bukoba; [1°19'54" S, 31°48'44" E]; 9–11 Jun. 1912; C.C. Gowdey leg.; BMNH.

UGANDA • 1 ♂; Banks of Nile near Kakindu; alt. 3400 ft; 24–25 Aug. 1911; S.A. Neave leg.; BMNH • 2 ♀♀; Eastern Mbale District, S of Mt Elgon; 2–5 Aug. 1911; S.A. Neave leg.; BMNH • 1 ♂, 3 ♀♀; Milgana; 30 Apr. 1911; C.C. Gowdey leg.; BMNH. – **Central Region** • 1 ♀; 3–4 mi. NE of Entebbe; [0°06'14" N, 32°30'34" E]; 25 Jun. 1912; C.A. Wiggins leg.; OUMNH • 1 ♂, 4 ♀♀; Bweya; [0°11'39" N, 32°32'59" E]; 10 May 1913; C.C. Gowdey leg.; BMNH • 3 ♀♀; same collection data as for preceding but 17 May 1913; BMNH • 2 ♀♀; same collection data as for preceding but 22 May 1913; BMNH • 1 ♀; Entebbe; [0°03' N, 32°27'36" E]; 13 May 1909; C.C. Gowdey leg.; BMNH • 3 ♂♂, 2 ♀♀; same collection data as for preceding but 14–25 May 1912; BMNH • 1 ♂, 7 ♀♀; same collection data as for preceding but 30–31 May 1912; BMNH • 1 ♀; same collection data as for preceding but 15–22 Jun. 1912; BMNH • 2 ♀♀; same collection data as for preceding but Aug. 1912; BMNH • 3 ♀♀; same collection data as for preceding but 24–25 May 1913; BMNH • 2 ♀♀; same collection data as for preceding but 30 May 1913; BMNH • 1 ♀; same collection data as for preceding but 12 Jun. 1913; BMNH • 1 ♀; same collection data as for preceding but 17 Jun. 1913; BMNH • 1 ♀; same locality as for preceding; 29 May 1909; C.A. Wiggins leg.; OUMNH • 1 ♂; same collection data as for preceding but 5 Jul.–7 Aug. 1909; OUMNH • 1 ♂; same collection data as for preceding but 6–13 May 1912; BMNH • 1 ♀; same locality as for preceding; May 1906; Maurice de Rothschild leg.; MNHN • 4 ♀♀; same collection data as for holotype; BMNH • 3 ♀♀; Mabira Forest; [0°29'03" N, 32°59'05" E]; 2 Jul. 1913; C.C. Gowdey leg.; BMNH • 1 ♀; Mabira Forest, Chagwe; [0°29'03" N, 32°59'05" E]; 16–25 Jul. 1911; S.A. Neave leg.; BMNH • 2 ♀♀; Msozi; [0°51' S, 31°42' E]; Feb. 1903; D. Radcliffe leg.; BMNH • 1 ♀; Mwera; [0°27'47" N, 32°19'56" E]; 2 Aug. 1913; C.C. Gowdey leg.; BMNH. – **Eastern Region** • 4 ♀♀; Between Jinja and Busia or Mbwago's E Busora (Some Forest); [0°15'44" N, 33°35'17" E]; 28 Jul.–1 Aug. 1911; S.A. Neave leg.; BMNH • 1 ♀; Between Kumi and NE shore of Lake Kioga; [1°32'09" N, 33°49'37" E]; alt. 3400–3600 ft; 18–20 Aug. 1911; S.A. Neave leg.; BMNH • 1 ♂, 1 ♀; Jinja; [0°26'20" N, 33°12'11" E]; Aug. 1928; V.G.L. van Someren leg.; BMNH • 1 ♂, 2 ♀♀; Mbale–Kumi Road, 3700 ft S of Lake Salisbury; [1°33'33" N, 33°57'15" E]; 15–17 Aug. 1911; S.A. Neave leg.; BMNH • 1 ♂; SE shore of Lake Kioga; [1°12'43" N, 33°26'09" E]; alt. 3400 ft; 21 Aug. 1911; S.A. Neave leg.; BMNH. – **Western Region** • 1 ♀; Fort Portal Road, Mbarara, Southern Toro; [0°36'48" S, 30°38'54" E]; 22–24 Oct. 1911; S.A. Neave leg.; BMNH • 4 ♂♂, 2 ♀♀; SE of Ankole; 4–8 Oct. 1911; S.A. Neave leg.; BMNH.

## Description

### Female

SIZE. 23.0–25.0 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus, scape, pedicel and legs from apical half of femur onward, excluding apical half of claw. Wings fuscous, with cyan-violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus ferruginous, black towards dorsal margin, on paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with broad, notched tooth, stepped above. Clypeus without indentation or carina. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein nearly joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.7–3.2 × length of antepenultimate spine. Petiole length 1.6–2.2 × its medial width.

**Male**

SIZE. 23.2–23.7 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible and hindleg from tibia onward, excepting apical half of claw. Wings fuscous, with cyan-violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially concave, with tooth emerging from inner side. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein nearly joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 2.1–2.4 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.

**Variation**

Unknown.

**Distribution**

Eastern to central Africa.

**Species of the *nigrohirtus* group**

The *nigrohirtus* group contains the following five species: *Sphex ahasverus*, *S. camerunicus*, *S. incomptus*, *S. nigrohirtus* and *S. pulawskii* sp. nov.

Members are characterized through posteriorly-oriented erect propodeal setae, which they share with the species of the *bohemanni* group (Fig. 1). Distinguishing features between both are covered in the introduction to that group.

***Sphex ahasverus* Kohl, 1890**  
Figs 75–76, 77 (blue)

*Sphex ahasverus* Kohl, 1890: 397, ♀.

*Sphex observabilis* R. Turner, 1918: 360, ♀. **Syn. nov.**

**Differential diagnosis**

Males and females of this species are unmistakable within their species group, as they have uniformly golden vestiture covering the pleurae and propodeum, which completely obscures the propodeal sculpture.

**Material examined****Holotype or syntype**

AFRICA • ♀; “South Australia”, but actually Africa; NHMW.

**Other material**

CAMEROON – **Southwest Region** • 1 ♀; “Johann-Albrechts-Höhe” [Government Station Johann Albrecht Mountain]; [4°40' N, 9°24' E]; 14 May 1896; L. Conradt leg.; ZMB • 1 ♀; Barombi Station; [4°40' N, 9°24' E]; P. Preuss leg.; ZMB.

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♀; “Kasaï”; May 1922; Van Risseghem leg.; MRAC • 1 ♀; “Sankuru”; 1910; Abrassart leg.; MRAC. – **Lomami** • 1 ♂; Tshofa; [5°14' S, 25°15' E]; Dec. 1934; Gillardin leg.; MRAC. – **Province of Équateur** • 1 ♂; Eala; [0°02'30" N, 18°20'06" E]; Jan. 1936; J. Ghesquière leg.; MRAC • 1 ♂; same collection data as for preceding but Aug. 1936; MRAC. – **South Kivu** • 1 ♀; Kavumu to Kabunga, km 82 (Mingazi); [2°01' S, 28°31' E]; 1951; H. Bomans leg.; MRAC. – **Tshuapa** • 2 ♀♀; Moma; [1°05' S, 23°23' E]; 1933; M. Molin leg.; MRAC • 1 ♀; same locality as for preceding; Jun. 1925; J. Ghesquière leg.; MRAC.

REPUBLIC OF THE CONGO – **Plateaux Department** • 1 ♀; Abala; [2°26'59" S, 14°42'59" E]; 13 Sep. 1951; MNHN.

UGANDA – **Central Region** • 1 ♀, holotype or syntype of *Sphex observabilis* R. Turner, 1918; Tero Forest; [0°50' S, 31°40' E]; 26–30 Sep. 1911; S.A. Neave leg.; BMNH. – **Western Region** • 1 ♂; Kabarole Kibale Forest National Park, Kanyawara (MUBFS); 0°33' N, 30°21' E; 23 Aug. 1997; C. Häuser leg.; THD-011-ZMB; GenBank CO1 gene: MW538553; GenBank LWR gene: MW582291; ZMB • 1 ♂; same collection data as for preceding; ZMB.

## Description

### Female

SIZE. 29.4–32.8 mm.

VESTITURE AND STRUCTURE. A redescription based on the holotype has already been published (Dörfel & Ohl 2015). Some additional important characters of the species are treated here. Erect propodeal setae oriented posteriorly. Free clypeal margin slightly stepped medially, clypeus with slight indentation in lower center, without carina. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Foretarsomere I 2.6–2.9 × length of antepenultimate spine. Petiole length 1.4–1.6 × its medial width.

### Male

SIZE. 27.0–29.1 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Forewing slightly fuscous, hindwing mostly hyaline.

VESTITURE. Appressed setae on clypeus, paraocular area, collar and propodeal enclosure silvery-golden, on scutum black. Erect setae on clypeus and paraocular area black intermixed with silvery ones, on scutum black, on collar and propodeal enclosure silvery-golden. Erect propodeal setae oriented posteriorly. Free clypeal margin glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna II–V with decreasingly dense, VI–VII with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum slightly raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII very gently notched. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII slightly concavely emarginate. Penis valvae fused, inner margin flattened and conspicuously raised, dorsally broadened. Petiole length 1.35–1.45 × its medial width. Flagellomeres IV–VII with broad placoids covering their entire length.

## Variation

Unknown.

**Distribution**

Central Africa.

**Remarks**

Members of *Sphex observabilis* are indistinguishable from the type of *S. ahasverus*, allegedly from South Australia, which leads us to the conclusion that both species are synonymous. However, we do not believe that there are morphologically identical populations of the species in both Uganda and South Australia. The specimens Kohl (1890) described as *S. ahasverus* were apparently part of a batch which the Vienna Natural History Museum had received in 1804 from Leopold von Fichtel. A locality error is therefore conceivable, since a large part of the material came from Africa (Rogenhofer 1889). Even though R. Turner treated *S. ahasverus* in his key to the Australian Sphecini (1910) and described *S. observabilis* in 1918, he likely failed to notice the connection between the two. Thus, *observabilis* should become an invalid name, while *ahasverus* is to be used for the species even though it is most likely restricted to Africa in its geographical distribution.

*Sphex camerunicus* Strand, 1916

Figs 78 (red), 79–80, 83

*Sphex bohemannii* var. *camerunicus* Strand, 1916: 105, ♀.

*Sphex conradti* Berland, 1927: 145, ♀. **Syn. nov.**

**Differential diagnosis**

Females can be recognized through a combination of having basally black mandibles, completely black erect propodeal setae and appressed silvery setae on the collar, as well as posterolaterally on the scutum (Fig. 83). In contrast, those of *S. incomptus*, *S. nigrohirtus* and *S. pulawskii* sp. nov. usually have the basal mandible half and the free clypeal margin medially ferruginous. Female *S. nigrohirtus* have uniformly black setae on the collar, scutum and propodeal enclosure (Fig. 84), whereas those of *S. incomptus* also have the majority of the propodeal setae silvery, in addition to the silvery appressed setae on the collar and the spot posterolaterally on the scutum (Fig. 85). Females of *S. pulawskii* sp. nov. resemble those of *S. camerunicus* in the color of the setae on the collar, but they are distinguished through their silvery appressed and erect setae at the posterior propodeal margin (Fig. 86). Female *S. camerunicus* are also considerably larger and have a deeper indentation on the clypeus.

Males of *S. camerunicus* differ in having broad placoids that completely cover flagellomeres IV–VII, and their clypeal indentation and carina are more pronounced as well. Excepting the unmistakable *S. ahasverus*, the other group members only have a narrow, often discontinuous placoid on flagellomere V. Furthermore, the valvices of *S. camerunicus* have a concave emargination dorsolaterally (Figs 79–80), while this structure is absent in *S. nigrohirtus* (Figs 81–82), *S. incomptus* and *S. pulawskii* sp. nov.

**Material examined****Holotype**

CAMEROON • ♀; L. Conradt leg.; DEI.

**Other material**

AFRICA • 2 ♀♀; “Congo”; MNHN • 1 ♂; Cap; MNHN.

ANGOLA – **Cuanza Sul Province** • 1 ♀; 7 mi. W of Gabela; [10°51'09" S, 14°15'40" E]; 16–18 Mar. 1972; BMNH.

CAMEROON • 1 ♀; G. Valdau and K. Knutsson leg.; NRS. – **Centre Region** • 2 ♂♂; Leboudi; [3°53'53" N, 11°27'2.4" E]; Sep. 1953; J.-P. Adam and J. Rageau leg.; MNHN • 3 ♂♂; Nkolbisson, Yaoundé; [3°52' N, 11°31' E]; 21 Oct. 1967; L. Tsacas leg.; MNHN • 1 ♀; Yaoundé; [3°52' N, 11°31' E]; Molez leg.; MNHN • 2 ♂♂; same collection data as for preceding; MNHN. – **South Region** • 1 ♀; Douma District; [3°30' N, 12°21' E]; Schipper leg.; ZMB.

CENTRAL AFRICAN REPUBLIC • 1 ♀; 27 Apr. 1918; M. Boulard leg.; MNHN.

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♀; “Kwawa (Bangala)”; 4 Nov. 1922; A. Collart leg.; MRAC • 1 ♀; “Kwilu”; Dec. 1913–Jan. 1914; P. Vanderijst leg.; MRAC. – **Bas-Uele** • 1 ♀; Bambesa; [3°28' N, 25°43' E]; Jan. 1933; H.J. Brédo leg.; MRAC • 1 ♀; same collection data as for preceding but 25 Sep. 1933; MRAC • 5 ♀♀; same collection data as for preceding but 20 Oct. 1933; MRAC • 3 ♀♀; same collection data as for preceding but 30 Oct. 1933; MRAC • 1 ♀; same collection data as for preceding but 1 Nov. 1933; MRAC • 2 ♂♂; same collection data as for preceding but Dec. 1933; MRAC • 1 ♀; same locality as for preceding; 14 Aug. 1937; J. Vrijdagh leg.; MRAC • 1 ♂; same collection data as for preceding but 17 Mar. 1939; IRSN • 1 ♀; same locality as for preceding; 9 May 1938; P. Henrard leg.; MRAC • 1 ♂; same locality as for preceding; Dec. 1934; J.V. Leroy leg.; MRAC • 1 ♀; Dingila; [3°27' N, 26°03' E]; May 1933; H.J. Brédo leg.; MRAC • 1 ♀; Poko-Nala-Rungu; Jan. 1912; Hutereau leg.; MRAC. – **Haut-Katanga** • 1 ♀; Mwera; [10°57'06" S, 27°04'55" E]; Jan. 1956; R.P. Th. de Caters leg.; MRAC. – **Ituri Province** • 1 ♀; Nduye-Makara; [1°51'33" N, 29°00'57" E]; Sep.–Oct. 1921; A. Pilette leg.; MRAC • 1 ♂; Penge; [1°20' N, 28°09' E]; 21 Feb. 1919; J. Bequaert leg.; MRAC. – **Kasai-Central** • 1 ♀; Kamponde; [6°41'53" S, 22°55'44" E]; 1945; MRAC. – **Kongo Central** • 1 ♂; Mangembo; [4°35'04" S, 14°16'20" E]; 1932; Zwolakowski leg.; MRAC • 1 ♀; Mayumbe; [4°30' S, 12°30' E]; 1917; R. Mayné leg.; MRAC. – **Kwango** • 1 ♂, 1 ♀; Kingunda; [6°34' S, 16°58' E]; 17 Jan. 1939; Mevr. Bequaert leg.; MRAC. – **Lualaba** • 1 ♂; Kapanga; [8°21' S, 22°34' E]; May 1933; F.G. Overlaet leg.; MRAC. – **Maniema** • 1 ♂; Lubutu; [0°44' S, 26°35' E]; 22 Jan. 1915; J. Bequaert leg.; MRAC. – **Mongala Province** • 1 ♀; Lisala; [2°09' N, 21°30' E]; 1940; Leontowitch leg.; MRAC. – **North Kivu** • 3 ♂♂, 6 ♀♀; Parc National de Virungas, Oycha region; Apr.–May 1950; J. de Wilde leg.; MRAC • 1 ♀; Rwankwi, N of Lake Kivu; [1°19'12" S, 29°19'12" E]; 15 Aug. 1951; J.V. Leroy leg.; MRAC. – **Province of Équateur** • 1 ♀; Eala; [0°02'30" N, 18°20'06" E]; Apr. 1932; H.J. Brédo leg.; MRAC • 1 ♀; same collection data as for preceding but 30 Oct. 1933; MRAC • 2 ♀♀; same locality as for preceding; Apr. 1933; A. Corbisier leg.; MRAC • 1 ♀; same locality as for preceding; Apr. 1935; J. Ghesquière leg.; MRAC • 1 ♂; same collection data as for preceding but Oct. 1935; MRAC. – **South Kivu** • 1 ♀; Kavumu à Kabunga km82 (Mingazi); [2°01' S, 28°31' E]; 1951; H. Bomans leg.; MRAC • 1 ♀; Lubongola near Shabunda; [2°34'32" S, 27°53'36" E]; 1939; Hautmann leg.; MRAC • 1 ♀; Mulungu; [2°53' S, 27°07' E]; 26 Sep. 1938; Hendrickx leg.; MRAC. – **Tshopo** • 1 ♀; Stanleyville [now Kisangani]; [0°30'55" N, 25°11'27" E]; Apr. 1915; J. Bequaert leg.; MRAC • 1 ♂; same locality as for preceding; Jun. 1932; J. Vrydagh leg.; MRAC • 1 ♂; same locality as for preceding; 10–13 Sep. 1928; A. Collart leg.; MRAC • 1 ♀; Yangambi; [0°46' N, 24°27' E]; 1940; MRAC.

EQUATORIAL GUINEA • 1 ♀; “Bénito”; MNHN • 1 ♀, lectotype of *Sphex conradti* Berland, 1927 (designated by Menke in Bohart & Menke 1976: 115); Fernando-Po [Bioko]; [3°30' N, 8°42' E]; 1901; L. Conradt leg.; MNHN • 2 ♀♀, paralectotypes of *Sphex conradti* Berland, 1927; same collection data as for lectotype of *Sphex conradti* Berland, 1927; MNHN. – **Centro Sur** • 1 ♀; Monte Alén, Benito River; [1°31'48" N, 10°06'36" E]; 16–30 Sep. 1906; G. Tessmann leg.; ZMB • 1 ♀; Uelleburg; [1°49' N, 10°36' E]; 15–31 Jan. 1907; G. Tessmann leg.; ZMB • 1 ♀; same collection data as for preceding but 15–28 Feb. 1907; ZMB • 1 ♀; same collection data as for preceding but Jun.–Aug. 1908; ZMB • 1 ♀; same collection data as for preceding; ZMB.

GHANA – **Ashanti Region** • 1 ♀; Tafo; [6°43'53" N, 1°36'49" W]; 26 Oct. 1970; B. Bolton leg.; BMNH. – **Eastern Region** • 1 ♂; Aburi; [5°50'52" N, 0°10'28" W]; 1912–1913; W.H. Patterson leg.; BMNH • 1 ♀; same locality as for preceding; Dec. 1941; K.M. Guichard leg.; BMNH.

GUINEA – **Nzérékoré Region** • 1 ♀; Mt Nimba; [7°36'09" N, 8°28'5.6" W]; alt. 1000 m; 2 Jun. 1942; M. Lamotte leg.; MNHN • 1 ♀; Nion, Mt Nimba; [7°36'09" N, 8°28'5.6" W]; 2 Jun. 1942; M. Lamotte leg.; MNHN.

LIBERIA – **Lofa County** • 1 ♀; 20 mi. [sic.] Voinjama; 13 Aug. 1966; E.S. Ross and K. Lorenzen leg.; CAS.

REPUBLIC OF THE CONGO – **Lékoumou Department** • 1 ♂; Mbouloupambou; [2°32'26.16" S, 13°32'45.96" E]; 11 Feb. 1980; C. Morin leg.; MNHN.

SIERRA LEONE • 1 ♀; A. Mocquerys leg.; IRSN • 1 ♀; W.G. Clements leg.; BMNH. – **Eastern Province** • 1 ♀; Bomaru; [8°00'47" N, 10°37'36" W]; 8 Aug. 1912; J.J. Simpson leg.; BMNH. – **Western Area** • 1 ♀; Freetown; [8°29'04" N, 13°14'04" W]; E.E. Austen leg.; BMNH.

TANZANIA – **Kagera Region** • 6 ♀♀; Bukoba; [1°19'54" S, 31°48'44" E]; 9–11 Jun. 1912; C.C. Gowdey leg.; BMNH.

TOGO – **Centrale Region** • 1 ♀; Bismarckburg [near Yégué]; [8°10'32.74" N, 0°41'09.42" E]; 23–26 Nov. 1892; L. Conradt leg.; ZMB • 1 ♀; same collection data as for preceding but 28 May–12 Jun 1893; ZMB • 1 ♀; same locality as for preceding; R. Büttner leg.; ZMB.

UGANDA • 1 ♂, 1 ♀; Toro, Daro or Durro Forest; 25–29 Oct. 1911; S.A. Neave leg.; BMNH. – **Central Region** • 1 ♂; “Entebbe, Forest within 4 mi. of Kitabi Hill”; 20–25 May 1912; C.A. Wiggins leg.; OUMNH • 1 ♀; same collection data as for preceding but 29 Jun. 1912; OUMNH • 1 ♀; same collection data as for preceding but Sep. 1913; OUMNH • 1 ♀; same collection data as for preceding but Oct. 1913; OUMNH • 1 ♀; Bweya; [0°11'39" N, 32°32'59" E]; 10 May 1913; C.C. Gowdey leg.; BMNH • 1 ♂; Entebbe; [0°03' N, 32°27'36" E]; 22 Feb. 1911; C.C. Gowdey leg.; BMNH • 1 ♀; same collection data as for preceding but 26 Aug. 1911; BMNH • 1 ♂, 4 ♀♀; same collection data as for preceding but 14–25 May 1912; BMNH • 1 ♀; same collection data as for preceding but 30–31 May 1912; BMNH • 1 ♂; same collection data as for preceding but Sep. 1912; BMNH • 1 ♀; same locality as for preceding; 10 Apr. 1912; C.A. Wiggins leg.; OUMNH • 1 ♂; same collection data as for preceding but 11 Apr. 1912; OUMNH • 2 ♀♀; same collection data as for preceding but 26 May 1912; OUMNH • 1 ♀; Mabira; [0°29'03" N, 32°59'05" E]; 15 Sep. 1910; C.C. Gowdey leg.; BMNH • 1 ♂, 2 ♀♀; same collection data as for preceding but 20 Sep. 1910; BMNH • 1 ♂, 1 ♀; Mawakota; [0°30' N, 32°15' E]; Jul. 1928; V.G.L. van Someren leg.; BMNH • 1 ♀; Mpanga Forest, Mpigi; [0°12'33" N, 32°17'44" E]; 25–30 Nov. 2014; W. Mey leg.; ZMB • 3 ♂♂; NW shores of Victoria Nyanza; [0°25' S, 31°40' E]; 12–15 Sep. 1911; S.A. Neave leg.; BMNH • 1 ♀; Tero Forest; [0°50' S, 31°40' E]; Jul. 1912; C.C. Gowdey leg.; BMNH • 1 ♀; Tero Forest, SE of Buddo; [0°50' S, 31°40' E]; 26–30 Sep. 1911; S.A. Neave leg.; BMNH. – **Western Region** • 1 ♀; 20–50 km NEE of Fort Portal; [0°42'29.4" N, 30°35'13.1" E]; 26 Nov. 2001; M. Snižek leg.; THD-023-OOLM; GenBank CO1 gene: MW538563; OÖLM • 5 ♀♀; Unyoro, Budongo Forest; [1°47' N, 31°34' E]; 11–15 Dec. 1911; S.A. Neave leg.; BMNH.

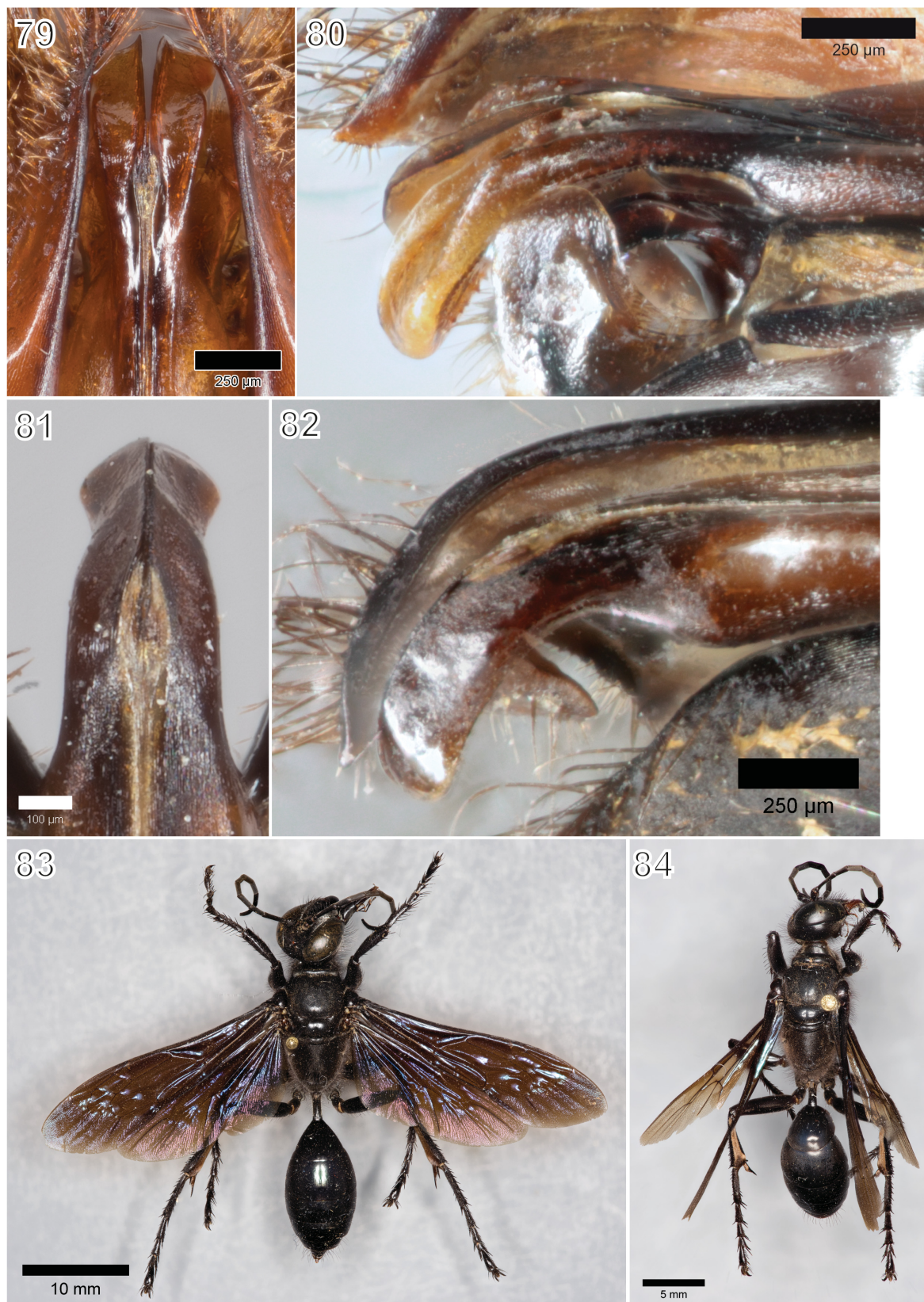
ZAMBIA – **Luapula Province** • 1 ♂; Lake Bangweolo, Chishi Island; [11°04'36" S, 29°51'38" E]; 23–25 Jun. 1908; S.A. Neave leg.; OUMNH.

## Description

### Female

SIZE. 28.1–32.2 mm.

COLOR. Black except for dark ferruginous stripe in center of mandible. Wings fuscous, with violet luster.



**Figs 79–84.** 79–80. Apical third of penis valvae in ♂♂ of *Sphex camerunicus* Strand, 1916. 81–82. Apical third of penis valvae in ♂ of *S. nigrohirtus* Kohl, 1895. 79, 81. Dorsal view. 80, 82. Lateral view. 83. *S. camerunicus*, habitus of ♀. 84. *S. nigrohirtus*, habitus of ♀.



VESTITURE. Appressed setae on clypeus, paraocular area and collar silvery, on scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented posteriorly. Central third of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin with broad, shovel-like process medially, slightly stepped above. Clypeus with notable indentation in lower center and longitudinal carina above. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.9–3.2 × length of antepenultimate spine. Petiole length 1.9–2.3 × its medial width.

#### Male

SIZE. 25.3–30.9 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Wings fuscous, with violet luster.

VESTITURE. Appressed setae on clypeus, paraocular area and collar silvery, on scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black, on paraocular area intermixed with silvery ones. Erect propodeal setae oriented posteriorly. Central third of clypeus glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna III–VI with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae fused, inner margin flattened and dorsally raised in its apical fourth, outer margin more broadly raised. Petiole length 2.0–2.3 × its medial width. Flagellomeres IV–VII with broad placoids covering their entire length.

#### Variation

Unknown.

#### Distribution

Western and central Africa.

#### Remarks

This species and its synonym *S. conradti* were incorrectly synonymized with *S. nigrohirtus* by Arnold (1928, 1951) and Berland (1952). Our study of the types revealed that *S. camerunicus* is actually a valid species. The corresponding male is described here for the first time.

*Sphex incomptus* Gerstaecker, 1871

Figs 85, 91 (red)

*Sphex incomptus* Gerstaecker, 1871: 352, ♂.

*Chlorion nyanzae* R. Turner, 1918: 358, ♀, ♂. Synonymized with *Chlorion incomptum* by Arnold 1928: 368.

#### Differential diagnosis

The members of this species are recognizable through having the majority of the propodeal setae silvery (Fig. 85). Excepting the unmistakable *S. ahasverus*, which possesses rich golden vestiture, the other

females in the *nigrohirtus* group have predominantly black erect propodeal setae (Figs 83–84, 86). Males of *S. pulawskii* sp. nov. have some of the propodeal setae silvery, but are differentiated through their conspicuous purple wing iridescence (Fig. 87).

### Material examined

#### Holotype or syntype

TANZANIA – **Tanga Region** • 1 ♂; Wanga; [5°12' S, 39°04' E]; v. d. Deck leg.; ZMB.

#### Other material

AFRICA • 1 ♀; 26 Mar. 1912; C.A. Wiggins leg.; OUMNH.

ANGOLA • 1 ♀; Welwilsch leg.; BMNH. – **Huíla Province** • 1 ♀; 1886; Campana leg.; MNHN.

CAMEROON – **Southwest Region** • 1 ♀; Malende Mukuya, S of Kumba; [4°21'25" N, 9°25'58" E]; 17 May 2006; J. Oehlke leg.; coll. Jacobs.

DEMOCRATIC REPUBLIC OF THE CONGO • 2 ♀♀; “Sankuru”; 1910; Abrassart leg.; MRAC • 1 ♀; Lomami, Kabwe; Jul.–Aug. 1931; P. Quarré leg.; MRAC. – **Bas-Uele** • 1 ♀; Bambesa; [3°28' N, 25°43' E]; 10 Oct. 1933; J.V. Leroy leg.; MRAC • 1 ♀; Poko; 3°10' N, 26°50' E; Aug. 1913; Lang and Chapin leg.; AMNH. – **Haut-Katanga** • 1 ♀; Moera, primary forest; [11°21'47" S, 26°42'20" E]; 1910; Grauer leg.; NHMW. – **Ituri Province** • 1 ♀; Bunia; [1°34' N, 30°15' E]; 1938; P. Lefèvre leg.; MRAC • 1 ♀; same locality as for preceding; 1 Feb. 1934; J.V. Leroy leg.; MRAC. – **Kasaï** • 1 ♀; Ikeke; [4°19' S, 21°15' E]; 8 May 1946; V. Lagae leg.; MRAC • 1 ♀; Ngombe; [6°35' S, 20°42' E]; 16 Nov. 1921; H. Schouteden leg.; MRAC. – **Kongo Central** • 1 ♀; Mangembo; [4°35'04" S, 14°16'20" E]; 1932; Zwolakowski leg.; MRAC • 1 ♂; Moanda; [5°56' S, 12°21' E]; Nov. 1934; P. Henrard leg.; MRAC. – **Mai-Ndombe Province** • 1 ♀; Tua; [3°38' S, 16°38' E]; 6 Jun. 1913; J. Maes leg.; MRAC. – **Maniema** • 1 ♂, 1 ♀; Lubutu; [0°44' S, 26°35' E]; 22 Jan. 1915; J. Bequaert leg.; MRAC. – **North Kivu** • 1 ♀; Irangi, Luhoha River; [1°50' S, 28°26' E]; 10 Sep. 1957; CAS • 2 ♀♀; Parc National de Virungas, Oycha region; Apr.–May 1950; J. de Wilde leg.; MRAC • 1 ♀; Ukaika; [0°30' N, 29°00' E]; Dec. 1910; Grauer leg.; NHMW. – **Province of Équateur** • 1 ♂; Eala; [0°02'30" N, 18°20'06" E]; 6 Oct. 1931; H.J. Brédo leg.; MRAC • 1 ♂; same collection data as for preceding but 19 Oct. 1931; MRAC • 1 ♀; same collection data as for preceding but Nov. 1931; MRAC • 2 ♂♂; same collection data as for preceding but 22 Nov. 1931; MRAC • 1 ♂; same collection data as for preceding but Mar. 1932; MRAC • 1 ♂; same collection data as for preceding but May 1932; MRAC • 2 ♂♂; same locality as for preceding; Jun. 1932; A. Corbisier leg.; MRAC • 1 ♀; same collection data as for preceding but 7 Jul. 1932; MRAC • 1 ♂; same collection data as for preceding but Nov. 1932; MRAC • 1 ♀; same collection data as for preceding but Dec. 1932; MRAC • 1 ♂; same collection data as for preceding but 14 Mar. 1933; MRAC • 2 ♂♂, 1 ♀; same collection data as for preceding but Apr. 1933; MRAC • 1 ♀; same locality as for preceding; May 1935; J. Ghesquière leg.; MRAC. – **Sankuru** • 1 ♀; Kondue; [4°58' S, 23°16' E]; Leonhard leg.; MRAC. – **Tshopo** • 1 ♀; Stanleyville [now Kisangani]; 0°30' N, 25°10' E; 10 Apr. 1915; Lang and Chapin leg.; AMNH • 1 ♀; Stanleyville [now Kisangani]; 0°30' N, 25°10' E; 11 Apr. 1915; Lang and Chapin leg.; AMNH. – **Tshuapa** • 1 ♀; Bokuma; [0°06' S, 18°41' E]; Jul. 1952; R.P. Lootens leg.; MRAC.

EQUATORIAL GUINEA – **Centro Sur** • 2 ♂♂; Uelleburg; [1°49' N, 10°36' E]; 1–14 Feb. 1907; G. Tessmann leg.; ZMB.

GABON – **Estuaire Province** • 1 ♂; Crystal Mountains, Muni; [0°49'45.6" N, 10°08'5.7" E]; 15–31 Oct. 1969; A. Villiers leg.; MNHN • 1 ♀; Libreville; [0°23'24.36" N, 9°27'15.84" E]; MNHN.

REPUBLIC OF THE CONGO – **Brazzaville Department** • 1 ♀; Djoumouna, Yaka-Yaka; [4°22'34" S, 15°09'36" E]; 3 Feb. 1977; S. Kellner-Pillaut leg.; MNHN. – **Kouilou Department** • 1 ♀; Dimonika; [4°11'55.8" S, 12°21'19.7" E]; Jan. 1964; A. Descarpentries and A. Villiers leg.; MNHN • 1 ♀; same locality as for preceding; 18 May 1977; J.-P. Grillot and C. Morin leg.; MNHN. – **Lékoumou Department** • 1 ♀; Ogooué River; [2°26'40.7" S, 13°41'29.4" E]; 1911; F. Faure leg.; MNHN.

TANZANIA – **Kagera Region** • 1 ♀, paratype of *Chlorion nyanzae* R. Turner, 1918; Bukoba; [1°19'54" S, 31°48'44" E]; 9–11 Jun. 1912; C.C. Gowdey leg.; BMNH. – **Mjini Magharibi Region** • 1 ♂, 1 ♀; Kizimbani; [9°03'42.5" S, 39°19'3.1" E]; 15 Jun. 1985; G.G.M. Schulten leg.; RMNH • 1 ♂; Zanzibar; [6°08' S, 39°20' E]; Hildebrandt leg.; NHMW • 2 ♂♂; same collection data as for preceding; ZMB • 1 ♀; same locality as for preceding; Raffray leg.; NHMW. – **Unguja South Region** • 1 ♂; Zanzibar, Jambiani; [6°19' S, 39°33' E]; 23 Mar. 1993; K.M. Guichard leg.; BMNH • 2 ♂♂; Zanzibar, Mzingani Forest; [6°10' S, 39°18' E]; 28 Mar. 1993; K.M. Guichard leg.; BMNH.

