Subgenus *Pseudapis* (*Pseudapis*) Kirby (Fig. 15A-C, D, H)

Pseudapis s. str. is widespread, occurring through Africa and Asia. It does not occur in Australia and Madagascar. Two groups, the sub-Saharan *Stictonomia* Cameron and the Palaearctic *Nomiapis* Cockerell are included in *Pseudapis* by Michener (2007) but have generic status in Pauly (1990) and Baker (2002). *Nomiapis* is characterized by the lack of apical hair bands on the terga and has only basal bands of tomentum. *Stictonomia* females have a pointed basitibial plate while it is rounded in *Pseudapis s.str. Stictonomia* is endemic to Africa (ten species) and inhabits forested area. *Pseudapis* (40 species) occurs mostly in xeric areas of tropical Africa and Asia. A monotypic genus, *Ruginomia* Pauly (1990), was erected to include *Ruginomia rugiventris* (Friese), a very strongly punctate and isolated southern African species, which Michener (2007) includes in *Pseudapis.*

Genus *Spatunomia* Pauly (Fig. 13C)

Spatunomia was described for two widely separated, large (13-15 mm) species with a red metasoma and without bands of tomentum on the terga. The most remarkable features of the genus are the simple mandibles in the female and the pedunculate last antennal segment in the male. They occur in widely separated areas, in Sudan and southern Africa.

Genus *Steganomus* Ritsema (Fig 15G)

Steganomus has two submarginal cells in the forewing and a large tegula. It lacks a carina along the lower margin of the eyes. The genus is Afrotropical (5 species) and Oriental (6 species).

8.3.2. Subfamily Nomioidinae

The Nomioidinae are minute bees. The anterior tentorial pits are lateral to the epistomal suture. The subfamily comprises three genera, and is not divided into tribes. They are all pollen collecting bees that nest in sandy areas.

Genus *Cellariella* Strand (Fig. 16A-B)

This is a small genus known from 5 species, all minute and black with extensive yellow maculations. The petiolate second submarginal cell of the forewing is unique. All the species live in deserts and the genus is endemic to sub-Saharan Africa and Madagascar.

Genus *Ceylalictus* Strand

Ceylalictus are minute bees with extensive yellow maculations. The distal region of tergum 2 is not transparent and yellow bands occur on the apical part of the terga.

Key to the subgenera of *Ceylalictus*

1. Metanotum with median tubercle bearing a dense bunch of long plumose hairs . . . . . ***Ceylalictus* (*Meganomioides*)**

1'. Metanotum without median tubercle **2**

2. Male mandible without subapical tooth; female mesoscutum usually with integumental yellow, median, transverse spot before hind margin; female inner metatibial spur with two teeth . . . . . ***Ceylalictus* (*Ceylalictus*)**

2'. Male mandible with subapical tooth; female mesoscutum without pale markings; female inner metatibial spur with three or four teeth . . . . . ***Ceylalictus* (*Atronomioides*)**

Subgenus *Ceylalictus* (*Ceylalictus*) Strand (Fig. 16C-D)

This is a widespread subgenus. Only four species are known from Africa. All have metallic green reflections.

Subgenus *Ceylalictus* (*Atronomioides*) Pesenko (Fig. 16E)

It is mostly a Palaeotropical and tropical Asian subgenus. One species inhabits southern Africa, two larger species (5,5 mm) are endemic to the Cape Verde Islands and six are endemic of Madagascar. The species are black or with metallic green reflections.

Subgenus *Ceylalictus* (*Meganomioides*) Pesenko (Fig. 16F)

The subgenus includes three principally Palaearctic species, one of them reaches the southern border of the Sahara in Mauritania. They are relatively large (5-5,5 mm) and the female metasoma is completely yellow.

Genus *Nomioides* Schenck (Fig. 16G-H)

The genus includes 62 species mostly inhabiting the deserts of Asia and North Africa. There are 8 sub-Saharan species. They are minute black or metallic species with extensive yellow maculations. The distal region of tergum 2 is transparent with a yellow band basally on the tergum. A monotypic subgenus, *Erythronomioides*, differs in having a large body (5 mm long), strongly elongate mandible and a red metasoma. It is included by Michener (2007) in *Nomioides* and is endemic to Socotra Island.

8.3.3. Subfamily Halictinae

8.3.3.1. Tribe Halictini

The Halictinae have the antennal sockets in the middle of the face, the anterior tentorial pit on the epistomal suture, the first submarginal cell of the forewing is longer than the second and third submarginals, which are similar in size, and the pollen collecting females have a median specialized area on tergum 5 (a longitudinal median furrow that divides the prepygidial fimbria), which is unique. It is divided into two tribes; the Halictini and the Augochlorini, of which only the former occurs in Africa. This genus comprises five pollen collecting and two cleptoparasitic genera.

