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A taxonomic revision of the
genus *Xylocopa*
Latreille (Hymenoptera:
Anthophoridae) in
southern Africa*

C. D. EARDLEY

National Collection of Insects, Plant Protection Research Institute, Private Bag X134, Pretoria 0001

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Twenty-four species of *Xylocopa*, of which *X. watmoughi* is here described as new, are recognised from southern Africa. Of these, three species probably only intrude into the northern region of the subcontinent and a further two species are only known from a single distribution record. Forty-two species and nine subspecies and varieties have been recorded in synonymy, of which 29 species and the nine subspecies and varieties are here proposed as new synonyms. A key for the identification of the species is provided, and partial or complete species descriptions are given. An additional 11 species and two varieties that are either of uncertain identity or of which the record distribution in southern Africa is doubtful are discussed. These species and varieties are neither described nor included in the key.

Uittreksel

'N TAKSONOMIESE HERSIENING VAN DIE GENUS XYLOCOPA LATREILLE (HYMENOPTERA: ANTHOPHORIDAE) IN SUIDELIKE AFRIKA

Vier-en-twintig suider-Afrikaanse spesies van *Xylocopa*, insluitend een nuwe spesie naamlik *X. watmoughi*, word behandel. Drie van hierdie spesies is waarskynlik indringers in die noordelike gebied van die subkontinent en 'n verdere twee spesies is slegs van 'n enkele rekord bekend. Twee-en-veertig spesies en nege subspecies en rasse word as sinonieme aangeteken. Nege-en-twintig van die spesies en al nege die subspecies is nuwe sinonieme. 'n Sleutel vir die identifikasie van die spesies is ingesluit en gedeeltelik of volledige spesiesbeskrywings word gegee. 'n Verdere elf spesies en twee rasse waarvan die identiteit of verspreiding in suider-Afrika onseker is, word bespreek.

I. INTRODUCTION

All the large carpenter bees that occur in southern Africa belong to the genus *Xylocopa* Latreille. They are generally relatively large robust bees, some of which are among the largest bees in the world. Large carpenter bees are found in all six of the zoogeographical regions; they are most diverse in the tropical and subtropical regions and their diversity progressively decreases to the north and south of the tropics. The large carpenter bees (tribe Xylocopini) together with the small carpenter bees (tribe Ceratinini) comprise the subfamily Xylocopinae within the family Anthophoridae (Hurd & Moure, 1963; Krombein, Hurd, Smith & Burks, 1979).

The historical background of the nomenclature of all the large carpenter bees was dealt with in detail by Hurd & Moure (1963), who clearly described the different generic and subgeneric classifications that have been applied to these bees, and this information has not been repeated here.

Vachal (1899) produced the first comprehensive key to the species of *Xylocopa* that occur in the Ethiopian zoogeographical region and the most recent revision of the African species was published by Friese in 1909. Although these two publications were well presented and have been useful for the recognition of several of the southern African species, they have become obsolete by the large number of species, subspecies and varieties that have subsequently been described and by modern taxonomic principles. The classification of the large carpenter bees was revised by Hurd & Moure (1963), who divided the Ethiopian species into 16 subgenera, thirteen of which were new. This work paved the way for future taxonomic research into poorly understood groups of large carpenter bees.

The purpose of this study was to provide a detailed taxonomic revision of the species of *Xylocopa* that occur in southern Africa, here defined as the area south of the Cunene and Zambezi rivers. This required a detailed taxonomic

study of all the species that have been recorded from southern Africa, the collection of material, the description of a new taxon and the redescription of poorly described taxa, a study of all the existing synonymies and the recognition of new synonyms through the examination of types and authentically determined material, and the compilation of an illustrated key to both sexes.

During the course of this study I examined over 3 000 specimens of about 200 described species, subspecies and varieties including several extra-African species. Although this research was based primarily on the collections in the National Collection of Insects, Plant Protection Research Institute, Pretoria, South Africa, material from several southern African and European museums was also examined and the visitation of most of these museums provided the opportunity to examine types and authentically determined material that would not otherwise have been available for study. It also enabled me to study specimens from the remainder of Africa in relation to the southern African fauna. This revision has, however, been hampered in that it was not possible to borrow material from the Museum für Naturkunde der Humboldt-Universität, Berlin, East Germany. The type-material of Friese, Strand, Gerstaecker, Klug and Kohl is housed in this museum.

Of the 229 specific, subspecific and variety names that have been applied to the African fauna, 88 have been listed in the past as occurring in southern Africa. Many of these forms are difficult or impossible to recognise from the descriptions. The examination of types, authentically determined material and large series of specimens showed that a large number of the synonyms appear to have resulted from the sexually dimorphic, widespread and highly variable nature of many of the African species. Only 24 southern African species, including one new species, are listed as valid in this study. Fifty-one synonyms have been recorded, 13 of which were previously listed as synonyms and 38 are proposed as new synonyms. Eleven species and two

varieties, that I am either unable to recognise or that I believe have been incorrectly recorded from southern Africa, are also discussed.

The difficulty involved in the association of the sexes in the xylocopids led Smith (1874) to state that there is no group of bees that is more difficult to understand than *Xylocopa*. In the present study a definite attempt has been made to associate the sexes by collecting nests that contained both females and males. The only species for which I was unable to find a nest that contained both sexes is *Xylocopa io* Vachal. Although I have attempted to include the biological data available to me, this revision is based primarily on the adult morphology. Furthermore, my interpretation of a few species was based on samples that were smaller than the sample size which I consider to be optimal. I do, however, believe that this study has made a contribution to our knowledge of the southern African fauna and it will facilitate future taxonomic research on the remainder of the African fauna.

II. METHODS

In this study a uniform set of morphological structures was used in combination to determine, describe and illustrate the species. The terminology used was taken from Michener (1944) and Hurd & Moure (1963).

Many of the Ethiopian xylocopids were described only from their colour or from morphological structures that were not part of a uniform set of reliable diagnostic features. During the course of this study a uniform set of approximately two hundred characters were examined, many of which were measured as linear dimensions and combined into about seventy ratios. In the initial stages of this study some 90 000 dimensions were recorded. These characters were carefully studied and it became apparent that many of these measurements were of little or no value in separating species. They were therefore not included in the species descriptions. It also became apparent that because of the large degree of intraspecific variation in the size of the xylocopids, absolute measurements are of little specific value. The descriptions of the species were based on both the shape of morphological structures and several linear dimensions. As size is of little significance as a distinguishing character, linear dimensions have been described in relation to one another, e.g. upper and lower interorbital distances subequal. The measurement and description of these structures follow the method that was described by Hurd & Moure (1963) and outlined by Daly (1973). In describing the position of the various structures of the legs I have adopted the system that was proposed by Grimshaw (1905) and outlined by Daly (1973).

The examination of the type-material of several of the southern African species of *Xylocopa* revealed the following difficulties: the types of several species are not in the collections into which they were originally deposited; it is difficult or impossible to recognise the type-material of a few species; several specimens, in various museums, that are actually syntypes, have been incorrectly labelled

as holotypes; lectotype labels have been attached to a few syntypes for which the lectotype designations have not been published; and at least one syntypical series appears to comprise two distinct species. Because several specimens have been incorrectly labelled as holotypes or lectotypes, and as I have not examined the whole type-series of most species, lectotypes have not been designated. The only exception is in *X. io*, in which the type-series appears to comprise two distinct species.

The key, which includes both males and females, was designed to provide for simple accurate determinations and does not reflect natural relationships between species. As an aid to the recognition of several species I have placed a few additional characters, including distribution, in parentheses in several of the couplets. In the second part of couplet 36 four species names have been listed. This is because I am unable to separate the males of these four species.

The only catalogue with a complete bibliography is that of Dalla Torre (1896). This catalogue includes all the southern African xylocopids that were described before 1896 and it has not been referred to under each species.

Distribution maps include the localities of the material that was studied in this revision as well as published distribution records. Doubtful records were omitted.

Unless otherwise stated, all the material that was examined during the course of this study is housed in the National Collection of Insects, Plant Protection Research Institute, Pretoria, and all the specimens that have "AcX" accession numbers belong to this Institute. Specimens that have an "H" accession number are housed in the State Museum, Windhoek, and specimens with either an "A" or a "B" accession number are housed in the collections in the Kruger National Park, South Africa.

ABBREVIATIONS

- AMNH American Museum of Natural History, New York, U.S.A.
- BMHN British Museum (Natural History), London, Great Britain.
- HEC Hope Entomological Collections, University Museum, Oxford, Great Britain.
- IRSN Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium.
- KNP Kruger National Park, South Africa.
- MCSN Museo Civico di Storia Naturale "Giacoma Doria", Genova, Italy.
- MHU Museum für Naturkunde Humboldt-Universität, Berlin, East Germany.
- MIZS Museo ed Istituto di Zoologia Sistemica della Università di Torino, Torino, Italy.
- MNHN Muséum National d'Histoire Naturelle, Paris, France.
- MRAC Musée Royal de l'Afrique Centrale, Tervuren, Belgium.
- NCI National Collection of Insects, Plant Protection Research Institute, Pretoria, South Africa.
- NHW Naturhistorischen Museum, Vienna, Austria.

NRS	Naturhistoriska Riksmuseet, Stockholm, Sweden.
PAS	The Polish Academy of Sciences, Warsaw, Poland.
RNH	Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands.
SC	Schulten's private collection, Amsterdam, The Netherlands.
SAM	South African Museum, Cape Town, South Africa.
SM	State Museum, Windhoek, South West Africa/Namibia.
TM	Transvaal Museum, Pretoria, South Africa.

III. THE SOUTHERN AFRICAN SPECIES OF *XYLOCOPA*

The genus *Xylocopa* is well defined. It has been described and discussed in detail by Hurd & Moure (1963) and requires no further attention here. Michener (1944) provided keys from which the tribe Xylocopini can be easily recognised and Hurd & Moure (1963) gave keys to the genera and subgenera of this tribe.

During the course of this study it became apparent that the subgeneric classification proposed by Hurd & Moure (1963) requires revision. This would mean, *inter alia*, the redefining and/or synonymy of a number of the subgenera. However, an improved and meaningful subgeneric classification could only be provided if the entire Ethiopian fauna was taken into consideration and as this study was confined to a relatively small portion of the African fauna, I decided to leave such an attempt in abeyance. A changed subgeneric classification based on an incomplete knowledge would be of little value in the taxonomic understanding of the southern African xylocopids. I have therefore not made use of the available subgeneric classification, which could be misleading, and I have used informal species-groups instead. These groups do not necessarily comprise the same species as the groups that were used by previous authors, nor are they intended as a substitute for a subgeneric classification; they are merely used to facilitate the description and determination of the species that are dealt with in this revision.

As many of the species are so closely related to each other, it has not been necessary to provide long detailed descriptions of all these species. A detailed description has therefore been given for each species-group and the species are described with reference to the group descriptions. This prevented the unnecessary repetition of characters that are shared by closely related species. In the group descriptions I have pointed out several exceptions where one or two species differ from the remainder of the species-group. These exceptions are dealt with in the species descriptions.

KEY TO THE SPECIES

1. Antenna with 10 flagellar segments; hind tibia with two tibial spurs; pygidial plate present (females) 2

— Antenna with 11 flagellar segments; hind tibia with only an anterior tibial spur; pygidial plate absent (males).....28

2. Scutellum, in profile, angulately divided (Fig. 23-27) 3

— Scutellum, in profile, evenly rounded (Fig. 22)21

3. Mesosomal dorsum reddish-orange (Fig. 63, 64, 70)..... 4

— Colour of mesosomal dorsum otherwise 7

4. Dorsal surface of metasomal tergum I reddish-orange *lateritia*

— Dorsal surface of metasomal tergum I black. 5

5. Wings pale brown, semi-translucent and without a metallic lustre (Fig. 70).... *isabelleae*

— Wings strongly and entirely infuscated, with a strong greenish or purple metallic lustre in certain plays of light (Fig. 63, 64) 6

6. Head partly or completely black (Fig. 63, 64) *flavorufa*

— Head completely orange (known only from the northern border of southern Africa)..... *mixta*

7. Head and body completely black (known to occur only near the Okavango Swamp in Botswana)..... *torrida*

— Colour otherwise 8

8. Mesosomal dorsum completely black (specific areas of the head, mesosomal pleura, mesosomal venter and metasoma clothed with white pubescence) 9

— Colour of mesosomal dorsum otherwise 10

9. Face, mesosomal pleura, mesosomal venter and lateral regions of metasoma mostly white; gena and fore tibia usually white; remainder of head, mesosoma and metasoma black; middle and hind legs completely black *nigrita*

— Head either completely white or with a mixture of white and black hairs; mesosoma, metasoma and legs completely black *imitator*

10. Metasoma completely black (Fig. 72, 73) *flavicollis*

— Dorsal surface of metasomal tergum I may be yellow, white or pale brown..... 11

11. Mesosomal dorsum, dorsal surface of metasomal tergum I, lateral regions of metasomal tergum VI and the anal fringe pale brown *varipes*

— Colour of mesosomal dorsum otherwise; dorsal surface of metasomal tergum I either yellow or white; remainder of metasoma completely black..... 12

12. Mesosomal dorsum completely yellow (Fig. 69) 13

— Mesosomal dorsum with anterior region black and posterior region either yellow or white (Fig. 66, 67)..... 16

13. Clypeus and supraclypeus flat, the lateral margins not distinctly raised as described below; metasomal tergum I with a central orifice on the subvertical surface that opens into an invaginated mite chamber 14

— Clypeus and supraclypeus gently concave as a result of the lateral clypeal and supraclypeal margins being distinctly raised; metasoma devoid of an invaginated mite chamber..... *scioensis*

14. Face partly or completely white..... *senior*
 — Face completely black.....15
15. Outer margin of fore coxa gently curved (known only from the eastern Transvaal and Natal) *calens*
 — Outer margin of fore coxa strongly emarginate (known only from the western one half of the Cape Province) *watmoughi*
16. Posterior region of mesosomal dorsum and dorsal surface of metasomal tergum I white (Fig. 66)17
 — Posterior region of mesosomal dorsum and dorsal surface of metasomal tergum I yellow (Fig. 67)18
17. Mesosomal pleura completely black; metasomal tergum I with a central orifice on the subvertical surface that opens into an invaginated mite chamber *caffra*
 — Mesosomal pleura almost completely white; metasoma devoid of an invaginated mite chamber *inconstans*
18. Mesosomal pleura completely black19
 — Mesosomal pleura almost completely yellow ...
 *inconstans*
19. Clypeus and supraclypeus flat, the lateral margins not distinctly raised as described below; metasomal tergum I with a central orifice on the subvertical surface that opens into an invaginated mite chamber20
 — Clypeus and supraclypeus gently concave as a result of the lateral clypeal and supraclypeal margins being distinctly raised; metasoma devoid of an invaginated mite chamber
 *scioensis*
20. Head completely black..... *caffra*
 — Head either completely white or with a mixture of white and black hairs *somalica*
21. Lower mandibular margin with a very large conspicuous tooth (Fig. 18) *sicheli*
 — Lower mandibular margin straight, without a large tooth (Fig. 16, 17, 19)22
22. Clypeus with two large tubercles on the lateral margins, one below each epistomal pit and a third large tubercle in the middle of the ventral clypeal margin..... *albifrons*
 — Lateral and ventral clypeal margins may be weakly tuberculate, gently raised or in the same plane as clypeus and supraclypeus23
23. Supraclypeus weakly carinate, lower supraclypeal margin distinctly raised above lateral regions of supraclypeus and dorsal region of clypeus; basitibial plate on proximal one half of hind tibia (known only from Mozambique, Zimbabwe and the Transvaal)..... *erythrina*
 — Supraclypeus flat and in same plane as clypeus, lower supraclypeal margin not distinctly raised as described above; basitibial plate on distal one half of hind tibia.....24
24. Punctuation adjacent to mesal borders of spiracles on metasomal terga IV and V very fine and dense, markedly different from the punctuation elsewhere on these two terga.....
 *rufitarsis*
 — Punctuation adjacent to mesal borders of spiracles on metasomal terga IV and V not differentiated as described above.....25
25. Integument just below lateral ocelli strongly tuberculate; lower region of face, below antennal sockets, shallowly concave *io*
 — Integument just below lateral ocelli either gently raised or weakly carinate; lower region of face, below antennal sockets, generally flat, clypeus gently convex and/or with the areas just below the epistomal pits either gently raised or weakly tuberculate26
26. Upper surface of pygidial spines flat; malar space about 1,5 times as long as flagellar segment II (known only from the southern and south-western Cape Province) *capitata*
 — Upper surface of pygidial spines either rounded or weakly carinate; malar space either a little shorter or as long as flagellar segment II27
27. Length of head and body between 15-20 mm (metasoma always completely black).....
 *hottentotta*
 — Length of head and body between 10-15 mm (metasoma either completely black or mostly black, with ventrolateral regions clothed with white pubescence)..... *lugubris*
28. Scutellum, in profile, angulately divided (Fig. 34) (tarsal segments II-V of middle leg about twice as wide as in fore or hind legs)29
 — Scutellum, in profile, evenly rounded (Fig. 28-33, 35-38).....31
29. Middle femur with a relatively long spiniform process (about one half times as long as middle femur) on the ventral surface; anterior region of mesosomal dorsum pale brown or brownish-orange..... *torrida*
 — Middle femur with a small prominence, that is definitely not spiniform, on the ventral surface; anterior region of mesosomal dorsum reddish-orange.....30
30. Face partly or completely black; genitalia with parameral and digital lobes as illustrated (Fig. 54) *flavorufa*
 — Face completely orange; genitalia with parameral and digital lobes similar to *flavorufa* in dorsal and lateral views (Fig. 54) and with posterior view as illustrated (Fig. 55) *mixta*
31. Metanotum, in profile, angulately divided (Fig. 35, 36).....32
 — Metanotum either flat or evenly rounded.....37
32. Mesosomal dorsum bright yellow in the centre circumscribed by either black or dark yellow pubescence (Fig. 74).....33
 — Head and dorsal surfaces of mesosoma and metasoma pale yellow, olive-yellow or ferruginous (Fig. 68, 71).....34
33. Mesosomal dorsum circumscribed by dark yellow pubescence, length of head and body between 11-16 mm (Fig. 74) *flavicollis*
 — Mesosomal dorsum circumscribed by black pubescence; length of head and body between 18-25 mm *imitator*
34. Colour of head, mesosoma and metasoma ferruginous (Fig. 71); genitalia with parameral and digital lobes as illustrated (Fig. 58)
 *isabelleae*
 — Head and dorsal surfaces of mesosoma and metasoma pale yellow, sometimes olive-

- coloured when viewed without magnification (Fig. 68); genitalia with parameral and digital lobes as illustrated (Fig. 57).....35
35. Clypeus and supraclypeus gently concave as a result of the lateral clypeal and supraclypeal margins being distinctly raised; length of head and body between 11-15 mm..... *scioensis*
- Clypeus and supraclypeus flat, the lateral margins not distinctly raised as described above; length of head and body between 15-25 mm.....36
36. Metanotum with subvertical (posterior) surface flat (Fig. 36) *watmoughi*
- Metanotum with subvertical (posterior) surface strongly concave (Fig. 35)
..... *caffra, somalica, senior, calens*
37. Pubescence of head, mesosoma and metasoma either pale yellow or ferruginous-yellow (Fig. 68, 76); facial markings as illustrated (Fig. 14, 15)38
- Colour of pubescence otherwise; facial markings otherwise39
38. Integument of metasomal terga mostly yellowish; length of head and body between 25-35 mm..... *nigrita*
- Integument of metasomal terga mostly black; length of head and body between 18-25 mm
..... *inconstans*
39. Integument of face completely black40
- Yellow facial markings present (post-mortem discoloration may result in yellow areas of face becoming brown and semi-transparent) (Fig. 1-5)41
40. Inner eye margins straight; eyes enlarged so that the maximum eye width is greater than one half of the maximum face width (Fig. 7)....
..... *rufitarsis*
- Inner eye margins strongly incurved; eyes not enlarged, i.e. maximum eye width less than one half of the maximum face width (Fig. 6)
..... *sicheli*
41. Middle tarsus unusually long, more than twice as long as fore or middle tarsi..... *io*
- Tarsi of all legs subequal in length.....42
42. Upper interorbital distance a little shorter than lower interorbital distance; genitalia with parameral and digital lobes as illustrated (Fig. 52) (known only from Mozambique, Zimbabwe and the Transvaal)..... *erythrina*
- Upper and lower interorbital distances subequal; genitalia with parameral and digital lobes as illustrated (Fig. 51).....43
43. Epistomal suture with a narrow black margin (Fig. 5); profile of propodeum as illustrated (Fig. 31); length of head and body between 25-30 mm (known only from the southern and south-western Cape Province) *capitata*
- Epistomal suture not usually darkly margined; profile of propodeum otherwise (Fig. 28, 29)44
44. Facial markings as illustrated (Fig. 1) (profile of propodeum as illustrated, Fig. 28)45
- Facial markings as illustrated (Fig. 2, 3) (profile of propodeum as illustrated, Fig. 29)
..... *hottentotta*
45. Length of head and body between 12-15 mm

- (known to occur throughout southern Africa) *lugubris*
- Length of head and body between 17-19 mm (known only from the southern region of the Cape Province) *albifrons*

THE XYLOCOPA ALBIFRONS GROUP OF SPECIES

The *X. albifrons* species-group consists of the following eight species, *X. albifrons*, *X. lugubris*, *X. hottentotta*, *X. io*, *X. erythrina*, *X. capitata*, *X. sicheli* and *X. rufitarsis*. These species are all closely related to the type-species of *Xylocopa*, *X. violacea*, and they have therefore been referred to almost exclusively in the genus *Xylocopa*, the only exception being *X. absurdipes* that was incorrectly placed in the genus *Mesotrichia* by LeVeque (1928) (see p. 13). The *X. albifrons* group can be easily recognised by the shape of the scutellum, metanotum, propodeum and the first metasomal tergite, which are gently rounded, and by the absence of a metasomal mite pouch in the female.

DESCRIPTION OF THE *X. ALBIFRONS* SPECIES-GROUP

Female. Colour: pubescence either completely black or mostly black with middle and hind tarsi pale yellow or orange, and with a white fringe on ventrolateral region of metasoma in *X. lugubris*; wings strongly and entirely infuscated.

Head: frontal view: summit of vertex weakly elevated above eyes, except in *capitata*; clypeus generally about level with adjacent parocular area, and about as long as clypeocellar distance, except in *capitata*; dorsal view: ocellorbital and interocellar distances usually subequal, except in *capitata*; profile: malar space either shorter or about as long as antennal flagellar segment II, except in *io* and *capitata*; mandible either bidentate or tridentate; upper mandibular margin usually notched; lower mandibular margin straight and without a large tooth, except in *sicheli*. Mesosoma: dorsolateral margins of pronotum gently rounded and without a distinct sulcus, except in *erythrina*; scutellum evenly rounded so that posterior region of mesosoma is gently curved, forming a horizontal (anterior) and a subvertical (posterior) surface (cf. Fig. 22); propodeum flat and declivous; wing venation as in *sicheli* (Fig. 20); legs: apex of basitibial plate bifurcate. Profile of scutellum, metanotum, propodeum and metasomal tergum I as in *capitata* (Fig. 22). Metasoma: tergum I evenly rounded, forming a subvertical (anterior) and a horizontal (posterior) surface, the subvertical surface is always devoid of a central orifice and an invaginated mite chamber; pubescence adjacent to mesal borders of metasomal spiracles IV and V not distinctly different from remainder of terga, except in *rufitarsis*; with two small pygidial spines near base of pygidial plate; dorsal surface of pygidial spines rounded, except in *capitata*.

Male. Colour: pubescence of head, mesosoma, metasoma and legs and the facial markings are described under each species; integument of

mesosoma, metasoma and legs entirely black, except in *sicheli*; wings pale brown and semi-translucent, with dark brown veins, except in *capitata*.

Head: frontal view (Fig. 1-7): summit of vertex weakly elevated above eyes, less than an ocellar diameter above upper eye margins, except in *rufitarsis*; inner eye margins gently incurved, except in *rufitarsis*; maximum eye width equal to or less than one half maximum face width, except in *rufitarsis*; region of parocular area adjacent to supra-antennal area and supra-clypeus weakly to moderately inflexed; clypeus flat and level with adjacent parocular area, except in *sicheli*; profile: malar space a little shorter to as long as flagellar segment II; antennal scape reaching to a level well above summit of vertex, between two and three times as long as flagellar segment I, except in *rufitarsis*; labrum gently convex; mandible bidentate; upper mandibular margin gently incurved, non-tuberculate, except in *erythrina*. Mesosoma: metanotum either flat or gently curved; propodeum either flat and declivous or gently curved and mostly declivous (Fig. 28-33); wing venation as in *sicheli* (Fig. 20); legs: basitarsi of all legs more or less similar in length and tarsal segments II-V of all legs more or less similar in length and width, except in *io*; basitibial plate on proximal one half of hind tibia, and reduced to a single plate, except in *sicheli*. Metasoma: tergum I gently curved so that the anterior region is subvertical and the posterior region is horizontal; tergum VII with distal margin gently rounded, except in *sicheli*; sternum VI flat, without a mediolongitudinal keel; genitalia with parameral and digital lobes as illustrated (cf. Fig. 51-53).

THE SPECIES THAT COMPRISE THE *X. ALBIFRONS* SPECIES-GROUP

The females that comprise the *X. albifrons* groups are fairly similar to each other in both colour and structure. They can, however, be reliably separated by the following combination of characters: colour of ventrolateral regions of metasoma; structure of integument just below lateral ocelli, supra-antennal area, clypeus and lower region of parocular area; mandibular teeth; pubescence adjacent to spiracles on metasomal terga IV and V; and shape of dorsal surfaces of pygidial spines.

Several of the males of this species-group are also rather similar to each other in colour and structure. They can generally be separated by the following combination of characters: colour of mesosoma; shape of eyes; facial markings; shape of scutellum, metanotum and propodeum; length of middle tarsus, and structure of parameral and digital lobes of the genitalia.

Xylocopa albifrons Lepeletier, Fig. 1, 28, 39

Xylocopa albifrons Lepeletier, 1841: 191; Vachal, 1899b: 103.

Xylocopa tuberculiceps Ritsema, 1880: 220-221. *syn. nov.*

Xylocopa albifrons was described by Lepeletier (1841) from a male specimen that was collected

in the Cape of Good Hope, a locality that was referred to by several authors that appears to have generally been used to refer to the southern region of the Cape Province, South Africa, and occasionally to the whole of the Cape Province. Although Vachal (1899b) suggested that *albifrons* could be the male of *X. tarsata*, I have examined the holotypes of both *albifrons* (in MNHN) and *tarsata* (now known as *X. hottentotta*) and I am confident that they are both distinct species.

In 1880 Ritsema described *X. tuberculiceps* from three females collected at Horstock in the Cape Province, a locality I have not been able to trace. I have studied one of the syntypes of *tuberculiceps* (in RNH) and I am confident of the identity of this species. I have also examined two series of specimens in which the sexes have been correctly associated and this information clearly indicated that the female of *albifrons* was described by Ritsema (1880) as *tuberculiceps*. The syntype of *tuberculiceps* which I have examined has a lectotype label. This label was attached by Dr P. D. Hurd who did not publish the lectotype designation.

Both *X. albifrons* and *X. tuberculiceps* were placed in the subgenus *Xylomelissa* by Hurd & Moure (1963).

The original and subsequent descriptions of the male of *X. albifrons* are inadequate for the recognition of this species and even though Ritsema (1880) described the most important diagnostic features of the female of *albifrons*, this species has not been comprehensively described. I have therefore redescribed this species with reference to the species-group description.

DESCRIPTION

Length: head 4,0-5,0 mm; scutum 4,0-5,0 mm; body length 17,0-19,0 mm; fore wing 14,0-17,0 mm.

Female. Colour: pubescence entirely black, except for hind tarsus which is mostly pale orange.

Head: frontal view: summit of vertex weakly elevated above eyes, about an ocellar diameter above upper eye margins; alveolorbital distance a little less than interalveolar distance; region of parocular area adjacent to supra-antennal area and supra-clypeus weakly inflexed; supra-antennal area strongly tuberculate; apex of frontal line distinctly raised above supra-clypeus; clypeus and supra-clypeus gently concave as a result of the four large facial tubercles which are located on the supra-antennal area, the lateral clypeal margins (one just below each epistomal pit) and the middle of the ventral clypeal margin; median region of clypeus about level with parocular area; dorsal view: integument just below lateral ocelli distinctly carinate, crest of carina usually impunctate and semi-circular; profile: vertex and gena about as wide as median eye width; mandible (similar to that in *capitata*, Fig. 17) tridentate, the upper tooth is relatively small and may be completely worn away; upper mandibular margin without a distinct tubercle; lower mandibular margin without a large tooth. Mesosoma: scutellum gently rounded (cf. Fig. 22); legs: apex of basitibial plate on distal one half of hind tibia, with a single row of denticles that extend towards proximal end of

hind tibia; propodeal triangle always absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *capitata* (Fig. 22). Metasoma: tergum I gently rounded the subvertical surface devoid of a central orifice and a mite chamber; pubescence adjacent to mesal borders of metasomal spiracles IV and V not distinctly different from remainder of terga; dorsal surface of pygidial spines rounded.

Male. Colour: pubescence of head, mesosoma and metasoma mostly black, with a little pale brown or white pubescence on anterior regions of scutum, mesosomal pleura and metasomal dorsum; legs mostly black, except middle and hind tarsi which are either black or orange. Facial markings (Fig. 1): clypeus and supra-clypeus completely pale yellow; paracolar area mostly pale yellow, yellow region of paracolar area reaching to a level well above upper margins of alveoli; labrum usually with a yellow spot in middle of proximal margin; mandible completely black.

Head: frontal view (Fig. 1): inner eye margins gently incurved; upper and lower interorbital distances subequal; maximum eye width equal to or less than one half maximum face width; alveolorbital and interalveolar distances subequal; supra-antennal area slightly carinate; apex of frontal line level with supra-clypeus; dorsal view: integument just below lateral ocelli slightly raised; interocellar and ocellorbital distances subequal; antennal scape reaching to a level well above summit of vertex, between two and three times as long as flagellar segment I; labrum gently convex, with a small median tubercle. Mesosoma: metanotum flat; propodeum with the median region gently curved and subvertical and the lateral regions curved so that the anterior region is subhorizontal and the posterior region is declivous (Fig. 28); legs: tarsus of middle leg not lengthened as in *io*; trochanter of hind leg non-tuberculate; hind femur with a relatively large tubercle on the ventral surface; distal end of hind tibia with ventral posterior region weakly swollen (hind leg as illustrated, Fig. 39). Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 28). Metasoma: tergum I gently curved; genitalia with parameral and digital lobes similar to that in *hottentotta* (Fig. 51).

DISTRIBUTION (FIG. 77)

Xylocopa albifrons has been recorded from several localities in the western, southern and south-western Cape Province and this species is apparently endemic to this region.

MATERIAL EXAMINED

♂ holotype of *X. albifrons*, "Afrique Delalande", plus Lepeletier's original determination and "type" labels, in MNHN; 1♀ syntype of *X. tuberculiceps*, "Horstock, Pr. C. Sp.", plus Ritsema's original determination label and a lectotype label that was attached by P. D. Hurd, in RNH.

16♀ and 11♂ with the following data: SOUTH AFRICA: CAPE PROVINCE: Rooi Els, several dates, 4♀ 3♂ (AcX 3218, 3219, 3220); Rooi Els, 24.XII.1967, feeding on *Borbonia cordata* flowers,

1♀; Rooi Els, 25.XI.1969, ex nest in *Psoralea aphylla*, 2♀ 5♂ (AcX 2995); Cedarberg, 18.XII.1972, 1♀ (AcX 3000); Cedarberg, near Crystal Pools, 14.XII.1969, 3♀; Cedarberg, near Crystal Pools, 14.XII.1969, feeding on leguminous flowers, 2♀; top of Sir Lowry's Pass, 28.XII.1967, feeding on *Psoralea pinnata* flowers, 1♀; Montagu Pass, near George, 2.X.1921, H. Brauns, 1♂ in TM; Pienaars River, 10.XI.1900, V. Jutrzencka, 1♂ in TM; Stellenbosch, 25.XII.1925, H. Brauns, "*X. tuberculiceps*" det. ? H. Brauns, 1♀ in SAM; Stellenbosch, XI.1887, "L.B.", "*X. tuberculiceps*" det. ? A. J. Hesse, 1♀ (♀407) in SAM; Bushmanland, Henriëries, no date, R. Lightfoot, 1♂ in SAM. Unless otherwise stated all material was collected by R. H. Watmough.

Xylocopa lugubris Gerstaecker

Xylocopa lugubris Gerstaecker, 1857: 460; Gribodo, 1857: 325; Friese, 1909: 225; Hurd & Moure, 1963: 226-230, 308; Watmough, 1974: 262-276.

Xylocopa angolensis Smith, 1874: 264; Friese, 1915: 23; Hurd & Moure, 1963: 222, 297. *syn. nov.*

Xylocopa nataliella Cockerell, 1933a: 61. *syn. nov.*

Xylocopa ogilviei Cockerell, 1933a: 60-61; 1935b: 63. *syn. nov.*

Xylocopa mensae Cockerell, 1933a: 58-59. *syn. nov.*

Xylocopa tarsata var. *oblita* Cockerell, 1936: 26. *syn. nov.*

Xylocopa lugubris var. *rufotegularis* Cockerell, 1947: 144. *syn. nov.*

Xylocopa enslini Brauns (*nomen nudum*); Anonymous, 1958: 31. *syn. nov.*

Gerstaecker (1857) described the female of *X. lugubris* from an unspecified locality in Mozambique. As I have not examined the holotype of *lugubris* (in MHU), my interpretation of this species is based on the original description and Friese's (1909) detailed colour description, both of which only deal with part of the natural variation of this species. The most important diagnostic feature of the colour variety from which this species was originally described is the white pubescence on the ventrolateral regions of the metasoma. The only other African species that is similar to *lugubris* in colour is *Xylocopa bouyssoui* Vachal. However, *X. bouyssoui* is much larger than *lugubris* and has not been recorded from southern Africa. From the determined material I examined it appears that *lugubris* has been confused with *X. tarsata* (now known as *X. hottentotta*). Determined material has therefore been of little assistance in recognising this species. I examined the material that Watmough (1974) recorded as *X. lugubris* and this material is actually *X. hottentotta*.

Xylocopa angolensis was described by Smith (1874) from a female specimen collected at an unspecified locality in Angola. I have examined the holotype of *angolensis* (in BMNH) and found it to be insignificantly different from the Mozambique material I determined as *lugubris*. I therefore synonymise *angolensis* and *lugubris*.

Cockerell (1933a) described *X. nataliella* from a female collected in "National Park", Natal (which

is today known as the Royal Natal National Park) and *X. ogilviei* from two females collected at the Matopo Hills in Zimbabwe. I have studied the original descriptions and have examined the holotype of *X. nataliella* (in BMNH) and one of the syntypes of *X. ogilviei* (in BMNH). These two species differ from the holotype of *lugubris* inasmuch as their pubescence and wings are slightly different in colour and they are undoubtedly conspecific with *lugubris*.

Cockerell (1933a) described *X. mensae* from a male collected on Table Mountain in Cape Town, Cape Province. I have studied the original description and the holotype (in BMNH) and this species is clearly a colour variety of *X. lugubris*.

Xylocopa tarsata var. *oblita* was described by Cockerell (1936) from a female collected at Wonderboom, near Pretoria in the Transvaal. On examining the holotype (in BMNH) I am confident that *oblita* is a colour variety of *lugubris* and not of *tarsata* as suggested by Cockerell (1936).

In 1947 Cockerell described *X. lugubris* var. *rufotegularis* from a male taken at Feira which is on the southern border of Zambia. I have studied the original description and the holotype (in BMNH) and agree that *rufotegularis* is a colour variety of *lugubris*.

The TM has several determined specimens and a syntypical series, that consists of a male and a female, of *X. enslini* Brauns. This species has not been described and it has only been recorded in a list of the insect type-specimens preserved in the southern and east African museums (Anonymous, 1958). *X. enslini* is therefore a *nomen nudum*; it is also conspecific with *X. lugubris*.

In 1963 Hurd & Moure described the subgenus *Apoxylocopa* for *X. lugubris* and its variety *rufotegularis*. However, these two authors placed *X. angolensis*, *X. nataliella*, *X. ogilviei* and *X. mensae*, all of which are junior synonyms of *lugubris*, in the subgenus *Xylomelissa*.

Xylocopa lugubris shows considerable variation in the colour of both sexes and this colour variation has led to the description of several synonyms, some of which have been described in detail. Of particular importance is the description of *X. lugubris* by Friese (1909) and the descriptions of *X. nataliella*, *X. ogilviei* and *X. mensae* by Cockerell (1933a). However, these descriptions do not deal with the complete colour variation of *lugubris* and several of the structural characters which have been described are not suitable diagnostic features. I have therefore redescribed this species in relation to the species-groups description given above.

DESCRIPTION

Length: head 3,0-4,0 mm; scutum 2,0-4,0 mm; body length 12,0-15,0 mm; fore wing 11,0-13,0 mm.

Female. Colour: pubescence mostly black, ventrolateral regions of metasoma either black or white and middle and hind tarsi black, yellow or orange.

Head: frontal view: summit of vertex weakly elevated above eyes, about an ocellar diameter above upper eye margins; alveolorbital and interal-

veolar distances subequal; region of parocular area adjacent to supra-antennal area and supraclypeus weakly inflexed; supra-antennal area weakly carinate; apex of frontal line distinctly raised above supraclypeus; clypeus either flat or slightly concave, usually with a very weak mediolongitudinal ridge; lateral clypeal margins either level with parocular area or slightly raised just below the epistomal pits; dorsal view: integument just below lateral ocelli slightly elevated, not carinate, crest of elevated area sometimes impunctate, never semi-circular; profile: vertex and gena about as wide as median eye width; mandible bidentate (cf. Fig. 19); upper mandibular margin without a distinct tubercle; lower mandibular margin without a large tooth. Mesosoma: parapsidal line reduced to a small oval spot; scutellum gently rounded (cf. Fig. 22); legs: apex of basitibial plate on distal one half of hind tibia, with a single row of denticles that extend towards proximal end of hind tibia; propodeal triangle always absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *capitata* (Fig. 22). Metasoma: tergum I gently rounded, the subvertical surface devoid of a central orifice and a mite chamber; pubescence adjacent to mesal borders of metasomal spiracles IV and V not distinctly different from remainder of terga; dorsal surface of pygidial spines rounded.

Male. Colour: pubescence either completely black, or with head, mesosoma and all femora and tibiae completely pale brown or partly black and partly pale brown, all tarsi orange or brownish-orange, and metasomal terga and sterna black, pale brown or white. Facial markings: clypeus and supraclypeus completely pale yellow; parocular area mostly pale yellow, yellow region of parocular area reaching to a level well above upper margins of alveoli (cf. Fig. 1); labrum usually with a yellow spot in middle of proximal margin; mandible completely black.

Head: frontal view (cf. Fig. 1): inner eye margins gently incurved; upper and lower interorbital distances subequal; maximum eye width less than one half maximum face width; alveolorbital and interalveolar distances subequal; supra-antennal area gently rounded; apex of frontal line level with supraclypeus; dorsal view: integument just below lateral ocelli flat, neither distinctly incurved nor slightly carinate; interocellar and ocellorbital distances subequal; antennal scape reaching to a level well above summit of vertex, about three times as long as flagellar segment I; labrum gently convex, with a very small median tubercle. Mesosoma: metanotum flat; propodeum with the median region gently curved and subvertical and the lateral regions distinctly curved so that the anterior region is subhorizontal and the posterior region is declivous (cf. Fig. 28); legs: tarsus of middle leg not lengthened as in *io*; hind trochanter non-tuberculate; hind femur with a relatively large tubercle on the ventral surface; distal end of hind tibia with the ventral posterior region weakly swollen (hind leg similar to that in *albifrons*, Fig. 39). Profile of scutellum, metanotum, propodeum and metasomal tergum I as in *albifrons* (Fig. 28). Metasoma: tergum I gently curved; genitalia with

parameral and digital lobes similar to that in *hottentotta* (Fig. 51).

COLOUR VARIATION

In the female of *X. lugubris* the pubescence on the ventrolateral regions of the metasoma is always black in specimens from the southern region of the Cape Province and usually white, occasionally black, in specimens from the remainder of the subcontinent. In the male, specimens from the southern region of the Cape Province are either completely black or mostly black and specimens from the remainder of the subcontinent are mostly pale brown.

DISTRIBUTION (FIG. 77)

Xylocopa lugubris has been recorded from numerous localities in southern Africa and this species appears to occur throughout the subcontinent.

MATERIAL EXAMINED

♀ holotype of *X. angolensis*, "F. Smith Coll., 79.22, B.M. Type Hym 17B 115", plus the original "type" label, in BMNH; ♀ holotype of *X. nataliella*, "Natal, National Park, 3-15.III.1932, A. Mackie, B.M. Type Hym. 17B 136", plus the original "type" label, in BMNH; 1♀ syntype of *X. ogilviei*, "S. Rhodesia, Matopo Hills, 17-30.IV.1932, J. Ogilvie, B.M. Type Hym. 17B 134", plus a ? original determination label, in BMNH; ♂ holotype of *X. mensae*, "South Africa, Table Mountain, 26.I.1932, J. Ogilvie, B.M. Type Hym. 17B 113", plus the original "type" label, in BMNH; ♀ holotype of *X. tarsata* var. *oblita*, "South Africa, Wonderboom near Pretoria, X.1931, W.P. Cockerell, B.M. Type Hym. 17B 1211", plus the original "type" label, in BMNH; ♂ holotype of *X. lugubris* var. *rufotegularis*, "N. Rhodesia, Feira, 1.VI.1911, F.V. Bruce Miller, B.M. Type Hym. 17B 1222", plus the original "type" label, in BMNH.