UGANDA – **Central Region** • 1 ♀; “Entebbe, Forest within 4 mi. of Kitabi Hill”; Jan.–Feb. 1913; C.A. Wiggins leg.; OUMNH • 1 ♂; Entebbe; [0°03' N, 32°27'36" E]; Aug. 1911; C.C. Gowdey leg.; BMNH • 1 ♀; same collection data as for preceding but 14–25 May 1912; BMNH • 1 ♀; same collection data as for preceding but 1–4 Jun. 1912; BMNH • 5 ♀♀; same collection data as for preceding but Aug. 1912; BMNH • 1 ♀; same collection data as for preceding but Oct. 1912; BMNH • 1 ♀; same locality as for preceding; 12–20 Jan. 1912; S.A. Neave leg.; BMNH • 1 ♂, holotype of *Chlorion nyanzae* R. Turner, 1918; same collection data as for preceding; BMNH • 1 ♀; Mabira; [0°29'03" N, 32°59'05" E]; 15 Sep. 1910; C.C. Gowdey leg.; BMNH • 1 ♀; Northern Buddu; [0°25' S, 31°40' E]; 16–18 Sep. 1911; S.A. Neave leg.; BMNH • 1 ♂; NW Lake Victoria, Kerenge Island; [0°03'49" N, 33°00'14" E]; 26 Jan. 1919; G.D. Hale Carpenter leg.; OUMNH • 1 ♂; Tero Forest; [0°50' S, 31°40' E]; Jul. 1912; C.C. Gowdey leg.; BMNH • 2 ♂♂; Tero Forest, SE of Buddu; [0°50' S, 31°40' E]; 26–30 Sep. 1911; S.A. Neave leg.; BMNH. – **Western Region** • 1 ♀; Kabarole Kibale Forest National Park, Kanyawara (MUBFS); 0°33' N, 30°21' E; 23 Aug. 1997; C. Häuser leg.; ZMB • 1 ♂; Kichwamba, Ankole; [0°13'08.2" S, 30°05'50.3" E]; 1–5 May 1968; P.J. Spangler leg.; USNM • 1 ♀; near Rwera, SW of Hoima; [1°02'25" S, 30°18'47" E]; 30 Nov. 2001; M. Snižek leg.; OÖLM.

ZIMBABWE – **Mashonaland Central** • 1 ♂; Mavhuradonha Saf., 15 km SE of Muzarabani; [16°33'33" S, 31°14'22.8" E]; 17 Dec. 1998; J. Halada leg.; THD-035-OOLM; GenBank LWR gene: MW582292; OÖLM.

## Description

### Female

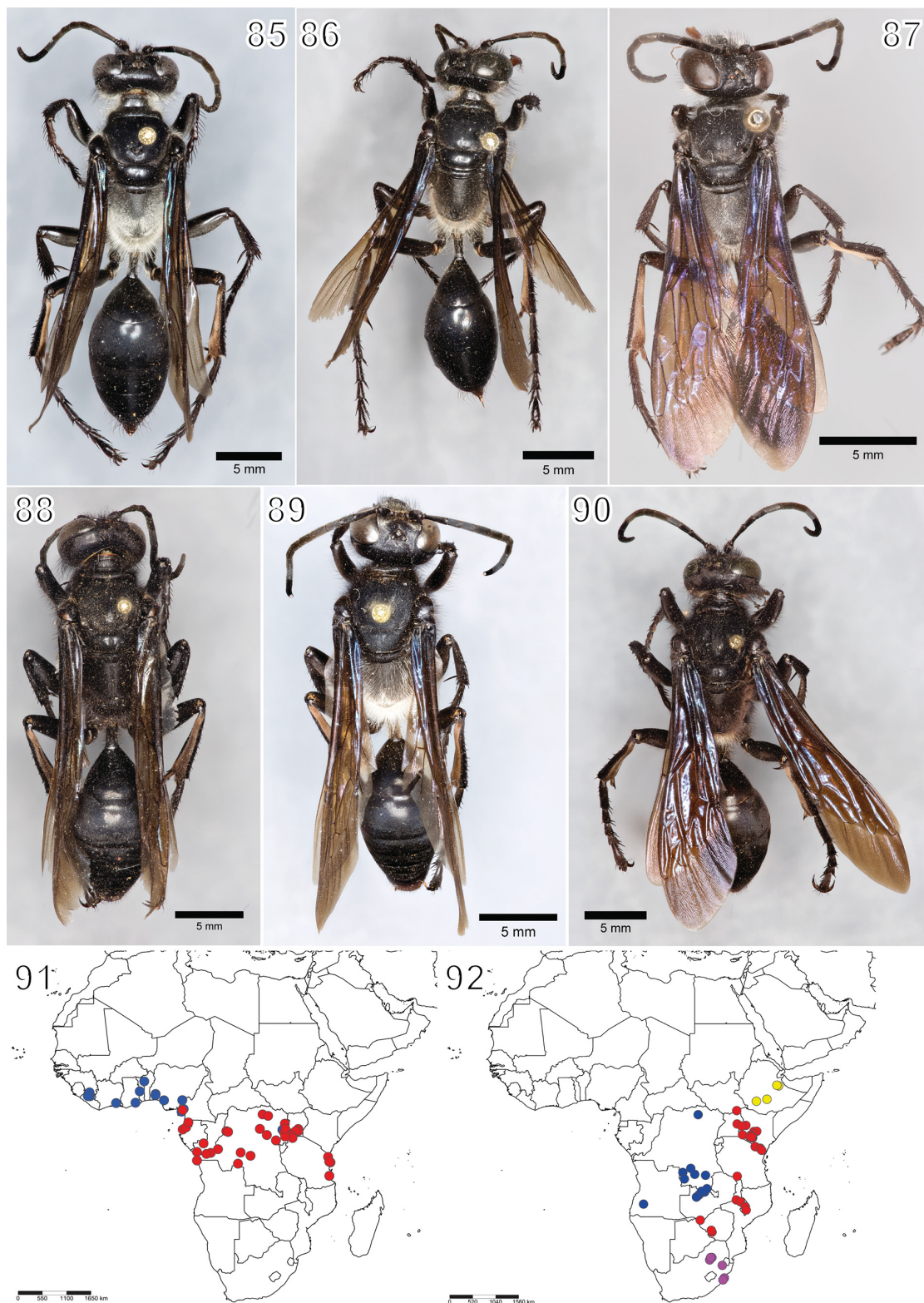
SIZE. 23.7–25.7 mm.

COLOR. Black except for basal half of mandible and free clypeal margin, which are ferruginous.

FOREWING. Slightly fuscous, with violet iridescence. Basal half of hindwing hyaline, apical margin slightly infuscate.

VESTITURE. Appressed setae on clypeus, paraocular area, collar and propodeal enclosure silvery, on scutum laterally silvery, otherwise black. Erect setae on clypeus and paraocular area black, on collar silvery intermixed with black ones, on scutum black intermixed with silvery ones, on propodeal enclosure silvery. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin with broad, shovel-like process medially, not stepped above. Clypeus with slight indentation in lower center and longitudinal carina above. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between



**Figs 85–92.** 85–86. Habitus of ♀. 87–90. habitus of ♂. 85. *Sphex incomptus* Gerstaecker, 1871. 86–87. *S. pulawskii* sp. nov. 88. *S. abbotti abbotti* W. Fox, 1891. 89. *S. abbotti nivarius* subsp. nov. 90. *S. bohemanni* Dahlbom, 1845. 91. Geographic distribution of *S. incomptus* (red) and *S. pulawskii* sp. nov. (blue). 92. Geographic distribution of *S. a. abbotti* (red), *S. a. nivarius* subsp. nov. (blue), *S. abyssinicus* (Arnold, 1928) (yellow) and *S. bohemanni* (purple).

submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I  $2.8\text{--}3.0 \times$  length of antepenultimate spine. Petiole length  $1.7\text{--}2.3 \times$  its medial width.

#### Male

SIZE. 20.5 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Forewing slightly fuscous, with violet iridescence. Basal half of hindwing hyaline, apical margin slightly infusate.

VESTITURE. Appressed setae on clypeus, paraocular area, collar and propodeal enclosure silvery, on scutum laterally silvery, otherwise black. Erect setae on clypeus, paraocular area and scutum black intermixed with silvery ones, on collar silvery intermixed with black ones and on propodeal enclosure silvery. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna II–VI with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII gently notched. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII concavely emarginate. Penis valvae without conspicuous modifications. Petiole length  $2.2\text{--}2.9 \times$  its medial width. Flagellomere V with narrow placoid covering its proximal four-fifths and tapering distally.

#### Variation

Unknown.

#### Distribution

Central to eastern Africa.

#### Remarks

There seems to have been some confusion regarding the differentiation between this taxon and the closely related *S. nigrohirtus*, which we were able to clear up through the study of their types. When Kohl (1895) compared them with each other, he correctly stated that one of the few differences between the males of both species is the color of the clypeal and thoracical setae. In *S. incomptus*, the black erect setae on the clypeus, scutum, scutellum and metanotum are intermixed with silvery ones, while the erect setae on the collar and propodeum are exclusively silvery. In contrast, *S. nigrohirtus* has the erect setae in these areas almost uniformly black. Even though Arnold was apparently aware of this fact and mentioned it in the redescriptions of both species (1928), he nevertheless assigned several specimens with uniformly black vestiture to *S. incomptus* without actually citing any characters to disassociate them from *S. nigrohirtus*. Later, Leclercq (1955) would continue this path with his establishment of the subspecies *S. incomptus anonymus* for specimens with only black pilosity. Our study of the types showed that they are actually members of *S. nigrohirtus*. Subsequently, specimens of *S. nigrohirtus* were prone to be misidentified as belonging to *S. incomptus*, which is evident in the material examined by Dollfuss (2008), where most of the locality records given for *S. incomptus* in reality correspond to *S. nigrohirtus*.

*Sphex nigrohirtus* Kohl, 1895  
Figs 13, 78 (blue), 81–82, 84

*Sphex nigrohirtus* Kohl, 1895: 66, ♂.

*Sphex incomptus anonymus* Leclercq, 1955: 12, ♂. **Syn. nov.**

### Differential diagnosis

Females of this taxon are easily recognizable, as they differ from all others in the group through having the mesosomal setae uniformly black (Fig. 84). Those of *S. camerunicus* (Fig. 83), *S. incomptus* (Fig. 85) and *S. pulawskii* sp. nov. (Fig. 86) have at least the appressed setae posteriorly on the collar and at a spot posterolaterally on the scutum silvery. Males of *S. nigrohirtus* can be more difficult to identify, as not all of them have uniformly black mesosomal setae. Those of *S. camerunicus* are distinguished through their dorsolaterally concave valvices (Figs 79–80) and broad placoids on flagellomeres IV–VII, whereas *S. nigrohirtus* has the valvices dorsolaterally flat or convex (Figs 81–82) and usually only a narrow placoid on flagellomere V. *Sphex incomptus* differs in having predominantly silvery propodeal setae and only slightly infuscate wings. Finally, males of *S. pulawskii* sp. nov. can be differentiated from this species through their conspicuous purple wing iridescence without a cyan tone (Fig. 87), while *S. nigrohirtus* always has cyan iridescence, at least on the basal half of the forewing.

### Material examined

#### Lectotype (designated here)

TANZANIA – **Tanga Region** • ♂; “Usambara and Bondei”; Feb.–Mar. 1880; C.W. Schmidt leg.; ZMB.

#### Paralectotype

TANZANIA • 1 ♂; same collection data as for lectotype; ZMB.

#### Other material

AFRICA • 2 ♂♂, 2 ♀♀; “Afr. or. All. de”; MNHN • 1 ♀; “East Africa”; IRSN • 1 ♂; Cap; MNHN.

DEMOCRATIC REPUBLIC OF THE CONGO – **Haut-Katanga** • 1 ♂; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; Aug. 1949; Ch. Seydel leg.; MRAC • 1 ♂; same collection data as for preceding but 30 Sep. 1949; MRAC • 3 ♀♀; same collection data as for preceding but 24 Jun. 1951; MRAC • 2 ♀♀; same collection data as for preceding but 17 May 1953; MRAC • 1 ♀; same collection data as for preceding but May 1953; MRAC. – **Haut-Lomami** • 1 ♂, holotype of *Sphex incomptus anonymus* Leclercq, 1955; “Upemba National Park, Kankunda (rive dr. Lupiala)”; [8°30' S, 26°30' E]; alt. 1300 m; 13–27 Nov. 1947; G.F. de Witte leg.; MRAC. – **Lualaba** • 1 ♀; Kapanga; [8°21' S, 22°34' E]; May 1933; F.G. Overlaet leg.; MRAC • 1 ♀; Lulua, Kanzenze; [10°31'12" S, 25°12'24" E]; 1932; R.P. Lefebure leg.; MRAC.

ETHIOPIA – **Oromia Region** • 1 ♂; Hawash River, S of Adama; 7 Jun. 1946; K.M. Guichard leg.; BMNH • 1 ♀; near Wachile; 4°32' N, 39°03' E; 30–31 May 2015; J. Halada leg.; OÖLM. – **Southern Nations, Nationalities, and Peoples' Region** • 1 ♂; Dilla; [6°25' N, 38°19' E]; Apr. 1948; K.M. Guichard leg.; BMNH.

KENYA • 3 ♀♀; Mogorr River; May 1913; A.O. Luckman leg.; BMNH. – **Homa Bay County** • 1 ♀; Ungoye, ICIPE Field Station; 0.61325° S, 34.8908° E; 13–27 Apr. 2006; R. Copeland leg.; ICIPE • 1 ♀♀; Ungoye, ICIPE Field Station, inside seasonally swampy forest; 0.61517° S, 34.9200° E; 22 Jun.–6 Jul. 2006; R. Copeland leg.; ICIPE. – **Kajiado County** • 1 ♀; Ngong; [1°21'09" S, 36°40'11" E]; Apr. 1941; V.G.L. van Someren leg.; BMNH. – **Kilifi County** • 1 ♀; Gedi National Park; [3°18'33.84" S, 40°01'1.92" E]; 2–6 Nov. 1972; M. Boulard leg.; MNHN • 1 ♀; Rabai; [3°55'54" N, 39°34'13" E]; Apr. 1928; V.G.L. van Someren leg.; BMNH • 2 ♂♂, 1 ♀; same collection data as for preceding but Nov.–Dec. 1933; BMNH. – **Kirinyaga County** • 1 ♀; Njuki-ini Forest, near Forest station; 0.51660° S, 37.41843° E; 30 Jan.–12 Feb. 2007; R. Copeland leg.; ICIPE. – **Kitui County** • 1 ♀; Kasaala area; 2.7836° S, 38.22517° E; 3–17 May 2016; R. Copeland leg.; ICIPE • 1 ♀; Ngaia Forest, bottom of forest; 0.32442° S, 38.5038° E; 24 Dec. 2011–7 Jan. 2012; R. Copeland leg.; ICIPE. – **Kwale County** • 1 ♂; Kwali Forest, 20 mi. W of Mombasa; [4°00'34" S, 39°18'18" E]; 1 Jun. 1948; M. Steele leg.; BMNH •

1 ♀; Muhaka Forest; 4.32664° S, 39.52462° E; 18 May–1 Jun. 2016; R. Copeland leg.; ICIPE • 1 ♀; Shimba Hills; 4°12.3' S, 39°25.2' E; 27 Jun. 1999; W.J. Pulawski and J.S. Schweikert leg.; CAS • 1 ♂, 1 ♀; same locality as for preceding; 15 Dec. 2003; W.J. Pulawski leg.; CAS. – **Meru County** • 1 ♀; Meru; [0°02'46" N, 37°39'21" E]; Sep. 1927; V.G.L. van Someren leg.; BMNH • 1 ♂; same collection data as for preceding but Jul. 1943; BMNH. – **Muranga County** • 3 ♂♂, 3 ♀♀; E foot and slopes of Aberdare Mts; [0°38'21" S, 36°47'28" E]; 24–27 Feb. 1911; S.A. Neave leg.; BMNH. – **Nyeri County** • 1 ♀; Nyeri; [0°25'12" S, 36°57' E]; M. Steele leg.; BMNH. – **Taita-Taveta County** • 1 ♂; Kasigau; [3°49' S, 38°40' E]; Nov. 1938; V.G.L. van Someren leg.; BMNH • 1 ♀; Mwatate area, below Bura Bluff, riverine forest; 3.48444° S, 38.33251° E; 7–21 Feb. 2012; R. Copeland leg.; ICIPE • 1 ♀; Voi; [3°23'26" S, 38°34'37" E]; 8–10 Feb. 1912; S.A. Neave leg.; BMNH • 3 ♂♂; same locality as for preceding; 16 May 2007; M. Halada leg.; OÖLM • 7 ♂♂; Wundanyi; [3°23'54" S, 38°21'37" E]; 18–22 Mar. 1997; Ma. Halada leg.; OÖLM • 5 ♂♂, 2 ♀♀; Wundanyi; [3°23'54" S, 38°21'37" E]; 5–10 Apr. 1997; Ma. Halada leg.; OÖLM. – **Trans-Nzoia County** • 1 ♀; Mt Elgon E side, Elgon Saw mill; [1°05'19.6" N, 34°45'15.5" E]; 1932–1933; C. Arambourg, P.-A. Chappuis and R. Jeannel leg.; MNHN.

**MALAWI – Central Region** • 1 ♀; 53 mi. N of Blantyre; [14°59'32" S, 34°51'55" E]; 25 Feb. 1958; CAS • 1 ♂; Dedza, 85 km SE of Lilongwe; [14°20' S, 34°20' E]; 5–12 Jan. 2002; J. Halada leg.; OÖLM • 1 ♀; Nkhotakota; [12°56' S, 34°18' E]; 2 Jan. 2002; J. Halada leg.; OÖLM. – **Northern Region** • 1 ♀; Karonga; [9°56' S, 33°56' E]; 7–11 Jul. 1910; S.A. Neave leg.; BMNH. – **Southern Region** • 1 ♀; Btwn. Ft. Mangoche and Chikala Boma; 20–25 Mar. 1910; S.A. Neave leg.; BMNH • 1 ♂; Mlanje; [16°01'53" S, 35°30' E]; 8–9 Feb. 1912; S.A. Neave leg.; BMNH • 1 ♀; same collection data as for preceding but 12 Feb. 1912; BMNH • 1 ♂; same collection data as for preceding but 23 Feb. 1912; BMNH • 1 ♀; same collection data as for preceding but 26 Feb. 1912; BMNH • 1 ♀; same collection data as for preceding but 3 Dec. 1912; BMNH • 1 ♂; same collection data as for preceding but 4 Dec. 1912; BMNH • 1 ♀; same collection data as for preceding but 14 Dec. 1912; BMNH • 2 ♀♀; same collection data as for preceding but 27 Dec. 1912; BMNH • 3 ♂♂; same collection data as for preceding but 6 Jan. 1913; BMNH • 1 ♀; same collection data as for preceding but 7 Jan. 1913; BMNH • 2 ♀♀; same collection data as for preceding but 15 Jan. 1913; BMNH • 1 ♀; same collection data as for preceding but 17 Jan. 1913; BMNH • 1 ♂; same collection data as for preceding but 21 Jan. 1913; BMNH • 1 ♀; same collection data as for preceding but 27 Jan. 1913; BMNH • 1 ♀; same collection data as for preceding but 1 Feb. 1913; BMNH • 1 ♀; same collection data as for preceding but 4 Feb. 1913; BMNH • 2 ♀♀; same collection data as for preceding but 11 Feb. 1913; BMNH • 1 ♀; same collection data as for preceding but 20 Feb. 1913; BMNH • 1 ♂; same collection data as for preceding but 22 Apr. 1913; BMNH • 1 ♂; same collection data as for preceding but 23 Apr. 1913; BMNH • 2 ♀♀; same collection data as for preceding but 5 Sep. 1913; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 7 Nov. 1913; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 6 Dec. 1913; BMNH • 1 ♀; same collection data as for preceding but 21 Dec. 1913; BMNH • 1 ♂; same collection data as for preceding but 10 Feb. 1914; BMNH • 1 ♂; same collection data as for preceding but 16 Feb. 1914; BMNH • 1 ♀; Mlanji Boma; [16°01'53" S, 35°30' E]; 26–30 Apr. and 3–5 May 1910; S.A. Neave leg.; BMNH • 1 ♀; Mt Mlanje; [16°01'53" S, 35°30' E]; 6 Dec. 1912; S.A. Neave leg.; BMNH • 1 ♀; Nantipwili 8 km SE of Limbe; 15°55' S, 35°04' E; 13 Sep. 1985; H. Hensen leg.; RMNH • 2 ♂♂; side of Mt Mlanje; [16°01'53" S, 35°30' E]; 3 Dec. 1913; S.A. Neave leg.; BMNH • 1 ♀; Zomba; [15°23'09" S, 35°19'07" E]; Dec. 1894; BMNH.

**MOZAMBIQUE** • 1 ♂, 1 ♀; valley of Kola River, near E Mt Chipirone; 6 Apr. 1913; S.A. Neave leg.; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 21 Nov. 1913; BMNH. – **Manica Province** • 1 ♂; 30 km NW of Catandica; [17°51'42.2" S, 32°58'18.7" E]; 17–18 Dec. 2003; J. Halada leg.; OÖLM • 1 ♀; Zambezi, near Tambara, Cangare Lake; [16°57'36.67" S, 34°05'2.23" E]; 3 May 1929; P. Lesne leg.; MNHN. – **Sofala Province** • 1 ♀; near Beira, Manga; [19°50' S, 34°51' E]; 27 Jul. 1929; P. Lesne leg.;

MNHN • 1 ♂; Salone; [18°10' S, 35°47' E]; 25 Oct. 1957; AMG • 1 ♂; Zambesi, Caia; [17°49'13" S, 35°20'39" E]; 18 Apr. 1912; H. Swale leg.; BMNH.

NAMIBIA – **Otjozondjupa Region** • 2 ♂♂; Waterberg; 20°30' S, 17°14' E; 19 Dec. 1993; W. Mey leg.; ZMB.

SOUTH AFRICA – **Eastern Cape** • 1 ♂; 60 km W of Grahamstown; 33°19' S, 25°57' E; 6 Jan. 2010; J. Halada leg.; OÖLM • 1 ♂; Alexandria Forest; [33°43' S, 26°22' E]; 15 Mar. 1981; D.W. and R.W. Gess leg.; AMG • 1 ♀; Algoa Bay; [33°50' S, 25°50' E]; 18 Feb. 1896; H. Brauns leg.; TMP • 1 ♂; same collection data as for preceding but 23 Feb. 1896; TMP • 1 ♂; same collection data as for preceding; BMNH • 1 ♂; Cannonvale; 33°40' S, 25°47' E; 18 Dec. 1987; A.J. Weaving leg.; AMG • 1 ♂; East London; [32°59' S, 27°52' E]; H. Brauns leg.; TMP • 1 ♂; East London, Queen's Park; [33°00'55" S, 27°54'41" E]; 21 Mar. 1914; G.B. Longstaff leg.; OUMNH • 1 ♀; Grahamstown, Belmont Valley; [33°19' S, 26°38' E]; 23 Jan. 1970; F.W. Gess leg.; AMG • 1 ♂; Grahamstown, Hilton; [33°15' S, 26°20' E]; 6 Jan. 1983; D.W. Gess leg.; AMG • 1 ♂; Pondoland, Port St Johns; [31°37'22" S, 29°32'41" E]; Nov. 1923; R.E. Turner leg.; BMNH • 2 ♂♂; same collection data as for preceding but 6–25 Feb. 1924; BMNH. – **KwaZulu-Natal** • 1 ♀; Durban; [29°53' S, 31°03' E]; BMNH • 1 ♂; Durban, Congella; [29°53' S, 31°03' E]; 9 Nov. 1904; G.F. Leigh leg.; OUMNH • 1 ♂; False Bay; 27°58' S, 32°23' E; 9–11 Mar. 1990; A.J. Weaving leg.; AMG • 1 ♂; Ithala Game Res., Savannah; 27°30' S, 31°20' E; 4–10 Apr. 2001; F. Koch leg.; ZMB • 1 ♂; Kosi Bay Camp; [27°00'18.2" S, 32°51'31.2" E]; 27 Jan. 2003; M. Snižek leg.; OÖLM • 3 ♂♂; Kosi Bay Nature Reserve; 26°58' S, 32°50' E; 19 Apr. 1999; F. Koch leg.; ZMB • 1 ♀; Lake St Lucia, Fanies Island; 28°06' S, 32°26' E; 21–25 Feb. 1987; A.J. Weaving leg.; AMG • 2 ♂♂; Maputaland, SW of Manguzi; [27°00'48.5" S, 32°43'24.1" E]; 29 Jan. 2003; M. Snižek leg.; OÖLM • 2 ♂♂; Ndumu Game Reserve; 26°53' S, 32°18' E; 5 Oct. 1982; J.G.H. Londt leg.; AMG • 1 ♀; Pongola; [27°22'41" S, 31°37'08" E]; 10 Apr. 1951; H.W. Bedford leg.; BMNH • 1 ♀; Sodwana Bay National Park; 27°37' S, 32°41' E; 1 Feb. 1994; F. Koch leg.; ZMB • 1 ♂; same collection data as for preceding but 7–10 Apr. 2001; ZMB • 1 ♀; St Michaels; 30°49'121" S, 30°24'119" E [sic]; 14 Jan. 1953; E. Mc.C. Callan leg.; AMG • 3 ♂♂; St. Lucia Park (Charter's Creek); 28°12' S, 32°25' E; 7 Feb. 1995; F. Koch leg.; ZMB • 1 ♂; near Tembe Elephant Park (Jozini); [27°25'48" S, 32°04'1.2" E]; 22 Jan. 2003; V. Krivan leg.; OÖLM • 1 ♂; Umlalazi River near Mtunzini; 28°56' S, 31°15' E; 2 Oct. 1982; J.G.H. Londt leg.; AMG. – **Limpopo** • 1 ♂; N of Nylstroom [now Modimolle]; 24°40' S, 28°30' E; 14 Jan. 2008; M. Halada leg.; THD-013-OOLM; GenBank CO1 gene: MW538567; GenBank LWR gene: MW582293; OÖLM • 6 ♂♂, 2 ♀♀; same collection data as for preceding; OÖLM • 1 ♂; Thabazimbi, 40 km S of Koedoeskop; [24°35'29" N, 27°24'41" E]; 1–5 Mar. 1999; J. and R. Oehlke leg.; coll. Jacobs. – **Mpumalanga** • 1 ♂; Nwaswitshaka Camp, Kruger National Park; [24°59'45" S, 31°35'31" E]; 21 Dec. 1994; C.L. Bellamy leg.; AMNH. – **Western Cape** • 2 ♀♀; George, 8 mi. E of Silver Kloof; [33°57'46" S, 22°27'42" E]; 28 Feb. 1914; G.B. Longstaff leg.; OUMNH • 1 ♀; Knysna, 14 mi. from road to George, Homtini Kloof; [34°02'10" S, 23°02'49" E]; 24 Feb. 1914; G.B. Longstaff leg.; OUMNH.

TANZANIA • 1 ♀; “East Africa”; F. Stuhlmann leg.; ZMB • 1 ♀; “German East Africa”; E. Fischer leg.; ZMB • 1 ♀; Lake Rukwa, E of Ukimbu; 25–27 Aug. 1899; Glauning leg.; ZMB. – **Arusha Region** • 4 ♀♀; 5 mi. S of Momela Lodge; [3°18'10" S, 36°51'51" E]; 9 Jan. 1970; M.E. Irwin and E.S. Ross leg.; CAS • 1 ♀; Momela, Mt Meru; 3°15' S, 36°51' E; 12–13 Jan. 1972; C.F. Huggins leg.; BMNH • 1 ♀; Momella Lakes, Mount Meru; [3°18'10" S, 36°51'51" E]; 20–31 Jan. 1964; W. Forster leg.; CAS • 1 ♂; Mto wa Mbu, Lake Manyara National Park; [3°21' S, 35°51' E]; 27 Nov. 1969; M.E. Irwin and E.S. Ross leg.; CAS. – **Dar es Salaam Region** • 1 ♀; Dar es Salaam; [6°48' S, 39°17' E]; Aug.–Sep. 1902; Meinhof leg.; ZMB. – **Kilimanjaro Region** • 1 ♀, paralectotype of *Sphex kilimandjaroensis* Cameron, 1908; Kilimanjaro, Kibonoto; [3°05'5.9" S, 37°20'38.5" E]; alt. 1300–1900 m; 11 May 1905; Y. Sjöstedt leg.; BMNH • 1 ♂; same collection data as for preceding but 3 May; NRS • 1 ♂; Kihuro [now Kihurio]; [4°27'53.5" S, 38°04'28.4" E]; 15 Jan. 1906; Schröder leg.; ZMB. – **Mbeya Region** •



1 ♀; Langenburg [now Tukuyu]; [9°15' S, 33°39' E]; 26 Jul.–8 Aug. 1898; F. Fülleborn leg.; ZMB • 2 ♀♀; same collection data as for preceding but 9–19 Aug. 1898; ZMB • 1 ♀; Manow; [9°15' S, 33°48' E]; MNHN. – **Mjini Magharibi Region** • 1 ♂; Zanzibar; [6°08' S, 39°20' E]; ZMB. – **Mwanzi Region** • 1 ♂, 1 ♀; Ukerewe Island; [2°01'45.48" S, 33°00'35.27" E]; A. Conrads leg.; ZMB. – **Pwani Region** • 1 ♀; 15 km W of Kibiti; 7°47' S, 38°49' E; 15 Jan. 2007; J. Halada leg.; OÖLM. – **Tanga Region** • 1 ♀; Gierra leg.; MNHN • 1 ♀; Amani Research Institute; [5°05' S, 38°40' E]; Nov. 1905; C. Schröder leg.; ZMB • 1 ♀; same locality as for preceding; Feb. 1908; J. Vosseler leg.; ZMB • 1 ♀; same collection data as for preceding but 20 Feb. 1908; ZMB • 1 ♂; Usambara, Nguela (Ngwelo); [5°04'59" S, 38°45'59.5" E]; Rolle leg.; ZMB.

UGANDA – **Western Region** • 1 ♂; Semliki Plains, near S shore of Lake Albert; [0°59'17" N, 30°30'09" E]; alt. 2200 ft; 25–27 Nov. 1911; S.A. Neave leg.; BMNH.

ZAMBIA – **Central Province** • 2 ♂♂, 6 ♀♀; 70 km NE of Kapiri Mposhi; 13°41' S, 29°18' E; 21 Nov. 2005; M. Halada leg.; OÖLM • 3 ♂♂, 3 ♀♀; same locality as for preceding; [13°41' S, 29°18' E]; 21 Nov. 2005; M. Snižek leg.; OÖLM • 1 ♀; “Mid. Luangwa Valley”; alt. 1700 ft; 28 Feb. 1908; S.A. Neave leg.; OUMNH. – **Eastern Province** • 1 ♀; “Up. Luangwa Valley”; alt. 1800–2000 ft; 17 Mar. 1908; S.A. Neave leg.; OUMNH. – **Muchinga Province** • 2 ♀♀; “L. Chambezi V., Mpika distr.”; alt. 3900 ft; 18 May 1908; S.A. Neave leg.; OUMNH • 1 ♀; “Mid. Chambezi Valley, Chinsali distr.”; alt. 4000 ft; 28 Apr. 1908; S.A. Neave leg.; OUMNH. – **Northern Province** • 1 ♀; “High Plateau S Lake Tanganyika (dense forest)”; alt. 4500 ft; 24–25 Aug. 1908; S.A. Neave leg.; OUMNH • 1 ♀; “L. Chambezi V., Kasama distr.”; alt. 3900 ft; 12–13 May 1908; S.A. Neave leg.; OUMNH • 1 ♂, paratype of *Sphex incomptus anonymus* Leclercq, 1955; Abercorn [now Mbala]; [8°50' S, 31°28' E]; Feb. 1943; IRSN • 1 ♀; same collection data as for preceding but Oct. 1943; IRSN • 1 ♀; E shore of Lake Bangweolo; alt. 3800 ft; 25 May 1908; S.A. Neave leg.; OUMNH. – **North-Western Province** • 1 ♀; 150 km S of Mwinilunga; 13°11' S, 24°14' E; 18 Oct. 2008; M. Halada leg.; OÖLM. – **Southern Province** • 1 ♀; Victoria Falls; [17°51' S, 25°52' E]; 11 Nov. 1967; E.S. Ross and A.R. Stephen leg.; CAS.

ZIMBABWE – **Manicaland** • 1 ♀; Mt Chirinda, Melsetter [now Chimanimani District]; [20°24'36" S, 32°40'08" E]; 6 Oct. 1905; G. Marshall leg.; OUMNH • 1 ♀; Mt Selinda; [20°25'23.3" S, 32°42'25.3" E]; 24 Jan. 1998; Ma. Halada leg.; OÖLM • 1 ♀; Umtali [now Mutare]; [18°58' S, 32°38' E]; 4 Apr. 1931; P.A. Sheppard leg.; TMP. – **Mashonaland Central** • 6 ♂♂; Mavhuradonha Saf., 15 km SE of Muzarabani; [16°33'33" S, 31°14'22.8" E]; 17 Dec. 1998; J. Halada leg.; OÖLM. – **Mashonaland West** • 2 ♂♂; Kwekwe, Ngezi Recreational Park; [18°41'12.2" S, 30°24'2.2" E]; 1 Dec. 1998; J. Halada leg.; OÖLM • 1 ♀; Lomagundi [now Makonde District]; [16°37'44" S, 30°08'25" E]; 1 Mar. 1938; R.H.R. Stevenson leg.; RMNH. – **Masvingo Province** • 1 ♂; Mushandike National Park, Masvingo; [20°03'45" S, 30°49'25" E]; 10 Dec. 1998; J. Halada leg.; OÖLM. – **Matabeleland South** • 1 ♀; near Nalatale Ruins, 70 km SW of Gweru; [19°52'57.5" S, 29°31'30.7" E]; Dec. 2011; J. Halada leg.; OÖLM.

## Description

### Female

SIZE. 22.5–27.9 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, free clypeal margin and apical segment of metasoma. Forewing fuscous, with cyan-violet iridescence, hindwing slightly fuscous.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented posteriorly. Clypeus medially with broad vertical glabrous stripe. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin with broad, gently notched, shovel-like process medially, not markedly stepped above. Clypeus with notable indentation in lower center and longitudinal carina above. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I  $2.5\text{--}3.2 \times$  length of antepenultimate spine. Petiole length  $1.4\text{--}2.1 \times$  its medial width.

#### Male

SIZE. 15.2–24.1 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Forewing fuscous, with cyan-violet iridescence, hindwing slightly fuscous.

VESTITURE. Appressed setae on clypeus, paraocular area, collar, posterolaterally on scutum and posteriorly of propodeal enclosure silvery, black on remainder of scutum and propodeal enclosure. Erect setae on clypeus, collar, scutum and propodeal enclosure black, uniformly black or intermixed with silvery ones on paraocular area and at posterior propodeal margin. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna II–VII with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin simple. Clypeus with notable carina in upper center. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII gently notched. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII concavely emarginate. Penis valvae without conspicuous modifications. Petiole length  $2.6\text{--}2.8 \times$  its medial width. Flagellomere V with narrow placoid covering its proximal four-fifths, and tapering medially or distally.

#### Variation

In males, the color of the appressed setae posterolaterally on the collar, scutum and propodeum as well as the erect setae at the posterior propodeal margin varies between silvery and black.

#### Distribution

Eastern to southeastern Africa.

#### Remarks

As mentioned above in the Remarks on *S. incomptus*, the subspecies proposed by Leclercq in 1955, *S. incomptus anonymus*, is actually a synonym of *S. nigrohirtus*, which resulted from confusing statements by Arnold (1928).

#### *Sphex pulawskii* sp. nov.

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Figs 86–87, 91 (blue)

#### Differential diagnosis

Within the *nigrohirtus* group, females of *S. pulawskii* sp. nov. can be recognized through their silvery appressed setae posterolaterally on the collar and silvery appressed and erect setae at the posterior propodeal margin, in combination with the remaining erect propodeal setae being black (Fig. 86). Those of *S. incomptus* have most of the propodeum covered with silvery setae (Fig. 85), whereas female *S. nigrohirtus* have uniformly black mesosomal setae (Fig. 84).

Males can be more difficult to identify, as some specimens of *S. nigrohirtus* share the combination of erect propodeal setae that are black on the enclosure and silvery at the posterior margin. The easiest characteristic to distinguish them is the absence of cyan iridescence on the wings of *S. pulawskii* sp. nov., being rich purple instead (Fig. 87).

### Etymology

We dedicate this species to Dr Wojciech J. Pulawski, who collected some of the specimens and who is responsible for creating and maintaining the amazing Catalog of Sphecidae that has made our work much more manageable.

### Material examined

#### Holotype

BENIN – **Atakora Department** • ♂; Niaro; [10°12'02.2" N, 1°36'59.9" E]; 2 Jul. 1969; J. Hamon leg.; MNHN.

#### Paratypes

AFRICA • 1 ♀; 2 Feb. 1894; ZMB.

