

BEAUFORTIA

SERIES OF MISCELLANEOUS PUBLICATIONS
INSTITUTE OF TAXONOMIC ZOOLOGY (ZOOLOGICAL MUSEUM)
UNIVERSITY OF AMSTERDAM

No. 331

Volume 26

September 26, 1977

Megachilidae (Hymenoptera, Apoidea) from Malaŵi (Central Africa). The genera *Creightonella*, *Megachile* (s.str.) and *Chalicodoma*

G. G. M. SCHULTEN

ABSTRACT

A large collection of Hymenoptera was made in Malaŵi (Central Africa) between 1968 and mid 1975. In this collection there are 113 specimens (10 species) of the genus *Creightonella*, 408 specimens (38 species) of the genus *Megachile* (s.str.) and 348 specimens (12 species and 6 subspecies) of the genus *Chalicodoma* (Apoidea; Megachilidae). Their distribution in Malaŵi is indicated. Seven new species are described viz. *M. nigrimanus* (♂ + ♀); *M. feijeni* (♂ + ♀); *M. horrida* (♀); *M. nigra* (♀); *M. zombae* (♀); *M. mlunguziensis* (♀); and *M. punctomarginata* (♂).

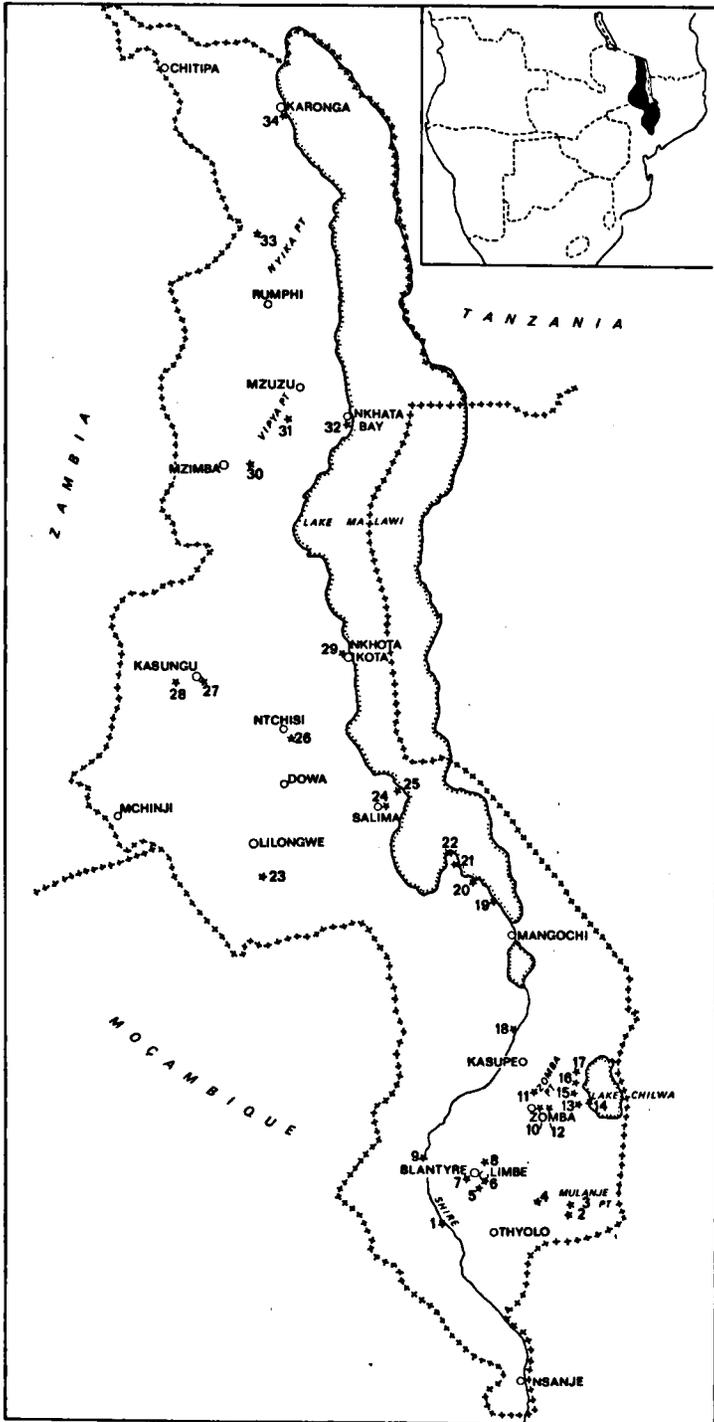
INTRODUCTION

Between 1968 and mid 1975 a large collection of Hymenoptera was made in Malaŵi by the present author and his wife together with Drs and Mrs H. R. Feijen. A first report on this collection has already been given (Schulten, 1975).

In this collection there are 113 specimens of the genus *Creightonella*, 408 of the genus *Megachile* (s.str.) and 348 of the genus *Chalicodoma* which have been identified with the keys and descriptions published by Pasteels (1965, 1966, 1970, 1973). In addition specimens were compared with those present in the collections of the British Museum (Natural History) in London and in the Musée Royale pour l'Afrique Centrale (M.R.A.C.) at Tervuren, Belgium. First descriptions are given of 7 species of *Megachile*.

For localities mentioned in this paper see fig. 1. The latest orthography of the localities has been used which in some cases may differ slightly from those on the labels.

Since collecting took place rather frequently in certain areas especially around Limbe and Zomba and along the southern lake shore area some,



although preliminary, conclusions have been drawn on the distribution of certain species. For each species the known distribution in Africa has been indicated too as given by Pasteels (l.c.). It was thought necessary, however, to condense the text of Pasteels in certain cases and to change certain geographical names into those which are currently in use.

The specimens are kept in the Institute of Taxonomic Zoology (Zoologisch Museum), Entomology Department, University of Amsterdam, except where indicated otherwise.

LIST OF SPECIES

Genus *Creightonella* Cockerell, 1908

Section *Adeloptera*

Creightonella gastracantha (Cockerell, 1931)

2 ♂, Cape Maclear 4.IV.1970.

Distribution: Zaire (Katanga), Liberia, Sierra Leone.

Section *Discolor*

Creightonella discolor (Smith, 1853)

8 ♂, Nkudzi Bay 7.I.1972, 23.III.1975; Cape Maclear 4.IV.1970; Bunda (C.o.A.) 15.VI.1971 (2); Salima (G.B.H.) 14.IV.1973; Karonga 30.XI.1970 (2).

28 ♀, Khanda rice scheme (L. Chilwa) 5.III.1975; Khanda river (L. Chilwa) 18.XII.1973 (3); Nkudzi Bay 7.I.1972, 23.III.1975 (3), 14.V.1975 (2); Cape Maclear 7.V.1971; Salima (G.B.H.) 13.IV.1975, 14.IV.1975 (13); Salima (near rice field) 14.IV.1975; Nkhota Kota 6.IV.1975; Nkhata Bay 27.IX.1974.

Distribution: Africa south of the Sahara. In Malaŵi this species occurs commonly along the lake shore and in the Lake Chilwa area (487-640 m), but may also occur at a higher altitude (1170 m).

Fig. 1. A map of Malaŵi indicating the collecting localities, with indication of the height above sea level.

1. Chikwawa, 105 m; 2. Mulanje Boma, 720 m; 3. Mt. Mulanje (Lichenya Pt.), 1950 m; 4. Thuchila, 600 m; 5. Limbe (Mt. Soche), lower slope, 1200 m; 6. Limbe, Limbe (Chancellor College), Limbe (Chichiri hill), 1170 m; Limbe (Maone), 1190 m; 7. Blantyre (hill near), 1200 m; 8. Limbe (Ndirande Mt.), 1490 m; 9. Mpatamanga (gorge), 234 m; 10. Zomba (Chirungu Estate), 700 m; 11. Zomba (Mlunguzi Estate), 1005 m; Zomba Pt. (Mlunguzi Stream), 1650 m; Zomba Pt. (Williams falls), 1740 m; Zomba Pt. (Queen's View), 1800 m; Zomba Pt. (Chingwe's hole), 1832 m; Zomba Pt., 1470-1832 m; 12. Chimpeni farm (L. Chilwa), 660 m; 13. Likangala river (L. Chilwa); Likangala rice scheme (L. Chilwa), 640 m; 14. Kachulu Bay (L. Chilwa) 640 m; 15. Chikaluma village (L. Chilwa), 640 m; 16. Khanda river (L. Chilwa); Khanda rice scheme (L. Chilwa), 640 m; 17. Domasi rice scheme (L. Chilwa), 640 m; 18. Liwonde, 465 m; 19. Mpepwe, 487 m; 20. Nkudzi Bay, 487 m; 21. Monkey Bay, 487 m; 22. Cape Maclear 487 m; 23. Bunda C.o.A. (College of Agriculture), 1170 m; 24. Salima, 510 m; 25. Salima G.B.H. (Grand Beach Hotel); Salima lake shore; Salima rice fields, 487 m; 26. Ntchisi forestry, 1410 m; 27. Kasungu, 1050 m; 28. Kasungu (Lifupa dam), 1021 m; 29. Nkhota Kota, 487 m; 30. Perkezi forest (Mzimba), 1290 m; 31. Vipya Pt., 1650 m; 32. Nkhata Bay, 487 m; 33. Nyika Pt. (Chelinda), 2285 m; 34. Karonga, 480 m.

Section Angulata

Creightonella angulata (Smith, 1853)

1 ♀, Zomba (Mlunguzi Estate) 18.III.1975.

Distribution: Africa south of the Sahara.

According to Pasteels, 1965, the females of *C. angulata* are probably confused with the unknown females of *C. hoplitis*. However, Pasteels, 1970, reports that females of *C. hoplitis* were collected in Senegal but these have apparently not been described.

Creightonella hoplitis (Vachal, 1903)

3 ♂, Kasungu (Lifupa dam) 19.IX.1972 (2), 20.IX.1972.

Distribution: Africa south of the Sahara.

The differences between males of *C. angulata* and *C. hoplitis* are very small. Females have only been described of *C. angulata*. Two of our specimens have the characteristics of *C. hoplitis* as to the carena of tergite 6 and length of the antenna (cf. Pasteels 1965 figs. 42—44). The hairs on the face and near the root of wing are however white instead of yellow, which is considered to be the typical coloration of *C. angulata*. The carena of the specimen of 20.IX.1972 agrees more with the description as given for *C. angulata* but its antenna is like that of the other two specimens and the hairs on face and near root of wing are white.

Creightonella ianthoptera (Smith, 1853)

18 ♂, Limbe 1.I.1973, 14. IX.1971; Limbe (Maone) 11.II.1973; Limbe (Mt. Soche) 8.II.1972 (3), 17.IV.1971, 25.X.1970; Zomba (Mlunguzi Estate) 10.III.1975; Zomba Pt. 24.XI.1971 (2); Zomba Pt. (Chingwe's hole) 11.I.1970, 25.I.1970 (3), 2.XI.1970; Ntchisi forestry 24.XII.1974; Nyika Pt. (Chelinda) 23.IX.1972.

13 ♀, Limbe (Chichiri hill) 13.III.1975; Limbe (Chancellor College) 29.I.1973; Limbe (Mt. Soche) 8.I.1973, 29.IV.1972, 17.XII.1971; Limbe (Ndirande Mt.) 15.XI.1970; Zomba (Mlunguzi Estate) 10.III.1975, 15.III.1975, 11.V.1975; Zomba Pt. 17.X.1973 (3); Zomba Pt. (Chingwe's hole) 25.X.1970.

Distribution: Equatorial, East and West Africa. In Malaŵi this species occurs commonly in the highlands and mountain areas (1170 m—2285 m).

Creightonella cognata (Smith, 1853)

12 ♂, Limbe 25.IX.1971; Limbe (Chichiri hill) 13.III.1975; Limbe (Mt. Soche) 8.II.1972 (2), 14.III.1972, 15.IV.1972, 17.XII.1971; Zomba (Mlunguzi Estate) 18.IV.1975, 3.VI.1974, 17.XII.1973 (2); Ntchisi forestry 21.VIII.1974.

6 ♀, Limbe (Mt. Soche) 17.XII.1971, 19.XII.1970; Zomba (Mlunguzi Estate) 3.III.1975 (2); Ntchisi forestry 21.XII.1974, 24.XII.1974.

Distribution: Africa south of the Sahara. In Malaŵi this species has only been collected above 1170 m.

The abdomen of all specimens, with the exception of two, is dark red. An obvious brown-red abdomen is found in the male from Limbe (Chichiri hill) and from Ntchisi.

Creightonella sternintegra Pasteels, 1965

1 ♂, Kasungu (Lifupa dam) 20.IX.1972.

Distribution: Zambia, Zaire (Kasai, Katanga).