Genus *Eupetersia* Blüthgen

Eupetersia are mainly red and black, sometimes with blue metallic reflections (in the subgenus *Calleupetersia* Cockerell). The propodeum is not strongly pitted, as in another, similar halictid genus, *Sphecodes*. The length of the antennal segments (see keys) is diagnostic and separates it from *Sphecodes*. They are cleptoparasitic.

Key to the subgenera of *Eupetersia*

1. Body with blue metallic reflections . . . . . .***Eupetersia* (*Calleupetersia*)**
1'. Body black or red **2**

2. Scutum densely punctate; scutellum with two sparsely punctate convexities . . . . . .***Eupetersia* (*Eupetersia*)**
2'. Scutum and scutellum with widely separated punctures; scutellum evenly convex . . . . . .***Eupetersia* (*Nesoeupetersia*)**

Subgenus *Eupetersia* (*Calleupetersia*) Cockerell (Fig. 17D)

Eupetersia (*Calleupetersia*) is confined to Ethiopia and East Africa. It is considered to be a synonym of *Eupetersia sensu stricto* by Michener (2007), but as a valid genus by Pauly (1999a). The body has blue metallic reflections, and in one species an extended tomentum (7 species).

Subgenus *Eupetersia* (*Eupetersia*) Blüthgen (Fig. 17A)

Eupetersia s. str. is known from East Africa and Madagascar. There are more than 14 species.

Subgenus *Eupetersia* (*Nesoeupetersia*) Blüthgen (Fig. 17B-C)

Eupetersia (*Nesoeupetersia*) appears to be confined to tropical Africa, as well as southern India and Indonesia. There are more than eight species.

Genus *Glossodialictus* Pauly (Fig. 20G)

Glossodialictus possibly should be regarded as a subgenus of *Patellapis* with an extraordinary long glossa and some metallic reflections. The genus is monotypic and occurs in Central Africa. The only species is *Glossodialictus wittei* Pauly.

Genus *Lasioglossum* Curtis

Lasioglossum have the distal veins in the forewing distinctly fainter than those to the wing base (diagnostic feature). They are all pollen collecting bees.

Key to the subgenera of *Lasioglossum*

1. Second submarginal crossvein (1 rs-m) as strong as first (Rs). **2**
1'. Second submarginal crossvein (1 rs-m), at least in females, weaker than first (Rs). **3**

2. Female with inner hind tibial spur pectinate; propodeum with hexagonal carina; glossa usually short, rarely long . ***Lasioglossum* (*Ctenonomia*)**

2'. Female with inner hind tibial spur dentate, first tooth large and rounded; propodeum with a rectangular carina; glossa mostly very long . . . . . ***Lasioglossum* (*Ipomalictus*)**

3. Female hind leg without a scopa or with only a few hairs . . . . . ***Lasioglossum* (*Paradialictus*)**

3'. Female hind leg with a well developed scopa **4**

4. Female terga with basal spots of tomentum; male T2 with broad basal band of erect and plumose white hair . . . . ***Lasioglossum* (*Sellalictus*)**

4'. Female terga without tomentum; male T2 without basal hair band **5**

5. Propodeum carinate . . . . . ***Lasioglossum* (*Evylaeus*)**

5'. Propodeum without carina between basal and posterior subvertical surfaces . . . . . ***Lasioglossum* (*Afrodialictus*)**

Subgenus *Lasioglossum* (*Ctenonomia*) Cameron (Fig. 18E-F)

Numerous species occur in sub-Saharan Africa (over 100 species). The pectinate hind tibial spur and the hexagonal carina on the propodeum are diagnostic. Some species have green metallic reflections (group *duponti*). Two species, classified by Pauly (1999b) in *Oxyhalictus*, have a very long glossa. Most species are broadly polylectic.

Subgenus *Lasioglossum* (*Ipomalictus*) Pauly (Fig. 18A-D)

Many species occur in sub-Saharan Africa (over 40 species). The large rounded first tooth on the inner hind tibial spur is diagnostic. The glossa is very long in most species (as long as the head or longer). Some species have metallic reflections. Most species are oligolectic on Convolvulaceae, Malvaceae and Cucurbitaceae. The subgenus *Rubrihalictus* Pauly from South Africa is close to *Ipomalictus* but has a short glossa and a regularly dentate hind tibial spur.

Subgenus *Lasioglossum* (*Afrodialictus*) Pauly (Fig. 19A-B)

Lasioglossum (*Afrodialictus*) is a montane subgenus that is endemic to sub-Saharan Africa. Most species are oligolectic on Asteraceae. There are about 36 species.