CAMEROON – **Southwest Region** • 1 ♀; Victoria [now Limbe]; [4°01' N, 9°13' E]; P. Preuss leg.; ZMB • 1 ♀; 12 mi. SW of Loum, Mungo Forest Camp; [4°34'05" N, 9°38'09" E]; 22 Oct. 1966; E.S. Ross and K. Lorenzen leg.; CAS.

DEMOCRATIC REPUBLIC OF THE CONGO – **North Kivu** • 1 ♀; Mutsora; [0°19'20" N, 29°44'43" E]; 22 Apr. 1905; Hackars leg.; MRAC.

GHANA – **Eastern Region** • 2 ♀♀; Aburi; [5°50'52" N, 0°10'28" W]; Dec. 1941; K.M. Guichard leg.; BMNH.

LIBERIA – **Bong County** • 1 ♀; 10 mi. NE of Gbanga [Gbarnga]; [7°09'30" N, 9°27'07" W]; 11 Aug. 1966; E.S. Ross and K. Lorenzen leg.; CAS. – **Gbarpolu County** • 1 ♀; Kolobanu [Kolobani]; [7°12'07" N, 9°52'38" W]; 19 Oct. 1926; J. Bequaert leg.; MRAC. – **Lofa County** • 1 ♀; 36 mi. S of Voinjama; [7°56'44" N, 9°32'10" W]; 13 Aug. 1966; E.S. Ross and K. Lorenzen leg.; CAS.

NIGERIA – **Cross River State** • 1 ♀; Obudu Cattle Ranch; [6°22' N, 9°22' E]; 3 May 1973; J.T. Medler leg.; BMNH. – **Edo State** • 1 ♂; Benin; [6°20'17" N, 5°37'32" E]; 30 Jul. 195?; T. Davey leg.; BMNH. – **Oyo State** • 1 ♀; 10 mi. N of Ibadan; [7°37'15" N, 3°55'08" E]; 9 Sep. 1966; E.S. Ross and K. Lorenzen leg.; CAS • 1 ♂; Olekemeji, Ibadan; [7°23' N, 3°53' E]; J.C. Bridwell leg.; USNM.

REPUBLIC OF CÔTE D'IVOIRE • 1 ♀; "Samplen"; 1910; A. Chevalier leg.; MNHN. – **Lagunes District** • 1 ♀; 40 km NW of Abidjan; [5°46'27" N, 4°07'34" W]; 6 Jan. 1991; W.J. Pulawski leg.; CAS.

SIERRA LEONE • 1 ♀; MNHN.

TOGO – **Centrale Region** • 1 ♀; Bismarckburg [near Yégué]; [8°10'32.74" N, 0°41'09.42" E]; 20 Jul.–20 Sep. 1890; R. Büttner leg.; ZMB • 1 ♀; same collection data as for preceding; ZMB.

### Description

#### Female

SIZE. 20.8–26.9 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible and free clypeal margin. Wings fuscous, with purple iridescence.

**VESTITURE.** Appressed setae on clypeus, paraocular area, collar, posterolaterally on scutum and at posterior propodeal margin silvery, on remainder of scutum and propodeal enclosure black. Erect setae on clypeus, frons, collar, scutum and propodeal enclosure black, on posterior margin of propodeum silvery. Central third of clypeus glabrous. Scutellum densely and coarsely pubescent.

**STRUCTURE.** Free clypeal margin with broad, gently notched, shovel-like process medially, not markedly stepped above. Clypeus with notable indentation in lower center and longitudinal carina above. Scutellum convex. Metanotum not raised, not markedly bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I  $2.8\text{--}2.9 \times$  length of antepenultimate spine. Petiole length  $1.8\text{--}2.2 \times$  its medial width.

### **Male**

**SIZE.** 20.6–21.7 mm.

**COLOR.** Black except for ferruginous stripe in center of mandible. Wings slightly fuscous, with markedly purple iridescence.

**VESTITURE.** Appressed setae on clypeus, paraocular area, collar and posterior margin of propodeum silvery, on scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar and scutum black, on propodeal enclosure silvery intermixed with black, on posterior margin of propodeum silvery. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna II–VI with increasingly dense fringes of black setae.

**STRUCTURE.** Free clypeal margin simple. Clypeus with longitudinal carina in upper center. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII slightly notched. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII concavely emarginate. Penis valvae without conspicuous modifications. Petiole length  $2.2\text{--}2.7 \times$  its medial width. Flagellomere V with narrow placoid covering its proximal four-fifths and tapering medially or distally.

### **Variation**

Unknown.

### **Distribution**

Western Africa.

### **Remarks**

After careful consideration, we came to the conclusion that while the distinguishing characters of this species are very subtle, its classification as a separate taxon is warranted nonetheless, the reasons for which are explained below.

Our studies show that the similar *S. nigrohirtus* is restricted to the southern and eastern parts of the African continent. However, *S. pulawskii* sp. nov. is found in western Africa, and it is characterized by having the appressed and erect setae on the propodeum, posterolaterally of the enclosure, colored silvery instead of black. Additionally, western females also have the appressed setae silvery posteriorly on the collar and posterolaterally on the scutum, whereas those from eastern and southern Africa have them black.

Males, however, are not so easy to define. The color of the appressed setae posterolaterally on collar, scutum and propodeum and the erect setae on the posterior propodeal margin varies between black and

silvery in *S. nigrohirtus* even among specimens from the same locality. There is one character that, although difficult to objectively define, is obvious in western African males: the iridescence on the wings. In these, it is uniformly purple, resembling the color Byzantium, whereas the tone is more akin to Spanish violet and always contains shades of cyan in *S. nigrohirtus*.

### Species of the *bohemanni* group

The *bohemanni* group contains the following six species and three subspecies: *Sphex abbotti*, *S. abbotti nivarius* subsp. nov., *S. abyssinicus*, *S. bohemanni*, *S. pseudopraedator* sp. nov., *S. schoutedeni*, *S. schoutedeni malawicus* subsp. nov., *S. stadelmanni* and *S. stadelmanni rufus* subsp. nov.

Members are characterized by posteriorly-oriented erect propodeal setae (Fig. 1), which they share with the species of the *nigrohirtus* group. The most prominent attributes that separate them are found on the female clypeus. In the *bohemanni* group, its appressed setae are brown or black (with a golden or brassy luster in some species, but not extending all the way to the clypeal center) (Figs 14–18), and the clypeus itself has an inconspicuous indentation at most and lacks a notable longitudinal carina. In contrast, females of the *nigrohirtus* group have entirely silvery appressed setae on the clypeus, a marked indentation in the lower center and a short but notable longitudinal carina in the upper center (Fig. 13); or their entire clypeus and paraocular area is covered densely with appressed rich golden setae in the case of *S. ahasverus*. Male specimens of the *nigrohirtus* group can be recognized through their smaller size and slender stature, as well as the more or less concavely emarginate posterior margin of sternum VIII, whereas males of the *bohemanni* group are built more stoutly and have the posterior half of sternum VIII usually entire and often shaped like a semicircle (Fig. 20). Notably, all male members of this group, except *S. pseudopraedator* sp. nov., are distinguishable to species level (but not to subspecies level) through a combination of the structure of sternum VII (Figs 19–20) and the genitalia, more specifically that of the pensivalvae (Figs 21–26). In the other groups, these have no easily discernible differences in the majority of members.

With the exception of *S. pseudopraedator* sp. nov., males of this group also have an extremely short (in the case of *S. abyssinicus* longer and acute), but very broad process emerging medially from the inner side of the free clypeal margin. *Sphex ahasverus* of the *nigrohirtus* group also possesses this feature. It is often very inconspicuous and not to be confused with the distinctly visible, less broad, tooth-like process present in males of the *umtalicus* group (Fig. 27).

#### *Sphex abbotti abbotti* W. Fox, 1891

Figs 15, 20, 88, 92 (red)

*Sphex abbotti* W. Fox, 1891: 42, ♀ (as *Abbotii*, incorrect original capitalization and spelling).

*Sphex kilimandjaroensis* Cameron, 1908: 262, ♂, ♀. **Syn. nov.**

*Chlorion neavei* Arnold, 1928: 370, ♂, ♀. **Syn. nov.**

#### Differential diagnosis

The males of this species possess a very recognizable feature, which is the markedly notched posterior margin of sternum VII (Fig. 20), a characteristic that they only share with *S. bohemanni* (Fig. 19) among species with uniformly black propodeal setae. Both can easily be distinguished by the fact that the notch is only about half as deep as the visible length of sternum VII in *S. bohemanni*, whereas it is significantly deeper in *S. abbotti* s. lat., so that the posteromedian part of sternum VII is almost or entirely covered by sternum VI. While *S. abbotti nivarius* subsp. nov. is identical to *S. abbotti abbotti* in these regards, the subspecies can be delimited based on having silvery erect propodeal setae (Fig. 89).

Female specimens look very similar to those of *S. stadelmanni stadelmanni*, as both have uniformly black appressed clypeal and paraocular setae. However, the mandibles and free clypeal margin of *S. stadelmanni stadelmanni* are to a significant extent ferruginously-colored (Fig. 16), whereas they are nearly completely black in *S. abbotti abbotti* (Fig. 15). Furthermore, *S. stadelmanni stadelmanni* is known only from eastern South Africa and southwestern Mozambique (Fig. 99 [yellow]), while *S. abbotti abbotti* is found predominantly in east Africa (Fig. 92 [red]). Females of other species in the *bohemanni* group are characterized by a differently-colored luster of their appressed clypeal and paraocular setae (Figs 14, 17–18).

## Material examined

### Holotype

TANZANIA – Kilimanjaro Region • ♀; Kilimanjaro; L. Abbott leg.; ANSP.

### Other material

AFRICA • 2 ♂♂, 1 ♀; “Nyassa”; MNHN.

KENYA • 2 ♂♂; near Cherangani Hills, 40 mi. E of Mt Elgon; [1°15'05" N, 35°26'33" E]; alt. 6200 ft; 15 Oct. 1924; C.R.S. Pitman leg.; BMNH. – **Kiambu County** • 2 ♂♂; 42 km NW of Nairobi; 1°4.6' S, 36°36.1' E; 3 Jun. 1949; W.J. Pulawski and J.S. Schweikert leg.; CAS • 1 ♂, 1 ♀; Kikuyu; 25 Feb. 1902; F. Thomas leg.; ZMB • 1 ♂, 2 ♀♀; Kikuyu; 19 Apr. 1902; F. Thomas leg.; ZMB • 2 ♀♀; Kikuyu, Kijabe; [0°56'42" S, 36°35'42" E]; Feb. 1912; Ch. Alluaud and Jeannel leg.; MNHN. – **Kisii County** • ♂; Kisii District, S of Kavirondo; [0°40' S, 34°45' E]; 9–12 May 1911; BMNH. – **Laikipia County** • 2 ♀♀; Nanyuki; [0°00'22" N, 37°04'26" E]; Jun. 1948; V.G.L. van Someren leg.; BMNH. – **Meru County** • 1 ♂; Meru; [0°02'46" N, 37°39'21" E]; Jul. 1943; V.G.L. van Someren leg.; BMNH. – **Nairobi County** • 1 ♂; Karen; [1°19'11.28" S, 36°41'55.68" E]; 17 Nov. 1969; M.E. Irwin and E.S. Ross leg.; CAS • 1 ♂; Karura; [1°13'33" S, 36°46'53" E]; 11 Jun. 1920; BMNH • 1 ♂; Muthaiga Road, Nairobi; [1°15'17.8" S, 36°49'54.3" E]; 4 Apr. 2007; M. Halada leg.; OÖLM • 1 ♀; Nairobi; [1°17' S, 36°49' E]; Nov. 1925; G. Babault leg.; MNHN • 1 ♂, 1 ♀; same locality as for preceding; Dec. 1909; Ch. Alluaud leg.; MNHN • 1 ♂; same locality as for preceding; F.J. Jackson leg.; BMNH. – **Nakuru County** • 1 ♂; Naivasha; [0°43' S, 36°26' E]; Sep. 1906; Maurice de Rothschild leg.; MNHN. – **Narok County** • 1 ♀; Ngare Narok, Masai Reserve; [1°02'40" S, 36°09'47" E]; 21 Dec. 1913; A.O. Luckman leg.; BMNH. – **Nyeri County** • 1 ♀; Nyeri; [0°25'12" S, 36°57' E]; Dec. 1948; V.G.L. van Someren leg.; BMNH. – **Taita-Taveta County** • 1 ♀; Chawia Forest; 3.47908° S, 38.34162° E; 26 Dec. 2011–9 Jan. 2012; R. Copeland leg.; ICIPE • 1 ♂; Kasigau; [3°49' S, 38°40' E]; Nov. 1938; BMNH • 1 ♂; Mt Kasigau, indigenous forest; 3.82700° S, 38.64875° E; 16–30 Nov. 2011; R. Copeland leg.; THD-032-ICIPE; GenBank CO1 gene: MW538552; GenBank LWR gene: MW582289; ICIPE • 1 ♂; Mt Mbololo; 5 May 1979; R. Murphy leg.; BMNH • 1 ♂; same locality as for preceding; Oct. 1938; V.G.L. van Someren leg.; BMNH • 1 ♂, 1 ♀; Wundanyi; [3°23'54" S, 38°21'37" E]; 24 Nov. 1997; M. Snižek leg.; OÖLM • 1 ♂, 2 ♀♀; same locality as for preceding; 18–22 Mar. 1997; Ma. Halada leg.; OÖLM • 2 ♂♂, 1 ♀; same collection data as for preceding but 5–10 Apr. 1997; OÖLM • 2 ♂♂; same locality as for preceding; 19–21 Nov. 1996; Mi. Halada leg.; OÖLM.

MALAWI – **Central Region** • 1 ♂, 1 ♀; 100 km S of Kasungu; [13°57'37.2" S, 33°28'16.5" E]; 29 Dec. 2001; J. Halada leg.; OÖLM • 2 ♀♀; Dedza, 85 km SE of Lilongwe; [14°20' S, 34°20' E]; 5–12 Jan. 2002; J. Halada leg.; OÖLM. – **Southern Region** • 1 ♂; Chingwe's Hole; [15°19'40" S, 35°16'41" E]; 2 Nov. 1970; Schulter leg.; AMG • 1 ♀; Mlanje; [16°01'53" S, 35°30' E]; 15 Jan. 1913; S.A. Neave leg.; BMNH • 1 ♂; same collection data as for preceding but 17 Jan. 1913; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 22 Jan. 1913; BMNH • 1 ♂, holotype or syntype of *Chlorion neavei* Arnold, 1928; same collection data as for preceding but 14 Mar. 1913; BMNH • 1 ♂; same collection data as for preceding but 29 Dec. 1913; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 2 Jan. 1914;

BMNH • 1 ♂; Queen's View; [15°20'59" S, 35°19'45.3" E]; 26 Jan. 1975; G.G.M. Schulten leg.; RMNH • 1 ♂; side of Mt Mlanje; [16°01'53" S, 35°30' E]; 11 Dec. 1913; S.A. Neave leg.; BMNH • 1 ♂; Zomba; [15°23'09" S, 35°19'07" E]; Nov. 1913; H.S. Stannus leg.; BMNH • 1 ♂; same collection data as for preceding but Jan. 1914; BMNH.

SOUTH SUDAN – **Equatoria Region** • 2 ♂♂; Didinga District, Nagichot; [4°16'15" N, 33°34'02" E]; alt. 6700 ft; Dec. 1925–Jan. 1926; G.D.H. Carpenter leg.; BMNH.

TANZANIA – **Arusha Region** • 1 ♂; Ngarenanyuki, Meru lowland; Jan.; Y. Sjöstedt leg.; NRS. – **Kilimanjaro Region** • 1 ♀; Kilimanjaro; W.L. Abbott leg.; USNM • 1 ♂, lectotype of *Sphex kilimandjaroensis* Cameron, 1908 (designated here); Kilimanjaro; 30 Oct. [1905?]; Y. Sjöstedt leg.; NRS • 1 ♀; Kilimanjaro, Kibonoto; [3°05'5.9" S, 37°20'38.5" E]; alt. 1000–1800 m; 29 Apr. 1905; Y. Sjöstedt leg.; NRS • 1 ♀, paralectotype of *Sphex kilimandjaroensis*; same locality as for preceding; alt. 1300–1900 m; 26 Apr. 1905; Y. Sjöstedt leg.; BMNH • 1 ♂, paralectotype of *Sphex kilimandjaroensis*; same collection data as for preceding but 4 May 1905; BMNH • 1 ♀, paralectotype of *Sphex kilimandjaroensis*; same collection data as for preceding but 9 May 1905; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 11 May 1905; NRS • 1 ♂, paralectotype of *Sphex kilimandjaroensis*; Kilimanjaro, Kibonoto Kulturzone; [3°05'5.9" S, 37°20'38.5" E]; 7 May 1905; Y. Sjöstedt leg.; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 12 May 1905; NRS • 1 ♂, 1 ♀; same collection data as for preceding but 15 May 1905; NRS. – **Mbeya Region** • 1 ♂, 1 ♀; Mt Rungwe, near New Langenburg; [9°08'06" S, 33°40'05" E]; 18–21 Nov. 1910; S.A. Neave leg.; BMNH • 1 ♀; Usangu Dist.; 29 Nov.–15 Dec. 1910; S.A. Neave leg.; BMNH. – **Ruvuma Region** • 1 ♂; Ugano (Umgano), Matengo Highlands, WSW of Songea; [10°58' S, 34°55' E]; alt. 1500–1700m; 23 Nov. 1937; F. Zimmer leg.; NHMW.

UGANDA – **Eastern Region** • 2 ♀♀; Kelim; [1°32'58" N, 33°38'46" E]; 6 Dec. 1910; C.C. Gowdey leg.; BMNH • 1 ♂; Mt Kokanjero, SW of Elgon; [1°07'48" N, 34°33' E]; 7–9 Aug. 1911; S.A. Neave leg.; BMNH.

ZIMBABWE • 1 ♂; 10 Nov. 1938; R.H.R. Stevenson leg.; AMG. – **Bulawayo** • 1 ♂; Bulawayo, Matobo; [20°31'57" S, 28°31'26.6" E]; 30 Jan. 1998; Ma. Halada leg.; OÖLM. – **Matabeleland North** • 1 ♂; Khami; [20°09'30" S, 28°22'36" E]; 30 Oct. 1938; G. Arnold leg.; RMNH • 1 ♂; Matetsi; [18°05' S, 26°07' E]; Dec. 1933; R.H.R. Stevenson leg.; BMNH.

## Description

### Female

SIZE. 26.8–29.5 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Wings uniformly fuscous, with cyan-purple iridescence.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with two broad, indistinct processes, stepped above. Clypeus with indentation in lower center, longitudinal carina in upper center barely noticeable. Scutellum convex. Metanotum not raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges, very indistinctly rugose in anterior third. Foretarsomere I 2.7–3.35 × length of antepenultimate spine. Petiole length 1.6–1.8 × its medial width.

### Male

SIZE. 22.5–32.2 mm.

COLOR. Black except for the following, which are ferruginous: stripe in center of mandible, tergum VII and sterna VII–VIII. Wings slightly fuscous, with cyan-purple iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area brassy, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented posteriorly. Free clypeal margin glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna II–VII with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII deeply incised, of metasomal sternum semicircular. Penis valvae dorsally open, their outer margins anteriorly and inner margins posteriorly raised into broad lobes. Petiole length 1.5–1.8 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.

### Variation

Unknown.

### Distribution

Eastern Africa.

### Remarks

Our studies showed that the synonymisation of *S. kilimandjaroensis* by Turner (1918) and Berland (1927) with *S. bohemani* was erroneous. The holotype of *S. bohemani* is unambiguously characterized by a considerably less deeply incised posterior margin of sternum VII, as well as more narrow placoids on flagellomeres IV–VI.

Photographs of the holotype of *S. abbotti* have been examined. The combination of uniformly black setae on the head and thorax, a black clypeal margin and only a few red spots on the mandibles are very good indicators that this species is identical to *S. kilimandjaroensis* and *S. neavei*, especially in conjunction with the locality data. Thus, *S. abbotti* should become the valid name.

One female from the type series of *S. kilimandjaroensis* in the BMNH is not conspecific with the remainder of the specimens from the type series, but actually a member of *S. nigrohirtus*. Thus, its locality data are included in the list of material for that species instead of here.

### *Sphex abbotti nivarius* subsp. nov.

urn:lsid:zoobank.org:act:CBE2E9E4-17B4-46AA-8751-D8D095806598

Figs 14, 89, 92 (blue)

### Differential diagnosis

Having a deep incision on the posterior margin of sternum VIII, males of this subspecies are well-characterized and can only be confused with those of *S. abbotti abbotti* (Fig. 20). The most notable difference between the two taxa is that male *S. abbotti nivarius* subsp. nov. have the erect (and in some cases additionally the appressed) propodeal setae silvery (Fig. 89) instead of black (Fig. 88).



Females are more difficult to distinguish and greatly resemble those of *S. schoutedeni schoutedeni*, with which they share the silvery erect propodeal setae. Because their geographical distribution is roughly the same, assigning the females to the males was quite difficult. The only trait that separates them and simultaneously coincides with that of the respective male is the color of the appressed propodeal setae, which is black in *S. schoutedeni schoutedeni* and silvery in some females of *S. abbotti nivarius* subsp. nov., though it is black in others. The most reliable way to identify females with uniformly black appressed propodeal setae is the ratio of petiole length to width, which is around 2.0 in *S. abbotti nivarius* subsp. nov. and smaller than 1.7 in *S. schoutedeni schoutedeni*. Despite the similarities in the respective females, the male genitalia and sterna leave no doubt that *S. schoutedeni* and *S. abbotti* are clearly two definite species.

### Etymology

‘*Nivarius*’ is a Latin adjective meaning ‘snowy’, which refers to the silvery-white setae on the propodeum that distinguish this subspecies.

### Material examined

#### Holotype

ZAMBIA – **North-Western Province** • ♂; E of Mufumbwe, NW of Kasempa; [13°22'37" S, 25°20'52.1" E]; 15 Nov. 2005; M. Snižek leg.; THD-016-OOLM; GenBank CO1 gene: MW538559; OÖLM.

#### Paratypes

ANGOLA – **Huíla Province** • 1 ♀; 16 mi. W of Paiva Couceiro; [14°49' S, 14°33' E]; 9 Dec. 1966; E.S. Ross and K. Lorenzen leg.; CAS.

DEMOCRATIC REPUBLIC OF THE CONGO – **Bas-Uele** • 1 ♀; Bambesa; [3°26'44.2" N, 25°41'27" E]; 4 Oct. 1937; J. Vrydagh leg.; IRSN. – **Haut-Katanga** • 1 ♀; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; 4 Feb. 1937; H.-J. Brédo leg.; IRSN • 1 ♀; same collection data as for preceding but 26 May 1937; IRSN • 1 ♀; same collection data as for preceding but 24 Dec. 1937; IRSN • 1 ♀; same locality as for preceding; Apr. 1928; M. Bequaert leg.; MRAC • 1 ♂; same locality as for preceding; Dec. 1923; Ch. Seydel leg.; MRAC • 1 ♂; Lusinga; [8°55'55" S, 27°12'20" E]; 1–8 Dec. 1947; G.F. de Witte leg.; MRAC. – **Haut-Lomami** • 1 ♀; Kamina; [8°44' S, 25°00' E]; 1930; R. Massart leg.; MRAC • 1 ♀; Kaniama; [7°31' S, 24°11' E]; 1931; R. Massart leg.; MRAC. – **Lualaba** • 2 ♂♂, 2 ♀♀; Kapanga; [8°21' S, 22°34' E]; Oct. 1932; F.G. Overlaet leg.; MRAC • 1 ♀; Sandoa; [9°41' S, 22°53' E]; Nov. 1931; F.G. Overlaet leg.; MRAC.

ZAMBIA – **North-Western Province** • 2 ♂♂, 1 ♀; 150 km SW of Solwezi; 13°02' S, 25°45' E; 15 Nov. 2005; M. Halada leg.; OÖLM • 1 ♀; 30 km E of Solwezi; 12°21' S, 27°01' E; 8 Nov. 2005; M. Halada leg.; OÖLM • 1 ♂; 80 km SSW of Solwezi; 12°45' S, 26°02' E; 13 Nov. 2005; M. Halada leg.; OÖLM • 1 ♀; Solwezi, 90 km E of Chisasa; [12°11' S, 26°24' E]; 9 Sep. 2005; M. Snižek leg.; OÖLM • 1 ♀; near Solwezi; [12°11' S, 26°24' E]; 1–3 Dec. 2002; J. Halada leg.; OÖLM.

### Description

#### Female

SIZE. 23.5–31.6 mm.

COLOR. Black except for basal half of mandible and free clypeal margin, which are ferruginous. Wings uniformly fuscous, with violet-bluish iridescence.

VESTITURE. Appressed setae on clypeus silvery-golden, black towards center, on paraocular area silvery, on collar and scutum black, on propodeal enclosure black, near posterior margin silvery or black. Erect setae on clypeus, paraocular area, collar and scutum black, on propodeal enclosure silvery. Erect

propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

**STRUCTURE.** Free clypeal margin medially with two broad, indistinct processes, not stepped above. Clypeus with indentation in lower center, without longitudinal carina. Scutellum convex. Metanotum not raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.8–3.3 × length of antepenultimate spine. Petiole length 1.8–2.1 × its medial width.

#### **Male**

**SIZE.** 25.5–29.7 mm.

**COLOR.** Black except for the following, which are ferruginous: basal half of mandible, tergum VII and sterna VII–VIII. Wings slightly infuscate, with violet-bluish iridescence.

**VESTITURE.** Appressed setae on clypeus and paraocular area brassy, anteriorly on collar, on scutum predominantly and anteriorly on propodeal enclosure black, posterolaterally on scutum and posteriorly on propodeum silvery. Erect setae on clypeus, paraocular area, collar and scutum black, on propodeal enclosure silvery. Erect propodeal setae oriented posteriorly. Free clypeal margin glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna II–VII with increasingly dense fringes of black setae.

**STRUCTURE.** Free clypeal margin medially with very indistinct process emerging from inner side. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII deeply incised, of metasomal sternum VIII semicircular. Penis valvae fused, apical third dorsally open, with several anteriorly-oriented fin-like processes. Petiole length 1.7–2.0 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.

#### **Variation**

Males can have the appressed facial setae pale silvery instead of brassy, or the appressed propodeal setae uniformly silvery instead of predominantly black.

#### **Distribution**

Central Africa.

*Sphex abyssinicus* (Arnold, 1928)

Figs 17, 25–26, 92 (yellow)

*Chlorion abyssinicum* Arnold, 1928: 372, ♂.

#### **Differential diagnosis**

The male of this species can easily be identified through its uniquely rectangular-shaped eighth sternum (Fig. 25) and enlarged valviceps (Fig. 26). Females have been undescribed until now, but we were able to tentatively assign four female specimens to *S. abyssinicus* based on morphological considerations and geographical distribution. As is the case with many female members of the *bohemanni* group, they are hard to distinguish from closely related species, but the color of the luster of the appressed facial setae is a useful diagnostic. In this species, it is ferruginous, as well as golden laterally on the clypeus and the paraocular area (Fig. 17), which separates it from most others. Females of *S. abbotti abbotti* can

look very similar (Fig. 15), but their facial setae lack a golden shimmer, whereas those of *S. schoutedeni malawicus* subsp. nov. possess it (Fig. 18), but are not known to occur north of Zambia.

### Material examined

#### Holotype

ETHIOPIA • ♂; 1911; R.E. Turner leg.; BMNH.

#### Paratype

ETHIOPIA • 1 ♂; same collection data as for holotype; BMNH.

#### Other material

ETHIOPIA • 1 ♂; same collection data as for holotype; BMNH. – **Harari Region** • 1 ♂; Harrar; [9°18'49" N, 42°07'05" E]; 1912; R.E. Turner leg.; BMNH • 1 ♂; Mulata Mts; [9°27'11" N, 41°45'25.4" E]; 22 Oct. 1925; AMNH. – **Oromia Region** • 1 ♀; 23 km NW of Mena; 6°35' N, 39°44' E; 28 May 2015; J. Halada leg.; OÖLM. – **Southern Nations, Nationalities, and Peoples' Region** • 1 ♀; Nera Dorze; 6°10'8.4" N, 37°34'7.9" E; Apr. 2013; M. Ströhle leg.; OÖLM • 1 ♀; same collection data as for preceding; THD-033-OÖLM; GenBank LWR gene: MW582276; OÖLM.

### Description

#### Female

SIZE. 24.5–30.2 mm.

COLOR. Black, except for ferruginous stripe in center of mandible. Wings uniformly fuscous, with turquoise luster.

VESTITURE. Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black, on clypeus and paraocular area with ferruginous-golden luster. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with two broad, indistinct processes, stepped above. Clypeus with indentation in lower center, without longitudinal carina. Scutellum convex. Metanotum not raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.8–2 × length of antepenultimate spine. Petiole length 1.4–1.7 × its medial width.

#### Male

SIZE. 30.9 mm.

COLOR. Black except for basal half of mandible, which is ferruginous. Wings slightly fuscous, with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area brassy, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna II–VII with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin medially with short, broad process emanating from inferior part. Scutellum convex. Metanotum slightly raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII

simple, of metasomal sternum VIII concavely emarginate and broadly truncated apically. Penis valvae fused, inner margin flattened and dorsally markedly raised, outer margin bulging near apex. Petiole length 1.3–1.4 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.

### Variation

Unknown.

### Distribution

Ethiopia.

*Sphex bohemanni* Dahlbom, 1845  
Figs 19, 90, 92 (purple)

*Sphex bohemanni* Dahlbom, 1845: 436, ♂.

*Sphex transvaalensis* Cameron, 1910: 140, ♂. Synonymized with *Chlorion bohemanni* by R. Turner 1918: 361.

### Differential diagnosis

Males of this species (Fig. 90) can easily be recognized through their distinctly notched posterior margin of sternum VII (Fig. 19). They share this character with those of *S. abbotti* s. lat. (Fig. 20), but can be distinguished based on the depth of the incision. In *S. abbotti*, the incision is acute-angled and covers most or all of the visible part of the sternum, whereas it is obtuse-angled in *S. bohemanni* and reaches only approximately the halfway point of the visible sternum.

### Material examined

#### Holotype

SOUTH AFRICA – **KwaZulu-Natal** • ♂; Port Natal [now Durban]; NRS.

#### Other material

AFRICA • 2 ♂♂; ZMB.

SOUTH AFRICA – **Gauteng** • 1 ♂, holotype or syntype of *Sphex transvaalensis* Cameron, 1910; “v. d Merwe” [Van Der Merwe Station]; [25°43'18" S, 28°29'49" E]; 12 Dec. 1906; BMNH • 1 ♂; Johannesburg; [26°12'16" S, 28°02'44" E]; Feb. 1905; G. Kobrow leg.; TMP • 1 ♂; Pretoria; [25°43'32" S, 28°14'38" E]; W.L. Distant leg.; BMNH • 1 ♂; Pretoria; [25°44'46" S, 28°11'17" E]; 1 Jan. 1924; W. Lingnau leg.; DEI. – **KwaZulu-Natal** • 1 ♂; Durban; [29°53' S, 31°03' E]; ZMB • 1 ♂; Luneburg, Luneberg; [27°19' S, 30°37' E]; Nov. 1912; W. Oom leg.; AMG • 1 ♂; Port Natal [now Durban]; [29°53' S, 31°03' E]; NRS • 1 ♂; Scottburgh; [30°17'11" S, 30°45'11" E]; 14 Mar. 1926; R.H.R. Stevenson leg.; BMNH.

### Description

#### Female

Unknown.

#### Male

SIZE. 27.3–30.6 mm.

COLOR. Black except for basal half of mandible, which is ferruginous. Wings fuscous, forewing with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black, at posterior margin of propodeum black or silvery. Erect propodeal setae oriented posteriorly. Clypeus without glabrous spot. Scutellum densely and coarsely pubescent. Metasomal sterna III–VII with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII distinctly notched, of metasomal sternum VIII triangular. Petiole length 1.4–1.6 × its medial width. Flagellomeres IV–VI with narrow placoids, the first two covering proximal four-fifths of flagellomere length, last one of similar extent as first two, shorter or altogether absent.

### Variation

Unknown.

### Distribution

South Africa (Gauteng and KwaZulu-Natal provinces).

### Remarks

While male specimens of *S. bohemanni* display a very conspicuous character for identifications as noted above, female specimens are treated as unknown, since they are presumably practically indistinguishable from those of several other African species in this group, namely *S. abbotti abbotti* and *S. stadelmanni stadelmanni*. They also occur in the same approximate geographic region as *S. stadelmanni stadelmanni*.

### *Sphex pseudopraedator* sp. nov.

urn:lsid:zoobank.org:act:12625520-0846-455C-9F27-1DF41BBC53C8

Figs 1, 93, 98

### Differential diagnosis

*Sphex pseudopraedator* sp. nov. (Fig. 93) can easily be distinguished from other members of the group through its yellow-tinged cellular wing area.

### Etymology

Pseudo- is a prefix derived from the Greek adjective ‘pseudēs’ meaning ‘false’, ‘*pseudopraedator*’ thus refers to the fact that this species has been incorrectly identified in the past as the Oriental *S. luteipennis* Mocsáry, 1883, which is a synonym of *S. praedator* F. Smith, 1858.

### Material examined

#### Holotype

ZAMBIA – Copperbelt Province • ♀; 50 km W of Chingola; [12°25′06.3″ S, 27°23′50.9″ E]; 1–2 Jan. 2003; J. Halada; OÖLM.

#### Paratypes

AFRICA • 1 ♂; “Baulen” [?]; 1949; Albens leg.; MRAC • 1 ♂; “Tweene” [?]; Feb. 1949; MRAC • 2 ♀♀; Cape of Good Hope; MNHN.

ANGOLA – Huíla Province • 1 ♀; 5 mi. NE of Negola; [14°04′55″ S, 14°32′52″ E]; 25 Mar. 1972; BMNH.

CAMEROON – **Centre Region** • 1 ♂; Yaoundé; [3°52' N, 11°31' E]; Sep. 1953; J.-P. Adam and J. Rageau leg.; MNHN • 1 ♂, 1 ♀; same collection data as for preceding; MNHN.

CENTRAL AFRICAN REPUBLIC – **Kémo** • 1 ♀; Sibut; [5°44'16" N, 19°05'12" E]; MNHN.

DEMOCRATIC REPUBLIC OF THE CONGO • 1 ♀; Katanga, N'Zenke; Mar. 1925; Ch. Seydel leg.; MRAC. – **Bas-Uele** • 1 ♂; Bambesa; [3°28' N, 25°43' E]; Aug. 1933; H.J. Brédo leg.; MRAC • 1 ♀; same collection data as for preceding but 10 Sep. 1933; MRAC • 1 ♀; same collection data as for preceding but 15 Sep. 1933; MRAC • 1 ♂, 2 ♀♀; same collection data as for preceding but 20 Sep. 1933; MRAC • 1 ♀; same collection data as for preceding but 25 Sep. 1933; MRAC • 1 ♂; same collection data as for preceding but 30 Oct. 1933; MRAC • 2 ♂♂; same locality as for preceding; 30 Aug. 1933; J.V. Leroy leg.; MRAC • 4 ♀♀; same collection data as for preceding but 10 Oct. 1933; MRAC • 1 ♀; same collection data as for preceding but Dec. 1934; MRAC • 1 ♂; same locality as for preceding; Jun. 1937; J. Vrijdagh leg.; MRAC. – **Haut-Katanga** • 1 ♀; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; Oct. 1924; Ch. Seydel leg.; MRAC • 1 ♀; same collection data as for preceding but 12 Jun. 1949; USNM • 1 ♂; same collection data as for preceding but 21 Jun. 1949; USNM • 1 ♂; same collection data as for preceding but 5 Feb. 1953; MRAC. – **Haut-Uele** • 1 ♀; Doruma; [4°43' N, 27°41' E]; 1934; R.P. De Graer leg.; MRAC. – **Ituri Province** • 1 ♀; Mahagi-Niarembe; [2°14'49" N, 31°06'41" E]; Sep. 1935; Ch. Scops leg.; MRAC • 1 ♂; Mahagi-Port; [2°08'16" N, 31°14'18" E]; Oct. 1934; H.J. Brédo leg.; MRAC. – **Kwango** • 1 ♂; Kimuanga; 27 Jan. 1930; Mevr. Bequaert leg.; MRAC. – **Lualaba** • 1 ♀; Kolwezi; [10°43' S, 25°28' E]; 5 Feb. 1953; L. Gilbert leg.; MRAC. – **South Kivu** • 4 ♂♂; Kadjudju; [2°09' S, 28°54' E]; 1932; G. Babault leg.; MNHN.

KENYA – **Embu County** • 1 ♂; Kirimiri Forest; 0.42563° S, 37.54660° E; 28 Apr.–12 May 2011; R. Copeland leg.; ICIPE. – **Kisii County** • 1 ♂; Kisii District, S of Kavirondo; [0°40' S, 34°45' E]; 9–12 May 1911; S.A. Neave leg.; BMNH. – **Trans-Nzoia County** • 1 ♀; Kitale; [1°01' N, 35°00' E]; 1932–1933; C. Arambourg, P.-A. Chappuis and R. Jeannel leg.; MNHN.

