

Colletidae: Subfamily Hylaeinae

The subfamily Hylaeinae, family Colletidae, has approximately 210 species, and includes seven genera. These bees are sometimes superficially mistaken for wasps. Females carry their pollen internally, in the crop. The majority of species are above-ground nesting bees. Most species use pre-existing holes, while some, such as some *Amphylaeus* and *Palaeorhiza*, excavate their own nest holes. The following couplets are adaptations of keys by Houston (1975) and Michener (2007).



Photos by Tobias Smith, unless otherwise attributed

Hylaeinae – Couplet 1

- ❖ Front tibial spine prolonged into long curved process at least as long as basitarsal diameter; strong protrusion on second metasomal sternum (S2); black with yellow, red or orange integumental bands on metasoma **... *Hyleoides***
- ❖ Front tibial spine small and inconspicuous; no strong protrusion on S2; no coloured integumental banding on metasoma **... 2**

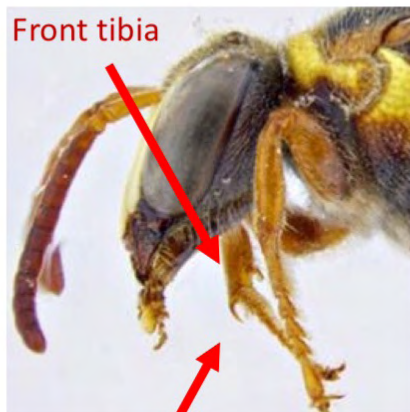


Photo: PaDIL - Sarah McCaffrey

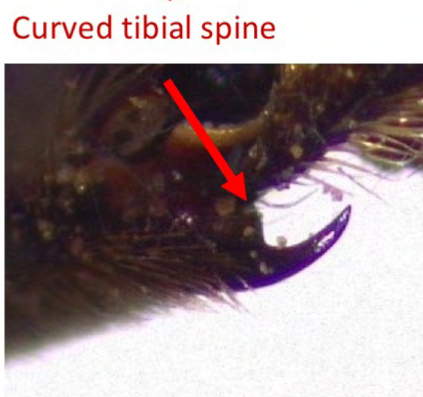
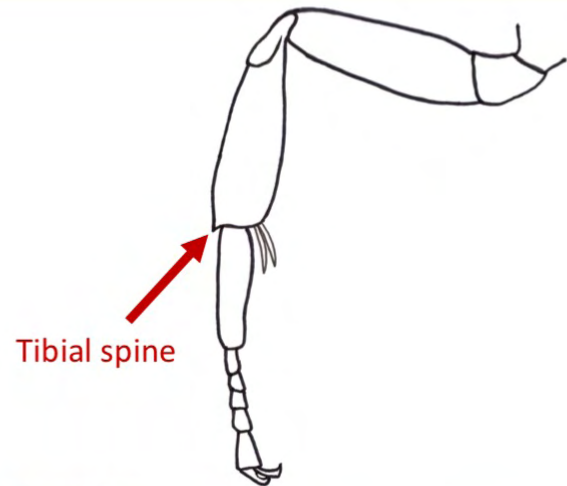