Subgenus *Lasioglossum* (*Evylaeus*) Robertson

In the Afrotropical Region this largely Holarctic subgenus is only known from a few species near the southern border of the Sahara (Mauritania, Sudan). Three species in Central Africa are tentatively placed in *Evylaeus* (group *schubotzi*), and a group of 5 species have been placed in the subgenus *Mediocralictus* by Pauly (1984c). Males of *Mediocralictus* have a pectinate hind tibial spur, as in the Oriental subgenus *Sudila.*

Subgenus *Lasioglossum* (*Paradialictus*) Pauly (Fig. 17G)

Lasioglossum (*Paradialictus*) has close affinities with *Lasioglossum* (*Afrodialictus*). Numerous features suggest that this subgenus is cleptoparasitic. *Lasioglossum (Paradialictus) synavei* Pauly was the only species but Gibbs (2009) has described a second cleptoparasitic species from Africa close to *Afrodialictus*. *Paradialictus* is confined to the mountains of East Africa.

Subgenus *Lasioglossum* (*Sellalictus*) Pauly (Fig. 19C-D)

Nearly all the species have spots of tomentum on the terga. All halictine males with a large spot of tomentum on the base of tergum 2 belong to this subgenus. They are Afromontane and South African, foraging commonly on Asteraceae. There are about 36 species.

Genus *Patellapis* Friese

The generic name *Patellapis,* used here in a broad sense, includes a rather diverse group of African halictines with strong distal wing venation. Males often have bristles on the fourth sternum. *Patellapis* are most easily identified by the absence of the diagnostic features of other Halictini with strong distal wing venation (see key above).

Key to the subgenera of *Patellapis*

1. Posterior margins of T1-T3 naked with pallid (white, yellow, blue or green) integument . . . . . ***Patellapis* (*Zonalictus*)**
1'. Posterior margins of terga brownish, sometimes translucent . . . . . **.2**

2. Female lower margin of hind tibia with a fringe of pectinate or palmate hairs **3**
2'. Female lower margin of hind tibia without pectinate or palmate hairs (long hairs on lower margin either with well separated long branches or branched in such a way that the rachis is only identifiable basally) **4**

3. Terga with distinct apical hair bands; female lower margin of hind tibia with palmate hairs; female sterna without distinct scopa; male sternum 4 without bristles . . . . . .***Patellapis* (*Lomatalictus*)**
3'. Terga without distinct apical hair bands; female with lower margin of hind tibia with pectinate hairs; female sterna with distinct scopa of plumose hairs; male sternum 4 with bristles . . . . . ***Patellapis* (*Dictyohalictus*)**

4. Large to moderate sized species; basitibial plate well defined, apex rounded; terga with conspicuous apical hair bands . . . . . .***Patellapis* (*Patellapis*)**
4'. Small to moderate-sized species (length 4 to 8 mm); basitibial plate poorly defined anteriorly, apex angulate or pointed; terga either without or with weak apical hair bands . . . . . ***Patellapis* (*Chaetalictus*)**

Subgenus *Patellapis* (*Chaetalictus*) Michener (Fig. 20C-D)

This subgenus occurs in southern Africa, and in the high mountains of Cameroon, East Africa and Madagascar. Numerous species in southern Africa await description. For some species it is difficult to choose whether they belong to the subgenus *Patellapis* or *Chaetalictus* because they combine a mixture of characters of both subgenera. A more precise definition of the subgenera is given by Timmermann & Kuhlmann (2008). There are about 50 described and a number of undescribed species.

Subgenus *Patellapis* (*Dictyohalictus*) Michener (Fig. 20H)

Pectinate hairs on the lower margin of the hind tibia in the female are diagnostic (a feature shared also by *Homalictus* in Australasia) for this subgenus. The pectinate hairs are strongly curved, their branches close together and tending to be at right angle to the rachis. Females also bear a scopa of plumose setae on the sterna and hind femur. Eleven species occur in West and Central Africa where they are confined to forested areas and they are always rare. One species occurs in southern Africa.

Subgenus *Patellapis* (*Lomatalictus*) Michener (Fig. 20F)

This subgenus is known from only one South African species, *Patellapis* (*Lomatalictus*) *malachurina* (Cockerell). The status of the subgenus is uncertain and it might be synonymized with *Patellapis* (*Chaetalictus*) (Timmermann & Kuhlmann 2008).

Subgenus *Patellapis* (*Patellapis*) Friese (Fig. 20E)

Patellapis s. str. comprises South African species that are mostly quite large. Twenty-three described species are known.

Subgenus *Patellapis* (*Zonalictus*) Michener (Fig. 20A-B)

The most conspicuous diagnostic feature of this subgenus is the white, yellow, greenish or bluish apical integumental bands, which are suggestive of *Nomia*. In females the lower margin of the hind tibia has pectinate or palmate hairs. However, the subgenus seems to be paraphyletic (Danforth et al. 2008). It occurs in the mountains of West, Central, East and southern Africa, Sokotra, Yemen and Madagascar. It is endemic to these areas and there are more than 70 species.