LESOTHO – **Berea District** • 1 ♂; Mamathes; [29°08' S, 27°51' E]; 9 Jan. 1952; C.F. Jacot-Guillarmod leg.; BMNH. – **Leribe** • 1 ♀; 3 Jan. 1932; C. Jacot-Guillarmod leg.; TMP.

MALAWI – **Northern Region** • 1 ♂; Nykia Plateau; 10°35' S, 33°48' E; 26 Feb.–2 Mar. 2001; F. Koch leg.; ZMB. – **Southern Region** • 1 ♂; Mlanje; [16°01'53" S, 35°30' E]; 17 Mar. 1913; S.A. Neave leg.; BMNH • 7 ♂♂, 1 ♀; Mt Mulanje; 15°55' S, 35°32' E; 6–11 Mar. 2001; F. Koch leg.; ZMB.

MOZAMBIQUE – **Manica Province** • 1 ♂; near Andrada, Valee du Revoué; [18°53'41" S, 32°51'16" E]; 1905; G. Vasse leg.; MNHN. – **Manicaland** • 1 ♀; Vumba; [19°06' S, 32°47' E]; 20 Feb. 1931; P.A. Sheppard leg.; TMP.

NIGERIA – **Gombe State** • 1 ♀; Kenne; [10°40'08" N, 11°27'33" E]; Sep. 1974; J.T. Medler leg.; BMNH. – **Kaduna State** • 1 ♂; 10 mi. SE of Soba; [10°52'34" N, 8°09'27" E]; 14 Sep. 1966; E.S. Ross and K. Lorenzen leg.; CAS. – **Taraba State** • 1 ♂; Gashaka Gumti National Park, 30 km SE of Serti; 7°21' N, 11°32' E; 24 Apr.–8 May 2011; J. Halada leg.; RMNH.

REPUBLIC OF CÔTE D'IVOIRE – **Abidjan District** • 2 ♀♀; Banco National Park; [5°23' N, 4°03' W]; R. Paulian and C. Delamare leg.; MNHN.

RWANDA – **Western Province** • 1 ♀; Ishwa, Lake Albert; [2°23'04" S, 28°55'58" E]; Sep. 1935; H.J. Brédo leg.; MRAC.

SIERRA LEONE – **Western Area** • 1 ♂; Freetown; [8°29'04" N, 13°14'04" W]; 29 Oct. 1989; G.G.M. Schulten leg.; RMNH • 3 ♂♂, 2 ♀♀; same collection data as for preceding but 2 Nov. 1991; RMNH • 1 ♂; swamp near York; [8°20' N, 13°04' W]; 27 Oct. 1991; G.G.M. Schulten leg.; RMNH.

SOUTH AFRICA • 1 ♂; Transvaal; 1906; A.J. Cholmley leg.; BMNH. – **Eastern Cape** • 1 ♂; 5 km NE of Mount Frere, roadside; [30°51'32" S, 29°01'31.7" E]; 13 Feb. 1974; A.B. Gurney leg.; USNM • 1 ♂; Algoa Bay; [33°50' S, 25°50' E]; 20 Mar. 1898; H. Brauns leg.; TMP • 1 ♂; Willowmore; [33°17' S, 23°29' E]; Dec. 1919; H. Brauns leg.; TMP. – **Gauteng** • 2 ♂♂; E of Johannesburg; [26°12'16" S, 28°02'44" E]; Jan. 1951; H. Pinkney leg.; USNM • 1 ♂; Johannesburg; [26°12'16" S, 28°02'44" E]; Jan. 1906; G. Kobrow leg.; TMP • 1 ♂, 1 ♀; same collection data as for preceding; TMP • 1 ♀; same collection data as for preceding; ZMB • 1 ♂; Mogale's Gate Biodiversity Centre; 25°56' S, 27°28' E; 15 Feb. 2012; M. Ströhle leg.; OÖLM • 1 ♀; near Johannesburg; [26°12'16" S, 28°02'44" E]; 1906; A.J. Cholmley leg.; BMNH • 1 ♂, 1 ♀; Pretoria City; [25°43'32" S, 28°14'38" E]; 12 Feb. 2000; J. Halada leg.; OÖLM. – **KwaZulu-Natal** • 1 ♀; "Natal"; v. Stuckrad leg.; ZMB • 6 ♂♂; 20 km S of Bergville; [28°54'49.2" S, 29°21'10.7" E]; 5 Feb. 2001; M. Snižek leg.; OÖLM • 1 ♂; 20 km W of Port Shepstone; [30°46'50.9" S, 30°12'38" E]; 2 Feb. 2000; J. Halada leg.; OÖLM • 1 ♀; Camperdown; [29°44' S, 30°32' E]; 10 Mar. 1908; G.F. Leigh leg.; TMP • 1 ♂; Drakensberge, Royal Natal National Park; 28°43' S, 28°53' E; 9 Feb. 1994; F. Koch leg.; THD-000-ZMB; GenBank CO1 gene: MW538560; ZMB • 1 ♂; same collection data as for preceding; THD-027-ZMB; GenBank LWR gene: MW582290; ZMB • 1 ♂; same collection data as for preceding; ZMB • 1 ♀; Durban, Yellowwood Park; [28°55' S, 30°56' E]; 7 Mar. 1976; F.J. Herbst leg.; AMG • 1 ♂; near Eshowe; [28°53'18" S, 31°26'54" E]; 5–6 Jan. 2000; J. Halada leg.; OÖLM • 1 ♂; Hilton; [29°33' S, 30°18' E]; 3 Mar. 1966; J.S. Taylor leg.; USNM • 2 ♂♂; Hluhluwe Game Reserve; 28°02' S, 32°05' E; 10 Feb. 1995; F. Koch leg.; ZMB • 1 ♀; same collection data as for preceding but 9–12 Feb. 1995; ZMB • 1 ♂; Pinetown; [29°49' S, 30°51' E]; 24 Jan. 1909; G.F. Leigh leg.; TMP • 1 ♀; Port Natal [now Durban]; [29°53' S, 31°03' E]; NRS • 1 ♀; Richmond, Indaleni; [29°54' S, 30°15' E]; 16 Jan. 1953; J.W. Hunt leg.; MRAC • 1 ♀; same locality as for preceding; J.W. Hunt leg.; MRAC • 1 ♂; St Lucia Park (Charter's Creek); 28°12' S, 32°25' E; 7 Feb. 1995; F. Koch leg.; ZMB. – **Limpopo** • 1 ♀; Lekgalameetse Nature Reserve; 24°12' S, 30°20' E; 26 Mar.–1 Apr. 2001; F. Koch leg.; ZMB • 1 ♀; Louis Trichardt; [23°02'37" S, 29°54'11" E]; Apr. 1932; A. Mackie leg.; BMNH. – **Mpumalanga** • 6 ♂♂; 10 km SE of Middleburg; [25°50'57.1" S, 29°32'51.7" E]; 29 Jan. 2010; J. Halada leg.; RMNH • 1 ♀; Lydenburg [now Mashishing]; [25°05'45.6" S, 30°26'45.6" E]; F. Wilms leg.; ZMB • 1 ♂; Waterval Boven; [25°39' S, 30°20' E]; 10–11 Feb. 2000; J. Halada leg.; OÖLM. – **North West** • 1 ♂; 5 km S of Brits; [25°41'21.4" S, 27°49'32.8" E]; 20 Jan. 2000; J. Halada leg.; OÖLM. – **Western Cape** • 1 ♂; Cape Town; [33°55' S, 18°25' E]; Oct. 1949; S. Straw leg.; MRAC.

TANZANIA – **Kilimanjaro Region** • 1 ♂, 1 ♀; Kilimanjaro, Kibonoto Kulturzone; [3°05'5.9" S, 37°20'38.5" E]; 7 May 1905; Y. Sjöstedt leg.; NRS • 1 ♀; same collection data as for preceding but 12 May 1905; BMNH • 1 ♀; same collection data as for preceding; NRS • 1 ♀; same collection data as for preceding but 18 May 1905; NRS. – **Ruvuma Region** • 1 ♂; Kigonsera; [10°48' S, 35°04' E]; Konow leg.; DEI.

TOGO – **Centrale Region** • 1 ♀; Bismarckburg [near Yégué]; [8°10'32.74" N, 0°41'09.42" E]; 30 Jun.–3 Jul. 1893; L. Conradt leg.; ZMB.

UGANDA – **Central Region** • 1 ♀; Bweya; [0°11'39" N, 32°32'59" E]; 22 May 1913; C.C. Gowdey leg.; BMNH • 1 ♀; Entebbe; [0°03' N, 32°27'36" E]; 30 May 1913; C.C. Gowdey leg.; BMNH. – **Eastern Region** • 1 ♀; 10 mi. NW of Soroti; [1°50'15" N, 33°29'44" E]; 13 Oct. 1957; CAS.

ZAMBIA – **Copperbelt Province** • 1 ♀; same collection data as for holotype; OÖLM. – **Lusaka Province** • 1 ♀; 25 km E of Lusaka; 15°21' S, 28°30' E; 3 Mar. 1995; W.J. Pulawski leg.; CAS • 1 ♀;

Lusaka International Airport; 15°19' S, 28°27' E; 26 Mar. 1998; W.J. Pulawski leg.; CAS. – **Northern Province** • 1 ♂; Senga Hill 40 mi. S of Abercorn; [9°21' S, 31°13' E]; 12 Feb. 1958; CAS. – **North-Western Province** • 1 ♂; 60 km W of Solwezi; [12°17'17.3" S, 25°49'06.2" E]; 4–6 Jan. 2003; J. Halada leg.; OÖLM. – **Western Province** • 1 ♂; Lealui; [15°13'50" S, 23°01'40" E]; 1919; V. Ellenberger leg.; MNHN.

ZIMBABWE • 1 ♂, 1 ♀; Sanyati Valley; Sep.–Dec. 1925; R.H.R. Stevenson leg.; TMP • 1 ♀; Vumba Mountains; 29 Feb. 1938; NRS. – **Bulawayo** • 1 ♂; Bulawayo; [20°10'12" S, 28°34'48" E]; 14 Feb. 1924; R.H.R. Stevenson leg.; USNM. – **Bulawayo Province** • 1 ♂; Feb. 1924; R.H.R. Stevenson leg.; TMP. – **Harare Province** • 1 ♂; near Harare; [17°49'45" S, 31°03'08" E]; 20 Jan. 1998; Ma. Halada leg.; OÖLM • 1 ♀; Salisbury [now Harare]; [17°49'45" S, 31°03'08" E]; 1915; O'Neil leg.; TMP • 1 ♂; same locality as for preceding; Feb. 1978; A. Watsham leg.; BMNH. – **Manicaland** • 1 ♂; Mount Selinda; [20°27' S, 32°43' E]; Marshall leg.; TMP. – **Mashonaland East** • 1 ♀; Chishawasha, near Salisbury [now Harare]; [17°46'14" S, 31°15'11" E]; Mar. 1978; A. Watsham leg.; BMNH • 1 ♀; same collection data as for preceding but Mar. 1982; BMNH.

## Description

### Female

SIZE. 25.1–28.9 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Cellular wing area yellowish, apical margin of forewing fuscous.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar and scutum black, appressed setae on propodeum black. Erect setae on propodeal enclosure black interspersed with golden ones, on posterior propodeal margin golden. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin with two notches near borders of approximate central third of clypeus. Free margin not stepped medially, clypeus with slight indentation in lower center, without carina. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 3.1–3.5 × length of antepenultimate spine. Petiole length 2.2–2.4 × its medial width.

### Male

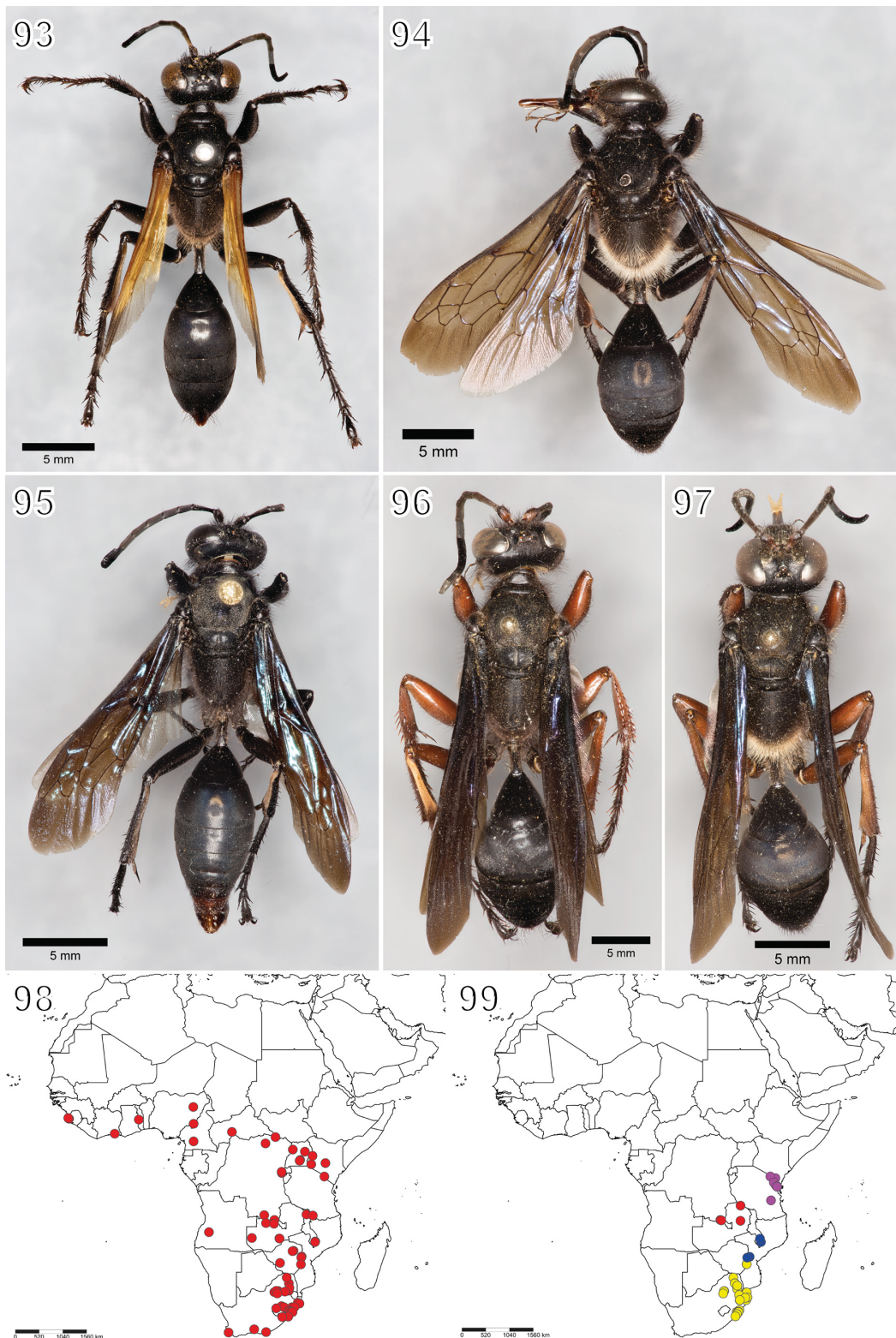
SIZE. 22.7–28.1 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Cellular wing area of yellowish, apical margin of forewing fuscous.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black, erect setae towards posterior margin of propodeum golden or silvery. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna III–VII with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin medially slightly emarginate. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII very slightly concavely emarginate. Petiole length 2.3–2.7 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.





**Figure 93–99.** 93, 96. Habitus of ♀. 94–95, 97. Habitus of ♂. 93. *Sphex pseudopraedator* sp. nov. 94. *S. schoutedeni schoutedeni* Kohl, 1913. 95. *S. stadelmanni stadelmanni* Kohl, 1895. 96–97. *S. stadelmanni rufus* subsp. nov. 98. Geographic distribution of *S. pseudopraedator* sp. nov. 99. Geographic distribution of *S. schoutedeni schoutedeni* (red); *S. schoutedeni malawicus* subsp. nov. (blue); *S. stadelmanni stadelmanni* (yellow); *S. stadelmanni rufus* subsp. nov. (purple).

### Variation

In males, the color of the erect mesosomal setae ranges from almost uniformly black with only a few golden ones at the posterior propodeal margin to the erect propodeal setae being predominantly silvery-golden with a few darker ones in between and the erect setae on the collar, scutum, scutellum and metanotum being partially or mostly silvery as well.

### Distribution

Widespread in Africa.

### Remarks

This species' female is similar to *S. praedator*, and its members have been repeatedly misidentified as *S. luteipennis*, a synonym of *S. pradedator* (Hensen 1991). However, as noted first by van der Vecht (1973), and later by Bohart & Menke (1976) and Dollfuss (2008), the specimens from Africa must be of a different species. Our study of the holotype of *S. praedator* and several specimens showed that they can be easily distinguished: in *S. pseudopraedator* sp. nov., the erect propodeal setae are uniformly oriented posteriorly and mostly straight, while in *S. praedator*, they are perpendicular or oriented slightly anteriorly, and the tips are often curved towards the anterior. This can best be seen on the anterior third of the propodeum. Moreover, the males of both species are very conspicuously different in their wing color, with *S. pradedator* having the wings markedly fuscous with a greenish iridescence, whereas those of *S. pseudopraedator* sp. nov. have a similar coloration as in the female, with the cellular area yellowish.

### *Sphex schoutedeni schoutedeni* Kohl, 1913

Figs 94, 99 (red)

*Sphex schoutedeni* Kohl, 1913: 205, ♂.

### Differential diagnosis

Males of this species are easiest to recognize based on the structure of their posterior sterna. Lacking an incision on the posterior margin of sternum VII and having sternum VIII semicircular and simple, they resemble *S. stadelmanni stadelmanni* (Fig. 95). While that species has uniformly black erect setae at least on the propodeal enclosure, these setae are mostly silvery in *S. schoutedeni schoutedeni* (Fig. 94). Close examination of the valvices also reveals notable structural differences between these species (Figs 21–24). The subspecies *S. schoutedeni malawicus* subsp. nov. is very similar to the nominotypical form, but has the erect propodeal setae black, as in *S. stadelmanni stadelmanni*.

Females are much more difficult to identify. Due to the absence of visible sternal or genitalia characters, the color of their erect and appressed propodeal setae is one of the only useful diagnostics. *Sphex abbotti nivarius* subsp. nov. (Fig. 89) has silvery erect propodeal setae as well, and members of that somewhat variable subspecies which possess black appressed propodeal setae are almost indistinguishable. However, their petiole is around twice as long as it is wide, whereas that of female *S. schoutedeni schoutedeni* is at most 1.7× as long as wide.

### Material examined

#### Holotype

ZAMBIA – **Muchinga Province** • ♂; Mpika; Jan. 1908; S.A. Neave leg.; MRAC.

#### Other material

DEMOCRATIC REPUBLIC OF THE CONGO – **Haut-Katanga** • 1 ♂; Elisabethville [now Lubumbashi]; [11°40' S, 27°29' E]; Jun. 1932; de Loose leg.; MRAC • 1 ♂; same collection data as for preceding but 1933; MRAC • 2 ♂♂; same collection data as for preceding but Feb. 1933; MRAC • 1 ♀;

same collection data as for preceding but Apr. 1933; MRAC • 1 ♂; same locality as for preceding; 2 Jan. 1937; H.-J. Brédo leg.; IRSN • 1 ♂; Lubumbashi; 11°45' S, 27°40' E; 12 Mar. 1921; M. Bequaert leg.; MRAC • 1 ♂; Kasepa, river; 1920; M. Bequaert leg.; MRAC.

ZAMBIA – **Muchinga Province** • 1 ♀; “L. Chambezi V., Mpika distr.”; alt. 3900 ft; 19 May 1908; S.A. Neave leg.; OUMNH. – **Northern Province** • 1 ♀; Abercorn [now Mbala]; [8°50' S, 31°28' E]; Nov. 1943; IRSN • 1 ♂; same locality as for preceding; 14 Feb. 1951; F.O. Albrecht leg.; BMNH.

## Description

### Female

SIZE. 23.4–28.9 mm.

COLOR. Black, except for basal half of mandible and free clypeal margin which are ferruginous. Wings uniformly fuscous, with purple-bluish iridescence.

VESTITURE. Appressed setae on clypeus black, at lateral clypeal margin and on paraocular area brassy. Appressed setae on collar, scutum, propodeal enclosure and posterior propodeal margin black. Erect setae on clypeus, paraocular area, collar and scutum black, on propodeal enclosure and posterior propodeal margin silvery. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with two broad, indistinct processes, stepped above. Clypeus with slight indentation in lower center, without carina. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.6–2.9 × length of antepenultimate spine. Petiole length 1.5–1.7 × its medial width.

### Male

SIZE. 25.4–25.8 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible and free clypeal margin partially. Wings slightly infuscate, with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area brassy, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar and scutum black, on propodeal enclosure brassy intermixed with black, on posterior margin of propodeum silvery. Erect propodeal setae oriented posteriorly. Clypeus with glabrous spot medially at free margin. Scutellum densely and coarsely pubescent. Metasomal sterna II–VII with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII semicircular. Fused penis valvae laterally not widened, with notch, valviceps oriented perpendicularly. Petiole length 1.4–1.6 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.

## Variation

In a male specimen from Angola, the appressed propodeal setae are silvery instead of black. Females often have the erect silvery setae on the propodeal enclosure interspersed with some black ones.

## Disribution

Central Africa.

*Sphex schoutedeni malawicus* subsp. nov.

urn:lsid:zoobank.org:act:59F1F204-D7F6-44E0-A5D8-11478E9D2A52

Figs 18, 23–24, 99 (blue)

**Differential diagnosis**

Males of this subspecies are most easily identifiable through the structure of their genitalia. Like *S. schoutedeni schoutedeni*, they have the fused penis valvae dorsally open, laterally not widened and with a notch (Figs 23–24). In the similar *S. stadelmanni stadelmanni* (Figs 21–22), the valvae are laterally widened, but lack a notch, and the valvicipites are curved posteroventrally and not perpendicularly-oriented as in *S. schoutedeni* s. lat. The males of the other species and subspecies of the *bohemanni* group all differ in having sternum VII or VIII modified in a conspicuous way (Figs 19–20, 25), whereas *S. schoutedeni malawicus* subsp. nov. has sternum VII without a notch and sternum VIII convex and entire. Finally, the nominotypical *S. schoutedeni schoutedeni* is distinguishable through having partially silvery propodeal setae (Fig. 94), while *S. s. malawicus* subsp. nov. has them black, with the exception of some erect golden setae at the posterior propodeal margin.

Females can be recognized based on the color of their clypeus and its vestiture. They, like all members of the *bohemanni* group, have the appressed setae black in the clypeal center, but the presence of golden appressed lateroclypeal and paraocular setae combined with a slightly ferruginous free clypeal margin is unique (Fig. 18).

**Etymology**

This subspecies is named after the country of Malawi, where most of the material was collected.

**Material examined**

**Holotype**

ZIMBABWE – **Manicaland** • ♂; Vumba Mountain; 19°07' S, 32°47' E; 16 Mar. 2001; F. Koch leg.; THD-028-ZMB; GenBank CO1 gene: MW538575; GenBank LWR gene: MW582287; ZMB.

**Paratypes**

MALAWI – **Southern Region** • 1 ♂, 1 ♀; Mlanje; [16°01'53" S, 35°30' E]; 20 Mar. 1913; S.A. Neave leg.; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 14 Apr. 1913; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 29 Apr. 1913; BMNH • 1 ♂; same collection data as for preceding but 6 May 1913; BMNH • 3 ♂♂; same collection data as for preceding but 10 May 1913; BMNH • 1 ♀; same collection data as for preceding but 19 May 1913; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 13 Jun. 1913; BMNH • 1 ♂, 4 ♀♀; same collection data as for preceding but 1 Jul. 1913; BMNH • 1 ♀; same collection data as for preceding but 7 Nov. 1913; BMNH • 1 ♂; Zomba; [15°23'09" S, 35°19'07" E]; Oct. 1950; C. Graham leg.; AMG • 1 ♂; same locality as for preceding; H.S. Stannus leg.; BMNH.

MOZAMBIQUE – **Manica Province** • 2 ♂♂; Vanduzi, 21 mi. N of Vila; [18°57'04" S, 33°15'58" E]; 14 Mar. 1958; Pery leg.; CAS.

TANZANIA – **Ruvuma Region** • 1 ♀; Ugano (Umghano), Matengo Highlands, WSW of Songea; [10°58' S, 34°55' E]; alt. 1500–1700m; 23 Nov. 1937; F. Zimmer leg.; NHMW • 3 ♀♀; same locality as for preceding; 20–30 Nov. 1935; Zerny leg.; NHMW • 5 ♀♀; same collection data as for preceding but 1–10 Dec. 1935; NHMW • 1 ♂; same collection data as for preceding but 1–12 Jun. 1936; NHMW.

ZAMBIA – **Central Province** • 1 ♂; “Alala Plateau, Mkushi distr.”; alt. about 4000 ft; 16 Nov. 1905; S.A. Neave leg.; OUMNH.

ZIMBABWE – **Manicaland** • 1 ♂, 1 ♀; Vumba Mt, Botanical Garden; 19°07' S, 32°47' E; 16–18 Mar. 2001; F. Koch leg.; ZMB.

## Description

### Female

SIZE. 26.7–27.1 mm.

COLOR. Black, except for basal half of mandible and free clypeal margin, which are ferruginous. Wings uniformly fuscous, with cyan-violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area black, towards lateral clypeal margins and on paraocular area with golden luster. Appressed setae on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with two broad, indistinct processes, stepped above. Clypeus with indentation in lower center, without carina. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I  $2.7 \times$  length of antepenultimate spine. Petiole length  $1.7\text{--}1.8 \times$  its medial width.

### Male

SIZE. 26.2–27.1 mm.

COLOR. Black, except for basal half mandible, which is ferruginous. Wings slightly fuscous, with cyan-violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area golden, on collar, scutum and propodeal enclosure black. Erect setae on clypeus black, on paraocular area black intermixed with golden ones, on collar, scutum and propodeal enclosure black, on posterior margin of propodeum silvery-golden. Erect propodeal setae oriented posteriorly. Clypeus with glabrous spot medially at free margin. Scutellum densely and coarsely pubescent. Metasomal sterna II–VII with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII semicircular. Fused penis valvae laterally not widened, with notch, valviceps oriented perpendicularly. Petiole length  $1.7\text{--}1.9 \times$  its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.

## Variation

Unknown.

## Distribution

Southeastern Africa.

*Sphex stadelmanni stadelmanni* Kohl, 1895  
Figs 16, 21–22, 95, 99 (yellow)

*Sphex stadelmanni* Kohl, 1895: 67

*Chlorion stadelmanni* var. *integrum* Arnold, 1928: 372, ♀, ♂ (syntypes: South Africa, KwaZulu-Natal, Scottburgh; Zimbabwe, Manicaland, Chirinda Forest; Mozambique, “Rikatla”, R. Stevenson leg.; SAM, TMP, not examined). **Syn. nov.**

### Differential diagnosis

Within their species group, members of this species (Fig. 95) closely resemble those of *S. abyssinicus* and *S. schoutedeni malawicus* subsp. nov., as all three are black with primarily dark vestiture. The males of *S. stadelmanni* s. lat. are most easily distinguishable through the structure of their genitalia. The penis valvae are fused and curved towards the dorsal side, where they form a chalice-like configuration with a slightly widened margin (Figs 21–22). The valvicipites are curved posteroventrally. In *S. schoutedeni* and its subspecies *S. s. malawicus* subsp. nov., the penis valvae lack a widened margin, and the valvicipites do not curve back toward the ventral side, but continue in dorsal direction (Figs 23–24). In *S. abyssinicus*, the fused part of the valvae is dorsoventrally enlarged (Fig. 26) and sternum VIII is conspicuously rectangular (Fig. 25).

Males of *S. abbotti abbotti* (Fig. 88) and *S. bohemanni* (Fig. 90) are also similar, but can be identified via their incised sternum VII (Figs 19–20). Those of the subspecies *S. stadelmanni rufus* subsp. nov. (Fig. 97) are characterized by having the central and lower part of the clypeus, as well as trochanter, femur and tibia, ferruginous instead of black.

Females of *S. stadelmanni stadelmanni* are very difficult to distinguish from those of *S. abbotti abbotti*, as both share uniformly black appressed clypeal and paraocular setae without a differently-colored luster (Figs 15–16). However, the ferruginous color of the mandibles is more extensive and also present on the free clypeal margin in *S. stadelmanni stadelmanni*. In contrast, *S. abbotti abbotti* has the clypeal margin and most of the mandibular base black. In some of the other females of the *bohemanni* group, the appressed setae on the paraocular area and clypeus are also black, but show a luster of a different color when viewed from certain angles (Figs 14, 17–18).

### Material examined

#### Holotype

MOZAMBIQUE – **Maputo Province** • ♂; Delagoa Bay [now Maputo Bay]; [25°59' S, 32°42' E]; ZMB.

#### Other material

ESWATINI – **Manzini Region** • 1 ♂, 1 ♀; Middleveld, Malkerns Research Station; [26°31'41.7" S, 31°11'55.5" E]; 16 Mar. 1979; G.G.M. Schulten leg.; RMNH • 1 ♂; same collection data as for preceding but 19 Apr. 1979; RMNH.

MOZAMBIQUE – **Maputo City** • 1 ♀; Maputo, Universidade; [25°58' S, 32°35' E]; 7 Feb. 1976; H.R. Feijen leg.; RMNH. – **Maputo Province** • 3 ♂♂; same collection data as for holotype; ZMB • 3 ♂♂; same locality as for holotype; R. Monteiro leg.; ZMB.

SOUTH AFRICA – **Gauteng** • 1 ♀; Johannesburg, Bloksberg; [26°12'16" S, 28°02'44" E]; 1907; C.H. Pead leg.; BMNH • 2 ♀; Pretoria; [25°43'32" S, 28°14'38" E]; W.L. Distant leg.; BMNH • 1 ♀; same locality as for preceding; 1 Jan. 1924; W. Lingnau leg.; DEI. – **KwaZulu-Natal** • 1 ♂; 20 km S of Manguzi; [27°10'45" S, 32°42'46" E]; 3 Dec. 2002; Ma. Halada leg.; OÖLM • 1 ♂; Durban; [29°53' S, 31°03' E]; 1902; F. Muir leg.; BMNH • 1 ♂; same locality as for preceding; W.L. Distant leg.; BMNH • 1 ♂; Durban, Blue Lagoon; [29°48'34.1" S, 31°01'59.4" E]; 11 Mar. 1963; H.N. Empey leg.; RMNH • 1 ♀; Elephant Game Park, Tembe; 27°03' S, 32°24' E; 23 Feb. 1997; F. Koch leg.; ZMB • 1 ♂; same collection data as for preceding but 19 Nov. 1999; ZMB • 1 ♀; Ithala Game Res.; 27°30' S, 31°20' E; 28–30 Jan. 1995; F. Koch leg.; ZMB • 1 ♂; Ithala Game Res., Savannah; 27°30' S, 31°20' E; 4–10 Apr. 2001; F. Koch leg.; ZMB • 1 ♂; Ithala Game Reserve, Louwsburg; [27°32'48.14" S, 31°18'48.71" E]; 10–23 Dec. 1993; F. Koch leg.; THD-008-ZMB; GenBank LWR gene: MW582288; ZMB • 1 ♂; same collection data as for preceding; ZMB • 1 ♂; Kosi Bay Nature Reserve; 26°58' S, 32°50' E; 19 Apr. 1999; F. Koch leg.; THD-009-ZMB; GenBank CO1 gene: MW538556; ZMB • 1 ♂; Malvern; [29°53'06" S,

30°55'30" E]; 1904; J.P. Cregoe leg.; BMNH • 1 ♂, 1 ♀; Mbazwana; [27°30' S, 32°34'44.4" E]; 6 Dec. 2002; Ma. Halada leg.; OÖLM • 2 ♂♂; Pinetown; [29°49' S, 30°51' E]; 21 Mar. 1910; G.F. Leigh leg.; TMP • 2 ♂♂; Salt Rock Beach; [29°30'10.98" S, 31°14'19.98" E]; 8 Apr. 1958; CAS • 1 ♀; Scottburgh; [30°17' S, 30°45' E]; 15 Mar. 1963; H.N. Empey leg.; RMNH • 1 ♂; same locality as for preceding; 14 Mar. 1926; R.H.R. Stevenson leg.; BMNH • 1 ♀; Shongweni Dam; [29°51'15" S, 30°42'50" E]; 15 Jan. 1976; F.J. Herbst leg.; AMG • 1 ♂; same locality as for preceding; 25 Feb. 1971; F.L. Farquharson leg.; AMG • 2 ♀♀; Umtentweni; 30°43' S, 30°28' E; 20 Apr. 1973; H.N. Empey leg.; AMG. – **Limpopo** • 1 ♀; 16 km E of Louis Trichardt; [23°03'59.6" S, 30°03'19.4" E]; 8 Dec. 1974; J.G. and B.L. Rozen leg.; AMNH • 1 ♀; Lekgalameetse Nature Reserve; 24°12' S, 30°20' E; 25–31 Mar. 2001; F. Koch leg.; ZMB • 1 ♂; same collection data as for preceding; ZMB • 1 ♀; same collection data as for preceding but 26 Mar.–1 Apr. 2001; ZMB • 13 ♂♂, 3 ♀♀; same collection data as for preceding but 30 Oct.–3 Nov 2010; ZMB. – **Mpumalanga** • 1 ♂, 1 ♀; 20 km NW of Nelspruit [now Mbombela]; [25°20'09" S, 30°49'35.5" E]; 26 Nov. 2003; J. Halada leg.; OÖLM • 1 ♀; Blyderevierspoort National Park; 24°39' S, 30°50' E; 13 Dec. 1995; F. Koch leg.; ZMB • 2 ♀♀; same collection data as for preceding but 10 Nov. 1999; ZMB • 1 ♀; same collection data as for preceding but 13 Nov. 1999; ZMB • 1 ♀; same collection data as for preceding but 1–3 Apr. 2001; ZMB.

ZAMBIA – **Northern Province** • 1 ♀; “L. Chambezi V.; Kasama distr.”; alt. 3900 ft; 4–6 May 1908; S.A. Neave leg.; OUMNH.

ZIMBABWE – **Manicaland** • 1 ♀; Chirinda Forest; [20°24'36" S, 32°40'08" E]; Nov. 1930; BMNH • 1 ♂; same collection data as for preceding but Dec. 1935; BMNH • 1 ♂; same locality as for preceding; [20°24'37" S, 32°41'57" E]; 20 Oct. 1949; USNM.

## Description

### Female

SIZE. 25.5–28.2 mm.

COLOR. Black except for basal half of mandible, free clypeal margin and occasionally femora, which are dark ferruginous. Wings uniformly fuscous, with cyan-purple iridescence.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with two broad, indistinct processes, stepped above. Clypeus with indentation in lower center, longitudinal carina in upper center barely noticeable. Scutellum convex. Metanotum not raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.4–2.6 × length of antepenultimate spine. Petiole length 1.3–1.7 × its medial width.

### Male

SIZE. 22.9–27.0 mm.

COLOR. Black except for basal half of mandible, which is ferruginous. Wings slightly fuscous, with cyan-purple iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area brassy, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black, on posterior margin of propodeum brassy in some specimens. Erect propodeal setae oriented posteriorly.

Free clypeal margin glabrous. Scutellum densely and coarsely pubescent. Metasomal sterna II–VII with increasingly dense fringes of black setae.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII semicircular. Fused penis valvae laterally widened, without notch, valviceps oriented posterodorsally. Petiole length 1.6–2.2 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length.

### Variation

Unknown.

### Distribution

Southeastern Africa.

### Remarks

Of *Sphex stadelmanni stadelmanni*, only the holotype is known. It differs from members of the subspecies *S. s. integer* (Arnold, 1928), which was described about 30 years later, in a single character: *S. s. stadelmanni* possesses a very notable broad incision on the posterior margin of tergum VII, while *S. s. integer* has tergum VII entire. We have studied several other males from the same locality as the type, presumably collected in a similar time period, but all of them, as well as every other specimen we examined that belonged to *S. stadelmanni* s. lat. were either *S. s. integer* or *S. s. rufus* subsp. nov. The morphological disparity in the holotype of *S. stadelmanni stadelmanni* might have been the result of malformation during ontogeny. This hypothesis is corroborated by the fact that all of the other terga of the specimen appear to be deformed in a similar way, albeit asymmetrically and only on the right side. It seems as though in this case, the emarginations are placed more centrally on a tergum the further posterior it is, so the symmetrical incision on the final tergum could fit with this theory. We propose that *S. s. integer* becomes a synonym of *S. s. stadelmanni*, as the holotype of *S. s. stadelmanni* is presumably merely an aberration of the same species, though the name has priority. Perhaps future DNA analyses will reveal more information, but with the methods used in this project we cannot hope to generate meaningful data from this over 120-year-old specimen.

### *Sphex stadelmanni rufus* subsp. nov.

urn:lsid:zoobank.org:act:4873E4CA-248F-4293-852F-0144E8E2E1D9

Figs 96–97, 99 (purple)

### Differential diagnosis

Females of *S. stadelmanni rufus* subsp. nov. (Fig. 96) are easy to recognize within the *bohemanni* group because of their predominantly ferruginous clypeus, femora and tibiae. These areas are largely black in other species, with at most the free clypeal margin being ferruginous.