Creightonella erythrura Pasteels, 1970

4 ♂, Likangala river (L. Chilwa) 10.III.1975; Nkudzi Bay 23.III.1975; Salima (G.B.H.) 15.IV.1973, 17.IV.1973.

Distribution: This species is only known from Malaŵi (Monkey Bay, Kasungu).

The hairs on clypeus and between antennae are yellow in the specimen from Likangala which is in accordance with the description but hairs on genae are white, not yellow. The other two specimens have white to light yellow hairs.

Creightonella rufoscapacea (Friese, 1903)

6 ♀, Chimpeni farm (L. Chilwa) 20.II.1975; Khanda river (L. Chilwa) 31.XII.1973; Domasi rice scheme (L. Chilwa) 19.III.1975; Monkey Bay 11.XII.1970 (2); Nkhota Kota 14.XII.1971.

Distribution: Equatorial, East and West Africa.

C. rufoscapacea is possibly the female of *C. angulata* (cf. Pasteels, 1965).

In Malaŵi this species has only been found in the Lake Chilwa area and along the lake shore.

Creightonella aculeata (Vachal, 1910)

11 ♂, Khanda river (L. Chilwa) 7.I.1974, 4.XII.1973; Zomba (Mlunguzi Estate) 17.XII.1973, 25.XII.1973; Zomba Pt. 17.X.1973; Cape Maclear 7.V.1971; Bunda (C.o.A.) 15.VI.1971, 21.XII.1969, 24.XII.1970; Salima (G.B.H.) 15.IV.1973, 16.IV.1973.

Distribution: Equatorial Africa from the West to the East. In Malaŵi this species has a wide vertical distribution (640 m—Zomba Pt.), which has not been observed in *C. rufoscapacea*.

Genus **Megachile** Latreille, 1802

Subgenus **Eurymella** Pasteels, 1965

Section **Eurymera**

Megachile eurymera Smith, 1854

1 ♂, Likangala river (L. Chilwa) 21.IV.1975.

Distribution: From South Africa (Natal) to Senegal but not in the Congo basin.

Megachile nigrimanus sp.n.

Material: 17 ♂, Khanda rice scheme (L. Chilwa) 5.III.1975 (holotype) collected by G. G. M. Schulten; Khanda rice scheme (L. Chilwa) 20.II.1975 (1 paratype), 2.III.1975 (2 paratypes), 5.III.1975 (4 paratypes); Domasi rice scheme (L. Chilwa) 19.III.1975 (2 paratypes); Limbe (Chichiri hill) 13.III.1975; Cape Maclear 4.IV.1970, 7.V.1971; Salima (G.B.H.) 14.IV.1973, 17.IV.1973; Kasungu (Lifupa dam) 20.IX.1972 (2).

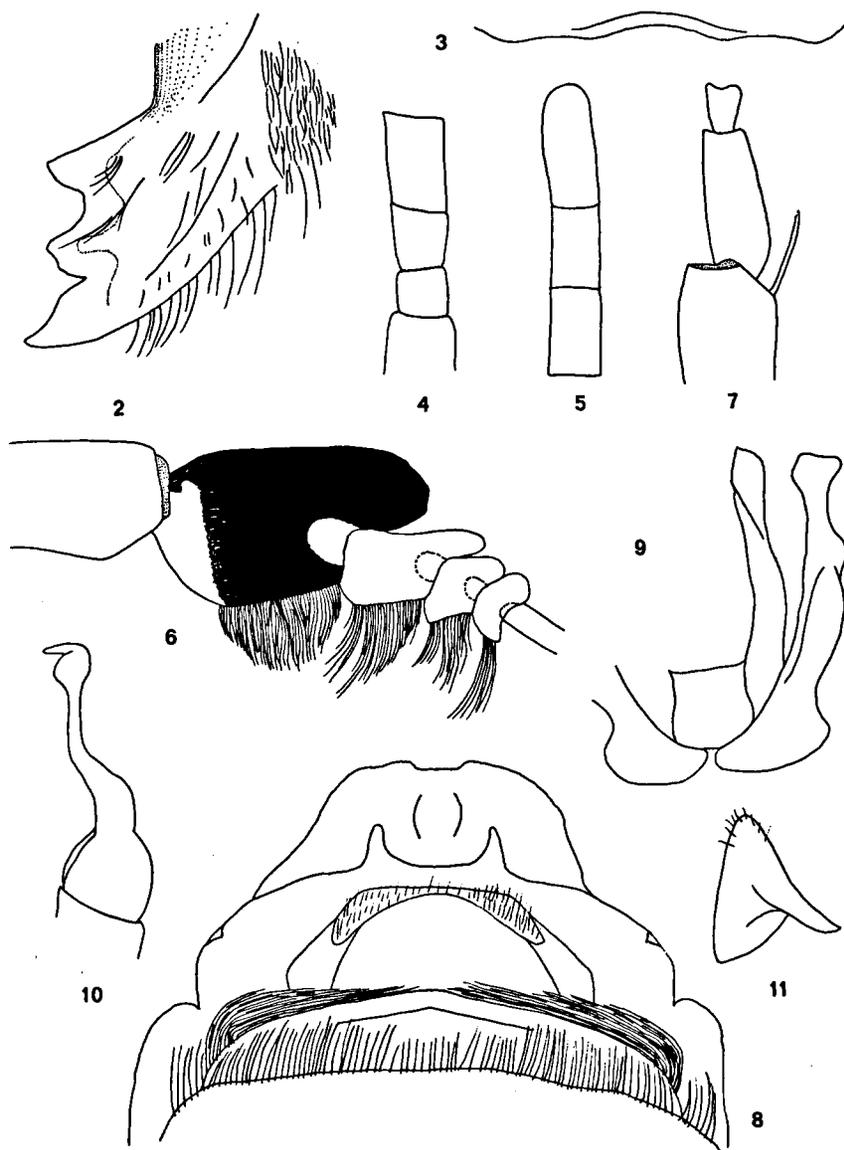
9 ♀, Khanda river (L. Chilwa) 24.XII.1973; Khanda rice scheme (L. Chilwa) 19.III.1975 (4); Likangala (L. Chilwa) 24.IV.1975; L. Chilwa 8.III.1970 (2); Cape Maclear 7.V.1971.

Two paratypes and two female specimens have been donated to M.R.A.C. at Tervuren, Belgium.

This species very much resembles *Megachile nigripollex* Vachal which occurs in the Congo basin. The male can easily be distinguished from *M. nigripollex* by the almost complete dark brown basitarsus I, the shape of front medio-tarsal segment 2 and its slender gonoforceps. The females of both species look identical.

Description ♂:

Structure: Mandible, shiny with little sculpturing, divided into two planes by a rounded carina; at its base a rounded, broad but flat hook in direct contact with the gena; subapically on the inner basal side of this hook a small patch of short light brown hairs, apically a much smaller patch of very short light brown hairs; biting part of mandible with three teeth, the superior one enlarged (fig. 2). Clypeus slightly emarginated (fig. 3). Eyes obvious convergent below. Vertex short, interocellar distance about $1.3 \times$ ocello-occipital distance. Antenna (figs. 4—5). Genae with circular, smooth shiny area, posteriorly bordered by a steep rounded carina which is densely covered by long white hairs; anteriorly there is a small carina running along the basal part of the eye margin. Front tarsal segments 2—5, coloured white-yellow; basitarsus I has a large, excavated, boat, shaped lobe at the inner side, which is almost completely dark brown on the inner- and outer sides; remainder of basitarsus I almost completely dark brown on the outer side; the inner side is white but has a dark brown oval patch along the margin; front tarsus with a thick fringe of white hairs (fig. 6). Tarsus II shortened and covered with long white hairs which form a fringe of about twice the width of basitarsus II; basitarsus III much smaller than tibia (fig. 7) and with a fringe of long white hairs about twice the width of basitarsus III; coxal spines broad and long with a small tuft of short red spiculae on the top and a small patch of red spiculae laterally of its base; on the coxal spines there are posteriorly dispersed long white hairs. Abdomen a little shorter than head and thorax combined. Carina of tergite 6 extended posteriorly into two dented short lobes which are separated by a small emargination; middle part of tergite 6 slightly elevated, its posterior margin medio-laterally with two triangulate spines between which there is



Figs. 2—11. *M. nigrimanus* ♂ sp. n. 2: Mandible (biting part), 3: Clypeus rim, 4: Base of antenna, 5: Apex of antenna, 6: Front tarsus (hairs on tarsal segments omitted), 7: Tibia and basitarsus III (hairs omitted), 8: Tergite 6 and 7 (ventrally) and sternite 4, 9: Genitalia (dorsally), 10: Gonoforceps (laterally), 11: Gonoforceps (from above).

a well defined depression. Sternite 4 with a broad straight opaque margin (fig. 8). Genitalia (figs. 9—11).

Sculpture: Clypeus anteriorly finely punctate, more widely so posteriorly; anterior margin impunctate. Vertex irregularly punctate; distances between punctures smaller than punctures, near apical eye margin distances as large as punctures. Mesoscutum and scutellum, shiny, coarsely punctate; middle of mesoscutum more widely punctate.

Vestiture: Vertical plane of mandible with white tomentum; outer margin of mandible with dispersed long, yellow-brown hairs. Clypeus and face densely covered with long, yellowish white hairs, behind anterior ocellus the hairs are light brown. Vertex with dispersed, light brown hairs. Tempora densely covered with long white hairs merging into a loose tuft near the genae. Mesoscutum, scutellum and axillae densely covered with long, light brown and white hairs which are darker brown posteriorly, leaving the sculpture visible. Metanotum and propodeum with dispersed long white hairs. Pronotum with white to light brown hairs; dense patch of white and brown hairs below tegulae, anteriorly of spiracle 2; mesopleura with dispersed long, darker brown hairs; small tuft of white hairs below hind-wing insertion. Metapleura with white to light brown hairs. Coxae with white hairs. Tergite 1 anteriorly with erect light-brown long hairs, more densely placed at the corners, posteriorly with shorter recumbent light brown hairs. Tergites 2—4 anteriorly with small band of light brown tomentum followed by a generally broader band of dispersed short, brown hairs which leave tergites largely exposed, and some light brown tomentum especially at the sides; posterior margin of tergites with large, thick band of yellow-brown tomentum. Tergite 5 completely covered with yellow-brown tomentum, more densely so posteriorly; superimposed on the tomentum there are curved red-brown hairs. Tergite 6 with white to light brown tomentum and with dispersed curved dark brown hairs. Sternites 1—4 with long, white fascies. Legs ciliated with white to light brown hairs. Tarsi on the outer side with long, white hairs and much shorter light-brown hairs, light to dark brown at the inner side.

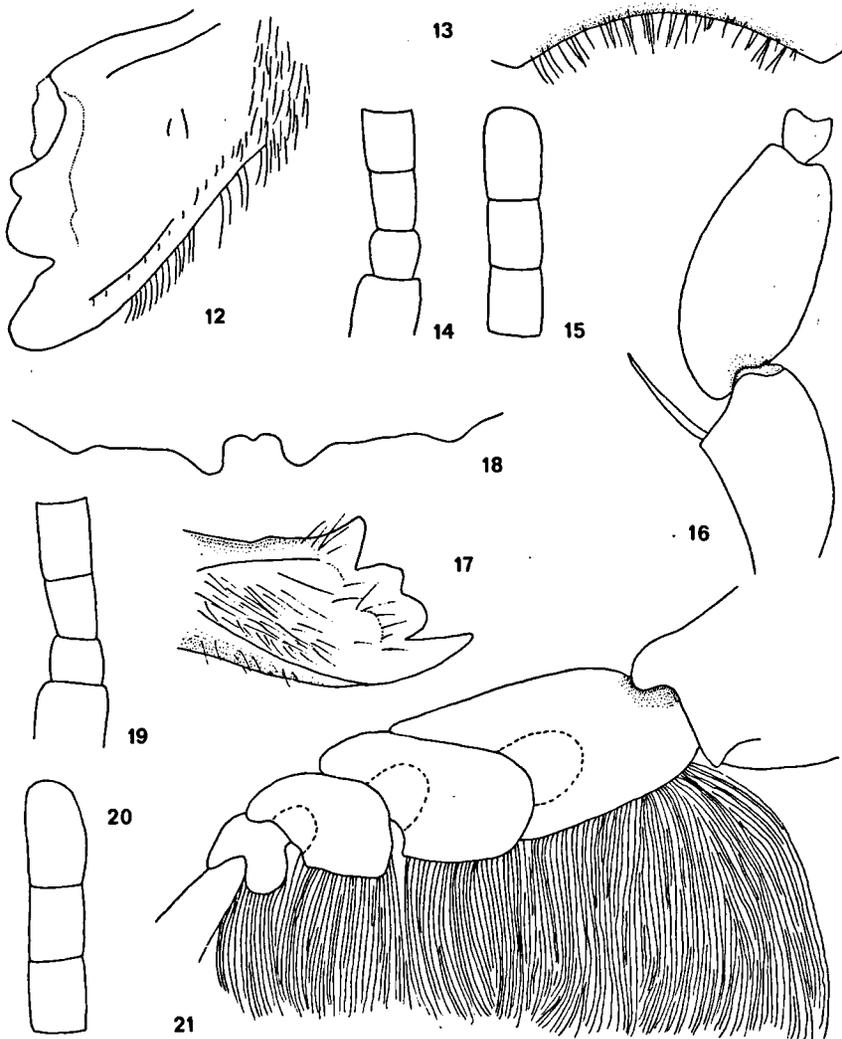
Colour: Mandibles dark brown to black, more reddish apically. Head, thorax and abdomen black. Tegulae brown. Legs dark brown to black, but femur and tibia I red-brown at the inner side. Wings somewhat smoky.