101♀ and 46♂ with the following data: MOZAMBIQUE: pan 19 km S. of camp, Massangena district, Save River, 10.XII.1972, F. de Moot, "Nat. Museum S. Rhodesia", 1♂ in SAM; Goba, 12.V.1980, H.R. Feijen, 2♀ 1♂ in SC; River Garcia, 2.IV.1980, H.R. Feijen, 1♀ in SC; Maciene, no date, R.F. Lawrence, det. ? A.J. Hesse, 1♀ in SAM. ZIMBABWE: Bulawayo, 8.VI.1924, no collector, "Rhodesia Museum", 1♀ in TM; Bulawayo, 11.X.1923, R. Stevenson, 1♂ in TM; Bulawayo, 21.XII.1919, no collector, "Rhodesia Museum", 1♀ in SAM; Rekomitjie Research Station, 26.IV.1974, R.J. Phelps, "*X. tarsata*" det. R.H. Watmough, 1♀; Turk Mine, 18.XI.1957, no collector, "Nat. Museum S. Rhodesia", 1♂ in SAM. SOUTH AFRICA: TRANSVAAL: the following five localities are in the Kruger National Park: Punda Milia, 20.II.1970, T.W. Drinkwater, ex nest in ? *Ficus* sp., 3♀ (AcX 3263); Skukusa, 2431DC, 27.I.1966, H. Braack, 1♂ (B 564) in KNP; between Sabie and Sand Rivers, 19.I.1965, Graupner, 1♀ 1♂ (A 455, 458) in KNP; Shipandani Pickett, 17.XII.1965, A., L & H. Braack, 1♀ (B 94) in KNP; Beit Bridge, 24.IV.1971, H. Aschenborn, 2♀ (AcX 3264); Mogoto Nature

Reserve, Zebediela, 24.15S 29.13E, 22-25.X.1979, C.D. Eardley, 2♀ 2♂ (AcX 2998); same data, except G.L. Prinsloo, M.W. Mansell & C.D. Eardley, collected in a malaise trap, 1♂; Langjan Nature Reserve, 22.52S 29.14E, 10-20.I.1980. C.D. Eardley, 6♀ 1♂ (AcX 2971, 3295, 3296); Bethesdakop, VII.1966, ex nest in peduncle of *Aloe marlothii*, 2♂; same locality, 12.XII.1966, 1♂; Mogol Nature Reserve, Ellisras district, 23.58S 27.45E, 19-23.XI.1979, G.L. Prinsloo, 1♀; Ben Alberts Nature Reserve, Thabazimbi, 24.37S 27.23E, 24-28.XI.1980, C.D. Eardley, 1♀; Barberton, no date, H. Edwards, 1♀ in SAM; Meintjieskop, II.1977, D.H. Jacobs, 1♀; Ziervogelkop, near Kalkbank, 19.III.1975, ex nest in stem of *Aloe marlothii*, 12♀; Nylsvley, 24.39S 28.42E, several dates, C.D. Eardley, 9♀ 1♂; Nylstroom, 24.42S 28.20E, 18.I.1980, C.D. Eardley, 3♀; 10 km N.E. of Nylstroom, 24.38S 28.29E, 4.II.1980, C.G. Moolman, 2♀; Pretoria, several dates, 2♀ 1♂ (AcX 3267); Pretoria, XI.1966, ex nest in peduncles of *Aloe marlothii*, "*X. ? tarsata*" det. M.A. Lieftinck 1968, 2♀; Pretoria, 2.XII.1915, W. Impey, 1♀ in TM; NATAL: Lake Kosi, I.1970, G.L. Prinsloo, 1♀; Ndumu Game Reserve, I.1978, G.L. Prinsloo, 1♀; Ingwavuma, 2731BB, 21.II.1979, J.G. Londt, 1♀; same locality, I.1978, G.L. Prinsloo, 2♀ 2♂; Cape Vidal, 28.10S 32.32E, 13.I.1981, C.D. Eardley, 1♂; Dukuduku Forest Reserve, I.1978, G.L. Prinsloo, 1♀; Mfongosi, XII.1914, W.E. Jones, 1♀ in SAM; same locality, X.1911, det. ? A.J. Hesse, 1♂ in SAM; Durban, collected in 1922, H.W. Bell-Marley, 3♂ in SAM; CAPE PROVINCE: Resolution, Grahamstown, collected in 1930, Walton, 1♀ in SAM (No. 55); Dunbrody, 5.III.-1912, no collector, 1♀ in SAM; Dunbrody, collected in 1899, O'Neil, "*X. absurdipes*" det. ? A.J. Hesse, "*X. carinata*" det. ? H. Brauns, 2♀ in SAM; same locality and collector, no date, "*X. ? absurdipes*" det. ? A.J. Hesse, "*X. tarsata*" det. H. Friese 1911, 1♀ in SAM; Andries Vosloo Kudu Reserve, II.1979, G.L. Prinsloo, 1♀; Willowmore, I.1979, C.D. Eardley, ex nest in dry peduncles of *Aloe* sp., 3♀ (AcX 2919, 3013, 3294); Willowmore, I.1915, H. Brauns, 1♂ (AcX 3013); Willowmore, XII.1918, H. Brauns, 1♂ in TM; Willowmore, 15.XII.1901, H. Brauns, "syntype of *X. enslini*", 1♂ in TM (Type No 717); Willowmore, no date, H. Brauns, "syntype of *X. enslini*", 1♀ in TM (Type No 716); Pakhuis Pass, IX.1916, no collector, 4♀ 4♂ in SAM; Fort Beaufort, Umdala, III.1954, no collector, 5♀ 1♂ in SAM; Leipoldtville, Elands Bay, X.1947 and XI.1948, collected on museum expeditions, 3♀ 4♂ in SAM; Great Brak River, Mossel Bay, II.1960, no collector, 3♀ in SAM; Gardiner's Drift, Adelaide, III.1954, no collector, 1♂ in SAM; Wallekraal, Namaqualand, X.1950, no collector, 1♂ in SAM; Spektakel, Namaqualand, 22.X.1890, R. Lightfoot, det. H. Friese 1911, 1♂ in SAM; same data except, "*X. angolensis*" det. H. Friese, 1♀ in SAM; Lilisburg, VI.1913, no collector, 1♀ in SAM; Vryburg, Griqualand West, X.1939, collected by museum staff, 3♂ in SAM; Ysterfontein, IX.1960, no collector, 2♀ 1♂ in SAM; Uniondale district, X.1952, collected on a museum expedition, 1♀ 1♂ in SAM; Pearly Beach, Bredasdorp, XII.1958, no

collector, 1♀ 3♂ in SAM; New Years Dam, 3326AC, Alicedale, 5.XI.1978, R. Miller and J.G. Londt, 1♀; Citrusdal, 32.36S 19.03E, II.1980, C.D. Eardley, ex nest in dry *Pinus* sp. branch, 1♀ (AcX 2975). SOUTH WEST AFRICA/NAMIBIA: Kombat, 7.XI.1975, S. Braine, 1♂; 38 km S.E. of Ondangwa, 1715DD, Ovamboland, 9.V.1971, no collector, 1♀ (H 2512) in SM; Windhoek, 2217 CA, XII.1972 no collector, 3♀ (H 11067). Unless otherwise stated all material was collected by R.H. Watmough.

***Xylocopa hottentotta* Smith, Fig. 2, 3, 29, 40, 51**

Xylocopa hottentotta Smith, 1854: 349; 1874: 256-257; Friese, 1909: 232; Hurd & Moure, 1963: 175, 306; Maa, 1970: 750.

Xylocopa hottentota Smith (!): Vachal, 1899b: 93, 107 (emendation *pro X. hottentotta*).

Xylocopa tarsata Smith, 1854: 348; 1874: 265; Vachal, 1899b: 99, 104. *syn. nov.*

Xylocopa carinata Smith, 1874: 265 [= *X. frontalis* (Olivier) sensu Reiche & Fairmaire, 1847: 455]; Dalla Torre, 1896: 208; Friese, 1909: 229-230. *syn. nov.*

Xylocopa producta Smith, 1874: 263; Dalla Torre, 1896: 208; Vachal, 1899b: 105; 1910: 321; Moidl, 1912: 273; Cockerell, 1933b: 682. *syn. nov.*

Xylocopa flavilabris Smith, 1874: 263; Vachal, 1899b: 97, 102; Friese, 1909: 223. *syn. nov.*

Xylocopa fraterna Vachal, 1899b: 106; Friese, 1909: 229-230; Cockerell, 1916: 189; 1933b: 682-683. *syn. nov.*

Xylocopa natalensis Vachal, 1899b: 97; 1910: 320-321; Friese, 1909: 229-230. *syn. nov.*

Xylocopa vumbensis Cockerell, 1933a: 59. *syn. nov.*

Smith (1854) described *X. hottentotta* from two females, one each from Port Natal, Natal, and an unspecified locality in Sierra Leone. In 1874 Smith described the male of *hottentotta*. I have compared Smith's description of the male with several series of specimens in which the sexes were correctly associated and it appears that he associated the sexes of this species incorrectly. In 1970 Maa designated the syntype collected at Port Natal as the lectotype of *hottentotta*. I have examined this lectotype (in BMNH) and am confident of the identity of this species. Hurd & Moure (1963) placed *hottentotta* in the subgenus *Ctenoxylocopa* and Maa (1970) placed this species in the subgenus *Nodula*, both of which are otherwise unknown from southern Africa.

Xylocopa tarsata was described by Smith (1854) from a female specimen collected in the Cape of Good Hope. The holotype of *tarsata* (in HEC), which I have examined, differs from the lectotype of *hottentotta* in the colour of the setae on the hind tarsi and the structure of the clypeus. I have examined material of *hottentotta* from numerous localities in southern Africa and these two species are conspecific. I have studied the material Watmough (1974) referred to as *X. tarsata* and it is actually *X. lugubris*.

In 1874 Smith proposed the name *X. carinata* for a species which Reiche & Fairmaire (1847) recorded incorrectly as *Xylocopa frontalis* (Olivier) from Ethiopia (Smith referred to the authors of this

article as Ferret & Galinier, who were actually the editors). The true *X. frontalis* is a Neotropical species. Smith (1874) apparently described *carinata* from two females collected in Angola and Ethiopia; the precise localities were not recorded. Smith (1874) did not point out the differences between *carinata* and *hottentotta* and I was unable to find any significant differences between the Angolan syntype of *carinata* (in BMNH) and the lectotype of *hottentotta*. I therefore synonymise these two species.

Smith (1874) described *X. producta* from an unspecified locality in Angola and stated that his species could, in fact, be the male of *X. carinata*. *X. producta* and *X. carinata* were later synonymised by Dalla Torre in 1896. This synonymy was, however, not accepted by Vachal (1899b, 1910) and Moidl (1912) who referred to *producta* as a valid species. I have compared the holotype of *producta* (in BMNH) with several series of specimens of *hottentotta* in which the sexes have been correctly associated and am confident that *producta* is a synonym of *hottentotta*, and therefore also synonymous with *carinata*.

Xylocopa flavilabris was described by Smith (1874) from a single male collected in the Cape of Good Hope. I have examined the holotype of *flavilabris* (in BMNH) and this species is definitely a synonym of *X. hottentotta*.

Xylocopa fraterna was described by Vachal (1899b) from a male specimen collected at Delagoa Bay in Mozambique. Although Friese (1909) correctly synonymised *fraterna* and *carinata*, Cockerell (1933b) regarded the former as a distinct species. I have examined the holotype of *fraterna* (in IRSN) and am confident that this species is a colour variety of *hottentotta*.

Vachal (1899b) described *X. natalensis* from three females that were collected at three different localities: an unknown locality in Natal probably Port Natal (see below); Cradock, in the Cape Province and not Natal as indicated by Vachal; and Taveta in Kenya. Although Vachal (1899b) did not designate a holotype, there is a specimen of *natalensis* (in MNHN) from Port Natal which has been incorrectly labelled as the holotype. I have studied this specimen and it is probably the Natal specimen that Vachal (1899b) referred to in the original description of *natalensis*. I therefore regard this specimen as one of the syntypes of *natalensis*. In the original description of *natalensis* Vachal suggested that this species is probably the female of *flavilabris*. Friese (1909) apparently did not agree as he regarded *flavilabris* as a distinct species and he synonymised *natalensis* with *carinata*. Following the examination of one of the syntypes of *natalensis* I am confident that this species is a synonym of *hottentotta* and it is therefore also synonymous with *flavilabris* and *carinata*.

Cockerell (1933a) described *X. vumbensis* from two females collected in Vumba, near Umtali in Zimbabwe. I have examined one of the syntypes of *vumbensis* (in BMNH) and although it differs slightly from the lectotype of *hottentotta* (it is similar to the holotype of *tarsata*), *vumbensis* and *hottentotta* are undoubtedly synonymous. The differences

between *vumbensis*, *carinata* and *natalensis* that were pointed out by Cockerell (1933a) are unreliable and therefore unsuitable for separating species.

The variation in the colour and structure of *X. hottentotta* has led to the description of several synonymous species, some of which have been described in detail. The most important descriptions are those of *X. producta* and *X. flavilabris* by Smith (1874), *X. fraterna* and *X. natalensis* by Vachal (1899b) and *X. vumbensis* by Cockerell (1933a). *X. hottentotta* has not been comprehensively described and I have therefore redescribed this species with reference to the *X. albifrons* group description.

DESCRIPTION

Length: head 3,0-5,0 mm; scutum 3,0-5,0 mm; body length 13,0-19,0 mm; fore wing 13,0-18,0 mm.

Female. Colour: pubescence entirely black, except for middle and hind tibiae and tarsi which are black, pale yellow or orange.

Head: frontal view: summit of vertex weakly elevated above eyes, about an ocellar diameter above upper eye margins; alveolar and interalveolar distances subequal; region of parocular area adjacent to supra-antennal area and supraclypeus distinctly inflexed; supra-antennal area strongly carinate; apex of frontal line distinctly raised above supraclypeus; clypeus either flat, slightly concave or slightly convex, and about level with adjacent parocular area; lateral clypeal margins just below the epistomal pits, and/or middle of ventral clypeal margin flat, slightly raised or weakly tuberculate; dorsal view: integument just below lateral ocelli weakly carinate, crest of carina usually semi-circular; profile: vertex and gena about as wide as median eye width; mandible bidentate; upper mandibular margin without a distinct tubercle; lower mandibular margin without a large tooth (as in *caffra*, Fig. 19). Mesosoma: scutellum gently rounded (cf. Fig. 22); legs: apex of basitibial plate on distal one half of hind tibia, with a single row of denticles that extend towards proximal end of hind tibia; propodeal triangle sometimes present. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *capitata* (Fig. 22). Metasoma: tergum I gently rounded, the subvertical surface without a central orifice and a mite chamber; pubescence adjacent to mesal borders of metasomal spiracles IV and V not distinctly different from remainder of terga; dorsal surface of pygidial spines rounded.

Male. Colour: pubescence either with head, mesosoma, metasoma and legs mostly black, with a little white on anterior regions of scutum, mesepisternum and metasomal tergum I or with head and mesosoma completely pale brown or ferruginous-brown (similar to that in *erythrina*, Fig. 62), metasoma mostly black, with a little pale brown on the lateral margins, legs almost completely black. Facial markings (Fig. 2, 3): clypeus, supraclypeus and lower region of parocular area mostly pale yellow, lower margin of face with either a narrow or a broad black margin and yellow region of the parocular area reaching to a level between upper and lower margins of alveoli (post-mortem discolo-

ration occasionally results in the facial markings being pale brown and semi-translucent); labrum and mandibles completely black.

Head: frontal view (Fig. 2, 3): inner eye margins gently incurved; upper and lower interorbital distances subequal; maximum eye width less than, or equal to, one half maximum face width; alveolar and interalveolar distances subequal; supra-antennal area slightly carinate; apex of frontal line raised very little above supraclypeus; dorsal view: integument just below lateral ocelli flat, slightly raised or slightly incurved; interocellar and ocellorbital distances subequal; antennal scape reaching to a level well above summit of vertex, between two and three times as long as flagellar segment I; labrum gently convex, with a small median tubercle. Mesosoma: metanotum flat; propodeum mostly flat and declivous, slightly curved near dorsolateral regions (Fig. 29); legs: middle tarsus not lengthened as in *to*; hind trochanter non-tuberculate, weakly tuberculate or with a relatively large distinct tubercle; hind femur always with a large tubercle on the ventral surface; distal end of hind tibia with ventral posterior region weakly swollen (hind leg either similar to that in *albifrons*, Fig 39, or as illustrated in Fig 40). Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 29). Metasoma: tergum I gently curved; genitalia with parameral and digital lobes as illustrated (Fig. 51).

COLOUR VARIATION

I have examined one very unusual male specimen that was collected at Cabora Bassa, Mozambique, on which the facial markings are very reduced. On this specimen only the dorsal region of the clypeus and the regions of the parocular areas that extend from just below the epistomal pits to the upper margins of the alveoli are pale yellow.

DISTRIBUTION (FIG. 77)

Xylocopa hottentotta is a widespread African species which has been recorded from numerous localities in southern Africa and probably occurs throughout this region.

MATERIAL EXAMINED

♀ lectotype of *X. hottentotta*, "Port Natal, 49.29, B.M. Type Hym. 17B 127", plus the original "type" label, in BMNH; ♀ holotype of *X. tarsata*, locality label illegible, "E. collection (1830-1873), W. W. Saunders", in HEC; 1♀ syntype of *X. carinata*, "Angola, F. Smith Coll., 1922, *X. frontalis* Ferret & Galinier (nec Olivier), B.M. Type Hym. 17B 125", plus the original "type" label, in BMNH; ♂ holotype of *X. producta*, "Africa, F. Smith Coll., 79.22, B.M. Type Hym. 17B 126", plus the original "type" label, in BMNH; ♂ holotype of *X. flavilabris*, "Cape of Good Hope, F. Smith, 64.77, B.M. Type Hym. 17B 116", plus the original "type" label, in BMNH; ♂ holotype of *X. fraterna*, "Moteire, Delagoa Bay, Coll. R.I. Sc. N. B.", plus the original "type" label, in IRSN; 1♀ syntype of *X. natalensis*, "Port Natal, Coll. Sichel 1867", plus a

recent holotype label, in MNHN; 1♀ syntype of *X. vumbensis*, "S. Rhodesia, Vumba, Umtali, 23-26.V.1932, A. Mackie, B.M. Type Hym. 17B 137", in BMNH.

180♀ and 147♂ with the following data: MOZAMBIQUE: Cabora Bassa "Brig. Ent. (1972-74)" M. C. Ferreira and G. V. Ferreira, "Moz. Songo Camuanguco IX.1973", 1♂ (165) in SC; following five localities are in the Chimanimani Mountains: Martin Falls, different dates, 3♀ 2♂ (AcX 3247); same locality, no date, ex nest in *Strelitzia nicolai*, "*X. lugubris*" det. M. A. Lieftinck 1964, 1♂ (AcX 3247); Martin Falls Gorge, 18.IV.1965, 3♀ (AcX 3248); path to Two Turns, 21.IX.1973, ex nest in *Widdringtonia* sp., 1♀; between Skeleton Pass and Camp Portage, 31.III.1972, 2♂; near Dragons Tooth, 13.IV.1968, 1♀ 3♂ (AcX 3249); ZIMBABWE: Mount Inyangani, different dates 5♀ (AcX 3250); same locality 25-26.XII.1965, "*X. lugubris*" det. M. A. Lieftinck 1964, 2♀; same locality and date, ex nest in *Widdringtonia* sp. and *Philippia* sp., 8♀ 8♂ (AcX 2999); same data plus, "*X. lugubris*" det. M. A. Lieftinck 1964, 2♂; Inyanga, 20 and 21.XI.1964, ex nest in *Pinus patula* rafters of house, 4♀; Chimanimani Mountains, 2.IV.1970, 1♀ 2♂ (AcX 3251); Leopard Rock, Vumba, 18.XII.1965, feeding on labiate flowers, 4♀; same date plus, 1 larva of *Physocephala* sp. removed from the abdomen, 1♀; same locality, 23-27.VIII.1965, 3♀; Balla Balla, 10.XII.1955, "Nat. Museum S. Rhodesia", 1♂ in SAM; Bulawayo, III.1916, no collector, "Rhodesia Museum", "*X. carinata* or *X. natalensis*" det. H. Brauns, 1♀ in SAM; Bindura, no date, D. Coghill, "an unnamed variety of *X. carinata*" det. ? A. J. Hesse, 1♀ 1♂ in SAM; same data, except *X. carinata* var. *ukerewensis*" det. ? A. J. Hesse, 1♂ in SAM; Salisbury, V.1913, no collector, "*X. carinata*" det. ? A. J. Hesse, 1♂ in SAM; Salisbury, IX.1913, no collector, 1♀ in SAM; Salisbury, collected in 1916, M. Arcturus, 1♂ in SAM. SOUTH AFRICA: TRANSVAAL: Soutpansberg, near Louis Trichardt, 15.VII.1969, feeding on *Polygala virgata* flowers, 1♀; Blouberg, 30 and 31.V.1970, 5♀ 2♂ (AcX 3252); Wolkberg, several dates, 67♀ 61♂ (AcX 2972, 3253, 3254); Wolkberg, 21 km S.E. of Tzaneen, several dates, 19♀ 41♂ (AcX 3255); Die Hel, near Olifants River, Middelburg, 4-5.V.1974, 1♀ 1♂; Gibraltar, near Sekororo, 9.X.1972, 1♀; Sekororo, 11.X.1971, 1♀; Varing Kloof, Bergheim, near Rustenburg, 24.X.1970, 1♀; Letaba Citrus Estates, 17.VIII.1966, 1♂; Cullinan, IX.1979, A. Weaver, 1♀; Barberton, XI.1911, H. Edwards, 1♀ in SAM; NATAL: Lake Kosi, I.1978, G. L. Prinsloo, 3♀; Durban, I.1916, no collector, "*X. carinata*" det. G. Nixon 1946, 1♀ (AcX 3256); Durban, Brighton Beach, 28.XII.1968, 1♂; Durban, Stella-Bush, 20.VI.1914, H. W. Bell-Marley, 4♀ in SAM; Durban, III.1888, J. Jesuls, "*X. carinata*" det. ? A. J. Hesse, 1♀ 1♂ in SAM; Durban, no date, Ross, "*X. flavilabris*" det. ? L. Péringuey, "*X. carinata*" det. H. Friese 1911, 1♀ in SAM; Lake Sibaya, E. Shore, 27.22S 32.43E, 18-20. I.1981, C. D. Eardley, 3♀ 1♂ (AcX 2973, 3289); Fannies Island Camp, Lake St. Lucia, 28.10S 32.25E, 14-16.I.1981, C. D. Eardley, 2♀ (AcX 2984);

Hluhluwe Game Reserve, 8.II.1974, feeding on *Grewia occidentalis* flowers, 1♀; Zululand, 1.XI.1936, H. Millar, 1♂; Umhlanga Rocks, 23.XII.1959, 2♂ (AcX 2997); Tongaat, "09-9", H. C. Burnup, 3♀; CAPE PROVINCE: Loerie, I.1960 no collector, 4♀ in SAM. SOUTH WEST AFRICA/NAMIBIA: Spitzkoppe, 16.VII.1976, 1♀; Spitzkoppe, 15, 16 and 18.VII.1976, feeding on *Monechma* sp. flowers, 1♀ 2♂; Brandberg, 20.VII.1976, 6♀ 2♂ (AcX 3257, 3292); same data plus, ex nest in *Dombeya* sp., 1♀ (AcX 3257); Swakopmund, 2114BA, 26.IX.1973, no collector, 2♀ (H 15915) in SM; Otjitambi, Outjo, 1915DC, 14-15.II.1972, no collector, 1♀ (H 6655) in SM; Otjitambi, 7.I.1951, "Gaerdes coll.", 1♀ (H 24768) in SM; Ameib, Karibib, 2115DC, 1-2.II.1972, no collector, 1♀ (H 6372) in SM; Spitzkoppe, 7.II.1970, "Gaerdes coll." 1♀ (H 24767) in SM; Troydfontein 17.IV.1963, "Gaerdes coll.", 1♀ (H 24766) in SM; Djab, 1.IX.1962, no collector, 3♀ 2♂ (H 2632) in SM; Fish River Canyon, 12.VII.1976, 2♂; Kaross, II.1925, collected on a museum expedition, "*X. tarsata* var. *namutonensis*" det. ? A. J. Hesse, 1♀ in SAM; Windhoek, XI.1920, S. Gilman, 1♂ in SAM. Unless otherwise stated all material was collected by R. H. Watmough.

Xylocopa io Vachal, Fig. 4, 41

Xylocopa io Vachal, 1898: 94-95; 1899b: 97; 1910: 320-321; Enderlein, 1903: 62; Hurd & Moure, 1963: 223, 307.

Xylocopa absurdipes Enderlein, 1903: 59-60; LeVeque, 1928: 2 (*Mesotrichia*); Hurd & Moure, 1963: 230-232, 296. *syn. nov.*

Xylocopa purpurina Cockerell, 1932b: 555. *syn. nov.*

Xylocopa speculifrons Cockerell, 1935a: 344-345. *syn. nov.*

Vachal (1898) described *X. io* from a syntypical series that consists of three females: two from Lake Ngami in Botswana and one from Port Natal, Natal. Vachal (1898, 1899b, 1910) repeatedly pointed out the close affinity between *io* and *carinata* (now known as *X. hottentotta*) and in 1903 Enderlein synonymised these two species. I have, however, examined one of the syntypes of *io* (in MNHN), which was incorrectly labelled as the holotype, and I am confident that *io* is a distinct species and not conspecific with *carinata*. Vachal (1898) pointed out that the syntype from Port Natal is devoid of subocellar carinae and as *io* is otherwise unknown from the east coast of southern Africa, it appears that the syntype from Port Natal is not conspecific with the rest of the type-series. Because it appears as though *io* was described from a syntypical series that contained two distinct species, it is necessary to designate a lectotype. I therefore designate the syntype which I have studied as the lectotype of *X. io*.

Xylocopa absurdipes was described by Enderlein (1903) from a single male collected at Hopefield in the Cape Province. Although I have not seen the holotype of *absurdipes* (in MHU), this species can easily be recognised by the unusually long middle tarsi. The synonymy of *absurdipes* and *io*, which I

here propose, is based primarily on my knowledge of the sexual dimorphism of the African xylocopids. This is because *io* is rather rare and I do not have a series of specimens in which both sexes were removed from the same nest. *X. absurdipes* was recorded in the genus *Mesotrichia* by LeVeque (1928). This is obviously an error as *absurdipes* is clearly characteristic of the group of species that LeVeque placed in the genus *Xylocopa*.

Cockerell (1932b) described *X. purpurina* from Uitenhage and he later (Cockerell, 1935a) described *X. speculifrons* from Doorn River Falls, both of which are in the Cape Province. *X. purpurina* and *X. speculifrons* were each described from a single female specimen. I have examined the holotypes of these two species (in BMNH) and they do not differ significantly from the lectotype of *io*. I therefore synonymise *purpurina* and *speculifrons* with *io*.

The female of *io* was placed in the subgenus *Xylomelissa* by Hurd & Moure (1963), but the very long middle tarsi of the male of *io*, which Hurd & Moure (1963) referred to as *absurdipes*, led these two authors to describe a new subgenus for *X. absurdipes*, namely *Dinoxycopa*.

The female of *X. io* was fairly well described in several publications by Vachal (1898, 1899b, 1910), and by Cockerell (1932b, 1935a) in the original descriptions of *X. purpurina* and *X. speculifrons*, respectively. However, the female of *io* can only be separated from several of its congeners by a combination of characters, some of which have not been adequately described. The male of *io* was described by Enderlein (1903), in the original description of *X. absurdipes*. In this description Enderlein dealt comprehensively with the colour and the unusually long middle tarsi, which are the most conspicuous diagnostic features of the male of *io*. However, Enderlein did not provide a complete description of the male of this species. I have therefore described this species in detail, with reference to the species-group description.

DESCRIPTION

Length: head 4,0-5,0 mm; scutum 3,0-4,0 mm; body length 13,0-18,0 mm; fore wing 13,0-15,0 mm.

Female. Colour: pubescence of head and body entirely black.

Head: frontal view: summit of vertex weakly elevated above eyes, about an ocellar diameter above upper eye margins; alveolorbital distance always a little less than interalveolar distance; region of parocular area adjacent to supra-antennal area and supra-clypeus weakly inflexed; supra-antennal area weakly carinate; apex of frontal line raised a little above supra-clypeus; clypeus mostly flat, except for the lateral margins just below the epistomal pits which are weakly elevated, and about level with adjacent parocular area; dorsal view: integument just below lateral ocelli strongly carinate; profile: vertex and gena about as wide as median eye width; malar space a little longer than flagellar segment II; mandible usually bidentate, occasionally tridentate; upper mandibular margin non-tuberculate; lower mandibular margin without a large tooth (similar to that in *caffra*, Fig. 19). Mesosoma: scutellum gently rounded (cf. Fig. 22); legs: apex of basitibial plate on

distal one half of hind tibia, with a single row of denticles that extend towards proximal end of hind tibia; propodeal triangle sometimes present. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *capitata* (Fig. 22). Metasoma: tergum I gently rounded, the subvertical surface without a central orifice and a mite chamber, pubescence adjacent to mesal borders of metasomal spiracles IV and V not distinctly different from remainder of terga; dorsal surface of pygidial spines rounded.

Male. Colour: pubescence of face white, vertex and gena black; anterior region of scutum, entire mesepisternum and mesosomal venter, and anterior region of metasomal dorsum white; remainder of mesosoma, metasoma and the entire legs black. Facial markings (Fig. 4): clypeus, supra-clypeus and lower region of parocular area yellow, yellow region of parocular area reaches to about upper margins of antennal sockets; ventral margin of clypeus sometimes with a narrow black border; labrum yellow; mandible with distal region black and proximal region mostly yellow.

Head: frontal view (Fig. 4): inner eye margins very gently incurved; upper and lower interorbital distances subequal; maximum eye width less than one half maximum face width; alveolorbital distance a little less than interalveolar distance; supra-antennal area slightly carinate; apex of frontal line raised a little above supra-clypeus; dorsal view: integument just below lateral ocelli flat or slightly incurved; interocellar and ocellorbital distances subequal; antennal scape reaching to a level well above summit of vertex, between two and three times as long as flagellar segment I; labrum gently convex, without a distinct median tubercle. Mesosoma: metanotum flat; propodeum with median region gently curved and subvertical and the lateral regions distinctly curved so that the anterior region is subhorizontal and the posterior region is declivous (as in *albifrons*, Fig. 28); legs: middle tarsi very much longer than tarsal segments in fore or hind legs, middle basitarsus about 1,5 times as long as hind basitarsus; tarsal segments II - IV of middle leg greater than six times as long as tarsal segments II - IV of hind leg; tarsal segment V of middle leg about twice as long as tarsal segment V of hind leg; hind trochanter non-tuberculate; hind femur weakly tuberculate; distal end of hind tibia with ventral posterior region weakly swollen (hind leg as illustrated in Fig. 41). Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *albifrons* (Fig. 34). Metanotum: tergum I gently curved; genitalia with parameral and digital lobes similar to that in *hottentotta* (Fig. 51).

DISTRIBUTION (FIG. 78)

Xylocopa io was described from Lake Ngami and Port Natal, (p. 12) and has subsequently only been recorded from the southern, western and south-western regions of the Cape Province.

MATERIAL EXAMINED

♀ lectotype of *X. io*, "Castelneau, Lac N'gami, coll. O. Sichel 1867", plus a recent holotype label, in

MNH; ♀ holotype of *X. purpurina*, "Uitenhage, X.1930, J. Ogilvie, B.M. Type Hym. 17B 111", plus the original "type" label, in BMNH; ♀ holotype of *X. speculifrons*, "South Africa, Cape Province, Doorn River Falls, XI.1931, J. Ogilvie, B.M. Type Hym. 17B 1210", plus the original "type" label, in BMNH.

7♀ and 7♂ with the following data: SOUTH AFRICA: CAPE PROVINCE: Gannaga Pass, 27 km S. of Middelpos, 26.IX.1972, H. D. Brown & A. Prinsloo, 1♀; Lange Kloof, Worcester, 17.X.1947, no collector, "Nat. Museum S. Rhodesia", 1♂ in SAM; Dunbrody, no date or collector, "*X. absurdipes*" det. ? L. Péringuey, 1♂ in SAM; Leipoldville, XI.1956, no collector, 1♀ in SAM; Klaarstroom, Prince Albert, X.1952, collected on a museum expedition, 5♀ 4♂ in SAM; Willowmore, 1.XII.1917, H. Brauns, 1♂ in TM.

Xylocopa erythrina Gribodo, Fig. 16, 30, 49, 52, 62

Xylocopa erythrina Gribodo, 1894b: 295, 296; Hurd & Moure, 1963: 232-234, 303; Maa, 1968: 106-107.

Xylocopa fraudulentula Gribodo, 1894b: 295, 297-298; Hurd & Moure, 1963: 234-236, 304; Maa, 1968: 106-107.

Gribodo (1894b) described *X. erythrina* and *X. fraudulentula* from the same locality, Sageneiti in Eritrea province, Ethiopia, and in so doing he was aware that they were probably the opposite sexes of the same species. The sexes of this species were not associated until 1968 when Maa, who had examined the type-series of *erythrina* and *fraudulentula* (both are in the MCSN), synonymised these two species. Maa chose *erythrina* as the senior synonym. In this paper Maa discussed the type-series and he designated lectotypes of *erythrina* and *fraudulentula*. Although I have not seen these two lectotypes, they were compared with two specimens from my collection by Dr R. Poggi of the Museo Civico di Storia Naturale "Giacomo Doria" in Genova, Italy, who believes that my material is correctly determined. I also have several series in which the sexes are correctly associated and I agree with the synonymy of these two species. The status of the subgenera *Perixylocopa* and *Euxylocopa* that were erected by Hurd & Moure (1963) for *erythrina* and *fraudulentula*, respectively, have been discussed by Maa (1968).

Although Gribodo (1894b) provided detailed descriptions of the colour of the female (which he referred to as *X. fraudulentula*) and one of the two distinct colour varieties of the male of *X. erythrina*, the colour and structure of this species have not been comprehensively described. I have therefore given a complete redescription which is related to the species-group description.

DESCRIPTION

Length: head 5,5-6,5 mm; scutum 5,0-6,0 mm; body length 20,0-25,0 mm; fore wing 19,0-21,0 mm.

Female. Colour: pubescence almost entirely black.

Head: frontal view: summit of vertex weakly elevated above eyes, between one and two times

ocellar diameter above upper eye margins; inner eye margins almost straight, gently incurved near upper margins; alveolorbital distance always a little greater than interalveolar distance; region of parocular area adjacent to supra-antennal area and supraclypeus strongly inflexed; supra-antennal area and supraclypeus strongly carinate; apex of frontal line distinctly raised above supraclypeus; supraclypeus weakly carinate; mediolongitudinal region of clypeus sometimes slightly raised; dorsal clypeal margin peculiar in that it is distinctly raised above median region of clypeus and above parocular area; dorsal view: integument just below lateral ocelli gently incurved; profile: vertex and gena a little narrower or about as wide as median eye width; mandible bidentate; upper mandibular margin distinctly notched and tuberculate; lower mandibular margin without a large tooth (Fig. 16). Mesosoma: pronotum differs from most other species in that a shallow sulcus runs obliquely from anterior dorsolateral margin to posterolateral margin just below prothoracic spiracle; scutellum gently rounded (cf. Fig. 22); legs: apex of basitibial plate on proximal one half of hind tibia, with two irregular ridges that extend towards proximal end of hind tibia; propodeal triangle relatively large and always present. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *capitata* (Fig. 22). Metasoma: tergum I gently rounded, the subvertical surface without a central orifice and a mite chamber; pubescence adjacent to mesal borders of metasomal spiracles IV and V not distinctly different from remainder of terga; dorsal surface of pygidial spines rounded.

Male. Colour (Fig. 62): pubescence of face and gena white; vertex, mesosomal dorsum and pleura either ferruginous-orange or mostly black, with a little white on anterior regions of scutum and mesepisternum; mesosomal venter mostly white; metasoma either with tergum I ferruginous-orange, i.e. concolorous with the mesosomal dorsum, or completely black, i.e. in specimens in which the mesosomal dorsum is mostly black; fore tibia and tarsus partly black and partly white; fore femur and entire middle and hind legs completely black. Facial markings: clypeus, supraclypeus and lower region of parocular area pale yellow, yellow region of parocular area reaches to a level between upper and lower margins of the alveoli (similar to that in *hottentotta*, Fig. 2); ventral clypeal margin with a narrow black border; labrum and mandible completely black.

Head: frontal view (cf. Fig. 2): inner eye margins almost straight, gently incurved near upper margins; upper interorbital distance about four fifths as long as lower interorbital distance; maximum eye width about one half maximum face width; alveolorbital distance usually a little greater than interalveolar distance; supra-antennal area weakly carinate; apex of frontal line raised a little above supraclypeus; dorsal view: integument just below lateral ocelli gently incurved; interocellar distance usually slightly shorter than ocellorbital distance; profile: malar space a little shorter than flagellar segment II; antennal scape reaching to a level well above summit of vertex, greater than three times as

long as flagellar segment I; labrum strongly and irregularly convex, with a distinct median tubercle; upper mandibular margin distinctly tuberculate. Mesosoma: pronotum peculiar in that a shallow sulcus runs obliquely from anterior dorsolateral margin to posterolateral margin near the prothoracic spiracle; metanotum gently curved; propodeum gently curved and subvertically inclined (Fig. 30); legs: middle tarsus not lengthened as in *io*; hind trochanter and tibia non-tuberculate; hind femur strongly tuberculate; distal end of hind tibia with ventral posterior region strongly swollen (hind trochanter, femur and tibia, anterior view, similar to those in *albifrons*, Fig. 39, and distal end of hind tibia, ventral view, as illustrated, Fig. 49). Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 30). Metasoma: tergum I gently curved; genitalia with parameral and digital lobes as illustrated (Fig. 52).

COLOUR VARIATION

I have examined one very unusual female specimen in which the pubescence on the pronotal lobes is white.

DISTRIBUTION (FIG. 78)

In southern Africa *X. erythrina* has been recorded from the Chimanimani Mountains in Mozambique and several localities in Zimbabwe and the Transvaal.

MATERIAL EXAMINED

87♀, 29♂ and 1 gynandromorph with the following data: MOZAMBIQUE: Chimanimani Mountains, 20.IX.1973, feeding on flowers of a legume, 1♀; same locality, 10-13.VII.1965, 3♀; following three localities are in the Chimanimani Mountains: near Martin Falls, 27.VIII.1953 and 30.VI.1971, 1♀ 1♂ (AcX 3222); Musapa Gap, 28.VI.1971, 1♀ (AcX 3223); near Skeleton Pass, 1.IV.1970, 1♂. ZIMBABWE: near Chewore-Zambezi rivers confluence, 4.IX.1964, 1♀; Glenara, 28.IV.1965, ex nest in *Jacaranda* sp., 1♂ (AcX 2993); Chimanimani Mountains, near southern lakes, 3.IV.1965, ex nest in *Uapaca kirkiana*, 3♀ 1♂ (AcX 3221); Salisbury, several dates, 16♀ 2♂ (AcX 2224, 3227, 3268, 3303); Salisbury, Avondale, several dates, 22♀ 11♂ (AcX 3225, 3226); same data, except E. Kadjakumanja, 19♀ 2♂ (AcX 3228, 3229, 3230); Leopards Rock, Vumba, 23-27.VIII.1965, 6♀; Umtali district, 3.V.1931., P.A. Sheppard, 1♂ in SAM; Matopo Hills, 4.VI.1917, no collector, "Rhodesia Museum", 1♀ 1♂ in SAM; Hope Fountain, near Bulawayo, 3.VI.1923, R. Stevenson, 1♂ in TM. SOUTH AFRICA: TRANSVAAL: Wolkberg, 29.VIII-1.IX.1969, 3♀ (AcX 2978); Sekororo, 23-26.V.1974, 2♂; same data plus, ex *X. flavorufa* nest in *Pterocarpus* sp., 1♂; Louis Trichardt, 9.V.1971, feeding on *Cassia* sp. flowers, 1♀; Buffelspoort, near Rustenburg, 5.III.1969, 1♂; Pretoria, several dates, 8♀ 3♂; Pretoria, VIII.1978 and 26.I.1981, C.D. Eardley, 1♀ 1 gynandromorph. Unless otherwise stated all material was collected by R.H. Watmough.

Xylocopa capitata Smith, Fig. 5, 17, 22, 31, 50

Xylocopa capensis Lepeletier, 1841: 179-180 (*nec X. capensis* Spinola, 1838); Smith, 1874: 254; Vachal, 1899b: 96, 101; Hurd, 1959: 141; Hurd & Moure, 1963: 239, 300.

Xylocopa capitata Smith, 1854: 348; 1874: 254; Dalla Torre, 1896: 208

Xylocopa armata Taschenberg, 1879: 574-575; Dalla Torre, 1896: 205; Vachal, 1900: 107; Hurd & Moure, 1963: 239, 297.

This species was first described by Lepeletier (1841) as *X. capensis* from a syntypal series that contained both male and female specimens. The type-series was collected in the Cape of Good Hope. *X. capensis* Lepeletier is a junior homonym of *X. capensis* Spinola and therefore the oldest junior synonym of *capensis* Lepeletier, which is *X. capitata* Smith, is the valid name of this species. Lepeletier (1841) placed the type-series of *capensis* in the MNHN and in Dejean's collection, which is housed in the MIZS (Horn & Kahle, 1935). I have studied several specimens of this species in the MNHN which I believe were determined by Lepeletier (Lepeletier's handwriting was compared with the handwriting on the determination labels) and this material probably constitutes part of the type-series. I have also studied a female and a male syntype of *capensis* from the MIZS and I am confident of the identity of this species.

In 1854 Smith described *X. capitata* from a female collected in the Cape of Good Hope and in 1874 Smith synonymised *capitata* and *capensis* Lepeletier. Smith (1874) referred to this species as *X. capensis* Lepeletier as he was apparently not aware that the name *capensis* was preoccupied in the genus *Xylocopa*. *X. capitata* was first referred to as the valid name of this species by Dalla Torre (1896). I have examined the holotype of *capitata* (in BMNH) and I agree with the synonymy of *capensis* Lepeletier and *capitata*.

Xylocopa armata was described by Taschenberg in 1879 from a single female that was collected at an unspecified locality in the Cape Province. In 1900 Vachal synonymised *armata* and *capensis* Lepeletier (now known as *X. capitata*). Although I have not been able to trace the holotype of *armata*, I have studied the original description of this species and it appears that *armata* and *capitata* are synonymous.

Xylocopa capitata has not been thoroughly described. The available descriptions of this species, of which the most useful are the descriptions of *X. capensis* by Smith (1874) and Vachal (1899b) and the original description of *X. armata* by Taschenberg (1879), are brief and largely repetitive. I have therefore redescribed this species in detail, with reference to the *X. albifrons* group description.

DESCRIPTION

Length: head 6,0-8,0 mm; scutum 6,0-7,0 mm; body length 23,0-30,0 mm; fore wing 20,0-22,0 mm.

Female: Colour: pubescence entirely black.

Head: frontal view: summit of vertex moderately elevated above eyes, about three times ocellar

diameter above upper eye margins; alveolorbital distance a little less than interalveolar distance; region of parocular area adjacent to supra-antennal area and supraclypeus strongly inflexed; supra-antennal area very strongly tuberculate; apex of frontal line strongly raised above supraclypeus; clypeus flat, the lateral margins usually slightly raised just below epistomal pits, and about level with adjacent parocular area; clypeus unique in that it is a little longer than clypeocellar distance; dorsal view: integument just below lateral ocelli strongly carinate, crest of carina either straight or slightly curved; interocellar distance a little shorter than ocellorbital distance; profile; vertex and gena considerably wider than median eye width; malar space longer than flagellar segment II; mandible (Fig. 17) tridentate; upper mandibular margin with a small distinct tubercle; lower mandibular margin without a large tooth. Mesosoma: scutellum gently rounded (Fig. 22); legs: apex of basitibial plate on distal one half of hind tibia, with a single row of denticles that extend towards proximal end of hind tibia; propodeal triangle always present, the ventrolateral margins strongly incurved. Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 22). Metasoma: tergum I gently rounded, the subvertical surface without a central orifice or a mite chamber; pubescence adjacent to mesal borders of metasomal spiracles IV and V not distinctly different from remainder of terga; dorsal surface of pygidial spines flat, unlike all other females.

Male. Colour: pubescence almost entirely black, except for anterior regions of scutum and mesosomal pleura and the dorsolateral regions of metasomal tergum I which usually contain a mixture of black and white hairs. Facial markings (Fig. 5): clypeus, supraclypeus and lower region of parocular area pale yellow, yellow region of parocular area reaches to a level between upper margins of alveoli and lower margin of median ocellus; ventral margin of face and epistomal suture with narrow black margins (post-mortem discoloration occasionally results in the facial markings being pale brown and semi-translucent); labrum and mandible completely black. Wings strongly and entirely infuscated with a purple or violet metallic lustre in certain plays of light.

Head: frontal view (Fig. 5): inner eye margins gently incurved; upper and lower interorbital distances subequal; maximum eye width less than one half maximum face width; alveolorbital distance usually a little shorter than interalveolar distance; supra-antennal area distinctly carinate; apex of frontal line distinctly raised above supraclypeus; dorsal view: integument just below lateral ocelli is unique in that small distinct carinae are clearly visible, crest of carinae gently curved; interocellar distance slightly shorter than ocellorbital distance; antennal scape reaching to a level well above summit of vertex, about three times as long as flagellar segment I; labrum strongly convex, with a small median tubercle. Mesosoma: metanotum gently curved; propodeum gently curved and declivous (Fig. 31); legs: middle tarsus not lengthened as in *io*; hind trochanter non-tuberculate; hind femur either weakly or strongly tuberculate; distal end of hind

tibia with ventral posterior region strongly swollen (hind trochanter, femur and tibia, anterior view, similar to those in *io*, Fig. 41, and distal end of hind tibia, ventral view, as illustrated, Fig. 50). Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 31). Metasoma: tergum I gently rounded; genitalia with parameral and digital lobes similar to that in *hottentotta* (Fig. 51).

DISTRIBUTION (FIG. 78)

Xylocopa capitata has been recorded from numerous localities in the southern, western and south-western Cape Province and it is apparently endemic to this region of southern Africa.

MATERIAL EXAMINED

? 2♀ 2♂ syntypes of *X. capensis* Lepeletier: 1♀ 1♂ without locality or type labels, in MIZS; 1♀ 1♂, "Museum Paris, Coll. O. Sichel 1869", plus an original determination label, in MNHN; ♀ holotype of *X. capitata*, "B.M. Type Hym. 17B 124", plus the original "type" label, in BMNH.