In males (Fig. 97), the ferruginous color on the clypeus is less extensive and sometimes barely visible, but the leg coloration is concurrent with that of the female and often sufficient for identification as well. Another character that differs from *S. stadelmanni stadelmanni* is the color of the appressed facial setae, which is silvery-white in the nominate species, but brassy in this subspecies. Both are identical in genital structure, and the shape of their penis valvae (Figs 21–22) reliably separates them from other species in the group.



**Etymology**

'*Rufus*' is a Latin adjective meaning 'red', which refers to the conspicuously-colored legs and clypeus of this taxon.

**Material examined****Holotype**

KENYA – **Taita-Taveta County** • 1 ♂; Wundanyi; [3°23'54" S, 38°21'37" E]; 5–10 Apr. 1997; Ma. Halada leg.; THD-014-OOLM; GenBank CO1 gene: MW538562; OÖLM.

**Paratypes**

KENYA – **Taita-Taveta County** • 5 ♂♂, 1 ♀; same collection data as for holotype; OÖLM • 3 ♂♂, 2 ♀♀; same collection data as for holotype but 18–22 Mar. 1997; OÖLM.

TANZANIA • 1 ♀; "German East Africa"; F. Fischer leg.; ZMB. – **Kilimanjaro Region** • 1 ♂, 2 ♀♀; "Kilimanjaro"; [3°04'33" S, 37°21'12" E]; Jan. 1906; Schröder leg.; ZMB • 1 ♀; Gonja; [4°16'09.3" S, 38°02'54.9" E]; 10 Jan. 1906; Schröder leg.; ZMB. – **Morogoro Region** • 1 ♀; "Usaramo, Rufidji, Khutusteppe"; [7°47'59.4" S, 37°29'13.1" E]; Oct.–Nov. 1896; Götze leg.; ZMB. – **Tanga Region** • 1 ♀; early 1904; A. Karasek leg.; ZMB • 1 ♂, 1 ♀; Dec. 1905; Schröder leg.; ZMB • 1 ♀; "East Usambara"; [4°59'54.1" S, 38°41'37.7" E]; F. Fischer leg.; ZMB • 1 ♀; Amani Research Institute; [5°05' S, 38°40' E]; 2 Mar. 1908; J. Vosseler leg.; ZMB • 1 ♀; Bumbuli; [4°52' S, 38°28' E]; 15 Dec. 1902; Meinhof leg.; ZMB.

**Description****Female**

SIZE. 25.0–31.5 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus excepting dorsal and lateral margin, basal half of scape, trochanters, femora and tibiae. Wings uniformly fuscous, with purple-bluish iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area black with ferruginous-golden luster, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented posteriorly. Lower center of clypeus glabrous. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin medially with two broad, indistinct processes, stepped above. Clypeus with inconspicuous indentation in lower center, longitudinal carina in upper center barely noticeable. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.5–2.8 × length of antepenultimate spine. Petiole length 1.3–1.9 × its medial width.

**Male**

SIZE. 24.5–28.2 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, longitudinal stripe medially on clypeus, basal half of scape, trochanters, femora and tibiae. Wings slightly fuscous, with violet iridescence.

**VESTITURE.** Appressed setae on clypeus and paraocular area brassy, on collar, scutum and propodeal enclosure black, on posterior margin of propodeum silvery-golden. Erect setae on clypeus black, on paraocular area black intermixed with silvery ones, on collar, scutum and propodeal enclosure black, on posterior margin of propodeum silvery-golden. Erect propodeal setae oriented posteriorly. Free clypeal margin medially glabrous. Scutellum densely and coarsely pubescent. Sterna II–VII laterally with increasingly dense fringes of black setae, sternum VIII uniformly with shorter, erect, ferruginous-brown setae which are longer laterally and posteriorly.

**STRUCTURE.** Free clypeal margin simple. Scutellum convex. Metanotum slightly raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Posterior margin of metasomal tergum VII convex. Propodeal enclosure without any notable ridges. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII semicircular. Petiole length 1.9–2.1 × its medial width. Flagellomeres IV–VI with broad placoids covering their entire length, flagellomere VII sometimes with moderately broad placoid covering approximately its basal half.

### **Variation**

Unknown.

### **Distribution**

Eastern Africa.

## **Species of the *gaullei* group**

The *gaullei* group contains the following five species: *Sphex decipiens*, *S. gaullei*, *S. jansei*, *S. pruinus* and *S. schmideggeri* sp. nov.

Members of this group can be recognized through a combination of anteriorly-oriented, curved erect propodeal setae and a convex scutellum. The orientation of the setae is best visible near the lateral margins of the propodeal enclosure and separates this group from the *umtalicus*- and *meridionalis* groups, where the erect propodeal setae are oriented perpendicularly but slightly curved towards anterior as well. Almost all of the species of the *gaullei* group can still be distinguished through their silvery or golden propodeal setae, whereas most members of the other two groups have them black. *Sphex decipiens* is a notable exception and can thus easily be mistaken as belonging to the *meridionalis* group, since, in accordance with the members of that group, it lacks the very dense and coarse setae on the scutellum that are present in the *umtalicus* group.

The presence of a convex scutellum can be used to delimit members of the *gaullei* group from those of the *satanas* group, which share the presence of anteriorly-oriented erect propodeal setae. The difference between the two is very easily recognizable in females (Fig. 5–6), but less pronounced in males. Most of them can be distinguished through the color of the clypeus and the color and density of its vestiture, as all males of the *satanas* group have the clypeus black (sometimes with the exception of having the free margin ferruginous) and the appressed and erect setae silvery-white without any conspicuous glabrous spots. In contrast, *S. jansei*, *S. gaullei* and *S. schmideggeri* sp. nov. have approximately the lower clypeal half brightly ferruginous, and the first two of them also sport golden erect facial setae. *Sphex decipiens* has the clypeus uniformly black, but its erect facial setae are also black in contrast to the silvery-white setae of the males in the *satanas* group. In addition, all males from the *gaullei* group have a notable glabrous area on the central and lower part of the clypeus, with one exception. The clypeus of male *S. pruinus* resembles that of the *satanas* group members, so the easiest character for distinguishing this species is its elongated petiole, the length of which is around 3.5 × its medial width (see Introduction for measurement details). In comparison, this coefficient is between 1.6 and 2.8 for all other males from both groups.

*Sphex decipiens* Kohl, 1895  
Figs 28, 100–101, 112 (red)

*Sphex decipiens* Kohl, 1895: 65, ♀, ♂ (syntypes: ♀, ♂, South Africa, former Cape Province, NHMW, examined).

### Differential diagnosis

This species is very distinct from the other members of the *gaullei* group, as both sexes have the clypeus black except near the free clypeal margin (Figs 28, 101), the scutellum black, the appressed facial setae silvery and the erect propodeal setae black. Therefore, *S. decipiens* is more likely to be mistaken for a species of the *umtalicus* group or, especially in the case of male specimens, one of the *meridionalis* group. Still, sequence data show that it is closely related to *S. jansei*.

One of the most diagnostically useful characters present in both sexes of members of the *umtalicus* group is a densely pubescent scutellum. Species of the *meridionalis*- and *gaullei* groups only have very sparse vestiture on the scutellum. As mentioned in the introductory remarks, this can even be seen when most of the setae have been lost due to abrasion, as the scutellar impression will usually still show the original state. Additionally, members of *S. decipiens* (Fig. 100) are distinguished from those of the *meridionalis* group by having the erect propodeal setae oriented anteriorly, as is the case for all species in the *gaullei*- and *satanas* groups. In members of the *meridionalis*- and *umtalicus* groups, the setae are more perpendicular and merely curved towards anterior (Figs 3–4). As this can be difficult to see, though, it may be easier to rely on other characters like the singular narrow placoid present only on flagellomere V of the antenna in males of the *meridionalis* group, whereas males of *S. decipiens* have a placoid on flagellomere IV and on occasion also on parts of flagellomeres III and V.

### Material examined

#### Syntypes

SOUTH AFRICA • 1 ♂, 1 ♀; “Capland”; NHMW.

#### Other material

AFRICA • 1 ♀; Cap, Cafferrie; 1865; MNHN • 1 ♂; same collection data as for preceding; MNHN.

ANGOLA • 1 ♂; Welwilsch leg.; BMNH. – **Cunene Province** • 1 ♂; Roçadas; [16°45' S, 14°59' E]; 30 Mar. 1972; BMNH.

NAMIBIA – **Erongo Region** • 1 ♀; 15 km E of Swakopmund; [22°38'17.3" S, 14°43'59.9" E]; 8 Feb. 1993; J. Gusenleitner leg.; OÖLM • 1 ♂; 20 km NW of Uis; 21°04' S, 14°41' E; 24 Mar. 2014; J. Halada leg.; OÖLM • 1 ♂, 1 ♀; 23 km N of Karibib; [21°44'45" S, 15°56'56" E]; 27 Feb. 1990; W.J. Pulawski leg.; CAS • 1 ♀; 55 km SW of Usakos; [22°31'0.6" S, 15°16'31" E]; 1 Mar. 1990; M. Schwarz leg.; OÖLM • 1 ♀; 65 km SW of Usakos; [22°31'0.6" S, 15°16'31" E]; 1 Mar. 1990; M. Schwarz leg.; OÖLM • 2 ♀♀; Otjikoko Sud Farm 33 mi. ENE of Omaruru; [21°10' S, 16°22' E]; 10–13 Feb. 1972; BMNH • 1 ♀; Phillips Ranch, 5 mi. N of Usakos; [21°55'35" S, 15°34'37" E]; 24 Oct. 1967; E.S. Ross and A.R. Stephen leg.; CAS. – **Hardap Region** • 1 ♀; 15 km S of Rehoboth; 23°28' S, 17°07' E; 20 Mar. 2014; J. Halada leg.; OÖLM • 2 ♂♂, 2 ♀♀; 23 km N of Rehoboth; [23°05'08.4" S, 17°06'11.4" E]; 15 Feb. 1990; M. Schwarz leg.; OÖLM • 1 ♀; 37–47 [km?] W of Maltahöhe; [24°52'31.8" S, 16°33'31.8" E]; 29 Mar. 1979; J.G. Rozen leg.; AMNH • 1 ♂; 49 km S of Rehoboth; [23°43'57" S, 17°16'60" E]; 14 Feb. 1990; W.J. Pulawski leg.; CAS • 5 ♂♂; 7 km N of Rehoboth; [23°13'27.3" S, 17°04'42.1" E]; 15 Feb. 1990; M. Schwarz leg.; OÖLM • 1 ♂; 73 km S of Mariental; [25°14'38.3" S, 17°56'08.2" E]; 13 Feb. 1990; M. Schwarz leg.; OÖLM • 1 ♂; 9 km N of Rehoboth; [23°12'20" S, 17°05'17" E]; 15 Feb. 1990; W.J. Pulawski leg.; CAS • 2 ♂♂; 9 km S of Rehoboth; [23°24'52.8" S, 17°04'57.9" E]; 16 Mar. 1990; M.

Schwarz leg.; OÖLM • 1 ♂; Namib-Naukluft National Park; 24°15' S, 16°14' E; 31 Jan.–1 Feb. 2007; F. Koch leg.; ZMB. – **Kavango West** • 1 ♂; 100 km SW of Rundu; [18°35'48" S, 19°06'58.3" E]; 1 Feb. 1993; J. Gusenleitner leg.; OÖLM • 1 ♀; 80 km SW of Rundu; [18°28'17.9" S, 19°14'1.9" E]; 25 Jan. 1993; M. Schwarz leg.; OÖLM. – **Khomas Region** • 1 ♂; 18 km W of 1237/C26 junction; 23°09' S, 16°42' E; 11 Mar. 1999; F.W. and S.K. Gess leg.; AMG • 1 ♂; Regenstein 15 mi. SSW of Windhoek; [22°44'01" S, 17°02'08" E]; 7 Feb. 1972; BMNH • 2 ♀♀; same collection data as for preceding but 8 Feb. 1972; BMNH • 1 ♀; S of Okasewa; 22°34'53" S, 18°11'15" E; 12–17 Feb. 2010; J. Oehlke leg.; coll. Jacobs. – **Kunene Region** • 1 ♀; 15 km SE of Outjo; [20°11'47.9" S, 16°16'01" E]; 3 Mar. 1990; M. Schwarz leg.; OÖLM • 1 ♀; Otjitambi Farm 27 mi. ESE of Kamanjab; [19°49' S, 15°10' E]; 14 Feb. 1972; BMNH • 2 ♀♀; same collection data as for preceding but 13–15 Feb. 1972; BMNH. – **Oshikoto Region** • 2 ♀♀; 10 km SE of Tsumeb; [19°17'31" S, 17°48'27.6" E]; 8 Mar. 1990; M. Schwarz leg.; OÖLM • 2 ♂♂; same locality as for preceding; 8 Mar. 1990; W.J. Pulawski leg.; CAS. – **Otjozondjupa Region** • 1 ♂, 2 ♀♀; 15 km NW of Otjiwarongo; [20°19'26.8" S, 16°36'36.5" E]; 3 Mar. 1990; M. Schwarz leg.; OÖLM • 1 ♂; 23 km W of Okahandja; [21°55'55.6" S, 16°40'19.6" E]; 17 Feb. 1977; J.G. and B.L. Rozen leg.; AMNH • 1 ♂; 27 km S of Okahandja; [20°50'18" S, 16°14'21.3" E]; 18 Feb. 1990; M. Schwarz leg.; OÖLM • 5 ♂♂, 1 ♀; 3 km NE of Kalkfeld; [20°50'18" S, 16°14'21.3" E]; 2 Mar. 1990; M. Schwarz leg.; OÖLM • 1 ♂; 30 km NE of Grootfontein; [19°22'19.4" S, 18°18'40.3" E]; 9 Mar. 1990; M. Schwarz leg.; OÖLM • 1 ♂; 37 km N of Windhoek; [22°12'16.1" S, 17°00'40" E]; 18 Feb. 1990; M. Schwarz leg.; OÖLM • 1 ♂; 40 km W of Okahandja; [21°53'54.9" S, 16°30'50.7" E]; 3 Feb. 1993; M. Schwarz leg.; OÖLM • 1 ♀; 90 km NE of Grootfontein; [18°59'50.5" S, 18°44'22.3" E]; 16 Jan. 1993; J. Gusenleitner leg.; OÖLM • 1 ♂; Gondwana Canyon Park; 20°30' S, 17°14' E; 21–25 Feb. 2008; F. Koch leg.; ZMB • 1 ♀; Okahandja; [21°59' S, 16°55' E]; 19 Feb. 1990; M. Schwarz leg.; OÖLM • 1 ♂; Otavi; [19°39' S, 17°20' E]; 2 Feb. 1993; M. Schwarz leg.; OÖLM • 1 ♂; Von Bach Dam, Okahandja; [22°00'49" S, 16°57'10" E]; 26 Feb.–15 Mar. 2010; F. Koch leg.; ZMB • 1 ♂; Waterberg, Main Camp; 20°30' S, 17°14' E; 2–10 Nov. 2007; F. Koch leg.; ZMB • 1 ♂; Waterberg, Okatijikona; 20°24' S, 17°24' E; 27–28 Feb. 2010; F. Koch leg.; ZMB.

SOUTH AFRICA • 1 ♂; Cape Province, Huguenot; Feb. 1932; BMNH. – **Eastern Cape** • 1 ♂; “Resolution, Albany Distr.”; 22 Dec. 1927; A. Walton leg.; TMP • 3 ♂♂, 1 ♀; 25 km N of Jansenville; 32°49' S, 24°44' E; 4 Jan. 2010; J. Halada leg.; OÖLM • 1 ♂, 1 ♀; 6 km S of Willowmore; 33°20' S, 23°27' E; 26 Jan. 1996; W.J. Pulawski leg.; CAS • 1 ♂; Algoa Bay; [33°50' S, 25°50' E]; H. Brauns leg.; TMP • 1 ♀; Clifton Farm, 18 km NW of Grahamstown; 33°11' S, 26°24' E; 16 Jan. 1996; W.J. Pulawski leg.; CAS • 4 ♂♂, 1 ♀; Colonie du Cap, Steynsburg; [31°17'47" S, 25°49'22" E]; 1914; R. Ellenberger leg.; MNHN • 1 ♂; Graaf-Reinet-Nieu-Bethesa; [31°52' S, 24°33' E]; 28 Jan. 2001; M. Snižek leg.; OÖLM • 1 ♀; Grahamstown; [33°18'36" S, 26°31'36" E]; 17 Jan. 1998; F. Schröder leg.; ZMB • 1 ♀; Olifantskop Pass, 30 km W of Grahamstown; [33°19'07.68" S, 25°56'47.4" E]; 25 Jan. 2000; J. Halada leg.; OÖLM • 1 ♂, 2 ♀♀; Somerset East; [32°43'18" S, 25°35'16" E]; 8 Dec. 1930; R.E. Turner leg.; BMNH • 2 ♂♂; Vlakwater, Grahamstown; 33°08'33" S, 26°18'20" E; 21 Nov. 1994; V. Mauss leg.; ZMB • 1 ♂; Warmbad, SW of Willowmore; [33°17' S, 23°29' E]; 14 Jan. 1998; F. Schröder leg.; THD-010-ZMB; GenBank CO1 gene: MW538566; ZMB • 1 ♀; Willowmore; [33°17' S, 23°29' E]; 1 Feb. 1903; H. Brauns leg.; BMNH • 1 ♀; same collection data as for preceding but 17 Feb. 1903; TMP • 1 ♀; same collection data as for preceding but 25 Feb. 1903; BMNH • 1 ♂; same collection data as for preceding but 6 Dec. 1906; TMP • 1 ♀; same collection data as for preceding but 20 Dec. 1911; TMP • 1 ♂; same collection data as for preceding but 10 Jan. 1912; BMNH • 1 ♀; same locality as for preceding; 1904; G. Kobrow leg.; TMP • 1 ♂; Zuurberg Area; [33°21'2.9" S, 25°44'44.3" E]; 30 Nov. 1994; V. Mauss leg.; ZMB. – **Free State** • 1 ♂, 1 ♀; Orange River, 30 km N of Colesberg; [30°24'33.3" S, 25°06'17.7" E]; 25 Nov. 2002; M. Halada leg.; OÖLM • 1 ♀; Wepener; [29°44' S, 27°02' E]; 18 Jan. 1965; H.N. Empey leg.; RMNH. – **North West** • 1 ♂, 2 ♀♀; 20 km W of Bothaville, Klerksdorp, Vaal River; [26°57'0.9" S, 26°45'44.4" E]; 31 Jan. 2001; M. Snižek leg.; OÖLM. – **Northern Cape** • 1 ♀; Belmont; [29°00' S, 23°30' E]; 22 Feb. 1934; J. Ogilvie leg.; BMNH • 1 ♂; Olifantshoek; [27°56' S, 22°44' E]; 24 Mar. 1990;

M. Schwarz leg.; OÖLM • 1 ♂; S Kalahari Desert, Van Zylsrus; [26°52'1.2" S, 22°03' E]; 15 Jan. 2001; M. Snižek leg.; OÖLM. – **Western Cape** • 1 ♂; 18 mi. SE of Touwsrivier; [33°27'52.7" S, 20°18'52.4" E]; 12 Nov. 1966; J.G. Rozen leg.; AMNH • 1 ♂; Barrydale; [33°54'29" S, 20°43' E]; 16 Dec. 2002; M. Snižek leg.; OÖLM • 1 ♂, 1 ♀; Bontebok National Park, Swellendam; [34°04'06.8" S, 20°28'06.6" E]; 2–3 Jan. 1993; F. Koch leg.; ZMB • 1 ♀; same collection data as for preceding; THD-001-ZMB; GenBank EF-1 $\alpha$  gene: MW558235; GenBank LWR gene: MW582286; ZMB • 1 ♂; Cape Town, Kloof Nek; [33°56'13" S, 18°23'59" E]; Jan. 1932; BMNH • 2 ♂♂; Ceres; [33°22'08" S, 19°18'39" E]; Dec. 1920; R.E. Turner leg.; BMNH • 1 ♂; Kirstenbosch; [33°58'57" S, 18°25'49" E]; 10 Nov. 1931; BMNH • 4 ♂♂; Klein-Karoo, Groot River, Langeberg; [33°50' S, 20°00' E]; 24 Nov. 2002; Ma. Halada leg.; OÖLM • 1 ♂, 1 ♀; Matjesfontein; [33°13'51" S, 20°35' E]; 19–31 Dec. 1928; R.E. Turner leg.; BMNH • 1 ♀; Pakhuis Pass; Clanwilliam; [32°10' S, 18°52' E]; 17 Jan. 2001; M. Snižek leg.; OÖLM • 1 ♀; Sea Point; [33°55'06" S, 18°23'22" E]; Nov. 1931–Jan. 1932; BMNH • 1 ♂; Wellington, Rooshoek; [33°34'11.8" S, 19°04'2.3" E]; Dec. 1959; A.M. Verhoeff leg.; RMNH • 1 ♂; same collection data as for preceding but Jan. 1960; RMNH • 1 ♀; Worcester; [33°38'47" S, 19°26'54" E]; Dec. 1933; R.E. Turner leg.; BMNH.

## Description

### Female

SIZE. 20.4–23.9 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, free clypeal margin, occasionally antenna from scape up to flagellomere V and occasionally legs from distal half of femur onward. Wings uniformly fuscous, with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented anteriorly. Clypeus with glabrous spot in lower center. Scutellum sparsely and finely pubescent.

STRUCTURE. Free clypeal margin simple, stepped medially. Clypeus without indentation or carina. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 1.7–2.0 × length of antepenultimate spine. Petiole length 1.9–2.0 × its medial width.

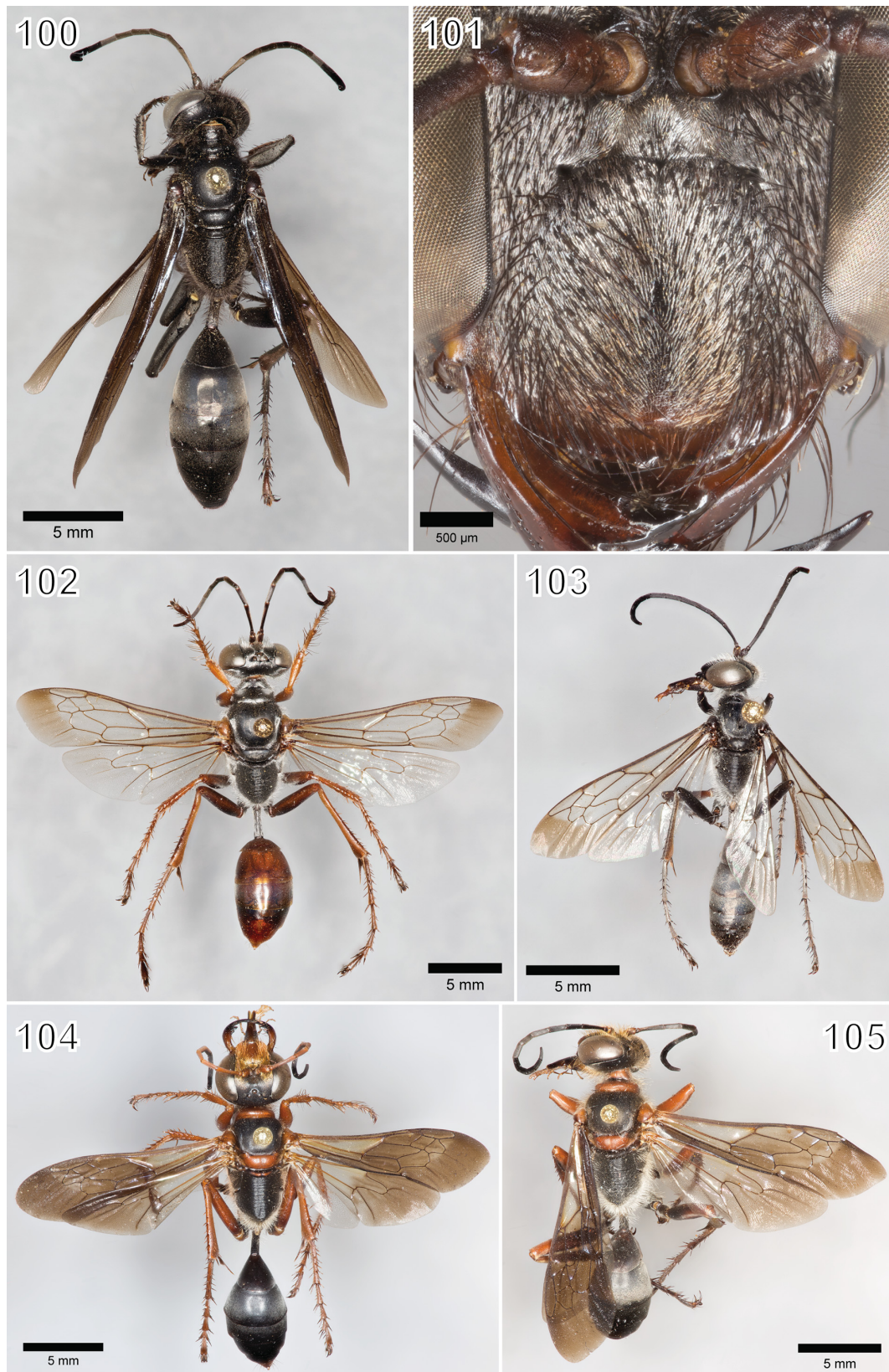
### Male

SIZE. 16.6–20.5 mm.

COLOR. Black, except for ferruginous stripe in center of mandible. Wings fuscous, with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented anteriorly. Lower part of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII very slightly concavely emarginate. Penis valvae without conspicuous modifications. Petiole length 1.9–2.2 × its medial width. Flagellomere III with narrow placoid covering it to varying extent, flagellomere IV with



**Figs 100–105.** 100–101. *Sphex decipiens* Kohl, 1895. 102–103. *S. pruinosus* Germar, 1817. 104–105. *S. gaullei* Berland, 1927. 100, 103, 105. Habitus of ♂. 101. Frontal view of ♀. 102, 104. Habitus of ♀.

narrow placoid nearly covering entire length, flagellomere V with placoid absent or narrow, covering it to varying extent.

### Variation

In females, antennae and legs can be partially ferruginous, and males can have the lower clypeal area more or less ferruginous.

### Distribution

Southern and southwestern Africa.

*Sphex gaullei* Berland, 1927  
Figs 6, 31–32, 104–105, 112 (yellow)

*Sphex gaullei* Berland, 1927: 151, ♀, ♂.

*Sphex rufiscutis laevigatus* Arnold, 1951: 145, ♀. Junior primary homonym of *Sphex laevigatus* Rossi, 1794. **Syn. nov.**

### Differential diagnosis

This species is very similar to *S. jansei* and has frequently been mistaken for it in the past, as until now there were no identification keys that featured both species. The morphological differences between the two are subtle, but undeniable.

Females of *S. jansei* (Fig. 106) and *S. gaullei* (Fig. 104) are characterized through their ferruginous clypeus with golden setae, their convex, sparsely pubescent, ferruginous scutellum, and their almost completely black scutum, petiole and metasoma. *Sphex schmideggeri* sp. nov. (Fig. 108) is similar, but has the scutum, petiole and metasomal tergum I predominantly ferruginous. The main characters that distinguish *S. gaullei* from *S. jansei* are the color of the erect propodeal setae, which is brownish-gray in *S. gaullei* and silvery-white in *S. jansei*, and the extent of the reddish coloration on the body. *Sphex jansei* has the pronotal lobe mostly black, with the posterior margin ferruginous at most, and some specimens also have a black collar. In *S. gaullei*, the collar and pronotal lobe are predominantly ferruginous.

Regarding males, *S. jansei* (Fig. 107) and *S. gaullei* (Fig. 105) both have approximately the lower half of the clypeus ferruginous and the remainder black, with the erect propodeal setae being silvery. What separates them is the fact that *S. gaullei* has the distal half of the fore- and hindwing notably infusate (Fig. 32). In contrast, the wings of *S. jansei* are hyaline in the cellular area and only the apical margin is fuscous (Fig. 30). Both species have the erect facial setae golden, whereas male *S. schmideggeri* sp. nov. have them silvery.

### Material examined

#### Lectotype (designated here)

CENTRAL AFRICAN REPUBLIC – **Nana-Grébizi** • ♀; Fort-Crampel [now Kaga-Bandoro]; MNHN.

#### Paralectotypes

CENTRAL AFRICAN REPUBLIC – **Nana-Grébizi** • 1 ♂; same collection data as for holotype; MNHN • 1 ♀; same collection data as for holotype; BMNH.

#### Other material

BURKINA FASO – **Cascades Region** • 1 ♀; Tingréla, Banfora; [10°38'31.7" N, 4°49'50.9" W]; 20 Dec. 1967; J. Hamon leg.; MNHN. – **Hauts-Bassins Region** • 1 ♂; Bobo-Dioulasso; [11°11' N, 4°17' W];

10 Nov. 1967; J. Hamon leg.; MNHN • 1 ♂; Koro; [11°09' N, 4°12' W]; 10 Dec. 1967; J. Hamon leg.; MNHN • 1 ♂; same collection data as for preceding but 13 Dec. 1967; MNHN.

DEMOCRATIC REPUBLIC OF THE CONGO – **Nord-Ubangi** • 2 ♀♀; Yakoma; [4°05'53" N, 22°26'45" E]; 12 Feb. 1932; H.J. Brédo leg.; MRAC • 6 ♀♀; same collection data as for preceding but 17 Feb. 1932; MRAC.

ETHIOPIA • 1 ♂, 1 ♀; 1882; Raffray leg.; MNHN.

GHANA – **Savannah Region** • 1 ♀; Yapi [Yapei]; [9°09'08" N, 1°08'52" W]; J.J. Simpson leg.; BMNH.

MALI – **Bamako Region** • 1 ♀; Barainba, NE of Bamako; [12°39' N, 8°00' W]; Aug. 1991; G. Popov leg.; BMNH. – **Mopti Region** • 1 ♀, holotype of *Sphex rufiscutis laevigatus* Arnold, 1951; near Sofara; [14°01' N, 4°14' W]; 3 Sep. 1944; K.M. Guichard leg.; BMNH.

NIGERIA • 1 ♀; Michika-Bama; 6 Dec. 1979; G. Popov leg.; BMNH. – **Oyo State** • 1 ♀; Fashola near Oyo; [7°54' N, 3°47' E]; 15 Nov. 1975; J.T. Medler leg.; USNM.

REPUBLIC OF CÔTE D'IVOIRE – **Vallée du Bandama District** • 1 ♂; Bouaké; [7°41' N, 5°01' W]; 1977; P.M. Elsen leg.; MRAC.

RWANDA – **Western Province** • 1 ♀; Ishwa, Lake Albert; [2°23'04" S, 28°55'58" E]; Sep. 1935; H.J. Brédo leg.; MRAC.

SENEGAL • 1 ♂; “Between Tambacounda and Kaffrine”; 27–30 Dec. 1967; M. Coruet leg.; MNHN.

SUDAN – **South Kordofan** • 1 ♀; Talodi, Nouzi, Nuba Mountains; [10°37'56" N, 30°22'46" E]; Nov. 1921; F. Moysey leg.; BMNH.

## Description

### Female

SIZE. 19.7–23.1 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, labrum, clypeus, scape, pedicel, flagellomeres I–V, collar, tegula, pronotal lobe, prepectus, scutellum, metanotum, forecoxa and legs from trochanter onward, except apical half of claw. Basal wing half often with yellow tinge, apical half fuscous with violet iridescence.

VESTITURE. Appressed setae on clypeus, paraocular area and scutum golden, on propodeal enclosure silvery-golden. Erect setae on clypeus and paraocular area ferruginous-golden, on collar and scutum ferruginous, on propodeal enclosure brownish-gray. Erect propodeal setae oriented anteriorly. Lower center of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin slightly notched medially, stepped above. Clypeus without indentation or carina. Scutellum convex. Metanotum raised, slightly bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with eight to twelve sharply distinct transversal ridges. Foretarsomere I 1.7–1.8 × length of antepenultimate spine. Petiole length 2.0–2.4 × its medial width.

### Male

SIZE. 17.0–21.2 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, labrum, scape, pedicel ventrally, proximal third of flagellomere I ventrally, lower half of clypeus, legs from femur or



tibia onward up to tarsomere II, collar, tegula and dorsal part of scutellum. Basal wing half hyaline, apical half fuscous with violet iridescence.

**VESTITURE.** Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect setae on clypeus and paraocular area golden, on collar ferruginous-golden, on scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Lower part of clypeus glabrous. Scutellum densely and finely pubescent.

**STRUCTURE.** Free clypeal margin simple. Scutellum convex. Metanotum raised, slightly bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with indistinct ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII concavely emarginate. Penis valvae without conspicuous modifications. Petiole length 2.2–2.4 × its medial width. Flagellomeres III + IV with narrow placoids covering their entire length.

### Variation

Unknown.

### Distribution

Western to central Africa.

***Sphex jansei*** Cameron, 1910  
Figs 2, 29–30, 106–107, 112 (purple)

*Sphex jansei* Cameron, 1910: 139, ♂ (holotype or syntype: 1 ♂, South Africa, Gauteng, Pretoria, TMP, not examined).

*Chlorion rufiscute* R. Turner, 1918: 359, ♀, ♂ (as *C. rufiscutis*, incorrect original termination). **Syn. nov.**

*Sphex mochii* Giordani Soika, 1942: 197, ♀ (as *S. Mochii*, incorrect original capitalization) (holotype: ♀, Ethiopia, Oromia Region, km 46 on Harrar–Dire Dawa Road, depository?, not examined).

**Syn. nov.**

### Differential diagnosis

Females of *S. jansei* (Fig. 106) are distinguished through their hyaline cellular wing area (Fig. 29) and silvery-white propodeal setae, whereas those of *S. gaullei* (Fig. 104) and *S. schmideggeri* sp. nov. (Fig. 108) have the propodeal setae brownish-grey. The cellular wing area of *S. gaullei* is somewhat infuscate (Fig. 31), while that of *S. schmideggeri* sp. nov. has a distinct yellow tinge.

Males of *S. jansei* (Fig. 107), as well as those of *S. gaullei* (Fig. 105), are distinguished from those of the remaining group members by their combination of a notable ferruginous clypeus and golden erect facial setae. *Sphex jansei* has the cellular forewing area hyaline and only a fuscous spot on the anterior part of the apical hindwing margin (Fig. 30), whereas *S. gaullei* has most of the cellular forewing area and all of the hindwing apex infuscate (Fig. 32).

### Material examined

AFRICA • 3 ♀♀; ZMB.

BOTSWANA – **South-East District** • 1 ♂, 1 ♀; Gaborone Dam; [24°42'0.58" S, 25°55'34.97" E]; 28 Dec. 1977; H.R. Feijen leg.; RMNH.

CENTRAL AFRICAN REPUBLIC – **Ouham-Pendé** • 1 ♀; Bozoum; [6°19'02" N, 16°22'42" E]; 30 Apr. 1914; S. Tessmann leg.; ZMB.

**KENYA** – **Homa Bay County** • 1 ♂; Gembe Hills, near seasonal stream; 0.48933° S, 34.24333° E; 15–22 Jan. 2005; R. Copeland leg.; ICIPE. – **Nakuru County** • 1 ♂; Mount Longonot Crater; [0°54'55" S, 36°27'25" E]; Dec. 1911; Ch. Alluaud and Jeannel leg.; MNHN.

**MALAWI** • 1 ♂, 1 ♀; NW shore of Lake Nyasa, between Florence Bay and Karonga; 30 Jun.–6 Jul. 1910; S.A. Neave leg.; BMNH. – **Northern Region** • 1 ♂; Karonga; [9°56' S, 33°56' E]; 7–11 Jul. 1910; S.A. Neave leg.; BMNH • 1 ♂, 1 ♀; Karonga District, valley of N Rukuru; [9°56' S, 33°56' E]; 15–18 Jul. 1910; S.A. Neave leg.; BMNH. – **Southern Region** • 1 ♂; Liwonde; [14°50' S, 35°20' E]; 23 Apr. 1975; G.G.M. Schulten leg.; RMNH.

**MOZAMBIQUE** – **Maputo City** • 1 ♂; Maputo; [25°58' S, 32°35' E]; 12 Feb. 1994; G.G.M. Schulten leg.; RMNH. – **Maputo Province** • 1 ♂; Moamba; [25°36'14.4" S, 32°14'45.6" E]; 27 Jan. 1976; G.G.M. Schulten leg.; RMNH • 1 ♀; Rikatla, N of Maputo; [25°46'57.9" S, 32°37'22.1" E]; 7–18 Apr. 1982; G.G.M. Schulten leg.; RMNH.