Length of body 12 mm, of wing 8 mm.

Description ♀:

Structure: Mandible shiny with little sculpturing, divided into two planes by a rounded carina; biting part of mandible (fig. 12) (shape of teeth is rather variable); irregular cutting edge between teeth 3 and 4. Clypeus medially swollen, anterior margin strongly emarginated (fig. 13). Eyes slightly convergent below. Vertex short, interocellar distance about 1.5 × oculo-occipital distance. Antenna (figs. 14—15). Basitarsus III elongated, slightly broader than tibia (fig. 16). Abdomen slightly longer than head and thorax combined.

Sculpture: Clypeus shiny, irregularly punctate; distances between punctures in the centre larger than along the margins; impunctate area medially posterior which reaches halfway down and extends along the posterior margin. Supraclypeal area anteriorly with small impunctate area adjacent to impunctate area of clypeus. Vertex irregularly punctate, distances between punctures generally as large as punctures; finer punctation between posterior ocelli and eye margin. Mesoscutum shiny, widely



Figs. 12—16. *M. nigrimanus* ♀ sp. n. 12: Mandible (biting part), 13: Clypeus rim, 14: Base of antenna, 15: Apex of antenna, 16: Tibia and basitarsus III (hairs omitted).

Figs. 17—21. *M. feijeni* ♂ sp. n. 17: Mandible (biting part), 18: Clypeus rim, 19: Base of antenna, 20: Apex of antenna, 21: Front tarsus (hairs on tarsal segments omitted).

punctated in the centre with distances between punctures larger than punctures, but along margins these distances are as wide as punctures. Scutellum and axillae more densely punctate.

Vestiture: Smallest plane of mandible covered with white tomentum; outer margin of mandible with dispersed, erect, yellow-brown hairs. Face densely covered with white hairs leaving the impunctate area of clypeus exposed; behind anterior ocellus the hairs are light brown. Tempora densely covered with white hairs merging into a loose tuft on the genae. Central part of mesoscutum with dispersed, light and dark brown hairs leaving the sculpture visible. Along margins of mesoscutum and near scutellum the hairs are more densely placed; mesoscutum anteriorly and posteriorly with some white tomentum. Scutellum and axillae with long, erect, dark brown hairs; anterior margin of metanotum with some white tomentum; propodeum with white hairs. Pronotum with light brown hairs; conspicuous patch of densely placed white hairs surrounded by light-brown hairs below tegulae, anteriorly of spiracle 2. Mesopleura densely covered with brown hairs, leaving the sculpture visible; anterior margin of mesopleura however with small band of white hairs; upper part of metapleura with brown hairs, lower part with white hairs. Coxae with light brown hairs. Tergite 1 anteriorly with erect, long, white to light brown hairs, more densely placed at the corners, posteriorly with shorter, light brown hairs. Tergites 2—5 anteriorly with small band of light brown tomentum followed by generally broader band of dispersed, short, dark brown to black hairs which leave tergites largely exposed, and some light brown tomentum at the sides; posterior margin of tergites with a large, thick band of yellow-brown tomentum; superimposed on posterior bands of tomentum on tergites 4 and 5 there are dispersed, curved, red-brown hairs; tergite 6 anterior half with white to light brown tomentum and long curved black hairs, posteriorly the hairs are recumbent. Scopa white on sternites 2—5 but margins of sternites 3—5 light brown; sternite 6 with long dark brown hairs; fascies sternales long and easily visible through the scopa. Legs ciliated with white to light brown hairs. Tarsi I and II on the outer side with white hairs, tarsus III with white hairs, on the inner side the tarsi are light to orange-brown.

Colour: Mandibles black except reddish band behind teeth. Head, thorax and abdomen black. Tegulae dark brown. Legs dark brown. Wings somewhat smoky.

Length of body 14 mm, of wing 9 mm.

***Megachile vittatula* Cockerell, 1911**

2 ♂, Nkudzi Bay 23.III.1975; Monkey Bay 23.III.1975.

1 ♀, Monkey Bay 23.III.1975.

Distribution: Botswana, Zaire (Katanga), Tanzania.

***Megachile opaculina* Cockerell, 1937**

6 ♂, Salima (G.B.H.) 15.IV.1973 (6).

3 ♀, Salima (G.B.H.) 15.IV.1973 (2); Karonga 30.XI.1970.

Distribution: South East and East Africa.

The hairs on clypeus and face are white, however with dispersed yellow-brown hairs, not only yellow.

Section Pyrrothorax

Megachile seclusa Cockerell, 1931

1 ♂, Likangala river (L. Chilwa) 23.XII.1971.

Distribution: South Africa (Cape), Rhodesia, Zaire (Katanga, Kivu).

Megachile dariensis Pasteels, 1965

1 ♀, Nkhata Bay 9.IV.1975.

Distribution: There is only one specimen known (Tanzania, Dar-es-Salaam). Since the specimen from Malaŵi is in a very good condition some additional information can be given on the vesture of the abdomen. Tergites 1—5 densely covered with dark red hairs, however, corners and side margins of tergite 1 with black hairs and some black hairs on side margin of tergite 2; tergite 6 is covered with white tomentum, except for anterior corners where tomentum is red; superimposed on tomentum there are dispersed curved, black hairs. Scopa red except for second half and outer margin of sternite 6 which has brown hairs. Incomplete white fascies sternales along outer margins of sternites 2—5.

Megachile bucephala (Fabricius, 1793)

2 ♂, Likangala (L. Chilwa) 24.IV.1975 (2).

2 ♀, Likangala river (L. Chilwa) 24.XII.1973; Cape Maclear 4.IV.1970.

Distribution: South Africa (Natal, Transvaal), Zaire (Katanga, Kasai).

Megachile bucephala var.

2 ♂, Cape Maclear 4.IV.1970; Karonga 15.II.1971.

There are some species which are very similar to *M. bucephala*. Of these only a few specimens are known and often only in the female sex. The supposed variety of *M. bucephala* has a slightly more emarginated clypeus with five teeth in stead of three but further looks identical to *M. bucephala*. Since we do not know whether a duplication of the outer teeth of the clypeus is within the range of normal variation of *M. bucephala* we do not wish to describe the variety as a new species for the time being.

Megachile feijeni sp. n.

Material: 26 ♂, Likangala (L. Chilwa) 21.IV.1975 (holotype) collected by H. R. Feijen; Likangala (L. Chilwa) 21.IV.1975 (1 paratype), 24.IV.1975 (10 paratypes); Khanda river (L. Chilwa) 7.I.1974, 11.XII.1973; Khanda (L. Chilwa) 1.V.1973; Khanda rice scheme 5.III.1975, 19.III.1975 (2), 30.III.1975 (8).

36 ♀, Likangala (L. Chilwa) 10.III.1975, 24.IV.1975 (3); Khanda rice scheme 5.III.1975 (2), 19.III.1975 (21), 30.III.1975.

Two paratypes and 2 female specimens have been donated to the M.R.A.C. at Tervuren, Belgium.

The male resembles *M. luteola* Pasteels but it has a small tooth in the middle of the notch of the clypeus, a black spot at the inner side of front mediotarsal segment 3, an enlarged apex of the antenna and a depressed tergite 7. The female keys out as *M. nigroaurea* Pasteels but differs by its larger size, the conspicuous dark yellow hairs on the face and the general black colour of the body.

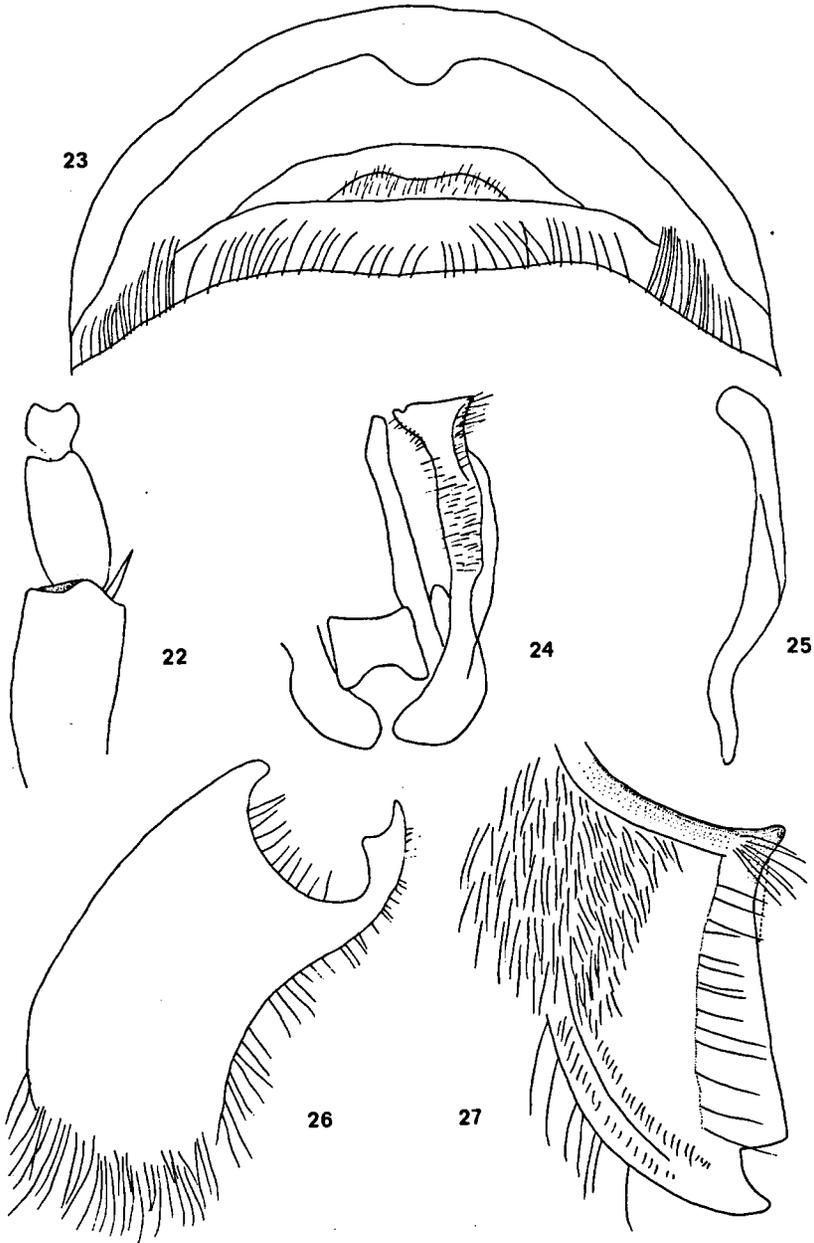
Description ♂:

Structure: Mandible, shiny and finely sculptured by small punctures and ridges, divided into two planes by a sharp carina; biting part of the mandible with four teeth (fig. 17). Clypeus anteriorly with a notch with a small tooth in the middle (fig. 18).

Eyes convergent below. Vertex strongly emarginated posteriorly, oculo-occipital distance about equal to interocellar distance. Base of antenna (fig. 19), apex of antenna slightly enlarged (fig. 20). Front tarsal segments 1—4 coloured white-yellow; front tarsal segments 1—3 enlarged, with, at the inner side, an oval black patch surrounded by brown on mediotarsal segment 2 and much smaller brown patch on mediotarsal segment 3. Front tarsus I with a thick, long fringe of white hairs (fig. 21); tarsus II with conspicuous fringe of long, white hairs with a length of about three times the width of the basitarsus; basitarsus III much smaller than tibia (fig. 22) and with a short fringe of white hairs. Femur and tibia I short, triangulate in cross-section, especially the tibia, smooth and shiny at two sides; coxal spines long, on top of spine a large patch of red spiculae and at the inner side, a patch of long white hairs; laterally of the spines on the coxa is a large elongate area with large, red-brown spiculae. Abdomen a little shorter than head and thorax combined. Carina of tergite 6 without dentation but with small emargination, posterior margin of tergite 6 without spines, tergite 7 posteriorly slightly depressed; sternite 4 with broad straight opaque margin (fig. 23). Genitalia (figs. 24—26).