Genus *Seladonia* Latreille

Sub-Saharan species of *Seladonia* all have metallic reflections. Some other species of sub-Saharan halictine bees have metallic reflections but they can be separated by a carinate propodeum (*Ctenonomia, Ipomalictus),* lack of apical hair bands (*Afrodialictus)* or weak distal wing venation.

Key to the subgenera of *Seladonia*

1. Both sexes densely punctate; female with scopa; T5 with posterolongitudinal area of inward directed hairs . . . . . ***Seladonia***

1'. Both sexes sparsely punctate; female without scopa; T5 without modified vestiture . . . . . .***Paraseladonia***

Subgenus *Seladonia* Robertson (Fig. 18G-H)

Seladonia (*Seladonia*) are abundant throughout the Old World and some species occur in the Western Hemisphere. They all have metallic gold, blue or green metallic reflections and apical hair bands on the terga. There are 18 African species.

Subgenus *Paraseladonia* Pauly (Fig. 17H)

The only known species, *Halictus* (*Paraseladonia*) *chalybaeus* (Friese), occurs throughout tropical Africa and is cleptoparasitic.

Genus *Sphecodes* Latreille (Fig. 17E-F)

Sphecodes are cleptoparasitic, *i.e*., females do not have a scopa. They are mostly red and black. The genus is noteworthy for the coarse sculpture on the thorax and propodeum. Males have antennal segments more strongly constricted than in other halictines. There are about 50 species in sub-Saharan Africa.

Genus *Thrinchostoma* Saussure

This is a genus of relatively large (length 8-16 mm), elongate bees. The clypeus is strongly produced, they are not metallic and the metasomal terga have laterally directed vestiture, which is unique. *Thrinchostoma* is Afrotropical and Oriental. It is divided into three subgenera: *Diagonozus*, *Eothrincostoma* and *Thrinchostoma*. They are pollen collecting bees. The genus is commonly found on flowers of *Impatiens* but also visits other plants.

Key to the subgenera of *Thrinchostoma*

1. Forewing of males without patch of dense hairs near second submarginal crossvein . . . . . .***Thrinchostoma* (*Eothrincostoma*)**
1'. Forewing of males with patch of dense hairs around second submarginal crossvein **2**

2. Head greatly extended below eyes, malar area almost as long as eye . . . . . .***Thrinchostoma* (*Diagonozus*)**
2'. Head moderately produced below eyes, malar area much shorter than eye, one-third to three times as long as wide . . . . . .***Thrinchostoma* (*Thrinchostoma*)**

Subgenus *Thrinchostoma* (*Diagonozus*) Enderlein (Fig. 21A-B)

Bees in this subgenus have an extremely long clypeus and proboscis. The subgenus *Diagonozus* only occurs in forested areas of West and Central Africa. There are three described species. One of these species is known from Sumatra (Sakagami *et al*., 1991).

Subgenus *Thrinchostoma* (*Eothrincostoma*) Blüthgen (Fig. 21C-D)

Eothrincostoma occurs in Central and East Africa, south to KwaZulu-Natal. There are four described species.

Subgenus *Thrinchostoma* (*Thrinchostoma*) Saussure (Fig. 21E-F)

The subgenus *Thrinchostoma* is widespread in tropical and sub-tropical Africa (over twenty species), Madagascar (12 species) as well as tropical Asia (ten species) (Michener & Engel, 2010).

8.3.4. Subfamily Rophitinae

Genus *Systropha* Illiger (Fig. 21G-H)

Rophitinae is represented in the Afrotropical Region by a single genus, namely *Systropha*. It is characterized by the scopa being on the side of the metasoma and the male flagellum being flattened and curled distally. The antennal sockets are well below the middle of the face. They are pollen collecting bees. There are nine Afrotropical species. They are frequently collected in Convolvulaceae flowers.