**SOUTH AFRICA** – **Gauteng** • 3 ♂♂, 1 ♀; Pretoria; [25°43'32" S, 28°14'38" E]; 25 Jan.–5 Mar. 1969; R.T. Simon Thomas leg.; RMNH • 1 ♀; Salt Pan, Pretoria; [25°24'30.55" S, 28°04'57.1" E]; 4–10 Feb. 1929; G. van Son leg.; TMP • 1 ♀; same collection data as for preceding but 14 Mar. 1956; TMP. – **KwaZulu-Natal** • 1 ♂; Estcourt; [29°00' S, 29°53' E]; 4 Mar. 1963; H.N. Empey leg.; RMNH • 1 ♂; Ithala Game Res.; 27°30' S, 31°20' E; 28–30 Jan. 1995; F. Koch leg.; THD-025-ZMB; Genbank CO1 gene: MW538561; ZMB • 1 ♀; Lake St Lucia, False Bay; [28°00'31.3" S, 32°21'39.9" E]; 13–17 Feb. 1967; D. Gillissen and L. Blommers leg.; RMNH • 1 ♂; Mkuze Game Reserve; 27°37' S, 32°14' E; 26 Feb.–3 Mar. 1987; A.J. Weaving leg.; AMG • 1 ♂, 2 ♀♀; same collection data as for preceding but 8–12 Mar. 1987; AMG • 1 ♀; Weenen; [28°50'57" S, 30°04'38" E]; Feb. 1925; H.P. Thomasset leg.; BMNH • 1 ♂; same collection data as for preceding but Mar. 1925; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but Jan.–Mar. 1927; BMNH. – **Limpopo** • 1 ♂; Punda Milia, Kruger National Park; [22°41'51.5" S, 31°01'13.8" E]; 22 Feb. 1969; R.T. Simon Thomas leg.; RMNH. – **Mpumalanga** • 1 ♀; 40 km SW of Komalipoor; [25°48'43" S, 31°49'46" E]; 1–2 Jan. 2004; J. Halada leg.; OÖLM • 2 ♀♀; Blyde River Canyon; [25°14'40.5" S, 30°16'24.1" E]; 28 Feb. 1982; F.J. Herbst leg.; AMG. – **North West** • 1 ♀; Mamagalieskraal; [25°32' S, 27°49' E]; 16 Mar. 1926; W. Lingnau leg.; DEI.

**TANZANIA** – **Lindi Region** • 1 ♂; Lindi; [9°59'49" S, 39°42'59" E]; 24–30 Jun. 1936; Zerny leg.; NHMW. – **Mbeya Region** • 2 ♀♀; Langenburg [now Tukuyu]; [9°15' S, 33°39' E]; 26 Jul.–8 Aug. 1898; F. Fülleborn leg.; ZMB • 1 ♀; same collection data as for preceding but 3 Sep.–4 Nov. 1898; ZMB. – **Morogoro Region** • 1 ♀; 50 km SW of Morogoro; 6°50' S, 37°15' E; 12 Jan. 2007; J. Halada leg.; OÖLM. – **Rukwa Region** • 1 ♀; Kafokola, Rukwa Valley, SW Tanganyika; [8°00' S, 32°00' E]; 9 Jun. 1952; O.W. Richards leg.; BMNH.

**ZAMBIA** • 1 ♀; “Luangwa to Petauke”; 14–17 Sep. 1910; S.A. Neave leg.; BMNH • 1 ♀, holotype of *Chlorion rufiscute* R. Turner, 1918; “Sinapunge”; 13 Feb. 1911; Silverlock leg.; BMNH • 1 ♂, 1 ♀; same collection data as for preceding; BMNH. – **Eastern Province** • 1 ♂; near mouth of Lusangazi River; [13°25'57.5" S, 31°32'31" E]; 1–3 Sep. 1910; S.A. Neave leg.; BMNH.

**ZIMBABWE** – **Bulawayo** • 1 ♀; Bulawayo; [20°10'12" S, 28°34'48" E]; 26 Jul. 1923; R.H.R. Stevenson leg.; USNM. – **Manicaland** • 2 ♂♂; 10–20 km S of Birchenough Bridge; [20°05'35.8" S, 32°21'06.7" E]; 24 Dec. 1998; M. Snižek leg.; OÖLM. – **Mashonaland West** • 1 ♀; 15 km NW of Makuti; [16°12' S, 29°09' E]; 12 Apr. 1985; J. Gusenleitner leg.; NHMW • 1 ♂; Sanyati Camp, Lake Kariba; [17° S, 28° E]; 8–10 Jan. 1985; A.J. Weaving leg.; AMG. – **Matabeleland North** • 1 ♂; Lonely Mine; [19°30'06" S, 28°44'49" E]; 18 Apr. 1914; H. Swale leg.; BMNH • 1 ♂; same collection data as for preceding but 19

Sep. 1914; BMNH • 1 ♀; Matetsi; [18°05' S, 26°07' E]; 1 Apr. 1934; R.H.R. Stevenson leg.; RMNH • 1 ♀; same collection data as for preceding but 28 Oct. 1934; BMNH • 1 ♂; Victoria Falls; [17°56' S, 25°50' E]; 14 Jan. 1969; F.J. Herbst leg.; AMG. – **Matabeleland South** • 1 ♀; Beit Bridge; [22°13' S, 30°00' E]; Apr. 1932; A. Mackie leg.; BMNH • 2 ♂♂; same locality as for preceding; 27 Mar. 1960; C.F. Jacot-Guillarmod leg.; AMG.

## Description

### Female

SIZE. 21.2–25.0 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, scape, pedicel, flagellomeres I–IV, clypeus, legs from trochanter onward, excluding apical half of claw, and occasionally collar dorsally, tegula, scutellum, dorsal part of metanotum and apical segment of metasoma. Cellular area of fore- and hindwing hyaline, apical margin fuscous.

VESTITURE. Appressed and erect setae on clypeus and paraocular area golden, on collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus medially with vertical glabrous stripe. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin stepped medially, with slight indentation above. Scutellum convex. Metanotum slightly raised, not markedly bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 1.8–2.0 × length of antepenultimate spine. Petiole length 2.4–2.7 × its medial width.

### Male

SIZE. 20.1–22.8 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, scape, pedicel ventrally, lower part of clypeus, legs from trochanter onward, excluding posterodorsal portion of trochanter and femur as well as apical half of claw, tegula and dorsal part of scutellum. Cellular area of forewing hyaline, apical margin fuscous. Hindwing hyaline.

VESTITURE. Appressed setae on clypeus and paraocular area silvery-golden, on collar, scutum and propodeal enclosure silvery. Erect setae on clypeus and paraocular area golden, on collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus medially with vertical glabrous stripe. Scutellum densely and finely pubescent.

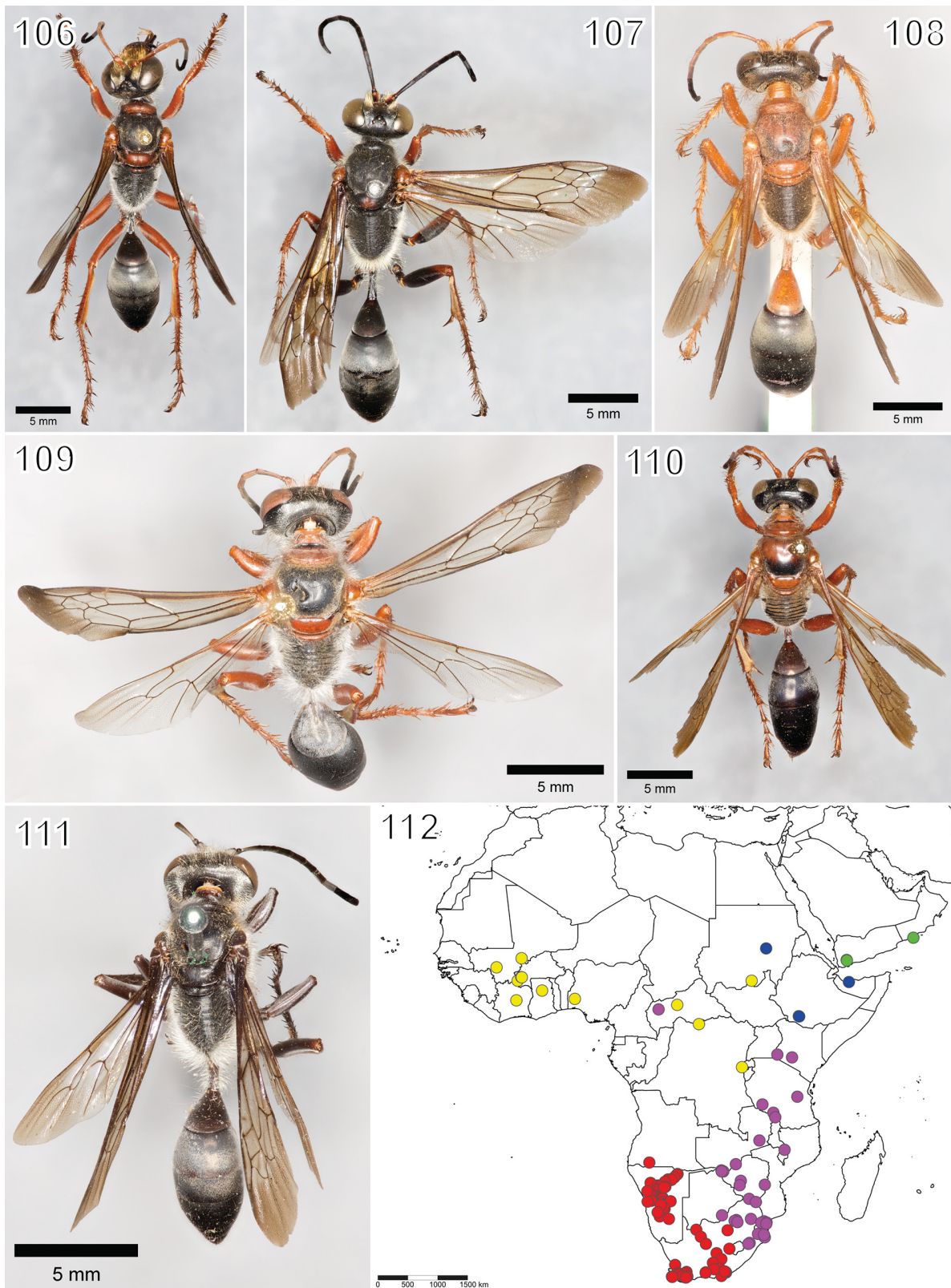
STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum slightly raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with indistinct ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII concavely emarginate. Penis valvae without conspicuous modifications. Petiole length 2.3–2.8 × its medial width. Flagellomeres III + IV with narrow placoids covering their entire length.

## Variation

Unknown.

## Distribution

Southeastern to eastern Africa.



**Figs 106–112.** 106–107. *Sphex jansei* Cameron, 1910. 108. *S. schmideggeri* sp. nov. 109. *S. pseudo-satanas* sp. nov. 110–111. *S. rufoclypeatus* sp. nov. 106, 108–110. Habitus of ♀. 107, 111. Habitus of ♂. 112. Geographic distribution of *S. decipiens* Kohl, 1895 (red), *S. pruinus* Germar, 1817 (blue), *S. gaullei* Berland, 1927 (yellow), *S. jansei* (purple) and *S. schmideggeri* sp. nov. (green).

## Remarks

Besides the original description, there are almost no other publications that mention diagnostic characters for this species. Brauns (1917) placed it in the genus *Isodontia* Patton, 1880, which, as correctly noted by Arnold (1928), must be incorrect due to the length of the petiole being described as only one-fourth longer than the hind coxa. Arnold also indicated that *S. jansei* may be synonymous to *S. rufiscutis*, but he was not able to certify this because of “the description of the colour [...] [being] too confused”. He stated that the type specimen of *S. jansei* could no longer be found in the TMP. Despite receiving material from the collection and having specifically requested the type specimen to be sent, it was not included in the loan, and further inquiries remained unanswered. Thus, we were forced to rely solely on the original description.

Part of the reason why it is difficult to interpret the color characters given by Cameron (1910) is that there likely were some important words omitted in the text; an attempt at correcting this issue is presented here:

“Black; ... mandibles, except the teeth, [red, as well as] the apex of clypeus, the centre broadly (the red colour extending near to the middle in the centre), the sides narrowly, antennal scape, tegulae, and the legs, except the [following which are all black:] coxae, greater part of the trochanters, a streak on the basal outer half of the fore femora, the basal three-fourths of the middle behind, and the hinder with more than three-fourths, ...”

Assuming these changes concur with Cameron’s intended description, the characters mentioned very closely match those we observed in males of *S. rufiscutis* and even rule out conspecificity with the similar *S. gaullei*, which is found in the equatorial regions of Africa, on account of the wing coloration. The geographic distribution of *S. jansei* and *S. rufiscutis* fit together as well, and all other species from southern Africa, an area from which we examined a large amount of material, are quite distinct. Therefore, we propose that *jansei* becomes the valid name for this species.

The type material of *Sphex mochii* Giordani Soika, 1942, is apparently lost, so the original description by Giordani Soika (1942) is the only basis we can use to discern its taxonomic identity.

The original description stated that the female of *S. mochii* is similar to that of *S. rufiscutis* (R. Turner, 1918) (= *S. jansei* Cameron, 1910). The scutellum was said to be more convex than in *S. jansei*, and the scutellum and metanotum are medially impressed. The petiole was described as being much shorter than in *S. pruinosus*. The wings of *S. mochii* were stated to be hyaline with the apical margin of the forewing infuscate, and the color pattern described corresponds with that of *S. jansei* and three other African species that are superficially similar (*S. gaullei*, *S. pseudosatanas* sp. nov. and *S. occidentalis* sp. nov.). Even so, the description cannot refer to *S. pseudosatanas* sp. nov., as this species has the scutellum markedly flatter than in *S. jansei*. Additionally, *S. occidentalis* sp. nov. can be ruled out due to its having uniformly fuscous wings. Finally, *S. gaullei* does not entirely match the description either, because a large part of its cellular wing area is infuscate (Fig. 31). Also, the scutellum of *S. jansei* and *S. gaullei* is more or less identical. We conclude that *S. mochii* is identical to *S. jansei* (= *rufiscutis*), which is in contrast to Giordani Soika’s original interpretation.

***Sphex pruinosus*** Germar, 1817  
Figs 102–103, 112 (blue)

*Sphex pruinosus* Germar, 1817: 261, ♂ (as *S. pruinosa*, incorrect original termination).

*Sphex scioensis* Gribodo, 1879: 343, ♀ (as *S. Scioensis*, incorrect original capitalization) (holotype not examined). Synonymized with *Sphex pruinosus* by Kohl 1890: 391.

### Differential diagnosis

Among the African *Sphex*, this species is easily recognized. Both sexes have a very long petiole (Figs 102–103), its length usually being more than three times its medial width. The only other species with a comparably long petiole is *S. cinerascens* (Fig. 38), both sexes of which have a conspicuous process medially on the free clypeal margin, similar to the one present in males of the *umtalicus* group. *Sphex cinerascens* has a yellow tinge on the basal half of the forewing, and its metasoma is completely black, whereas *S. pruinosus* lacks the yellow tinge and, in females, often has the anterior half of the metasoma somewhat ferruginous.

### Material examined

#### Holotype or syntype

CROATIA – **Split-Dalmatia County** • ♂; Spalatro [now Split]; ZMB.

#### Other material

AFRICA • 1 ♂; “Africa”; DEI.

ETHIOPIA – **Southern Nations, Nationalities, and Peoples’ Region** • 1 ♀; 10 km SE of Konso; [5°18’ N, 37°28’ E]; 17 Apr. 2007; J. Halada leg.; OÖLM • 1 ♂; 20 km SE of Konso; 5°15’ N, 37°32’ E; 11–13 May 2015; J. Halada leg.; OÖLM.

OMAN – **Ad Dakhiliyah Governorate** • 1 ♂; wadi near Al Ghul, S of Nizwa; 22°53.4’ N, 57°31.12’ E; 10 Dec. 2003; M. Ohl leg.; THD-036-ZMB; GenBank EF-1 $\alpha$  gene: MW558236; GenBank LWR gene: MW582275; ZMB.

SOMALIA – **Woqooyi Galbeed** • 6 ♂♂; Berbera; [10°26’22” N, 45°00’51” E]; 12 Mar. 1949; K.M. Guichard leg.; BMNH.

SUDAN – **Khartoum State** • 1 ♀; Khartoum; [15°30’02” N, 32°33’36” E]; 4 Apr. 1964; L. Razoux Schulz leg.; RMNH • 2 ♂♂; same collection data as for preceding but 5 Oct. 1964; RMNH • 1 ♀; same locality as for preceding; 18 Nov. 1986; G.G.M. Schulten leg.; RMNH • 1 ♀; same collection data as for preceding but 4 Dec. 1991; RMNH.

### Description

#### Female

SIZE. 21.3–23.2 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, scape, tegula, legs from femora onward and metasoma. Wings hyaline, apical margin of forewing fuscous.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin with small notch medially, not stepped above. Clypeus without indentation and carina. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with 5–8 transversal ridges. Foretarsomere I 1.4–2.0  $\times$  length of antepenultimate spine. Petiole length 3.2–3.3  $\times$  its medial width.

#### Male

SIZE. 15.6–18.2 mm.

**COLOR.** Black except for ferruginous stripe in center of mandible. Wings hyaline, apical margin of forewing fuscous.

**VESTITURE.** Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus usually without glabrous spot. Scutellum densely and finely pubescent.

**STRUCTURE.** Free clypeal margin simple. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with 3–5 indistinct transversal ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII concavely emarginate. Petiole length 3.0–3.8× its medial width. Flagellomeres III–VI with broad placoids covering their entire length.

### Variation

Unknown.

### Distribution

Northeastern Africa, Mediterranean region, Arabian Peninsula to India.

### *Sphex schmideggeri* sp. nov.

urn:lsid:zoobank.org:act:EA676305-B0D0-492E-8270-485BEADA1E3B

Figs 108, 112 (green)

### Differential diagnosis

This species (Fig. 108) somewhat resembles *S. paulinierii* (Fig. 39) in its color pattern, having the wings more or less yellowish with dark apices, and having the petiole, scutellum, metanotum and metasomal segment I ferruginous. However, both species are structurally very different, as *S. paulinierii* is much larger, has the erect setae on the propodeal enclosure very short and has the structure otherwise known as a spiracular groove modified in a way that it is disassociated from the spiracle; we therefore opted to place it in its own subgenus. *Sphex schmideggeri* sp. nov., on the other hand, has the typical traits of a *gaullei* group member, namely anteriorly-oriented erect propodeal setae and a convex scutellum.

From the other members of the group, it is distinguished through its ferruginous petiole and metasomal base. Specifically, females differ from those of *S. decipiens* and *S. pruinosus* (Fig. 102) in having the clypeus nearly completely ferruginous and the appressed and erect facial setae golden. Those of *S. jansei* (Fig. 106) and *S. gaullei* (Fig. 104) are distinguishable through having the cellular forewing area hyaline without any tinge (Fig. 29) and apically infusate (Fig. 31), whereas *S. schmideggeri* sp. nov. has the cellular forewing area hyaline with a yellow tinge. Males are unique among those of the *gaullei* group in their combination of having a largely ferruginous clypeus and silvery-white appressed and erect facial setae.

### Etymology

We dedicate this species to Dr Christian Schmid-Egger, who was very kind to provide us with specimens from his collection and their sequence data.

### Material examined

#### Holotype

YEMEN – **Dhale Governorate** • ♀; Jebel Jihaf [Jabal Jihāf]; [13°45'38" N, 44°40'35" E]; 12 Oct. 1937; H. Scott and E.B. Britton leg.; BMNH.

### **Paratypes**

OMAN – **Dhofar Governorate** • 1 ♂; Jabal Samhan, 13 km N of Mirbat; 17°06'40" N, 54°42'40" E; 4 Sep. 2019; C. Schmid-Egger leg.; BC-ZSM-HYM-30269-D08; coll. Schmid-Egger • 1 ♀; same collection data as for preceding; coll. Schmid-Egger.

YEMEN – **Dhale Governorate** • 1 ♀; Wadi Dareija, SW of Dhala; [13°40'45" N, 44°42'07" E]; 29–30 Sep. 1937; H. Scott and E.B. Britton leg.; BMNH.

### **Description**

#### **Female**

SIZE. 18.4–22.9 mm.

COLOR. Ferruginous except for the following, which are black: apical half of mandible, head except clypeus, scape, pedicel, flagellomeres VI–IX, posterior half of scutum, episternal sulcus, propodeal enclosure, apical half of claw and metanotum except segment I. Cellular wing area yellowish, apex infusate.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure rich or pale golden. Erect propodeal setae oriented anteriorly. Lower center of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple, stepped medially. Clypeus without indentation or carina. Scutellum convex. Metanotum raised slightly, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with indistinct ridges. Foretarsomere I 1.8–2.0 × length of antepenultimate spine. Petiole length 2.3–2.4 × its medial width.

#### **Male**

SIZE. 18.7 mm.

COLOR. Black except for the following, which are ferruginous: clypeus except dorsolateral margin, basal half of mandible, scape, pedicel, base of flagellomere I, anterior part of pronotum, lower half of propodeum, collar dorsally, prepectus, posterior half of pronotal lobe, tegula, scutellum, metanotum, petiole, metasomal segment I and legs excluding apical half of claw. Cellular wing area hyaline, with inconspicuous yellow tinge, apex infusate.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Central and lower part of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple. Scutellum convex. Metanotum slightly raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with indistinct ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII concavely emarginate. Penis valvae without conspicuous modifications. Petiole length 2.6 × its medial width. Flagellomeres III + IV with narrow placoids covering their entire length.

### **Variation**

In females, the anterior half of the scutum and the ventral part of the mesopleuron can be black instead of ferruginous.

### **Distribution**

Southern and southeastern Arabian Peninsula.



### Species of the *satanas* group

The *satanas* group contains the following four species and one subspecies: *Sphex pseudosatanas* sp. nov., *S. rufoclypeatus* sp. nov., *S. satanas*, *S. satanas memnon* subsp. nov. and *S. socotrensis* sp. nov.

Females of this group are easy to recognize, as all of them have a very flat scutellum (Fig. 5). All other female *Sphex* from the Afrotropical region have a more convex scutellum (Fig. 6), the sole exception being *S. paulinierii*. However, its enormous size, conspicuous coloration and very short propodeal setae make that species unmistakable.

Males in the group are characterized by their uniformly black clypeus (excepting *S. socotrensis* sp. nov., which has the free margin ferruginous) combined with uniformly silvery setae on their entire body. Members of the *gaullei* group, which share the anteriorly-oriented erect propodeal setae, have a significant amount of the clypeus ferruginously-colored, or their erect setae are not silvery-white. The one exception with a black clypeus and uniformly silvery setae, *S. pruinosus*, is easily recognized by its long petiole, the length of which is greater than 3 times the medial width (see Introduction). In comparison, that ratio is at most 2.5 in all members of the *satanas* group.

#### *Sphex pseudosatanas* sp. nov.

urn:lsid:zoobank.org:act:71C639FE-C171-457B-86DA-757EE7CFC5BF

Figs 109, 118 (red)

#### Differential diagnosis

Females of this species are easy to recognize within the *satanas* group. In contrast to those of *S. satanas* s. lat. (Figs 113–114) and *S. socotrensis* sp. nov. (Fig. 116), they have both the scutellum and the metanotum uniformly ferruginous (Figs 109), a character which they share with female *S. rufoclypeatus* sp. nov. (Fig. 110). However, *S. rufoclypeatus* sp. nov. has the clypeus and the anterior half of the scutum ferruginous, whereas the upper half of the clypeus and the entire scutum are black in *S. pseudosatanas* sp. nov.

Identification of males is more difficult. While male *S. socotrensis* sp. nov. stand out due to their ferruginous legs (Fig. 117), *S. satanas satanas* (Fig. 115), *S. pseudosatanas* sp. nov. and *S. rufoclypeatus* sp. nov. (Fig. 111) all have a black integument and silvery setae. The most reliable characters to distinguish them are a combination of wing infuscation and placoid pattern. The male of *S. satanas satanas* has uniformly fuscous forewings and largely fuscous hindwings, whereas in *S. pseudosatanas* sp. nov., only the apex of the forewing is fuscous. *Sphex rufoclypeatus* sp. nov. has slightly infuscate forewings and hyaline hindwings. *Sphex satanas satanas* and *S. pseudosatanas* sp. nov. share the pattern of narrow placoids on the proximal half or third of flagellomeres IV–VI, whereas *S. rufoclypeatus* sp. nov. has broad placoids covering the entire length of flagellomeres III–VI.

#### Etymology

‘Pseudo-’ is a prefix derived from the Greek adjective ‘pseudēs’ meaning false; ‘*pseudosatanas*’ thus refers to the fact that this species can be confused with the similar *S. satanas*.

#### Material examined

##### Holotype

KENYA – **Laikipia County** • ♀; Laikipia, Mpala Research Centre; [0°17'33" N, 36°53'53" E]; 20 Jan. 2005; P. Lenguya leg.; THD-029-BMNH; Genbank CO1 gene: MW538569; GenBank EF-1 $\alpha$  gene: MW558238; GenBank LWR gene: MW582278; BMNH.

### Paratypes

ETHIOPIA – **Southern Nations, Nationalities, and Peoples' Region** • 1 ♀; Arba Minch; 6°00' N, 37°33' E; Nov. 2011; M. Ströhle leg.; OÖLM.

KENYA • 1 ♂; 1912; R.J. Stordy leg.; BMNH. – **Isiolo County** • 5 ♂♂, 1 ♀; Buffalo Springs National Reserve; [0°31'17.32" N, 37°37'2.53" E]; 15–18 Jul. 1987; H.R. Feijen leg.; RMNH. – **Kajiado County** • 1 ♂; Olorgesailie National Monument; 1.57930° S, 36.44566° E; 30 Oct.–13 Nov. 2011; R. Copeland leg.; ICIPE. – **Kitui County** • 1 ♂; E of Mwingi; [0°56' S, 38°03' E]; 14 May 2007; M. Halada leg.; OÖLM • 1 ♂; near Mwingi; [0°56' S, 38°03' E]; 7 Apr. 2007; M. Halada leg.; OÖLM • 6 ♂♂; Mwingi, Kangonde vadi; [0°56' S, 38°03' E]; 18 Apr. 2007; M. Halada leg.; OÖLM • 1 ♂; Shrubland near Kwandula Hill, Simsi area; 2.01477° S, 38.32618° E; 1–4 Dec. 2013; J. Bukhebi and R. Copeland leg.; ICIPE. – **Kwale County** • 1 ♀; Shimoni; [4°39' S, 39°23' E]; Dec. 1911; Ch. Alluud and Jeannel leg.; MNHN. – **Laikipia County** • 1 ♀; same collection data as for holotype but 2 Feb. 2005; BMNH • 1 ♀; same collection data as for preceding; BMNH. – **Makueni County** • 1 ♀; Makindu; [2°16'41" S, 37°49'07" E]; 5–7 Apr. 1911; S.A. Neave leg.; BMNH • 3 ♀♀; Mtito Andei; [2°41'23" S, 38°10' E]; 26–28 Mar. 1911; S.A. Neave leg.; BMNH. – **Samburu County** • 1 ♂; 11 mi. S of Mukawa; [1°02'28" N, 36°40'25" E]; 2 Sep. 1957; CAS. – **Taita-Taveta County** • 1 ♀; Mt Kasigau, bottom of forest; 3.82080° S, 38.64178° E; 16–30 Jun. 2011; R. Copeland leg.; ICIPE • 2 ♂♂, 1 ♀; same collection data as for preceding but 27 Jul.–10 Aug. 2011; ICIPE • 2 ♂♂, 1 ♀; same collection data as for preceding but 10–24 Aug. 2011; ICIPE • 1 ♂; same collection data as for preceding but 5–19 Oct. 2011; ICIPE • 2 ♂♂; same collection data as for preceding but 19 Oct.–2 Nov. 2011; ICIPE • 2 ♂♂, 1 ♀; Voi; [3°23'26" S, 38°34'37" E]; 16 May 2007; M. Halada leg.; OÖLM • 1 ♂; same locality as for preceding; 3°24' S, 38°33.2' E; 21–22 May 2000; V.F. Lee and W.J. Pulawski leg.; CAS • 3 ♂♂, 1 ♀; near Voi (Tsavo); [3°23'26" S, 38°34'37" E]; 8–18 Nov. 1996; M. Halada leg.; OÖLM • 1 ♂; same collection data as for preceding but 22 Nov.–2 Dec. 1996; OÖLM • 1 ♂, 1 ♀; same locality as for preceding; 23 Mar.–4 Apr. 1997; M. Halada leg.; OÖLM.

SOUTH SUDAN – **Bahr el Ghazal Region** • 1 ♀; “M'Bokou”; 1912; Gaillard leg.; MNHN.

TANZANIA – **Dodoma Region** • 2 ♂♂, 1 ♀; 35 km N of Dodoma; 5°54' S, 35°45' E; 14 Dec. 2006; J. Halada leg.; OÖLM • 1 ♂; 70 km N of Dodoma; 5°40' S, 35°48' E; 16 Dec. 2006; J. Halada leg.; OÖLM. – **Morogoro Region** • 2 ♂♂; 43 km E of Morogoro; 6°39.1' S, 38°1.5' E; 14 Jun. 2001; M.H. Bourbin and W.J. Pulawski leg.; CAS. – **Tanga Region** • 1 ♂; 73 km NW of Korogwe; 4°40.8' S, 38°6.4' E; 18 Jul. 2001; O.S. Haji and W.J. Pulawski leg.; CAS.

### Description

#### Female

SIZE. 17.0–21.6 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, lower half of clypeus, scape, pedicel, flagellomeres I–IV, collar, pronotal lobe, prepectus, tegula, legs from coxa onward except inner margin of claw, scutellum, metanotum, metasomal segment I laterally and ventrally, and metasomal segments V and VI. Apical margin of forewing with fuscous spot, cellular area of forewing and entire hindwing hyaline.

VESTITURE. Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect setae on clypeus silvery-golden, on paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin gently notched medially, not stepped above. Clypeus without indentation or carina. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with 4–5 transversal ridges. Foretarsomere I  $1.65\text{--}1.95 \times$  length of antepenultimate spine. Petiole length  $1.70\text{--}1.85 \times$  its medial width.

#### Male

SIZE. 12.7–18.2 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Wings hyaline, apical margin of forewing fuscous.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple, not stepped medially. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins submarginal cell II medially. Propodeal enclosure with a few extremely indistinct transversal ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length  $2.0\text{--}2.2 \times$  its medial width. Flagellomeres IV–VI with narrow placoids covering their proximal halves.

#### Variation

Unknown.

#### Distribution

Eastern Africa.

#### *Sphex rufoclypeatus* sp. nov.

urn:lsid:zoobank.org:act:5DBDFA5B-EA8C-45D3-8F41-D6CE0973DF9F

Figs 110–111, 118 (blue)

#### Differential diagnosis

Females of this species (Fig. 110) are easy to recognize within the *satanas* group. In contrast to those of *S. satanas* s. lat. (Figs 113–114) and *S. socotrensis* sp. nov. (Fig. 116), they have both the scutellum and the metanotum uniformly ferruginous, a character which they share with female *S. pseudosatanas* sp. nov. (Fig. 109). However, *S. pseudosatanas* sp. nov. has the upper half of the clypeus and the entirety of the scutum black, whereas the clypeus and the anterior half of the scutum are ferruginous in *S. rufoclypeatus* sp. nov.

Identification of males is more difficult. While male *S. socotrensis* sp. nov. stand out due to their ferruginous legs (Fig. 117), *S. satanas satanas* (Fig. 115), *S. pseudosatanas* sp. nov. and *S. rufoclypeatus* sp. nov. (Fig. 111) all have a black integument and silvery setae. The most reliable characters to distinguish them are a combination of wing infuscation and placoid pattern. The male of *S. satanas satanas* has uniformly fuscous forewings and largely fuscous hindwings, whereas in *S. pseudosatanas* sp. nov., only the apex of the forewing is fuscous. *Sphex rufoclypeatus* sp. nov. has slightly infuscate forewings and hyaline hindwings. *Sphex satanas satanas* and *S. pseudosatanas* sp. nov. share the pattern of narrow placoids on the proximal half or third of flagellomeres IV–VI, whereas *S. rufoclypeatus* sp. nov. has broad placoids covering the entire length of flagellomeres III–VI.

## Etymology

'*Rufoclypeatus*' is a Latin participle meaning 'armed with a red shield,' referring to the ferruginous color of the female clypeus.

## Material examined

### Holotype

CENTRAL AFRICAN REPUBLIC – **Bamingui-Bangoran** • ♀; Koukourou Bamingui Reserve; 7°15' N, 20°03' E; 20 Apr. 2010; J. Halada leg.; THD-012-OOLM; GenBank CO1 gene: MW538570; OÖLM.

### Paratypes

BENIN • 1 ♀; "Cercle de Djougou-Kouandé"; [10°03'45.5" N, 1°40'40.9" E]; 1908; Brot leg.; MNHN.

BURKINA FASO – **Hauts-Bassins Region** • 1 ♀; Samandéni; [11°27'09" N, 4°27'27" W]; 8 Jun. 1968; J. Hamon leg.; MNHN.

CENTRAL AFRICAN REPUBLIC – **Ouham-Pendé** • 1 ♀; Bozoum; [6°19'02" N, 16°22'42" E]; 1–10 May 1914; G. Tessmann leg.; ZMB.

GHANA – **Northern Region** • 1 ♀; Malawe [Maluwe]; [8°40'17" N, 2°17'40" W]; 20 May 1913; J.J. Simpson leg.; BMNH.

NIGERIA – **Bauchi State** • 1 ♀; Azare; [11°40'29" N, 10°11'26" E]; 1924; Ll. Lloyd leg.; BMNH. – **Niger State** • 1 ♂; Zungeru; [9°48'26" N, 6°09'08" E]; Nov. 1911; J.W. Scott Macfie leg.; BMNH.

SENEGAL • 1 ♀; between Tambacounda and Kaffrine; 27–30 Dec. 1967; M. Coruet leg.; MNHN.

## Description

### Female

SIZE. 17.0–21.6 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus, scape, pedicel, flagellomeres I–V, collar, pronotum, prepectus, mesopleuron, tegula, legs from coxa onward except inner margin of claw, anterior half of scutum, scutellum, metanotum and apical metasomal segment. Cellular area of forewing increasingly fuscous toward apex, with violet iridescence. Apical margin of fore- and hindwing fuscous. Hindwing hyaline.

VESTITURE. Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect setae on clypeus and paraocular area golden-ferruginous, on collar, scutum and propodeal enclosure silvery. Erect propodeal setae short, sparse, oriented anteriorly. Lower center of clypeus glabrous. Scutellum sparsely and finely pubescent.

STRUCTURE. Free clypeal margin simple, stepped medially. Clypeus with slight indentation in lower center, without carina. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with 4–5 transversal ridges. Foretarsomere I 1.55–1.65 × length of antepenultimate spine. Petiole length 1.8 × its medial width.

### Male

SIZE. 15.7 mm.

COLOR. Black except for ferruginous stripe in center of mandible. Forewing and apical margin of hindwing slightly infusate.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Free clypeal margin glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin folded medially. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with four indistinct transversal ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length  $1.8 \times$  its medial width. Flagellomeres III–VI with broad placoids covering their entire length.

### Variation

Unknown.

### Distribution

Western to central Africa.

### *Sphex satanas satanas* Kohl, 1898

Figs 113, 115, 118 (yellow)

*Sphex satanas* Kohl, 1898: 339, ♀, ♂.

*Sphex gorgon* Kohl, 1913: 204, ♀. Synonymized with *Sphex satanas* by Leclercq 1955: 7.

### Differential diagnosis

Among the members of its species group, the female of *S. satanas* s. lat. can easily be recognized by having an entirely black scutellum and metanotum (Figs 113–114). In *S. pseudosatanas* sp. nov. (Fig. 109) and *S. rufoclypeatus* sp. nov. (Fig. 110), these areas are completely ferruginous instead, and *S. socotrensis* sp. nov. has the metanotum and the posterior margin of the scutellum ferruginous (Fig. 116). The subspecies *S. satanas memnon* subsp. nov. has the propodeal setae black instead of silvery (Fig. 114).

Male specimens are slightly harder to distinguish. They are characterized though their somewhat infuscate cellular wing area (Fig. 115), whereas the other members of the group have it barely fuscous or completely hyaline. Furthermore, males of *S. satanas* possess narrow placoids on the proximal halves of flagellomeres IV–VI, a configuration similar to that of *S. socotrensis* sp. nov. and *S. pseudosatanas* sp. nov. However, these two species lack the more or less distinct folding just above the middle of the free clypeal margin, which is present in *S. satanas* and *S. rufoclypeatus* sp. nov. (compare Fig. 28).

### Material examined

#### Lectotype (designated here)

DEMOCRATIC REPUBLIC OF THE CONGO – **Kongo Central** • ♀; Boma Sundi; P. Rolin leg.; IRSN.

#### Presumed paralectotypes (see Remarks)

DEMOCRATIC REPUBLIC OF THE CONGO – **Kongo Central** • 2 ♂♂, 1 ♀; Boma; [5°51' S, 13°03' E]; M. Tschoffen leg.; IRSN • 1 ♀; same collection data as for preceding; MRAC • 1 ♂, 2 ♀♀; same collection data as for lectotype; IRSN • 1 ♂, 1 ♀; Boma, West Africa; [5°51' S, 13°03' E]; NHMW.