Sculpture: Clypeus anteriorly densely punctate, posteriorly with larger punctures; vertex with large punctures; distances between punctures smaller than punctures but between posterior ocelli and eye margin the punctation is much finer and near apical eye margin is a small irregular area with distances between punctures as large as punctures, mesoscutum shiny, with large punctures, distances between punctures in general smaller than punctures.

Vestiture: Vertical plane of mandible with white and long, yellow-brown hairs; the other plane with long, yellow-brown hairs. Clypeus densely covered with long, yellow-brown hairs. Vertex with dispersed long, yellow-brown hairs. Tempora with white hairs forming a thick tuft on the genae. Mesoscutum densely covered with long, yellow-brown hairs, leaving the sculpture visible; similar hairs on scutellum and axillae but more densely



Figs. 22—26. *M. feijeni* ♂ sp. n. 22: Tibia and basitarsus III (hairs omitted), 23: Tergite 6 and 7 (ventrally) and sternite 4, 24: Genitalia, 25: Penis valve (laterally), 26: Gonoforceps (from above).
Fig. 27. *M. feijeni* ♀ sp. n. 27: Mandible (biting part).

placed. Scutellum posteriorly and metanotum anteriorly with thin band of white tomentum. Metanotum and propodeum with light to yellow-brown hairs. Pronotum with light to yellow-brown hairs; conspicuous patch of densely placed yellowish white hairs below tegulae, anteriorly of spiracle 2. Upper part of meso- and metapleura with dispersed yellow-brown hairs, lower part with white hairs. Tergite 1 anteriorly with erect long, yellow-brown hairs, leaving the sculpture visible, hairs are more densely placed at the corners, posteriorly with a band of more recumbent, yellow-brown hairs, larger at the corners. Tergites 2—4 anteriorly with a small band of yellow-brown tomentum which may be worn away, followed by a broad band of dispersed short, yellow-brown hairs, leaving the tergites largely exposed; posteriorly there is a broad band of yellow-brown tomentum; on tergite 4 there are some dispersed curved, yellow-brown hairs superimposed on this tomentum; tergite 5 completely covered with yellow-brown tomentum, superimposed on which are dispersed yellow-brown hairs; these hairs are darker brown posteriorly; tergite 6 with white tomentum especially in the middle and some dispersed yellow-brown hairs. Coxae with dispersed long, white hairs. Femur I on the outer side along upper half with long, white hairs, along lower half with short, yellow-white hairs. Tibia I on the outer side with short, yellow-brown hairs especially along upper margin. Femur II and III with dispersed long, white hairs. Tibia II with long fringe of white hairs. Tibia III with a few dispersed short white hairs. Tarsi with short, white hairs on the outer side, red-brown at the inner side. Fascies sternales broad, white and continuous on sternites 1—3, less dense on sternite 4, especially in the middle.

Colour: Mandibles in general black but teeth dark red except point of lower tooth. Head, thorax and abdomen black. Tegulae light brown. Wings somewhat smoky.

Length of body 12 mm, of wing 8 mm.

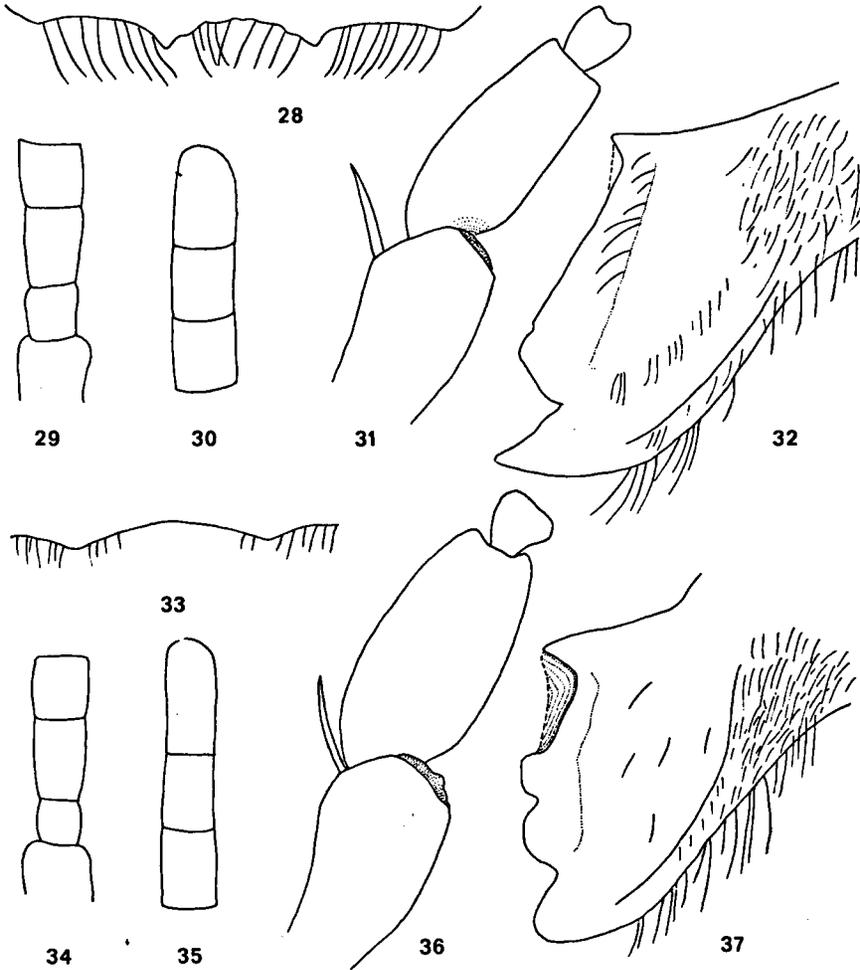
Description ♀:

Structure: Mandible shiny with little sculpturing, divided into two planes by a sharp incomplete carina. Mandible lacks teeth 2 and 3 and is straight at this level; cutting edge long but only slightly visible (fig. 27). Clypeal margin emarginated (fig. 28). Eyes slightly convergent. Vertex strongly emarginated posteriorly, interocellar distance about $1.3 \times$ ocello-occipital distance. Antenna (figs. 29—30). Basitarsus III enlarged; smaller in width than tibia (fig. 31). Abdomen a little shorter than head and thorax combined.

Sculpture: Clypeus irregularly punctate; distances between punctures smaller than punctures; irregular impunctate band medially from anterior to posterior margin. Vertex densely punctate with distances between punctures smaller than punctures; above apical eye margin small irregular area with distances larger than punctures. Mesoscutum with large punctures; distances between punctures smaller than punctures.

Vestiture: Smallest plane and adjacent small area of larger plane densely

covered with recumbent short, white hairs; outer margin of mandibles with dispersed long, yellow hairs; single row of erect, yellow hairs running along outer edge of upper plane, Face densely covered with yellow-brown hairs, which are dark brown behind anterior ocellus; some white tomentum in front of anterior ocellus. Tempora densely covered with white hairs. Genae with long, white hairs forming a loose tuft. Vertex with dispersed erect, yellow hairs. Mesoscutum centrally with white and black hairs, leaving the sculpture visible; along lateral and anterior margins hairs are white. Scutellum with white and yellow hairs; axillae with yellow and brown hairs.



Figs. 28—31. *M. feijeni* ♀ sp. n. 28: Clypeus rim, 29: Base of antenna, 30: Apex of antenna, 31: Tibia and basitarsus III (Hairs omitted).
Figs. 32—36. *M. horrida* ♀ sp. n. 32: Mandible (biting part), 33: Clypeus rim, 34: Base of antenna, 35 Apex of antenna, 36: Tibia and basitarsus III (Hairs omitted).
Fig. 37. *M. nigra* ♀ sp. n. 37: Mandible (biting part).

Anterior margin of metanotum with thin band of white tomentum; metanotum and propodeum with long, white hairs. Pronotum, meso- and metapleura with white hairs, leaving the sculpture visible; conspicuous dense patch of white hairs below tegulae, anteriorly of spiracle 2. Tergite 1 anteriorly with dispersed long erect, white hairs, corners and lateral margins with more densely placed white hairs; posterior margin with small band of more recumbent short white hairs. Tergite 2 anteriorly with short erect, white hairs, leaving the sculpture visible, posteriorly with small band of white tomentum; some white tomentum along side margins; tergites 3—5 anteriorly with dispersed very short, white hairs leaving the tergites almost completely exposed; posteriorly with band of white tomentum (which may have been partly worn away), some white tomentum along side margins. Tergite 6 with dispersed long, dark brown hairs and white tomentum anteriorly along side margins. Scopa white on sternite 2, yellow-brown on sternites 3—5 with some white hairs along lateral margins, especially so on sternites 3 and 4; sternite 6 anteriorly with red-brown hairs, posteriorly with black hairs; incomplete fascies sternales along outer margin of sternites 2—5.

Colour: Mandibles, head, thorax and abdomen black; tegulae brown. Legs black. Wings somewhat smoky especially apical half.

Length of body 14 mm, of wing 10 mm.

Nests: The females were building their nests in the small dykes around the rice fields. The nesting material consisted of grass leaves of about 5 cm.

Megachile horrida sp. n.

Material: 3 ♀, Zomba Pt. (Williams falls) 29.III.1971 (holotype) collected by G. G. M. Schulten; Limbe (Chichiri hill) 8.I.1973 (paratype); Zomba Pt. 9.III.1975 (paratype).

This species keys out as *Megachile dolichognatha* Ckll., but it has a smooth area in the middle of the clypeus; the vestiture of the clypeus consists of white and black hairs and scopa on sternites 5 and 6 is black.

Description ♀:

Structure: Mandible, with little sculpturing and shiny is divided into two planes by a sharp incomplete carina; mandible lacks teeth 2 and 3 and is straight at this level; cutting edge long but only slightly visible (fig. 32). Clypeus emarginated (fig. 33). Eyes convergent below. Vertex strongly emarginated posteriorly; interocellar distance 1.5 × ocello-occipital distance. Antenna (figs. 34—35). Basitarsus III slightly smaller than tibia but with the same width (fig. 36). Abdomen somewhat larger than head and thorax combined.

Sculpture: Clypeus rather irregularly punctate with large punctures; small impunctate band in the middle which extends a little into the supra-clypeal area. Vertex with large punctures, distances between punctures finely sculptured; between posterior ocellus and eye margin the punctures are smaller. Mesoscutum and scutellum with large punctures forming a reticulate pattern.

Vestiture: Vertical plane of mandible and adjacent part of other plane with tomentum-like white hairs and some dispersed much longer yellow hairs; outer margin of mandible with long, yellow-brown hairs. Clypeus with a mixture of white and long brown hairs, leaving the impunctate area exposed; along the lower half of the eye margins the hairs are white; laterally of the antenna the hairs are dark brown and between the antenna there are white and brown hairs. Behind anterior ocellus and in front of posterior ocelli the hairs are dark brown. Vertex with dispersed long, brown hairs. Tempora and genae with white hairs between which there are dispersed long, yellow hairs; white hairs on tempora are small near eye margin but become longer posteriorly; number of yellow hairs increases near genae where they form a loose tuft. Mesoscutum with long, dark brown hairs. Scutellum, metanotum and propodeum with white and yellow hairs, axillae with dark brown hairs. Pronotum with white and yellow-brown hairs. Upper half of meso- and metapleura with yellow-brown hairs, the lower half with white hairs; conspicuous patch of white hairs below tegulae. Tergite 1 anteriorly with long erect, red-brown hairs, posteriorly with a thick band of recumbent red-brown hairs. Tergite 2 anteriorly with dispersed shorter, red-brown hairs, posteriorly with a thick band of recumbent red-brown hairs. Tergite 3 anteriorly with dispersed short, red-brown hairs and some black hairs, posteriorly with broad band of light brown tomentum. Tergite 4 anteriorly with dispersed black hairs with some white hairs, anteriorly with a band of brownish white tomentum. Tergite 5 anteriorly with dispersed black hairs, posteriorly with a band of white tomentum on which long, black hairs are superimposed; side margins of tergites 1—5 anteriorly with short, white hairs between which there are some black hairs, there is an increasing number of black hairs from tergites 2 to 5. Tergite 6 with long dispersed, black hairs and some white tomentum especially posteriorly. Coxae and femores with long, white-yellow hairs. Tibiae and tarsi ciliated with white hairs; tarsi red-brown at the inner side. Scopa white-yellow on tergites 2—4, black on tergites 5 and 6; small incomplete fascies sternales on sternites 2—4.

Colour: Mandible largely red-brown except biting edge. Head, thorax and abdomen black. Tegulae brown. Legs red-brown. Wings hyaline.

Length of body 14 mm, of wing 9 mm.

Megachile michaelis Cockerell, 1931

2 ♀, Limbe 1.VI.1972; Cape Maclear 4.IV.1970.