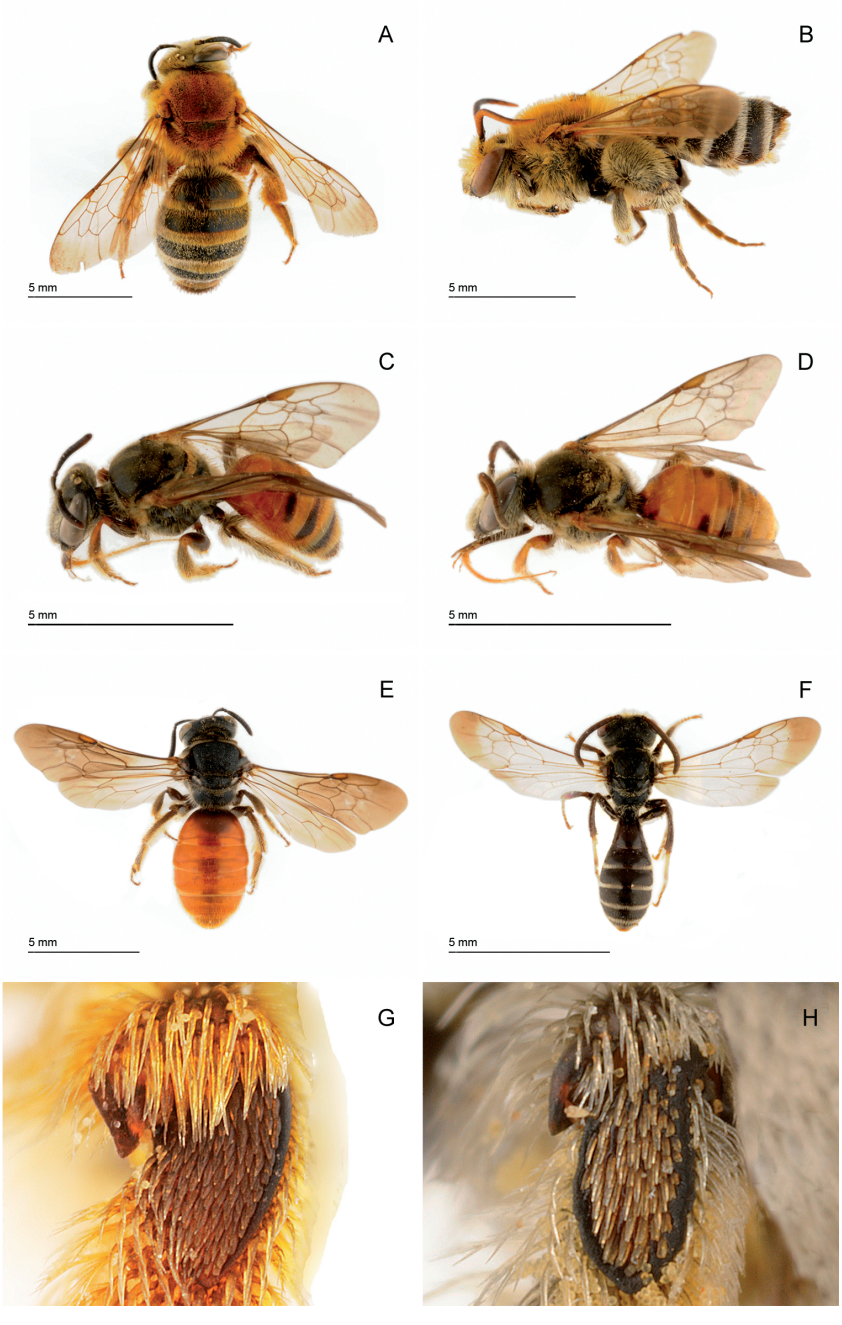

Fig. 12. A. *Lipotriches (Macronomia) vulpina*, female; B. *Lipotriches (Macronomia) vulpina*, male; C. *Lipotriches (Maynenomia) testacea*, female; D. *Lipotriches (Maynenomia) testacea*, male; E. *Lipotriches (Lipotriches) cribrosa*, female; F. *Lipotriches (Lipotriches) hylaeoides*, male; G. basitibial plate of female margined by carina only on posterior side (*Lipotriches*); H. basitibial plate of female with marginal carina complete (*Nomia*).

