

Genus *Nasutapis* Michener (Fig. 36E)

Nasutapis has a distinct projection medioventrally on the clypeus. This genus is monotypic (*Nasutapis straussorum* Michener) and endemic to KwaZulu-Natal, South Africa, and found in nests of *Braunsapis facialis* (Gerstaecker).

8.6.2. Subfamily Nomadinae

In sub-Saharan Africa the Nomadinae comprises four tribes and six genera. They are all cleptoparasitic. Diagnostic features for the subfamily are difficult to define, but almost each tribe has a distinctive feature, except Ammobatoidini.

8.6.2.1. Tribe Nomadini

Genus *Nomada* Scopoli (Fig. 37A)

Nomadini has one genus in sub-Saharan Africa, namely *Nomada*. There are ten species, occurring mostly in North-East and southern Africa.

8.6.2.2. Tribe Epeolini

Genus *Epeolus* Latreille (Fig. 37B)

Epeolini has one genus in sub-Saharan Africa, namely *Epeolus*. There are 13 species that occur mostly on the east side of the continent, along its entire length.

8.6.2.3. Tribe Ammobatoidini

Genus *Ammobatoides* Radoszkowski (Fig. 37C)

Ammobatoidini has one genus in sub-Saharan Africa, and it is known only from the holotype of *Ammobatoides braunsi* Bischoff. It was collected in Willowmore, South Africa. It therefore goes without saying that it is extremely rare.

8.6.2.4. Tribe Ammobatini

The Ammobatini has four sub-Saharan genera. They all comprise cleptoparasitic bees. *Ammobates* has its centre of diversity in the Palaearctic, as does *Chiasmognathus*, which occurs just north of the Afrotropical Region and intrudes into sub-Saharan Africa. *Pasites* is mostly Afrotropical and *Sphecodopsis* is endemic to southern Africa.

Genus *Ammobates* Latreille (Fig. 37D)

This genus has one species, *Ammobates auster* Eardley. It was described from a few specimens that are widely distributed in southern Africa, but also occurs in East Africa (unpublished records, Schwarz collection, Austria).

Genus *Pasites* Jurine (Fig. 37E)

Pasites occur throughout the Afrotropical Region, and this area is its centre of diversity. There are 18 Afrotropical species, and one additional species that occurs through much of southern Asia.

Genus *Chiasmognathus* Engel

The genus *Chiasmognathus* consists of minute bees (2 mm) who victimize nests of the equally diminutive bees of the subfamily Nomioiinae. There are ten described species. Engel (2010) reported the first species of the genus from sub-Saharan Africa, based on a male collected in southwestern Niger.

Genus *Sphecodopsis* Bischoff (Fig. 37F)

Sphecodopsis is endemic to southern Africa. The diagnostic feature is crossed mandibles, when in repose. There are two subgenera that can only be separated using characters of the female.

Key to the subgenera of *Sphecodopsis*

1. Female tergum 6 forming a slender spine ***Sphecodopsis (Pseudodichroa)***
- 1'. Female tergum 6 bifurcate ***Sphecodopsis (Sphecodopsis)***

Subgenus *Sphecodopsis (Pseudodichroa)*

Subgenus *Sphecodopsis (Pseudodichroa)* has two species that are endemic to the Western Cape Province, South Africa. One species *Sphecodopsis fumipennis* (Bischoff) is recorded as a parasite of *Scapter erubescens* (Friese). They are most commonly collected late in the afternoon when their host is also on the wing. The subgenus is easy to recognise, but the species are difficult to separate.

Subgenus *Sphecodopsis (Sphecodopsis)* Bischoff

This subgenus is more widespread, occurring through much of the xeric regions of South Africa, and diverse, having 12 species.

8.6.2.5. Tribe Biastini

Genus *Schwarzia* Eardley (Fig. 37G)

Schwarzia is the only Afrotropical genus of Biastini and it is known from one East African species, *Schwarzia emmae* Eardley. The tribe comprises cleptoparasitic bees, and this species possibly parasitises *Systropha*.

8.6.3. Subfamily Apinae

The Apinae comprises six tribes and 16 genera. They cannot be defined by a few distinctive characters (Michener 2007), neither morphological nor behavioural.

There are social species, cleptoparasites, robbers, oil collectors and pollen collectors, including all the corbiculate bees.