Distribution: Only the type specimen is known (Zaire, Katanga). Since one specimen was collected at the same locality and date as *M. bucephala* var. they may belong to a still undescribed species. More specimens are needed in order to come to a final conclusion.

Section Semierma

Megachile nigra sp. n.

Material: 2 ♀, Nkhata Bay 19.XI.1970 (holotype) collected by G. G. M. Schulten; Nkhata Bay 19.XI.1970 (paratype).

This species resembles *M. caricina* Ckll. but can easily be recognised by its broader basitarsus III.

Description ♀:

Structure: Mandible shiny and sculptured, divided into two planes by a rounded complete carina; cutting edge between teeth 3 and 4; biting part of mandible (fig. 37). Clypeus emarginated with long stiff, reddish hairs in the inner margin (fig. 38). Eyes slightly convergent below. Vertex short, interocellar distance about $1.3 \times$ ocello-occipital distance. Antenna (figs. 39—40). Basitarsus III elongated, somewhat broader than tibia (fig. 41). Abdomen somewhat larger than head and thorax combined.

Sculpture: Clypeus generally with small punctures forming a reticulate pattern with an impunctate triangular area medially posterior which extends itself as an irregular impunctate thin band which reaches halfway down; supraclypeal area with larger punctures and with small irregular impunctate area adjacent to impunctate area of the clypeus. Vertex irregularly punctate with large punctures. Mesoscutum with finer punctation, distances between the punctures smaller than their diameter; distances finely sculptured.

Vestiture: Smallest plane of mandible with white hairs; exterior margin of mandible with dispersed long, yellow hairs. Clypeus centrally exposed with laterally situated, towards the centre converging, white hairs between which yellow hairs are dispersed; hairs between antennal sockets are grey to light brown, towards anterior ocellus darker and behind anterior ocellus dark brown. Vertex with dispersed dark brown hairs. Tempora with long white hairs which form a loose tuft of white to light yellow hairs on the genae. Mesoscutum in the middle and scutellum with short, brown hairs, leaving the sculpture easily visible; along anterior and lateral margins of mesoscutum there is a mixture of more densely placed gray and brown hairs; axillae anteriorly with densely placed brown hairs and posteriorly with some white hairs; posterior margin of scutellum and anterior margin of metanotum with thin band of white tomentum. Propodeum with dispersed long, white hairs, more densely placed at the sides. Lower part of pronotum with white and grey hairs; upper part with mixture of white and dark brown hairs. Mesopleura largely covered with long, grey-brown hairs, leaving the sculpture visible; along anterior and posterior margins the hairs are of a lighter grey-brown; conspicuous patch of densely placed white hairs below scapulae, anteriorly of spiracle 2. Upper part of metanotum with grey-brown hairs, lower part with white hairs. Coxae with dispersed yellow hairs. Tergite 1 anteriorly with dispersed long, white hairs which leave tergite largely exposed and much more densely placed white hairs at the corners; posteriorly there is a small continuous band of white tomentum, enlarged at the sides. Tergites 2—4 anteriorly with dispersed short, white hairs followed by an area of dispersed short, dark brown hairs (tergites are almost

completely exposed), posteriorly with small continuous bands of white tomentum, enlarged at the sides. Tergite 5 with dispersed short, dark brown hairs in the middle and dispersed white tomentum at the sides; posteriorly with a broad continuous band of white tomentum, superimposed on this tomentum is a row of curved, short, dark brown hairs. Tergite 6 with white tomentum and dispersed long, dark brown hairs. Scopa white on sternite 2 and anteriorly of sternite 3, red on sternites 3—5 and anteriorly on sternite 6, reddish-brown posteriorly. Fascies sternales visible through the scopa. Legs ciliated with white hairs. Inner side of tarsi red-brown.

Colour: Mandibles red-brown except teeth and outer margin. Head, thorax and abdomen black. Tegulae dark brown. Legs dark brown. Wings hyaline but somewhat smoky posteriorly.

Length of body 14 mm, of wing 9 mm.

Megachile attenuata Vachal, 1909

14 ♂, Limbe 14.IX.1971 (2); Limbe (Chancellor College) 20.IV.1970; Limbe (Maone) 14.VIII.1972, 17.VIII.1972; Limbe (Mt. Soche) 8.II.1972; Limbe (Ndirande Mt.) 15.XI.1970; Zomba (Mlunguzi Estate) 8.III.1975, 10.III.1975, 21.III.1975, 17.XII.1973; Zomba Pt. (Chingwe's hole) 11.I.1975, 25.I.1975, 25.X.1970.

10 ♀, Limbe (Chancellor College) 29.IV.1968; Zomba (Mlunguzi Estate) 2.II.1975, 8.II.1975 (4), 29.III.1975, 22.V.1975; Zomba (forestry road) 27.IV.1975; Ntchisi forestry 5.IV.1975; Kasungu (Lifupa dam) 12.IV.1975.

Distribution: East Africa (Mozambique, Zanzibar, Kenya, Uganda).

All males have, on tergite 1, a mixture of dark brown and white hairs and not only white hairs as has been described.

The differences between females of *M. caricina* Cockerell, 1907, and *M. attenuata* are very small. The latter species has its face covered with yellow hairs instead of white hairs and the base of tergites 2—5 is covered with black hairs instead of white hairs.

Two of our specimens (Zomba, Mlunguzi Estate 2.II.1975, 8.II.1975) have almost completely white hairs on the face but the base of tergites 2—5 has black to brown hairs.

Megachile kimilonana Cockerell, 1920

4 ♂, Kasungu (Lifupa dam) 20.IX.1972 (4).

Distribution: Zaire (Katanga, Kivu), East Africa (Tanzania, Kenya).

Megachile salsburyana Friese, 1922

1 ♂, Kasungu (Lifupa dam) 19.IX.1972.

Distribution: Rhodesia, Zambia, Zaire (Katanga).

Hairs on metanotum are, however, yellow-brown instead of pink. Propodeum has white-yellow hairs, not yellow. Upper part of meso- and metapleura yellow-brown not white.

Section Patellimana

Megachile konowiana Friese, 1903

4 ♂, Chimpeni farm (L. Chilwa) 17.II.1975 (2); Nkudzi Bay 27.III.1975; Salima (G.B.H.) 15.IV.1973.

Distribution: South and East Africa (Kalahari, Rhodesia, Malaŵi).

Section: unknown

Megachile aurifera Cockerell, 1935

1 ♀, Kasungu (Lifupa dam) 20.IX.1972.

Distribution: There is one specimen known from the Kalahari desert, one from Botswana (Palapye) and one from Rhodesia (Matopos).

Subgenus **Amegachile** Friese, 1909

Megachile bituberculata Ritsema, 1879

23 ♂, Mulanje Boma 30.III.1975; Limbe 14.IX.1971 (3); Limbe (Chichiri hill) 13.III.1975; Limbe (Maone) 11.II.1972, 11.IX.1972; Limbe (Mt. Soche) 15.IV.1972; Zomba (Mlunguzi Estate) 18.III.1975; Likangala river (L. Chilwa) 8.VI.1973; Khanda rice scheme (L. Chilwa) 5.III.1975; Cape Maclear 4.IV.1970, 7.V.1971; Bunda (C.o.A.) 25.IV.1970, 15.VI.1971 (5); Perkezi forest (Mzimba) 17.XI.1970, 22.XI.1970; Karonga 15.II.1971, 16.II.1971.

14 ♀, Limbe 25.XII.1971; Limbe (Mt. Soche) 15.IV.1972, 17.IV.1971, 16.V.1972; Limbe (Ndirande Mt.) 15.XI.1970; Zomba (Mlunguzi Estate) 22.II.1975 (3), 3.III.1975; Zomba (Chirungu Estate) 17.II.1975; Chimpeni farm (L. Chilwa) 17.II.1975; Likangala river (L. Chilwa) 24.IV.1975; Cape Maclear 4.IV.1970; Nkhata Bay 9.IV.1975.

Distribution: Central Africa from west (Liberia, Ghana) to east (Rhodesia, Zambia). In Malaŵi it is a common species with a wide vertical distribution (487 m—1290 m).

Megachile nasalis Smith, 1879

5 ♂, Khanda rice scheme (L. Chilwa) 19.III.1975; Nkudzi Bay 7.I.1972; Bunda (C.o.A.) 25.XII.1970; Salima (near rice field) 14.IV.1973; Kasungu (Lifupa dam) 19.IX.1972.

14 ♀, Mulanje Boma 30.III.1975 (2); Limbe (Maone) 7.IV.1973; Limbe (Mt. Soche) 17.IV.1971; Khanda river (L. Chilwa) 18.XII.1973 (4); Liwonde 23.IV.1975; Nkudzi Bay 7.I.1972; Monkey Bay 14.V.1975; Kasungu (Lifupa dam) 11.XI.1973; Nkhota Kota 6.IV.1975 (2).

Distribution: Southern and East Africa.

In Malaŵi it is a common species which does not seem to occur above 1200 m, however. All females belong to the variety *volkmanni* Friese, 1904.

Subgenus **Digitella** Pasteels, 1965

Megachile pycnocephala Pasteels, 1966

1 ♀, Cape Maclear 7.V.1971.

Distribution: Rhodesia (Inyanga National Park).

The basitarsus III in this species is enlarged but not as long as tibia III as has been described (cf. Pasteels, 1966). Scopa on sternite 6 has some red hairs anteriorly, the remainder is black.

Subgenus *Eutricharaea* Thomson, 1872

Section *Argentata*

Megachile gratioosa Gerstaecker, 1857

8 ♂, Limbe 28.IX.1971, 10.X.1971; Khanda river (L. Chilwa) 11. XII.1973; Nkudzi Bay 6.I.1972 (2); Monkey Bay 23.III.1975; Cape Maclear 7.V.1971 (2).

17 ♀, Limbe 14.IX.1971 (5), 7.XI.1970, 20.XI.1971 (2), 26.XI.1971, 19.XII.1971, 28.XII.1970; Zomba (Mlunguzi Estate) 8.III.1975 (2); Khanda 18.XII.1973 (2); Mpepwe 10.XI.1970; Nkudzi Bay 7.I.1972; Bunda (C.o.A.) 10.XI.1970.

Distribution: Africa south of the Sahara. In Malaŵi it is probably a common species.

In all specimens the scopa is white on sternite 2, in the middle of the anterior margin of sternite 3 and along the outer sides of sternite 4. Sternite 6 has brown to black hairs. The remaining part of the scopa is orange, but there may be some black hairs along the outer side of sternite 5. According to Pasteels (1965) sternite 4 is completely orange and the black hairs on sternite 5 are always present.

Megachile semiflava Cockerell, 1935

11 ♂, Limbe 14.IX.1971 (6), 20.XI.1971; Khanda river (L. Chilwa) 11.XII.1973; Cape Maclear 4.IV.1970, 7.V.1971; Kasungu 22.XI.1970.

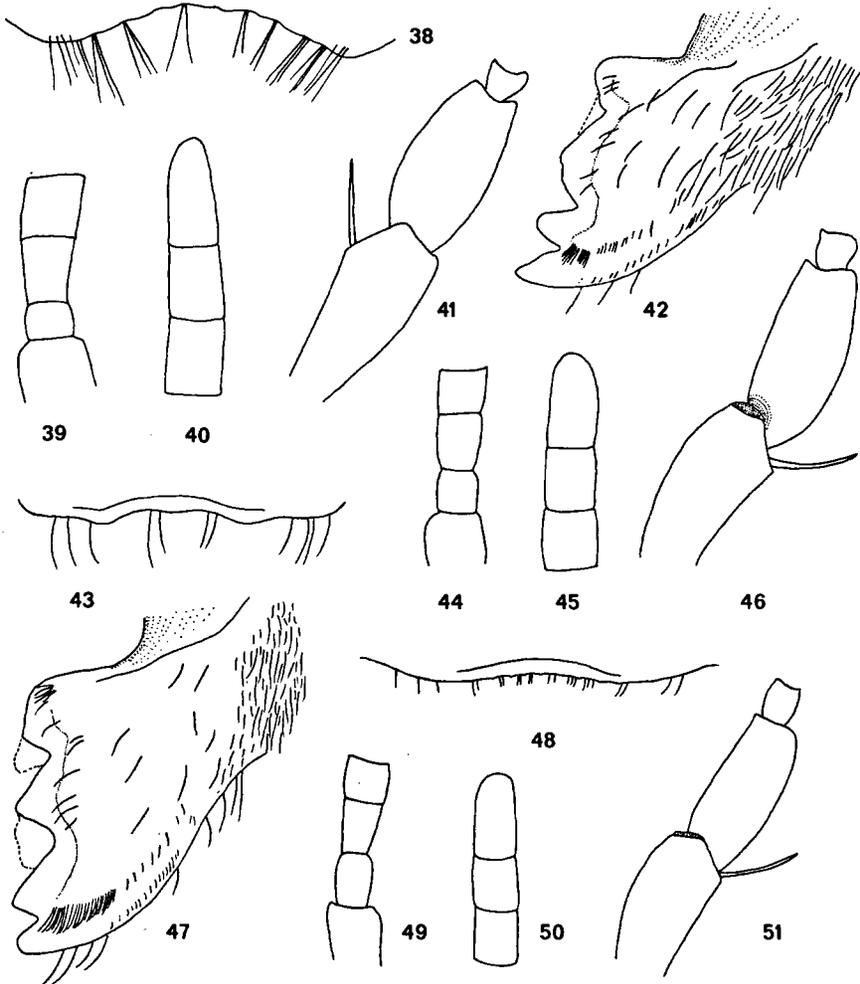
35 ♀, Limbe 1.VI.1972, 10.VI.1972 (3), 14.IX.1971 (10), 28.IX.1971 (3), 10.X.1971, 26.XI.1971, 19.XII.1971; Zomba (Mlunguzi Estate) 2.II.1975 (2), 8.III.1975 (4), 23.III.1974; Chimpeni farm (L. Chilwa) 17.II.1975; Khanda rice scheme (L. Chilwa) 5.II.1975 (3), 23.X.1972; Liwonde 23.IV.1975; Nkudzi Bay 7.I.1972; Cape Maclear 4.IV.1970; Salima (G.B.H.) 25.II.1975; Vipyra Pt. 26.IX.1971 (2); Nkhata Bay 27.IX.1974.