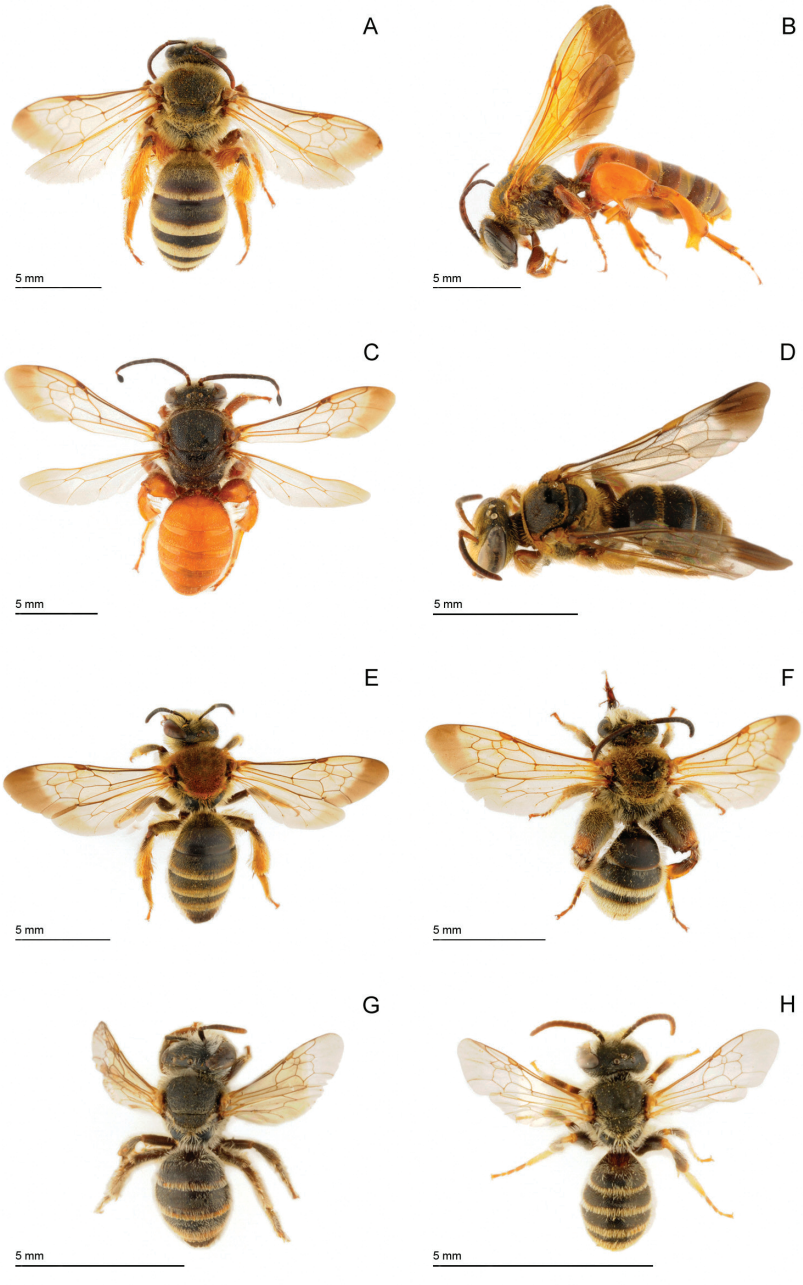

Fig. 13. A. *Lipotriches (Afronomia) meridionalis*, female; B. *Lipotriches (Afronomia) picardi*, male; C. *Spatunomia rubra*, male; D. *Lipotriches (Nubenomia) derema*, male; E. *Lipotriches (Trinomia) orientalis*, female; F. *Lipotriches (Trinomia) orientalis*, male; G,.*Lipotriches (Austronomia*) sp., female; H. *Lipotriches (Austronomia)* sp., male.