8.6.3.1. Tribe Ancylini

Genus *Ancyla* Lepeletier (Fig. 38A-B)

This genus is mostly Asian, occurring in Sudan and possibly southern Sudan, which is Afrotropical.

8.6.3.2. Tribe Ctenoplectrini

The Ctenoplectrini tongue is intermediate between long and short-tongued bees, together with Ancylini. Phylogenetic studies, however, indicate that they belong to the long-tongued bee family Apidae (Michener 2007). Some are pollen collectors and others are cleptoparasitic.

Genus *Ctenoplectra* Kirby (Fig. 38C-D)

Ctenoplectra is a pollen and oil collecting bee, and therefore has a scopa and well developed oil collecting hairs on the metasomal venter. The anterior hind tibial spur is greatly expanded basally (sickle-shaped). Some are metallic blue or green and one species has pale integument bands on the distal margins of the metasomal terga. There are five widespread species, but as with *Ctenoplectrina* it is more common in tropical areas.

Genus *Ctenoplectrina* Cockerell (Fig. 38E-F)

Ctenoplectrina is cleptoparasitic and does not have a scopa in the female. The oil collecting hairs are reduced. There are two widespread species, but they appear to be more common in tropical areas.

8.6.3.3. Tribe Eucerini

Eucerini are large, hairy bees. They are ground nesting and collect pollen.

Genus *Tetralonia* Spinola (Fig. 39A-B)

Tetralonia comprises two subgenera; *Tetralonia* (*Eucara*) and *Tetralonia* (*Thygatina*). There are 15 species. It appears as if they collect pollen mostly from plants of the family Malvaceae.

Key to the subgenera of *Tetralonia*

1. Ventral edge of clypeus concave mesally, gently convex laterally; female scopa very sparse; male hind leg with posterior tibial spur usually either curved or swollen near base, and/or basitarsus with a tuft of long hair basoventrally ***Tetralonia* (*Eucara*)**
- 1'. Ventral edge of clypeus entirely concave; female scopa not very sparse, but not as dense as in *Tetraloniella*; male hind leg not modified as described above ***Tetralonia* (*Thygatina*)**

Subgenus *Tetralonia* (*Eucara*) Friese

This subgenus is endemic to sub-Saharan Africa and widespread, yet uncommon. There are seven species.

Subgenus *Tetralonia* (*Thygatina*) Cockerell

Tetralonia (*Thygatina*) is widespread in sub-Saharan Africa, and also occurs in southern India and Sri Lanka. It is not frequently collected. There are seven species.

Genus *Tetraloniella* Ashmead (Fig. 39C-D)

Subgenus *Tetraloniella* (*Tetraloniella*) Ashmead

Only the nominative subgenus of *Tetraloniella* occurs in Africa and it has 33 species. They are widespread and common. All bees with a male antennal flagellum longer than three times the eye's length belong to this genus. Hence their common name is long-horned bees.

8.6.3.4. Tribe Anthophorini

Anthophorini are large, hairy bees; solitary, ground nesting, pollen collectors. There are three genera.

Genus *Amegilla* Friese (Fig. 40A-B)

Amegilla has one subgenus with 71 species. They are widespread, common and visit flowers of a large variety of plants.

Genus *Anthophora* Latreille (Fig. 40C-D)

Anthophora has three subgenera (*Heliophila*, *Paramegilla* and *Pyganthophora*) with a total of 54 species. They are widespread and fairly common.

Key to the subgenera of *Anthophora*

1. Female with upper, posterior margin of hind tibia with simple hair; male labrum mostly with two small, subapical, median tubercles and/or tergum 7 without distinct teeth or lobes posteriorly ***Anthophora* (*Heliophila*)**
- 1'. Female upper, posterior margin of hind tibia with plumose hair; male labrum without tubercles; tergum 7 with submedian teeth **2**
2. Female either with metasomal apical hair bands interrupted medially or metasomal dorsum with appressed hair; male without basitibial plate, if present then pygidial plate and lateral tooth below pygidial plate absent ***Anthophora* (*Paramegilla*)**
- 2'. Female with metasomal apical hair bands complete and/or surface covered with erect hair; male with basitibial plate ***Anthophora* (*Pyganthophora*)**

Subgenus *Anthophora (Heliophila)* Klug

The subgenus *Anthophora (Heliophila)* comprises the small common *Anthophora*. They occur throughout Africa, and through much of the Holarctic Region. They mostly have yellow clypeal maculation. Thirty-nine species occur in sub-Saharan Africa.