94♀, 41♂ and 1 gynandromorph with the following data: SOUTH AFRICA: CAPE PROVINCE: the following seven localities are in the Cedarberg: no precise locality, 14-17.XII.1969, 15♀ 5♂ (AcX 3232, 3233); near Algeria, 14.XII.1969, 9♀ 9♂; near Algeria, 15.XII.1969, ex nest in *Widdringtonia* sp., 2♀ (AcX 3231); Wolfberg, 18.XII.1969, feeding on mauve leguminous flowers, 1♀; same data, except feeding on flowers of feathery legume, 1♀; near Sneeberg, 19.XII.1969, 1♀ 1♂ (AcX 3234); same data plus, ex nest in *Protea* sp., 4♀ (AcX 3234, 3235); same locality, 14 and 20.XII.1969, ex nest in *Widdringtonia* sp., 4♀ (AcX 3234, 3235); on Tafelberg, 15.XII.1969, 2♀ (AcX 3236); near Crystal Pools, 16.XII.1969, 2♀; Sand River, 17.XII.1969, 2♀ (AcX 3233, 3237); Akkerboom, 20.XII.1969, feeding on mauve leguminous flowers, 1♀; Strand, 16.XII.1967, 2♀; Strand, several dates, feeding on *Virgilia oroboides* flowers, 5♀; Strand, 19.XII.1967, feeding on *Spartina junceum* flowers, 3♀; Strand 17-19.XII.1967, feeding on *Tipuana tipu* flowers, 3♀; Somerset West, several dates, 6♀ 4♂ (AcX 3238, 3244, 3278); Somerset West, 17.XII.1967, feeding on *Virgilia oroboides* flowers, 3♀; Helderberg, Somerset West, 20.XI.1969, feeding on *Aspalathus* sp. flowers, 1♂; Hex River Mountains, near Bree River below Sybasberg and Twins, 7.XII.1975, 7♂ (AcX 3239); Caledon district, XII.1975, 1♂; Betty's Bay, Caledon district, 26.XII.1975, 7♀ 5♂ 1 gynandromorph (AcX 3240); Elgin, 27.III.1922, J.G. Elser, 2♂ (AcX 3242); Willowmore, X.1908, H. Brauns, 1♂ in SAM; Gnadenthal, 16.XII.1907, "C.G.H.", 2♀; Sir Lowry's Pass, 10.VII.1905, Solly, 1♀; Hermanus Botanical Gardens, 28.XII.1967, feeding on *Virgilia oroboides* flowers, 2♀; Du Toitskloof, 820 m, 25.I.1950, no collector, 1♀ in SAM; Cape Town, 12.IX.1917, T.W. Wintle, 1♀ (AcX 3243); Cape Town, Mowbray, 7.II.1903, "C.G.H.", 6♀ 4♂; Cape Town, Lions Head, 318CD, 29.IX.1979, J.G. Londt, 1♀; Stellenbosch, 28 and 29.XII.1975, 5♀ (AcX 2977, 3241); Stellenbosch, X.1975, 2♀ 1♂. Unless

otherwise stated all material was collected by R.H. Watmough.

Xylocopa sicheli Vachal, Fig. 6, 18, 20, 32, 42, 53

Xylocopa sicheli Vachal, 1898: 92; 1899b: 93; Friese, 1909: 230-231; Hurd & Moure, 1963: 182-185, 315.

Xylocopa sichelii Vachal (!): Dover, 1925: 47 (emendation pro *X. sicheli*).

Xylocopa colura Vachal, 1898: 92-93; 1899b: 109-110; Friese, 1909: 230.

Xylocopa sicheli var. *kobrowi* Brauns, 1912: 65-67. *syn. nov.*

Xylocopa rhodesi Cockerell, 1933a: 59-60; 1936: 27; Hurd & Moure, 1963: 226, 314. *syn. nov.*

Xylocopa sicheli gordonica Cockerell, 1936: 27. *syn. nov.*

In 1898 Vachal described *X. sicheli* from two females and *X. colura* from a male. All three of these specimens were collected in Kaffraria, a locality that generally refers to the region of the Cape Province surrounding King William's Town. Vachal (1898) was aware that *sicheli* and *colura* were probably the opposite sexes of the same species and in 1909 Friese correctly synonymised these two species. Friese (1909) chose *X. sicheli* as the senior synonym. My concordance with the synonymy of *sicheli* and *colura* follows the examination of the holotype of *colura*, one of the syntypes of *sicheli*, which has been incorrectly labelled as the holotype, (both are in the MNHN) and several series of specimens in which the sexes have been correctly associated.

The male of *X. sicheli* shows a considerable degree of geographical variation. In 1912 Brauns described *X. sicheli* var. *kobrowi* from several specimens collected at Johannesburg, Lichtenburg and the Marico district, all three of which are in the Transvaal. I have studied both the original description of *kobrowi*, which is sufficient for the recognition of this variety, and four specimens which I believe are syntypes (in TM) and I agree with Brauns that *kobrowi* is a colour variety of *sicheli*. Cockerell (1933a) described *X. rhodesi* from the Matopo Hills in Zimbabwe and in 1936 he described *X. sicheli gordonica* from Upington in the northern Cape Province. I have studied the holotypes of both *rhodesi* and *sicheli gordonica* (both are in the BMNH) and they are both definitely colour varieties of *X. sicheli*.

The large lower mandibular tooth, which is unique to *X. sicheli*, and the specialized host plant requirements, i.e. they nest primarily in the peduncles of aloe flowers, led Hurd & Moure (1963) to describe a new subgenus, namely *Gnathoxylocopa*, for *X. sicheli*. Hurd & Moure (1963) had apparently not seen the holotype of *X. rhodesi* when they suggested that this species should be placed in the subgenus *Epixylocopa*.

Vachal (1898, 1899b) provided fairly detailed descriptions of both sexes of *X. sicheli* (Vachal referred to the male of *X. sicheli* as *X. colura*). But these descriptions do not deal adequately with the

structure of both sexes and the colour variation of the male of this species. I have therefore redescribed *X. sicheli* in relation to the species-group description given above.

DESCRIPTION

Length: head 3,0-5,0 mm; scutum 3,0-4,5 mm; body length 13,0-18,0 mm; fore wing 12,0-15,0 mm.

Female. Colour: pubescence entirely black.

Head: frontal view: summit of vertex weakly elevated above eyes, about twice ocellar diameter above upper eye margins; alveolorbital distance a little greater than interalveolar distance; region of parocular area adjacent to supra-antennal area and supra-clypeus gently inflexed; supra-antennal area gently rounded; apex of frontal line about level with supra-clypeus; clypeus gently convex, the lateral clypeal margins about level with parocular area; dorsal view: integument just below lateral ocelli more or less flat; profile: vertex and gena either a little wider or about as wide as median eye width; antennal flagellum with segment I subequal to combined length of the following two flagellar segments, unlike the other females in which flagellar segment I is about as long as the following three flagellar segments; labrum strongly and evenly convex, with a small median tubercle; mandible (Fig. 18) tridentate, upper mandibular margin without a distinct tubercle; lower mandibular margin with a large curved tooth. Mesosoma: scutellum gently rounded (cf. Fig. 22); legs: apex of basitibial plate in about middle of hind tibia, with two rows of denticles that extend towards proximal end of hind tibia; propodeal triangle always present, and relatively large. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *capitata* (Fig. 22). Metasoma: tergum I gently rounded, the subvertical surface without a central orifice and a mite chamber; pubescence adjacent to mesal borders of metasomal spiracles IV and V not distinctly different from remainder of terga; dorsal surface of pygidial spines rounded.

Male. Colour: pubescence either completely golden-brown or with vertex, most of the mesosomal dorsum, mesosomal pleura, metasomal dorsum and outer surfaces of legs either dark brown or black, and the face, anterior region of mesosomal dorsum, entire mesosomal venter, metasomal venter and inner surfaces of legs either pale brown or golden-brown. Integument of face, antennal scape, labrum and mandible completely black, i.e. without facial markings (Fig. 6). Integument of metasomal sterna with proximal regions yellowish (yellow region of sterna generally only visible by dissection).

Head: frontal view (Fig. 6): inner eye margins gently incurved; upper and lower interorbital distances subequal; maximum eye width less than one half maximum face width; alveolorbital distance a little greater than interalveolar distance; supra-antennal area gently rounded; apex of frontal line level with supra-clypeus; clypeus slightly convex; dorsal view: integument just below lateral ocelli slightly incurved; interocellar and ocellorobital distances subequal; antennal scape reaching to a level well above summit of vertex, between two and three

times as long as flagellar segment I; labrum gently convex non-tuberculate. Mesosoma: metanotum gently curved, the median region very much wider than the lateral regions; propodeum with median region gently curved and subvertical and the lateral regions distinctly curved so that the relatively narrow anterior region is subhorizontal and the posterior region is declivous (Fig. 32); legs: middle tarsus not lengthened as in *io*; hind trochanter and femur non-tuberculate; distal end of hind tibia with inner posterior region strongly swollen (hind leg as illustrated, Fig. 42); apex of basitibial plate with two small spines, a character peculiar to this species. Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 32). Metasoma: tergum I gently curved; tergum VII with distal margin gently and distinctly concave; genitalia with parameral and digital lobes as illustrated (Fig. 53).

DISTRIBUTION (FIG. 79)

Xylocopa sicheli has been recorded from numerous localities in southern Africa and as *sicheli* has not been recorded from Africa north of the Zambezi and Cunene rivers, it appears that this species is endemic to the subcontinent.

REMARKS

Brauns (1912) stated that *X. sicheli* nests in the fresh living tissue of the peduncles of aloe flowers. This does not appear to be correct as Dr R.H. Watmough of the Plant Protection Research Institute, Pretoria, (personal communication), Dr F. Gess of the Albany Museum in Grahamstown, South Africa (personal communication) and I have only collected nests of *sicheli* in dead dry aloe peduncles.

MATERIAL EXAMINED

1♀ syntype of *X. sicheli*, "Cap, Coll. O. Sichel 1867", plus a recent holotype label, in MNHN; ♂ holotype of *X. colura*, "Cap, Coll. O. Sichel 1867", plus a recent holotype label, in MNHN; 2♀ 2♂ syntypes of *X. sicheli* var. *kobrowi*, "Johannesburg, G. Kobrow", in TM; ♂ holotype of *X. rhodesi*, "S. Rhodesia, Matopo Hills, 17-30.IV.1932, J. Ogilvie, B.M. Type Hym. 17B 112", plus the original "type" label, in BMNH; ♂ holotype of *X. sicheli gordonica*, "Cape Province, Upington, 7.XII.1933, J. Ogilvie, B.M. Type Hym. 17B 117", plus the original "type" label, in BMNH.

160♀ and 96♂ with the following data: ZIMBABWE: Khami, 14.VII.1930, no collector, "Rhodesia Museum", 1♂ in SAM; Bulawayo, 8.II.1925, no collector, "Rhodesia Museum", 1♀ in SAM; Mapinge Pass, near Great Dyke, IX.1965, ex nest in peduncle of *Aloe ortholopha*, 2♀. SOUTH AFRICA: TRANSVAAL: Ziervogelkop, near Kalkbank, 19.III.1975, ex nest in stem of *Aloe marlothii*, 4♀; Wolkberg, 30.VIII.1975, 1♀ 1♂; Sekororo, 23-26.V.1974, ex nest in stem of *Aloe aculeata*, 10♀ 1♂ (AcX 3270); Sekororo, 10.X.1971, 4♀ 1♂ (AcX 3271); Dendron, 3.X.1968, 1♀; Potgietersrus, 6.VIII.1975, ex nest in *Aloe*

marlothii, 2♀; Pretoria, X, XI and XII.1978, C.D. Eardley, 20♀ 14♂ (AcX 2863, 2865, 2866, 2867, 2871, 2930); Pretoria, 31.XII.1917 and 18.I.1918, no collector, "*X. rufitarsis*" det. J.B.E. List, 4♂ (AcX 3272); Pretoria, 6.XII.1915, no collector, feeding on lucerne flowers, 1♀; Pretoria, 26.IX.1916, no collector, "*X. hottentotta*" det. "Imp. Buro, Ent.", 3♀ (AcX 3273); Pretoria, 16.I.1966, 1♂; Pretoria, XI.1966, ex nest in peduncle of *Aloe marlothii*, 1♀; same data plus, det. G. Nixon 1968, 1♀; Pretoria, Brummeria, 15.IX.1969, L.C. Starke, 2♀ (AcX 3274); same locality, 28.V.1975, C. Stirton, 2♀; Pretoria, Union Buildings Gardens, 11.I.1966, det. G. Nixon 1968, 1♀; Pretoria North, 4.II.1966, 1♂; NATAL: Mfongosi, III.1914 and IV.1916, W.E. Jones, 2♀ in SAM; Durban, Stella Bush, collected in 1915, H.W. Bell-Marley, 1♀ (36) in SAM; CAPE PROVINCE: Beau Vallon, Orange River, 9.X.1974, 1♀; same data plus, ex nest in *Aloe garipeensis*, 6♀ 5♂; Orange River, near Rosh Pinah, 28.X.1974, 2♀ 1♂ (AcX 3275); 42 km N. of Postmasburg, X.1939, collected by museum staff, 1♀ in SAM; Graaff-Reinet, I.1979, C.D. Eardley, 18♀ 11♂ (AcX 2877, 2878, 2879, 2880, 2882); same locality, 13 and 14.III.1969, L.C. Starke, 5♀ (AcX 3276); Grahamstown, I.1979, C.D. Eardley, ex nest in dry peduncles of *Aloe* sp., 11♀ 13♂ (AcX 2890, 2891, 2892); Willowmore, I.1979, C.D. Eardley, ex nest in dry peduncles of *Aloe* sp., 31♀ 21♂ (AcX 2911, 2912, 2913, 2914, 2915, 2916, 2917, 2918, 2976, 2994); Willowmore, different dates, H. Brauns, 2♀ 1♂ in TM; Willowmore, XI.1904, G. Kobrow, 1♂ in TM; Mossel Bay, Overbok, collected in 1896, no collector, det. ? A.J. Hesse, 1♂ in SAM; Albert district, between Burgersdorp and Nooitgedacht, X.1935, collected by museum staff, 1♀ in SAM; Het Kruis, X.1947, collected on a museum expedition, 1♀ in SAM. SOUTH WEST AFRICA/NAMIBIA: Windhoek, 2217Ca, 4.XI.1972 and XII.1972, no collectors, 4♀ (H 11066, 11067) in SM; Windhoek, 17.VII.1976, 5♀ 16♂; same data plus, ex nest in *Aloe littoralis*, 6♀; Oetha, on Orange River bank, 28.X.1974, ex nest in peduncle of *Aloe garipeensis*, 1♀; Rosh Pinah, Orange River, 28.X.1974, ex nest in peduncle of *Aloe garipeensis*, 2♀ 1♂ (AcX 3277); Sandfontein, I.1921, S. Gillman, "*X. sicheli* var. *kobrowi*" det. ? A.J. Hesse, 1♀ in SAM; Volgestrausskluft, Bethanie, 2717BA, 24-29.IV.1974, no collector, 2♀ (H 20580) in SM; Riverside, 2616CA, Bethanie, 23-26.X.1971, no collector, 1♀ (H 4969) in SM; Gautscha Pan, Bushmanland, 19.48S 20.35E, 9-13.VI.1917, no collector, 1♂ (H 2257) in SM. Unless otherwise stated all material was collected by R.H. Watmough.

Xylocopa rufitarsis Lepeletier, Fig. 7, 33, 43

Xylocopa rufitarsis Lepeletier, 1841: 191-192; Vachal, 1899b: 96, 108-109; Hurd & Moure, 1963: 223-226, 314.

Xylocopa maculosa Vachal, 1898: 95-96; 1899b: 96. *Xylocopa rufitarsis* var. *namaquaensis* Friese, 1911: 687; 1922: 7; Hurd, 1959: 142; Hurd & Moure, 1963: 226, 310. *syn. nov.*

Lepeletier (1841) described *X. rufitarsis* from a male specimen that was collected in Kaffraria and he

placed the type-specimen in the collection of Dejean, which is now housed in the MIZS (Horn & Kahle, 1935). This museum has a specimen of *rufitarsis* which is most probably the holotype. However, the MNHN also has a specimen of *rufitarsis* from Kaffraria which appears to have been determined by Lepeletier (the handwriting on the label was compared with Lepeletier's handwriting) and this specimen has "Type (?)" written on the label. As Lepeletier (1841) did not place his type-material in the MNHN, this specimen is obviously not the holotype. I have examined the holotype of *rufitarsis* and I am confident of the identity of this species.

Xylocopa maculosa was described by Vachal (1898) from five Kaffrarian females. The type-series was from Sichel's collection and should be in the MNHN (Horn & Kahle, 1936). I have examined the *Xylocopa* collection in this museum and was unable to find any type-material of *maculosa*. My interpretation of this species is therefore based on the original description in which Vachal (1898) described the most important diagnostic features of the female of *maculosa*, i.e. the short fine pubescence on the sides of the metasomal terga IV and V. *X. maculosa* was synonymised with *rufitarsis* by Vachal (1899b). I have examined several series of specimens of *rufitarsis* in which the sexes are correctly associated and I hereby confirm the synonymy of *maculosa* and *rufitarsis*.

Friese (1911) described *X. rufitarsis* var. *namaquaensis* from two males collected at Okiep in the western Cape Province. In 1922 Friese again described *namaquaensis*, apparently from three males, two of which were from Okiep and one from Willowmore in the southern Cape Province, as a new variety. In these two descriptions Friese (1911, 1922) was undoubtedly referring to the same variety and in 1959 Hurd synonymised the variety *namaquaensis* described by Friese in 1911 with the variety *namaquaensis* which Friese described in 1922. I have examined the two syntypes from Okiep (in SAM) and *namaquaensis* is clearly a colour variety of *rufitarsis*.

Although the female of *rufitarsis* is similar to the rest of the females in the *X. albifrons* group, the male of *rufitarsis* can be easily recognised by several distinct features. This led Hurd & Moure (1963) to describe a new subgenus, namely *Epixylocopa*, for this species.

Xylocopa rufitarsis has not been described in detail. Although Vachal (1898) provided a reasonably detailed description of the female, i.e. in the original description of *X. maculosa*, the descriptions of the male of this species deal only with colour (Lepeletier, 1841; Vachal, 1899b and others). I have therefore redescribed both sexes of *X. rufitarsis* with reference to the species-group description.

DESCRIPTION

Length: head 4,0-5,0 mm; scutum 3,0-4,5 mm; body length 12,0-15,0 mm; fore wing 11,0-14,0 mm.

Female. Colour: pubescence entirely black.

Head: frontal view: summit of vertex weakly

elevated above eyes, about an ocellar diameter above upper eye margins; inner eye margins almost straight, gently incurved near upper margins; alveolorbital distance a little shorter than interalveolar distance; region of parocular area adjacent to supra-antennal area and supraclypeus gently inflexed; supra-antennal area distinctly carinate; apex of frontal line distinctly raised above supraclypeus; clypeus flat and level with parocular area; dorsal view: integument just below lateral ocelli either weakly raised or slightly carinate; profile: vertex and gena about as wide as median eye width; mandibles bidentate; upper mandibular margin with a small tubercle; lower mandibular margin without a large tooth (similar to that in *erythrina*, Fig. 16); antennal scape about twice as long as flagellar segment I, unlike the other females in which the scape is between 2,5-3,5 times as long as flagellar segment I. Mesosoma: scutellum gently rounded (cf. Fig. 22); legs: apex of basitibial plate on distal one half of hind tibia, with a single row of denticles that extend towards proximal end of hind tibia; propodeal triangle always absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *capitata* (Fig. 22). Metasoma: tergum I gently rounded, the subvertical surface without a central orifice and a mite chamber; tergum IV and V are unique in that they have small areas of fine dense pubescence adjacent to mesal borders of the spiracles; dorsal surface of pygidial spines either rounded, or slightly carinate.

Male. Colour: pubescence either mostly black, with middle and hind tarsi either completely or partly orange, or with face mostly black, vertex, mesosomal dorsum, mesepisternum, first metasomal tergite and lateral regions of metasomal terga pale or dark brown, fore tarsus mostly orange, middle and hind tarsi completely orange and remainder of mesosoma, metasoma and legs black; integument of face, antennal scape, labrum and mandible completely black, i.e. yellow facial markings absent (Fig. 7).

Head: frontal view (Fig. 7): summit of vertex level with upper eye margins; inner eye margins almost straight; upper and lower interorbital distances subequal; eyes enlarged, maximum eye width a little greater than one half maximum face width; alveolorbital distance a little less than interalveolar distance; supra-antennal area weakly carinate; apex of frontal line raised slightly above supraclypeus; dorsal view: integument just below lateral ocelli either flat or gently incurved; ocellorbital distance much less than interocellar distance; antennal scape with its distal margin about level with summit of vertex, less than twice as long as flagellar segment I; labrum gently convex, with a small median tubercle. Mesosoma: metanotum and propodeum flat and declivous (Fig. 33); legs: middle tarsus not lengthened as in *io*; hind trochanter and femur non-tuberculate; distal end of hind tibia with inner posterior region weakly swollen (hind leg as illustrated, Fig. 43). Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 33). Metasoma: tergum I gently curved; genitalia with parameral and digital lobes similar to that in *hottentotta* (Fig. 51).

Xylocopa rufitarsis has been recorded from numerous localities in South Africa and from the Transkei and it appears that this species is probably endemic to the southern and eastern regions of the subcontinent.

MATERIAL EXAMINED

♂ holotype of *X. rufitarsis*, no original label, in MIZS; 2♂ syntypes of *X. rufitarsis* var. *namaquaensis*, "Okiep, C. Warren", one each collected in IX.1886 and IX.1887, one syntype with a label that reads as follows: "*X. rufitarsis* Lep. comp. cotype, 405" that was written by ? L. Péringuey, in SAM.

86♀ and 70♂ with the following data: SOUTH AFRICA: TRANSVAAL: Wolkberg, 30.VIII.1975, 1♂; Wolkberg, 21 km S.W. of Tzaneen, 10.III.1976, 2♂; Sekororo, 9 and 10.X.1971, 3♂ (AcX 3261); NATAL: Tongaat, "08-9", H.C. Burnup, 1♀; Durban, I.1916, no collector, det. G. Nixon 1946, 1♀ (AcX 3262); ORANGE FREE STATE: Caledon River, near Maseru, 25.XI.1970, H. Aschenborn, 2♀; Adullum farm near Clarens, 28.32S 28.28E, 20-26.II.1980, C. Kok, 2♂; Senekal, 18.XI.1971, no collector, 1♂; CAPE PROVINCE: Kimberley, collected in 1887, A. Tucker, 1♀ (No. 406) in SAM; Colesberg, X.1935 and XI.1939, collected by museum staff, 1♀ 1♂ in SAM; Colesberg, XI.1917, H. Brauns, 1♀ in TM; Albert district, Burgersdorp, X.1935, collected by museum staff, 1♀ in SAM; Graafwater, X.1947, collected on a museum expedition, 1♀ in SAM; Bowesdorp, Namaqualand, XI.1931 and IX.1941, collected by museum staff, 4♀ 2♂ in SAM; Klip vlei, Garies, Namaqualand, XI.1931, collected by museum staff, 1♀ in SAM; Outiep, Garies, Namaqualand, IX.1953, J. du Toit, 1♀ in SAM; Numeis, Richtersveld, 13.V.1922, S.E. Smith, 2♀ 2♂; Ysterfontein, IX.1960, no collector, 1♀ 2♂ in SAM; Port Nolloth, VIII.1890, "R.M.L.", "*X. rufitarsis* var. *namaquaensis*" det. ? A.J. Hesse, 1♂ in SAM; Port Nolloth, 9.V.1922 and VII.1922, W. Auther, 2♀ 1♂; Port Nolloth, Copenhagen, II.1938, no collector, 1♀ 2♂ in SAM; Springbok, Namaqualand, 28.X.1974, 1♀; Cedarberg, 14 and 16.XII.1969 and 18.XII.1972, 3♀; Cedarberg, near Sneeberg, 20.XII.1969, 1♀; Citrusdal, 32.36S 19.03E, II.1980, C.D. Eardley, ex nest in *Pinus* sp., 3♀ (AcX 2943); Vermont Dunes, 14.I.1978, V. Whitehead, 1♀ in SAM; 6 km S.W. of Sutherland, 25.IX.1972, H.D. Brown, E. Koster & A. Prinsloo, 1♀; Aliwal North, I.1979, C.D. Eardley, 1♀; Middelburg, 1.XI.1972, E. Holm, collected in a malaise trap, 1♂; Willowmore, 1.XI.1903 and 5.IV.1904, H. Brauns, det. ? H. Brauns, 1♀ 1♂ in SAM; Willowmore, 3323AD, 31.X.1978, R. Miller, 3♀; Slypsteen, Towerwaterkloof, Willowmore district, X.1938, collected by museum staff, 2♂ in SAM; Herschell, 1.IV.1933 and X.1933, C. Hall, 2♀ 1♂; Giftsberg, Rhyndorp, IX.1911, no collector, det. ? A.J. Hesse, 1♂ in SAM; Bainskloof Pass, 3319CA, 30 km N.E. of Wellington, 27.IX.1979, J.G. Londt, 2♂ (AcX 3266); Uniondale district, X.1952, collected on a museum expedition, 1♂ in SAM; Pearly

Beach, Bredasdorp, XII.1958 and IX.1959, no collector, 2♂; Pakhuis Pass, IX.1961, no collector, 1♂ in SAM; Bulhoek Klaver, Clanwilliam, X.1950, collected on a museum expedition, 1♂ in SAM; Papendorp, Olifants River, X.1950, collected on a museum expedition, 1♂ in SAM; 29 km E. of Touws River, on road to Hondewater, XII.1962, no collector, 1♀ in SAM; Three Kloof, Fraserburg, "div.", XI.1935, collected by museum staff, 1♀ in SAM; Stellenbosch, XI.1887, "L.B.", "*X. lugubris*" det. H. Friese 1911, "*X. albifrons*" det. ? A.J. Hesse, 1♀ in SAM; Wellington, 33.40S 19.00E, II.1980, C.D. Eardley, ex nest in *Pinus* sp., 6♀ 4♂ (AcX 2950, 3299); Betty's Bay, Caledon district, different dates in XII.1975, 9♀ 12♂ (AcX 3258); Wit Els Kloof, Hex River Mountains, 19 km S.E. of Ceres, XII.1975, 2♀ (AcX 3259); Rooi Els, several dates, 18♀ 12♂ (AcX 3260); Rooi Els, 25.XI.1969, ex nest in *Psoralea aphylla*, 2♀ (AcX 3260); Rooi Els, I.1968, ex nest in *Metalasia muricata* 1♂; Somerset West, by Lourens River, 27.XII.1967, ex nest in rotten oak wood, 1♀; Somerset West, VIII.1963, H.D. Catling, 1♂; Strand, 16.XII.1967, 2♀; Strand, 19.XII.1967, feeding on *Tipuana tipu*, 1♀; Hout Bay dunes, 25.III.1979, J.G. Londt, 1♀ 1♂; Hout Bay, 30.XII.1957, feeding on yellow papilionate flowers, 1♀; Wynberg, 9.V.1915, R. Smit, 1♂; Stellenbosch, XI.1915, H. Brauns, 1♂ in TM; Great Winterhoek Mountains, Tulbach, XI.1932, K.H. Barnard, 1♂ in SAM; Great Winterhoek, Tulbach, 1370 m., XI.1916, Lightfoot, 1♀ in SAM; Montagu, X.1919, R. Tucker, 1♂ in SAM; George district, VIII.1931, C. Thorne, 1♂ in SAM. TRANSKEI: Port St. Johns, 3-4.XII.1969, A.L. Capener, 1♀. Unless otherwise stated all material was collected by R.H. Watmough.

THE XYLOCOPA FLAVORUFA GROUP OF SPECIES

The *X. flavorufa* species-group includes three species: *X. flavorufa*, *X. mixta* and *X. torrida*, of which only *X. flavorufa* is well-known from southern Africa. *X. mixta* and *X. torrida* occur mainly in tropical Africa and they appear to occasionally intrude into the northern region of southern Africa. Cockerell (1906, 1932a) and LeVeque (1928, 1930) referred to these three species in the genus *Mesotrichia* and Hurd & Moure (1963), who regarded *Mesotrichia* as a subgenus of *Xylocopa*, placed them in this subgenus.

The *X. flavorufa* group of species is generally recognised by the following combination of characters: large bees, usually between 20-30 mm long; mostly black, with specific areas clothed with orange, reddish-orange or brownish-orange pubescence, except in the female of *torrida*; wings strongly and entirely infuscated with a relatively strong purple or greenish metallic lustre in certain plays of light, except in the male of *torrida*; males with clypeus and supra-clypeus completely pale yellow and the parocular areas completely black (Fig. 8, 9); scutellum and first metasomal tergite angulately divided in both sexes (Fig. 23, 34); females with a metasomal mite chamber; males with

tarsal segments II-V of middle leg about twice as long and very much wider than in hind leg.

Although the colour of the female of *X. flavorufa* closely resembles that of *X. isabelleae*, a species not included in this group, these two species can be separated by the above-mentioned characters.

DESCRIPTION

Female. Colour: pubescence either entirely black or partly black with specific areas, i.e. head, mesosomal dorsum, mesosomal pleura, fore leg and anal fringe, partly or completely orange or reddish-orange. Fore and hind wings strongly and entirely infuscated with a relatively strong purple or green metallic lustre in certain plays of light.

Head: frontal view: summit of vertex weakly elevated above eyes, usually less than twice ocellar diameter above upper eye margins; inner eye margins very gently incurved, almost straight; alveolorbital distance a little greater than interalveolar distance; region of parocular area adjacent to supra-antennal area, supraclypeus and dorsal region of clypeus, strongly inflexed; supra-antennal area weakly carinate, except in *torrida*; apex of frontal line slightly raised above supraclypeus, except in *torrida*; clypeus either flat or slightly concave, its dorsolateral margins gently rounding into inflexed parocular area; dorsal view: integument just below lateral ocelli gently incurved; interocellar distance a little less than ocellorbital distance; profile: vertex and gena narrower than median eye width; mandible similar to that in *caffra* (Fig. 19), bidentate; upper mandibular margin notched, without a distinct tubercle; lower mandibular margin straight, without a large tooth. Mesosoma: scutellum very acutely divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface (cf. Fig. 23); metanotum and propodeum flat and declivous; wing venation similar to that in *scioensis* (Fig. 21); legs: apex of basitibial plate broadly rounded, sometimes notched, on distal one half of hind tibia; propodeal triangle absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I as in *flavorufa* (Fig. 23). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface (cf. Fig. 23), the subvertical surface with a relatively large orifice that opens into an invaginated mite chamber; tergum VI devoid of pygidial spines near base of pygidial plate.

Male. Colour: partly black, with specific areas, i.e. head, mesosomal dorsum, mesosomal pleura, legs and anal fringe either partly or completely orange, reddish-orange or pale brown. Fore and hind wings as in female, except in *torrida*. Facial markings (Fig. 8, 9): clypeus and supraclypeus pale yellow, supra-antennal area and region of vertex between lateral ocelli either black or yellow; frontal surface of antennal scape pale yellow.

Head: frontal view (Fig. 8, 9): summit of vertex about level with upper eye margins; inner eye margins straight; alveolorbital distance a little less than interalveolar distance; lateral ocelli peculiar in that their upper margins are about twice an ocellar diameter below upper eye margins; eyes enlarged,

maximum eye width greater than one half maximum face width, unlike most of the other southern African species (except *rufitarsis*) in which the maximum eye width is less than or equal to one half maximum face width; upper interorbital distance shorter than lower interorbital distance; region of parocular area adjacent to supra-antennal area, supraclypeus and dorsal region of clypeus strongly inflexed; supra-antennal area gently rounded; apex of frontal line level with supraclypeus; clypeus flat, raised a little above parocular area, its dorsolateral margins gently rounding into parocular area; dorsal view: integument just below lateral ocelli gently incurved; interocellar distance much longer than ocellorbital distance; profile: malar space virtually non-existent at its narrowest point; antennal scape with its distal end reaching to a point slightly below upper eye margins and not reaching to a point well above summit of vertex as in most of the other species, about twice as long as flagellar segment I (Fig. 8, 9); labrum strongly tuberculate; mandible bidentate, ventral tooth very much wider than upper tooth, except in *torrida*; upper mandibular margin gently incurved, without a distinct tubercle. Mesosoma: scutellum divided at about right-angles into a broad horizontal (anterior) and a narrow, flat, subvertical (posterior) surface (cf. Fig. 34); metanotum and propodeum flat and declivous; wing venation similar to that in *scioensis* (Fig. 21); legs (Fig. 44, 45): middle femur with a relatively large flat prominence on proximal one half of ventral surface; tarsal segments II-V of fore and middle legs more than twice as long as tarsal segments II-V of hind leg; tarsal segments II-V of middle leg very much wider than tarsal segments II-V of hind leg; hind trochanter and femur non-tuberculate; ventral surface of hind tibia with a relatively small tubercle, and with the posterior region of the distal end strongly swollen; basitibial plate on distal one half of hind tibia. Profile of scutellum, metanotum, propodeum and metasomal tergum I as in *flavorufa* (Fig. 34). Metasoma: tergum I angulately divided (cf. Fig. 34); tergum VII with distal margin gently rounded, occasionally very slightly concave; sternum VI with a relatively large mediolongitudinal keel.

REMARKS

LeVeque (1930) recorded the mite species *Dinogamasus villosior* (Berlese) from the metasomal mite pouch of *X. flavorufa*, *X. mixta* and *X. torrida*.

THE SPECIES THAT COMPRISE THE *X. FLAVORUFA* SPECIES-GROUP

The females of *flavorufa*, *mixta* and *torrida* are structurally very similar and they can only be reliably separated by the colour of the head, mesosoma and the metasoma. Contrarily, the males of *flavorufa* and *mixta* can only be reliably separated by the structure of the genitalia, as it is difficult to determine the difference in the extent of the orange facial pubescence of these two species. The male of *torrida* can be separated from its southern African congeners by its colour and the structure of the face, middle femur and the genitalia as described below.

Xylocopa flavorufa (DeGeer), Fig. 8, 23, 34, 44, 54, 63, 64

Apis flavorufa DeGeer, 1778: 605-606; Lepeletier, 1841: 177-178 (*Xylocopa*); Gribodo, 1894b: 272 (*Koptortosoma*); Vachal, 1899b: 149 (*Xylocopa*); Cockerell, 1906: 364; 1932a: 449 (*Mesotrichia*); Friese, 1909: 233 (*Xylocopa*); LeVeque, 1930: 6-7, 9 (*Mesotrichia*); Hurd & Moure, 1963: 251, 304 (*Xylocopa*).

Xylocopa trepida Fabricius, 1804: 304; Lepeletier, 1841: 177-178; Perkins, 1899: 37-39; Moure, 1960: 159-160; Moreno & Moreno, 1980: 147.

Xylocopa flavorufa var. *genuina* Vachal, 1899b: 151-152.

Mesotrichia mixta genuina (Vachal): Cockerell, 1932a: 449-450; 1935a: 343-344. *syn. nov.*

Mesotrichia mixta genuina var. *lilacina* Cockerell, 1935a: 343-344. *syn. nov.*

Xylocopa flavorufa was originally described in the genus *Apis* by DeGeer (1778) from a female specimen. DeGeer recorded the type-locality as the Cape of Good Hope. *X. flavorufa* was transferred to its current genus, *Xylocopa*, by Lepeletier (1841) and it was placed in the genus *Koptortosoma* by Gribodo (1894b) and in *Mesotrichia* by Cockerell (1906). I have examined a large number of authentically determined specimens of this distinct and well documented species (in MNHN, IRSN, MRAC, BMNH, TM, SAM) and it has not been necessary to examine the holotype (in NRS).

Fabricius (1804) allegedly described *X. trepida* from Brazil (see Moure, 1960) and this species, which Perkins (1899) later recorded from South Africa, was synonymised with the African species *X. flavorufa* by Lepeletier in 1841.

As a result of the rather subtle differences in colour between the geographical varieties of *flavorufa* and several other very closely related African species, some controversy has developed concerning the naming and classification of the colour varieties of *X. flavorufa*. Vachal (1899b) revised the African and European xylocopids in the form of a key. In this revision Vachal (1899b) printed variety names in italics and for most of the species that Vachal divided into varieties he denoted the true form by the term "var. *genuina*", which he placed behind the species name in non-italicized print. The only exception was with the male of *flavorufa* in which "var. *genuina*" was printed in italics (in the female of *flavorufa* the term "genuina" was not printed in italics), which gives the impression that the name *genuina* constitutes a separate variety. In this revision Vachal (1899b) was apparently not aware that the colour of his material of *flavorufa* differed from that of the holotype. Cockerell (1932a), who realised that Vachal was not dealing with the true form of *flavorufa*, accepted the use of italics as the proposal of a new scientific name and he referred to *genuina* as a subspecies of *mixta*, i.e. *M. mixta genuina*. I have studied the colour variation of *flavorufa*, and "genuina" is clearly a colour variety of *flavorufa* and not a subspecies of *mixta*. I do not believe that Vachal (1899b) intended to describe a separate variety and I was unable to find a specimen in the MNHN that was determined

by Vachal as *X. flavorufa* var. *genuina*. There is, however, a male specimen in the MNHN that is from Kaffraria. This specimen was determined by Vachal as *X. flavorufa* and it was recently labelled as the lectotype of *X. flavorufa* var. *genuina*. This label was attached by Dr P. D. Hurd who did not publish this lectotype designation.

The colour of the mesosomal dorsum of *X. flavorufa* is variable (see colour variation, p. 23) and Cockerell (1935a) described a very pale coloured female specimen from Wonderboom, near Pretoria in the Transvaal, South Africa, as *M. mixta genuina* var. *lilacina*. I have not been able to locate the holotype of this variety. However, as *X. mixta* has not been recorded from southern Africa and as Cockerell (1932a, 1935a) referred to the colour variety of *flavorufa* which occurs in the Transvaal as *X. mixta genuina*, *mixta genuina* var. *lilacina* is clearly a colour variety of *flavorufa* and not a variety of *mixta*. I have examined numerous specimens of *flavorufa* from the Transvaal and elsewhere in southern Africa and *lilacina* clearly lies within the general colour variation of *flavorufa*.

The colour and structure of *X. flavorufa* have not been comprehensively described and the descriptions of this species are confusing, as two of the colour varieties have been described as varieties of *X. mixta*. I have therefore included a detailed redescription of both sexes of *X. flavorufa* in which I have referred to the species-group description given above.

DESCRIPTION

Length: head 5,3-7,1 mm; scutum 5,6-8,4 mm; body length 18,0-33,0 mm; fore wing 19,0-22,5 mm (female), 21,0-28,0 mm (male).

Female. Colour (Fig. 63, 64): pubescence of head either completely black or with a mixture of black, grey and orange hairs; mesosomal dorsum either completely reddish-orange or with the anterior and anterolateral region reddish-orange and with the median and posterior region black; mesosomal pleura: mesepisternum either completely reddish-orange or reddish-orange dorsally and black ventrally; mesepimeron completely black; mesosomal venter black; propodeum black; all legs completely black, except for ventral surface of fore tarsus which is either black or orange; metasoma completely black, except for the very broad, conspicuous, orange anal fringe.

Head: frontal view: inner eye margins very gently incurved, almost straight; supra-antennal area weakly carinate; apex of frontal line slightly raised above supraclypeus. Mesosoma: scutellum very acutely divided so that the subvertical surface is strongly concave; metanotum and propodeum declivous (Fig. 23). Metasoma: tergum I angulately divided, the subvertical surface with an invaginated mite chamber; devoid of pygidial spines.

Male. Colour: pubescence of face and gena either completely black or with a mixture of black and orange hairs; vertex always orange; mesosoma, excluding the legs, and the entire metasoma as in female; legs mostly black, except fore and middle tibiae and tarsi and the ventral surfaces of hind

femur and tarsus which are mostly orange; sides of middle tarsus, especially tarsal segments II-V, with relatively long conspicuous hairs which are either completely orange or which contain a mixture of orange, white and a few black hairs; ventral surface of middle tarsus either orange or white. Facial markings (Fig. 8): clypeus and supra-clypeus pale yellow; supra-antennal area either black or yellow; region of vertex between lateral ocelli usually black and occasionally yellowish-orange; frontal surface of antennal scape pale yellow.

Head: frontal view (Fig. 8): lateral ocelli about twice ocellar diameter below upper eye margins; eyes enlarged, maximum eye width much greater than one half maximum face width; upper interorbital distance about four fifths as long as lower interorbital distance; antennal scape with its distal end reaching to a point slightly below upper eye margins. Mesosoma: scutellum divided at about right-angles, the posterior surface flat and declivous (Fig. 34); metanotum and propodeum flat and declivous (Fig. 34); legs: middle femur with a fairly large flat prominence, which is less than one half as long as middle femur, on proximal one half of ventral surface; tarsal segments II-V of middle leg more than twice as long and very much wider than tarsal segments II-V of hind leg; hind tibia with a small tubercle near the middle of the ventral surface (hind leg as illustrated, Fig. 44). Metasoma: tergum I angulately divided; sternum VI with a relatively large mediolongitudinal keel; genitalia with parameral and digital lobes as illustrated (Fig. 54).

COLOUR VARIATION

The reddish-orange colour of the mesosomal dorsum generally results from the hairs being pale orange near their bases, becoming dark red near their distal ends. These hairs may, however, be either completely pale orange or completely dark red and I have a specimen from Plettenberg Bay (AcX 2925) in which the mesosomal dorsum is completely brown. I also have a few specimens in which the dorsolateral regions of the first metasomal tergite have a few reddish-orange hairs. These hairs are rather inconspicuous and they do not affect the general appearance of *flavorufa*, in which the dorsal surface of the first metasomal tergite is black. These differences in colour occur throughout the geographical range of this species.

The extent of the reddish-orange pubescence on the mesosomal dorsum of *X. flavorufa* varies geographically. In specimens from the southern and south-eastern Cape Province the mesosomal dorsum is completely reddish-orange. This southern form generally intergrades with the northern form in which only the anterior and anterolateral region of the mesosomal dorsum is reddish-orange and the remainder of the mesosomal dorsum is black. The latter form is known from Natal, the Transvaal, Mozambique, Zimbabwe and South West Africa/Namibia. In the area where the northern and southern colour varieties intergrade, i.e. the Transkei and southern Natal, the median and posterior region of the mesosomal dorsum contain a mixture of reddish-orange and black hairs.

DISTRIBUTION (FIG. 80)

In southern Africa *X. flavorufa* occurs primarily on the eastern side of the subcontinent. The distribution of this species appears to gradually taper from a relatively large area in the north-eastern region of southern Africa to the relatively narrow coastal forests that occur along the southern coast of the Cape Province. I have also recorded two specimens from South West Africa/Namibia. Further collecting is required to ascertain whether the distribution of this species extends from Angola, where *flavorufa* is known to occur, into the central region of South West Africa/Namibia.