Distribution: South and South East Africa (Cape, Natal, Transvaal, Rhodesia, Zambia). In Malaŵi it is probably a common species. One male specimen from Limbe 14.IX.1970 has, however, white hairs on tergites 1—4 instead of yellow hairs. Another specimen of the same series has white hairs on tergite 1 while the hairs on tergites 2—4 are yellow-white. In some female specimens the hairs at the base of tergites 2—4 appear to be more white than yellow. White hairs on the base of tergites 2—4 is typical for *M. rhodesica* Cockerell, 1920. This coloration may however be the normal variation in *M. semiflava*.

Megachile sp. aff. semiflava Cockerell, 1935

5 ♀, Limbe 30.IX.1971, 20.XI.1971; Zomba Pt. (Chingwe's hole) 27.I.1971; Vipya Pt. 26.IX.1971, 27.XI.1970.

The hairs on the base of tergites 2—4 are reddish-brown, not yellow. This may be an undescribed species or forma.



Figs. 38—41. *M. nigra* ♀ sp. n. 38: Clypeus rim, 39: Base of antenna, 40: Apex of antenna, 41: Tibia and basitarsus III (hairs omitted).

Figs. 42—46. *M. zombae* ♀ sp. n. 42: Mandible (biting part), 43: Clypeus rim, 44: Base of antenna, 45: Apex of antenna, 46: Tibia and basitarsus III (hairs omitted).

Figs. 47—51. *M. mlunguziensis* ♀ sp. n. 47: Mandible (biting part), 48: Clypeus rim, 49: Base of antenna, 50: Apex of antenna, 51: Tibia and basitarsus III (hairs omitted).

Megachile ekuviella Cockerell, 1909

1 ♂, Bunda (C.o.A.) 25.XII.1970.

Distribution: Southern and East Africa (South Africa, Orange Free State, Angola, Zaire (Katanga, Kivu), Rhodesia, Zambia).

Megachile uamiella Pasteels, 1965

2 ♂, Kasungu (Lifupa dam) 19.IX.1972 (2).

Distribution: Central African Republic.

Megachile rufohirtula Cockerell, 1937

5 ♀, Limbe 28.IX.1971; Khanda river (L. Chilwa) 11.XII.1973; Kasungu (Lifupa dam) 11.IV.1975, 12.IV.1975 (2).

Distribution: Southern and East Africa.

Megachile zombae sp. n.

Material: 1 ♀, Zomba plateau 17.X.1973 (holotype) collected by H. R. Feijen.

This species closely resembles *M. rufohirtula* Cockerell but differs by its longer vertex, its dark, red-brown hairs on sternite 5 and black hairs on sternite 6 (in stead of resp. orange and orange-black).

Description ♀:

Structure: Mandible, sculptured and shiny, divided into two planes by a rounded incomplete carina. Near apical tooth there are two small brushes. Cutting edge between teeth 3 and 4; biting part of mandible (fig. 42). Clypeus slightly emarginated (fig. 43). Vertex short, interocellar distance twice ocello-occipital distance. Antenna (figs. 44—45). Basitarsus III elongated, slightly smaller than tibia (fig. 46). Abdomen compact, slightly shorter than head and thorax combined.

Sculpture: Clypeus with impunctate anterior margin and irregular impunctate band medially from anterior to posterior margin, extended into supraclypeal area as an impunctate area. Clypeus with reticulate punctation alongside impunctate band and a much finer punctation near eye margin. Vertex with large punctures, reticulate; near apical eye margin distances between punctures slightly larger. Mesoscutum and scutellum with slightly smaller punctures, reticulate.

Vestiture: Smallest plane of mandible with white hairs which merge into long dispersed, yellow-brown hairs. Outer margin of mandible with dispersed long, dark brown hairs. Clypeus densely covered with white and yellow-brown hairs leaving impunctate band on clypeus exposed. Densely placed long, brown hairs behind anterior ocellus. Vertex with rather densely placed long, brown hairs. Tempora with long, white hairs which form a rather dense tuft near genae; hairs apically on tempora have a light brownish tinge; hairs on genae are yellowish. Mesoscutum densely covered with long, grey-brown hairs but leaving sculpture still visible; along anterior and lateral margins hairs are more dense and white to light brown. Anterior and posterior margins of scutellum with some white tomentum; scutellum and

axillae with dispersed long, light brown hairs; posteriorly on axillae, hairs are white to light brown. Metanotum with white tomentum along anterior margin and with dispersed long, white hairs. Propodeum with long, white hairs. Pronotum with long, white hairs. Meso- and metapleura densely covered with long, white hairs which have a light brown tinge. Mesothorax below with long, white hairs but on coxa I hairs are yellow-brown. Tergite 1 anteriorly with dispersed long, white to light brown hairs, more dense at the anterior corners; posteriorly with a dense row of shorter, orange-brown hairs. Tergite 2 anteriorly with orange-brown hairs, posteriorly with a band of white tomentum enlarged at the sides. Tergites 3—4 anteriorly with thin band of dispersed short, white hairs followed by a much broader area of dispersed short, orange-brown hairs, posteriorly with a thick band of white tomentum enlarged at the sides; superimposed on the white tomentum there are, on tergite 3, some curved, brown hairs, on tergite 4, however, there is a row of dark brown curved hairs. Tergite 5 with dispersed black hairs and posteriorly with a broad band of white tomentum. Bands of white tomentum are clearly double on tergites 4 and 5, less obvious on tergite 3. Tergite 6 with some white tomentum and dispersed curved, black hairs. Scopa white on sternite 2; white-yellow anteriorly on sternite 3; orange-brown on sternites 3 and 4; dark red-brown on sternite 5 and black on sternite 6. Short continuous fascies sternales visible through scopa. Legs ciliated with white hairs.

Colour: Mandible with small red band behind teeth. Remainder of mandibles, head, thorax and abdomen black. Tegulae dark brown, light brown along outer margin. Legs dark brown. Wings hyaline.

Length of body 10 mm, of wing 7 mm.

Megachile asarna Cockerell, 1937

1 ♀, Nkhota Kota 14.XII.1971.

Distribution: Only the type specimen is known (South Africa, Cape).

Section Malangensis

Megachile astridella Pasteels, 1965

2 ♂, Limbe (Maone) 14.VIII.1972; Likangala river (L. Chilwa) 15.VI.1973.

Distribution: South Africa (Cape, Zululand), Kenya, Rwanda.

Section Pilosella

Megachile pilosella Friese, 1922

6 ♂, Zomba Pt. 11.V.1975 (2); Zomba Pt. (Chingwe's Hole) 25.I.1970. Hairs on face and mesonotum yellow according to description.

Zomba Pt. 11.V.1975, 24.XI.1971; Zomba Pt. (Mlunguzi stream) 1.IV.1971. Hairs on face and mesonotum white.

20 ♀, Mulanje Mt. (Lichenya Pt.) 4.IV.1971 (4); Zomba Pt. 11.V.1975 (3), 14.XI.1971, 24.XI.1971 (4); Zomba Pt. (Queen's View) 26.I.1975 (2), 25.X.1970 (2); Zomba Pt. (Chingwe's Hole) 11.I.1970, 25.I.1970, 25.X.1970, 1.XI.1970.

Distribution: Rhodesia, Zambia, Malaŵi. In Malaŵi this species only occurs above 1650 m.

Subgenus **Paracella** Pasteels, 1965

Megachile semivenusta Cockerell, 1931

19 ♂, Mulanje 19.X.1971; Limbe 14.IX.1971 (4), 28.IX.1971, 10.X.1971 (2); Limbe (Maone) 17.VIII.1972; Limbe (Mt. Soche) 16.X.1971; Likangala river (L. Chilwa) 24.IV.1975 (2), 25.V.1975, 15.VI.1975; Liwonde 23.IV.1975; Cape Maclear 4.IV.1970, 7.V.1971.

14 ♀, Limbe 19.XII.1971; Khanda river 18.XII.1973 (2); Zomba (Mlunguzi Estate) 2.II.1975, 8.II.1975, 3.III.1975, 18.IV.1975, 27.IV.1975, 2.V.1975; Nkudzi Bay 7.I.1972; Bunda (C.o.A.) 1.1.1972, 15.VI.1971; Kasungu (Lifupa dam) 20.IX.1972; Nkhata Bay 27.IV.1974.

Distribution: Tropical Africa from Rhodesia to Liberia. In Malaŵi it is probably a common species.

The identification of females is somewhat dubious. They all key out as *M. semivenusta*. The specimens from Zomba, Bunda, Kasungu and Nkhata Bay do not have an obvious elongated abdomen which is considered typical for this species. In addition the hairs on tergites 2—4 are dark brown in certain specimens (Zomba) in stead of yellow-brown but there are also specimens with an intermediate coloration.

The taxonomic problems with this large group of small black and brown *Megachile* (*M. gratiosa*, *M. semivenusta* and related species) can only be solved by outbreeding of nests.

Megachile spec. aff. semivenusta Cockerell, 1931

1 ♂, Mpatamanga Gorge 2.V.1971.

This specimen looks very similar to *M. semivenusta* but it lacks the black spot at the inner side of front tarsus 2. This is probably a new species but the specimen is in too poor a condition to base a description on.

Megachile lutescens Cockerell, 1937

3 ♀, Monkey Bay 23.III.1975 (2); Nkhata Bay 19.XI.1970. *M. lutescens* Cockerell, 1937 is considered by Pasteels, 1965 to be synonymous with *M. curtula* Gerstaecker, 1857. The specimens from Malaŵi key out as *M. curtula* but on tergite 5 there are long red hairs in stead of black ones. The scopa is white-yellow on sternite 2, straw-yellow in sternites 3—5 and dark brown to black on sternite 6 in stead of yellowish anteriorly, reddish in the centre and black on sternites 5 and 6.

The Malaŵi specimens agree completely with those on which Cockerell, 1937 based his description of the female of *M. lutescens*. Therefore the name *M. lutescens* is reintroduced again.

Megachile mlunguziensis sp. n.

Material: 2 ♀, Zomba Pt. (Mlunguzi stream) 25.X.1971 (holotype) collected

by G. G. M. Schulten; Zomba Pt. (tributary of Mlunguzi) 10.XII.1973 (paratype).

The key of Pasteels, 1965 leads to *M. abongana* Strand from which species *M. mlunguziensis* differs in vestiture of mesonotum and abdomen.

Description:

Structure: Mandible, shiny with little sculpturing, divided into two planes which gradually merge together. Cutting edges between teeth 2—3 and 3—4; biting part of mandible (fig. 47). Clypeus with smooth anterior margin and slightly emarginated (fig. 48). Vertex short, interocellar distance about $1.1 \times$ ocello-occipital distance. Antenna (figs. 49—50). Basitarsus III elongated, slightly smaller than tibia (fig. 51). Abdomen as broad as thorax but a little shorter than length of head and thorax combined.

Sculpture: Clypeus shiny with irregular, small impunctate band medially posterior to halfway down clypeus and extended into supraclypeal area; punctures along-side impunctate band large with distances between punctures smaller than punctures; near eye margin a much finer punctation. Vertex with large punctures, distances smaller than punctures but a finer punctation between posterior ocelli and area near apical eye margin with larger distances between punctures. Mesoscutum and scutellum with smaller punctures; distances between punctures finely sculptured and equal to or somewhat smaller than their diameter.