Subgenus *Anthophora (Paramegilla)* Friese

These are the large, black faced *Anthophora* that are usually found in deserts and dry savannah in Africa. They also occur in the Holarctic Region. Seven species occur in sub-Saharan Africa.

Subgenus *Anthophora (Pyganthophora)* Brooks

In the Afrotropical Region this subgenus is confined to the southern part of South Africa. However, it also occurs in much of the Holarctic Region. There are seven African species.

***Pachymelus* Smith (Genus) (Fig. 40E-F)**

Pachymelus are large bees. Bigger than the average *Anthophora* or *Amegilla*. There are two subgenera.

Key to the subgenera of *Pachymelus*

- 1. Aerolia absent ***Pachymelus (Pachymelopsis)***
- 1'. Aerolia present ***Pachymelus (Pachymelus)***

Subgenus *Pachymelus (Pachymelopsis)* Cockerell

The subgenus *Pachymelus (Pachymelopsis)* is wide spread in southern and East Africa. There are four species.

Subgenus *Pachymelus (Pachymelus)* Smith

This subgenus is mostly Madagascan (18 species), except for one species *Pachymelus peringueyi* (Friese) that occurs near the west coast of South Africa.

8.6.3.5. Tribe Melectini

The Melectini are cleptoparasitic; laying their eggs in other bees provisioned cells.

Genus *Afromelecta* Lieftinck (Fig. 41A-B)

Afromelecta comprises two subgenera (*Acanthomelecta* and *Afromelecta*) and three species.

Key to the subgenera of *Afromelecta*

1. Maxillar palpus six-segmented; scutellar spines as long as scutellum . . .
..... ***Afromelecta (Acanthomelecta)***
- 1'. Maxillar palpus minute, one or two-segmented; scutellar spines about
half as long as scutellum ***Afromelecta (Afromelecta)***

Subgenus *Afromelecta (Acanthomelecta)* Lieftinck

This subgenus is only known from *Afromelecta bicuspis* (Stadelmann) that occurs in Tanzania.

Subgenus *Afromelecta (Afromelecta)* Lieftinck

Afromelecta s. str. has two species that occur along the eastern region of Africa.

Genus *Thyreus* Panzer (Fig. 41C-D)

Thyreus are widespread in the Old World. There are 40 species in sub-Saharan Africa. They often have pale blue vestiture, which is metallic in some tropical species.

8.6.3.6. Tribe Meliponini

Meliponini are the stingless bees. They are social and frequently nest in cavities. Mostly their comb is horizontal and surrounded by pots for the storage of honey and pollen. They collect pollen and nectar from flowers, except *Cleptotrigona*, which is a robber bee. Little has been written about their social structure and nesting biology in Africa, although much has been done for the South American species. There are six Afrotropical genera. Keeping stingless bees is called meliponiculture and this is practiced sporadically in Africa, although widely practiced in South America. The species are morphologically similar and certainly some new cryptic species await discovery, especially in the genera *Hypotrigona* and *Liotrigona*.

Genus *Cleptotrigona* Moure (Fig. 42A)

There is one species of *Cleptotrigona* that occurs throughout sub-Saharan Africa, *Cleptotrigona cubiceps* (Friese). It is a robber bee (cleptoparasitic), stealing pollen and nectar from other stingless bee's nests (*Hypotrigona* and probably *Liotrigona*) for the provision of its own nests in tree cavities. They are widely distributed in Africa through the tropics and the savannah.

Genus *Dactylurina* Cockerell (Fig. 42B)

There are two species of *Dactylurina*. They occur through most of tropical Africa. They have exposed nests, often in the fork between tree branches, enclosed in an envelope of batumen and they have vertical comb.

Genus *Hypotrigona* Cockerell (Fig. 42C)

There are four *Hypotrigona* species. They nest in small tree cavities in the tropical areas of Africa, mostly in savannah vegetation. They are all tiny bees

and, with *Liotrigona*, they are frequently called sweat bees because they are bothersome to people in hot weather. In South Africa they are also known as mopani bees or mocca bees.