Photo: Tobias Smith



Photo: PaDIL - Caroline Harding

Strong protrusion on second metasomal sternum

Hyleoides, 8 species, widespread



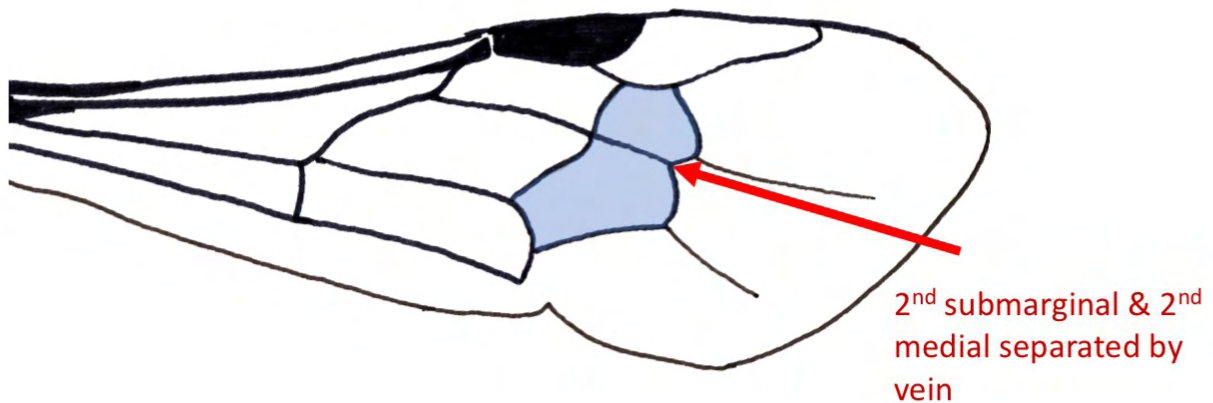
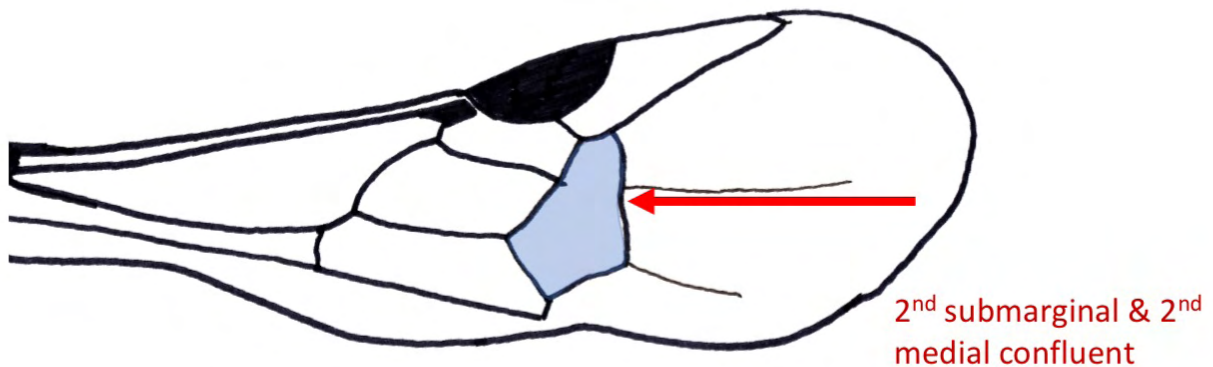
Photos: PaDIL - Caroline Harding

Houston, T. (1975) A revision of the Australian hylaeine bees (Hymenoptera: Colletidae). *Australian Journal of Zoology, Supplementary Series*, 36: 1–135.

Hylaeinae – Couplet 2 (1)

- ❖ Second submarginal and second medial cells of forewing confluent (minute slender bees) ... **Hylaeus (part*)**
- ❖ Second submarginal and second medial cells of forewing separated by a vein ... **3**

* *Hylaeus* that key out here are in the subgenus *Heterapoides* or *Gephyrohylaeus*



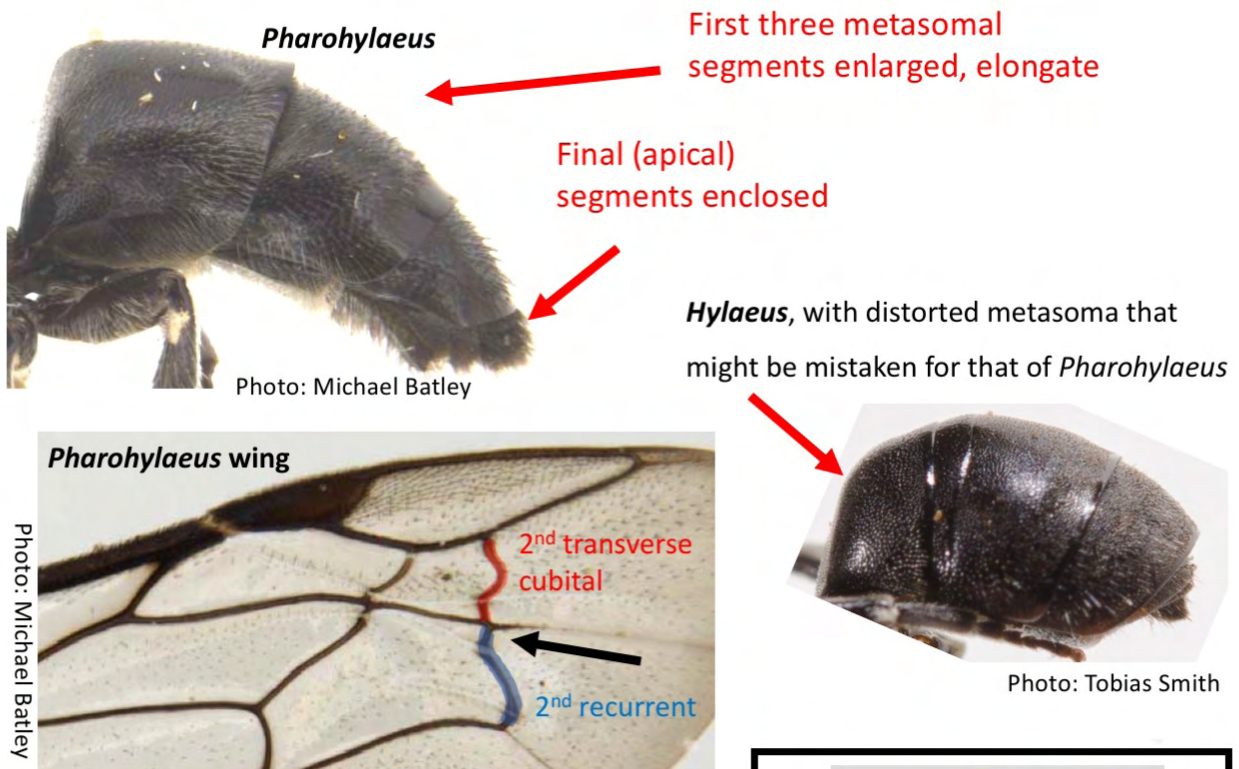
<i>Hylaeus (Heterapoides)</i>	<i>Hylaeus (Gephyrohylaeus)</i>
8 species	1 species
Widespread	Widespread