MATERIAL EXAMINED

236♀, 104♂ and 1 gynandromorph with the following data: MOZAMBIQUE: the following six localities are in the Chimanimani Mountains: Martin Falls, 31.III.1970, 3♀ 2♂ (AcX 3142); same locality, 1.III.1971, ex nest in *Syzygium cordatum*, 1♀ (AcX 3244); Martin Falls Gorge, 26.XII.1966 - 4.I.1967, 1♀; Bvumodzi Plateau, on path to Martin Falls, 17.IV.1965, 2♀ 2♂ (AcX 3247); old customs house by Musapa River, 27.VI.1971, 8 triungulin larvae of *Synhoria* sp. were removed from specimen, 1♂ (AcX 3146); same locality, 27 and 28.VI.1971, 3♀ 1♂ (AcX 3145, 3146); Bundi Valley, near mountain hut, 28.III.1970, ex nest in *Uapaca kirkiana*, 1♂ (AcX 2992); Musapa Gap, 29.VI.1971, 1 triungulin larva of *Synhoria* sp. removed from hind coxa, 1♂; Lourenço Marques (now known as Maputo), 24.VII.1970, G. Bornemissza, 1♀. ZIMBABWE: Zambezi-Chewore rivers confluence, flood plain, 1.IX.1964, boring nest in *Acacia albida*, 2♀ (AcX 2963); Rekomitjie Research Station, 16.IX.1973, R.J. Phelps, det. R.H. Watmough, 1♂; Leopard Rock, Vumba, 18.XII.1965, feeding on guava flowers, 1♀; Salisbury, several dates, 3♀ 4♂ 1 gynandromorph (AcX 3287); Salisbury, Avondale, several dates, 4♀ 1♂ (AcX 3157, 3160); same data plus, det. M.A. Lieftnick 1968, 2♀ 2♂ (AcX 2957, 2958, 2959); same data except, E. Kadjakumanja, 10♀ 3♂ (AcX 3155, 3156); Melsetter, 4.IV.1970, ex nest in *Spathodea* sp., 1♀ 1♂ (AcX 3149); Chimanimani Mountains, 14.VII.1964, feeding on *Aeschynomene nodulosa* flowers, 1♀; Chimanimani Mountains, Bundi Valley, 31.III.1972, 5♀ 1♂ (AcX 3150); same locality, several dates, ex nest in *Uapaca kirkiana*, 16♀ 1♂ (AcX 3151, 3152, 3153); Lundi River, near Rhino Hotel, 10.VII.1971, feeding on *Sesbania bispinosa* flowers, 9♀; same locality, 12.VII.1970, feeding on flowers of leguminous vine, 3♀; same locality, 12 and 13.VII.1969, feeding on *Lathyrus* sp. flowers, 2♀; same locality, 13 and 14.VII.1969 and 10.VII.1970, 4♂; Mount Selinda, Chirinda Forest, 1065 m, 15-26.I.1959, A.C. van Bruggen, 1♀; Buhwa foothills, Belingwe, 4.V.1973, "Nat. Museum S. Rhodesia", no collector, 1♀ in SAM; Bulawayo, 30.IV.1912, G. Arnold, 1♂ in SAM; Bulawayo, 15.II.1925, "Rhodesia Museum", no collector, 1♂ in SAM. SWAZILAND: Mbabane, VII.1956, B. Pringle, 1♀. TRANSKEI: Umzimkulu, 6.IX.1978, J.G. Londt, 2♂. SOUTH AFRICA: TRANSVAAL: the following three

localities are in the Kruger National Park: Punda Milia, 2231CA, 13.I.1965, J. Kloppers, 2♀ (B 442, 443) in KNP; same data except, H. Braack, 1♂ (B 444) in KNP; Pretoriusskop, 2531AB, 14.II.1968, L. Robertson, 1♂ (F 176) in KNP; Crocodile River road, 28.V.1969, L.C. Starke, 1♀ (AcX 3169); Blouberg, 31.V.1970 and 3.IV.1971, 14♀ 3♂ (AcX 2964, 3161); Pietersburg, 14.IX.1966, feeding on *Calpurnia* sp. flowers, 1♀; Mogoto Nature Reserve, Zebediela, 24.15S 29.13E, 22-25.X.1979, C.D. Eardley, 3♀; Sekororo, several dates, 14♀ 3♂ (AcX 3162, 3163, 3164, 3165, 3166); Lydenburg, Sekororo, 23-26.V.1976, 5♀ 1♂ (AcX 3167); Mogol Nature Reserve, Ellisras district, 23.58S 27.45E, 19-23.XI.1979, M.W. Mansell, 1♀; Wolkberg, 13.IV.1974 and 29.VIII - 1.IX.1969, 6♂; Wolkberg, 29.V.1971, 1 triungulin larva of *Synhoria* sp. was removed from specimen, 1♂ (AcX 3168); Wolkberg, 30.V.1971, ex nest in *Pterocarpus angolensis*, 1♀ (AcX 3176); Letaba Citrus Estates, 17.VIII.1966, 1♂ (AcX 2988); Die Hel, Olifants River, near Loskop Dam, 26.VII.1975, ex nest in *Commiphora* sp., 1♀ 1♂; Hebron, Mariespokop, 5.IX.1971, 2♂; Hebron, 17.XII.1968, 2♂; Gravelotte, 3.V.1963, M.F. Johannsmeier, 1♂; Barberton, III.1979, C.D. Eardley, ex nest in *Jacaranda* sp., 1♀ (AcX 2932); Komatipoort, 27.V.1969, L.C. Starke, 1♀ (AcX 3170); 30 km S. of Komatipoort, collected in 1972, E. Holm, collected in a malaise trap, 1♀; Nelspruit, VIII.1966, feeding on flowers of *Tecoma stans*, 1♀ (AcX 3175); Potgietersrus, several dates, 3♀ 1♂ (AcX 3171, 3172); same locality, 23-24.VII.1969, ex nest in *Agave* sp., 1♀ (AcX 3173); same locality, 29.IV.1966, ex nest in roof of old garage, 1♀; Naboomspruit 4.IV.1966, feeding on *Tecoma stans* flowers, 1♀; Nylstroom, VI.1971, G.L. Prinsloo, 1♀; Pretoria, 6.III.1916, no collector, det. J.B.E. List, 1♂ (AcX 3174); Bronkhorstspuit, Togati Kloof near Wilge River, 26.IX.1971, ex nest in *Pinus* sp. beams of old shed, 4♀ 4♂; NATAL: Lake Kosi, I.1978, G.L. Prinsloo, 2♀; Mfongosi, no date, W.E. Jones. "X. ? *mixta*" det. ? A.J. Hesse, 1♂; Umhlanga Rocks, in coastal forest, 29.XII.1959, 1♂ (AcX 2990); Eshowe, "12-16", H.W. Bell-Marley, 1♀; Tongaat, "08.9", H.C. Burnup, det. C. Dover 1921, 1♀; Durban, I.1916, no collector, det. Durban Museum, 2♀ (AcX 3177); Scottburgh, Amahlongwo River, 29.VII.1978, ex nest in *Erythrina* sp., 5♀ 1♂ (AcX 2991, 3178); Pietermaritzburg, 2930CD, IX.1978, J.G. Londt, 1♀; same locality, 24.IX.1964, 1♂; same locality, 23, 24 and 25.IX.1964, feeding on *Calpurnia* sp. flowers, 5♀ 3♂; same locality, II.1977, C.D. Eardley, 1♀; same locality, XII.1912, C. Fuller, 1♀; Wenen, I.1926, H.P. Thomasset, det. B. Uvarov, 1♀; CAPE PROVINCE: Grahamstown, several dates, A. Urban, 32♀ 23♂; Port Elizabeth, 20.X.1960, J.S. Taylor, ex nest in *Melia azedarach*, 2♀; Plettenberg Bay, I.1979, C.D. Eardley, ex nest in *Pinus* sp., 34♀ 10♂ (AcX 2921, 2922, 2924, 2925, 2926, 2934, 2967); Natures Valley, I.1979, C.D. Eardley, 1♀; Hankey, I.1979, C.D. Eardley, ex nest in *Jacaranda* sp., 14♀ 4♂ (AcX 2936); Victoria Bay, near George, XII.1954, 1♀; Cofimvaba, 14.V.1959, collected by a native commissioner, 1♀. SOUTH WEST AFRICA/NAMIBIA. Okahandja, 4.III.1972, no collector, 1♀ (H 24769) in SM; Andara,

Kavango, 20-25.VII.1971, no collector, 1♂ (H 3475) in SM. Unless otherwise stated all material was collected by R.H. Watmough.

Xylocopa mixta Radoszkowski, Fig. 55

Xylocopa mixta Radoszkowski, 1881: 199; Vachal, 1899b: 148; Cockerell, 1906: 364 (*Mesotrichia*); LeVeque, 1930: 7, 9 (*Mesotrichia*); Hurd & Moure, 1963: 252, 310.

Xylocopa mixta was described in its current genus by Radoszkowski (1881) from a female that was collected at "Huilla (Ancieta)", Angola. In 1906 Cockerell transferred this species to the genus *Mesotrichia*. Although I have not been able to trace the holotype of *X. mixta*, the brief original description is sufficient to enable me to recognise this species. *X. mixta* has not been recorded from southern Africa but it does occur in southern Zambia and could quite possibly intrude into northern Zimbabwe. I have therefore included a brief description of *mixta*, in which I have mentioned only the important diagnostic characters and reference should be made to the species-group description. I have also included both sexes of *mixta* in the foregoing key.

DESCRIPTION

Length: head 4,0-6,0 mm; scutum 4,5-5,5 mm; body length 22,0-27,0 mm; fore wing 24,0-27,0 mm.

Female. Colour: pubescence of head completely orange; mesosomal dorsum with anterior and anterolateral region reddish-orange, and with the median and posterior region black (similar to that in *flavorufa*, Fig. 64); mesosomal pleura: mesepisternum completely reddish-orange; mesepimeron completely black; mesosomal venter and propodeum black; legs: fore coxa and trochanter either black or brownish-orange; fore femur black; fore tibia and tarsus mostly reddish-orange; entire middle and hind legs black; metasoma completely black, except for the very broad and conspicuous orange anal fringe.

Male. Colour: pubescence of head, mesosoma and metasoma as in female, except entire fore leg and middle tibia and tarsus reddish-orange; middle coxa, trochanter, femur and the entire hind leg mostly black, sometimes with a few relatively small and inconspicuous orange areas. Facial markings as in *X. flavorufa* (Fig. 8). Structure of head, mesosoma, metasoma and appendages as described above for the *X. flavorufa* group, except for the genitalia in which the parameral lobes differ from those in *flavorufa* in posterior view (Fig. 55).

MATERIAL EXAMINED

5♀ 1♂ with the following data: Zambia: Samfya, near Lake Bangweulu, 15.I.1959, feeding on *Stenostylis* sp. flowers, R.H. Watmough, 1♀; same locality and collector, different dates, 3♀ 1♂ (AcX 2966, 2987); Abercorn, X.1943, "Nat. Museum S. Rhodesia", no collector, 1♀ in SAM; Kafue River, collected in 1909, J. Drury, det. ? A.J. Hesse, 1♀ in SAM.

Xylocopa torrida (Westwood), Fig. 9, 45, 56, 65

Mesotrichia torrida Westwood, 1838: 113; Smith, 1854: 349; 1874: 260 (*Xylocopa*); Vachal, 1899b: 150, 152 (*Xylocopa*); LeVeque, 1928: 7, 11; 1930: 8-9; Hurd & Moure, 1963: 252, 317 (*Xylocopa*).

In 1838 Westwood described *X. torrida* from an unspecified number of male specimens (probably two) that were collected at an unknown locality in the western region of tropical Africa. *X. torrida* was originally described in the genus *Mesotrichia* and as the original description of *torrida* followed the original description of *Mesotrichia*, *torrida* has been regarded as the type-species of *Mesotrichia* by monotype. Smith (1854) transferred *torrida* to the genus *Xylocopa*. Although this species is well known from the equatorial regions of central and west Africa, it has only been recorded from southern Africa from a single female that was collected at Lake Ngami in northern Botswana. I have not been able to locate the type-series of *torrida* [the type repository was given by Westwood (1838) as "Mus. Soc. Ent. Londinensis (olim Kirbii), et Soc. Hist. Nat. Belfast"] and I therefore determined this species from the authentically determined material in the TM, BMNH, MRAC and from the descriptions of Westwood (1838), Smith (1874) and Vachal (1899b).

As *torrida* only intrudes into the northern region of southern Africa, I have included a brief description in which I described only the important separating characters and reference should be made to the *X. flavorufa* group description given above. I have also included both sexes in the foregoing key.

DESCRIPTION

Length: head 6,0-7,0 mm; scutum 5,5-7,0 mm; body length 25,0-30,0 mm; fore wing 22,0-27,0 mm.

Female. Colour: head, mesosoma, metasoma and appendages entirely black.

Head: frontal view: supra-antennal area gently rounded; apex of frontal line about level with supraclypeus.

Male. Colour (Fig. 65): pubescence of head pale brown; mesosoma mostly pale brown or brownish-orange, except for median and posterior region of mesosomal dorsum, mesepimeral region of mesosomal pleura and propodeum which are black; fore and middle legs completely pale brown; hind leg mostly black, with a little pale brown pubescence on ventral surfaces of the femur and tarsus; metasoma with a relatively sparse pale brown fringe on distal margin of metasomal tergum I; all metasomal sterna sparsely clothed with pale brown hairs; anal fringe mostly black, the ventral region pale brown; remainder of metasoma black. Fore and hind wings weakly and entirely infuscated with a faint mauve metallic lustre in certain plays of light. Facial markings as in the species-group description.

Head: frontal view (Fig. 9): upper interorbital distance between two thirds and one half as long as lower interorbital distance; mandibles tridentate, as a result of distal margin of large lower tooth being

weakly notched. Mesosoma: scutellum divided at about right-angles, the posterior surface flat and declivous (similar to that in *flavorufa*, Fig. 34); legs: middle femur with a very large prominence near proximal end of ventral surface that is flat near the base, becoming spinose towards the distal end; entire prominence about one half times as long as middle femur; hind tibia with a small tubercle near distal end of ventral surface (hind leg as in Fig. 45). Metasoma: parameral and digital lobes of genitalia similar to those in *flavorufa* in the dorsal and lateral views (cf. Fig. 54), and differing from those in *flavorufa* in the posterior view (Fig. 56).

MATERIAL EXAMINED

6♀ and 2♂ from west Africa with the following data: "Fernando Po" (now known as MACIAS NGUEMA), 14.III.1892, H. Brauns, 2♀ in TM; country unknown, Grand Bona, 12.VIII.1892, H. Brauns, 2♀ in TM; EQUATORIAL GUINEA: Batta, 18.III.1892, H. Brauns, 1♀ in TM; country unknown, Kirby, 17.III.1892, no collector, 1♀ 1♂ in TM. CAMEROON: Precise locality not given, 25.III.1892, H. Brauns, det. F. Kohl, 1♂ in TM.

THE XYLOCOPA CAFFRA GROUP OF SPECIES

This species-group consists of the following six species: *X. caffra*, *X. somalica*, *X. senior*, *X. watmoughi*, *X. calens* and *X. lateritia*. With the exception of *X. watmoughi* which is here described as new, all the species in this species-group have been placed in the genus *Mesotrichia* by Cockerell and LeVeque, and in the genus *Xylocopa*, subgenus *Koptortosoma*, by Hurd & Moure (1963).

The *X. caffra* group is readily distinguished from the other southern African species of *Xylocopa* by the following combination of characters: medium size, usually between 15-22 mm long; females with specific areas of mesosomal dorsum yellow, white or reddish-orange, and dorsal surface of metasomal tergum I concolorous with yellow, white or reddish-orange region of mesosomal dorsum; males almost completely pale yellow (cf. Fig. 68); supraclypeus and clypeus either flat or very slightly concave; scutellum of female, metanotum of male and metasomal tergum I of both sexes angulately divided; females have a metasomal mite chamber; male genitalia with parameral and digital lobes as in *caffra* (Fig. 57). *X. scioensis*, *X. inconstans* and the male of *X. isabelleae* are superficially rather similar to the *X. caffra* species-group, with which they may be confused. But these three species can be readily separated from the *X. caffra* group by the above-mentioned characters.

DESCRIPTION OF THE X. CAFFRA SPECIES-GROUP

Female. Colour: pubescence of head either black, white or with a mixture of black and white hairs; mesosomal dorsum completely bright yellow, completely reddish-orange or black anteriorly and either yellow or white posteriorly; mesosomal venter black; mesosomal pleura mostly black, except for a

small area just below the tegula which is usually concolorous with anterior region of mesosomal dorsum; propodeum black; dorsal surface of metasomal tergum I concolorous with yellow, white or reddish-orange region of mesosomal dorsum; remainder of metasoma black; legs completely black. Fore and hind wings either infuscated or semi-translucent.

Head: frontal view: summit of vertex weakly raised above eyes, about twice ocellar diameter above upper eye margins, except in *caffra* and *watmoughi*; alveolorbital and interalveolar distances subequal; region of parocular area adjacent to supra-antennal area, supraclypeus and dorsal region of clypeus, strongly inflexed; supra-antennal area distinctly carinate; apex of frontal line distinctly raised above supraclypeus; clypeus either flat or slightly concave, its dorsolateral margins gently rounding into inflexed parocular area; dorsal view: integument just below lateral ocelli gently incurved, interocellar distance usually a little smaller than ocellorbital distance; profile: vertex and gena narrower than median eye width, except in *caffra* and *watmoughi*; mandible bidentate (cf. Fig. 19), upper mandibular margin notched and without a distinct tubercle, except in *watmoughi*; lower mandibular margin straight, without a large tooth. Mesosoma: scutellum acutely divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface (cf. Fig. 24); wing venation as in *scioensis* (Fig. 21); legs: outer margin of fore coxa gently curved, except in *watmoughi*; apex of basitibial plate broadly rounded, in about middle of hind tibia; propodial triangle absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I as in *caffra* (Fig. 24). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface, the subvertical surface with a relatively small orifice that opens into an invaginated mite chamber; tergum VI devoid of pygidial spines near base of pygidial plate.

Male. Colour (cf. Fig. 68): pubescence of head, mesosoma, metasoma and legs mostly pale yellow, except propodeum and subvertical surface of metasomal tergum I which are either pale yellow or white, and ventral surfaces of mesosoma, metasoma, entire middle and hind legs and anal fringe which are completely pale yellow, completely black or partly pale yellow and partly black; vestiture sometimes appearing olive-green when viewed without magnification, this is because the black integument is vaguely visible between the pale yellow hairs. Fore and hind wings semi-translucent and pale brown, veins dark brown, without a metallic lustre. Facial markings (cf. Fig. 10): clypeus with dorsal and ventral margins and the mediolongitudinal region black, yellow or partly black and partly yellow; frontal surface of antennal scape yellow; mandibles either completely black or mostly black with a conspicuous yellow area near base of mandible.

Head: frontal view (cf. Fig. 10): summit of vertex weakly elevated above eyes, about an ocellus diameter above upper eye margins; lower interorbital distance ranges from a little shorter to about three fourths as long as upper interorbital distance; alveolorbital distance either a little greater to about

as long as interalveolar distance; region of parocular area adjacent to supra-antennal area and supraclypeus strongly inflexed; supra-antennal area slightly carinate; apex of frontal line raised a little above supraclypeus; clypeus flat, raised a little above parocular area, and with its dorsolateral margins gently rounding into parocular area; dorsal view: integument just below lateral ocelli gently incurved; interocellar distance usually a little greater than ocellorbital distance; profile: malar space much shorter than flagellar segment II, almost non-existent at its narrowest point; labrum gently convex, and non-tuberculate; mandible bidentate; upper mandibular margin gently incurved, non-tuberculate. Mesosoma: metanotum very acutely divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface (cf. Fig. 35), except in *watmoughi*; propodeum generally flat and declivous (cf. Fig. 35); wing venation as in *scioensis* (Fig. 21); legs: basitarsi of all legs more or less similar in length and tarsal segments II-V of all legs more or less similar in length and width; trochanter, femur and tibia of hind leg non-tuberculate; distal end of hind tibia with ventral posterior region strongly swollen (hind leg as in *caffra*, Fig. 46); basitibial plate on proximal one half of hind tibia. Profile of scutellum, metanotum, propodeum and metasomal tergum I as in *caffra* (Fig. 35). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface; tergum VII with distal margin shallowly and evenly concave; sternum VI with a small mediolongitudinal keel; genitalia with paramer and digital lobes as in *caffra* (Fig. 57).

THE SPECIES THAT COMPRISE THE *X. CAFFRA* SPECIES-GROUP

The females of the *X. caffra* group are rather similar to each other in their structure. They can be distinguished most easily by a combination of the colour of the head, mesosomal dorsum and the dorsal surface of the first metasomal tergite as described under each species. The only exception is *X. watmoughi* that differs from the rest of the *X. caffra* species-group by a combination of its colour and the structure of the fore coxa.

The males of the *X. caffra* group are in all respects very similar and I am unable to separate them from one another, except the male of *X. watmoughi* that differs from the rest of this species-group in the shape of the metanotum. In living male specimens of *caffra*, *senior*, *watmoughi* and *calens* the eyes are pale yellow, and in *somalica* they are pale blue (Watmough, personal communication). However, the eye colour changes in dead specimens and is therefore not a reliable diagnostic character. I am therefore only able to separate the males of *caffra*, *somalica*, *senior* and *calens* that form part of a series that contains female specimens; and males of *caffra* that were collected at localities from which *somalica*, *senior* and *calens* have not been recorded, i.e. the southern, south-western and western regions of the Cape Province. Consequently, I have about sixty male specimens that were collected in Zimbabwe, Mozambique and the Transvaal which I

am unable to identify. Although this material has not been recorded in this revision, it was used in compiling the *X. caffra* group description.

Xylocopa caffra (Linnaeus), Fig. 10, 19, 24, 35, 46, 57, 66-68.

Apis caffra Linnaeus, 1767: 959; Fabricius, 1804: 346 (*Bombus*); Latreille, 1805: 62 (*Xylocopa*); Smith, 1874: 258-259 (*Xylocopa*); Gribodo, 1894b: 272 (*Koptortosoma*); Vachal, 1899b: 147, 153 (*Xylocopa*); Cockerell, 1908: 34 (*Mesotrichia*); Friese, 1909: 248 (*Xylocopa*); LeVeque, 1930: 11-13, 14 (*Mesotrichia*); Hurd & Moure, 1963: 267-273, 299 (*Xylocopa*); Day, 1979: 54 (*Xylocopa*).

Xylocopa caffra var. *mossambica* Gribodo, 1894a: 116, Vachal, 1899b: 147; Friese, 1909: 248; Cockerell, 1916: 188 (*Mesotrichia*).

Xylocopa caffra var. *mombassica* Gribodo (!): Enderlein, 1903: 51 (emendation *pro X. caffra* var. *mossambica*).

Mesotrichia mossambica (Gribodo): Cockerell, 1935a: 343; 1935b: 64; 1936: 25; Maa, 1968: 110-111 (*Xylocopa*). *syn. nov.*

Xylocopa caffra is a wide-spread African species that was described in the genus *Apis* by Linnaeus (1767). This species was described from a female specimen that was collected at an unknown locality in the Cape Province. The holotype is believed to be housed in the Museum Ludovica Ulrica in Uppsala, Sweden (Day, 1979). *X. caffra* was transferred to the genus *Bombus* by Fabricius in 1804. In 1805 Latreille placed *caffra* in its currently accepted genus, *Xylocopa*, and this species was subsequently placed in the genus *Koptortosoma* by Gribodo (1894b) and in *Mesotrichia* by Cockerell (1908). Both *Koptortosoma* and *Mesotrichia* are today regarded as subgenera of *Xylocopa* (Hurd & Moure, 1963). The descriptions of this rather common African species deal almost exclusively with its colour. As *caffra* can be easily recognised from the descriptions, there has been virtually no confusion as to the identity of this species. This was evident from the examination of the large amount of correctly determined material of *X. caffra* that I studied in the following museums: MNHN, IRSN, MRAC, BMNH, TM and SAM. It has therefore not been necessary to examine the holotype of this species.

Gribodo (1894a) described the variety *X. caffra* var. *mossambica* from Magnarra in Mozambique. This variety differs from the true form of *X. caffra* in that the cross-bands are white and not yellow (Fig. 66, 67). Enderlein (1903) referred to this variety incorrectly as *X. caffra* var. *mombassica*. In 1916 Cockerell transferred the variety *mossambica* to the genus *Mesotrichia* and he later recorded it as a distinct species in *Mesotrichia* (Cockerell, 1935a). Although I have not studied the holotype of *mossambica*, which is housed in the Istituto di Zoologia della Università di Bologna in Bologna, Italy, I am confident that *mossambica* is only a colour variety of *caffra*. This is primarily evident from the series of specimens of *caffra* (AcX 3022)

that I have studied in which both yellow and white cross-banded specimens were removed from the same nest.

The two distinct colour varieties of this well documented species can be easily recognised from the descriptions of Vachal (1899b) and Friese (1909). As the complete range of the colour variation and the structural characters of *X. caffra* have not been recorded in detail, I have redescribed *X. caffra* with reference to the species-group description given above.

DESCRIPTION

Length: head 4,8-6,4 mm; scutum 4,0-5,2 mm; body length 14,0-22,0 mm; fore wing 16,0-19,0 mm.

Female. Colour (Fig. 66, 67): head, mesosoma, metasoma and legs mostly black except for two prominent yellow or white cross-bands, the anterior cross-band extending across scutellar region of mesosomal dorsum and the posterior cross-band across anterior region of metasomal dorsum. Fore and hind wings strongly and entirely infuscated with a faint to moderate green or violet metallic lustre in certain plays of light.

Head: frontal view: summit of vertex weakly to moderately raised above eyes, usually between two and three times ocellar diameter above upper eye margins; clypeus either flat or slightly concave, its dorsolateral margins gently rounding into inflexed parocular area; profile: vertex and gena either narrower or about as wide as median eye width; mandible (Fig. 19) bidentate, upper mandibular margin notched and without a distinct tubercle. Mesosoma: scutellum very acutely divided so that the posterior surface is strongly concave (Fig. 24); metanotum and propodeum flat and declivous (Fig. 24); legs: outer margin of fore coxa gently curved. Metasoma: tergum I angulately divided (Fig. 24), the subvertical surface with an invaginated mite chamber; devoid of pygidial spines.

Male. Colour and structure as described for the species-group.

COLOUR VARIATION

The colour of the cross-bands (one on the posterior region of the mesosomal dorsum and one on the anterior region of the metasomal dorsum) in *X. caffra* generally range from white (Fig. 66) through various shades of pale yellow to bright yellow (Fig. 67). I have, however, examined a few specimens of the bright yellow variety in which the cross-bands have a faint ferruginous tinge and I also have a few specimens in which the cross-bands are almost completely ferruginous.

The variation in the colour of the cross-bands in the female of *X. caffra* is weakly correlated with the geographic distribution of this species. Specimens from the southern, south-western and eastern regions of the Cape Province, the whole of the Transkei, Natal and Mozambique are always bright yellow. In the eastern Transvaal both yellow and white cross-banded specimens are common, and specimens from the central and northern Cape Province, the remainder of the Transvaal, Zimbabwe, Botswana and South West Africa/Namibia

usually have white cross-bands, pale and bright yellow cross-banded specimens are, however, occasionally collected in these regions.

DISTRIBUTION (FIG. 80)

Xylocopa caffra appears to be relatively common throughout southern Africa, except for certain regions of the eastern highlands of Zimbabwe where altitude and the relatively high summer rainfall are possible limiting factors (Watmough, personal communication).

REMARKS

LeVeque (1930) recorded the mite species *Dinogamasus braunsi* (Vitzthum) and *Dinogamasus cockerelli* LeVeque from the metasomal mite pouch of *X. caffra*.

MATERIAL EXAMINED

444♀, 164♂ and 5 gynandromorphs housed in the following institutions: NCI, KNP, SAM, SC and SM. As *X. caffra* is a very common, well-known species which occurs throughout almost the entire subcontinent (see distribution map, Fig. 80), only material with host plant data is recorded below. ZIMBABWE: near Zambezi-Chewore rivers confluence, 3 and 7.IX.1964, feeding on *Combretum* sp. flowers, 6♀; Lundi River, near Rhino Hotel, 10.VII.1971, feeding on *Sesbania bispinosa* flowers, 5♀; same locality, 12 and 13.VII.1969, feeding on *Lathyrus* sp. flowers, 7♀; same locality, 13.VII.1969, feeding on *Cassia spectabilis* flowers, 1♀; Buby River, by main road, 14.VII.1969, feeding on flowers of maculate aloe, 4♀; Matopo National Park, 4.VI.1964, feeding on *Salvia* sp. flowers, 1♀; Gwanda, 4.VI.1964, feeding on *Bougainvillea* sp. flowers, 3♀. SOUTH AFRICA: TRANSVAAL: Pietersburg, 14.IX.1966, feeding on *Calpurnia* sp. flowers, 1♀ (AcX 3141); Letaba Citrus Estates, 17.VIII.1966, feeding on *Bauhinia purpurea* flowers, 1♀ (AcX 3119); same data, except feeding on *Cassia didymobotrya* flowers, 2♀ (AcX 3119); Ziervogelkop, near Kalkbank, 19.III.1975, ex nest in peduncle of *Aloe marlothii*, 19♀ 11♂; Olifants River, 1,5 km above confluence with Blyde River, 6-8.VII.1968, ex nest in *Ficus sycomorus*, 30♀ 8♂ (AcX 3121, 3122, 3123); Die Hel, Olifants River, near Loskop Dam, 26-27.VII.1975, ex nest in *Commiphora* sp., 2♀; Gibraltar, near Sekororo, on bank of Olifants River, 10.X.1972, feeding on *Grewia* sp. flowers, 1♀; Potgietersrus, 6.VIII.1975, ex nest in peduncle of *Aloe marlothii*, 2♀ (AcX 2954); Tagati Kloof, 48 km from Bronkhorstspuit, near Wilge River, 26.IX.1971, ex nest in *Pinus* sp. beams of old shed, 5♀; Pietermaritzburg, 23.IX.1964, feeding on *Calpurnia* sp. flowers, 2♀; CAPE PROVINCE: Whittlesea, I.1979, C. D. Eardley, ex nest in *Salix* sp., 4♀ (AcX 2920); Graaff-Reinet, I.1979, C. D. Eardley, ex nest in peduncle of *Aloe* sp., 17♀ 19♂ (AcX 2883, 2884, 2885, 2886, 2887, 2888, 2889); 20 km S.E. Citrusdal on road to Ceres, 32.40S 19.12E, II.1980, C. D. Eardley, ex nest in *Pinus* sp., 25♀ 17♂ (AcX 2945,

2946, 2947, 2948, 2949); Richtersveld, Grasdrif, 12.X.1974, ex nest in wood of old shed, 1♀ 16♂; Caledon district, Rooi Els, 23.XII.1967, feeding on *Borbonia cordata* flowers, 2♀; same locality, 25.XI.1969, ex nest in *Protea* sp., 1♀; Cedarberg, 14.XII.1969, ex nest in *Widdringtonia cedarbergensis*, 2♀ (AcX 3081, 3082); same locality, 19.XII.1969, feeding on *Rubus* sp. flowers, 1♀; same locality, 18.XII.1969, feeding on labiate flowers, 1♀; same locality, 20.XII.1969, ex nest in oak tree, 1♀ (AcX 3091); same locality, 10.XII.1969, feeding on aromatic labiate flowers, 1♀; same locality, 20.XII.1969, feeding on flowers of yellow legume, 2♀; 7 km N. of Steytlerville, Groot River, 3324AB, 30.X.1978, J. G. Londt & R. Miller, 2♀; Strand, 18.XII.1967, feeding on *Tipuana tipu* flowers, 1♀; Hout Bay, 30.XII.1957, feeding on yellow papilionate flowers, 1♀. SOUTH WEST AFRICA/NAMIBIA: Omatako, 13.VII.1976, ex nest in *Commiphora* sp., 4♀ 2♂; Brandberg, 20.VII.1976, ex nest in *Aloe littoralis*, 8♀ 6♂ (AcX 3138, 3139); Ababis, 12.VII.1975, ex nest in *Commiphora* sp., 2♂; Spitzkoppe near Usakos, 15 and 18.VII.1976, feeding on *Monechma* sp. flowers, 3♀. Unless otherwise stated all material was collected by R. H. Watmough.

Xylocopa somalica Magretti

Xylocopa flavobicipincta var. *somalica* Magretti, 1895: 157-158; Friese, 1909: 251.

Xylocopa somalica Magretti: Vachal, 1899b: 148, 160; Cockerell, 1933b: 680-681 (*Mesotrichia*); Hurd & Moure, 1963: 275, 316; Maa, 1968: 110.

In 1895 Magretti described the variety *X. flavobicipincta* var. *somalica* from two Somalian females (the type-locality was given as "Arussigalla, Ganale Guddà"). Four years later Vachal (1899b) raised *somalica* to species level and Cockerell (1933b) transferred this species to the genus *Mesotrichia*. In 1968 Maa studied the type-series of *flavobicipincta* (now known as *X. scioensis*) and *somalica* and he stated that they are definitely not conspecific. In this paper Maa designated a lectotype of *X. somalica* (in MCSN). Although I have not examined the lectotype of either *somalica* or *flavobicipincta*, I do have specimens of these two species which were compared with the lectotypes by Dr R. Poggi, who stated that my specimens seem to be correctly identified. I have also studied the differences between *somalica* and *flavobicipincta* that were described by Maa in 1968, all of which are good diagnostic characters, and I agree that *somalica* is a distinct species.

Xylocopa somalica cannot be recognised by colour alone and the structure of this species has not been thoroughly described. I have therefore redescribed *somalica* with reference to the *X. caffra* group description given above.

DESCRIPTION

Length: head 4,0-5,2 mm; scutum 3,6-4,8 mm; body length 13,0-17,0 mm; fore wing 14,0-18,0 mm.

Female. Colour: pubescence of head mostly white, sometimes with a mixture of white and black

hairs; mesosoma, metasoma and legs mostly black, except for two prominent yellow cross-bands, the anterior one extending across the scutellar region of the mesosomal dorsum and the posterior one across the anterior region of the metasomal dorsum (similar to that in *X. caffra*, Fig. 67). Fore and hind wings faintly to moderately infuscated with a faint green or violet metallic lustre in certain plays of light.

Head: frontal view: summit of vertex weakly raised above eyes, about twice ocellar diameter above upper eye margins; clypeus either flat or slightly concave, its dorsolateral margins gently rounding into inflexed parocular area; profile: vertex and gena always narrower than median eye width; mandible bidentate; upper mandibular margin notched and without a distinct tubercle. Mesosoma: scutellum very acutely divided so that the posterior surface is strongly concave; metanotum and propodeum flat and declivous (similar to that in *caffra*, Fig. 24); legs: outer margin of fore coxa gently curved. Metasoma: tergum I angulately divided, the subvertical surface with an invaginated mite chamber; devoid of pygidial spines.

Male. Colour and structure as described for the species-group.

DISTRIBUTION (FIG. 81)

In southern Africa *X. somalica* has only been recorded from a few localities in the eastern highlands of Zimbabwe, the Chimanimani Mountains in Mozambique and from several localities in the eastern one half of the Transvaal.

MATERIAL EXAMINED

44♀ and 23♂ with the following data: MOZAMBIQUE: Chimanimani Mountains, on path to Martin Falls above Musapa Gap, 17.IV.1965, 3♀ 3♂ (AcX 3053); Chimanimani Mountains, 31.III.1970, 3♀ 2♂ (AcX 3055); Chimanimani Mountains, Martin Falls, 26.VII.1953 and 27.VIII.1953, 1♀ 1♂. ZIMBABWE: Chimanimani Mountains, 3.IV.1970, ex nest in *Syzygium guineense*, 13♀ 5♂ (AcX 3049, 3050, 3052); Chimanimani Mountains, near top of Long Gulley, 19.IV.1965, ex nest in *Syzygium cordatum*, 3♀ 4♂ (AcX 3054); Chimanimani Mountains, Outward Bound School, 30.III.1972, 1♀; Vumba, Leopards Rock, 23-27.VII.1965 and 18.XII.1965, 8♀ 8♂; Vumba Mountains, XII.1933, "Rhod. Museum", no collector, 1♀ in SAM; Mount Selinda, Chirinda Forest, 1065 m, 15-26.I.1959, A. C. van Bruggen, 1♀; Mount Inyangani, 25-26.XII.1965, 1♀; Melsetter, 19.IV.1965, ex nest in *Jacaranda* sp., 1♀; Melsetter, 4.IV.1970, ex nest in *Spathodea* sp., 1♀ (AcX 3059). SOUTH AFRICA: TRANSVAAL: Komatipoort, 27.V.1969, L. C. Starke, 1♀ (AcX 3056); Komatipoort, 29.V.1969, M. W. Strydom, 1♀ (AcX 3057); Kruger National Park, Crocodile River road, 28.V.1969, L. C. Starke, 1♀ (AcX 3058); Barberton, III.1979, C. D. Eardley, ex nest in *Jacaranda* sp., 1♀ (AcX 2933); Soutpansberg, near Louis Trichardt, 14.VII.1969, feeding on *Polygala virgata* flowers, 1♀; Shewasaulu, 18.I.1965, A. L. Capener, 1♀; 15 km from Rosehaugh, 1.XI.1971,

A. Prinsloo, 1♀ (AcX 2959). Unless otherwise stated all material was collected by R. H. Watmough.

Xylocopa senior Vachal

Xylocopa senior Vachal, 1899b: 159; Maidl, 1912: 282; LeVeque, 1930: 11-12 (*Mesotrichia*); Cockerell, 1933b: 681 (*Mesotrichia*); Hurd & Moure, 1963: 275, 315.

Vachal (1899b) described *X. senior* in its current genus, from a single female that was collected at an unspecified locality in Tanzania (German East Africa). In 1930 LeVeque placed *senior* in the genus *Mesotrichia*. I have studied the holotype of *senior* (in MNHN) and in my view *senior* is a distinct species and not a variety of *X. anicula*, as suggested by Maidl (1912), or of *X. caffrariae*, as suggested by Cockerell (1933b). Both *anicula* and *caffrariae* are junior synonyms of *X. scioensis*. Although the colour of *senior* closely resembles that of *scioensis*, the structure of the clypeus and supra-clypeus of these two species are quite different and the female of *scioensis* does not have a metasomal mite pouch as in *senior* and its allies.

The descriptions of *X. senior* deal only with colour and as this species cannot be recognised by colour alone, I have redescribed *senior* with reference to the *X. caffra* group description given above.

DESCRIPTION

Length: head 4,0-4,8 mm; scutum 3,6-4,4 mm; body length 13,0-18,0 mm; fore wing 14,0-16,0 mm.

Female. Colour: pubescence of head mostly white, sometimes with a mixture of white and black hairs; mesosomal dorsum and dorsal surface of metasomal tergum I completely bright yellow; tegula and dorsal region of mesosomal plura concolorous with mesosomal dorsum; remainder of mesosoma and metasoma and the entire legs black (similar to those in *watmoughi*, Fig. 69). Fore and hind wings usually pale brown and semi-translucent, veins and apical regions dark brown and opaque, without a metallic lustre, occasionally weakly infuscated with a very weak green or purple metallic lustre in certain plays of light.

Head: frontal view: summit of vertex weakly raised above eyes, about twice ocellar diameter above upper eye margins; clypeus either flat or slightly concave, its dorsolateral margins gently rounding into inflexed parocular area; profile: vertex and gena always narrower than median eye width; mandible bidentate; upper mandibular margin notched and without a prominent tubercle. Mesosoma: scutellum very acutely divided so that the posterior surface is strongly concave; metanotum and propodeum flat and declivous (similar to those in *caffra*, Fig. 24); legs: outer margin of fore coxa gently curved. Metanotum: tergum I angulately divided, the subvertical surface with an invaginated mite chamber; devoid of pygidial spines.

Male. Colour and structure as described for the species-group.

In southern Africa *X. senior* has been recorded from a few localities in Zimbabwe, from numerous localities in the Transvaal, Grahamstown in the eastern Cape Province, Kimberley in the northern Cape Province and four different localities in South West Africa/Namibia. Further collecting is therefore needed in order to ascertain the complete distribution of *X. senior*.

REMARKS

LeVeque (1930) recorded the mite species *Dinogamasus braunsi* from the metasomal mite pouch of *X. senior*.

MATERIAL EXAMINED

♀ holotype of *X. senior*, "Dtsch. O. Afrika, coll. J. Vachal 181", plus a det. label that was written in Vachal's handwriting and a recent holotype label, in MNHN.

97 ♀ and 3♂ with the following data: ZIMBABWE: near Chewore-Zambezi rivers confluence, 7.IX.1964, feeding on *Combretum* sp. flowers, 1♀; Lundi River, near Hippo Pools, 9,5 km below Rhino Hotel, 10.VII.1971, feeding on labiate flowers, 1♀; Buby River, on main Beit Bridge-Fort Victoria road, 24.IV.1971, H. Aschenborn, 1♀; Glenara Estates, about 16 km from Salisbury on Mazoe road, 12.XII.1964, ex nest in *Jacaranda* sp., 1♀ 1♂ (AcX 3062); Salisbury, 20.I.1953, ex nest in bamboo culms, 1♀; Warren Hills, near Salisbury, 24.IV.1965, ex nest in *Uapaca kirkiana*, 1♀ (AcX 3065); Warren Hills, Ace of Spades Kopie, 24.IV.1965, ex nest in *Uapaca kirkiana*, 2♀ 2♂ (AcX 3063); Bindura, 4.IX.1935, E.W. Lannin, 1♀ in SAM; Bulawayo, I.1912, no collector, "Rhodesia Museum", 1♀ in TM. SOUTH AFRICA: TRANSVAAL: Bethesda, 13.V.1966, 1♀; Dendron, 3.X.1968, 2♀; Mogoto Nature Reserve, Zebediela, 24.15S 29.13E, 22-25.X.1979, C.D. Eardley, 2♀ (AcX 2961); Louis Trichardt, 9.V.1971, feeding on *Cassia* sp. flowers, 1♀; Loskop Dam, "28-1.V. 1973", T. Bouwer & A. Prinsloo, 1♀; 20 km S.E. of Loskop Dam Nature Reserve, 25.22S 29.35E, 9-13.II.1981, C.G. Moolman & W. Harrop, 1♀; same data, except S.J. van Tonder & C. Kok, 1♀; Letaba Citrus Estates, 17.VIII.1966, feeding on *Cassia didymobotrya* flowers, 1♀; Potgietersrus, 12.II.1972, Weber, 1♀; Doorndraai Dam Nature Reserve, 24.18S 28.44E, 4-7.II.1980, P. Smith, 2♀; Bronkhorstspuit, X.1977, M. Strang, 1♀; Nylsvley Nature Reserve, 24.39S 28.42E, 10-11.XII.1979, C.G. Moolman, 2♀; same locality, except X.1978, G. Ferreira, 1♀; same locality, except several dates, C.D. Eardley, 9♀ (AcX 2970, 3302); Pretoria, several dates, 21♀; Pretoria, X.1978, C.D. Eardley, ex nest in peduncle of *Aloe* sp., 1♀ (AcX 2868); Pretoria, Brummeria, 28.V.1975, C. Stirton, 3♀; same locality, 15.IX.1969, M.W. Strydom, 1♀ (AcX 3069); Pretoria, Magnolia Dell, 11.X.1967, C.M. Niemann, 1♀; Soutpan, Pretoria district, 25.24S 28.06E, 17.II.1981, I. Millar, 7♀; same data, except M.W. Mansell, 4♀; same data, except R.G. Oberprieler, 4♀; Rustenburg Nature Reserve,

25.40S 27.12E, 23-26.II.1981, C.D. Eardley, 2♀; same data, except I. Millar, 1♀; same data, except R.G. Oberprieler, 1♀; Rustenburg, 8.XII.1969, L.C. Starke, 1♀ (AcX 3068); Trident, Magaliesberg, 12.IX.1976, ex nest in *Bequaertiodendron magaliesmontanum*, 1♀; Varingkloof above Bergheim, Magaliesberg, 23.XI.1976, feeding on flowers of yellow legume, 2♀; Dome Pools area, Magaliesberg, 27.IV.1975; feeding on flowers of blue labiate, 2♀; Johannesburg, XI.1974, J.W. Bowen, 1♀; Potchefstroom, 3.XII.1945, M.J. Oosthuizen, 1♀ (AcX 3060); same data plus, det. G. Nixon 1946, 1♀ (AcX 3060). CAPE PROVINCE: Kimberley, collected in 1887, A. Tucker, det. ? A.J. Hesse, 1♀ in SAM; Grahamstown, II.1911, C.W. Mally, det. G. Nixon 1946, 1♀ (AcX 3067). SOUTH WEST AFRICA/NAMIBIA: Windhoek, 17.VII.1975, ex nest in *Aloe littoralis*, 1♀; Ghaub, Tsumeb, 1917BC/D, 19-28.XI.1972, no collector, 2♀ (H 10735) in SM. Otjikoto Lake, Tsumeb, 1917BA, 17.II.1972, no collector, 1♀ (H 6808) in SM. Unless otherwise stated all material was collected by R.H. Watmough.

***Xylocopa watmoughi* spec. nov.**, Fig. 36, 69

Xylocopa apicalis Smith: Watmough, 1974: 263, 265, 272 (misidentification).

I here name this species after my colleague Dr R.H. Watmough whose material has greatly assisted this revision. The two species that are most closely related to *X. watmoughi* are *X. calens* and *X. apicalis*. Although the colour of these three species is very similar, *watmoughi* and *calens* differ in the shape of the outer margin of the fore coxa; and *watmoughi* differs from *apicalis* in that the latter species is devoid of a metasomal mite chamber.

Xylocopa watmoughi was determined incorrectly by Watmough (1974) as *X. apicalis*. The emendation of this misidentification follows the examination of both the material on which Watmough based his determinations and the holotype of *apicalis* (in BMNH). *X. apicalis* was recorded from several different localities in the Cape Province by the following authors: Vachal (1899b), Maidl (1912), Cockerell (1932a) and Skaife (1952). As *watmoughi* and *apicalis* are concolorous and as *apicalis* is otherwise unknown to occur in southern Africa, it appears that these authors misidentified *watmoughi* as *apicalis*.

As I have placed *watmoughi* in the *X. caffra* group of species, this species is described with reference to the species-group description given above.

DESCRIPTION

Length: head 4,8-5,6 mm; scutum 4,0-6,4 mm; body length 15,0-25,0 mm; fore wing 16,0-18,0 mm.

Female. Colour (Fig. 69): pubescence of head black; mesosomal dorsum and dorsal surface of metasomal tergum I completely bright yellow; mesosomal pleura: mesepisternum yellow dorsally and black ventrally; mesepimeron completely black; remainder of mesosoma and metasoma and the

entire legs black; fore and hind wings strongly infuscated with a faint green or purple metallic lustre in certain plays of light.