Vestiture: Smallest plane of mandible with white hairs; outer margin of mandible with dispersed long, yellow hairs. Lateral margins of clypeus with white hairs, central part with widely dispersed white hairs leaving clypeus exposed. Densely placed short, white hairs along eye margins; long, white hairs between antennal sockets which merge into a mixture of white and dark brown hairs towards ocelli; semicircular row of long, dark brown hairs from inner margin of eyes posteriorly along anterior ocellus. Vertex with dispersed dark brown hairs. Tempora densely covered with white hairs which merge into a loose tuft on genae. Mesoscutum with some white tomentum leaving sculpture easily visible; centrally with dispersed long, dark brown hairs with few white hairs; along the anterior, posterior and lateral margins more densely placed white hairs. Scutellum with white tomentum, and especially posteriorly with dispersed long, dark brown hairs and few somewhat shorter white hairs; on axillae white hairs are more numerous. Metanotum with thin band of white tomentum along anterior margin and dispersed long, white hairs. Propodeum posteriorly with long, white hairs, laterally these hairs have a light brown tinge. Pronotum laterally with mixture of long, white and dark brown hairs, lower part with shorter white hairs. Meso- and metapleura with long, white hairs but sculpture remains visible. Patch of more densely placed white hairs below tegulae anteriorly of spiracle 2. Coxae with light-yellow hairs. Tergite 1 with dispersed long, white hairs centrally, more dense and longer on the anterior corners. Tergites 2—5 posteriorly with thin bands of white tomentum, slightly

enlarged at the sides; bands very thin centrally but complete on tergites 2—3, less obvious or incomplete on tergites 4—5. Tergite 2 anteriorly with dispersed short, white hairs, posteriorly with dark brown hairs. Tergites 3—5 anteriorly with dispersed short, dark brown hairs, in front of white tomentum there is a row of curved, dark brown hairs on tergites 4 and 5, less obvious on tergite 3; in addition there are curved, dark brown hairs dispersed over tergite 5. Tergites 2—5 remain almost completely exposed. Tergite 6 anteriorly with curved, black hairs, recumbent hairs posteriorly. Scopa white on sternites 2—5 with some black hairs at the sides, sternite 6 with black hairs. Short continuous fascies sternales visible through scopa. Legs ciliated with white hairs; tarsi yellow-brown at the inner side. Colour: Mandible black except irregular red band behind teeth. Head, thorax, abdomen black. Tegulae brown, opaque at the outer margin. Legs brown to black. Wings hyaline. Length of body 10 mm, length of wing 7 mm.

Megachile punctomarginata sp. n.

Material: 1 ♂, Limbe (Maone) 11.IX.1972 (holotype) collected by H. R. Feijen.

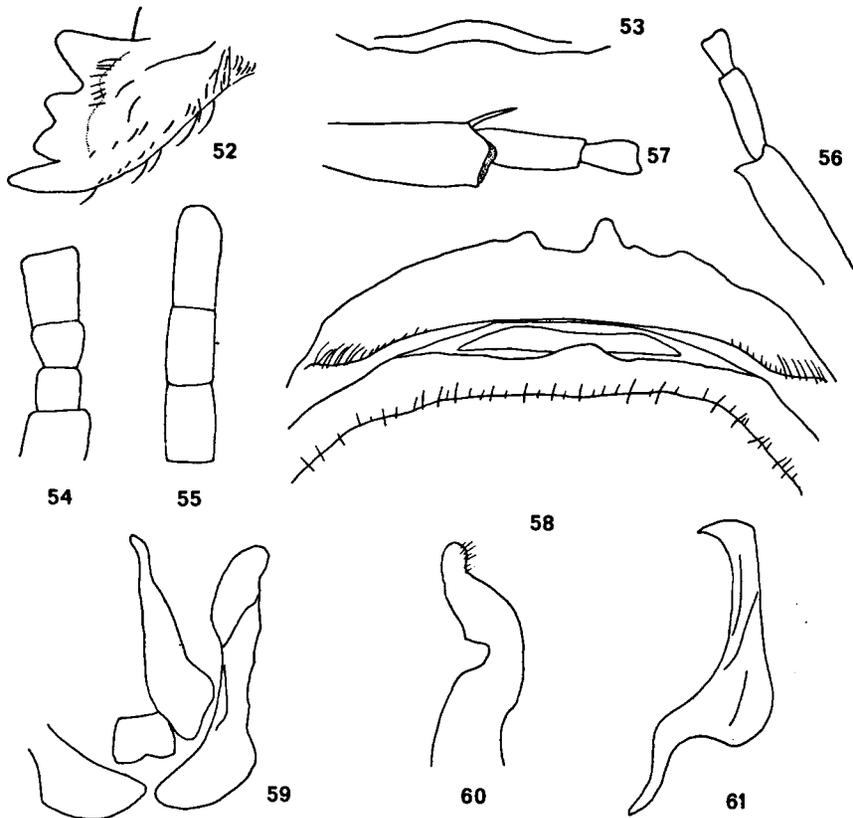
Description:

Structure: Mandibles shiny with little sculpturing, divided into two planes by a rounded incomplete carina; biting part of mandible with four teeth, the two central teeth are small, the posterior tooth enlarged (fig. 52). Clypeus rim smooth with small emargination in the middle (fig. 53). Vertex long, ocello-occipital distance about $1.2 \times$ interocellar distance. Antenna (figs. 54—55). Basitarsus I elongated but not modified (fig. 56). Basitarsus III elongated but narrow; less than half the width of tibia (fig. 57). Coxal spines short, thin and pointed, with small tuft of yellow hairs near top and dispersed long, white hairs anteriorly; small patch of red spiculae laterally of basis. Coxae with dispersed long, white hairs. Carina of tergite 6 with small emargination and two short flat teeth; posterior margin without teeth. Sternites 1—3 with large opaque margin. Sternite 4 with opaque margin which is enlarged and pointed in the middle (fig. 58). Abdomen rectangulate, slightly shorter than head and abdomen combined. Genitalia cf. figs. 59—61.

Sculpture: Clypeus anteriorly finely punctate, posteriorly with larger punctures. Vertex with large punctures, distances between punctures smaller than punctures and finely sculptured. Mesoscutum and scutellum with large punctures, distances between punctures smaller than punctures and finely sculptured.

Vestiture: Vertical plane of mandible with white hairs, outer margin with dispersed long, yellow hairs. Clypeus and face with long, white hairs, especially along the margins and leaving sculpture in the middle partly visible. Long, red-brown hairs behind anterior ocellus. Vertex with dispersed long, dark brown hairs. Mesoscutum with dispersed dark brown hairs and some shorter white hairs in the middle, leaving the sculpture visible, more

densely placed white hairs along the anterior and posterior margins. Scutellum and axillae with long, dark brown hairs mixed with white hairs. Remainder of thorax with long, white hairs, leaving sculpture partly visible. Tergite 1 anteriorly with dispersed long, white hairs, more densely placed at the corners, posteriorly with white tomentum at the corners and dispersed dark brown hairs in the middle, leaving sculpture visible. Tergite 2 anteriorly with few white hairs, followed by a broad band of dispersed short, dark brown hairs, posteriorly with a continuous band of white tomentum. Tergites 3—5 posteriorly with a continuous band of white tomentum; tergite 3 anteriorly with dispersed short, dark brown hairs; tergites 4—5 anteriorly with similar but black hairs, on tergite 5 hairs are much longer. Tergite 6 with white tomentum, on which dispersed long, black hairs are superimposed. Sternites 1—3 with white fascies, enlarged at the sides; sternite 4 with short fascies only at the sides. Femora I—III with long, white hairs. Tibia



Figs. 52—61. *M. punctomarginata* ♂ sp. n. 52: Mandible (biting part), 53: Clypeus rim, 54: Base of antenna, 55: Apex of antenna, 56: Tibia and basitarsus I (hairs omitted) 57: Tibia and basitarsus III (hairs omitted), 58: Tergites 6 and 7 (ventrally) and sternite 4, 59: Genitalia (dorsally), 60: Gonoforceps (laterally), 61: Penis valve (laterally).

I—III with shorter white hairs. Tibia III apically on outer side with a dense patch of white hairs. Front tarsi fringed with long, white hairs; tarsi II and III with shorter white hairs.

Colour: Mandibles black but teeth dark red. Clypeus, thorax and abdomen black. Tegulae black but dark brown at outer side. Legs black on the outer side, reddish brown on inner side. Wings somewhat smoky.

Length of body 10 mm, of wing 7 mm.

Megachile spec. aff. *niveicauda* Cockerell, 1931

1 ♂, Perkezi forest (Mzimba) 17.XI.1970.

This species resembles *M. niveicauda* in respect to mandibles, length of vertex, front tarsi, tarsi III, shape of tergites, sternites and genitalia but the carena is clearly dented and the vestiture does not correspond exactly to the description. This is probably an undescribed species but it is in too poor a condition to base a description upon.

Section Fulvitaris

Megachile fulvitaris Friese, 1910

2 ♀, Limbe (Ndirande Mt.) 8.III.1970 (2).

Distribution: Zaire (Katanga), Malaŵi, Tanzania, Uganda.

Section Apiformis

Megachile apiformis Smith, 1853

10 ♂, Limbe 14.IX.1971 (4), 28.IX.1971, 10.X.1971 (2); Limbe (Ndirande Mt.) 21.V.1975; Zomba Pt. (Queen's View) 25.I.1971 (2).

13 ♀, Limbe 28.IV.1971, 28.IX.1971 (3), 28.XII.1970; Limbe (Chichiri hill) 22.III.1970; Limbe (Ndirande Mt.) 15.XI.1970 (2); Zomba (Mlunguzi Estate) 3.VI.1974; Zomba Pt. 1.XI.1970; Zomba Pt. (Chingwe's Hole) 25.X.1970, 1.XI.1970; Bunda (C.o.A.) 25.XII.1970.

Distribution: Southern and East Africa — South Africa (Cape), Rhodesia, Zaire (Katanga, Kivu), Malaŵi, Tanzania —. In Malaŵi this species occurs above 1170 m.

Megachile ungulata Smith, 1853

14 ♂, Limbe 28.IX.1971, 10.X.1971; Limbe (Chichiri Hill) 13.III.1975; Limbe (Mt. Soche) 21.XI.1971; Zomba Pt. 17.X.1972 (2), 24.XI.1971; Zomba Pt. (Queen's View) 25.X.1970; Zomba Pt. (Chingwe's Hole) 25.I.1970 (3), 25.X.1970; Bunda (C.o.A.) 15.VI.1971 (2).

Distribution: Southern and East Africa — South Africa (Cape), Tanzania —. In Malaŵi this species occurs above 1170 m.

Megachile harrarensis Friese, 1915

7 ♂, Limbe (Mt. Soche) 15.IV.1972, 19.XII.1970; Zomba Pt. 1.XI.1974; Zomba Pt. (Queen's View) 25.X.1970; Zomba Pt. (Chingwe's Hole) 11.I.1970 (2), 27.I.1971.

Distribution: Zaire (Kivu), Rwanda, Kenya, Ethiopia. In Malaŵi this species is found above 1200 m.

Genus *Chalicodoma* Lepeletier, 1841

Subgenus *Pseudomegachile* Friese, 1899

Section *Fulva*

***Chalicodoma congruens natalensis* (Friese, 1903)**

1 ♂, Nkudzi Bay 14.V.1975.

Distribution: South Africa (Natal), Zaire (Katanga, Kivu), Rwanda, Rhodesia, Zambia, Malaŵi.

***Chalicodoma sinuata sinuata* (Friese, 1903)**

3 ♂, Nkudzi Bay 7.I.1972; Kasungu (Lifupa dam) 19.IX.1972, 20.IX.1972.

21 ♀, Mpatamanga gorge 15.V.1972; Khanda rice scheme (L. Chilwa) 19.III.1975; Liwonde 23.IV.1975 (3); Nkudzi Bay 21.III.1975, 23.III.1975 (4), 14.V.1975 (2); Cape Maclear 4.IV.1970 (2); Salima (G.B.H.) 25.II.1975 (2), 14.IV.1973, 15.IV.1973; Kasungu (Lifupa dam) 20.IX.1972.

Distribution: Rhodesia, Zambia, Malaŵi, Zaire (Katanga, Kivu), Burundi, Uganda, Kenya. In Malaŵi it is probably a common species with a wide vertical distribution (234 m—1021 m).

Section *Cyanipennis*

***Chalicodoma marchalli* (Friese, 1904)**

2 ♂, Liwonde 23.IV.1975; Nkudzi Bay 14.V.1975.

3 ♀, Nkudzi Bay 9.IV.1972; Cape Maclear 7.V.1971 (2).

Distribution: Southern Africa (Kalahari desert), Zaire (Katanga), East Africa.

In the males the hairs on the vertex are white-yellow not bright red. In the females the scopa is white not golden yellow.