Genus *Liotrigona* Moure

Liotrigona has two described species in Africa and six in Madagascar. At least two additional species in Africa are awaiting description. They are minute bees, and as with *Hypotrigona*, they are frequently called sweat bees. They nest in small tree cavities through much of the tropical areas of Africa, occurring also in savannah and deserts.

Genus *Meliponula* Cockerell (Fig. 42E)

Meliponula is the most diverse African stingless bee genus with nine species, and it has the largest species. It is divided into three subgenera; *Axestotrigona*, *Meliplebeia* and *Meliponula*. They nest in tree cavities and in the ground, and the comb, at least sometimes, is irregular. They occur in tropical Africa, mostly in forested areas and savannah.

Key to the subgenera of *Meliponula*.

1. Propodeal profile largely vertical; corbicula occupying less than distal half of hind tibia ***Meliponula (Meliponula)***
- 1'. Propodeal, in profile, slanting dorsally; corbicula occupying more than distal half of hind tibia **2**
2. Face without yellow markings ***Meliponula (Axestotrigona)***
- 2'. Face with yellow markings ***Meliponula (Meliplebeia)***

Subgenus *Meliponula (Axestotrigona)* Moure

These are the largest African stingless bees (two species). Some are black, *Meliponula cameroonensis* (Friese), and some are brown, *Meliponula ferruginea* (Lepeletier). They occur in tropical wooded areas.

Subgenus *Meliponula (Meliponula)* Cockerell

Meliponula bocandei (Spinola), the only included species, is a medium sized, relatively common, stingless bee. It occurs mostly in wooded, tropical areas.

Subgenus *Meliponula (Meliplebeia)* Moure

Meliplebeia are generally smaller than *Meliponula* s. str. and often less hairy. There are six species. They also occur in wooded areas.

Genus *Plebeina* Moure (Fig. 42F)

Plebeina is monotypic with *Plebeina hildebrandti* (Friese) being the only species. They occur widely through the eastern region of Africa and are common. They often nest in termite mounds.

8.6.3.7. Tribe Apini

These are the honey bees. They occur through much of the Old World. Five species occur in Asia and one in both Europe and Africa, although *Apis florea* Fabricius intrudes into North Africa. They are all social, pollen collectors and have vertical comb. Much has been written about their social biology and methods of communications. They are very important to agriculture as pollinators and honey producers.

Genus *Apis* Linnaeus (Fig. 43A-B)

The Apini is represented in Africa by two species. One is the honey bee or *Apis mellifera* Linnaeus. There are, however, a number of subspecies (Hepburn & Radloff, 1998). They occur throughout Africa. They are commonly kept in hives (keeping honey bees is called apiculture) for honey production and pollination. The other species, *Apis florea*, is only known from parts of North-East Africa.

Key to cleptoparasitic long-tongued bees (females only)

1. Two or fewer submarginal cells in forewing 2
- 1'. Three submarginal cells in forewing 17
2. One closed submarginal cell in forewing *Cleptotrigona*
- 2'. Two closed submarginal cells in forewing 3
3. Metanotum with prominent median tubercle *Aglaopis*
- 3'. Metanotum flat to gently curved 4
4. Metasomal venter with oil collecting hairs on S3-S5 *Ctenoplectrina*
- 4'. Metasomal venter without oil collecting hairs 5
5. Sternum 6 with a small gutter posteromedially 6
- 5'. Sternum 6 not modified 7
6. Mandibles cross in repose *Sphecodopsis*
- 6'. Mandibles overlap in repose *Ammobates*
7. Clypeus with distinct tubercle medioventrally *Nasutapis*
- 7'. Clypeus not tuberculate 8
8. Clypeus above epistomal pits about parallel sided 9
- 8'. Clypeus above epistomal pits converges mesally 10
9. Body slender and largely naked *Eucondylops*
- 9'. Body robust and hairy *Macrogalea*
10. Marginal cell of forewing truncate apically *Chiasmognathus*
- 10'. Marginal cell rounded apically 11
11. Face with two juxtantennal, longitudinal carinae, and a median, longitudinal carina between antennal sockets *Euaspis*
- 11'. Face without medio-longitudinal carinae 12
12. Axilla pointed *Larinostelis*
- 12'. Axilla rounded 13