Head: frontal view: summit of vertex moderately raised above eyes, about three times ocellar diameter above upper eye margins; clypeus either flat or slightly concave, its dorsolateral margins gently rounding into inflexed parocular area; profile: vertex and gena about as wide as median eye width; mandible bidentate; upper mandibular margin notched, with a small distinct tubercle in middle of upper margin (similar to that in *erythrina*, Fig. 16). Mesosoma: scutellum very acutely divided so that the posterior surface is strongly concave (cf. Fig. 24); metanotum and propodeum flat and declivous; legs: outer margin of fore coxa strongly emarginate. Metasoma: tergum I angulately divided, the subvertical surface with an invaginated mite chamber; devoid of pygidial spines.

Male. Colour: pubescence of head, mesosoma, metasoma and legs mostly pale yellow, except propodeum and subvertical surface of metasomal tergum I which are either pale yellow or white, and ventral surfaces of mesosoma, metasoma, middle and hind legs and the whole of the anal fringe which are either partly or completely black (similar to those in *X. caffra*, Fig. 68). Facial markings as described above for the species-group.

Head: frontal view (similar to that in *caffra*, Fig. 10): lower interorbital distance about three fourths as long as upper interorbital distance; clypeus flat, raised a little above parocular area, and with its dorsolateral margins gently rounding into parocular area. Mesosoma: metanotum divided at about right angles, with a horizontal (anterior) and a more or less flat, subvertical (posterior) surface that slopes slightly forward (Fig. 36).

COLOUR VARIATION

In the female of *X. watmoughi* the bright yellow mesosomal and metasomal pubescence may have a ferruginous tinge.

DISTRIBUTION (FIG. 81)

Xylocopa watmoughi has been recorded from several localities in the western one half of the Cape Province and it is apparently endemic to this region of the subcontinent.

MATERIAL EXAMINED

♀ holotype, 6♀ and 8♂ paratypes with the following data: SOUTH AFRICA: CAPE PROVINCE: Wellington, 33.40S 19.00E, II.1980, C.D. Eardley, ex nest in *Pinus* sp., ♀ holotype, 3♀ and 4♂ (AcX 2951); Citrusdal, 32.36S 19.03E, II.1980, C.D. Eardley, ex nest in *Pinus* sp., 3♀ 4♂ (AcX 2944, 2946, 2956). Holotype and paratypes in NCI; 1♀ 1♂ paratypes to be deposited in each of the following institutions: BMNH, AMNH and MNHN.

ADDITIONAL MATERIAL: 29♀ and 1♂ with the following data: SOUTH AFRICA: CAPE PROVINCE: Groblershoop, 25.X.1975, C.G. Moolman, 1♀; Brand Kaross, on the Orange River, 9.X.1974, 5♀; Richtersveld, Grasdrif, 12.X.1974, ex

nest in wood of old shed, 2♀; Cedarberg, near Algeria, 14.XII.1969, 1♀; Caledon Botanical Gardens, 28.XII.1967, feeding on *Virgilia* sp. flowers, 1♀; Caledon district, Betty's Bay Botanical Gardens, 20.III.1974, 1♀; Rooi Els, 10.IX.1969, 9♀; Rooi Els, 25.XI.1969, ex nest in *Psoralea aphylla*, 1♀; Hex River mountains, Wit Els Kloof, 19 km S.E. of Ceres, 10.XII.1975, 2♀ (AcX 3190); Hermanus Botanical Gardens, 28.XII.1967, feeding on *Virgilia oroboides* flowers, 1♀; Hermanus, XII.1962, H.D. Catling, 1♀; Franschoek Pass, Jan Joubertsgat Bridge, 3319CC, 26.IX.1979, J.G. Londt, 1♀; 5 km E. of Wellington on Bainskloof Pass, 3119CA, 17.IX.1979, J.G. Londt, 1♀; 30 km N.E. of Wellington on Bainskloof Pass, 3119CA, 27.IX.1979, J.G. Londt, 1♀; Somerset West, Helderberg Nature Reserve, XI.1969, ex nest in twig of *Pinus* sp., 1♀ (AcX 3051). Unless otherwise stated all material was collected by R.H. Watmough.

Xylocopa calens Lepeletier

Xylocopa calens Lepeletier, 1841: 196-197; Smith, 1874: 261; Vachal, 1899b: 146, 155; LeVeque, 1928: 2, 20 (*Mesotrichia*); Hurd & Moure, 1963: 273, 299.

Lepeletier (1841) described *X. calens* in its current genus, from several females that were collected at an unspecified locality in Madagascar. The type-series of *X. calens* was placed in the MNHN and in Dejean's collection, which is now housed in the MIZS. At the end of the original description Lepeletier (1841) pointed out that he also had a small specimen of this species from Senegal that was placed in Serville's collection. This has caused some confusion as to which specimen is the type of *X. calens*. The MNHN has a specimen that was recently labelled as the "holotype" which is from Senegal. This specimen is obviously the smaller specimen that Lepeletier (1841) referred to in the original description and it is therefore not the holotype. Although I was unable to find any other material in the MNHN that could have formed part of the type-series, there are two specimens in the MIZS that according to the available information form, at least, part of the type-series of *X. calens*. I have examined one of the syntypes of *calens* (in MIZS) and I have compared determined specimens of this species from numerous localities in Africa, including Senegal, with several specimens from Madagascar (in MNHN, MRAC, BMNH). Following the examination of this material which I believe is correctly determined, I regard *X. calens* as a wide-spread species that occurs in both Africa and Madagascar. *X. calens* has not previously been recorded from southern Africa. In 1928 LeVeque placed *calens* in the genus *Mesotrichia*.

I have examined the holotype of *Xylocopa modesta* (a well documented African species that has not been recorded from southern Africa) and the only apparent difference between *modesta* and *calens* is that *modesta* is considerably smaller than *calens*. Size, however, is not a reliable diagnostic character. It therefore appears that *calens* and *modesta* are synonymous. Since I have not been able

to study the variation of *calens*, I do not propose to synonymise these two species.

Xylocopa calens cannot be recognised from its colour alone and as the descriptions of this species deal mainly with colour, i.e. Lepeletier (1841), Smith (1874), Vachal (1899b) and others, I have redescribed *calens* with reference to the species-group description given above.

DESCRIPTION

Length: head 5,2-5,9 mm; scutum 4,3-5,4 mm; body length 18,0-20,0 mm; fore wing 17,0-19,0 mm.

Female. Colour: pubescence of head black; mesosomal dorsum, tegula and dorsal surface of metasomal tergum I completely bright yellow; mesosomal pleura either completely black or mostly black with a little yellow on upper region of mesepisternum; remainder of mesosoma and metasoma and the entire legs black (similar to that in *watmoughi*, Fig. 69). Fore and hind wings strongly and entirely infuscated with a faint to moderate green or violet metallic lustre in certain plays of light.

Head: frontal view: summit of vertex weakly raised above eyes, about twice ocellar diameter above upper eye margins; clypeus either flat or slightly concave, its dorsolateral margins gently rounding into inflexed parocular area; profile: vertex and gena always narrower than median eye width; mandible bidentate; upper mandibular margin notched, without a prominent tubercle. Mesosoma: scutellum very acutely divided so that the posterior surface is strongly concave (cf. Fig. 24); metanotum and propodeum flat and declivous; legs: outer margin of fore coxa usually gently curved, upper region of the lateral margin almost straight. Metasoma: tergum I angulately divided, the subvertical surface with an invaginated mite chamber; devoid of pygidial spines.

Male. Colour and structure as described for the species-group.

DISTRIBUTION (FIG. 81)

Although *X. calens* has been recorded from numerous localities in Africa north of southern Africa, it is only known from three localities in southern Africa, all of which are in mountainous regions on the eastern side of the subcontinent.

MATERIAL EXAMINED

4♀ with the following data: SOUTH AFRICA: TRANSVAAL: Barberton, IV.1911, H. Edwards, "*X. olivacea* var *calens*" det. H. Friese 1911, 1♀ in SAM; De Kuilen, Lydenburg district, 25.10S 30.32E, 12.II.1981, C.G. Moolman & W. Harrop, 1♀ (AcX 3265); NATAL: Mdedelelo Forest Reserve, 29.07S 29.26E, 13-14.XI.1981, S.J. van Tonder and C. Kok, 2♀.

Xylocopa lateritia Smith

Xylocopa lateritia Smith, 1854: 346; 1874: 257-258; Gerstaecker, 1857: 460; 1862: 444; Vachal, 1899b: 112, 153; Maidl, 1912: 282; LeVeque,

1928: 3; 1930: 11-12 (*Mesotrichia*); Hurd & Moure, 1963: 274, 308.

Smith (1854) described *X. lateritia* from a female that was said to have been collected on the "Isle of Johanna (Mozambique)", a locality I have not been able to locate but which is probably one of the Comoro Islands, which are in the Mozambique Channel [in 1912 Maidl referred to the distribution of *lateritia* as "Komoren (Insel Johanna)"]. I have examined the holotype of *lateritia* (in HEC) and the locality label is illegible. Before the male of *lateritia* was described Gerstaecker (1862) recorded both sexes of this species from unspecified localities in Mozambique. The male of *lateritia* was later described by Smith (1874) from a specimen that was apparently collected on the Isle of Johanna. In 1928 LeVeque placed *lateritia* in the genus *Mesotrichia*.

I have not seen the male of *lateritia* and as I have only examined a relatively small number of xylocopids from Mozambique, I am not sure if *lateritia* occurs in southern Africa. I have therefore included a brief description of the female in which I have referred to the *X. caffra* group description. I have also included the female in the foregoing key.

DESCRIPTION

Length: head 5,0 mm; scutum 4,2 mm; body length 22,0 mm; fore wing 17,0 mm.

Colour: pubescence of head completely black; mesosomal dorsum, tegula, upper region of mesepisternum and dorsal surface of metasomal tergum I reddish-orange; remainder of mesosoma and metasoma and the entire legs black. Wings moderately infuscated with a strong green or mauve metallic lustre in certain plays of light. Structure of entire body as described for the *X. caffra* species-group.

REMARKS

LeVeque (1930) recorded the mite species *Dinogamasus braunsi* from the metasomal mite pouch of *X. lateritia*.

MATERIAL EXAMINED

♀ holotype (label illegible). 1♀ with the following data: TANZANIA: Madibura, collected in 1905, "Ertl.", det. H. Friese 1913, in TM.

SPECIES SOLA

The following seven species, namely *X. scioensis*, *X. isabelleae*, *X. flavicollis*, *X. inconstans*, *X. nigrita*, *X. imitator* and *X. varipes*, have not been incorporated into species-groups. This is because they do not have any close relatives that occur in southern Africa which would have enabled me to compile such groups.

Xylocopa scioensis Gribodo, Fig. 11, 21, 25

Xylocopa scioensis Gribodo, 1884: 279; Vachal, 1899b: 158; Friese, 1909: 245-246; Cockerell,

1917: 462 (*Mesotrichia*); Hurd & Moure, 1963: 275, 315; Maa, 1968: 107-108.

Xylocopa flavobicincta Gribodo, 1894a: 119; Friese, 1909: 250-251; Maidl, 1912: 284; Cockerell, 1917: 461-462; 1933b: 680 (*Mesotrichia*); Maa, 1968: 108-110; Watmough, 1974: 263-265, 271-272 (misidentified).

Xylocopa modesta var. *anicula* Vachal, 1899a: 233.

Xylocopa anicula Vachal: Vachal, 1899b: 145, 156; Enderlein, 1903: 52; Cockerell, 1908: 36 (*Mesotrichia*); Maa, 1968: 108.

Xylocopa caffrariae Enderlein, 1903: 55-56; Cockerell, 1933b: 680-681 (*Mesotrichia*); Watmough, 1974: 263-278. *syn. nov.*

Xylocopa caffrariae var. *capensis* Enderlein, 1903: 56; Schulz, 1906: 251; Cockerell, 1932b: 557 (*Mesotrichia*). *syn. nov.*

Xylocopa caffrariae enderleini Schulz, 1906: 251, replacement name for *X. caffrariae* var. *capensis* Enderlein. *syn. nov.*

Mesotrichia bevisi Cockerell, 1917: 461-462; Hurd & Moure, 1963: 273, 298 (*Xylocopa*). *syn. nov.*

Mesotrichia rufosellata Cockerell, 1922: 666; Hurd & Moure, 1963: 275, 315 (*Xylocopa*). *syn. nov.*

Mesotrichia whaitsi Cockerell, 1932b: 557; Hurd & Moure, 1963: 275, 319 (*Xylocopa*). *syn. nov.*

Mesotrichia heterotricha Cockerell, 1933b: 680; Hurd & Moure, 1963: 274, 306 (*Xylocopa*). *syn. nov.*

Mesotrichia vansoni Cockerell, 1935b: 63-64; Hurd & Moure, 1963: 275, 318 (*Xylocopa*). *syn. nov.*

Xylocopa scioensis was described by Gribodo (1884) from a female that was taken at Ambo-Karra in Ethiopia. In the original description of *X. scioensis* Gribodo (1884) provided a comparison of this species with *X. calens*, *X. lateritia*, *X. modesta* and *X. olivacea* (Fabricius) (*olivacea* is a well documented African species that has not been recorded from southern Africa) and this comparison helped me to recognise *scioensis*. Furthermore, I have a specimen that was compared with the holotype of *scioensis* (in MCSN) by Dr R. Poggi who stated that my specimen seems to be correctly identified. The absence of a mite chamber in the female and the distinct facial structure of both sexes strongly indicate that *scioensis* is a distinct species and not a variety of *X. modesta* as suggested by Vachal (1899b). *X. scioensis* and all its synonyms were placed in the genus *Mesotrichia* by Cockerell (several publications, see above), Hurd & Moure (1963) referred to them in the genus *Xylocopa*, subgenus *Koptortosoma*.

Gribodo (1894a) described *X. flavobicincta* from a type-series that appears to have contained two females from Shewa province in Ethiopia and two males from Zanzibar (Maa, 1968). In 1968 Maa studied the type-series (in MCSN) and found that Gribodo (1894a) had incorrectly associated the sexes of this species. Maa (1968) designated a female as the lectotype of *flavobicincta* and he stated that the male syntypes belong to *X. divisa* (now known as *X. flavicollis*), and not to *flavobicincta*, the species to which they were originally assigned. Although I have not examined the lectotype of *flavobicincta*, I have a specimen of this species which was compared

with the lectotype by Dr R. Poggi. I have studied the diagnostic features of *flavobicincta* that were described by Maa (1968) and I have also examined specimens of this species from numerous localities in southern Africa, and this information clearly indicates that *flavobicincta* is a colour variety of *scioensis*. The synonymy of *X. flavobicincta* and *X. suspiciosa* Vachal is discussed on p. 47. The material that Watmough (1974) recorded as *flavobicincta* and which I have examined, actually belongs to *X. somalica*.

Xylocopa anicula was described as a variety of *X. modesta* by Vachal (1899a) and later that year Vachal (1899b) raised *anicula* to species level. In 1903 Enderlein synonymised *anicula* and *scioensis*. This synonymy was not accepted by Cockerell (1908) who transferred *anicula* to the genus *Mesotrichia*. I have, however, examined the holotype of *anicula* (in MNHN) and as it only differs slightly in colour from the lectotype of *scioensis* (according to the original description of *scioensis*), I agree with the synonymy of these two species.

Enderlein (1903) described *X. caffrariae* from Kaffraria (4♀ and 4♂) and *X. caffrariae* var. *capensis* from an unspecified locality in the Cape Province (4♀) and from Port Natal (1♀) in Natal, South Africa. The name *capensis* is, however, preoccupied in the genus *Xylocopa* by the name *X. capensis* Spinola (1838). Schulz (1906) therefore renamed *X. caffrariae* var. *capensis* as *X. caffrariae enderleini*. Cockerell (1932b) referred to the variety *capensis* as a subspecies of *caffrariae*, which he placed in the genus *Mesotrichia*. I have examined a female and a male syntype of *caffrariae* and one of the syntypes of *caffrariae* var. *capensis* that is from the Cape Province (all of which are in PAS). Following the examination of this material and the original descriptions of *caffrariae* and *caffrariae* var. *capensis*, I am quite sure that this species and its variety are both colour variants of *scioensis*.

Xylocopa bevisi was described in the genus *Mesotrichia* by Cockerell (1917) from a male that was collected in Umbilo, Natal, and in 1963 Hurd & Moure transferred this species to its current genus, *Xylocopa*. The holotype of *bevisi* (in BMNH) is very unusual in that it has only two submarginal cells in the fore wings. However, a careful examination of the holotype indicated that the radial sector vein between the first and second submarginal cells is incomplete in the right wing and almost completely absent in the left wing. The absence of fully developed cross veins between the first and second submarginal cells is clearly a malformation of the wings. As *bevisi* is otherwise indistinguishable from the male of *scioensis*, I here synonymise these two species.

The colour variation found in the female of *scioensis* led Cockerell (1922, 1932b, 1933b, 1935b) to describe several synonymous species. In 1922 Cockerell described *X. rufosellata*, in the genus *Mesotrichia*, from a female that was taken at Pietermaritzburg, Natal, and he stated that the holotype of this species would be returned to the Natal Museum, Pietermaritzburg, but it is not in this or any other museum that I have visited and has therefore not been studied. In 1963 Hurd & Moure

placed *rufosellata* in the genus *Xylocopa*. Although *rufosellata* is unusual in that the hair on the posterior region of the mesosomal dorsum is ferruginous, Cockerell (1922) clearly described the shape of the clypeus and supraclypeus, which is a diagnostic feature that is known in only one southern African species, namely *X. scioensis*. I therefore synonymise *scioensis* and *rufosellata*. Cockerell (1932b, 1933b, 1935b) described *X. whaitsi* from Oudtshoorn, *X. heterotricha* from Huguenot (both are in the Cape Province) and *X. vansoni* from Maun in Botswana. Each of these three species was described in the genus *Mesotrichia* from a single female specimen, and in 1963 they were transferred to the genus *Xylocopa* by Hurd & Moure. The examination of the original descriptions and the holotypes of these three species (the holotypes of *whaitsi* and *heterotricha* are in the BMNH and the holotype of *vansoni* is in the TM) has clearly indicated that *whaitsi*, *heterotricha* and *vansoni* are synonymous with *scioensis*.

Both sexes of *scioensis* resemble the *X. caffra* species-group in colour and structure. But they can be easily recognised by the raised lateral margins of the clypeus and supraclypeus which Cockerell (1922) very aptly described as an inverted "U", and by the absence of a metasomal mite pouch in the female.

The colour of *X. scioensis* is very variable and the different colour varieties have been described in detail as several distinct species. The most useful of these colour descriptions are those of *X. caffrariae* and *X. caffrariae* var. *capensis* by Enderlein (1903) and *X. bevisi*, *X. rufosellata*, *X. whaitsi*, *X. heterotricha* and *X. vansoni* by Cockerell (1917, 1922, 1932b, 1933b, 1935b, respectively). As the complete range in the variation of the colour of *scioensis* has not been incorporated into a single colour description and as the structure of this species has not been described in detail, I have provided a comprehensive description of *X. scioensis*.

DESCRIPTION

Length: head 3,0-4,0 mm; scutum 3,0-5,0 mm; body length 11,0-13,0 mm; fore wing 11,0-14,0 mm.

Female. Colour: pubescence of head usually with a mixture of black and white hairs, sometimes either completely black or completely white; mesosomal dorsum either completely bright yellow or black anteriorly and bright yellow posteriorly; tegula and upper region of mesepisternum concolourous with anterior region of mesosomal dorsum; dorsal surface of metasomal tergum I bright yellow, metasomal tergum II usually with a few sparse yellow hairs [the yellow mesosomal and metasomal pubescence is occasionally a little reddish, i.e. as in the specimen that Cockerell (1922) described as *rufosellata*]; remainder of mesosoma and metasoma black; legs completely black (colour, in dorsal view, similar to that in either *caffra*, Fig. 67 or *watmoughi*, Fig. 69). Wings strongly and entirely infuscated sometimes with a green or purple metallic lustre in certain plays of light.

Head: frontal view: summit of vertex weakly elevated above eyes, about an ocellar diameter above upper eye margins, and broadly and shallowly concave, not more or less flat or distinctly convex as

in the remainder of the southern African species; alveolorbital and interalveolar distances subequal; region of parocular area adjacent to supra-antennal area and supraclypeus strongly inflexed; supra-antennal area distinctly carinate; apex of frontal line distinctly raised above supraclypeus; clypeus slightly raised above parocular area; lateral margins of supraclypeus and dorsolateral margins of clypeus gently raised so that the supraclypeus and the dorsal region of the clypeus are gently and distinctly concave; dorsal view: integument just below lateral ocelli slightly incurved; interocellar and ocellorbital distances subequal; profile: vertex and gena narrower than median eye width; mandible (cf. Fig. 19) bidentate; upper mandibular margin notched, without a distinct tubercle; lower mandibular margin straight, without a large tooth. Mesosoma: scutellum acutely divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface (Fig. 25); wing venation as illustrated (Fig. 21); legs: apex of basitibial plate rounded, in about middle of hind tibia; propodeal triangle absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 25). Metasoma: tergum I angulately divided, the subvertical surface without a central orifice and an invaginated mite chamber; tergum VI devoid of pygidial spines near base of pygidial plate.

Male. Colour: pubescence of vertex and dorsal region of gena pale yellow; face below antennal sockets and ventral region of gena either pale yellow or white; mesosomal dorsum, mesosomal pleura, outer surface of legs and metasomal terga mostly pale yellow; propodeum and anterior (subvertical) surface of metasomal tergum I either pale yellow or white; ventral surfaces of mesosoma, metasoma and legs either pale yellow or black; pale yellow vestiture sometimes appears olive-green when viewed without magnification, this is because the black integument is vaguely visible between the pale yellow hairs (similar to that in *X. caffra*, Fig. 68). Facial markings (Fig. 11): mediolongitudinal and ventral regions of clypeus black, yellow or partly black and partly yellow; frontal surface of antennal scape yellow; mandible either completely black or mostly black with a small yellow area near base of mandible.

Head: frontal view (Fig. 11): summit of vertex weakly elevated above eyes, about an ocellar diameter above upper eye margins; upper and lower interorbital distances subequal; alveolorbital and interalveolar distances subequal; region of parocular area adjacent to supra-antennal area and supraclypeus gently inflexed; supra-antennal area weakly carinate; apex of frontal line distinctly raised above supraclypeus; clypeus slightly raised above parocular area; lateral margins of supraclypeus and dorsolateral margins of clypeus gently raised so that the supraclypeus and the dorsal region of the clypeus are gently and distinctly concave; dorsal view: integument just below lateral ocelli slightly incurved; interocellar and ocellorbital distances subequal; profile: malar space much shorter than flagellar segment II, almost non-existent at its narrowest point; labrum weakly convex, non-tuberculate; mandible bidentate; upper mandibular margin gently incurved, non-tuberculate. Mesosoma: meta-

notum angulately divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface (cf. Fig. 35); propodeum flat and declivous; wing venation as in female (Fig. 21); legs: basitarsi of all legs more or less similar in length, and tarsal segments II-V of all legs more or less similar in length and width; trochanter, femur and tibia of hind leg non-tuberculate; distal end of hind tibia with ventral posterior region strongly swollen (hind leg as in *caffra*, Fig. 46); basitibial plate on proximal one half of hind tibia. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *caffra* (Fig. 35). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface; tergum VII with distal margin shallowly and evenly concave; sternum VI with a small mediolongitudinal keel; genitalia with parameral and digital lobes similar to that in *X. caffra* (Fig. 57).

DISTRIBUTION (FIG. 82)

Xylocopa scioensis has been recorded from numerous localities in southern Africa, most of which are in the eastern and southern regions of the subcontinent. As *scioensis* nests primarily in the internodes of *Phragmites* sp., the distribution of this species and its host plant probably coincide. *Phragmites* occurs throughout southern Africa, in areas where there is a relatively abundant supply of water.

REMARKS

Xylocopa albiceps Fabricius, which has not been recorded from southern Africa, is the only distinct African species that is closely related to *X. scioensis*. Although the female of *albiceps* is black with white pubescence on its head, *scioensis* and *albiceps* are structurally very similar. I have not thoroughly compared the males of *scioensis* and *albiceps*.

Although *scioensis* nests primarily in the hollow internodes of dead *Phragmites* sp., it also accepts exotic hollow or pithy stemmed plants. I have a few specimens that were collected in bamboo and Cockerell (1922) recorded *X. rufosellata* (now known as *X. scioensis*) from a sunflower stem.

MATERIAL EXAMINED

♀ holotype of *X. anicula*, "Haut Zambezi, E. Fox, 88-94", det. J. Vachal, plus a recent holotype label, in MNHN; 1♀ and 1♂ syntype of *X. caffrariae*, "Kaffraria, S. Krebs", plus the original "type" label, in PAS; 1♀ syntype of *X. caffrariae* var. *capensis*, "Capland, S. Krebs", plus the original "type" label, in PAS; ♂ holotype of *X. bevisi*, "Umbilo, 10.X.1915, L. Bevis, 1708, B.M. Type Hym. 17B 1220", plus the original "type" label, in BMNH; ♀ holotype of *X. whaitsi*, "Oudtshoorn, C. Province, P. & A. Whaits, B.M. Type Hym. 17B 1218", plus the original "type" label, in BMNH; ♀ holotype of *X. heterotricha*, "Cape Province, Huguenot, 5-10.II.1932, L. Ogilvie, B.M. Type Hym. 17B 135", plus the original "type" label, in BMNH; ♀ holotype of *X. vansonii*, "Vernay-Lang Kalahari Expedition, Maun, 18.V.-7.VI.1930, TM

holotype No. 1223", plus the original "type" label, in TM.

138♀ and 53♂ with the following data: MOZAMBIQUE: Macaneta, 26.III.1980, H.R. Feijen, 2♀ in SC; Inhambane, no date, R.F. Lawrence, "*X. caffrariae* var. *capensis*" det. ? A.J. Hesse, 1♂ in SAM; Masiene, no date, R.F. Lawrence, "*X. caffrariae* var. *capensis*" det. ? A.J. Hesse, 1♀ in SAM; River Garcia, 2.IV.1980, H.R. Feijen, 3♀ 2♂ in SC; Boane, 15.X.1971, E. Holm, 1♀; Inhaca, Lourenzo Marques (now known as Maputo), X.1912, K.H. Barnard, 1♀ 1♂ in SAM. ZIMBABWE: Salisbury, Avondale, several dates, 9♀ 7♂ (AcX 3009, 3014, 3015, 3024); same locality, 20.I.1953 and V.1965, ex nest in bamboo, 1♀ 1♂ (AcX 3016); same locality, 10.XII.1965 and an unspecified date in 1965, ex nest in *Phragmites* sp., 1♀ 1♂ (AcX 3008); Lake McIlwain, V.1965, ex nest in *Phragmites* sp., 5♂; Beit Bridge, 2.I.1965, 1♀ 1♂. SOUTH AFRICA: TRANSVAAL: Kruger National Park, Pafuri, 2231AD, 11.I.1966, H. Braack, 1♀ (B 373) in KNP; Kruger National Park, Crocodile Bridge, 21.V.1969, J. Matthew, 1♀ (AcX 3216); Mogoto Nature Reserve, Zebediela, 24.15S 29.13E, 22-25.X.1979, G.L. Prinsloo, 4♀; Buysdorp, 23.01S 29.22E, 16.I.1980, C.D. Eardley, 1♀; Loskop Dam Nature Reserve, 25.25S 29.20E, 9-13.II.1981, C.G. Moolman & W. Harrop, 1♀; Barberton, III.1979, C. Kok, 1♀ (AcX 3003); Mogol Nature Reserve, Ellisras district, 23.58S 27.45E, 19-23.XI.1979, M.W. Mansell, 1♀; same data, except G.L. Prinsloo, 1♀; Pretoria, 25.45S 28.12E, several dates, 29♀ 6♂ (AcX 3006, 3010, 3017, 3018, 3019, 3020, 3021, 3022, 3023, 3025, 3300); same locality, 25.XII.1968, 1♀; same locality, VII.1929, H.K. Munro, 5♀ 3♂ (AcX 3215); same locality, 18.III.1979, P.J. Eardley, 1♀; Roodeplaat, 26.I.1964, C. Daiber, 1♀ (AcX 3245); same locality, 12.I.1971, "B.B.", 1♀; Soutpan, Pretoria district, 25.24S 28.06E, 17.II.1981, I.M. Millar, 1♀; same data, except R.G. Oberprieler, 1♀; Rustenburg, 6.XII.1969, L.C. Starke, 1♂; Potchefstroom, 3.XII.1965, M.J. Oosthuizen, ex nest in Spanish reeds, "*X. caffrariae*" det. G. Nixon 1946, 2♀ (AcX 3026); Marico, I.1921, H. Brauns, 1♂ in TM; Lichtenburg, 10.I.1906, H. Brauns, "*X. anicula*" det. F. Maidl, 1♂ in TM; NATAL: Ndumu Game Reserve, I.1978, G.L. Prinsloo, 1♀; Mfongosi, no date, W.E. Jones, 1♀ in SAM; same locality, XII.1911, W.E. Jones, 1♂ in SAM; CAPE PROVINCE: Kimberley, collected in 1887, A. Tucker, "*X. caffrariae*" det. H. Friese 1911, 1♀ 1♂ in SAM; Groblershoop, 28.53S 21.59E, 13-17.IV.1981, C.G. Moolman, 2♀; Grahamstown, I.1979, C.D. Eardley, ex nest in *Phragmites australis*, 36♀ 7♂ (AcX 2893, 2894, 2896, 2898, 2899, 2900, 2901, 2902, 2903, 2904, 2905, 2906, 2907, 3004, 3005, 3011); same locality, 25.VIII.1978, F. Gess, ex nest in *Phragmites australis*, 4♀ 4♂ (AcX 2874, 2875, 2876); Willowmore, II.1916, H. Brauns, 1♀ 1♂; Oudtshoorn Experimental Farm, 33.31S 21.25E, several dates, feeding on lucerne flowers, 14♀ 5♂; Humansdorp, I.1979, C.D. Eardley, 1♀ 1♂; Stellenbosch, XII.1888, "R.M.L." 1♀ in SAM; Stellenbosch, collected in 1888, "L.P.", "*X. caffrariae*" det. H. Friese 1911, 1♂ in SAM; Hex

River, I.1888, no collector, "*X. anicula*" det. H. Brauns, "*X. ? suspiciosa*" det. ? A.J. Hesse, 1♂ in SAM; Hex River, I.1884, no collector, "*X. ? suspiciosa*" det. ? L. Péringuey, 1♀ in SAM. SOUTH WEST AFRICA/NAMIBIA: Popa Falls, 18.07S 21.33E, Kavango, 26-31.VIII.1971, no collector, 1♀ (H 3801) in SM. Unless otherwise stated all material was collected by R.H. Watmough.

Xylocopa isabelleae Hurd, Fig. 12, 58, 70, 71

Xylocopa eximia Friese, 1908: 569 (nec *X. eximia* Pérez, 1901).

Xylocopa isabelleae Hurd, 1959: 136-137 (replacement name for *X. eximia* Friese); Hurd & Moure, 1963: 274, 303, 307.

In 1908 Friese described *X. eximia* from a single female that was collected at Ikutha in Kenya. As the name *X. eximia* is a junior homonym of *X. eximia* Pérez (1901), Hurd (1959) renamed this species as *X. isabelleae*. I have not seen the holotype of *X. eximia* Friese (in MHU) and I have therefore determined this species from the original description. Although Friese's (1908) description of *eximia* (now known as *X. isabelleae*) is rather short, he provided a comparison of this species with the closely related *X. lateritia*. I have examined the holotype of *lateritia* and I compared specimens of *isabelleae* with both the types and the descriptions of other similar African species, i.e. *X. flavorufa* var. *harrarensis* (in MNHN), *X. lateritia* (in HEC) and *X. aestuans* var. *rubida* (the comparison of *aestuans* var. *rubida* with *isabelleae* was done for me by Dr R. Poggi), and I am confident of the identity of *isabelleae*.

Although the female of *X. isabelleae* resembles the female of *X. flavorufa*, these two species can be easily separated by the following characters: size; colour of wings; structure of the clypeus, supra-clypeus and supra-antennal area. The male of *isabelleae* is similar to the males of the *X. caffra* group; differing mainly in colour and the structure of the parameral and digital lobes of the genitalia. *Xylocopa isabelleae* is known only from the brief original description that deals primarily with the colour of the female. I have therefore redescribed both sexes of this species in detail.

DESCRIPTION

Length: head 5,0-6,0 mm; scutum 4,0-6,0 mm; body length 20,0-22,0 mm; fore wing 13,0-15,0 mm.

Female. Colour (Fig. 70): pubescence of head completely black; mesosomal dorsum, tegula and upper region of mesepisternum reddish-orange, remainder of mesosoma, entire metasoma and the entire legs black. Wings pale brown and semi-translucent, veins and apical regions dark brown, without a metallic lustre.

Head: frontal view: summit of vertex weakly elevated above eyes, about twice ocellar diameter above upper eye margins, alveolorbital distance a little greater than interalveolar distance; region of parocular area adjacent to supra-antennal area,

supraclypeus and dorsal region of clypeus strongly inflexed; supra-antennal area gently rounded; apex of frontal line level with supra-clypeus; clypeus gently convex, raised a little above parocular area, its dorsolateral margins gently rounding into inflexed parocular area; dorsal view: integument just below lateral ocelli gently incurved; interocellar distance a little less than ocellorbital distance; profile: vertex and gena about as wide as median eye width; mandible bidentate; upper mandibular margin notched and without a distinct tubercle; lower mandibular margin straight, without a large tooth (cf. Fig. 19). Mesosoma: scutellum very acutely divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface (cf. Fig. 24); metanotum and propodeum flat and declivous; wing venation as in *scioensis* (Fig. 21); legs: apex of basitibial plate broadly rounded, on distal one half of hind tibia, with a ridge that extends towards proximal end of hind tibia; propodeal triangle absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *caffra* (Fig. 24). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface, the subvertical surface with a relatively small orifice that opens into an invaginated mite chamber; tergum VI devoid of pygidial spines near base of pygidial plate.

Male. Colour (Fig. 71): pubescence of head, mesosoma, metasoma and legs mostly ferruginous, except for a narrow strip between basitibial plate and distal end of hind tibia, inner surface of middle and hind tarsi, and lateral regions of anal fringe which are usually black; dorsal surface of mesosoma and metasoma sometimes appear slightly greenish when viewed without magnification, this is due to the black integument being vaguely visible between the ferruginous hairs. Facial markings (Fig. 12): ventral region of supra-clypeus, and dorsal, medio-longitudinal and ventral regions of clypeus black, yellow or partly black and partly yellow; anterior surface of antennal scape yellow; mandibles usually completely black, occasionally with a small yellowish area near base of mandible. Wings pale brown and semi-translucent, veins dark brown, without a metallic lustre. Metasoma with integument differing from most of the other species in that the proximal regions of terga II-VII and sterna II-VI is yellow (yellow region is usually only visible by dissection).

Head: frontal view (Fig. 12): summit of vertex weakly elevated above eyes, about an ocellar diameter above upper eye margins; upper and lower interorbital distances subequal; alveolorbital distance a little greater to about as long as interalveolar distance; region of parocular area adjacent to supra-antennal area and supra-clypeus gently inflexed; supra-antennal area gently rounded, not carinate or tuberculate; apex of frontal line level with supra-clypeus; clypeus mostly flat, raised a little above parocular area, its dorsolateral margins gently rounded; dorsal view: integument just below lateral ocelli gently incurved, not carinate or tuberculate; interocellar and ocellorbital distances subequal; profile: malar space much shorter than flagellar segment II, almost non-existent at its narrowest point; labrum gently convex, non-tuberculate;

mandible bidentate; upper mandibular margin gently incurved, non-tuberculate. Mesosoma: metanotum angulately divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface (cf. Fig. 35); metanotum and propodeum flat and declivous; wing venation as in *scioensis* (Fig. 21); legs: basitarsi of all legs more or less similar in length; tarsal segments II-V of all legs more or less similar in length and width; trochanter and tibia of hind leg non-tuberculate; ventral surface of hind femur with a very small flattish prominence near its proximal end; distal end of hind tibia with ventral posterior region strongly swollen [hind leg similar to that in *caffra* (Fig. 46), differing only in the presence of a small flat femoral prominence]; basitibial plate in about middle of hind tibia. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *caffra* (Fig. 35). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface; tergum VII with distal margin angulately concave; genitalia with parameral and digital lobes as illustrated (Fig. 58).

DISTRIBUTION (FIG. 82)

In southern Africa *X. isabelleae* is only known from the coastal dune forests of northern Natal and from Maciene, which is near the coast in Mosambique. Further collecting is therefore needed in order to ascertain the complete distribution of this species.

MATERIAL EXAMINED

107♀ and 38♂ with the following data: MOZAMBIQUE: Maciene, XII.1933, R.L. Lawrence, "*X. lateritia*" det. ? A.J. Hesse, 1♂ in SAM. SOUTH AFRICA: NATAL: Cape Vidal, 28.10S 32.32E, 13.I.1981, 1♀ 2♂ (AcX 3179); same locality, 29.V.1976, R.H. Watmough, 2♀; Dukuduku Forest Reserve, X.1969, T.W. Drinkwater, 11♀; Fanies Island camp, St. Lucia, 28.10S 32.25E, 14-16.I.1981, 40♀ 6♂ (AcX 3180, 3181, 3182, 3183, 3184, 3189); Charters Creek, St. Lucia, 28.12S 32.25E, 14-16.I.1981, 3♀ 3♂ (AcX 3187); Lake Sibaya, E. shore, 27.22S 32.43E, 18-20.I.1981, 50♀ 26♂ (AcX 2962, 3183, 3186, 3188). Unless otherwise stated all material was collected by C.D. Eardley.

Xylocopa flavicollis (DeGeer), Fig. 13, 59, 72-74

Apis flavicollis DeGeer, 1778: 606; Vachal, 1899b: 148, 156 (*Xylocopa*); Enderlein, 1903: 56-57 (*Xylocopa*); Hurd & Moure, 1963: 274, 302 (*Xylocopa*).

Apis citronella DeGeer, 1778: 606-607; Vachal, 1899b: 156 (*Xylocopa*).

Apis collaris Olivier, 1789: 69; Vachal, 1899b: 148 (*Xylocopa*).

Xylocopa divisa Klug, 1807: 264; Smith, 1874: 259-260; Gribodo, 1884: 281; 1894a: 117-119; Stadelmann, 1898: 22-23, Vachal, 1899b: 148; Enderlein, 1903: 56-57; Friese, 1909: 251-252; Cockerell, 1916: 189; 1935a: 344 (*Mesotrichia*) LeVeque, 1930: 16-17 (*Mesotrichia*).

Xylocopa sulphurea Spinola, 1838: 519; Lieftinck, 1964: 144; Moreno & Moreno, 1980: 148 *syn. nov.*

Xylocopa stuhlmanni Kohl, 1893: 182; Stadelmann, 1898: 23; Vachal, 1900: 108; Enderlein, 1903: 56-57; Friese, 1909: 252-253; Cockerell, 1919: 170; 1935a: 344 (*Mesotrichia*); LeVeque, 1930: 17-18 (*Mesotrichia*).

Xylocopa stuhlmanni var. *albicincta* Enderlein, 1903: 57.

Mesotrichia albicincta (Enderlein): Cockerell, 1935b: 63. *syn. nov.*

DeGeer (1778) described the female of this species as *Apis flavicollis* and the male as *Apis citronella*, each from a single specimen that was collected in the Cape of Good Hope. Both these species were transferred to the genus *Xylocopa* and correctly synonymised by Vachal (1899b), who realised that they were the opposite sexes of the same species. Vachal (1899b) chose *X. flavicollis* as the senior synonym. My confirmation of the synonymy of these two species follows the examination of the holotypes of both *flavicollis* and *citronella* (both of which are in the NRS), and several series of specimens in which the sexes were correctly associated. Hurd & Moure (1963) placed *X. flavicollis* and all its synonyms in the subgenus *Koptortosoma*.

Apis collaris was described by Olivier (1789) from a female specimen that was collected in the Cape of Good Hope. Vachal (1899b) transferred *collaris* to the genus *Xylocopa* and correctly synonymised this species with *X. flavicollis*. Although the original description of *collaris* is brief and concerned primarily with colour, it is sufficient to separate this species from its southern African congeners. I have studied the original description of *collaris* and I agree with the synonymy of this species with *X. flavicollis*. I have not been able to locate the holotype of *collaris*, which according to Horn & Kahle (1936) should be in either the MNHN or in the Royal Scottish Museum in Edinburgh, Great Britain.

Xylocopa divisa was briefly described in its current genus by Klug (1807) from a female specimen. The type-locality of this species was not recorded. *X. divisa* was synonymised with *X. stuhlmanni* by Stadelmann (1898) (*stuhlmanni* is today known to be a junior synonym of *flavicollis*) and with *X. flavicollis* by Vachal (1899b). Although I have not studied the holotype of *divisa* (? in MHU), I have examined several specimens of *flavicollis* (in MNHN, BMNH, IRSN, MRAC) that were determined as *X. divisa*. It therefore appears that *flavicollis* and *divisa* were correctly synonymised by Vachal (1899b).

Spinola (1838) described *X. sulphurea* in its current genus from the Cape of Good Hope. The original description of *sulphurea* is brief and it is not sufficient for the recognition of this species. Although Lieftinck (1964) was unable to locate the holotype of *sulphurea*, the catalogue of the material in Spinola's collection (in MIZS) by Moreno & Moreno (1980) clearly indicates that the holotype of this species is in the MIZS. I have examined the holotype of *sulphurea* and I am confident that *sulphurea* is a junior synonym of *flavicollis*.

Kohl (1893) described *X. stuhlmanni* from two

female specimens that were collected at Quelimane in Mozambique and Bagamoyo in Tanzania. In 1898 Stadelmann, who had examined the holotypes of *stuhmanni* (in MHU) and *divisa*, synonymised these two species (this synonymy was not accepted by several authors, i.e. Enderlein, 1903; Friese, 1909; Cockerell, 1919 and 1935a, who separated these two species on relatively slight differences in colour) and in 1900 Vachal synonymised *stuhmanni* with *flavicollis*. Although I have not seen the holotype of *stuhmanni*, I have carefully compared the descriptions and authentically determined material from various localities in Africa and all the available information strongly suggests that *stuhmanni* is a colour variety of *flavicollis*.

Xylocopa stuhmanni var. *albicineta* was described in its current genus by Enderlein (1903) from three female specimens that were collected at Langenburg in Tanzania. Cockerell (1935b) referred to *albicineta* as a distinct species in the genus *Mesotrichia*. This variety differs from the true form of *stuhmanni* in that the posterior region of the mesosomal dorsum is white and not yellow. I have examined several specimens of *albicineta*, including a syntype (in PAS), and although I have not examined a series in which both yellow and white cross-banded specimens were removed from the same nest, the colour and the geographical distribution of the colour varieties are comparable with those in *X. caffra* and *X. inconstans*. I therefore believe that *X. stuhmanni* var. *albicineta* is a colour variety of *X. flavicollis*.

Although both sexes of *X. flavicollis* resemble the *X. caffra* group in structure, this species can be easily recognised by its colour, i.e. the dorsal surface of the first metasomal tergite is black in the female (Fig. 72 and 73) and the male is mostly bright yellow (Fig. 74). The colour of the male of *flavicollis* resembles that of the male of *X. imitator*, but these two species differ in size and *imitator* probably does not occur in southern Africa.

Xylocopa flavicollis is a wide-spread African species and the variation in the colour of this species has led to the description of several synonyms. Although the different colour varieties of *flavicollis* have been described in detail by several authors, i.e. Smith (1874), Vachal (1899b) and Enderlein (1903), the complete range of the variation in the colour and structure of this species has not been comprehensively described. I have therefore redescribed *X. flavicollis* in detail.

DESCRIPTION

Length: head 4,0-5,0 mm; scutum 4,0-5,0 mm; body length 13,0-16,0 mm; fore wing 13,0-15,0 mm.

Female. Colour (Fig. 72 and 73): pubescence of face below lateral ocelli and gena white, black or with a mixture of white and black hairs; vertex always black; mesosomal dorsum with posterior region of scutum and entire scutellum either bright yellow or white; remainder of mesosoma, entire metasoma and legs black. Fore and hind wings strongly and entirely infuscated with a faint blue of purple metallic lustre in certain plays of light.