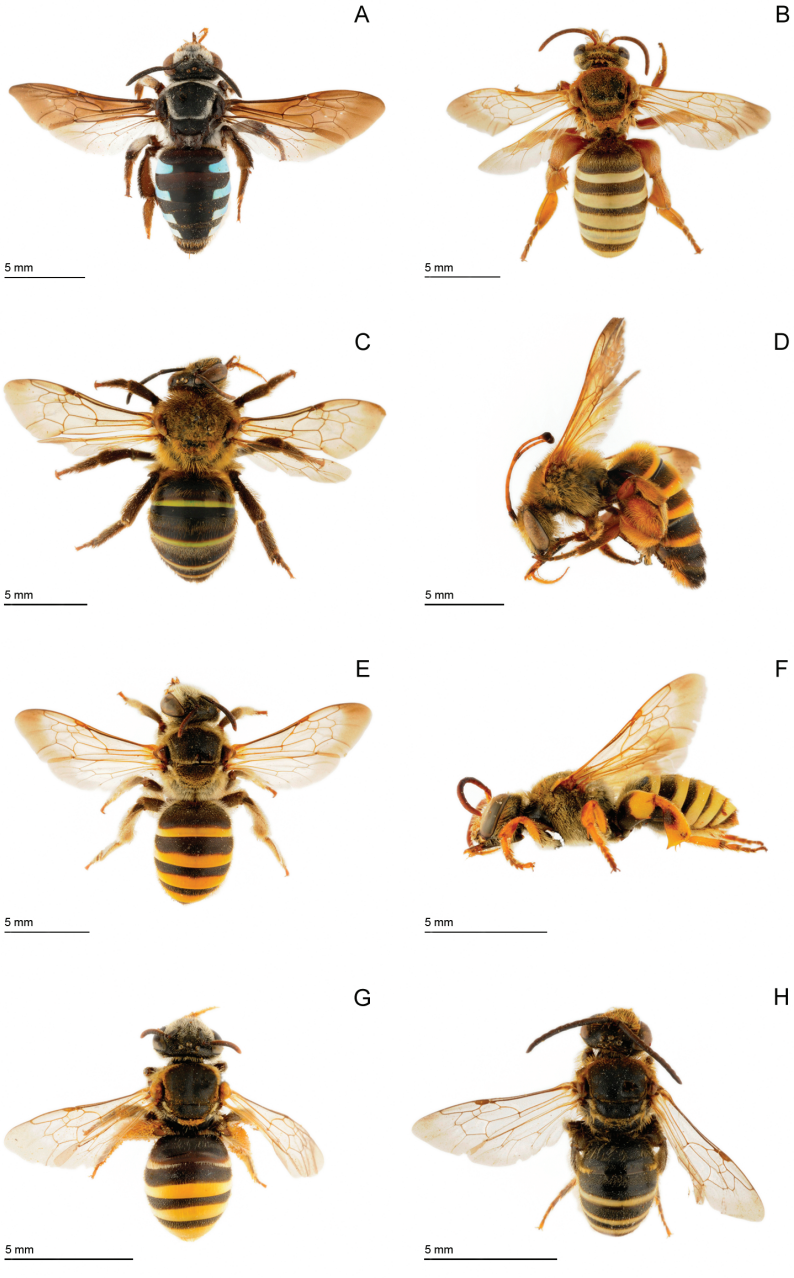

Fig. 14. Nomiinae with colored tergal bands. A. *Nomia (Crocisaspidia) chandleri*, female; B. *Nomia (Crocisaspidia) zonaria*, male; C. *Nomia (Acunomia) viridicincta*, female; D. *Nomia (Acunomia) ivoirensis*, male; E. *Nomia (Nomia) scitula*, female; F. *Nomia (Nomia) antecedens*, male; G. *Nomia (Leuconomia)* sp., female; H. *Nomia (Leuconomia) bouyssoui*, male.