***Chalicodoma kigonserana* (Friese, 1903)**

1 ♀, Khanda rice scheme (L. Chilwa) 1.V.1973.

Distribution: Rhodesia, Zambia, Zaire (Katanga), Uganda, Kenya.

***Chalicodoma semicognata* (Cockerell, 1937)**

1 ♀, Cape Maclear 4.IV.1970.

Distribution: Rhodesia, Zambia, Malaŵi.

Subgenus *Neglectella* Pasteels, 1965

Section *Armatipes*

***Chalicodoma laminata* (Friese, 1903)**

13 ♂, Limbe 2.VII.1971; Limbe (Chancellor College) 20.IV.1968, 1.V.1968; Limbe (Chichiri Hill) 15.IV.1970; Zomba (Mlunguzi Estate) 21.III.1975,

23.III.1974, 12.IV.1974 (2); Chikaluma village (L. Chilwa) 1.III.1974 (3); Domasi rice scheme (L. Chilwa) 19.III.1975; Salima (G.B.H.) 15.IV.1973.

21 ♀, Thuchila 4.V.1971 (2); Limbe (Chancellor College) 3.V.1968 (2); Limbe (Chichiri Hill) 15.IV.1970; Limbe (Maone) 1.IV.1972, 4.V.1973; Limbe (Mt. Soche) 29.IV.1972 (2); Zomba (Mlunguzi Estate) 27.IV.1975; Khanda rice scheme (L. Chilwa) 19.III.1975 (2); Monkey Bay 23.III.1975 (2); Salima (beach) 16.III.1970 (2); Salima (G.B.H.) 25.II.1975 (4), 16.IV.1973.

Distribution: East Africa (from the Cape to Dar-es-Salaam). In Malaŵi it is probably a common species below 1200 m.

Section Scindularia

Chalicodoma spec. aff. combinata Pasteels, 1965

1 ♂, Nkudzi Bay 7.I.1972.

Distribution; Only the holotype and paratype are known (Kenya). Our specimen agrees with the structural characters of *C. combinata* but differs in vestiture. Hairs on metanotum are a mixture of red-brown and white (not grey) hairs. Tergite 2 has red-brown hairs anteriorly (not white) and there are no black hairs on apex of tergite 4. Our specimen is very probably *C. combinata* but it could not be compared with the holotype.

Subgenus Carinella Pasteels, 1965

Chalicodoma torrida pachingeri (Friese, 1903)

7 ♂, Likangala river (L. Chilwa) 25.V.1975 (2); Cape Maclear 4.IV.1970 (2); Salima (G.B.H.) 25.II.1975 (3).

8 ♀, Limbe 7.XI.1970; Khanda rice scheme (L. Chilwa) 19.III.1975; Zomba (Mlunguzi Estate) 13.IV.1974, 18.IV.1975 (2), 27.IV.1975; Nkudzi Bay 14.V.1975; Nkhata Bay 27.IX.1974.

Distribution: Rhodesia, Zambia, Zaire (Katanga, Kivu, Kasai), Malaŵi, Moçambique, Kenya. In Malaŵi it is probably a common species below 1200 m.

Chalicodoma silverlocki (Meade-Waldo, 1913)

5 ♂, Cape Maclear 4.IV.1970 (5).

2 ♀, Liwonde 23.IV.1975; Salima (F.M.B. depot) 16.III.1970.

Distribution: Zaire, Malaŵi, Moçambique, Kenya.

Subgenus Callomegachile Michener, 1962

Section Rufipennis

Chalicodoma rufipennis (Fabricius, 1793)

6 ♂, Limbe 19.XII.1970; Limbe (Maone) 25.III.1973, 20.IV.1973, 23.IV.1973; Salima (G.B.H.) 25.II.1975, 15.IV.1973.

13 ♀, Limbe (Chancellor College) 3.V.1968; Limbe (Maone) 22.IV.1973,

28.IV.1973; Zomba (Mlunguzi Estate) 18.III.1975 (2), 18.IV.1975, 27.IV.1975 (3); Salima (G.B.H.) 26.II.1975, 15.IV.1973; Nkhota Kota 6.IV.1975 (2).

Distribution: Zaire (Katanga, Kivu), East Africa. In Malaŵi it is probably a common species below 1190 m.

***Chalicodoma chrysorrhaea* (Gerstaecker, 1857)**

3 ♂, Khanda river (L. Chilwa) 7.I.1974; Cape Maclear 4.IV.1970; Nkudzi Bay 7.I.1972.

53 ♀, Mpatamanga gorge 15.V.1972 (3); Limbe 25.XII.1971; Limbe (Chancellor College) 3.V.1968; Zomba (Mlunguzi Estate) 17.IV.1975 (2), 18.IV.1975 (3), 27.IV.1975 (2); Likangala rice scheme (L. Chilwa) 8.III.1973; Khanda river (L. Chilwa) 2.III.1975, 5.III.1975, 19.III.1975 (4), 30.III.1975 (2); Domasi rice scheme (L. Chilwa) 19.III.1975; Liwonde 23.IV.1975, 24.IV.1975 (2); Nkudzi Bay 7.I.1972, 23.III.1975 (2), 14.V.1975 (4); Cape Maclear 4.IV.1970 (4), 16.XII.1972; Monkey Bay 23.III.1975; Salima (G.B.H.) 25.II.1975, 26.II.1975 (2), 14.IV.1973 (2), 15.IV.1973 (5), 16.IV.1973; Kasungu 11.II.1971; Kasungu (Lifupa dam) 20.IX.1972; Nkhota Kota 14.XII.1971 (2).

Distribution: Southern and East Africa. In Malaŵi it is a common species below 1170 m.

Section Transiens

***Chalicodoma anomomaculata* Pasteels, 1965**

5 ♀, Lichenya Pt. (Mt. Mulanje) 5.VII.1971 (5).

Distribution: Rhodesia, Zambia, Tanzania.

In Malaŵi this species is probably only found on the plateaux areas at high altitude.

Section Antinorii

***Chalicodoma antinorii* (Gribodo, 1879)**

7 ♂, Thuchila 4.V.1971; Limbe 15.V.1972; Limbe (Maone) 28.IV.1973, 30.IV.1973; Limbe (Mt. Soche) 16.IV.1972, 29.IV.1972, 9.V.1970.

Distribution: Tanzania, Kenya, Ethiopia.

Subgenus *Maximegachile* Guiglia & Pasteels, 1961

***Chalicodoma maxillosa* (Guerin, 1895)**

1 ♀, Kasungu (Lifupa dam) 20.IX.1972.

Distribution: Africa south of the Sahara.

Subgenus *Stenomegachile*

***Chalicodoma atopognatha* (Cockerell, 1933)**

2 ♀, Chikwawa 29.III.1970; Cape Maclear 4.IV.1970.

Distribution: Rhodesia.

Subgenus *Gronoceras* Cockerell, 1907

***Chalicodoma bombiformis bombiformis* (Gerstaecker, 1857)**

6 ♂, Likangala river (L. Chilwa) 24.XII.1973; Salima (G.B.H.) 14.IV.1973, 15.IV.1973 (2), 16.IV.1973; Kasungu 11.II.1971.

3 ♀, Zomba (Chirungu Estate) 17.II.1975; Zomba (Mlunguzi Estate) 18.IV.1975; Khanda rice scheme (L. Chilwa) 19.III.1975.

Distribution: Rhodesia, Zaire (Katanga, Kasai), Moçambique.

***Chalicodoma cincta nigrocincta* (Ritsema, 1874)**

69 ♂, Limbe 25.XII.1971; Limbe (Chancellor College) 20.II.1973; Limbe (Chichiri Hill) 13.III.1975 (4), 1.IV.1970, 2.IV.1970 (2); Limbe (Maone) 10.II.1973, 11.II.1973, 25.II.1973, 7.IV.1973, 10.V.1973, 12.V.1973; Limbe (Mt. Soche) 15.IV.1972; Zomba (Chirungu Estate) 17.II.1975 (4); Zomba (Mlunguzi Estate) 10.III.1974 (2), 16.III.1974, 18.III.1975, 21.III.1975, 18.IV.1975; Chimpeni farm (L. Chilwa) 17.II.1975 (3); Likangala river (L. Chilwa) 10.III.1975, 18.XII.1973; Chikaluma village (L. Chilwa) 1.III.1974; Khanda rice scheme (L. Chilwa) 2.III.1975 (7), 5.III.1975 (15), 19.III.1975 (8), 30.III.1975; Domasi rice scheme (L. Chilwa) 19.III.1975 (2); Bunda (C.o.A.) 15.IV.1975; Kasungu 11.II.1971; Nkhata Bay 9.IV.1975 (3).

36 ♀, Limbe 7.III.1970, 20.IV.1971, 24.X.1970; Limbe (Chancellor College) 8.II.1973, 4.IV.1973, 16.V.1968, 9.XI.1968; Limbe (Chichiri Hill) 13.III.1975, 2.IV.1970; Limbe (Maone) 10.II.1973 (4), 11.II.1973 (3); Blantyre (hill near) 7.VI.1970; Zomba (Chirungu Estate) 17.II.1975 (2); Zomba (Mlunguzi Estate) 23.IV.1975; Zomba (forestry road) 4.V.1975; Likangala rice scheme (L. Chilwa) 10.III.1975 (3); Khanda rice scheme (L. Chilwa) 5.III.1975 (4), 19.III.1975 (2); Kachulu Bay (L. Chilwa) 15.X.1970; Salima (G.B.H.) 25.II.1975, 26.II.1975; Bunda (C.o.A.) 25.IV.1970, 25.XII.1970; Nkhata Bay 9.IV.1975.

Distribution: Africa south of the Sahara. In Malaŵi it is a common species below 1200 m.

***Chalicodoma felina felina* (Gerstaecker, 1857)**

22 ♂, Limbe 26.XI.1970; Limbe (Maone) 25.III.1973, 7.IV.1973 (2), 20.IV.1973; Limbe (Mt. Soche) 25.X.1970, 8.XII.1971; Limbe (Ndirande Mt.) 15.XI.1970 (2); Zomba (Mlunguzi Estate) 16.III.1974; Liwonde 23.IV.1975; Nkudzi Bay 14.V.1975; Cape Maclear 4.IV.1970, 7.V.1971; Salima (G.B.H.) 14.IV.1973, 15.IV.1973 (2), 16.IV.1973; Kasungu 11.II.1971; Perkezi Forest (Mzimba) 22.II.1971; Likangala river (L. Chilwa) 24.XII.1973 (2).

33 ♀, Limbe 25.XII.1971; Zomba (Mlunguzi Estate) 20.I.1974, 22.II.1975, 6.V.1975; Chikaluma village (L. Chilwa) 1.III.1974; Likangala river (L. Chilwa) 10.III.1975, 14.IX.1972, 18.XII.1973, 24.XII.1973 (2); Nkudzi Bay 7.I.1972, 14.V.1975 (2); Monkey Bay 11.XII.1970; Cape Maclear 4.IV.1970; Salima beach 18.III.1970 (2), Salima (G.B.H.) 25.II.1975 (6), 26.II.1975; Kasungu (Lifupa dam) 16.VI.1972; Kasungu 11.II.1971; Nkhota Kota 6.IV.1975 (3); Perkezi Forest (Mzimba) 22.II.1971 (4).

Distribution: Africa south of the Sahara. In Malaŵi it is a common species below 1490 m.

ACKNOWLEDGEMENTS

The author is indebted to Prof. J. J. Pasteels for his help in identifying specimens and Miss J. van der Horst for drawing some of the figures.

REFERENCES

PASTEELS, J. J.

- 1965 Revision des Megachilidae de l'Afrique Noire. I. Les genres *Creightonella*, *Chalicodoma* et *Megachile*. S. Str. — Ann. Mus. roy. Afr. Centr., (in-8, Sci. zool.), 137 : 1—579.
- 1966 Megachilidae (Genres: *Creightonella*, *Megachile* et *Chalicodoma*) peu connues ou nouvelles des régions paléarctiques et africaines. — Bull. Ann. Soc. roy. Ent. Belg., 102 : 1—19.
- 1970 Espèces nouvelles de Megachilidae d'Afrique Noire. I. Genres *Creightonella* Cockerell et *Chalicodoma* Lepeletier. — Rev. zool. bot. afr., 82 : 205—232.
- 1973 Espèces nouvelles de Megachilidae (Hymenoptera, Apoidea) d'Afrique Noire. II. Genre *Megachile* Latreille (partim). — Rev. zool. bot. afr., 87 : 698—727.

SCHULTEN, G. G. M.

- 1975 Campsomerinae (Hymenoptera, Scoliidae) collected in Malaŵi (Central Africa). — Bull. zool. Mus. Univ. Amsterdam, 4 : 59—68.

G. G. M. SCHULTEN
Royal Tropical Institute,
Entomology section,
Amsterdam — The Netherlands