Head: frontal view: summit of vertex weakly

elevated above eyes, less than twice ocellar diameter above upper eye margins; alveolorbital and interalveolar distances subequal; region of parocular area adjacent to supra-antennal area and supraclypeus strongly inflexed; supra-antennal area weakly carinate; apex of frontal line either level with supraclypeus or raised slightly above supraclypeus; clypeus either flat or slightly concave, raised a little above parocular area, its dorsolateral margins gently rounding into inflexed parocular area; unlike most of the other species the median clypeal length is a little shorter than the clypeocellar distance; dorsal view: integument just below lateral ocelli slightly incurved; interocellar distance either about as long as or a little shorter than ocellorbital distance; profile: vertex and gena narrower than median eye width; mandible bidentate; upper mandibular margin notched, without a distinct tubercle; lower mandibular margin straight, without a large tooth (cf. Fig. 19). Mesosoma: parapsidal lines are unique in that they curve slightly inwards anteriorly; scutellum acutely divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface (similar to that in *caffra*, Fig. 24); wing venation similar to that in *scioensis* (Fig. 21); legs: apex of basitibial plate rounded, in about middle of hind tibia; propodeal triangle absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *caffra* (Fig. 24). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface, the subvertical surface with a relatively small orifice that opens into an invaginated mite chamber; tergum VI devoid of pygidial spines near base of pygidial plate.

Male. Colour (Fig. 74): pubescence of vertex and dorsal region of gena bright yellow; face pale yellow becoming very pale yellow, almost white near the ventral margin; gena mostly very pale yellow or white; mesosomal dorsum bright yellow, except for the anterior, lateral and posterior margins which contain a mixture of yellow and brown or black hairs (this region appears dark yellow when viewed without magnification); metanotum and propodeum very pale yellow or white; dorsal region of mesosomal pleura concolorous with lateral regions of mesosomal dorsum; ventral regions of mesosomal pleura and the entire mesosomal venter white, pale yellow, black or with a mixture of yellow and black hairs; legs: outer surfaces of fore tibia and tarsus either yellow or ferruginous-yellow and outer surfaces of middle and hind tibiae partly yellow and partly black, remainder of fore, middle and hind legs black; metasomal terga mostly yellow and metasomal sterna mostly black. Facial markings (Fig. 13): ventral clypeal margin either yellow or partly yellow and partly black; antennal scape completely black; mandible usually completely black, occasionally with a little yellow near base of mandible.

Head: frontal view (Fig. 13): summit of vertex weakly elevated above eyes, about an ocellar diameter above upper eye margins; upper and lower interorbital distances subequal; alveolorbital and interalveolar distances subequal; region of parocular area adjacent to supra-antennal area and supraclypeus gently inflexed; supra-antennal area slightly

carinate; apex of frontal line usually about level with supraclipeus; clypeus mostly flat, raised a little above adjacent parocular area, its dorsolateral margins gently rounded; dorsal view: integument just below lateral ocelli slightly incurved; interocular distance distinctly greater than ocellorbital distance; profile: malar space much shorter than flagellar segment II, almost non-existent at its narrowest point; labrum gently convex, non-tuberculate; mandible bidentate; upper mandibular margin gently incurved, non-tuberculate. Mesosoma: parapsidal lines are peculiar in this species in that they curve slightly inwards anteriorly; metanotum angulately divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface (similar to that in *caffra*, Fig. 35); propodeum flat and declivous; wing venation similar to that in *scioensis* (Fig. 21); legs: basitarsi of all legs more or less similar in length, tarsal segments II-V of all legs more or less similar in length and width; trochanter, femur and tibia of hind leg non-tuberculate; distal end of hind tibia with inner posterior region strongly swollen (hind leg similar to that in *caffra*, Fig. 46); basitibial plate on proximal one half of hind tibia. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *caffra* (Fig. 35). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface; tergum VII with a very small mediolongitudinal carina; genitalia with parameral and digital lobes as illustrated (Fig. 59).

COLOUR VARIATION

The variation in the colour of the facial and scutellar pubescence in the female of *X. flavicollis* is weakly correlated with the geographical distribution of this species. The face is mainly white in specimens from Zimbabwe, Mozambique, the Transvaal, northern Natal and South West Africa/Namibia. In specimens from southern Natal, the Transkei and the eastern Cape Province the face and genae are generally clothed with a mixture of white and black hairs and in specimens from the southern and the south-eastern Cape Province, the head is completely black. On the other hand, the scutellar pubescence is always bright yellow in specimens from the southern and eastern Cape Province, the Transkei, Natal and Mozambique. In specimens from the Transvaal, Zimbabwe and South West Africa/Namibia the scutellar pubescence is usually white and occasionally bright yellow.

The male of *flavicollis* does not show any definite pattern of colour variation. I have a specimen from Lake Sibaya that is very unusual in that the mesosomal dorsum is ferruginous and not bright yellow.

DISTRIBUTION (FIG. 82)

Xylocopa flavicollis has been recorded from numerous localities in southern Africa, most of which are in the eastern and southern regions of the subcontinent. This species has also been recorded from a few localities in Botswana and South West

Africa/Namibia and further collecting is needed in order to determine the complete distribution of *X. flavicollis*.

REMARKS

The mites *Dinogamasus productus* and *Dinogamasus oudemansi* were described by LeVeque (1930) from the metasomal mite pouch of this species.

MATERIAL EXAMINED

♀ holotype of *X. flavicollis*, no original labels, holotype label attached by P. D. Hurd, in RMS (No 449 81); ♂ holotype of *X. citronella*, no original labels, holotype label attached by P. D. Hurd, in RMS (No 448 81); ♂ holotype of *X. sulphurea*, no labels, in MIZS; ♀ syntype of *X. stuhlmanni* var. *albicincta*, "Nyassa-See, Langenburg, II.98, S. G. Fülleborn", plus the original "type" label, in PAS (12/45).

167♀ and 42♂ with the following data: MOZAMBIQUE: Macaneta, 26.III.1980, H. R. Feijen, 1♀ in SC; Catuane, 5.V.1980, H. R. Feijen, 1♀ in SC; Rikatla Delagoa "(Junod)", no date or collector, "*X. stuhlmanni*" det. H. Friese 1913, 1♀ in TM; Inhaca Island, Delagoa Bay, IX.1965, H. E. Patterson, 1♀. ZIMBABWE: Zambezi-Chewore rivers confluence, 3 and 7.IX.1964, feeding on *Combretum* sp. flowers, 3♀; Rekomitjie Research Station, 4.XI.1973 and 7-8.IV.1974, R. J. Phelps, "*X. stuhlmanni*" det. R. H. Watmough, 1♀ 1♂; Victoria Falls, XII.1938, no collector, "National Museum S. Rhodesia", 1♂ in SAM; same locality, II.1935, no collector, "Rhod. Museum", 1♂ in SAM; Sabi Valley, II.1939, no collector, "Nat. Museum S. Rhodesia", 1♀ 1♂ in SAM; same data plus, "*X. stuhlmanni* var. *albicincta*" det. G. Arnold, 1♀; Buhwa foothills, Belingwe, 1.V.1973, "Nat. Museum S. Rhodesia", 1♀ in SAM; Lower Sabi, 19-21.IX.1965, 1♀ (AcX 3203); Zimbabwe Ruins, 5.IV.1970, feeding on *Cassia* sp. flowers, 1♀; Lundi River, near Rhino Hotel, 10.VII.1971, feeding on *Sesbania bispinosa* flowers, 1♀; same locality, XII.1972, 1♀; Matopo National Park, near wardens office, 4.VI.1964, feeding on blue *Salvia* sp. flowers, 4♀; Matopo, 4.V.1924, no collector, "Rhodesia Museum", 1♀ in SAM; Matopo Hills, 21.IX.1924, R. S. Stevenson, 1♀ in TM. SOUTH AFRICA: TRANSVAAL: the following 3 localities are in the Kruger National Park: Pafuri, 22.27S 31.17E, I.1979, L. Braack, 1♀ (AcX 3007); same locality, 2.I.1966, H. Braack, 1♀ 1♂ (B 372, 373) in KNP; Crocodile Bridge, 20.V.1969, M. W. Strydom, 1♂ (AcX 3204); Malelane, 30.V.1969, L. C. Starke, 1♀ (AcX 3205); Mariepskop, 2.XI.1971, T. Bouwer, 2♀ (AcX 2968); Strydom Tunnel, 19.II.1969, M. W. Strydom, 1♀ (AcX 3206); same data, except, L. C. Starke, 1♀ (AcX 3207); Komatipoort, 23.V.1969, M. W. Strydom, 2♀ (AcX 3208); Strydom Motel, 17-19.IV.1973, A. Prinsloo & T. Bouwer, 1♀; Wolkberg, 29.VIII-1.IX.1969 and 5.IX.1976, 4♀; Sekororo, 10.X.1971, 1♀ (AcX 3209); Barberton, III.1979, C. D. Eardley, 2♀; NATAL: Lake Sibaya, E. shore, 27.22S 32.43E, 18-20.I.1981, C. D. Eardley, 36♀ 9♂ (AcX 3202,

3279); Ndumu Game Reserve, I.1978, G. L. Prinsloo, 1♀; Cape Vidal, 28.10S 32.32E, 29.V.1976, 12♀ 4♂; same locality, 13.I.1981, R. G. Oberprieler, 1♂; same data, except C. D. Eardley, 5♀ 2♂ (AcX 3210); Ingwavuma, I.1978, G. L. Prinsloo, 4♀; 14 km S.E. of Ingwavuma, 2732AA, 21.II.1979, J. G. Londt, 1♀; Mbaswane, IV.1977, G. L. Prinsloo, 1♂; Kwaliweni Forest, 2731BB, 21.II.1979, J. G. Londt, 1♂; Mtunzini, 14.II.1972, A. Prinsloo, 1♂; Tongaat, "08-9", H. C. Burnup, 2♀; Durban, Brighton Beach, 28.XII.1968, 1♀; Durban, I.1916 and an unspecified date in 1916, no collector, "*X. divisa*" det. Durban Museum, 2♀ (AcX 3211); Durban, Stella Bush, II.1915, H. W. Bell-Marley, 1♀; Illovo River, 24.III.1916, "*X. stuhlmanni*" det. "Imp. Buro. Ent." 1916, 1♀ (AcX 3312); Umhlanga Rocks, 11.VIII.1955, no collector, "Nat. Museum S. Rhodesia", 1♀ in SAM; Valley of a Thousand Hills, 27.IX.1964, feeding on *Petrea* sp. flowers, 1♀; Pietermaritzburg, II.1977, C. D. Eardley, 1♀; Pietermaritzburg, Otto's Bluff, 28.XI.1979, J. G. Londt, 1♂; CAPE PROVINCE: Grahamstown, several dates, A. Urban, 24♀ 1♂; Grahamstown, 17.III.1969, M. W. Strydom, 1♀ (AcX 3213); Grahamstown, I.1979, G. L. Prinsloo, 1♀; Grahamstown, Albany district, 13.III.1955, H. D. Brown, 1♀; Grahamstown, Dassie Krantz, 3326BC, 5.XI.1978, R. Miller & J. G. Londt, 1♀ 1♂ (AcX 3027); Baviaanskloof, III.1979, G.L. Prinsloo, 1♀; Port Elizabeth, II.1945, G. A. Hepburn, ex nest in *Oleander* sp., "*X. stuhlmanni*" det. G. Nixon 1946, 4♀ 2♂ (AcX 3214); same locality, 19.III.1950, no collector, "Nat. Museum S. Rhodesia", 1♀ in SAM; Algoa Bay, 25.XII.1895, H. Brauns, 1♀ in TM; Uitenhage, IX.1950, "Nat. Museum S. Rhodesia", 1♂ in SAM; Plettenberg Bay, I.1979, C. D. Eardley, ex nest in *Pinus* sp., 12♀ 6♂ (AcX 2909, 2910); Hankey, I.1979, C. D. Eardley, ex nest in *Jacaranda* sp., 5♀ 3♂ (AcX 2908); George, I.1979, C. D. Eardley, 1♀; Knysna, I.1979, C. D. Eardley, 2♀ 1♂. TRANSKEI: Port St. Johns, X.1916, H. H. Swinny, 1♂ in TM. SOUTH WEST AFRICA/NAMIBIA: Popa Falls, 18.07S 21.33E, Kavango, 26-31.VIII.1971, no collector, 2♀ (H 3802) in SM; Andara, 1821AB, Kavango, 20-25.VIII.1971, no collector, 2♀ (H 3473) in SM; Brandberg, 19.VII.1976, 1♀. Unless otherwise stated all material was collected by R. H. Watmough.

***Xylocopa inconstans* Smith, Fig. 14, 26, 37, 47, 60.**

Xylocopa inconstans Smith, 1874: 264; Vachal, 1899b: 146, 152-153; Cockerell, 1908: 34 (*Mesotrichia*); LeVeque, 1928: 21; Hurd & Moure, 1963: 247, 306.

Xylocopa inconstans var. *flavescens* Vachal, 1899b: 146, Friese, 1909: 253.

Mesotrichia flavescens (Vachal): Cockerell, 1908: 34; LeVeque, 1928: 21. *syn. nov.*

Smith (1874) described *X. inconstans* in its current genus, from an unknown locality in South Africa and from Lake Ngami in Botswana. In 1908 Cockerell transferred this species to the genus *Mesotrichia*. According to Horn & Kahle (1936) Smith's material is housed in the BMNH and the

HEC. The BMNH has two paralectotypes of *X. inconstans*, one from each of the type-localities. However, neither of these two museums has a lectotype of *inconstans* and I have no record of a publication in which a lectotype was designated. It therefore appears that the two paralectotypes are incorrectly labelled and that they comprise the whole of the type-series. I have studied the paralectotypes and the original description of *inconstans* and I am confident of the identity of this species.

Although Smith (1874) described *inconstans* from a specimen in which the cross-bands (one on the posterior region of the mesosomal dorsum and one on the anterior region of the metasomal dorsum) are white, he mentioned that he had seen specimens in which the cross-bands are bright yellow. Vachal (1899b) later described the yellow cross-banded variety as *X. inconstans* var. *flavescens* from two females that were collected at an unspecified locality in Senegal and in 1908 Cockerell referred to *flavescens* as a distinct species in the genus *Mesotrichia*. Although *flavescens* has not been recorded from southern Africa, I have examined a few specimens of *inconstans* from this region that have pale yellow cross-bands, one of which (AcX 2931-1) was reared from a nest that contained four white cross-banded specimens. I have also examined one of the syntypes of *flavescens* (in MNHN) and several bright yellow cross-banded specimens from various localities in Africa and I am confident that *flavescens* is a colour variety of *inconstans*. Although the syntype which I studied has a lectotype label, I have no record of a publication in which a lectotype of *X. inconstans* var. *flavescens* was designated. Hurd & Moure (1963) described the subgenus *Xenoxylcopa* for *inconstans* and its close relatives.

Although the colour of the female of *X. inconstans* and *X. caffra* is quite similar, *inconstans* can be easily recognised by the following characters: mesosomal pleura either white or yellow; head capsule relatively large, almost as wide as mesosoma; and without a metasomal mite chamber; the male of *inconstans* resembles the males of both the *X. caffra* group (in colour) and *X. nigrita* (in colour and structure). However, the male of *inconstans* can be easily recognised by the following combination of characters: integument of propodeum ferruginous-yellow; integument of metasomal terga black; metasomal terga II-IV with small black (non-pubescent) area near the dorsolateral margins; and shape of scutellum, metanotum, propodeum and metasomal tergum I (Fig. 37).

Although the colour of *X. inconstans*, which is a reliable diagnostic character of this species, has been described in detail by Smith (1874) and Vachal (1899b), the structure of *inconstans* has not been dealt with in detail. I have therefore provided a comprehensive description of *X. inconstans*.

DESCRIPTION

Length: head 6,0-8,0 mm; scutum 4,0-6,0 mm; body length 18,0-23,0 mm; fore wing 19,0-23,0 mm.

Female. Colour: pubescence of head black; mesosoma with scutellum, metanotum and mesepis-

ternum either white or yellow; metasoma with dorsal surface of tergum I concolorous with white or yellow region of mesosoma; remainder of mesosoma and metasoma black; legs completely black (similar to those in *caffra* in dorsal view, Fig. 66, 67). Fore and hind wings strongly and entirely infuscated with virtually no metallic lustre.

Head: frontal view: summit of vertex strongly elevated above eyes, more than four times ocellar diameter above upper eye margins, and strongly convex; vertex and upper region of gena almost impubescent (structure of vertex is peculiar to this species); inner eye margins very gently incurved, almost straight; position of alveoli is unique in that they are a little closer to lower margin of median ocellus than to upper clypeal margin; alveolar distance a little greater than interalveolar distance; region of parocular area adjacent to supra-antennal area and supraclypeus gently inflexed; supra-antennal area either gently rounded or slightly carinate; apex of frontal line about level with supraclypeus; clypeus flat, raised a little above adjacent parocular area, its dorsolateral margins gently rounded; median clypeal length comparatively shorter than in the other southern African species, less than one half as long as its lower (maximum) width; dorsal view: integument just below lateral ocelli gently incurved; interocellar distance about one half as long as ocellar distance; profile: vertex and gena subequal to median eye width; mandible (similar to that in *caffra*, Fig. 19) bidentate; upper mandibular margin notched, with a distinct tubercle when viewed from a dorsolateral position; lower mandibular margin straight, without a large tooth. Mesosoma: dorsolateral region of pronotum differs from most of the other species in that it has a strong ridge that runs obliquely from the anterolateral margin to the posterolateral margin; scutellum angulately divided into a horizontal (anterior) and a subvertical, flat (posterior) surface (Fig. 26); wing venation similar to that in *scioensis* (Fig. 21); legs: lateral region of fore coxa is unique in that it is curved strongly backwards; apex of basitibial plate broadly rounded, sometimes gently emarginate, on proximal one half of hind tibia; propodeal triangle absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 26). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface, the subvertical surface devoid of a central orifice and an invaginated mite chamber; tergum VI with two pygidial spines near base of pygidial plate, upper surface of pygidial spines gently rounded.

Male: Colour: pubescence of head and dorsal surface of mesosoma and metasoma mostly pale yellow; ventral surface of mesosoma and metasoma either pale yellow or ferruginous-yellow; all femora with a little sparse brown pubescence; outer surfaces of tibiae and tarsi of all legs either yellow or ferruginous; inner surfaces of all legs either black or brown; anal fringe mostly ferruginous. Facial markings (Fig. 14): ventrolateral and mediolongitudinal regions of clypeus, ventral margin of supraclypeus, supra-antennal area, interocellar area and regions of vertex near inner eye margins usually

yellow; frontal surface of antennal scape yellow; mandible with distal one half black and proximal one half mostly yellow. Integument mostly black, except propodeum and proximal regions of metasomal terga and sterna which are ferruginous-yellow, a character which is peculiar to only a few species (ferruginous-yellow regions of terga and sterna generally only visible by dissection).

Head: frontal view (Fig. 14): summit of vertex weakly elevated above eyes, about an ocellar diameter above upper eye margins; upper and lower interorbital distances subequal; alveolar distance distinctly greater than interalveolar distance; region of parocular area adjacent to supra-antennal area, supraclypeus and dorsal region of clypeus gently inflexed; supra-antennal area gently rounded; apex of frontal line level with supraclypeus; clypeus flat, distinctly raised above adjacent parocular area, its dorsolateral margins gently rounded; dorsal view: integument just below lateral ocelli gently incurved; interocellar and ocellar distances subequal; profile: malar space much shorter than second flagellar segment, almost non-existent at its narrowest point; labrum distinctly convex, with a small median tubercle; mandible bidentate, upper mandibular margin gently incurved, non-tuberculate. Mesosoma: metanotum gently curved; propodeum gently curved and declivous (Fig. 37); wing venation similar to that in *scioensis* (Fig. 21); legs: basitarsi of all legs more or less similar in length; tarsal segments II-V of all legs more or less similar in length and width; trochanter, femur and tibia of hind leg non-tuberculate; distal end of hind tibia with inner posterior region strongly swollen (hind leg as illustrated, Fig. 47); basitibial plate on proximal one half of hind tibia. Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 37). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface; tergum VII with distal margin deeply and unevenly concave; sternum VI with a small distinct mediolongitudinal keel; genitalia with parameral and digital lobes as illustrated (Fig. 60).

COLOUR VARIATION

In the female the pubescence of the scutellum, metanotum, mesosomal pleurae and the dorsal surface of the first metasomal tergite is usually white and occasionally pale yellow. Although specimens in which the mesosomal and metasomal cross-bands (similar to those in *caffra*, Fig. 67) and the mesepisternum are bright yellow have been recorded from Africa north of the Cunene and Zambezi rivers, bright yellow cross-banded specimens have not been recorded from southern Africa.

DISTRIBUTION (FIG. 83)

Xylocopa inconstans appears to occur mainly in the north-western and north-eastern regions of the subcontinent. A few specimens have also been collected in the central region of southern Africa and further collecting is needed in order to ascertain the complete distribution of this species.

MATERIAL EXAMINED

2♀ syntypes of *X. inconstans*, one each from "S. Africa, 63 79" and "Lake Ngami, 60 86", both specimens with recent paralectotype labels, in BMNH; 1♀ syntype of *X. inconstans* var. *flavescens*, "Seneg. ?, Museum Paris Senegal, Coll. O. Sichel 1867", plus a ? original det. label and a recent lectotype label, in MNHN.

105♀ and 38♂ with the following data: ZIMBABWE: near Zambezi-Chewore rivers confluence, 7.IX.1964, feeding on *Combretum* sp. flowers, 2♀; Rekomitjie Research Station, 17.IX.1973, R. J. Phelps, det. R. H. Watmough, 1♀; Victoria Falls, Kenmaur, 29.V.1964, feeding on *Bougainvillea* sp. flowers, 1♀; Wankie National Park, Main Camp, "Nov. - Feb. 1970", Herbert, "Nat. Museum S. Rhodesia", 1♀ in SAM; Leopard Rock, Vumba, 23-27. VIII.1965, 5♀; same data plus two det. labels, one each by G. Nixon 1968 and M. A. Lieftinck 1968, 1♀ (AcX 3193); Salisbury, several dates, 5♀ 7♂; Salisbury, Avondale, several dates, 5♀ 4♂ (AcX 3195); same locality, 28.VII.1964, ex nest in *Jacaranda* sp., 1♂; same locality, 17.XII.1965, two det. labels one each by G. Nixon 1968 and M. A. Lieftinck 1968, 1♀ (AcX 3196); same locality, 7.IX.1969 and 5.X.1969, E. Kadjakumanja, 2♀ (AcX 3197); Bulawayo, 7.XII.1922, no collector, "Rhodesia Museum", 1♂ in SAM; Chipinga, V.1926, no collector, "Rhodesia Museum", 1♂ in SAM; Umzingwane River, Henderson's Ranch, 10.VI.1964, 1♂ (AcX 3246); Gwelo, 27.XI.1959, J. Loveridge, 1♀; Beit Bridge, 28.IV.1968, feeding on *Tecoma* sp. flowers, 2♀; Lundi River, near Rhino Hotel, 13.VII.1969, 1♀; same locality, 12.VI.1970 and 10.VI.1971, feeding on *Sesbania bispinosa* flowers, 7♀; same locality, 14.VII.1969, feeding on flowers of legume, 2♀; same locality, 13.VII.1969, feeding on *Petunia* sp. flowers, 1♀; same locality, 14.VII.1969, feeding on *Lathyrus* sp. flowers, 1♀. SOUTH AFRICA: TRANSVAAL: the following three localities are in the Kruger National Park: Nyandu 2231CB, 10.I.1966, H. Braack, 1♀ (B 312) in KNP; Pretoriuskop, 2531AB, 14.II.1968, L. Robertson, 1♀ 1♂ (F 174, 175) in KNP; Skukuza, 2431DC, 24.X.1966, L. Braack, 1♂ (C 334) in KNP; Mara, several dates, 20♀ 4♂; Bethesda, 13.V.1966, 1♀ 1♂; same data plus, ex nest in *Melia azedarach*, 1♀; Langjan Nature Reserve, 22.52S 29.14E, 10-20.I.-1980, C. D. Eardley, 1♀ (AcX 2979); Wolkberg, 29.VIII-1.IX.1969, 1♀; Letaba Citrus Estates, 17.VIII.1966, feeding on *Bauhinia purpurea* flowers, 1♂; Olifants River, about 1,5 km above confluence with Blyde River, 6-8.VII.1968, feeding on *Grewia* sp. flowers on river bank, 1♀; Barberton, III.1979, C. D. Eardley, 5♀ 1♂ (AcX 2931); Komati-poort, 27.V.1969, L. C. Starke, 2♀ (AcX 3198); Komati-poort, 23.V.1969, M. W. Strydom, 1♀ (AcX 3199); Potgietersrus, 11.VII.1970, 1♂; Marikana district, Rustenburg, 24.III.1968, W. Treadwell, 1♂; Marble Hall, 23.I.1955, F. W. Kirby, 1♂. CAPE PROVINCE: Groblershoop, 10.X.1975, C. G. Moolman, 2♀ 2♂. SOUTH WEST AFRICA/NAMIBIA: Spitzkoppe, near Usakos, 16 and 17.VII.1976, ex nest in *Commiphora* sp., 5♀ 3♂ (AcX 3200); Brandberg,

20.VII.1976, ex nest in *Aloe littoralis*, 3♂ (AcX 3201); Ruacana Falls, 1714AC, Owambo, 26-27. VIII.1973, no collector, 12♀ (H 14017) in SM; Palmwag, 1913DD, Damaraland, 10-12.VI.1976, S. Louw, 1♀ (H 32776) in SM; Andara, 1821AB, Kavango, 20-25.VIII.1971, no collector, 2♀ (H 3474) in SM; Bethel, 22.35S 15.55E, Karibib, 2-4.I.1975, no collector, 2♀ 1♂ (H 28881) in SM; Djab, Windhoek, 2217CC, 1.IX.1962, no collector, 2♀ (H 2641) in SM; Okaukuejo, 1915BB, 13.X.1961, no collector, 1♀ (H 2643) in SM; Ohopoho, 1813BB, 3.V.1961, no collector, 1♀ (H 2642) in SM; Gobabeb, 2315DA, Walvisbaai, 26.X.1968, no collector, 1♀ (H 4376) in SM; Otjikotoberg, 1917AB, Tsumeb, 8-13.VII.1974, no collector, 1♀ (H 20193) in SM; Ondorusu Falls, 1713BD, Kaokoland, 23-26.VIII.1973, no collector, 1♀ (H 13873) in SM; Okahandja, IV.1966, "Gaerdes coll.", 1♂ (H 24747) in SM; Okerfontein Goas, 1816DC, Etosha, 13.III.1973, no collector, 1♂ (H 12625) in SM. Unless otherwise stated all material was collected by R. H. Watmough.

Xylocopa nigrita (Fabricius), Fig. 15, 27, 38, 48, 61, 75, 76

Apis nigrita Fabricius, 1775: 379; 1804: 340 (*Xylocopa*); Gribodo, 1894b: 272 (*Koptortosoma*); Vachal, 1899b: 111-112, 150-151 (*Xylocopa*); Cockerell, 1917: 461; 1930: 298, 302 (*Mesotrichia*); LeVeque, 1928: 3, 8, 14-15; 1930: 3, 6-8 (*Mesotrichia*); Hurd & Moure, 1963: 264-267, 311 (*Xylocopa*).

Xylocopa conjuncta Smith, 1854: 350; Dalla Torre, 1896: 215; Friese, 1909: 240; LeVeque, 1930: 3, 7-8; 1932: 111 (*Mesotrichia*).

Mesotrichia obscurior LeVeque, 1933: 163-164; Hurd & Moure, 1963: 267, 311 (*Xylocopa*). *syn. nov.*

Mesotrichia perobscura LeVeque, 1933: 162-163; Hurd & Moure, 1963: 267, 313 (*Xylocopa*). *syn. nov.*

Mesotrichia perobscura var. *nigripars* LeVeque, 1933: 163; Hurd & Moure, 1963: 267, 311 (*Xylocopa*). *syn. nov.*

Xylocopa nigrita was originally described in the genus *Apis* by Fabricius (1775) from a female specimen that was collected at an unspecified locality in Sierra Leone. In 1804 Fabricius transferred *nigrita* to its current genus. This species was later placed in the genus *Koptortosoma* by Gribodo (1894b) and in 1917 Cockerell referred to *nigrita* in the genus *Mesotrichia*. In 1963 Hurd & Moure described the subgenus *Afroxycopa*, in the genus *Xylocopa*, of which *nigrita* is the type-species. I have examined the holotype of *nigrita* (in Banks collection, BMNH) and I am confident of the identity of this species.

Smith (1854) described *X. conjuncta*, in its current genus, from a male specimen and he recorded the type-locality as "South Africa". *X. conjuncta* was synonymised with *X. nigrita* by Dalla Torre (1896) and in 1930 LeVeque placed *conjuncta* in the genus *Mesotrichia*. I was unable to locate the

holotype of *conjuncta* in the BMNH, where it was originally deposited (Smith, 1854), and I therefore determined this species from the original description. Although Smith's (1854) description of *conjuncta* is brief, the colour and size of *conjuncta* resembles only one southern African species, namely *X. nigrita*.

LeVeque (1933) described *X. obscurior*, *X. perobscura* and *X. perobscura* var. *nigripars* from Port Natal (in Natal), Delagoa Bay (in Mozambique) and Kaffraria (in Cape Province), respectively. These two species and the variety were originally described in the genus *Mesotrichia* and they were transferred to the genus *Xylocopa* by Hurd & Moure (1963). The most important difference between *nigrita*, *obscurior*, *perobscura* and *perobscura* var. *nigripars* is in the amount of white pubescence on their heads, fore legs, mesosomal pleurae and the metasomal terga II-V, and they can be easily recognised from the original descriptions. I have only seen the holotype of *perobscura* var. *nigripars* (in NRS); the holotypes of *obscurior* and *perobscura* are in the MHU. The examination of numerous specimens of *nigrita* from several localities in Africa (in MNHN, IRSN, MRAC) has clearly indicated that the characters used by LeVeque (1933) to separate *obscurior*, *perobscura* and *perobscura* var. *nigripars* from *nigrita* are actually intraspecific colour differences. I therefore synonymise these two species and the variety with *X. nigrita*. When LeVeque (1933) described *perobscura* as intermediate between *nigrita* and "*obscura*" she was obviously referring to *obscurior* (*X. obscura* Lepeletier is a Neotropical species that is not dealt with in this revision).

The female of *X. nigrita* can be easily recognised by its colour and although the male of *nigrita* superficially resembles the male of *inconstans*, these two species can be readily separated by the colour of the integument of the metasoma and the structure of the metanotum and the propodeum.

Xylocopa nigrita has not been thoroughly described. The most useful descriptions, which deal mainly with colour, are the descriptions of both sexes by Vachal (1899b) and the descriptions of the females of *obscurior*, *perobscura* and *perobscura* var. *nigripars* by LeVeque (1933). I have therefore redescribed this species in detail.

DESCRIPTION

Length: head 6,0-8,0 mm; scutum 6,0-8,0 mm; body length 24,0-28,0 mm; fore wing 24,0-27,0 mm.

Female. Colour (Fig. 75): pubescence of face below lateral ocelli, mesosomal pleura and lateral and dorsolateral regions of metasomal terga II-V white; gena, mesosomal venter and outer surfaces of fore tibia and tarsus completely black, completely white or with a mixture of black and white hairs; remainder of head, mesosoma and metasoma black; fore femur and middle and hind legs completely black. Fore and hind wings strongly and entirely infuscated, with a very faint green or mauve metallic lustre in certain plays of light.

Head: frontal view: summit of vertex strongly elevated above eyes, about four times ocellar

diameter above upper eye margins; alveolorbital distance a little greater than interalveolar distance; region of parocular area adjacent to supra-antennal area, supraclypeus and dorsal region of clypeus strongly inflexed; supra-antennal area weakly carinate; apex of frontal line about level with supraclypeus; structure of the clypeus is unusual in that the dorsal and lateral margins are strongly and distinctly raised; dorsal view: integument just below lateral ocelli gently incurved; interocellar distance about one half as long as ocellorobital distance; profile: vertex and gena subequal to median eye width; mandible bidentate, upper mandibular margin notched, without a distinct tubercle; lower mandibular margin straight, without a large tooth (cf. Fig. 19). Mesosoma: scutellum angulately divided into a horizontal (anterior) and a subvertical, weakly concave (posterior) surface (Fig. 27); wing venation similar to that in *scioensis* (Fig. 21); legs: apex of basitibial plate broadly rounded, gently emarginate or bifurcate, on distal one half of hind tibia; propodeal triangle absent. Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 27). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface, the subvertical surface with a relatively large triangular orifice that opens into an invaginated mite chamber; tergum VI devoid of pygidial spines near base of pygidial plate.

Male. Colour (Fig. 76): pubescence on head pale yellow; dorsal surfaces of mesosoma and metasoma either pale yellow or ferruginous-yellow; remainder of mesosoma, metasoma and the legs mostly pale yellow, middle and hind tarsi sometimes ferruginous-yellow. Facial markings (Fig. 15): clypeus, supraclypeus, supra-antennal area and region of vertex near inner eye margins mostly yellow; frontal surface of antennal scape and proximal region of labrum yellow; mandible with distal part black and proximal region mostly yellow. Integument unusual in that the propodeum and distal regions of the metasomal terga and sterna are mostly ferruginous-yellow.

Head: frontal view (Fig. 15): summit of vertex weakly elevated above eyes, about twice ocellar diameter above upper eye margins; upper and lower interorbital distances subequal; alveolorbital distance a little greater than interalveolar distance; region of parocular area adjacent to supra-antennal area, supraclypeus and dorsal region of clypeus strongly inflexed; supra-antennal area slightly carinate; apex of frontal line slightly raised above supraclypeus; clypeus flat, distinctly raised above adjacent parocular area, its dorsolateral margins gently rounded; dorsal view: integument just below lateral ocelli gently incurved; interocellar distance a little shorter than ocellorobital distance; profile: malar space much shorter than flagellar segment II, almost non-existent at its narrowest point; labrum weakly tuberculate; mandible bidentate, upper mandibular margin gently incurved, non-tuberculate. Mesosoma: metanotum gently curved; propodeum slightly curved and declivous (Fig. 38); wing venation similar to that in *scioensis* (Fig. 21); legs: basitarsi of all legs more or less similar in length; tarsal segments II-V of all legs more or less

similar in length and width; trochanter and tibia of hind leg non-tuberculate; hind femur with a small spine near proximal end of ventral surface; distal end of hind tibia with ventral posterior region strongly swollen (hind leg as illustrated, Fig. 48); basitibial plate on proximal one half of hind tibia. Profile of scutellum, metanotum, propodeum and metasomal tergum I as illustrated (Fig. 38). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface; tergum VII with distal margin deeply and unevenly concave; sternum VI with a small distinct mediolongitudinal keel; genitalia with parameral and digital lobes as illustrated (Fig. 61).

COLOUR VARIATION

The colour of the female of *X. nigrita* varies mainly in the amount of white pubescence that occurs on the genae and the metasomal terga II-V. The extent of the white pubescence in these areas decreases progressively from the north-eastern region of southern Africa, where the genae are completely white and a relatively broad area of the dorsolateral regions of the metasoma is clothed with white pubescence, to southern Natal and the Transkei where the genae are mostly black (occasionally completely black) and only the lateral surfaces of the metasoma are clothed with white pubescence.

DISTRIBUTION (FIG. 83).

Xylocopa nigrita, which is apparently widespread in central and west Africa, has been recorded in southern Africa from Lake Ngami in northern Botswana and several localities in Mozambique, the eastern highlands of Zimbabwe, the eastern Transvaal and the coastal regions of Natal and the Transkei.

REMARKS

LeVeque (1930, 1933) recorded the mite species *Dinogamasus crassipes* Kramer from the metasomal mite pouch of *X. nigrita*.

The African species that are most closely related to *X. nigrita* are *X. asaccula* and *X. oudemansi*, both of which were described by LeVeque (1933) in the genus *Mesotrichia*. I have examined the holotypes of both *asaccula* (in BMNH) and *oudemansi* (in MRAC). *X. asaccula* is definitely a distinct species that differs from *nigrita* in that it does not have a metasomal mite chamber. *X. oudemansi* resembles *nigrita* in both colour and structure and I am of the opinion that *oudemansi* and *nigrita* are synonymous.

MATERIAL EXAMINED

♀ holotype of *X. nigrita*, "Sierra Leone, 63 47", in Banks collection, BMNH; ♀ holotype of *X. perobscura* var. *nigripars*, "Kaffraria, J. Wahlberg, pouch empty N. LeVeque", plus the original "type" label, in NRS (No. 297 81).

47♀ and 7♂ with the following data: MOZAMBIQUE: Gorongosa Mountains, 18.IV.1971, H. Aschenborn, 1♀; Chimanimani

Mountains, Top of Nhauti, 1 808 m, 14.IV.1968, 1♀; 40 km E. of Vila Pery, 19.IV.1971, G. B. Bornmissza, 1♀; Inhambane, I.1924, R. F. Lawrence, 1♂ in SAM; Dondo, 4.II.1924, R. H. R. Stevenson, 1♂ in SAM; Lourenço Marques (now known as Maputo), no date or collector, det. H. Friese 1911, 1♂ in SAM. ZIMBABWE: Vumba National Park, 23-27.VIII.1965, 31♀ 3♂ (AcX 2965); same data plus, det. M.A. Lieftinck 1968, 2♀; Chirinda Forest, 20.X.1947, no collector, "Nat. Museum S. Rhodesia", det. ? H. Brauns, 1♀ in SAM; same locality, XII.1935, no collector, "Rhod. Museum", 1♀ in SAM. SOUTH AFRICA: TRANSVAAL: Swadene, 24.32S 30.48E, 16.IV.1982, R. G. Oberprieler, 1♀; NATAL: Mbaswane, 8.V.1976, H. D. Brown 1♀; Lake Sibaya, E. shore, 27.22S 32.43E, 18-20.I.1981, C. D. Eardley, 1♀; 14 km SE of Ingwavuma, 2732AA, 21.II.1979, J. G. Londt, 1♀ (AcX 2952); Dukuduku Forest Reserve, XII.1969, T. W. Drinkwater, 1♀; Durban, no date, J. H. Bowker, "*X. cloti*" det. ? A. J. Hesse, 1♂ (165) in SAM; Durban, Stella Bush, II.1915, H. W. Bell-Marley, "*X. cloti*, between *cloti* & *nigrita*" det. ? A. J. Hesse, 1♀ (223) in SAM; Umhlali, no date, Barnard, "*X. cloti*, probably only a variety of *nigrita*" det. ? A. J. Hesse, 1♀ in SAM; Umhlatuzi, XI.1918, H. W. Bell-Marley, 1♀ in SAM. TRANSKEI: near Nboyti, 30.XII.1980, 1♂. Unless otherwise stated all material was collected by R. H. Watmough.

Xylocopa varipes Smith

Xylocopa varipes Smith, 1854: 351; 1874: 258; Dalla Torre, 1896: 204; Vachal, 1899b: 111; Enderlein, 1903: 50, 58-59; Friese, 1909: 235-236; Maidl, 1912: 276; LeVeque, 1928: 4, 11-12, 21 (*Mesotrichia*); Hurd & Moure, 1963: 275-279, 318.

Smith (1854) described *X. varipes* from "South Africa (Fernando Po)" and an unspecified locality in Sierra Leone. But Fernando Poo (this is the correct spelling for the above locality) is a small island just off the west African coast, which is today known as Macias Nguema, and not a locality in South Africa. Smith (1854) placed the type-series of *varipes* in the BMNH and this museum has a specimen of this species in its type collection that has west Africa written on the label. This specimen is probably one of the syntypes of *varipes*. *X. varipes* was described in its current genus and in 1928 LeVeque placed this species in the genus *Mesotrichia*. Hurd & Moure (1963) described the subgenus *Oxyxylocopa* of which *varipes* is the type-species. There has been some controversy over the association of the sexes of *X. varipes* (see Smith, 1874; Dalla Torre, 1896; Vachal 1899b; Enderlein, 1903; Friese, 1909; Maidl, 1912; LeVeque, 1928) and I am unable to associate the sexes of this species with confidence.

Xylocopa varipes is well known from west Africa. This species was recorded from southern Africa by Friese (1909) from a female that was collected at Dumisa in southern Natal and I have examined a female of *varipes* (in RNH) that has "Cape, Gribodo Provn. C. sp." written on its labels.

This species is otherwise unknown from southern Africa.

My interpretation of *X. varipes* is based on the original description, the description by Vachal (1899b) and the examination of one of the syntypes (in BMNH) of this species. As *varipes* is known to occur in southern Africa from a single distribution record and as I am unsure of the identity of the male I have only described the diagnostic features of the female of this species.

DESCRIPTION OF FEMALE

Length: head 6,0 mm; scutum 5,0 mm; body length 20,0 mm; fore wing 22,0 mm.

Colour: pubescence of head, mesosomal dorsum, mesosomal pleura, dorsal surface of metasomal tergum I, lateral margins of metasomal terga V and VI, anal fringe and outer surface of fore leg, middle tibia and tarsus, and hind tibia pale brown; mesosomal venter, inner surface of fore leg and middle tarsus dark reddish-brown; remainder of metasoma and legs black. Wings moderately and entirely infuscated with a faint purple, mauve or blue metallic lustre in certain plays of light.

Head: frontal view: supra-antennal area gently rounded; apex of frontal line about level with supraclypeus, clypeus with the dorsal and lateral margins and the mediolongitudinal region strongly and distinctly raised; dorsal view: integument just below lateral ocelli slightly incurved. Mesosoma: scutellum angulately divided into a horizontal (anterior) and a subvertical, strongly concave (posterior) surface; wing venation similar to that in *scioensis* (Fig. 21); legs: apex of basitibial plate broadly rounded, gently emarginate or bifurcate, on distal one half of hind tibia. Profile of scutellum, metanotum, propodeum and metasomal tergum I similar to that in *X. scioensis* (Fig. 25). Metasoma: tergum I angulately divided into a subvertical (anterior) and a horizontal (posterior) surface, the subvertical surface without a central orifice and metasomal mite chamber; tergum VI devoid of pygidial spines near base of pygidial plate.

MATERIAL EXAMINED

♀ syntype of *X. varipes*, "W. Africa, B. M. Type Hym. 17B 118", plus the original "type" label, in BMNH.

2♀ with the following data: SOUTH AFRICA: "Cape, Gribodo Provn. C. Sp.", in RNH; and country unknown, Cape Loper, III.1892, H. Brauns, "*Xylocopa africana*" det. F. Kohl, in TM.

Xylocopa imitator Smith

Xylocopa imitator Smith, 1854: 351-352; 1874: 266; Vachal, 1899b: 149-150; Maidl, 1912: 277; LeVeque, 1928: 3, 14; 1930: 15, 17 (*Mesotrichia*); Hurd & Moure, 1963: 274, 306.

In 1854 Smith described *X. imitator* in its current genus from a female that was collected in Sierra Leone. The precise type-locality was not given. In 1928 LeVeque transferred this species to the genus *Mesotrichia*. I have examined the holotype

of *imitator* (in BMNH) and I am confident of the identity of this species. Although *imitator* is well-known from central, west and east Africa, it is known to occur in southern Africa from a single female that Maidl (1912) recorded from Port Natal, Natal.

Vachal (1899b) suggests that the male of *imitator* could have been described as *Xylocopa obscurata* Smith, whereas Enderlein (1903) stated that the latter species could, in fact, be the male of *X. varipes* (*X. obscurata* has not been recorded from southern Africa and has therefore not been dealt with in this revision). I, however, have a female and a male of *imitator* sent to me by Dr G. Anzenberger of the University of Zurich in Zurich, Switzerland, who worked on the ethology of this species. From this material it is clear that the male of *imitator* was described by Enderlein (1903) as *Xylocopa lepeletieri*, which is quite different from the male that was described as *X. obscurata*. Although I have not seen the type-material of *lepeletieri* (in MHU and ? PAS), Enderlein (1903) provided a detailed description of the male and I have studied a male of *lepeletieri* that was determined by Maidl (in TM). Enderlein (1903), however, described *lepeletieri* from a type-series in which the sexes were incorrectly associated. As I have not seen the type-series of *lepeletieri*, I am unable to designate a lectotype of this species and I am unable to synonymise *imitator* and *lepeletieri*.

As the occurrence of *imitator* in southern Africa is known from a single distribution record, I have only provided a brief description of this species in which I have referred to the closely related *X. flavicollis*.

DESCRIPTION

Length: head 4,0-5,5 mm; scutum 4,5-5,5 mm; body length 18,0-21,0 mm; fore wing 18,0-21,0 mm.