13.	Pterostigma more than twice as long as wide	14
13'.	Pterostigma about twice as long as wide	15
14.	Metasoma cone-shaped, elongate	<i>Coelioxys</i>
14'.	Metasoma more compressed, shorter	<i>Schwarzia</i>
15.	Tegula enlarged	<i>Afrostelis</i>
15'.	Tegula not enlarged	16
16.	Body black, without yellow markings (African)	<i>Stelis</i>
16'.	Body with yellow markings (endemic to Sokotra)	<i>Xenostelis</i>
17.	Scutellum strongly laminate	<i>Thyreus</i>
17'.	Scutellum not laminate	18
18.	Distal parts of wings, beyond venation, hairless and coarsely papillate; scutellum spinose	<i>Afrolelecta</i>
18'.	Distal parts of wings hairy; scutellum gently rounded or tuberculate . . .	19
19.	Middle coxa much shorter than distance between its summit and posterior wing base	<i>Ammobatoides</i>
19'.	Middle coxa at least nearly as long as distance between its summit and base of hind wing	20
20.	Tergum 5 with pseudopygidium	<i>Epeolus</i>
20'.	Tergum 5 without pseudopygidium	21
21.	Sternum 6 with a conical concavity posteromesally.	<i>Pasites</i>
21'.	Sternum 6 entire posteromesally	<i>Nomada</i>

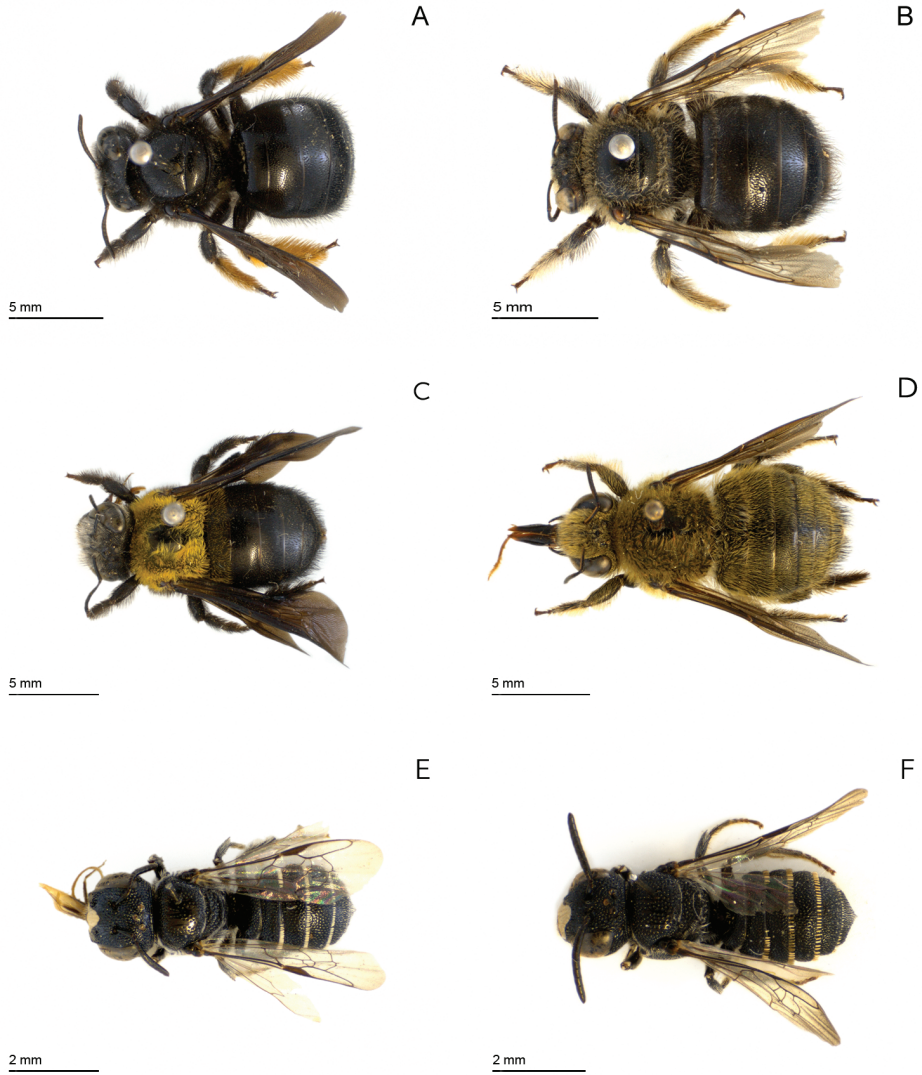


Fig. 35. A-B. *Xylocopa lugubris* Gerstaecker. A. Female; B. Male; C-D. *Xylocopa scioensis* Gribodo: C. Female; D. Male; E-F. *Ceratina moerenhouti* Vachal: E. Female; F. Male.