Line drawings by Tobias Smith (based on diagrams in Michener 1965)

Hylaeinae – Couplet 3 (2)

- ❖ Second recurrent vein distal to second transverse cubital vein; metasomal segments 1–3 enlarged and enclosing more apical ones ... *Pharohylaeus*
- ❖ Second recurrent vein in line with or basal to second transverse cubital vein; metasomal segments 1–3 not enlarged nor enclosing more apical ones ... 4

Note that occasionally the metasoma of some pinned specimens of other genera such as *Hylaeus* can appear to have enlarged metasomal segments 1–3 as an artefact of drying out (see example photo below right).



Pharohylaeus

1 species, *P. lactiferus*

Only known from north
and central QLD




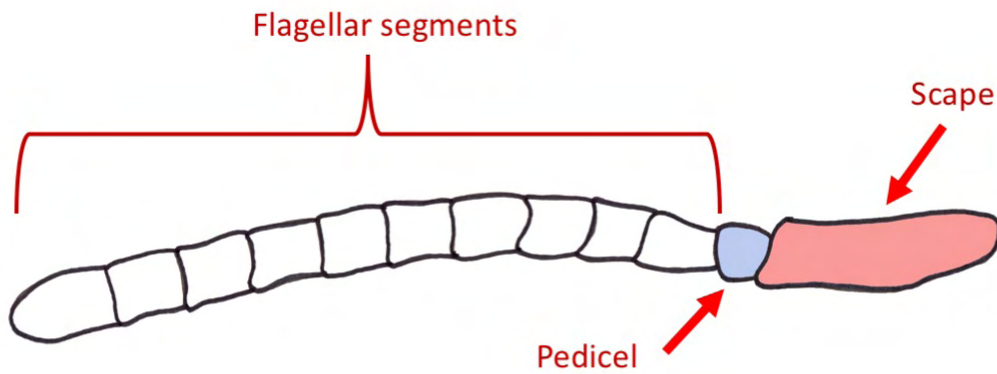
Photo: Michael Batley

Hylaeinae – Couplet 4 (3)

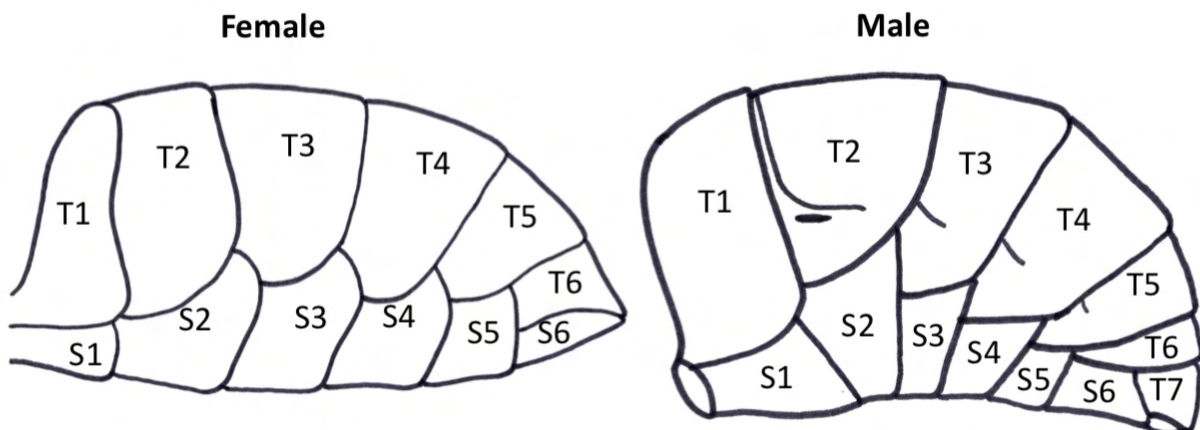
- ❖ Males ... 5
- ❖ Females ... 9

There are two easy methods of determining the sex of bee specimens: **1)** the number of antennal segments, and **2)** the number of metasomal segments.