Female. Similar to *X. flavicollis*, except as follows: colour: completely black with the exception of the head which is clothed with white pubescence.

Head: frontal view: median clypeal length and clypeoocellar distances subequal.

Male. Colour generally resembling that in *X. flavicollis*; for a detailed colour description refer to the original description in *X. lepeletieri* (Enderlein, 1903).

Head, mesosoma and metasoma similar to those in *X. flavicollis*, except as follows: head: dorsal view: interocellar and ocellorobital distances subequal. Mesosoma: basitibial plate either near middle or on proximal one half of hind tibia. Metasoma: tergum VII with distal margin strongly and angulately concave.

REMARKS

LeVeque (1930) described the mite species *Dinogamasus heteraspis* from the metasomal mite pouch of *X. imitator*.

MATERIAL EXAMINED

♀ holotype of *X. imitator*, "38.11.8.248, no mites found by N. LeVeque on 11.I.1932, B. M.

Type Hym. 17B 119" plus the original "type" label, in BMNH.

5♀ and 3♂ with the following data: GABON: precise locality not given, 19.III.1892, H. Brauns, det. F. Kohl, 1♀ in TM. EQUATORIAL GUI-NEA: Bata, 18.III.1892, H. Brauns, det. F. Kohl, 1♀ in TM; country unknown, "Insel Eloby", 23.III.1892, H. Brauns, 1♀ in TM; country unknown, Chama, 1.VIII.1892, H. Brauns, "X. lepeletieri" det. F. Maidl, 1♂ in TM; country unknown, Loango, 6.VII.1892, H. Brauns, det. F. Kohl, 1♀ in TM. ANGOLA: Teixeira de Sousa, II.1965, C. A. Green, 1♂. TANZANIA: Rubondo Island in Lake Victoria, 900 m above sea level, no date, G. Anzenberger, 1♀ 1♂.

SPECIES OF UNCERTAIN IDENTITY AND OF DOUBTFUL DISTRIBUTION

Xylocopa capensis Spinola

Xylocopa capensis Spinola, 1838: 519 (nec *X. capensis* Lepeletier); Hurd & Moure, 1963: 273, 299; Lieftinck, 1964: 144; Moreno & Moreno, 1980: 149.

Xylocopa capensis was described by Spinola (1838) from the Cape Province. This species is the senior homonym of *X. capensis* Lepeletier. Spinola (1838) described only the male of *capensis* and although he did not indicate the number of specimens in his type-series, the MIZS has two male specimens of *capensis* Spinola which appear to comprise the type-series. I have examined one of these syntypes, but *capensis* belongs to the *X. caffra* group and as I am unable to separate the males of the species that comprise this species-group, I am unable to deal conclusively with this species.

Xylocopa leucothoracoides Maidl

Xylocopa leucothoracoides Maidl, 1912: 283-284; Strand, 1915: 65; LeVeque, 1928: 3, 20 (*Mesotrichia*); Hurd & Moure, 1963: 274, 308.

Maidl (1912) described *X. leucothoracoides* from Dar es Salaam in Tanzania. Although Maidl clearly stated that this species was described from a single male holotype which is housed in the NHW, this museum has two syntypes, one of which has a lectotype label. This label was attached to the syntype by Dr P. D. Hurd who did not publish this lectotype designation. *X. leucothoracoides* was placed in the genus *Mesotrichia* by LeVeque (1928) and this species is known from southern Africa from one specimen which Strand (1915) recorded from Zululand in Natal. I have examined the two syntypes of *leucothoracoides* and this species clearly belongs to the *X. caffra* group. As I am unable to separate the males of the species that comprise this species-group, I cannot comment any further on the identity of *leucothoracoides*.

Xylocopa luteola Lepeletier

Xylocopa luteola Lepeletier, 1841: 198; Vachal,

1899b: 154, 160; Maidl, 1912: 281; Cockerell, 1917: 461-462; 1932b: 558; 1936: 25 (*Mesotrichia*); Hurd & Moure, 1963: 274, 309.

Xylocopa luteola was described by Lepeletier (1841) from "Nubie", which I presume is the Nubia district in Sudan. This species was later recorded from the Cape Province by Vachal (1899b), Maidl (1912) and Cockerell (1932b, 1936). I have not been able to locate the holotype of *X. luteola*, which was placed in Dejean's collection and should therefore be in the MIZS (Horn & Kahle, 1935). As I am unable to recognise *luteola* from the original description, this species has not been comprehensively dealt with in this revision.

Xylocopa carinata var. *fulvopilosa* Friese

Xylocopa carinata var. *fulvopilosa* Friese, 1909: 230; 1922: 7; Cockerell, 1916: 189; Hurd, 1959: 142; Hurd & Moure, 1963: 223, 305.

In 1909 Friese allegedly described *X. carinata* var. *fulvopilosa* from two male specimens, one each from Cameroon and Togo; the precise localities were not recorded. In 1922 Friese again described *X. carinata* var. *fulvopilosa* as new, from two females and a male that were collected at Bipindi and an unspecified locality in Cameroon. Friese (1909, 1922) was undoubtedly dealing with the same variety in these two descriptions and in 1959 Hurd synonymised these two varieties. In 1916 Cockerell recorded *X. carinata* var. *fulvopilosa* from Stella Bush in Durban, Natal. I have not seen the type-series of *fulvopilosa* (in MHU) and I am therefore unable to deal conclusively with the status of this variety. I have, however, studied the brief original description of *X. carinata* var. *fulvopilosa*, and I believe that the variety *fulvopilosa* is actually a colour variety of *hottentotta*.

Xylocopa tarsata var. *namutonensis* Strand

Xylocopa tarsata var. *namutonensis* Strand, 1911: 142; Hurd & Moure, 1963: 223, 310.

Xylocopa tarsata var. *namutonensis* was described by Strand (1911) from a female collected at Namutoni Autjo in South West Africa/Namibia. Strand (1911) separated *namutonensis* from the true form of *X. tarsata* (now known as *X. hottentotta*) by the colour of the setation on the hind tarsi, which is pale yellow and not reddish as in the true form of this species. I have not seen the holotype of *X. tarsata* var. *namutonensis* (in MHU) and I am uncertain about the identity of this variety; it is probably a colour variant of either *X. hottentotta* or *X. lugubris*, two very closely related species.

Xylocopa obscuritarsis Friese

Xylocopa obscuritarsis Friese, 1922: 4-5; Hurd & Moure, 1963: 230, 312.

Friese (1922) described *X. obscuritarsis* from a female collected at Algoa Bay in the Cape Province and a male that was taken at Ondonga in South West

Africa/Namibia. *X. obscuritarsis* is only known from the type-series (in MHU), which I have not been able to examine. As I cannot recognise this species from the brief original description, I have not been able to deal with *obscuritarsis* in any further detail.

Xylocopa obscuritarsis was placed by Hurd & Moure (1963) in the subgenus *Apoxylocopa*, of which *X. lugubris* is the type-species.

Xylocopa pilosa Friese

Xylocopa pilosa Friese, 1922: 6; Hurd & Moure, 1963: 226, 313.

Xylocopa pilosa was described by Friese (1922) from two male specimens; one was taken at Salisbury in Zimbabwe and the other from an unspecified locality in Malawi. I have not seen the type-series of *X. pilosa* (in MHU) and as I am unable to recognise *pilosa* from the original description, I have not dealt with this species in any detail.

Hurd & Moure (1963) suggested that *X. pilosa* should be placed in the subgenus *Epixylocopa* of which the type-species is *X. rufitarsis*.

Xylocopa suspiciosa Vachal

Xylocopa suspiciosa Vachal, 1899b: 156; Friese, 1909: 250-251; Maidl, 1912: 284; Cockerell, 1917: 461-462; 1932b: 557; 1933b: 681 (*Mesotrichia*); Hurd & Moure, 1963: 275, 316.

Xylocopa suspiciosa was described by Vachal (1899b) from two males that were allegedly collected at Delagoa Bay in Mozambique. The types were later examined by Maidl (1912) who gave the type-locality as Algoa Bay, which is in the Cape Province. One of these two authors obviously recorded the type-locality incorrectly and as the type-series of *suspiciosa* is not in the NHW, where it was originally deposited, I am unable to correct the error. There has been some controversy over the exact status of *X. suspiciosa*. Vachal (1899b) suggested, in the original description of *suspiciosa*, that this species could be the male of *X. somalica*. Friese (1909), however, referred to *suspiciosa* as a synonym of *flavobicincta* and Cockerell (1917, 1932b, 1933b) regarded *suspiciosa* as a valid species. As I am unable to recognise *X. suspiciosa* from the original description, I cannot deal conclusively with this species.

Xylocopa africana (Fabricius)

Apis Africana Fabricius, 1781: 477; 1804: 346 (*Bombus*); Lepeletier, 1841: 198-199 (*Xylocopa*); Gribodo, 1894b: 272 (*Koptortosoma*); LeVeque, 1928: 2, 8, 11-12 (*Mesotrichia*); Cockerell, 1930: 298, 302 (*Mesotrichia*); Moreno & Moreno, 1980: 148 (*Xylocopa*); Hurd & Moure, 1963: 273, 296 (*Xylocopa*).

Fabricius (1781) described *X. africana* in the genus *Apis* and in 1804 he transferred this species to the genus *Bombus*. In 1841 Lepeletier placed

africana in its current genus, *Xylocopa*. This species was later transferred to the genus *Koptortosoma* by Gribodo (1894b) and in 1928 LeVeque referred to *africana* in the genus *Mesotrichia*. I have studied the holotype of *X. africana* (in Bank's collection, BMNH) and I am confident of the identity of this species.

The only record of *X. africana* from southern Africa is by Moreno & Moreno (1980) who stated that there is one specimen of this species [a photograph of which is given in Moreno & Moreno (1980)] in Spinola's collection from the Cape of Good Hope. As this species is otherwise unknown from southern Africa, I regard this distribution record as doubtful.

Xylocopa cloti Vachal

Xylocopa cloti Vachal, 1898: 98; 1899b: 111-112, 151; Enderlein, 1903: 59; LeVeque, 1928: 2, 15; 1930: 12, 14 (*Mesotrichia*); Cockerell, 1930: 304 (*Mesotrichia*).

Vachal (1898) described *X. cloti* in its current genus from a male collected in Egypt and this species was transferred to the genus *Mesotrichia* by LeVeque in 1928. *X. cloti* was recorded from Natal by Vachal (1899b) and LeVeque (1928), and from Kaffraria by Enderlein (1903). I have not examined any of the specimens that were recorded from southern Africa. I have, however, studied the holotype of *X. cloti* (in MNHN) and this species is definitely not conspecific with any of the southern African xylocopids known to me. As the male of *X. cloti* closely resembles the male of *X. nigrita*, it appears as if the distribution records of *X. cloti* from southern Africa have resulted from the misidentification of *X. nigrita* as *X. cloti*.

Xylocopa oblonga Smith

Xylocopa oblonga Smith, 1874: 256; Vachal, 1899b: 95, 101; Maidl, 1912: 269; Hurd & Moure, 1963: 239, 311; Maa, 1970: 750.
Xylocopa oblongata Smith (!): Friese, 1909: 227 (emendation *pro X. oblonga*).

Xylocopa oblonga was allegedly described from the Cape of Good Hope by Smith in 1874 from a male and a female. This species was subsequently synonymised with *X. capensis* Lepeletier (now known as *X. capitata*) by Friese in 1909. But the male and female syntypes of *oblonga* (in BMNH) belong to two different species, neither of which are otherwise known to occur in the Cape Province. Maa (1970), who dealt adequately with this species, designated the male syntype as the lectotype of *X. oblonga*. I have studied the lectotype and this species is otherwise unknown to me, I therefore believe that the distribution record of *oblonga* from southern Africa is incorrect.

Xylocopa fervens Lepeletier

Xylocopa fervens Lepeletier, 1841: 196; Smith, 1874: 293; Hurd & Moure, 1963: 251, 304.

Although Lepeletier (1841) described *X. fervens* from Cayenne in French Guiana, South America, he noted that the type-specimen is probably from the Cape of Good Hope. Smith (1874) agreed with Lepeletier and suggested that the specimen on which the description of *X. fervens* was based is a variety of the South African species, *X. flavorufa*. I have not seen the holotype of *fervens* and I therefore cannot comment on the identity of this species.

Xylocopa fenestrata (Fabricius)

Apis fenestrata Fabricius, 1798: 273; 1804: 339 (*Xylocopa*); Ma, 1938: 285-288 (*Xylocopa*); Maa, 1970: 731-735 (*Xylocopa*).

Maa (1970) who has dealt with *X. fenestrata* in detail recorded *X. fenestrata fenestrata* from the Oriental and Palaearctic regions and *X. fenestrata mauritii* from Mauritius and Madagascar. However, the TM has a specimen of *X. fenestrata* which was identified by Dr T. C. Maa, of Tunghai University, Taichung, Taiwan, that has "Willowmore, Sept. 1912, Dr Brauns" written on the label. As this species is otherwise unknown from southern Africa, I am of the opinion that this specimen is incorrectly labelled and that *X. fenestrata* does not occur in the subcontinent.

Lastly, I have examined five male specimens (in RNH) of an unknown species, that were allegedly collected in the Cape Province. These specimens each contain two determination labels which read *X. olivacea* Spinola and *X. caffra*, respectively. *X. olivacea* is an Oriental species and these five specimens do not belong to *X. caffra* or any other southern African species known to me. I am therefore of the opinion that this material is incorrectly labelled and that it was not collected in the Cape Province.

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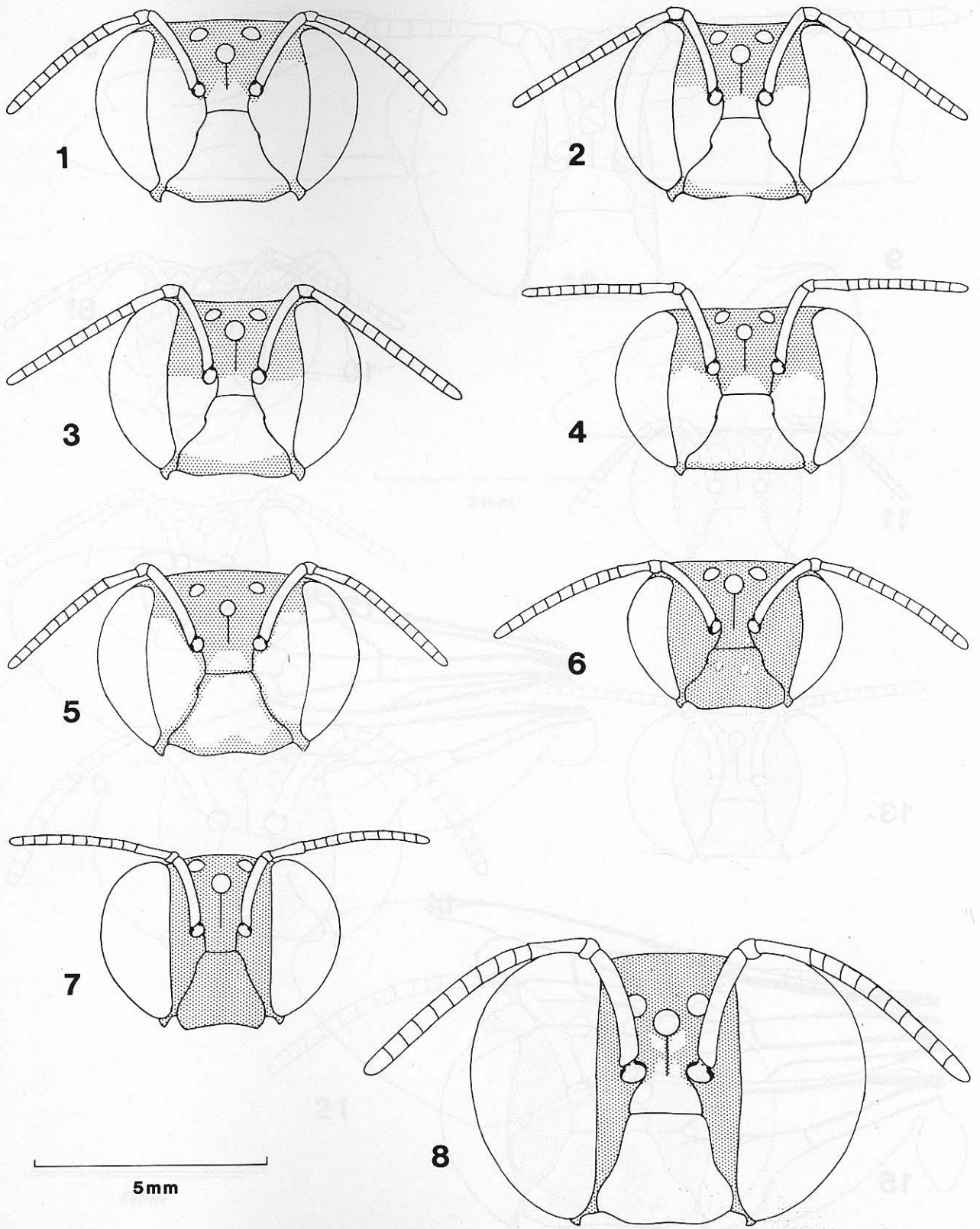


FIG. 1 - 8. *Xylocopa* spp., head of male, frontal view (stippled = black; non-stippled = yellow). 1. *X. albifrons*. 2 & 3. *X. hottentotta*. 4. *X. io*. 5. *X. capitata*. 6. *X. sicheli*. 7. *X. rufitarsis*. 8. *X. flavorufa*

FIG. 1 - 8. *Xylocopa* spp., kop van mannetjie, vooraansig (gestippelde areas = swart; ongestippel = geel). 1. *X. albifrons*. 2 & 3. *X. hottentotta*. 4. *X. io*. 5. *X. capitata*. 6. *X. sicheli*. 7. *X. rufitarsis*. 8. *X. flavorufa*

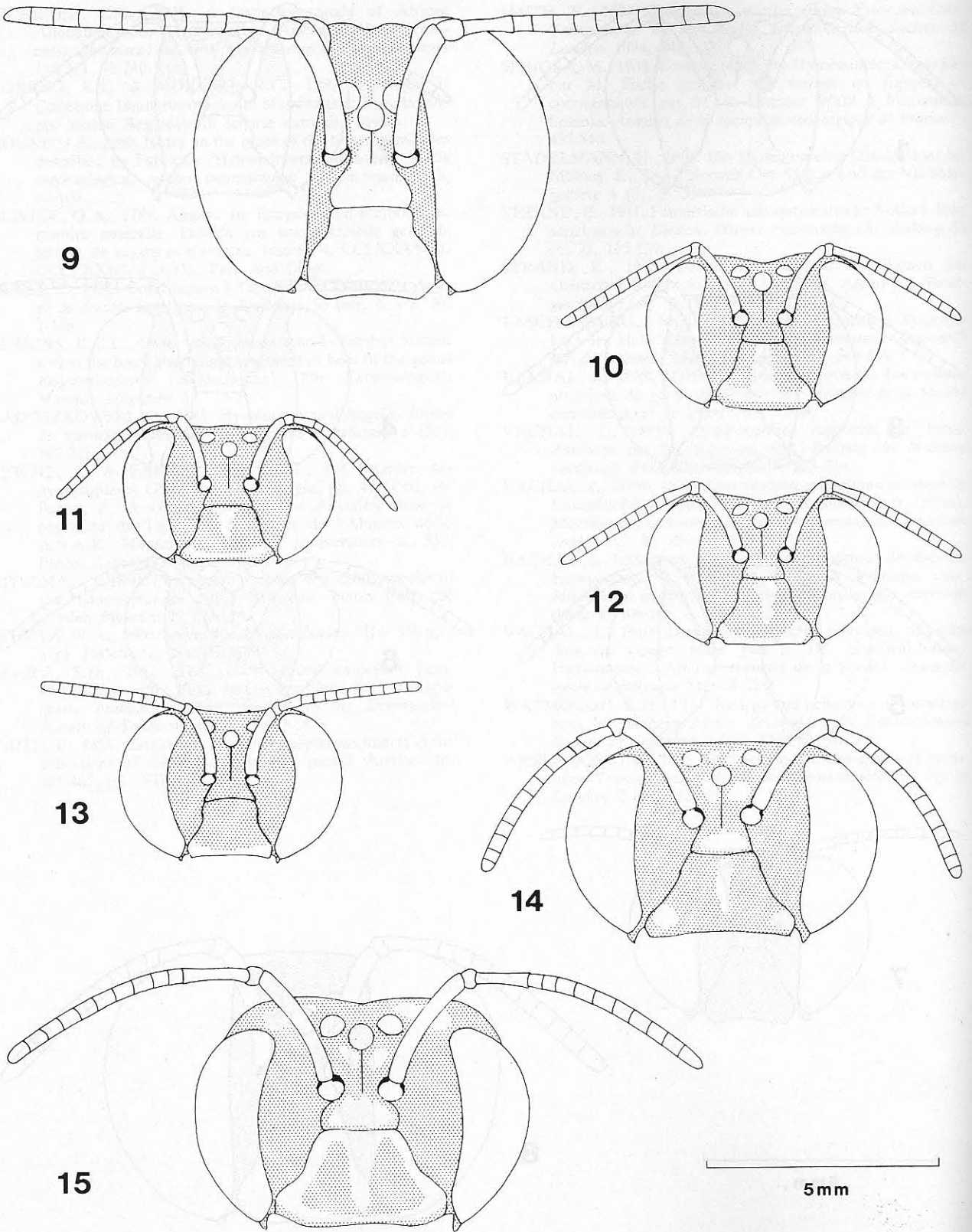


FIG. 9 - 15. *Xylocopa* spp., head of male, frontal view (stippled = black; non-stippled = yellow). 9. *X. torrida*. 10. *X. caffra*. 11. *X. scioensis*. 12. *X. isabelleae*. 13. *X. flavicollis*. 14. *X. inconstans*. 15. *X. nigrita*

FIG. 9 - 15. *Xylocopa* spp., kop van mannetjie, vooraansig (gestippelde areas = swart; ongestippel = geel), 9. *X. torrida*, 10. *X. caffra*. 11. *X. scioensis*. 12. *X. isabelleae*. 13. *X. flavicollis*. 14. *X. inconstans*. 15. *X. nigrita*

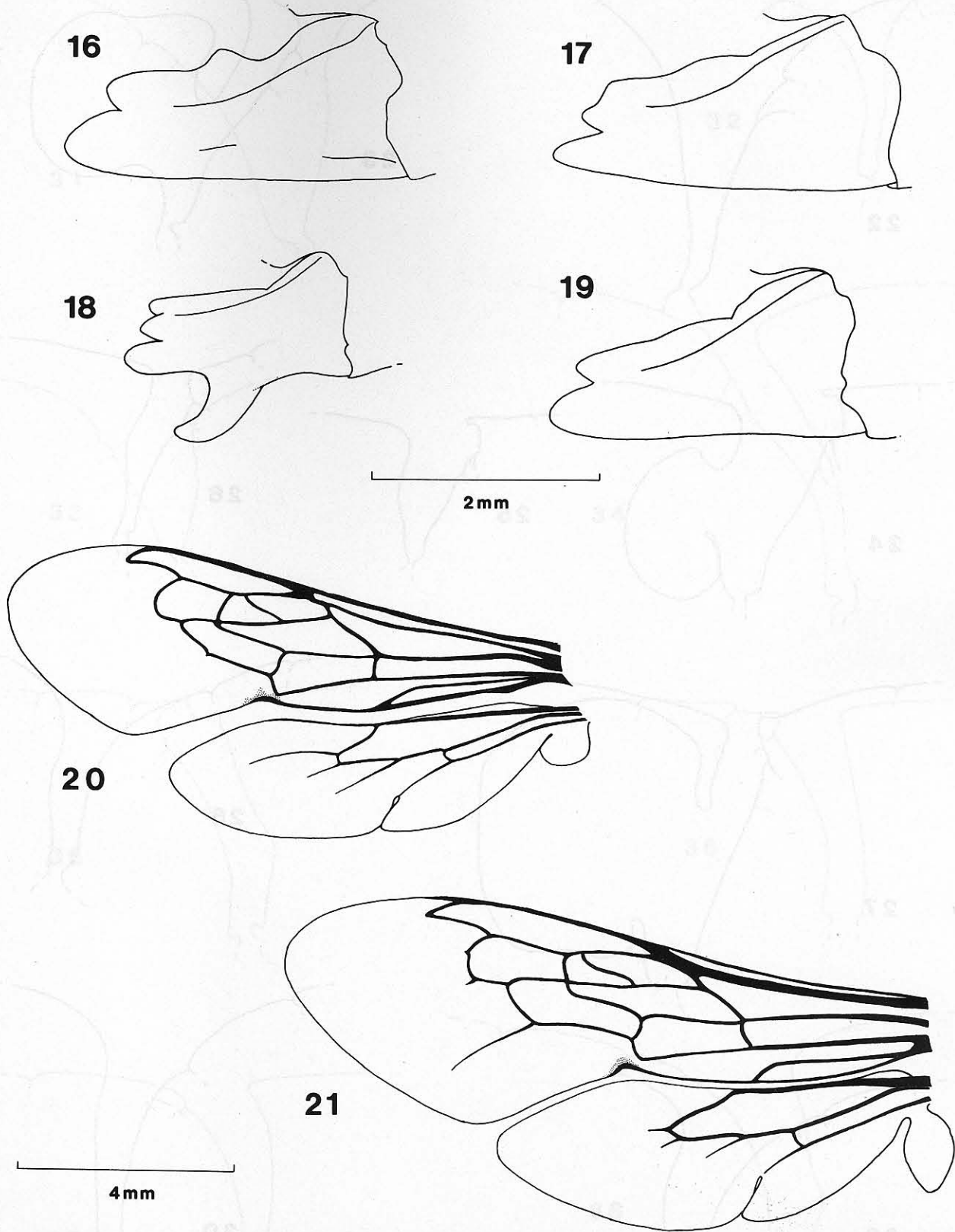


FIG. 16 - 21. *Xylocopa* spp.. Fig. 16 - 19. Mandibles of female. 16. *X. erythrina*. 17. *X. capitata*. 18. *X. sicheli*. 19. *X. caffra*. Fig. 20 - 21. Fore and hind wings of female. 20. *X. sicheli*. 21. *X. scioensis*

FIG. 16 - 21. *Xylocopa* spp.. Fig. 16 - 19. Mandibel van wyfie. 16. *X. erythrina*. 17. *X. capitata*. 18. *X. sicheli*. 19. *X. caffra*. Fig. 20 - 21. Voor- en agtervlerk van wyfie. 20. *X. sicheli*. 21. *X. scioensis*

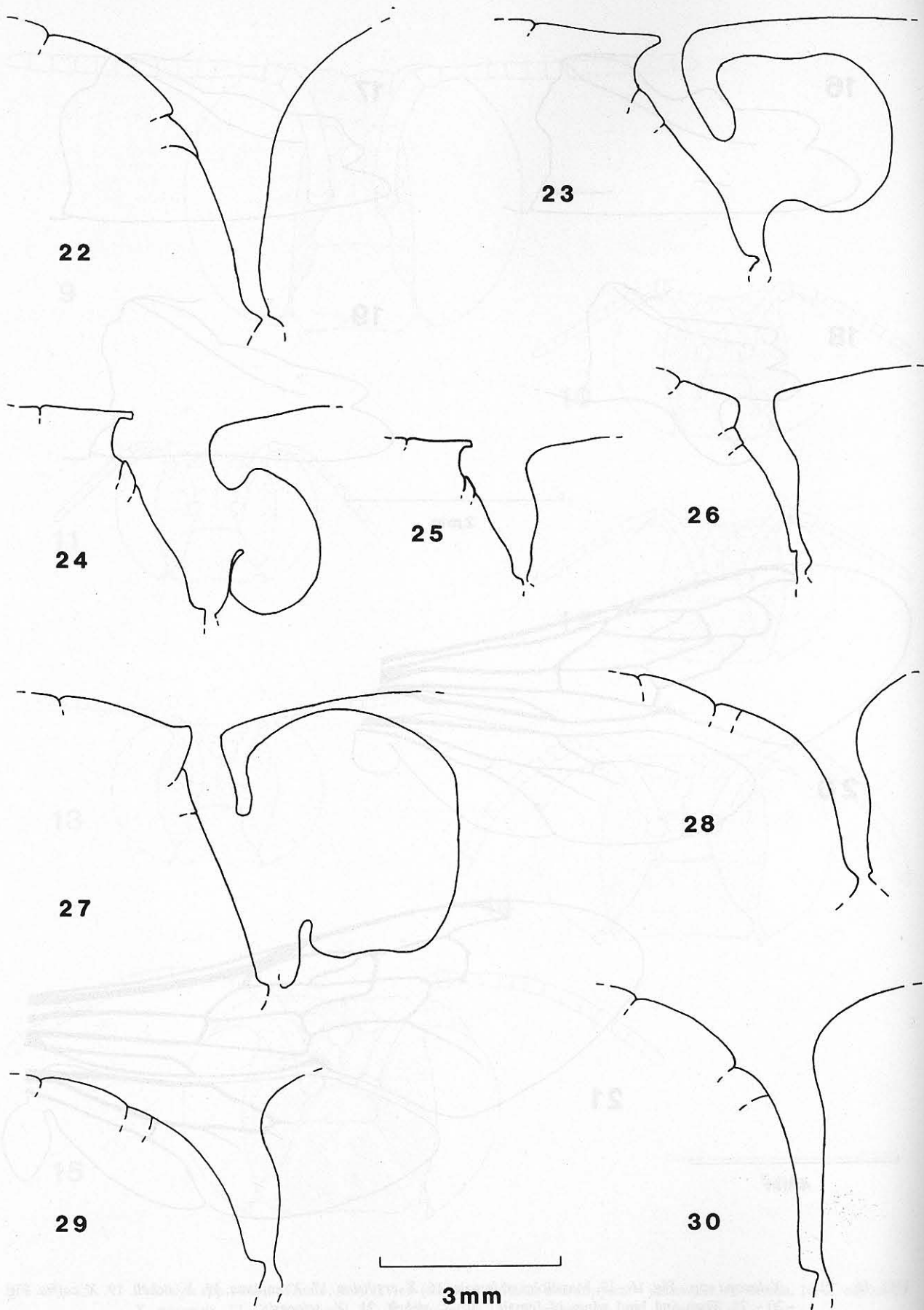


FIG. 22 - 30. *Xylocopa* spp., profile of scutellum, metanotum, propodeum and metasomal tergum I. 22. *X. capitata* ♀. 23. *X. flavorufa* ♀. 24. *X. caffra* ♀. 25. *X. scioensis* ♀. 26. *X. inconstans* ♀. 27. *X. nigrita* ♀. 28. *X. albifrons* ♂. 29. *X. hottentotta* ♂. 30. *X. erythrina* ♂

FIG. 22 - 30. *Xylocopa* spp., profil van scutellum, metanotum, propodeum en metasomale tergum I. 22. *X. capitata* ♀. 23. *X. flavorufa* ♀. 24. *X. caffra* ♀. 25. *X. scioensis* ♀. 26. *X. inconstans* ♀. 27. *X. nigrita* ♀. 28. *X. albifrons* ♂. 29. *X. hottentotta* ♂. 30. *X. erythrina* ♂

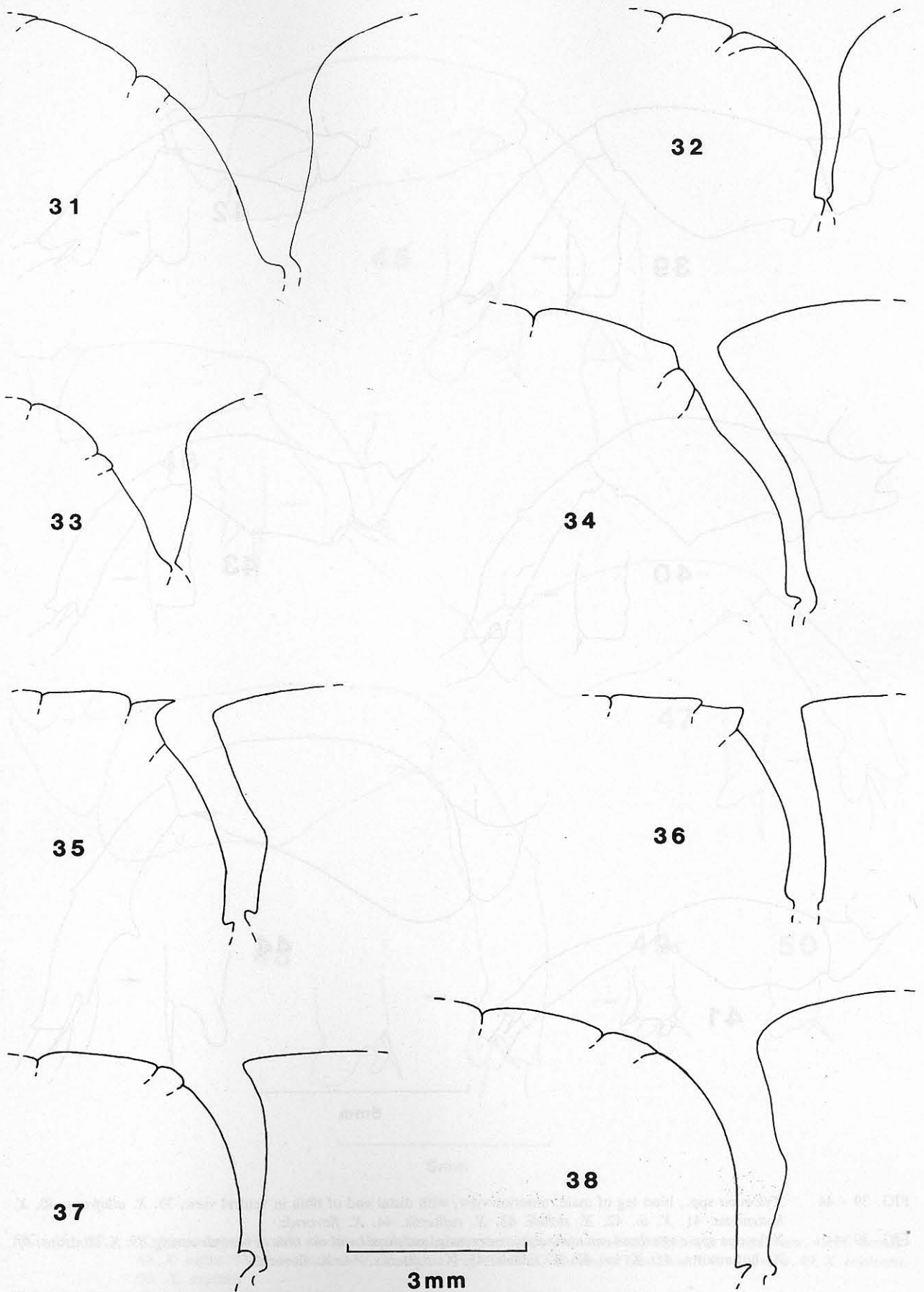


FIG. 31 - 38. *Xylocopa* spp., profile of scutellum, metanotum, propodeum and metasomal tergum I. 31. *X. capitata* ♂. 32. *X. sicheli* ♂. 33. *X. rufitarsis* ♂. 34. *X. flavorufa* ♂. 35. *X. caffra* ♂. 36. *X. watmoughi* ♂. 37. *X. inconstans* ♂. 38. *X. nigrita* ♂

FIG. 31 - 38. *Xylocopa* spp., profiel van scutellum, metanotum, propodeum en metasomale tergum I. 31. *X. capitata* ♂. 32. *X. sicheli* ♂. 33. *X. rufitarsis* ♂. 34. *X. flavorufa* ♂. 35. *X. caffra* ♂. 36. *X. watmoughi* ♂. 37. *X. inconstans* ♂. 38. *X. nigrita* ♂

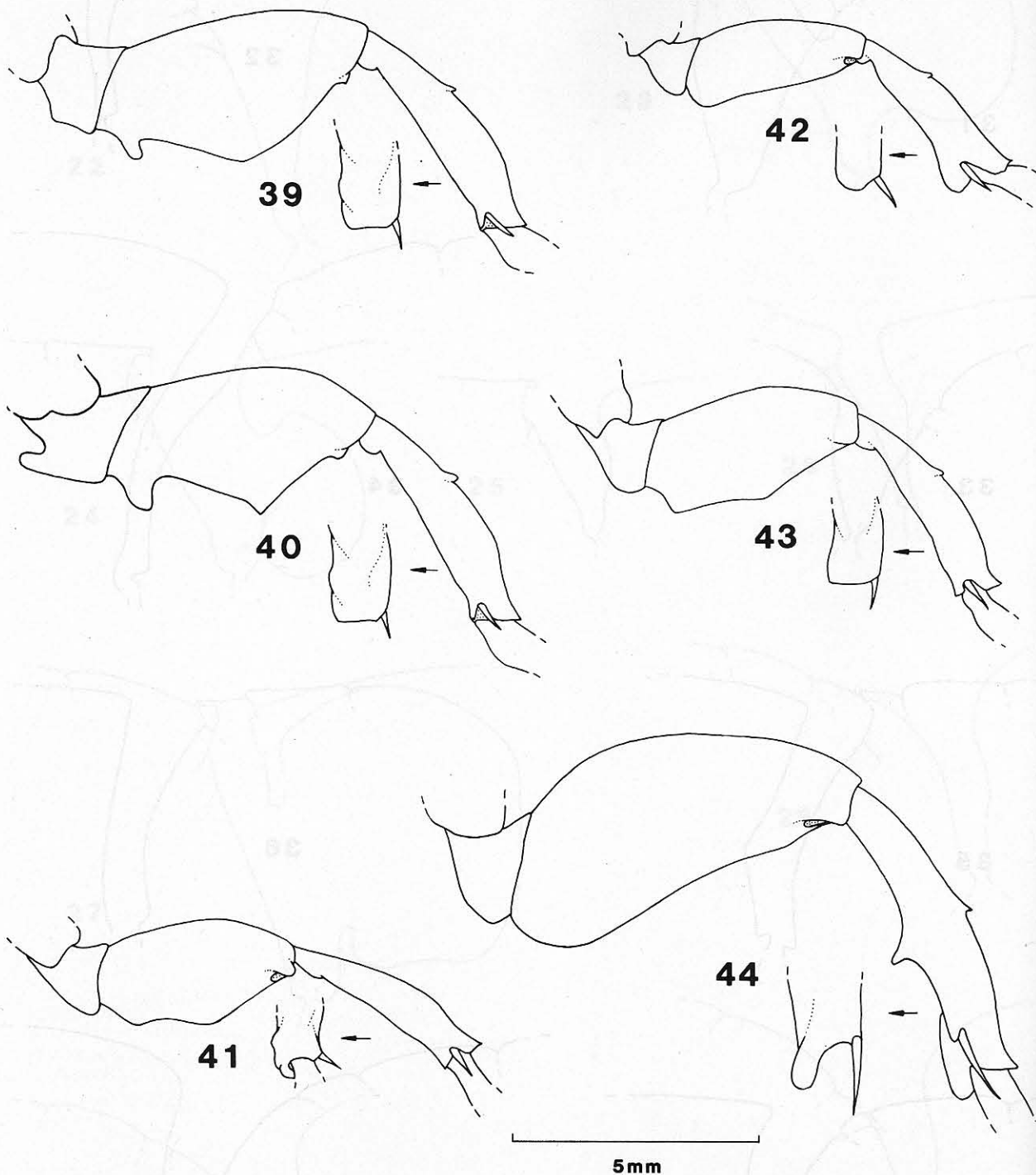


FIG. 39 - 44 *Xylocopa* spp., hind leg of male, anterior view, with distal end of tibia in ventral view. 39. *X. albifrons*. 40. *X. hottentotta*. 41. *X. io*. 42. *X. sicheli*. 43. *X. rufitarsis*. 44. *X. flavorufa*
 FIG. 39 - 44. *Xylocopa* spp., agterbeen van mannetjie, vooraansig, met distale end van tibia in ventrale aansig. 39. *X. albifrons*. 40. *X. hottentotta*. 41. *X. io*. 42. *X. sicheli*. 43. *X. rufitarsis*. 44. *X. flavorufa*

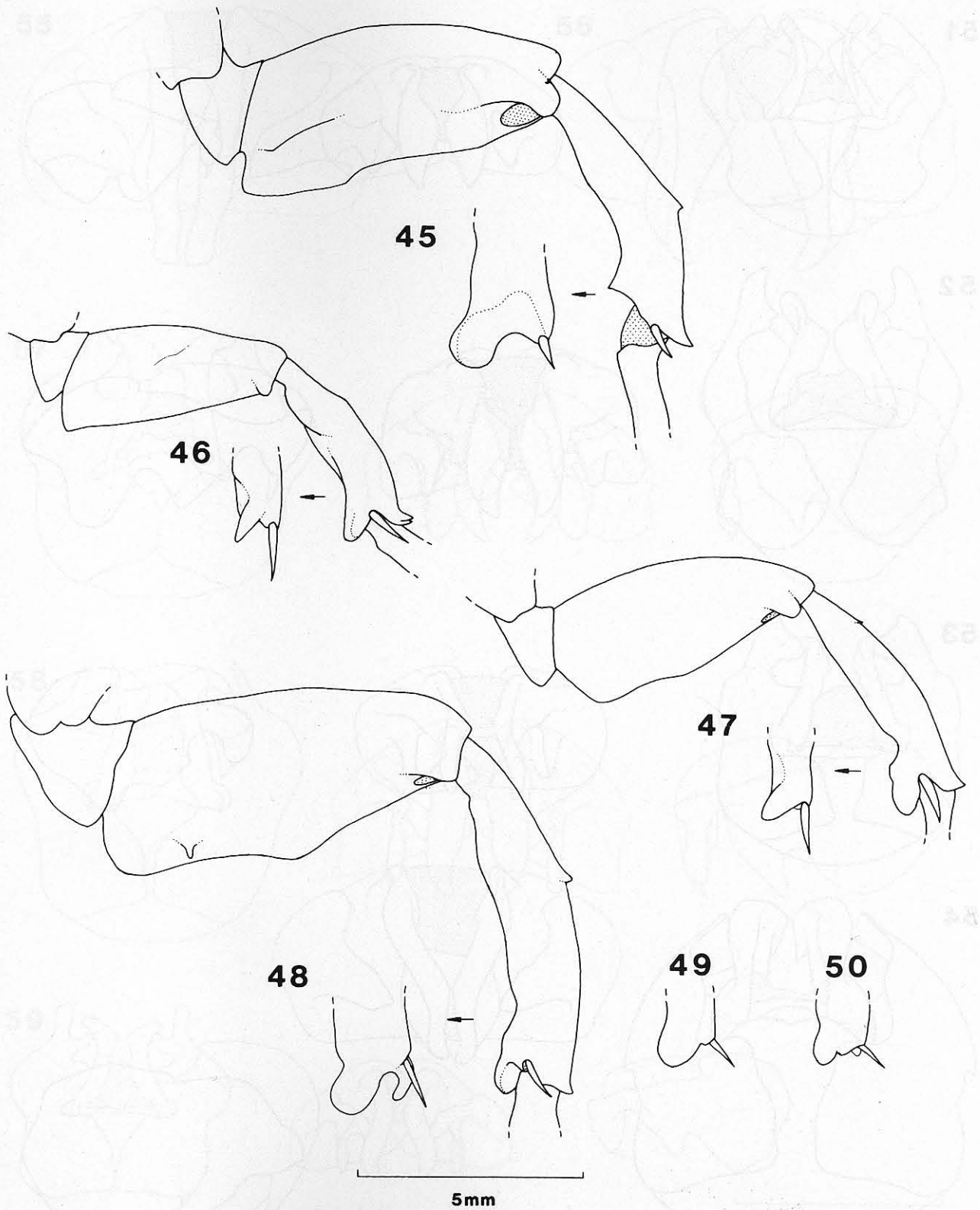


FIG. 45 - 50. *Xylocopa* spp., Fig. 45 - 48. Hind leg of male, anterior view, with distal end of tibia in ventral view. 45. *X. torrida*. 46. *X. caffra*. 47. *X. inconstans*. 48. *X. nigrita*. Fig. 49 - 50. Distal end of hind tibia in ventral view. 49. *X. erythrina*. 50. *X. capitata*

FIG. 45 - 50. *Xylocopa* spp., Fig. 45 - 48. Agterbeen van mannetjie, vooraansig, met distale end van tibia in ventrale aansig. 45. *X. torrida*. 46. *X. caffra*. 47. *X. inconstans*. 48. *X. nigrita*. Fig. 49 - 50. Distale end van agtertibia in ventrale aansig. 49. *X. erythrina*. 50. *X. capitata*