Fig. 36. A. *Allodape punctata* (Lepelletier & Serville), female; B. *Allodapula variegata* (Smith), female; C. *Braunsapis bouyssouri* (Vachal), female; D. *Compsomelissa zaxantha* (Cockerell), female; E. *Nasutapis straussorum* Michener, female; F. *Eucondylops konowi* Brauns, female; G-H. *Macrogalea candida* (Smith): G. Female; H. Male.



Fig. 37. A. *Nomada gigas* Friese, female; B. *Epeolus natalensis* Smith, female; C. *Ammobatoides scriptus* (Gerstäcker), female; D. *Ammobates auster* Eardley, female; E. *Pasites appletoni* (Cockerell), female; F. *Sphecodopsis vespericena* Eardley, female; G-H. *Schwarzia emmae* Eardley. G. Female. H. Male.

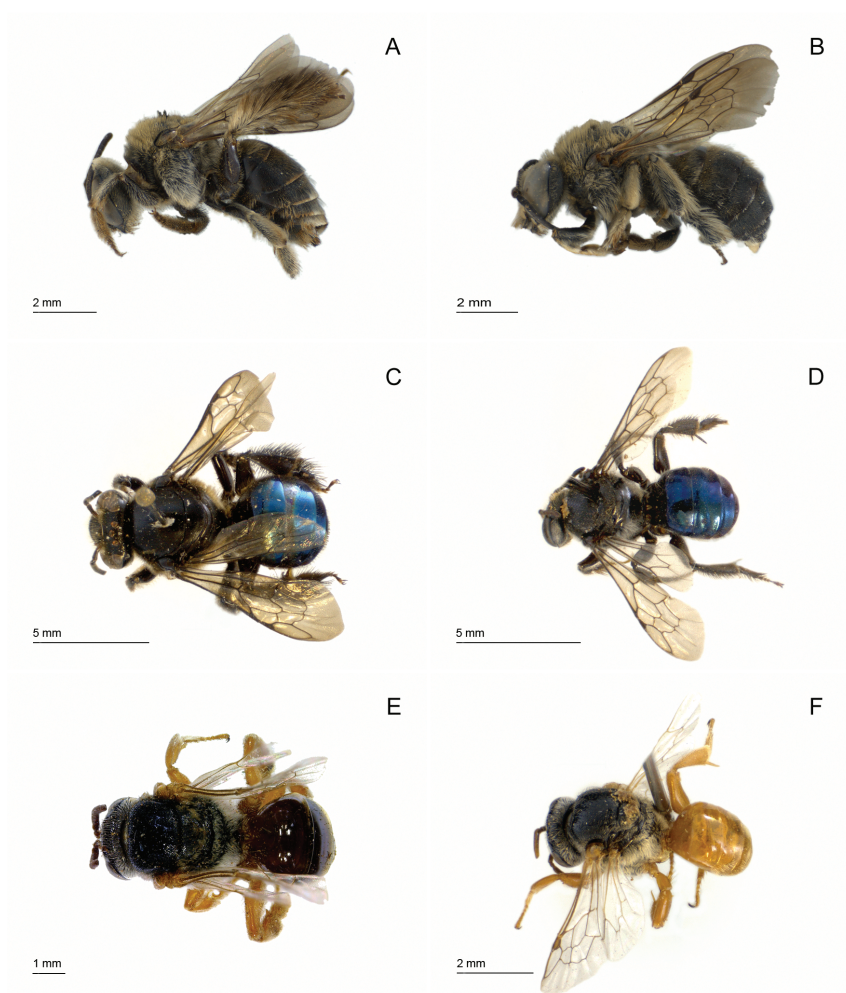


Fig. 38. A-B. *Ancyra* sp.: A. Female; B. Male. C-D. *Ctenoplectra bequaerti* Cockerell: C. Female; D. Male; E-F. *Ctenoplectrina politula* (Cockerell): E. Female; F. Male.