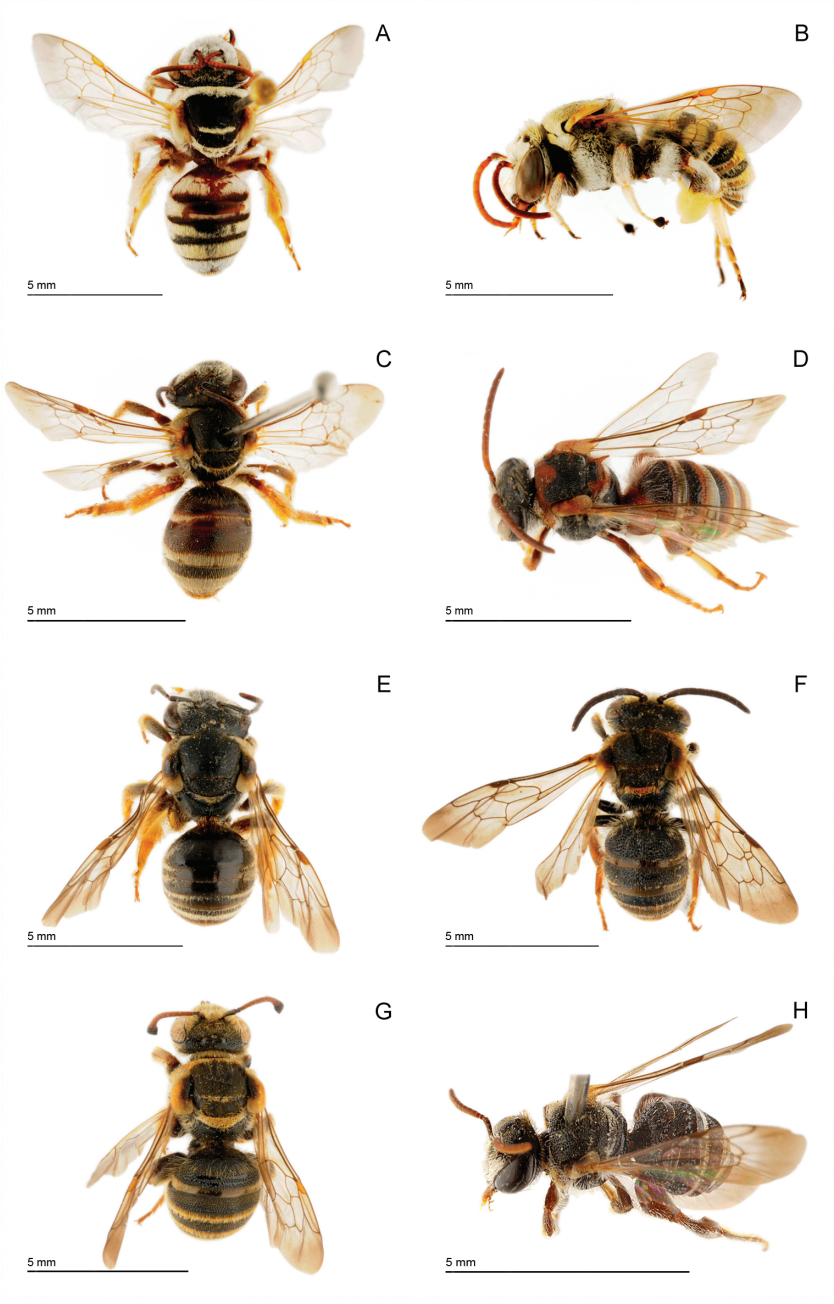

Fig. 15. Nomiinae with enlarged tegulae. A. *Pseudapis (Pseudapis) nilotica*, female; B. *Pseudapis (Pseudapis) nilotica*, male; C. *Pseudapis (Stictonomia) aliceae*, female; D. *Pseudapis (Stictonomia) aliceae,* male; E. *Pseudapis* (*Pachynomia) amoenula*, female; F. *Pachynomia amoenula*, male; G. *Steganomus* sp., male; H. *Pseudapis (Ruginomia) rugiventris*, male.

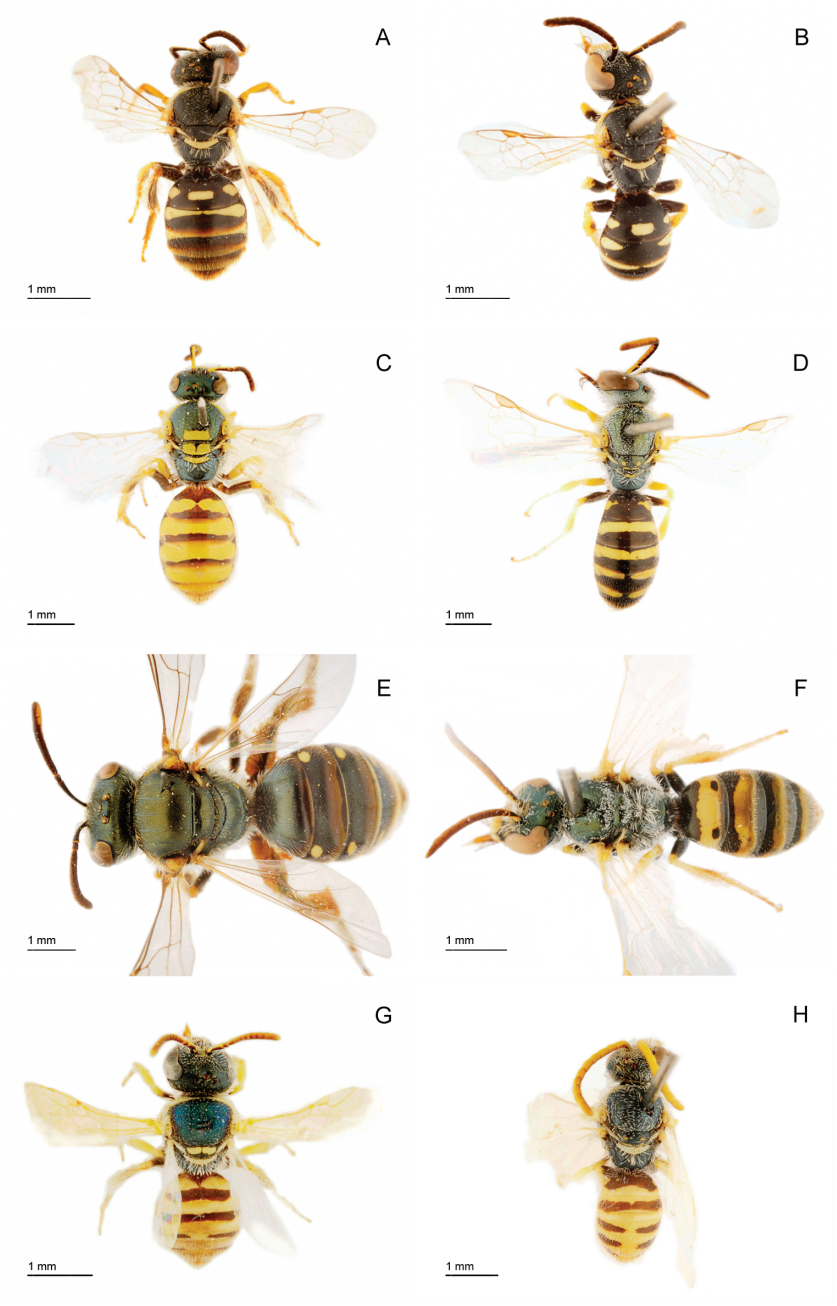

Fig.16. Nomioidinae. A, *Cellariella kalaharica*, female; B. *Cellariella kalaharica*, male; C. *Ceylalictus (Ceylalictus) muiri*, female; D. *Ceylalictus (Ceylalictus) punjabensis*, male; E. *Ceylalictus* (*Atronomioides*) *capverdensis*, female; F. *Ceylalictus* (*Meganomioides*) *karachensis*, male; G. *Nomioides maculiventris*, female; H. *Nomioides maculiventris*, male.