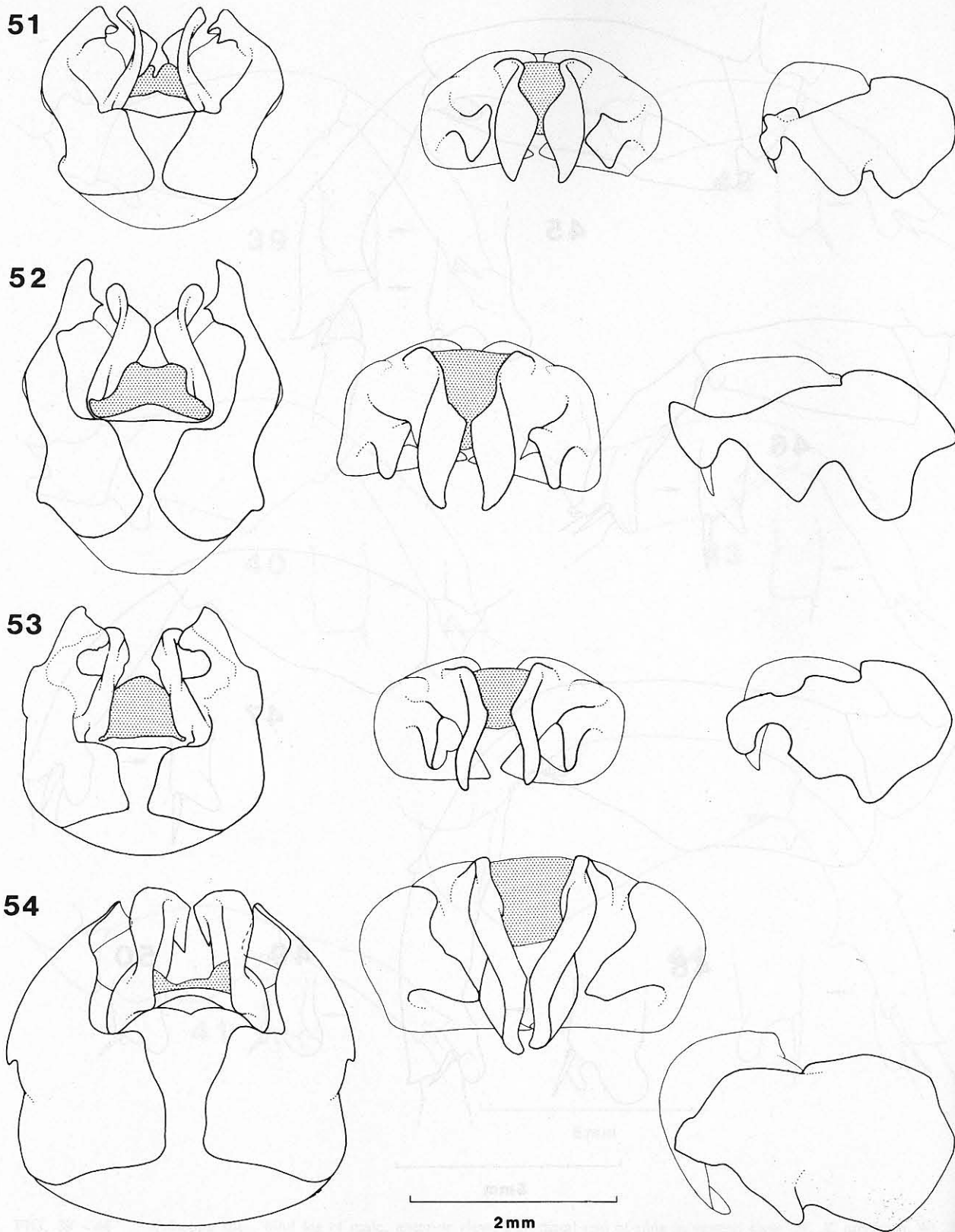


FIG. 51 - 54. *Xylocopa* spp., male genitalia showing shape of parameral and digital lobes in dorsal, posterior and lateral views, from left to right respectively (shading illustrates membranous tissue of aedeagus). 51. *X. hottentotta*. 52. *X. erythrina*. 53. *X. sicheli*. 54. *X. flavorufa*

FIG. 51 - 54. *Xylocopa* spp., manlike genitalieë met paramerale en digitale lobbe in dorsale, agterste en sy-aansigte, van links na regs (gestippelde areas verteenwoordig vliesagtige weefsel van aedeagus). 51. *X. hottentotta*. 52. *X. erythrina*. 53. *X. sicheli*. 54. *X. flavorufa*

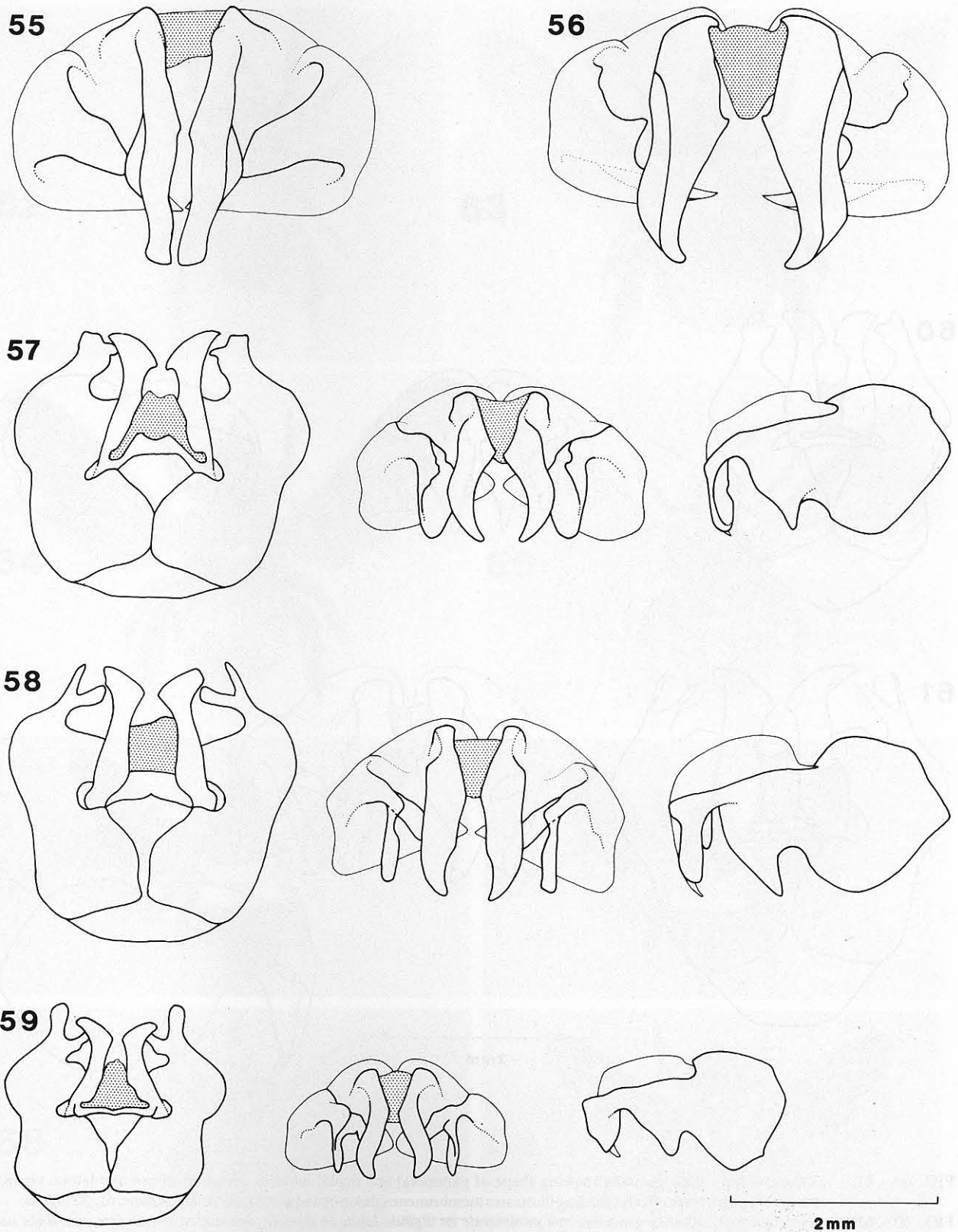


FIG. 55 - 59. *Xylocopa* spp., male genitalia (shading illustrates membranous tissue of aedeagus). Fig. 55 - 56. Shape of parameral and digital lobes in posterior view. 55. *X. mixta*. 56. *X. torrida*. Fig. 57 - 59. Shape of parameral and digital lobes in dorsal, posterior and lateral views, from left to right respectively. 57. *X. caffra*. 58. *X. isabelleae*. 59. *X. flavicollis*

FIG. 55 - 59. *Xylocopa* spp., manlike genitalieë (gestippelde areas verteenwoordig vliesagtige weefsel van aedeagus). Fig. 55 - 56. Paramerale en digitale lobbe in agterste aansig. 55. *X. mixta*. 56. *X. torrida*. Fig. 57-58. Paramerale en digitale lobbe in dorsale, agterste en sy-aansigte, van links na regs. 57. *X. caffra*. 58. *X. isabelleae*. 59. *X. flavicollis*

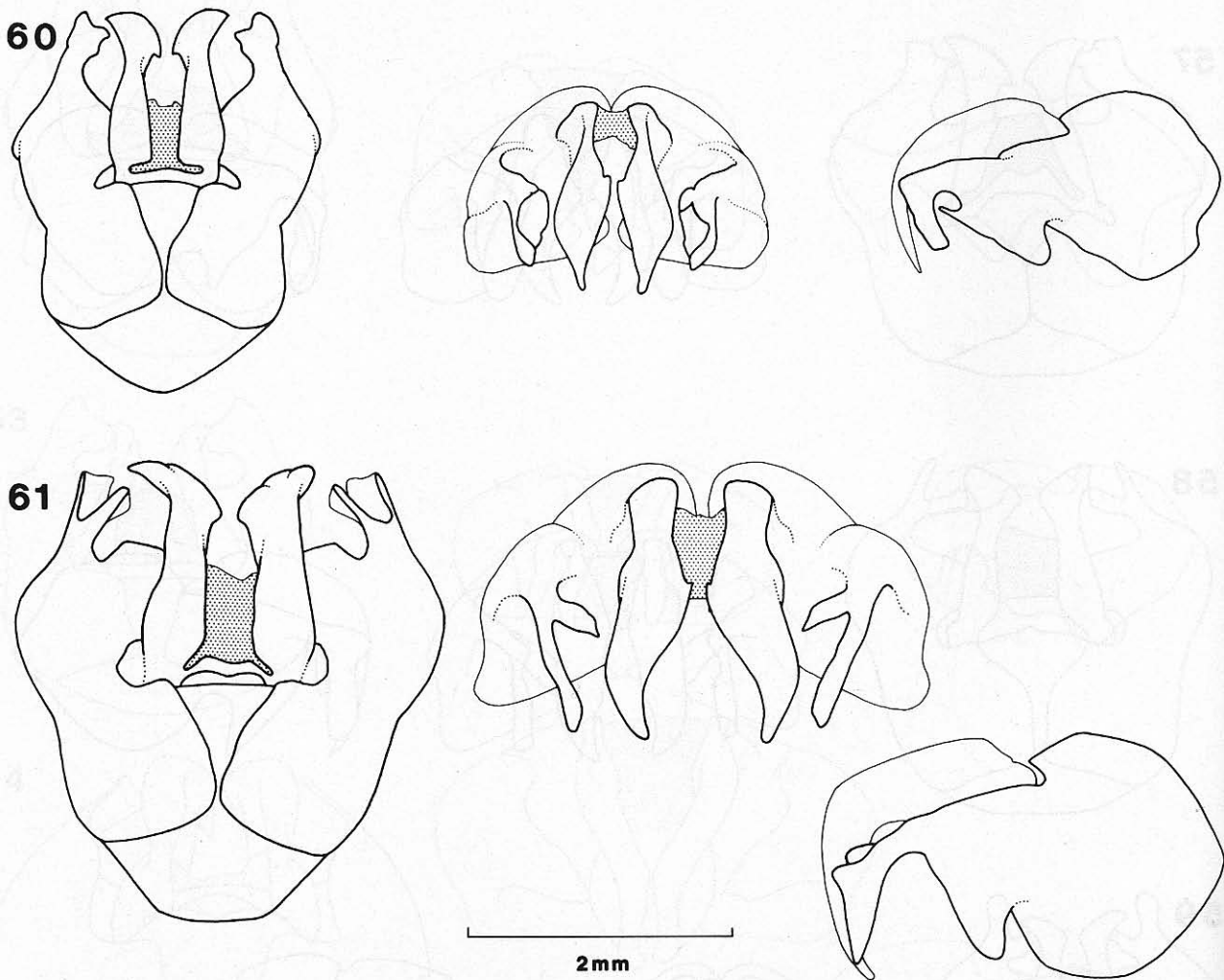


FIG. 60 - 61. *Xylocopa* spp., male genitalia showing shape of parameral and digital lobes in dorsal, posterior and lateral views, from left to right respectively (shading illustrates membranous tissue of aedeagus). 60. *X. inconstans*. 61. *X. nigrita*

FIG. 60 - 61. *Xylocopa* spp., manlike genitalieë met paramerale en digitale lobbe in dorsale, agterste en sy-aansigte, van links na regs (gestippelde areas verteenwoordig vliesagtige weefsel van aedeagus). 60. *X. inconstans*. 61. *X. nigrita*

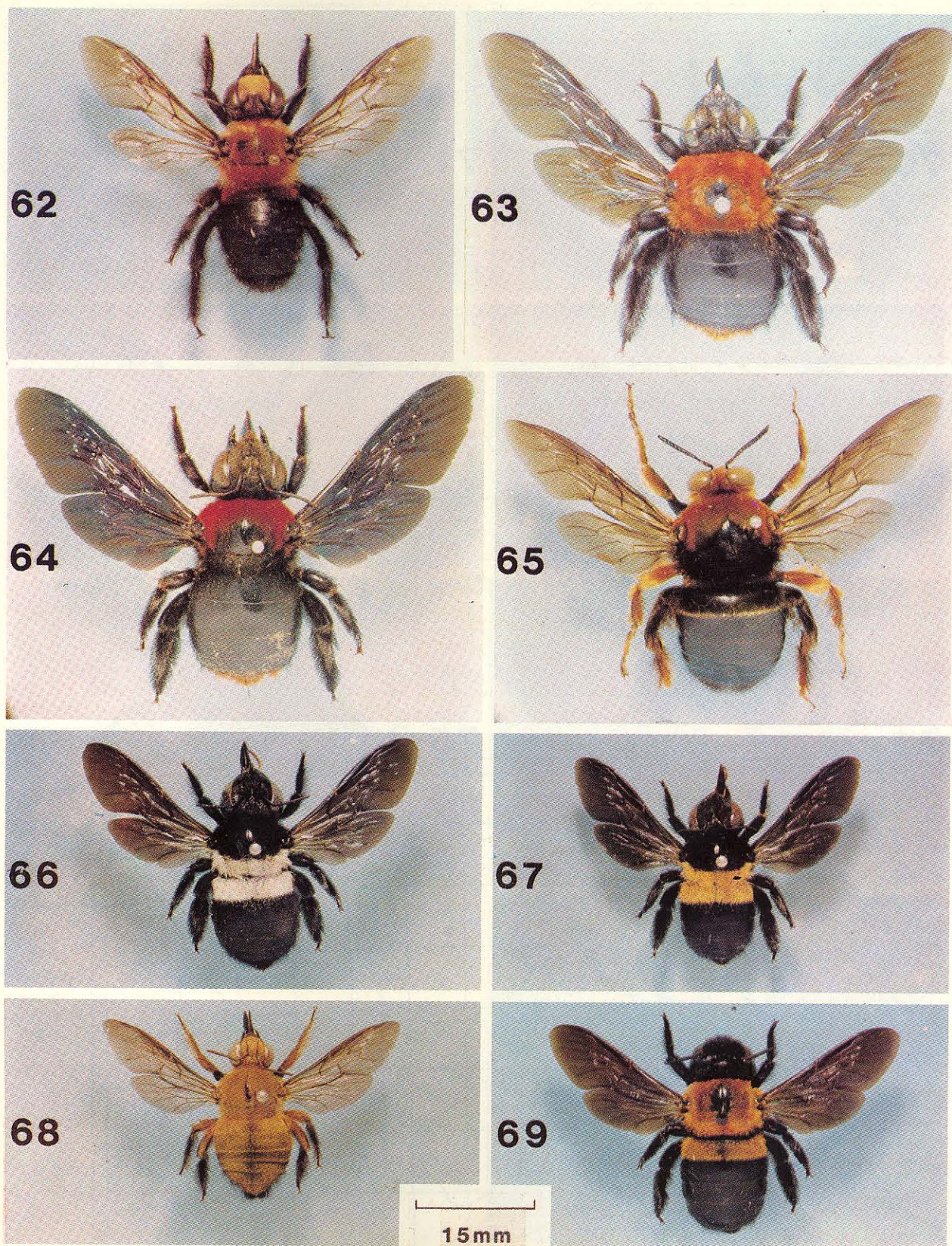
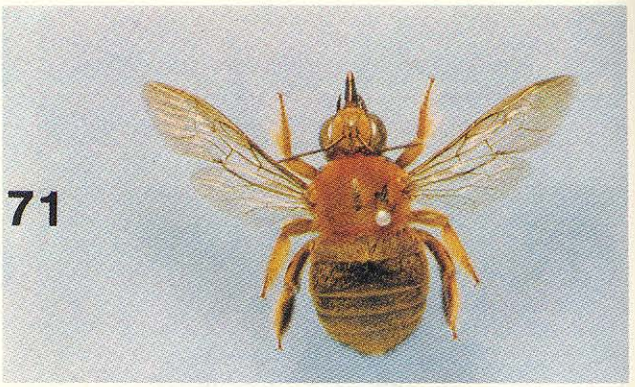
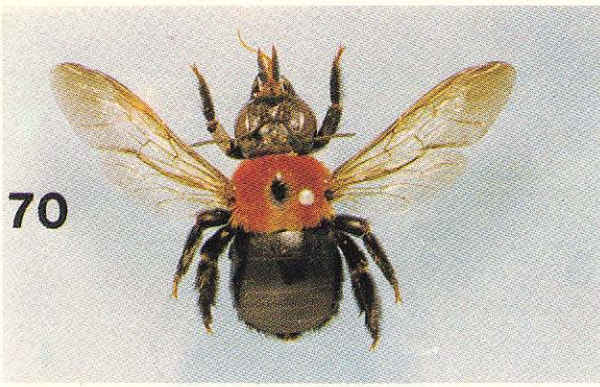


FIG. 62 - 69. *Xylocopa* spp., showing colour. 62. *X. erythrina* ♂. 63 - 64. *X. flavorufa* ♀. 65. *X. torrida* ♂. 66 - 67. *X. caffra* ♀. 68. *X. caffra*. ♂ 69. *X. watmoughi* ♀

FIG. 62 - 69. *Xylocopa* spp., kleurvertoning. 62. *X. erythrina* ♂. 63 - 64. *X. flavorufa* ♀. 65. *X. torrida* ♂. 66 - 67. *X. caffra* ♀. 68. *X. caffra* ♂. 69. *X. watmoughi* ♀



15mm

FIG. 70 - 76. *Xylocopa* spp., showing colour. 70. *X. isabelleae* ♀. 71. *X. isabelleae* ♂. 72-73. *X. flavicollis* ♀. 74. *X. flavicollis* ♂. 75. *X. nigrita* ♀. 76. *X. nigrita* ♂
 FIG. 70 - 76. *Xylocopa* spp., kleurvertoning. 70. *X. isabelleae* ♀. 71. *X. isabelleae* ♂. 72-73. *X. flavicollis* ♀. 74. *X. flavicollis* ♂. 75. *X. nigrita* ♀. 76. *X. nigrita* ♂

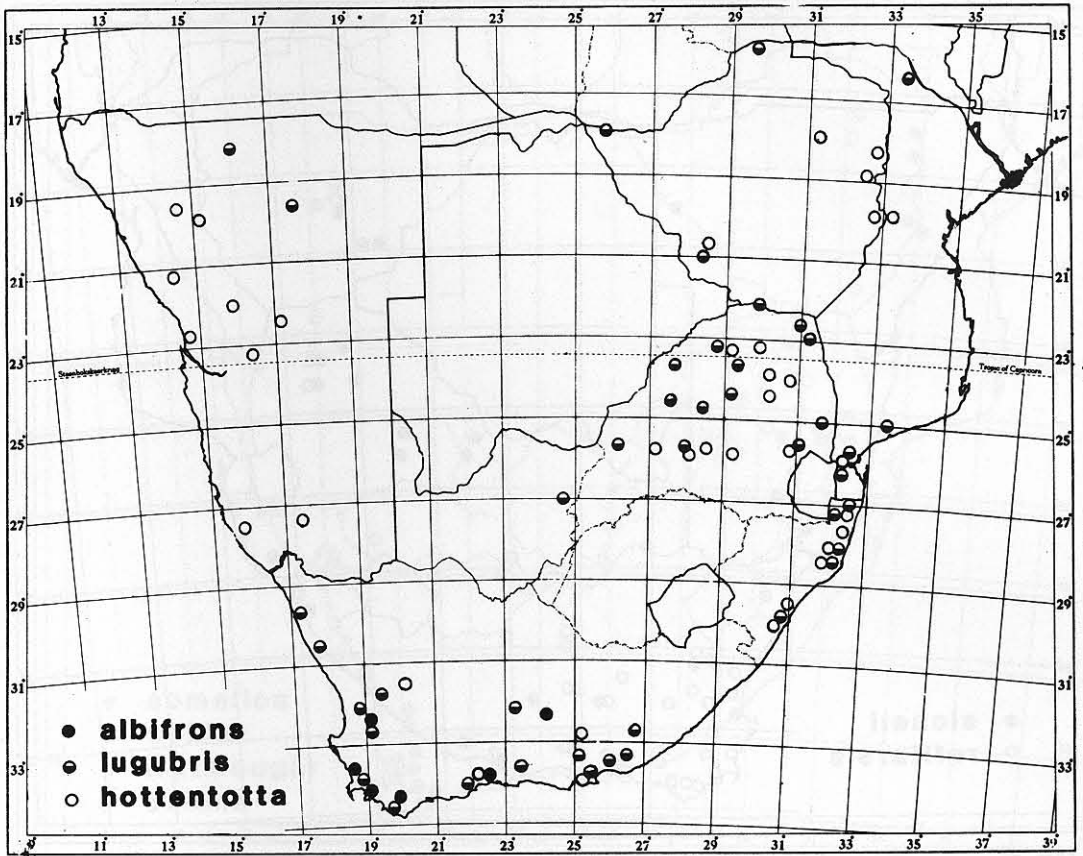


FIG. 77. Known distribution of *X. albifrons*, *X. lugubris* and *X. hottentotta* in southern Africa
 FIG. 77. Bekende verspreiding van *X. albifrons*, *X. lugubris* en *X. hottentotta* in suidelike Afrika

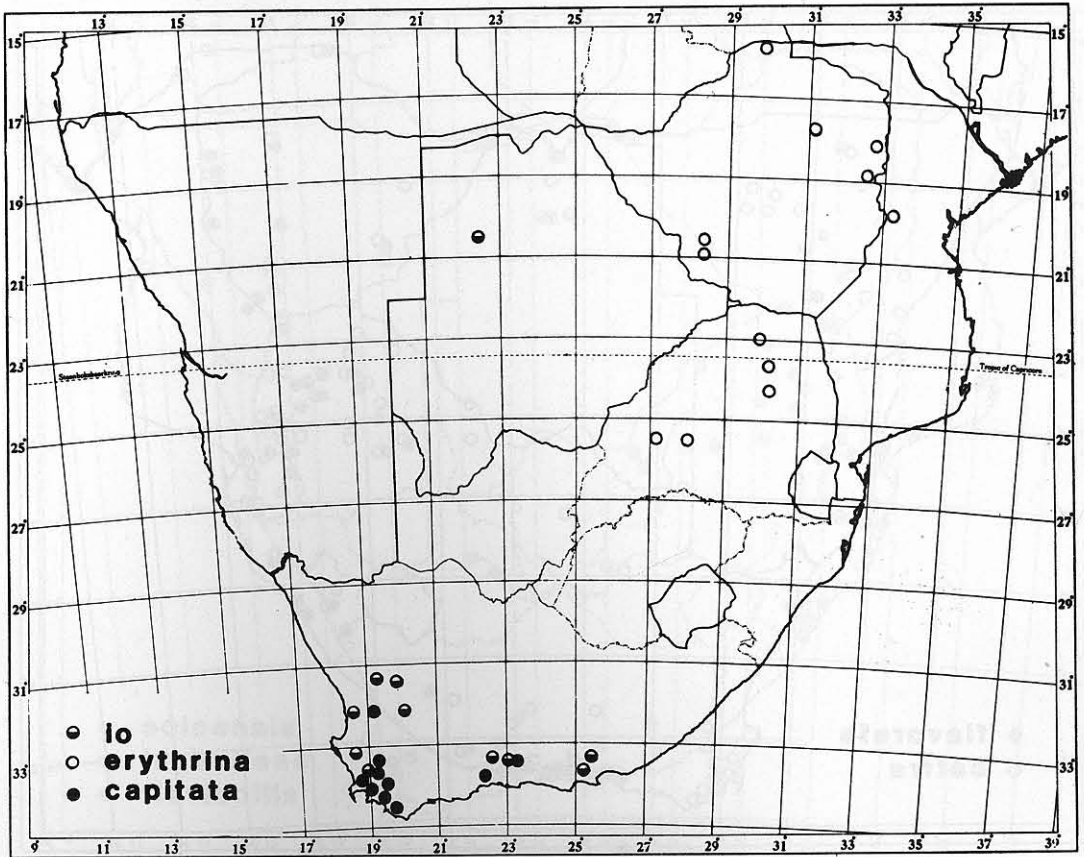


FIG. 78. Known distribution of *X. io*, *X. erythrina* and *X. capitata* in southern Africa
 FIG. 78. Bekende verspreiding van *X. io*, *X. erythrina* en *X. capitata* in suidelike Afrika

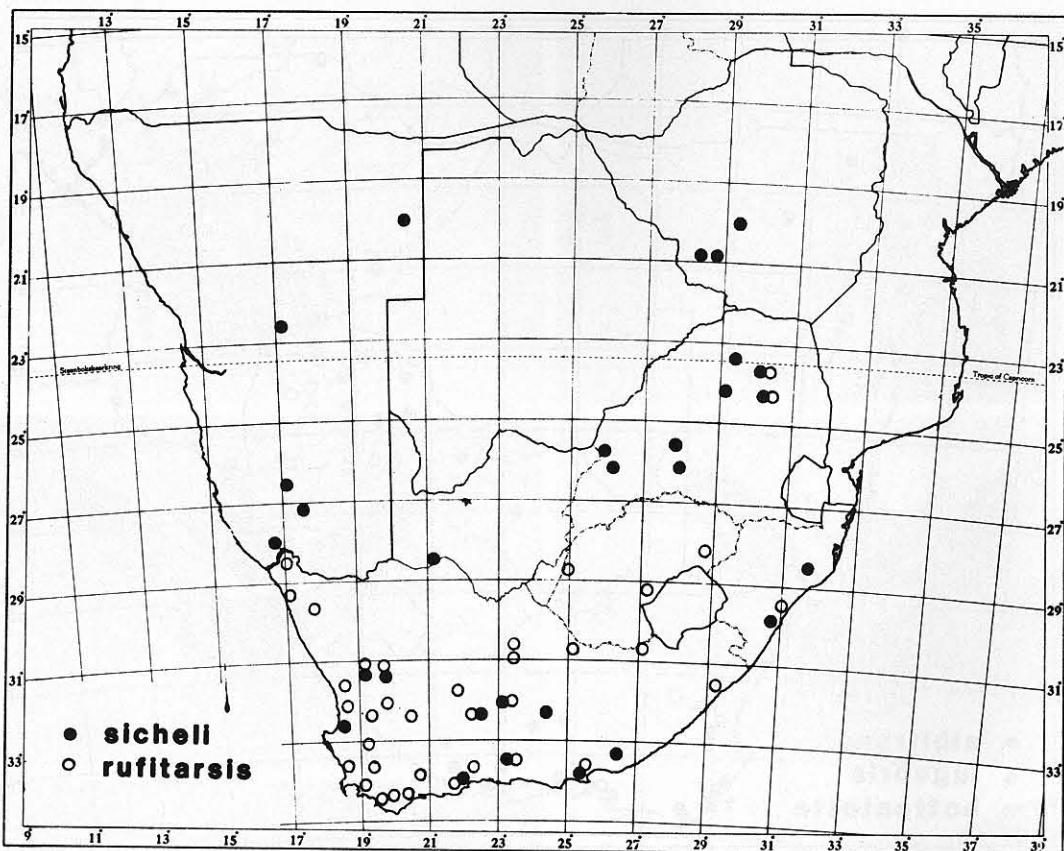


FIG. 79. Known distribution of *X. sicheli* and *X. rufitarsis* in southern Africa
 FIG. 79. Bekende verspreiding van *X. sicheli* en *X. rufitarsis* in suidelike Afrika

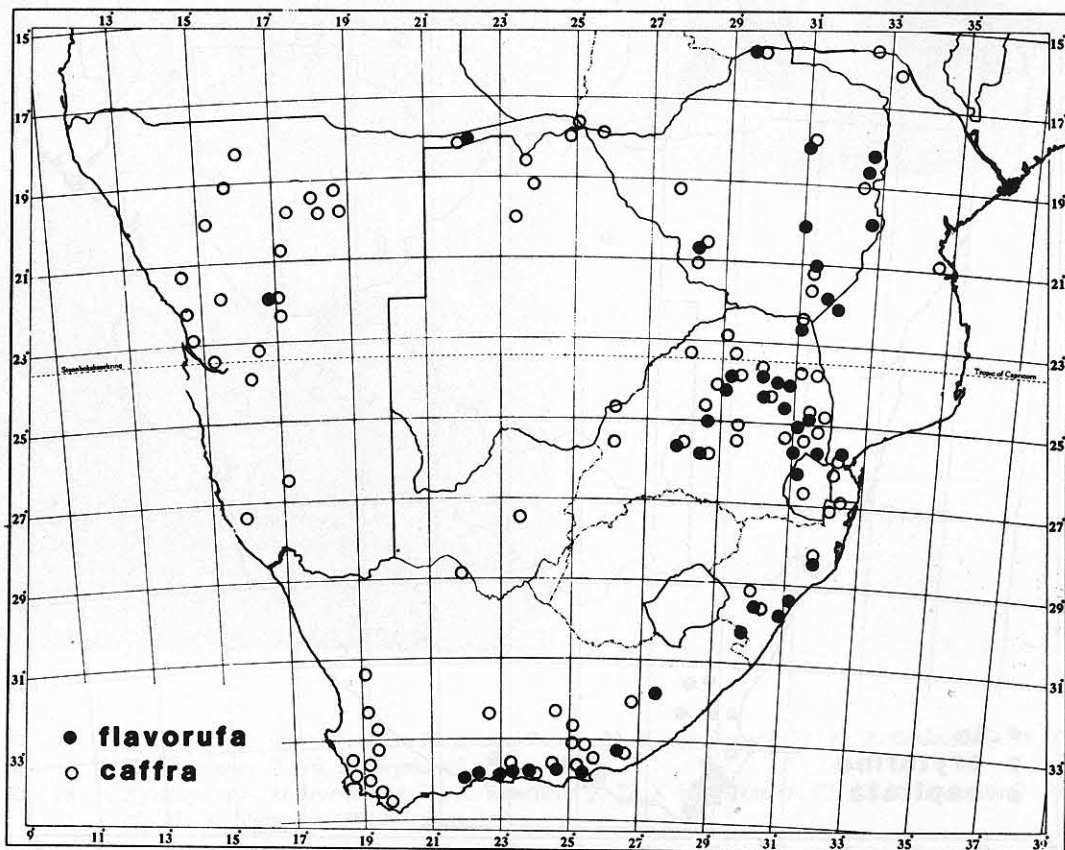


FIG. 80. Known distribution of *X. flavorufa* and *X. caffra* in southern Africa
 FIG. 80. Bekende verspreiding van *X. flavorufa* en *X. caffra* in suidelike Afrika

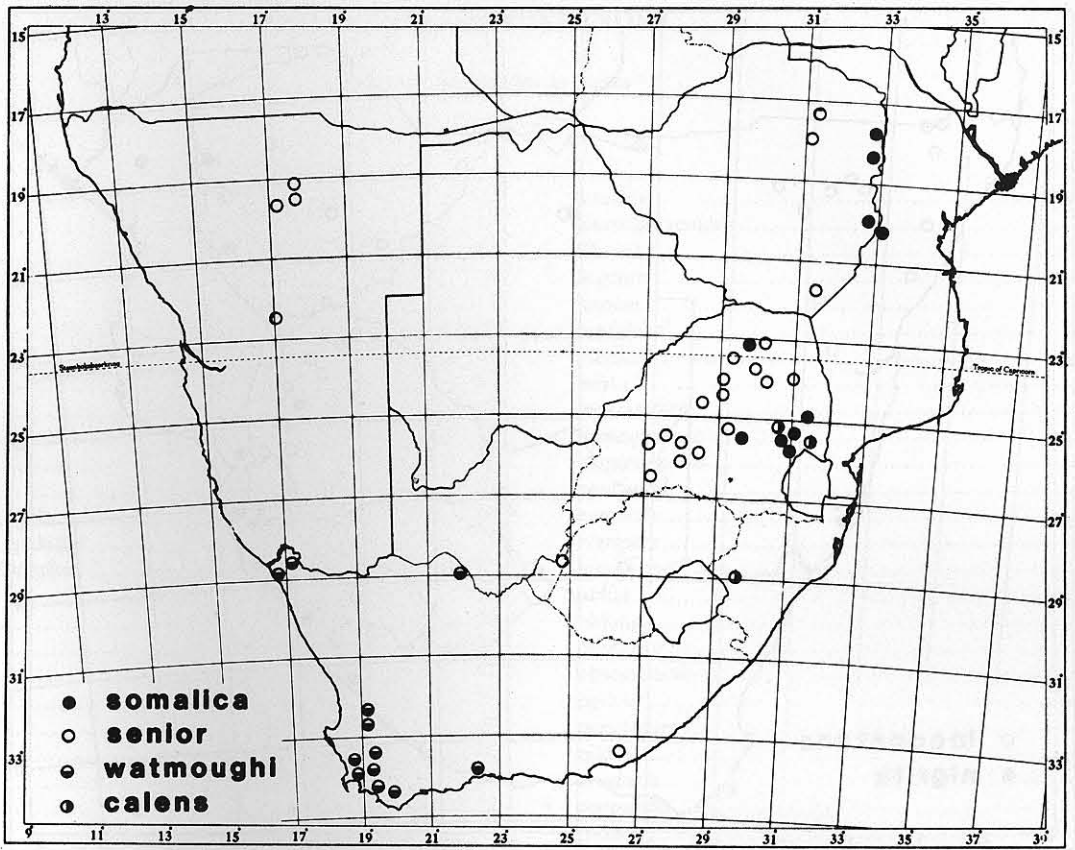


FIG. 81. Known distribution of *X. somalica*, *X. senior*, *X. watmoughi* and *X. calens* in southern Africa
 FIG. 81. Bekende verspreiding van *X. somalica*, *X. senior*, *X. watmoughi* en *X. calens* in suidelike Afrika

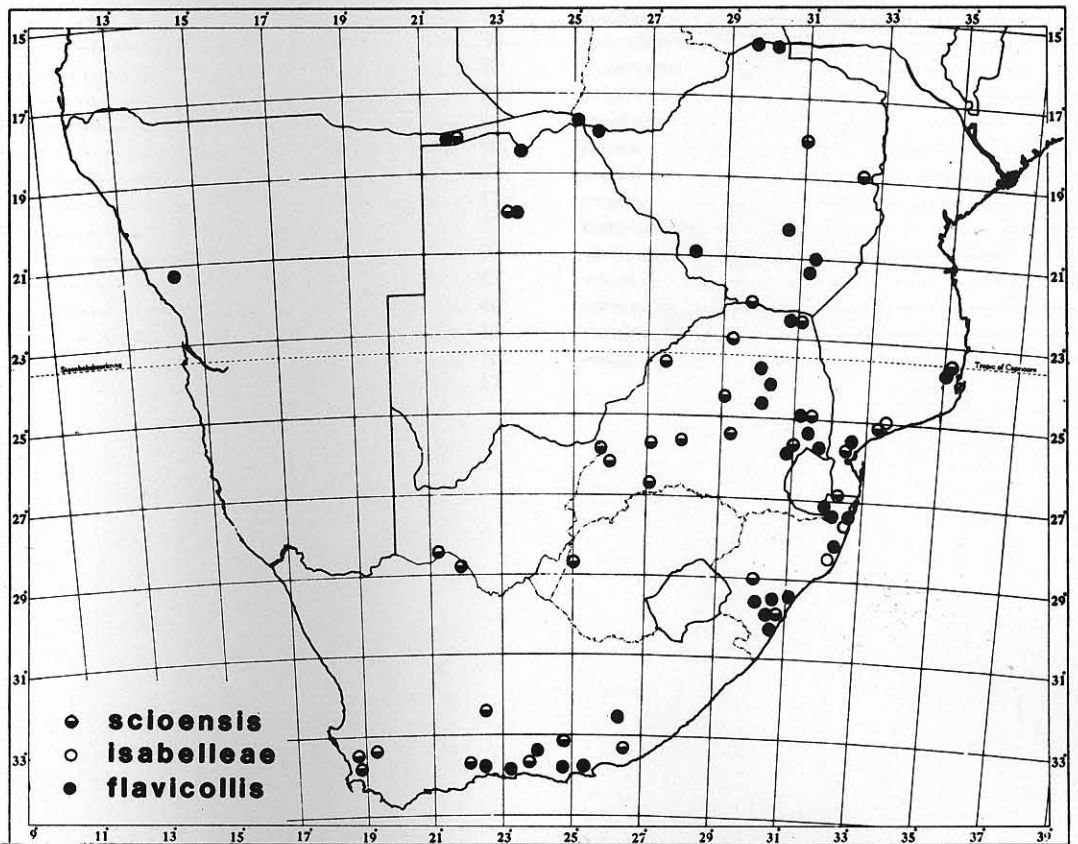


FIG. 82. Known distribution of *X. scioensis*, *X. isabelleae* and *X. flavicollis* in southern Africa
 FIG. 82. Bekende verspreiding van *X. scioensis*, *X. isabelleae* en *X. flavicollis* in suidelike Afrika

VI. SPECIES INDEX

Synonyms in italics

<i>absurdipes</i>	12	<i>lateritia</i>	32
<i>africana</i>	47	<i>leucothoracoides</i>	46
<i>albicincta</i>	37	<i>lilacina</i>	22
<i>albifrons</i>	6	<i>lugubris</i>	7
<i>angolensis</i>	7	<i>luteola</i>	46
<i>anacula</i>	33	<i>maculosa</i>	18
<i>apicalis</i>	30	<i>mensae</i>	7
<i>armata</i>	15	<i>mixta</i>	24
<i>bevisei</i>	33	<i>mossambica</i>	27
<i>caffra</i>	27	<i>namaquaensis</i>	18
<i>caffrariae</i>	33	<i>namutonensis</i>	46
<i>calens</i>	31	<i>natalensis</i>	10
<i>capensis</i> Spinola.....	46	<i>nataliella</i>	7
<i>capensis</i> , Lepeletier.....	15	<i>nigripars</i>	42
<i>capensis</i> , Enderlein.....	33	<i>nigrita</i>	42
<i>capitata</i>	15	<i>oblita</i>	7
<i>carinata</i>	10	<i>oblonga</i>	47
<i>citronella</i>	37	<i>obscurior</i>	42
<i>cloti</i>	47	<i>obscuritarsis</i>	46
<i>collaris</i>	37	<i>ogilviei</i>	7
<i>colura</i>	17	<i>perobscura</i>	42
<i>conjuncta</i>	42	<i>pilosa</i>	47
<i>divisa</i>	37	<i>producta</i>	10
<i>enderleini</i>	33	<i>purpurina</i>	12
<i>enslini</i>	7	<i>rhodesi</i>	17
<i>erythrina</i>	14	<i>rufitarsis</i>	18
<i>eximia</i>	36	<i>rufosellata</i>	33
<i>fenestrata</i>	48	<i>rufotegularis</i>	7
<i>fervens</i>	47	<i>scioensis</i>	32
<i>flavescens</i>	40	<i>senior</i>	29
<i>flavicollis</i>	37	<i>sicheli</i>	17
<i>flavilabris</i>	10	<i>somalica</i>	28
<i>flavobicincta</i>	33	<i>speculifrons</i>	12
<i>flavorufa</i>	22	<i>stuhlmanni</i>	37
<i>fraterna</i>	10	<i>sulphurea</i>	37
<i>fraudulenta</i>	14	<i>suspiciosa</i>	47
<i>fulvopilosa</i>	46	<i>tarsata</i>	10
<i>genuina</i>	22	<i>torrida</i>	25
<i>gordonica</i>	17	<i>trepida</i>	22
<i>heterotricha</i>	33	<i>tuberculiceps</i>	6
<i>hottentotta</i>	10	<i>vansoni</i>	33
<i>imitator</i>	45	<i>varipes</i>	44
<i>inconstans</i>	40	<i>vumbensis</i>	10
<i>io</i>	12	<i>watmoughi</i>	30
<i>isabelleae</i>	36	<i>whaitsi</i>	33
<i>kobrowi</i>	17		

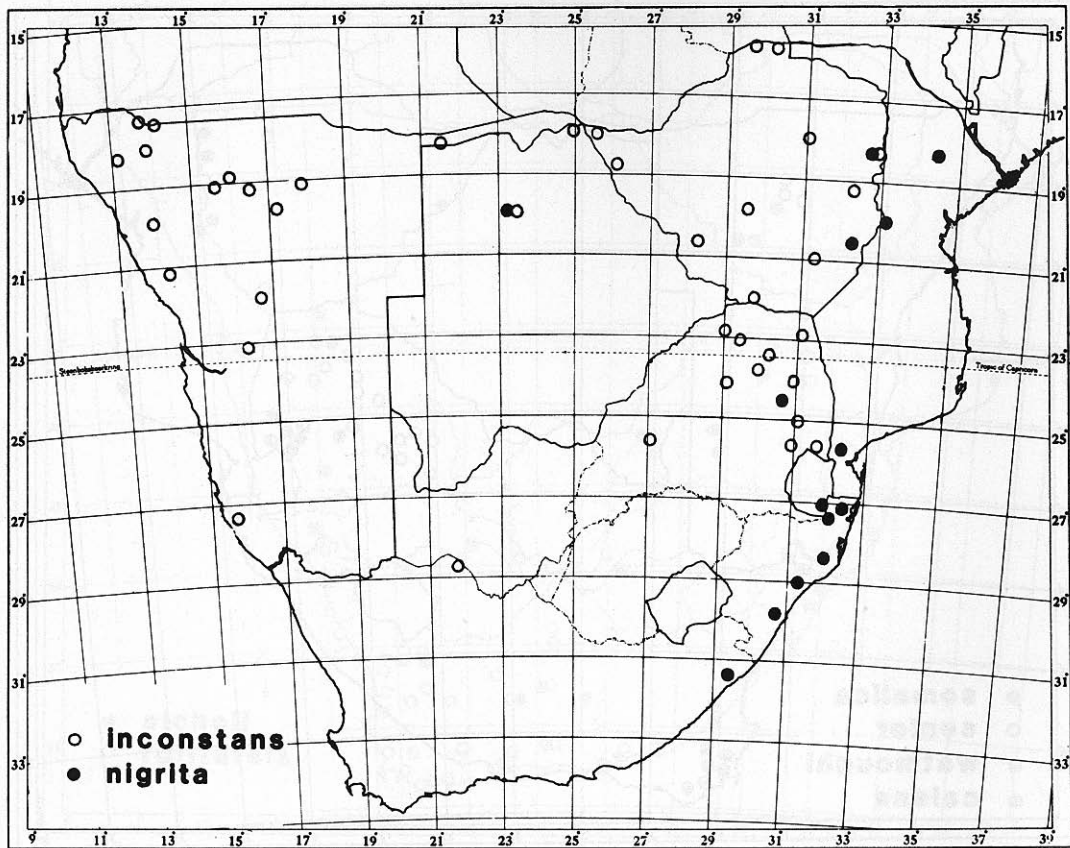


FIG. 83.
FIG. 83.

Known distribution of *X. inconstans* and *X. nigrita* in southern Africa
Bekende verspreiding van X. inconstans en X. nigrita in suidelike Afrika