#### Other material

BURUNDI – **Bujumbura Rural Province** • 1 ♂; Rusizi National Park; 3.34364° S, 29.27246° E; 13–20 Apr. 2010; R. Copeland leg.; ICIPE.

DEMOCRATIC REPUBLIC OF THE CONGO • 2 ♀♀; Lulua; 1929; Walker leg.; MRAC. – **Haut-Katanga** • 1 ♂; Lubumbashi; [11°40' S, 27°29' E]; Apr. 1951; Ch. Seydel leg.; MRAC • 1 ♀; Lufira River; [10°54'27" S, 26°59'42" E]; alt. 3500 ft; 9 Sep. 1907; BMNH • 1 ♀, holotype of *Sphex gorgon* Kohl, 1913; Lukafu; S.A. Neave leg.; MRAC. – **Haut-Lomami** • 2 ♀♀; Tshibamba; [8°15'42" S, 24°21'45" E]; Mar. 1933; F.G. Overlaet leg.; MRAC. – **Haut-Uele** • 1 ♂; “Yebo Moto”; 1926; L. Burgeon leg.; MRAC • 1 ♀; Vankerhovenville; [3°18' N, 29°26' E]; J. Bequaert leg.; MRAC. – **Ituri Province** • 1 ♀; Terr. Wamba, Epulu; [1°23'52" N, 28°34'51" E]; Sep. 1956; M. Poll leg.; MRAC. – **Kasai-Central** • 4 ♀♀; Lula (Kasai); [7°43'51" S, 22°51'56" E]; 1958; A.J. Jobaert leg.; MRAC • 7 ♀♀; Lula (Kasai), Terr. Luisa; [7°43'51" S, 22°51'56" E]; Aug. 1956; M. Poll leg.; MRAC • 1 ♀; Lula (rés. chasse Bushimaie), Terr. Luisa; [7°43'51" S, 22°51'56" E]; Aug. 1956; M. Poll leg.; MRAC. – **Kongo Central** • 1 ♀; Boma; [5°51' S, 13°03' E]; 18 Jun. 1915; J. Bequaert leg.; MRAC • 1 ♀; same collection data as for preceding; MRAC. – **Lomami** • 1 ♀; Lomami, Kambaye; [6°52'38" S, 23°44'09" E]; Sep. 1930; P. Quarré leg.; MRAC. – **Lualaba** • 1 ♀; 150–200 mi. W of Kambove; 12 Oct. 1904; BMNH • 1 ♀; same collection data as for preceding but 27–30 Oct. 1907; BMNH • 1 ♀; Kapanga; [8°21' S, 22°34' E]; Aug. 1932; F.G. Overlaet leg.; MRAC • 3 ♀♀; same collection data as for preceding but Sep. 1932; MRAC • 12 ♀♀; same collection data as for preceding but Oct. 1932; MRAC • 6 ♀♀; same collection data as for preceding but Nov. 1932; MRAC • 8 ♀♀; same collection data as for preceding but Dec. 1932; MRAC • 1 ♀; Kapiri; [10°18' S, 26°11' E]; Sep. 1912; Miss. Agric. leg.; MRAC • 1 ♀; Lulua, Luashi; [10°55'41" S, 23°36'28" E]; Nov. 1938; F. Freyne leg.; MRAC. – **South Kivu** • 1 ♀; Uvira; 28–29 Aug. 1931; A. Mackie leg.; BMNH. – **Tanganyika** • 1 ♂; Kabalo; [6°03' S, 26°55' E]; 7 Jul. 1947; M. Poll leg.; MRAC.

MALAWI – **Central Region** • 1 ♂; Fish Eagle Inn, Salima; [13°47' S, 34°26' E]; 19 Aug. 1974; H.R. Feijen leg.; RMNH • 1 ♀; Marimba; [13°10' S, 33°20' E]; Nov.–Dec. 1910; J.E.S. Old leg.; BMNH. – **Northern Region** • 1 ♂; Karonga; [9°56' S, 33°56' E]; 7–11 Jul. 1910; S.A. Neave leg.; BMNH • 1 ♂; same collection data as for preceding but 13 Jul. 1910; BMNH • 1 ♂; Nkhata Bay, Rest House; [11°36' S, 34°18' E]; 27 Sep. 1974; H.R. Feijen leg.; RMNH. – **Southern Region** • 1 ♀; Mlanje; [16°01'53" S, 35°30' E]; 12 Jul. 1913; S.A. Neave leg.; BMNH • 3 ♀♀; same collection data as for preceding but 1 Oct. 1913; BMNH • 1 ♀; same collection data as for preceding but 8 Oct. 1913; BMNH • 1 ♀; same collection data as for preceding but 1 Nov. 1913; BMNH • 1 ♀; same collection data as for preceding but 1 Dec. 1913; BMNH • 1 ♀; same collection data as for preceding but 21 Dec. 1913; BMNH • 1 ♀; Zomba; [15°23'09" S, 35°19'07" E]; Nov. 1913; H.S. Stannus leg.; BMNH.

MOZAMBIQUE – **Cabo Delgado Province** • 1 ♀; Kitaragio [near Pangane]; [12°00'3.4" S, 40°31'08.5" E]; 19–27 Nov. 2009; O. Montreuil leg.; MNHN • 1 ♀; Nhica, camp; 10°45.35' S, 40°136' E; 20 Nov. 2009; C. Villemant leg.; MNHN • 1 ♀; Vamizi Island; 11°1.97' S, 40°38.74' E; C. Villemant leg.; MNHN. – **Sofala Province** • 1 ♀; Foret d’Inhandconde; Oct. 1907; G. Vasse leg.; MNHN • 1 ♀; Tendo du Sungoué, Gorongoza; [18°30' S, 34°03' E]; Oct. 1907; G. Vasse leg.; MNHN. – **Tete Province** • 1 ♀; 15 km SSE of Manje; 15°29' S, 33°16' E; 2–4 Dec. 2005; M. Kadlecová leg.; OÖLM. – **Zambezia Province** • 3 ♂♂, 6 ♀♀; foothills N of Mt Chipirone; [16°27'59" S, 35°43'38" E]; 19 Nov. 1913; S.A. Neave leg.; BMNH • 1 ♀; same collection data as for preceding but 21 Nov. 1913; BMNH.

NAMIBIA – **Hardap Region** • 1 ♀; Mariental; [24°38' S, 17°58' E]; 28 Dec. 1977; H.N. Empey leg.; AMG. – **Oshikoto Region** • 1 ♂; Namutoni; [18°48' S, 16°59' E]; 1919; J. Breyer leg.; TMP. – **Otjozondjupa Region** • 1 ♀; 60 km S of Otjiwarongo; [21°00'45" S, 16°39'21" E]; 17 Nov. 1994; M. Kuhlmann leg.; BMNH • 1 ♀; Okahandja; [21°59' S, 16°55' E]; 17 Dec. 1983; H.N. Empey leg.; AMG • 1 ♀; same locality as for preceding; 3–11 Dec. 1927; R.E. Turner leg.; BMNH • 1 ♀; same collection data as for preceding but 12–18 Dec. 1927; BMNH • 1 ♂, 6 ♀♀; Waterberg; [20°30' S, 17°14' E]; 15–17 Jan. 1993; F. Koch leg.; ZMB • 1 ♀; same collection data as for preceding but 31 Oct.–2 Nov. 2007; ZMB • 5 ♂♂; Waterberg, Main Camp; 20°30' S, 17°14' E; 2–10 Nov. 2007; F. Koch leg.; ZMB.

SOUTH AFRICA – **Limpopo** • 1 ♂; Nwanedi Nature Reserve; 22°38' S, 30°24' E; 27–30 Oct. 2010; F. Koch leg.; ZMB • 1 ♀; Sikororo [Ga-Sekororo]; [24°12'27.6" S, 30°24'33.3" E]; Jul. 1922; G.P.F. v. Dam leg.; TMP.

TANZANIA • 1 ♀; Nwaya, N shore of Lake Nyasa; 15–16 Nov. 1910; S.A. Neave leg.; BMNH • 1 ♀; Usangu Dist., foot of Kifulufulu Mts; 16–17 Dec. 1910; S.A. Neave leg.; BMNH. – **Dodoma Region** • 1 ♀; 50 km N of Kondoa; 4°36' S, 35°46' E; 9 Dec. 2006; J. Halada leg.; OÖLM. – **Mbeya Region** • 1 ♀; Mt Rungwe, near New Langenburg; [9°08'06" S, 33°40'05" E]; 18–21 Nov. 1910; S.A. Neave leg.; BMNH. – **Morogoro Region** • 6 ♀♀; road to Kilossa, Usagara District; [6°50' S, 36°59' E]; 22–26 Dec. 1910; S.A. Neave leg.; BMNH. – **Unguja South Region** • 1 ♀; Zanzibar, Jambiani; [6°19' S, 39°33' E]; 23 Mar. 1993; K.M. Guichard leg.; BMNH.

ZAMBIA – **Central Province** • 1 ♂; 70 km NE of Kapiri Mposhi; [13°41' S, 29°18' E]; 21 Nov. 2005; M. Snižek leg.; OÖLM. – **Eastern Province** • 1 ♂, 1 ♀; “Mid-Luangwa Valley”; 14–16 Aug. 1900; S.A. Neave leg.; BMNH. – **Northern Province** • 1 ♀; Abercorn [now Mbala]; [8°50' S, 31°28' E]; Oct. 1943; IRSN • 1 ♀; same collection data as for preceding but Nov. 1943; IRSN • 1 ♀; Lake Mweru Wantipa; [8°42' S, 29°46' E]; Sep. 1944; IRSN • 1 ♀; Luwingu; [10°15'43" S, 29°55'37" E]; 12 Jul. 1908; S.A. Neave leg.; OUMNH • 1 ♂; Meru Wantipa; [8°40'38" S, 29°43'22" E]; 10 Jul. 1952; BMNH. – **North-Western Province** • 1 ♀; Ntambu 150 km W of Solwezi; 12°18' S, 25°10' E; 11 Nov. 2005; M. Halada leg.; THD-018-OOLM; GenBank CO1 gene: MW538568; OÖLM.

ZIMBABWE • 1 ♂; Hillside; [17°50'15" S, 31°04'54" E]; 1 Nov. 1922; Swinburne and Stevenson leg.; TMP. – **Matabeleland North** • 1 ♂; Lonely Mine; [19°30'06" S, 28°44'49" E]; 24 Sep. 1913; H. Swale leg.; BMNH • 1 ♂, 1 ♀; same collection data as for preceding but 25 Sep. 1913; BMNH • 1 ♀; same collection data as for preceding but 25 Oct. 1914; BMNH • 1 ♀; same collection data as for preceding but 2 Jan. 1915; BMNH • 1 ♀; same locality as for preceding; 9 Feb. 1919; G. Arnold leg.; MNHN • 1 ♀; Turk Mine; [19°44' S, 28°45' E]; 1 Dec. 1958; AMG. – **Midlands** • 1 ♀; Shangani, 60 km SW of Gweru; [19°46' S, 29°22' E]; 2 Dec. 1998; Ma. Halada leg.; OÖLM.

## Description

### Female

SIZE. 18.6–23.0 mm.

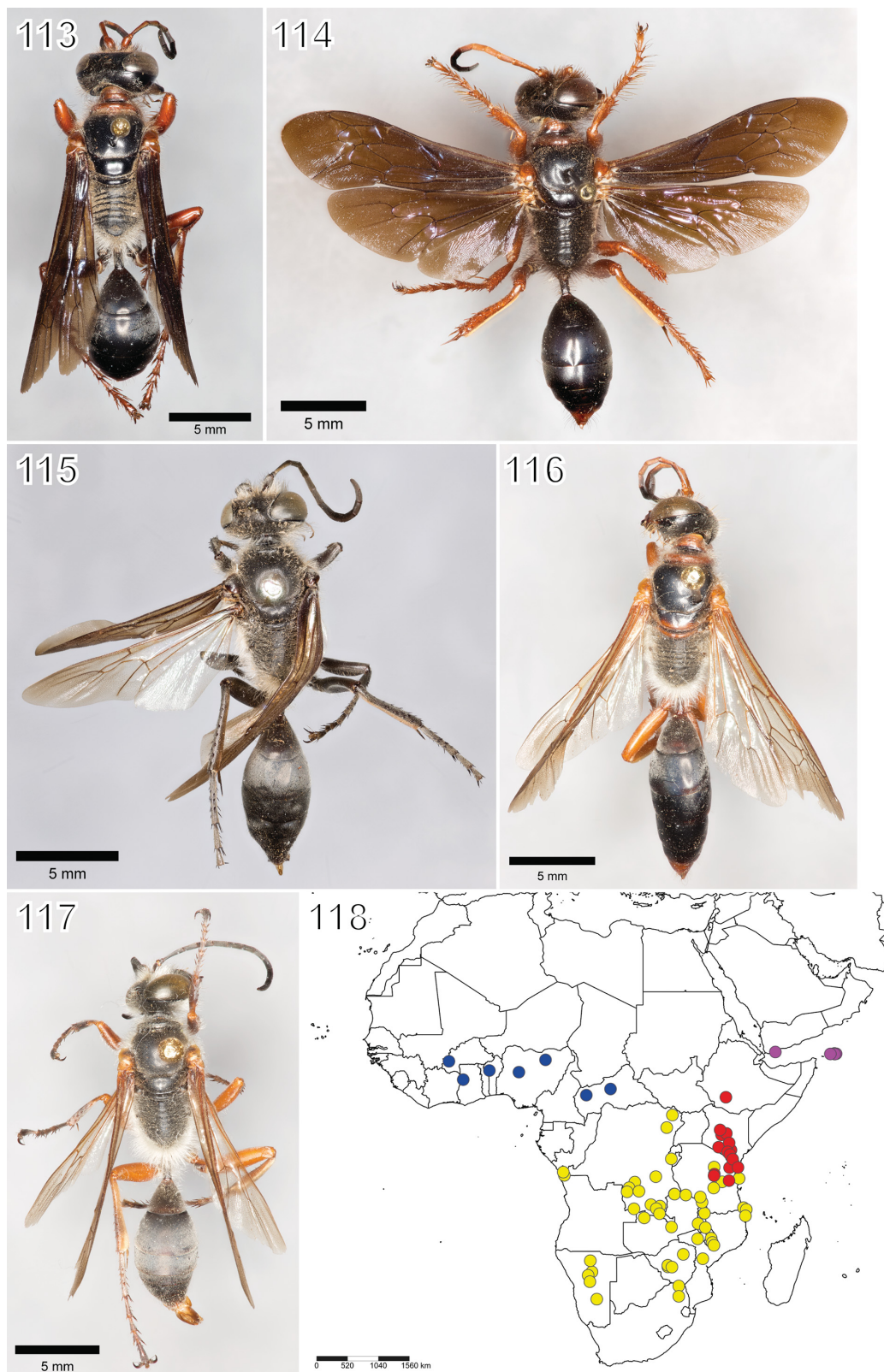
COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus, scape, pedicel, flagellomeres I–III, collar, pronotal lobe, tegula, prepectus, and legs except coxa and inner margin of claw. Wings fuscous, with violet iridescence.

VESTITURE. Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect setae on clypeus, paraocular area, collar and scutum dark ferruginous, on propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum sparsely and finely pubescent.

STRUCTURE. Free clypeal margin simple, stepped medially. Clypeus with indentation in lower center, without carina. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with 4–6 transversal ridges. Foretarsomere I 1.8–2.1 × length of antepenultimate spine. Petiole length 1.5–1.6 × its medial width.

### Male

SIZE. 17.3–22.0 mm.



**Figs 113–118.** 113–114, 116. Habitus of ♀. 115, 117. Habitus of ♂. 113, 115. *Sphex satanas satanas* Kohl, 1898. 114. *S. satanas memnon* subsp. nov. 116–117. *S. socotrensis* sp. nov. 118. Geographic distribution of *S. pseudosatanas* sp. nov. (red), *S. rufoclypeatus* sp. nov. (blue), *S. s. satanas* (yellow) and *S. socotrensis* sp. nov. (purple).



**COLOR.** Black except for ferruginous stripe in center of mandible. Forewing fuscous, with violet iridescence. Hindwing largely hyaline.

**VESTITURE.** Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

**STRUCTURE.** Free clypeal margin simple, slightly stepped medially. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with 4–6 transversal ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 1.6–1.9 × its medial width. Flagellomeres IV–VI with narrow placoids covering their proximal halves.

### **Variation**

Unknown.

### **Distribution**

Central, southwestern and southeastern Africa.

### **Remarks**

The original description states that the type series consists of five females and three males collected in Boma and housed in the Royal Belgian Museum in Brussels. We were able to locate a matching number of specimens, the locality labels of which read “Boma” or “Boma Sundi”, that had been distributed between IRSN and MRAC. Some of them had already been labelled as paratypes by unknown revisers or collection staff, but since these designations were apparently never published, they are not valid. Also, there are a male and a female specimen from Boma bearing type labels by Kohl in the NHMW collection. Which of the aforementioned ten specimens actually constitute the type series cannot be determined with complete certainty, but we feel confident in designating a specimen from the IRSN as the lectotype.

*Sphex satanas memnon* subsp. nov.

urn:lsid:zoobank.org:act:50FDA09F-CC76-4160-B355-CAE7E564D321

Fig. 114

### **Differential diagnosis**

The female of this subspecies shares the uniformly black scutellum and metanotum of *S. satanas satanas* (Fig. 113) and is overall very similar, with the only difference being that *S. s. memnon* subsp. nov. has the appressed and erect propodeal setae entirely black (Fig. 114).

### **Etymology**

‘*Memnon*’ is an Ancient Greek noun, used here in apposition, and the name of a mythological Ethiopian king.

### **Material examined**

#### **Holotype**

ETHIOPIA • ♀; “Abbai Gorge”; 23 Oct. 1945; K.M. Guichard leg.; BMNH.

## Description

### Female

SIZE. 20.6 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus, scape, pedicel, flagellomeres I–V, collar, pronotal lobe, tegula, prepectus, and legs except coxa and inner margin of claw. Wings fuscous, with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery-golden, on collar silvery, on scutum and propodeal enclosure black. Erect setae on clypeus and paraocular area ferruginous, on collar, scutum and propodeal enclosure black. Erect propodeal setae oriented anteriorly. Clypeus without glabrous spot. Scutellum sparsely and finely pubescent.

STRUCTURE. Free clypeal margin gently notched medially, stepped above. Clypeus with slight indentation in lower center, without carina. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with four transversal ridges. Foretarsomere I  $1.6 \times$  length of antepenultimate spine. Petiole length  $1.2 \times$  its medial width.

### Male

Unknown.

### Variation

Unknown.

### Distribution

Ethiopia.

### *Sphex socotrensis* sp. nov.

urn:lsid:zoobank.org:act:65257FF5-CA69-4417-BA68-92E2FC9885D4

Figs 116–117, 118 (purple)

### Differential diagnosis

Males of this species are characterized by having at least the trochanter and femur bright ferruginous (Fig. 117), while the legs of males of the other members of the group are uniformly black. Females have the metanotum and the posterior margin of the scutellum ferruginous with the anterior part black (Fig. 116), whereas the scutellum and metanotum are uniformly ferruginous in *S. pseudosatanas* sp. nov. (Fig. 109) and *S. rufoclypeatus* sp. nov. (Fig. 110), and uniformly black in *S. satanas* s. lat. (Figs 113–114).

### Etymology

‘*Socotrensis*’ is a Latinization meaning ‘from Socotra’, as this island is one of the only known locations where the species occurs.

### Material examined

#### Holotype

YEMEN – **Socotra Governorate** • 1 ♀; Hadibo Plain; alt. 0–300 ft; [12°39' N, 54°01'10" E]; 16 Apr. 1967; K.M. Guichard leg.; BMNH.

**Paratypes**

YEMEN – **Aden Governorate** • 7 ♂♂; Khormaksar, S.L.; [12°51'56" N, 45°03'18" E]; 13 Mar. 1967; K.M. Guichard leg.; BMNH. – **Socotra Governorate** • 1 ♀; same collection data as for holotype; BMNH • 1 ♂; same locality as for holotype; alt. 0–200 ft; 2 Apr. 1967; K.M. Guichard leg.; BMNH • 3 ♂♂, 1 ♀; Hadibo Plain, Ras H.M. Foothills; [12°39' N, 54°01'10" E]; 30 Apr. 1967; K.M. Guichard leg.; BMNH • 1 ♂; Hadibo Plain, S.L.; [12°39' N, 54°01'10" E]; 19 Mar. 1967; K.M. Guichard leg.; BMNH • 8 ♂♂; same collection data as for preceding but 2 Apr. 1967; BMNH • 1 ♀; same collection data as for preceding but 7 Apr. 1967; BMNH • 1 ♀; Hamadara [Hamadero]; [12°36' N, 54°16' E]; alt. 400 m; 4 Apr. 1967; K.M. Guichard leg.; BMNH • 1 ♂; Kishin; [12°33' N, 54°04' E]; Aug. 1956; OUMNH exped.; BMNH • 1 ♂; same locality as for preceding; alt. 700 m; 18 Apr. 1967; K.M. Guichard leg.; BMNH • 1 ♂; Sha'ab [Shuab] Bay, Avicennia Mangrove; 12°34' N, 53°24' E; 20 Feb. 1999; H. Pohl leg.; coll. Schmid-Egger.

**Description****Female**

SIZE. 22.1–24.2 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus, scape, pedicel, flagellomeres I–IV, collar, apical half of pronotal lobe, tegula, prepectus, posterior two-thirds of scutellum, metanotum and legs excluding apical half of claw. Wings hyaline, apical margin of fore- and hindwing slightly fuscous.

VESTITURE. Appressed setae on clypeus and paraocular area golden, on collar, scutum and propodeal enclosure silvery. Erect setae on clypeus and paraocular area golden, on collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Lower center of clypeus glabrous. Scutellum sparsely and finely pubescent.

STRUCTURE. Free clypeal margin simple, stepped medially. Clypeus without indentation or carina. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with 5–8 transversal ridges. Foretarsomere I 1.7–1.8 × length of antepenultimate spine. Petiole length 1.3–1.5 × its medial width.

**Male**

SIZE. 15.6–19.3 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, scape, tegula, legs except coxa and tarsomere V, and metasomal sterna I and VIII. Wings hyaline, apical margin of forewing slightly fuscous.

VESTITURE. Appressed and erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery. Erect propodeal setae oriented anteriorly. Clypeus with small glabrous spot in upper center. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin simple. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII very slightly concave. Penis valvae without conspicuous modifications. Petiole length 2.2–2.5 × its medial width. Flagellomeres IV–VI with narrow placoids covering their proximal two-thirds.

### Variation

Unknown.

### Distribution

Socotra, southwestern Yemen.

### Species of the *malagassus* group

The *malagassus* group contains the following two species: *Sphex comorensis* sp. nov. and *S. malagassus*.

The species in this group possess perpendicularly-oriented erect propodeal setae, and the scutellar vestiture is somewhat dense and can be fine or coarse. Therefore, members can be superficially similar to those of the *meridionalis*- and *umtalicus* groups. What reliably separates them from these groups is the fact that their metanotum is not raised at all, whereas members of the other two groups normally have it somewhat elevated towards its center, although without the distinct tubercles which are present in the *argentatus* group. In the *malagassus* group, the erect propodeal setae are straight instead of curved, and the wings are no more than slightly infusate. Finally, both species are only known from Madagascar or the surrounding islands, respectively, whereas the members of the *meridionalis*- and *umtalicus* group seem to be restricted to the mainland.

#### *Sphex comorensis* sp. nov.

urn:lsid:zoobank.org:act:79F4CFD2-FBBC-41BD-AD25-4C526C3D01C6

Figs 119, 123 (red)

### Differential diagnosis

Both sexes of this species lack the conspicuous ferruginous stripe which is present laterally on the mesosoma in most specimens of *S. malagassus*. Additionally, males (Fig. 119) are recognizable through having the clypeus almost completely black, in contrast to the entirely ferruginous clypeus of *S. malagassus*. Furthermore, *S. malagassus* has the penis valvae modified in a very conspicuous way (Figs 121–122), while those of *S. comorensis* sp. nov. have the same shape as in most African species of *Sphex*.

In females of *S. comorensis* sp. nov., the appressed setae on the head and mesosoma are rich golden, whereas those of *S. malagassus* are pale silvery.

### Etymology

‘*Comorensis*’ is a Latinization meaning ‘from the Comoros’, as this archipelago is the only known location where the species occurs.

### Material examined

#### Holotype

UNION OF THE COMOROS – **Mohéli** • ♂; Châlet St Antoine; [12°16'56" S, 43°39'48" E]; 11 Jan. 2003; U. Dall'Asta leg.; THD-030-MRAC; GenBank CO1 gene: MW538557; MRAC.

#### Paratypes

UNION OF THE COMOROS • 1 ♀; Anjouan; [12°15' S, 44°25' E]; 1922; R. Decary leg.; MNHN. – **Grande Comore** • 1 ♀; La Grille; [11°27' S, 43°20' E]; 23 Apr.–3 May 1991; K.M. Guichard leg.; BMNH • 2 ♂♂, 1 ♀; Mitsoudjé; [11°49' S, 43°16' E]; Dec. 1970; J. Brunhes leg.; RMNH • 1 ♂; same collection data as for preceding; ZMB.

## Description

### Female

SIZE. 16.7–22.3 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, labrum, lower half of clypeus, scape, pedicel ventrally, tegula, metasoma laterally, fore- and midfemur apically, fore- and midtibia, fore- and midtarsomeres I–IV and basal half of hindtibia. Wings slightly fuscous, basal half with inconspicuous brownish-yellow tinge, with violet iridescence.

VESTITURE. Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure golden. Erect setae on clypeus and paraocular area ferruginous, on scutum golden intermixed with black ones, on collar and propodeal enclosure golden. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Clypeus medially with very narrow vertical glabrous stripe. Scutellum densely and coarsely pubescent.

STRUCTURE. Free clypeal margin with notched process medially, not stepped. Clypeus without indentation, with indistinct longitudinal carina in upper center. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I  $2.45 \times$  length of antepenultimate spine. Petiole length  $1.7\text{--}2.0 \times$  its medial width.

### Male

SIZE. 18.9–21.3 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, lower center of clypeus, scape, pedicel ventrally, tegula, fore- and midfemur apically, fore- and midtibia, and hindfemor and -tibia ventrally. Cellular wing area hyaline, basal half with inconspicuous brownish-yellow tinge, with violet iridescence, wing apices infuscate.

VESTITURE. Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery-golden. Erect setae on clypeus ferruginous-brown, on paraocular area, collar and propodeal enclosure golden, on scutum golden intermixed with black ones. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Clypeus without glabrous spot. Scutellum densely and coarsely pubescent.

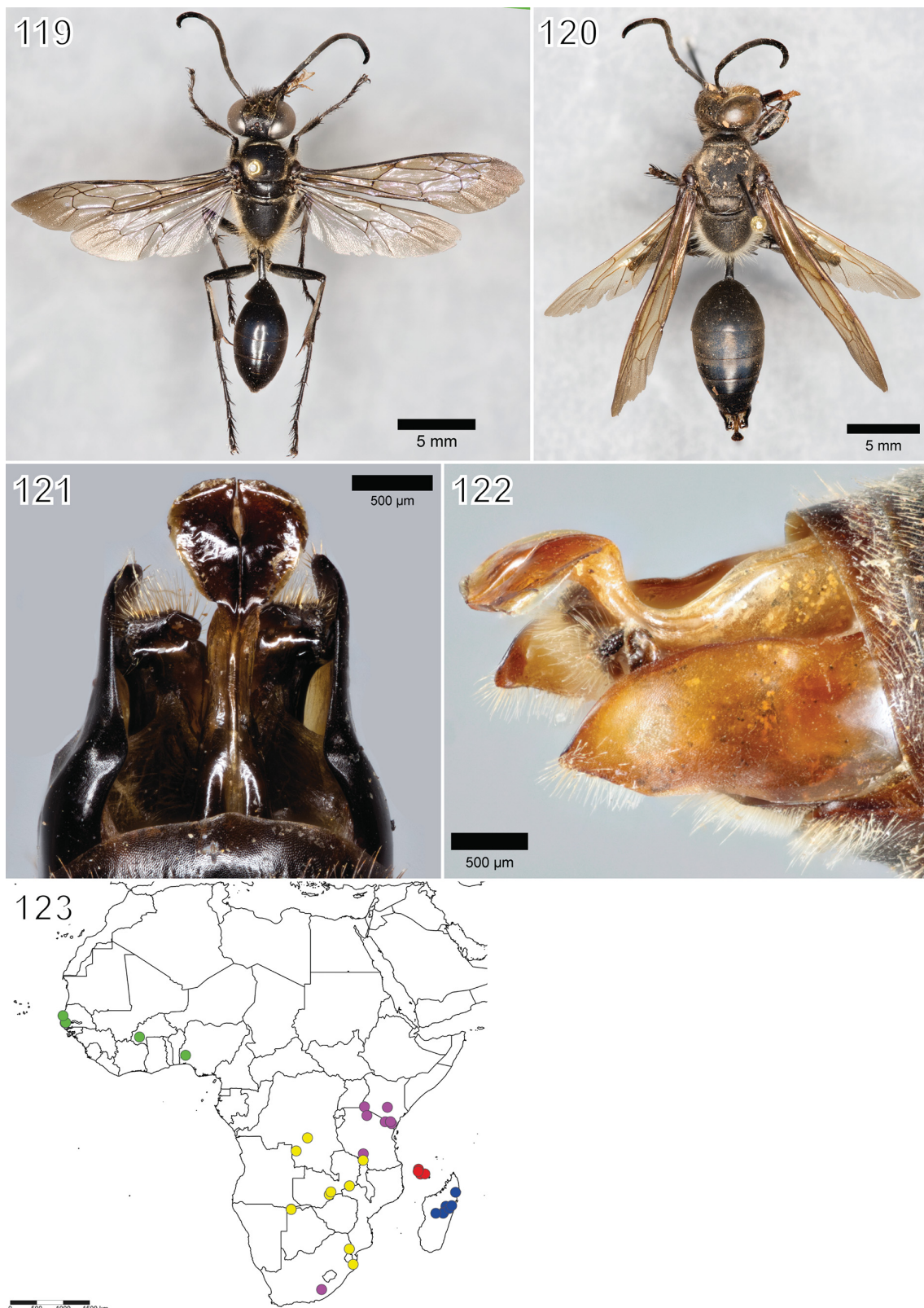
STRUCTURE. Free clypeal margin simple. Scutellum flat. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length  $2.5\text{--}2.8 \times$  its medial width. Flagellomere IV with moderately broad placoid covering only small portions or up to its proximal four-fifths, flagellomere V with moderately broad placoid covering most of it, flagellomere VI with moderately broad placoid covering only small portions or up to its proximal four-fifths.

## Variation

Unknown.

## Distribution

Comoros.



**Figs 119–123.** 119–120. Habitus of ♂. 121. Dorsal view of male genitalia. 122. Lateral view of male genitalia. 119. *Sphex comorensis* sp. nov. 120–122. *S. malagassus* de Saussure, 1890. 123. Geographic distribution of *S. comorensis* sp. nov. (red), *S. malagassus* (blue), *S. meridionalis* (Arnold, 1947) (yellow), *S. nefrens* sp. nov. (purple) and *S. occidentalis* sp. nov. (green).

***Sphex malagassus*** de Saussure, 1890  
Figs 120–122, 123 (blue)

*Sphex malagassus* de Saussure, 1890: pl. 18 fig. 38, ♀.

**Differential diagnosis**

Males of this species (Fig. 120) can be distinguished from those of *S. comorensis* sp. nov. (Fig. 119) through their entirely ferruginous clypeus, whereas *S. comorensis* sp. nov. has it black excepting the free margin. *Sphex malagassus* also has the penis valvae modified in a unique way (Figs 121–122). In females of *S. malagassus*, the appressed clypeal, paraocular and mesosomal setae are inconspicuously pale, while they are brightly golden in those of *S. comorensis* sp. nov. In addition, most specimens of *S. malagassus* (but not all) have a broad ferruginous stripe of varying extension laterally on the mesosoma that is absent in *S. comorensis* sp. nov.

**Material examined**

MADAGASCAR • 1 ♀; Hildebrandt leg.; ZMB • 1 ♂; Staudinger leg.; ZMB. – **Alaotra-Mangoro** • 1 ♂; Didy; [18°07' S, 48°32' E]; 16 Apr. 1992; A. Pauly leg.; MRAC • 1 ♀; Périnet (Analamazaotra Special Reserve); 18°56' S, 46°16' E; alt. 950 m; 10 May 1984; R. Hensen and A. Aptroot leg.; RMNH. – **Analamanga** • 1 ♂; Ambohimanga; 18°45' S, 47°38' E; alt. 1600 m; 17 Apr. 1984; R. Hensen and A. Aptroot leg.; THD-022-RMNH; GenBank CO1 gene: MW538555; GenBank LWR gene: MW582285; RMNH • 15 ♂♂, 10 ♀♀; Antananarivo; [18°56' S, 47°31' E]; Ch. Lambertson leg.; MRAC • 1 ♂, 2 ♀♀; same locality as for preceding; Sikora leg.; ZMB. – **Analanjirofo** • 1 ♀; Fampanambo; [15°22'31" S, 49°37'17" E]; Jun. 1960; J. Vadon leg.; MRAC • 3 ♀♀; same collection data as for preceding but Mar. 1961; MRAC. – **Atsinanana** • 1 ♂; Manakambahiny near Vavatène; 17°38' S, 48°58' E; Feb. 1995; A. Pauly leg.; MRAC. – **Betsiboka** • 1 ♀; 25 km W of Morarano-Chrome, forest; 17°45' S, 47°59' E; 25 Apr. 1991; A. Pauly leg.; MRAC.

**Description**

**Female**

SIZE. 22.5–27.9 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus, scape, pedicel, outer parts of paraocular area, postgena, neck, collar laterally, tegula and variable lateral stripe from pronotum up to propodeum. Wings hyaline, cellular area with yellow tinge, apex slightly infusate.

VESTITURE. Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery-golden. Erect setae on clypeus, paraocular area, collar and scutum black or ferruginous-brown, on propodeal enclosure silvery-golden. Erect propodeal setae oriented perpendicularly or anteriorly. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin medially notched, not stepped above. Clypeus without indentation and carina. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein nearly joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Foretarsomere I 2.4–2.5 × length of antepenultimate spine. Petiole length 1.6–2.1 × its medial width.

**Male**

SIZE. 21.5–24.5 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus, scape and variable lateral stripe from pronotum up to propodeum. Wings hyaline, cellular area with yellow tinge.

**VESTITURE.** Appressed setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery-golden. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure silvery-golden, occasionally intermixed with black ones. Erect propodeal setae oriented perpendicularly or anteriorly. Clypeus without glabrous spot. Scutellum densely and coarsely pubescent.

**STRUCTURE.** Free clypeal margin simple. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein nearly joins interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII semicircular and slightly pointed. Penis valvae fused, dorsoventrally S-shaped, apically flattened and broadened. Petiole length 1.7–2.1 × its medial width. Flagellomeres IV–VI with broad placoids covering entire their length.

### **Variation**

Laterally on the mesosoma, the extent of the ferruginous coloration varies.

### **Distribution**

Madagascar. Several individuals of this species owned by the MRAC were allegedly collected on São Tomé Island, as part of a collecting series by Henri De Saeger from 1932. This locality information appears spurious, since all other records of *S. malagassus* known to us are from Madagascar. It seems unlikely that the species would occur on both these islands when it has never been found anywhere in the area between them. Therefore, we choose to ignore the locality data from the respective specimens.

## **Species of the *meridionalis* group**

The *meridionalis* group contains the following three species: *Sphex meridionalis*, *S. nefrens* sp. nov. and *S. occidentalis* sp. nov.

Members are characterized through their black, more or less perpendicularly-oriented erect propodeal setae which are slightly curved towards the anterior (Figs 3–4), and therefore closely resemble some species of the *umtalicus* group. Nonetheless, several characters unequivocally separate the two groups. Firstly, females of the *meridionalis* group (Fig. 8) lack the coarse scutellar vestiture present in those of the *umtalicus* group (Figs 3–4). As this can be difficult to assess without practice, a useful indicator is the presence or absence of long erect setae, of similar quality to those on the metanotum, near the scutellar center. Females of the *meridionalis* group only have long erect scutellar setae near the posterolateral margin of the scutellum, whereas those of the *umtalicus* group usually also have some near the center. Secondly, male specimens of the *umtalicus* group always have a conspicuous tooth-like process that emerges from below the free clypeal margin (Fig. 27). This structure is absent in members of the *meridionalis* group.

### ***Sphex meridionalis* (Arnold, 1947)** Figs 8, 36, 123 (yellow), 124

*Chlorion decipiens meridionalis* Arnold, 1947: 145, ♀ (types not examined).

### **Differential diagnosis**

Females of this species are commonly misidentified as *S. haemorrhoidalis*, since both have clypeus and legs ferruginous, and they are identical in the orientation and coloration of their erect propodeal setae. However, *S. haemorrhoidalis*, like all members of the *umtalicus* group, is characterized by their dense and coarse scutellar vestiture (Figs 3–4). On the other hand, the scutellar vestiture in the *meridionalis*



group is very fine and often only visible from an angle, and there are very few long erect setae centrally. Female *S. meridionalis* (Fig. 124) differ from those of *S. nefrens* sp. nov. (Fig. 125) in having the appressed facial setae ferruginous-golden (Fig. 36) instead of brassy (Fig. 37). *Sphex occidentalis* sp. nov. has the appressed facial setae in a less ferruginous tone of golden, and its collar, scutellum and metanotum are noticeably ferruginous (Fig. 127).

Male specimens of *S. meridionalis* and its presumed sister species, *S. nefrens* sp. nov. (Fig. 126), cannot yet be reliably distinguished based on morphology. They resemble those of *S. decipiens* (Fig. 100) and are most easily differentiated from that species by having a shorter, wider petiole, a ferruginous clypeal margin and a different placoid pattern. Males of *S. occidentalis* sp. nov. (Fig. 128) are recognizable through having part of their flagellum, legs and mesosomal dorsum ferruginous.

### Material examined

DEMOCRATIC REPUBLIC OF THE CONGO – **Lomami** • 1 ♀; Kabinda; [6°08' S, 24°29' E]; Schwetz leg.; MRAC. – **Lualaba** • 1 ♀; Kapanga; [8°21' S, 22°34' E]; May 1933; F.G. Overlaet leg.; MRAC.

MALAWI • 1 ♀; NW shore of Lake Nyasa, between Florence Bay and Karonga; 30 Jun.–6 Jul. 1910; S.A. Neave leg.; BMNH. – **Northern Region** • 1 ♀; Karonga; [9°56' S, 33°56' E]; 7–11 Jul. 1910; S.A. Neave leg.; BMNH • 1 ♀; same collection data as for preceding but 13 Jul. 1910; BMNH.

NAMIBIA – **Kavango East** • 1 ♂; Mahango Game Reserve; 18°17' S, 21°43' E; 4 Mar. 1997; F. Koch leg.; THD-026-ZMB; GenBank EF-1 $\alpha$  gene: MW558240; GenBank LWR gene: MW582279; ZMB • 1 ♀; same collection data as for preceding; THD-003-ZMB; GenBank CO1 gene: MW538564; ZMB • 1 ♀; same collection data as for preceding but 2–5 Mar. 1994; ZMB.

SOUTH AFRICA – **KwaZulu-Natal** • 5 ♀♀; Mkuze Game Reserve; 27°37' S, 32°14' E; 8–12 Mar. 1987; A.J. Weaving leg.; AMG. – **Mpumalanga** • 1 ♀; Kruger N. Park, N'Watlinwambu, River-bank Skukuza; [24°59'45" S, 31°35'31" E]; 25 Mar. 1998; M. Generani and P.L. Scaramozzino leg.; CAS.

ZAMBIA – **Eastern Province** • 1 ♀; “Up. Luangwa Valley”; alt. 1800–2000 ft; 23–24 Mar. 1908; S.A. Neave leg.; OUMNH • 2 ♂♂; 31 km E of Petauke; 14°18' S, 31°36' E; 17 Mar. 1995; W.J. Pulawski leg.; CAS • 1 ♂; 32 km E of Petauke; 14°17' S, 31°37' E; 24–26 Mar. 1995; W.J. Pulawski leg.; CAS. – **Lusaka Province** • 1 ♀; Kafue; [15°46' S, 28°11' E]; 5 Apr. 1981; G.G.M. Schulten leg.; RMNH • 1 ♀; Lusaka International Airport; 15°19' S, 28°27' E; 26 Mar. 1998; W.J. Pulawski leg.; CAS. – **Muchinga Province** • 1 ♀; “L. Chambezi V.; Mpika distr.”; alt. 3900 ft; 16 May 1908; S.A. Neave leg.; OUMNH • 3 ♂♂; “Mid. Chambezi Valley, Chinsali distr.”; alt. 4000 ft; 25 Apr. 1908; S.A. Neave leg.; OUMNH • 1 ♀; same collection data as for preceding but 28 Apr. 1908; OUMNH. – **Northern Province** • 1 ♂, 1 ♀; “L. Chambezi V.; Kasama distr.”; alt. 3900 ft; 3 May 1908; S.A. Neave leg.; OUMNH • 1 ♀; same collection data as for preceding but 4–6 May 1908; OUMNH • 1 ♂, 1 ♀; same collection data as for preceding but 9 May 1908; OUMNH • 1 ♂; same collection data as for preceding but 14 May 1908; OUMNH.

### Description

#### Female

SIZE. 18.8–25.9 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, scape, pedicel, flagellomeres I–IV, clypeus, trochanters ventrally and legs from femur onward excepting apical half of claw. Wings fuscous, forewing with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area rich golden, on collar, scutum and propodeal enclosure black. Erect setae on clypeus and paraocular area ferruginous to black, on collar, scutum



**Figs 124–128.** 124–125, 127. Habitus of ♀. 126, 128. Habitus of ♂. 124. *Sphex meridionalis* (Arnold, 1947). 125–126. *S. nefrens* sp. nov. 127–128. *S. occidentalis* sp. nov.

and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Center of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin medially with broad, notched tooth, stepped above. Clypeus with slight indentation in lower center, without carina. Scutellum convex. Metanotum raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein nearly joins proximal from interstitium between submarginal cells II and III. Propodeal enclosure with numerous very fine transversal ridges. Foretarsomere I 2.2–2.3 × length of antepenultimate spine. Petiole length 1.4–1.5 × its medial width.

#### Male

SIZE. 18.4–22.0 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, free clypeal margin medially and apical segment of metasoma. Wings fuscous, with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular area, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin medially concave. Scutellum convex. Metanotum slightly raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with numerous very fine transversal ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 1.6 × its medial width. Flagellomere V with moderately broad placoid covering almost its entire length.

#### Variation

In some females, flagellomeres as well as mid- and hindlegs are largely black.

#### Distribution

Central to southeastern Africa.

#### Remarks

Despite the fact that we did not examine type material of this species, we are very certain that our interpretation of *S. meridionalis* is correct. Arnold's description is quite helpful and mentions several characters like a ferruginous clypeus, brownish-golden facial setae and markedly infusate wings. Their combination excludes all other African species of *Sphex*, and the geographic distribution fits as well.

#### *Sphex nefrens* sp. nov.

urn:lsid:zoobank.org:act:9CE718A7-DF94-4037-8413-4147FC20B705

Figs 37, 123 (purple), 125–126

#### Differential diagnosis

This species (Figs 125–126) is very similar to *S. meridionalis* (Fig. 124), as both are characterized by having perpendicularly-oriented and anteriorly-curved erect propodeal setae (compare Fig. 4) combined with a finely pubescent scutellum (Fig. 8). Members of the *umtalicus* group have the erect propodeal setae oriented the same way, but are distinguished by their more coarsely-pubescent scutellum (Figs 3–4).

Female members of *S. meridionalis* have rich golden appressed setae on the paraocular area, and their clypeal setae are partially golden as well, but mostly dark (Fig. 36). On the other hand, females of *S. nefrens* sp. nov. possess uniformly brassy appressed setae on the paraocular region and clypeus (Fig. 37). Female *S. decipiens* somewhat resemble them in their scutellar vestiture and propodeal sculpture, but have the erect propodeal setae oriented anteriorly and the clypeus almost entirely black, occasionally with a ferruginous margin (Fig. 101), as opposed to a completely ferruginous clypeus in *S. meridionalis* and in the final member of the *meridionalis* group, *S. occidentalis* sp. nov. *Sphex occidentalis* sp. nov. is distinguished from the other taxa by its ferruginous collar, scutellum and metanotum (Fig. 127).

Male specimens of this species (Fig. 126) and *S. meridionalis* cannot yet be reliably distinguished based on morphology. They resemble *S. decipiens* (Fig. 100) more than their female counterparts do and are most easily differentiated from that species by the presence of a shorter, wider petiole, appressed golden facial setae and a different placoid pattern. Males of *S. occidentalis* sp. nov. are recognizable through having part of their flagellum, legs and thoracical dorsum ferruginous (Fig. 128).

### Etymology

‘*Nefrens*’ is a Latin adjective that translates to ‘toothless’ and refers to the absence of a tooth-like process on the free clypeal margin in the male of this species, whereas in contrast the process is present in the somewhat similar males of the *umtalicus* group.

### Material examined

#### Holotype

KENYA – **Taita-Taveta County** • ♀; Voi; 3°24′ S, 38°33.2′ E; 21–22 May 2000; V.F. Lee and W.J. Pulawski leg.; CAS.

#### Paratypes

KENYA – **Kitui County** • 1 ♂; E of Mwingi; [0°56′ S, 38°03′ E]; 14 May 2007; M. Halada leg.; THD-015-OOLM; GenBank CO1 gene: MW538565; GenBank EF-1α gene: MW558241; GenBank LWR gene: MW582280; OÖLM • 2 ♂♂; same collection data as for preceding; OÖLM • 1 ♂; Mwingi, Kangonde vadi; [0°56′ S, 38°03′ E]; 18 Apr. 2007; M. Halada leg.; OÖLM. – **Migori County** • 1 ♂; E shore of Victoria Nyanza, near Karungu; [0°50′35″ S, 34°09′23″ E]; 28–29 Apr. 1911; S.A. Neave leg.; BMNH. – **Taita-Taveta County** • 1 ♂; Taita Hill Discovery Centre; 3°42.3′ S, 38°46.6′ E; 13–14 Dec. 2002; W.J. Pulawski leg.; CAS • 1 ♂; E of Taveta; [3°24′ S, 37°41′ E]; 7 Apr. 2007; M. Halada leg.; OÖLM • 4 ♂♂; same collection data as for holotype; CAS • 1 ♂; Voi River; [3°23′26″ S, 38°34′37″ E]; 14 Apr. 2007; M. Halada leg.; OÖLM.

SOUTH AFRICA – **Eastern Cape** • 1 ♀; Queenstown; [31°53′51″ S, 26°52′31″ E]; 16 Jan.–10 Feb. 1923; R.E. Turner leg.; BMNH.

TANZANIA • 1 ♀; Serengeti; [2°20′ S, 34°34′ E]; 5 May 2008; A.R.E. Sinclair leg.; ZMB. – **Manyara Region** • 1 ♂; “Massai-Nyika; Mgera-Burunge”; Sep. 1893; O. Neumann leg.; ZMB. – **Mbeya Region** • 1 ♂; near Majombe; 8°50′13″ S, 33°57′27″ E; 29 Feb. 2008; J. Oehlke leg.; coll. Jacobs.

### Description

#### Female

SIZE. 21.5–22.7 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, scape, pedicel, flagellomeres I–IV and basal half of V, clypeus and legs from apical half of femora onward. Wings fuscous, forewing with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area brassy, on collar, scutum and propodeal enclosure black. Erect setae on clypeus and paraocular region ferruginous to black, on collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Center of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin medially with broad, notched tooth, stepped above. Clypeus with indentation in lower center, without carina. Scutellum convex. Metanotum raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with numerous very fine transversal ridges. Foretarsomere I 3.0–3.2 × length of antepenultimate spine. Petiole length 0.9–1.2 × its medial width.

#### **Male**

SIZE. 20.0–21.3 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, free clypeal margin medially and apical segment of metasoma. Wings fuscous, with violet iridescence.

VESTITURE. Appressed setae on clypeus and paraocular region silvery, on collar, scutum and propodeal enclosure black. Erect setae on clypeus, paraocular region, collar, scutum and propodeal enclosure black. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower center of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin medially concave. Scutellum convex. Metanotum raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins markedly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with numerous very fine transversal ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 1.6 × its medial width. Flagellomere V with narrow placoid covering almost its entire length.

#### **Variation**

Unknown.

#### **Distribution**

Eastern and southern Africa.

#### ***Sphex occidentalis* sp. nov.**

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Figs 123 (green), 127–128

#### **Differential diagnosis**

Both sexes of this species are easy to distinguish from other members of the group by having the collar, scutellum and metanotum, or at least their dorsal parts, ferruginous instead of black (Figs 127–128).

#### **Etymology**

‘*Occidentalis*’ is a Latin adjective meaning ‘western’. It describes the geographic distribution of this species and also references the name of the closely related *S. meridionalis*.

#### **Material examined**

##### **Holotype**

BURKINA FASO – **Hauts-Bassins Region** • ♀; Soumouso; [11°00′51.9″ N, 4°02′42.9″ W]; 16 Oct. 1968; J. Hamon leg.; MNHN.

### **Paratypes**

GAMBIA – **Banjul** • 1 ♂; Banjul; [13°27'09" N, 16°34'40" W]; 10–23 Nov. 1983; K.M. Guichard leg.; BMNH.

NIGERIA – **Oyo State** • 2 ♀♀; Fashola near Oyo; [7°54' N, 3°47' E]; Nov. 1974; J.T. Medler leg.; BMNH • 2 ♀♀; same collection data as for preceding but 15 Nov. 1975; USNM.

SENEGAL – **Thiès Region** • 3 ♂♂; Ft de Bandia; [14°37'25" N, 17°01'40" W]; 15–17 Nov. 1967; M. Coruet leg.; MNHN.

### **Description**

#### **Female**

SIZE. 20.1–23.9 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, scape, pedicel, flagellomeres I–V, clypeus, legs from trochanter onward excluding apical half of claw, collar dorsally, tegula, dorsal part of scutellum and metanotum, and apical segment of metasoma. Wings fuscous, forewing with conspicuous purple iridescence.

VESTITURE. Appressed and erect setae on clypeus, paraocular region, collar and scutum golden, appressed and erect setae on propodeal enclosure brown. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Clypeus without glabrous spot. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin slightly stepped medially. Clypeus without indentation and carina. Scutellum convex. Metanotum not raised, not bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure with numerous very fine transversal ridges. Foretarsomere I 2.2–2.3 × length of antepenultimate spine. Petiole length 1.2–1.4 × its medial width.

#### **Male**

SIZE. 17.1–20.1 mm.

COLOR. Black except for the following, which are ferruginous: basal half of mandible, clypeus excepting dorsolateral area, scape, pedicel, flagellomeres I–V, collar, prepectus, tegula, scutellum and occasionally metanotum dorsally, apical segment of metasoma, legs from trochanter onward excepting trochanters, and femora of mid- and hindlegs dorsally. Wings fuscous, with conspicuous purple iridescence.

VESTITURE. Appressed setae on clypeus and paraocular area silvery-golden, on collar, scutum and propodeal enclosure ferruginous-brown, on posterior margin of propodeum silvery. Erect setae on clypeus, paraocular region, collar, scutum and propodeal enclosure ferruginous-brown or black, on posterior margin of propodeum silvery. Erect propodeal setae oriented perpendicularly, slightly curved towards anterior. Lower part of clypeus glabrous. Scutellum densely and finely pubescent.

STRUCTURE. Free clypeal margin medially concave, very inconspicuously stepped medially. Scutellum convex. Metanotum raised, not notably bituberculate. 2<sup>nd</sup> recurrent vein joins slightly proximal from interstitium between submarginal cells II and III. Propodeal enclosure without any notable ridges. Posterior margin of metasomal tergum VII convex. Posterior margin of metasomal sternum VII simple, of metasomal sternum VIII triangular. Penis valvae without conspicuous modifications. Petiole length 1.9 × its medial width. Flagellomere V with narrow placoid covering almost its entire length.

### **Variation**

Unknown.

## Distribution

Western Africa.

## Discussion

### 1. Phylogenetic relationships between the subgenera of *Sphex* and the basal species groups

The phylogenetic analyses we conducted based on the sequence data newly generated from the African species and additional data from GenBank (Benson *et al.* 2013) convincingly indicate the monophyly of *Sphex* s. str. as a subgenus (Fig. 130). The genus *Sphex* s. lat., which includes the subgenus *Sphex* (*Fernaldina*), has been hypothesized to be paraphyletic (Ohl 1996). We were unable to verify this hypothesis with genetic data, as tree resolution at the generic level was comparatively low in all analyses.

The subgenus newly erected here, *Sphex* (*Menkeella*) subgen. nov., is distinguished through having very short, erect propodeal setae and a modified spiracular groove which does not actually connect to the spiracle. Regarding the complete absence of a groove laterally on the propodeum in *Fernaldina*, it seems reasonable to assume that *Menkeella* subgen. nov. is more closely related to *Sphex* s. str. than *Fernaldina*

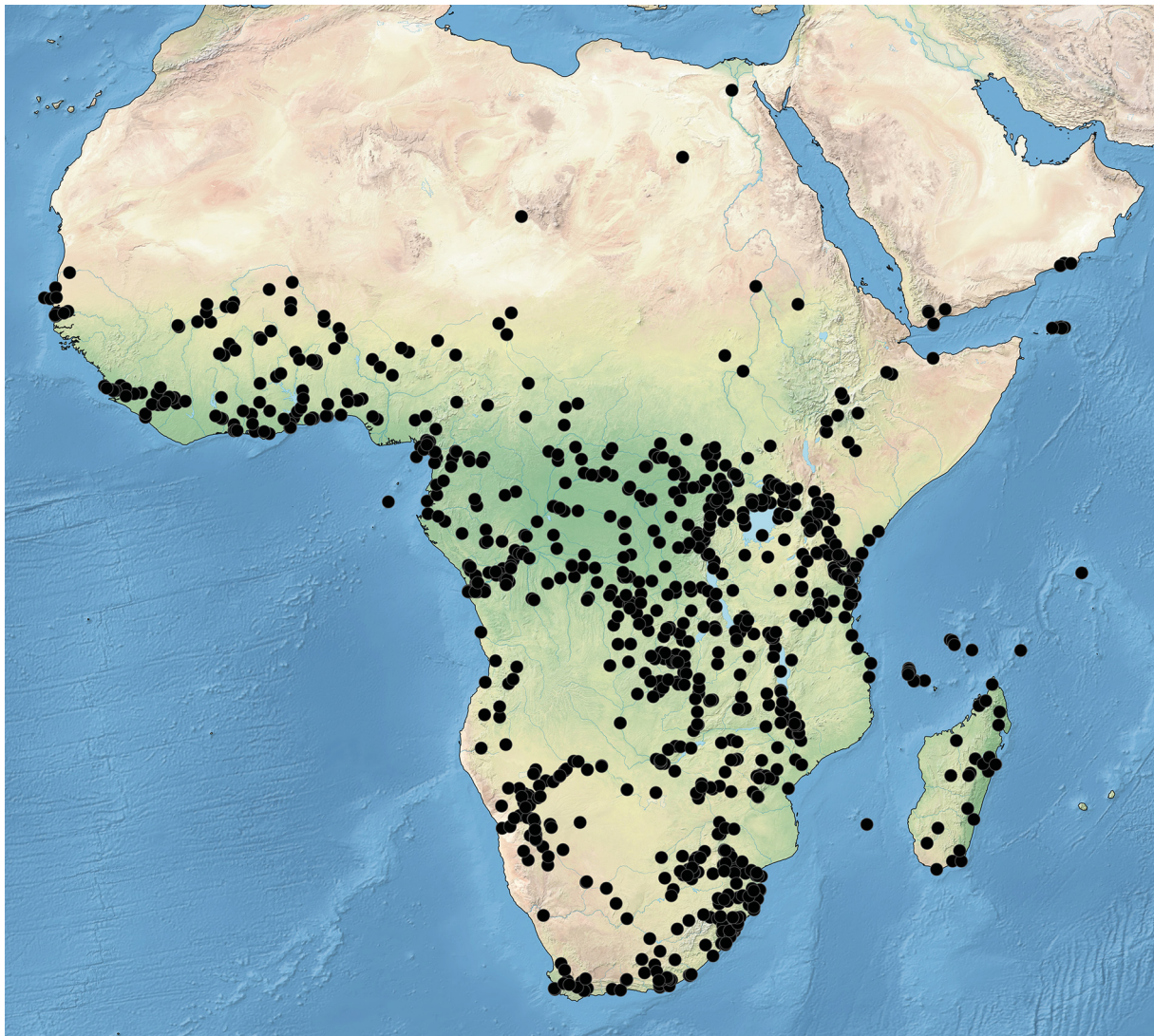


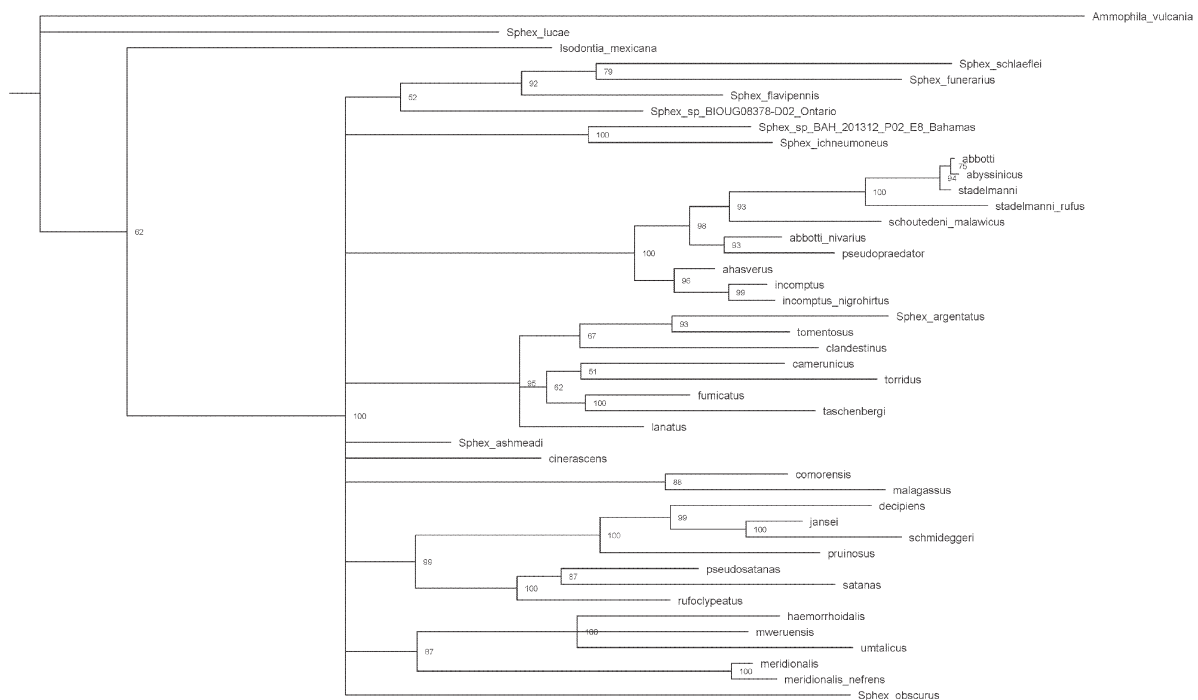
Fig. 129. Geographic coordinates from all examined specimens with traceable localities.

is. The females of both *Menkeella* subgen. nov. and *Fernaldina*, as well as those of *Isodontia* Patton, 1880, lack a carina on the labrum, but to our knowledge, that structure is present in all female *Sphex* s. str. and thus likely an apomorphy of the subgenus *Sphex*. In conclusion, we presume *Sphex* (*Menkeella*) subgen. nov. to be the sister group of *Sphex* (*Sphex*) (Fig. 131).

Based on the perpendicular and straight, erect propodeal setae of the *malagassus* group that greatly resemble those of *Isodontia* and *Fernaldina*, this group may be the sister taxon of all other species groups treated here: the remaining *Sphex* s. str. from the Afrotropical region are apomorphic in having the erect propodeal setae distinctly curved, and usually oriented either anteriorly or posteriorly.

Next, a split presumably occurred between the *argentatus* group and the remainder of the species. All of its members share a conspicuously bituberculate metanotum as a synapomorphy, and their status as a sister taxon to the other groups is supported by the fact that the *argentatus* group is the only one encompassing species that have the erect propodeal setae oriented in different ways. Therefore, one would assume that these species did not diverge from their common ancestor as recently as those within the other groups did from theirs. Furthermore, within this group there is a greater amount of interspecific variation regarding the male placoid pattern, as can be seen in Table 2. As the group contains species from the Palearctic, the Oriental and the Australian regions as well (Hensen 1991), the Afrotropical *Sphex* as a whole appear not to be monophyletic.

The remaining six species groups, all of which are well-defined by morphological and genetic data, can be arranged into three pairs of sister taxa (Fig. 130), with the different orientation of the erect propodeal setae present in each of them being an obvious autapomorphy (Fig. 131). Unfortunately, the evolutionary history among these three supergroups is unclear, as we were unable to find any synapomorphies that would suggest a sister group relationship between any two of them. In the following paragraphs, each supergroup is discussed in further detail.



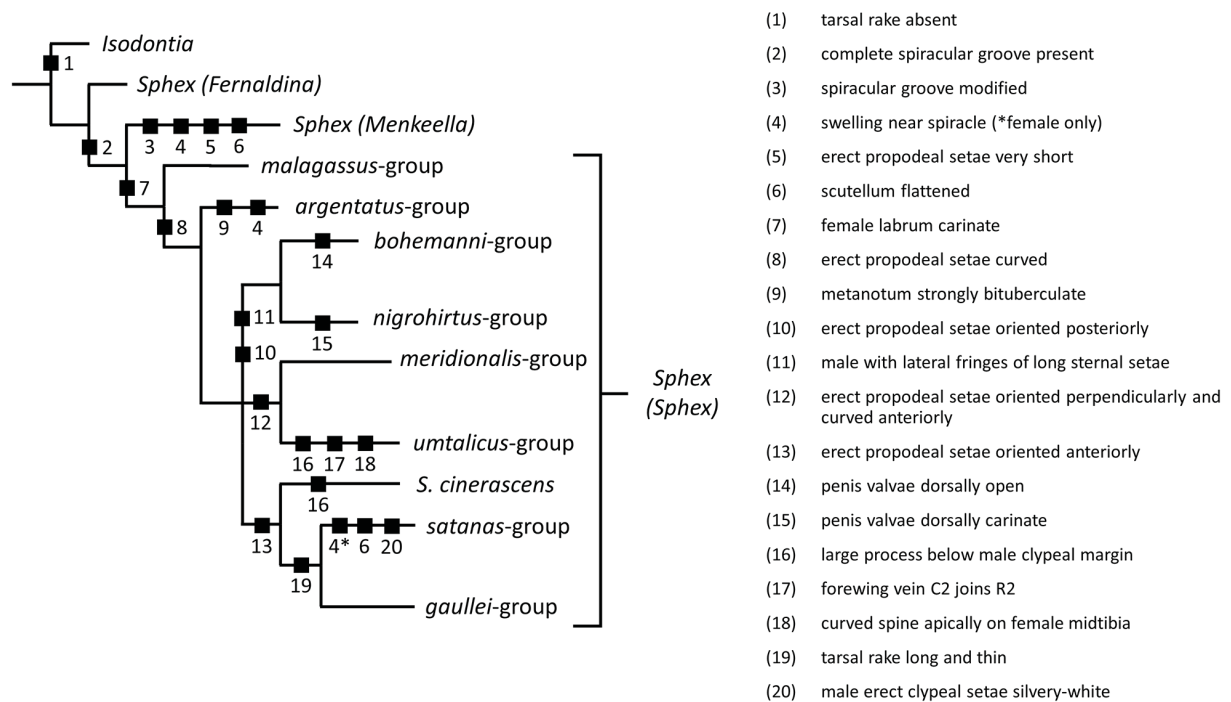
**Fig. 130.** Bayesian inference phylogenetic tree based on available sequence data of CO1, EF-1 $\alpha$  and LWR, with the posterior probability shown at each node. For the Afrotropical species treated in our study, the genus name has been omitted.



## 2. The *bohemanni-nigrohirtus* supergroup

It is very likely that the *bohemanni* group and the *nigrohirtus* group are sister taxa. All their members share the posteriorly-oriented erect propodeal setae, an apparently synapomorphic character that is found in almost no other African *Sphex*, with the exception of *S. tomentosus*, a member of the *argentatus* group. Although the erect propodeal setae are also oriented posteriorly in that species, their texture is somewhat different, as they are coarser and less straight, and their density is markedly greater. In this regard, they greatly resemble those of the fellow group member *S. lanatus*, though that species and most others in the *argentatus* group have them oriented anteriorly. Therefore, we do not think this fact contradicts our hypothesis of posteriorly-oriented erect propodeal setae being an autapomorphy of the *bohemanni-nigrohirtus* supergroup.

Within this supergroup, *S. ahasverus* and *S. pseudopraedator* sp. nov. are presumably each the sister taxon to the remainder of the species within their respective groups. While the sequence data and some morphological characters suggest that *S. ahasverus* belongs in the *nigrohirtus* group and *S. pseudopraedator* sp. nov. in the *bohemanni* group, several attributes of both species lead us to believe that they might also be assigned conversely. Males of *S. ahasverus* possess the posteriorly somewhat triangular, concavely emarginate sternum VIII that is also found in the other members of the *nigrohirtus* group, while males of the *bohemanni* group (with the exception of *S. pseudopraedator* sp. nov.) have sternum VIII more rounded and entire. However, male *S. ahasverus* also have appressed setae covering more than two-thirds of the clypeus, large placoids on flagellomeres IV–VI and, like their female counterparts, a very large and stout body. All of these characters are typical of the *bohemanni* group. Males of *S. pseudopraedator* sp. nov. have similarly extensive facial vestiture and an identical placoid configuration in most cases, and females have the appressed facial setae black, which, regarding at least the clypeal center, is also true for all members of the *bohemanni* group but does not occur within the *nigrohirtus* group. Nevertheless, both sexes are much more slender and smaller than the other members of the *bohemanni* group. Additionally, we already mentioned that males deviate in the shape of sternum



**Fig. 131.** Preliminary hypothesis on the phylogenetic relationships within *Sphex* Linnaeus, 1758, based on morphological characters.

VIII, and the density of the fringes of setae on the sterna notably increases from the base towards sternum VII, as in the males of the *nigrohirtus* group, whereas those of the *bohemanni* group often have their density somewhat constant on most sterna.

A conspicuous detail present in the *bohemanni* group is the remarkable interspecific polymorphism of the male genitalia compared to the other species groups. The combination of characters in penis valvae and sterna VII and VIII are distinct for each species, whereas the remaining groups have the genitalia largely identical even on an inter group-level. A possible explanation for this could lie in the very similar appearance of the females within the *bohemanni* group. Some of them are barely distinguishable even by experts, so one could speculate that it may also be more difficult for males to find a conspecific mate. If so, evolutionary pressure might have led to the diversification of male genitalia to prevent accidental cross-species mating. However, this theory is based on the assumption that males use at least some visual cues when searching for a female. Sexual behavior in *Sphex* has not been extensively analyzed, but studies on *S. ingens* from South America indicate that pheromones excreted by the female are one of the most important aspects in mate finding, as males were observed trying to mate with prey that was left by females (Souza *et al.* 2015). Therefore, the diverse male genitalia in the *bohemanni* group are probably the result of other factors.

In any case, the overall low number of diagnostic characters among the members of this group suggests that these species emerged relatively recently. Nonetheless, the few available features are quite diverse and distinct. Based on sex-specific characters like the color of the free clypeal margin for females and the shape of the two apical sterna for males, the members of the *bohemanni* group can be further assembled into presumed sister taxa. *Sphex abbotti* s. lat. and *S. bohemanni* are most likely closely related, as both have a conspicuously notched posterior margin on sternum VII. Furthermore, *S. schoutedeni* s. lat. and *S. stadelmanni* s. lat. share a ferruginous clypeal margin and mandibular base in the female, and their penis valvae are structurally very similar. Finally, as detailed above, *S. pseudopraedator* sp. nov. is probably the sister taxon to the remainder of the group. We cannot reliably place *S. abyssinicus* yet, since its penis valvae and apical sternum are of very unusual shapes, but the presumed respective female greatly resembles that of *S. abbotti*. As discussed before, the molecular data from most species in the group is rather fragmentary, which is probably the reason why the resulting topology of the taxa within the *bohemanni* group does not fit the morphological data well.

According to the available sequence data, *S. camerunicus* belongs in the *argentatus* group, yet we are certain that this placement is incorrect, even though the support values for both the ML and BI analyses are reasonably high. Morphologically, both sexes of *S. camerunicus* fit extremely well into the *nigrohirtus* group and do not possess any of the traits that characterize the *argentatus* group. The presumed error is most likely a result of the data for this species being very sparse, as for the purpose of DNA extraction we only had access to a singular specimen collected after 1980, and DNA amplification proved to be very difficult for that one. As such, we could sequence only about 330 bp of DNA in total.

### 3. The *gaullei-satanas* supergroup

Another well-supported clade of two sister taxa is the *gaullei-satanas* supergroup. The members of both groups share anteriorly-oriented erect propodeal setae, and even though this attribute can be found in a number of species of the *argentatus* group, the character combination which defines that group (conspicuously bituberculate metanotum and swelling anterior of spiracle) is absent in the *gaullei-satanas* supergroup. Furthermore, the females in the *gaullei-satanas* supergroup are characterized by a tarsal rake, with spines that are significantly longer and thinner than those of the other African *Sphex*. We have found that a viable way of quantifying this is the comparison of absolute tarsomere length and absolute spine length, with the exact measuring points being described in the Introduction. While the

resulting quotient is subject to intraspecific variation, it usually ranges around 1.6 to 1.8 in the *gaullei* and *satanas* groups, whereas it is nearly always greater in the remainder of the species (between 1.8 and 3.8).

Interestingly enough, some character states in these groups parallel those present within the *argentatus* group. Members of the *gaullei* group have faint tubercles on the metanotum, and females in the *satanas* group possess a swelling near the spiracle. Nonetheless, these traits probably evolved convergently.

There is evidence that the sister taxon to the *gaullei-satanas* supergroup consists of *S. cinerascens* and its presumed relatives, though of these, only *S. cinerascens* occurs in Sub-Saharan Africa. *Sphex cinerascens* has a potential sister species in *S. obscurus* (Fabricius, 1793), which is native to southern Asia and the Arabian Peninsula. There seems to be comparatively little congruity in the CO1 region of *S. obscurus* and *S. cinerascens*, though this could be attributed to the sparsity of available data for *S. cinerascens*, as both are very similar morphologically. In both species, the anteriorly-oriented erect propodeal setae, characteristic for the *gaullei*- and *satanas* groups, are present.

*Sphex pruinosus* is likely the sister to the remaining members of the *gaullei* group, as it is differentiated from the other species by its uniformly silvery setae, very long petiole and the lack of a glabrous area on the clypeus. *Sphex cinerascens* also has a long petiole and a uniformly pubescent clypeus, which corroborates this cladistic placement.

While the three species *S. jansei*, *S. gaullei* and *S. schmideggeri* sp. nov. are morphologically quite similar, and the details of their phylogenetic relationship are not easily recognizable, *S. decipiens* is clearly their sister taxon. It has the erect setae and almost all of the integument black, as well as the wings conspicuously infusate, whereas the aforementioned species are all partially ferruginous, with silvery or golden erect setae and largely hyaline wings.

#### 4. The *meridionalis-umtalicus* supergroup

The final supergroup we propose based on morphological and molecular evidence encompasses the *meridionalis*- and *umtalicus* group. The erect propodeal setae are oriented perpendicularly in both groups, with a slight curvature toward anterior. Also, paralleling the aforementioned *bohemanni-nigrohirtus* supergroup, this notable synapomorphic trait apparently evolved convergently at one point within the *argentatus* group, as *S. fumicatus* and its sister species *S. taschenbergi* have the erect propodeal setae oriented in a similar way, but are otherwise morphologically and genetically clearly distinct.

Van der Vecht (1973) hypothesized that the African *S. haemorrhoidalis* is part of a species group that also contains at least two species in the Oriental region, one of them being *S. subtruncatus* Dahlbom, 1843. As diagnostic characters for this group he listed a curved spine at the apex of the midtibia in females, and for males a small transverse lobe that is depressed below the level of the clypeus medially at the anterior clypeal margin. We agree with his assessment, as in addition to these characters, the propodeal sculpture, the orientation of the erect propodeal setae and the density of the scutellar vestiture in *S. subtruncatus* greatly resemble those of the *umtalicus* group as well. It represents another argument against the monophyly of the African *Sphex*, paralleling the case of the *argentatus* group also encompassing species from other continents.

Based on data from commonly-collected species, there seem to be five major distribution patterns in the Afrotropical region:

1. Sub-Saharan continental area, apparently not restricted to a specific climate zone; a prime example is *S. fumicatus* (Fig. 48)
2. Southwestern arid and desert regions (*S. decipiens*, Fig. 112 [red])

3. Southeastern and eastern temperate regions (*S. umtalicus*, Fig. 77 [red])
4. Central and western tropical rainforests (*S. camerunicus*, Fig. 78 [red])
5. Madagascar and/or the surrounding islands (*S. torridus*, Fig. 56 [blue])

Naturally, these are very simplified representations, but data is sparse for many species and collectors are very selective in choosing localities, which complicates assessing species distributions in a balanced way over the Afrotropical region.

## Acknowledgements

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**Supplementary file 1.** Further data on voucher specimens of *Sphex* Linnaeus, 1758 used for DNA sequencing (see also Table 2).