Antennal segments. Count the total number of antennal segments, including the scape and pedicel. Female bees have **12** segments, and males have **13** segments.

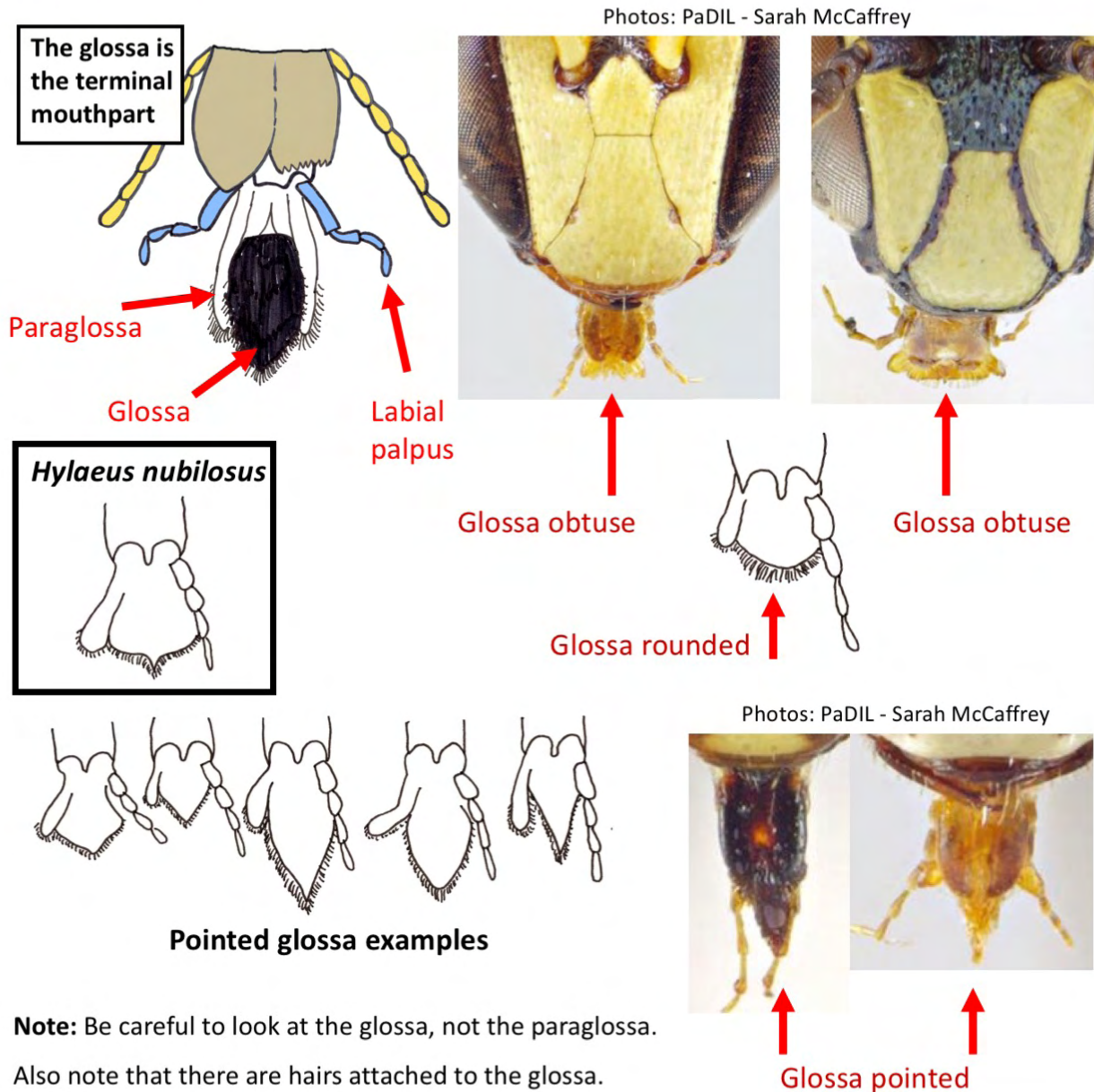


Metasomal segments. Count the total number of metasomal segments (pairs of terga and sterna). Female bees have **6** segments, and males have **7** segments.




Hylaeinae – Couplet 5 (4)

- ❖ Glossa obtuse or rounded at apex (with a small median point in *Hylaeus nubilosus*)
- ... **Hylaeus (part)**
- ❖ Glossa pointed at apex
- ... **6**



Note: Be careful to look at the glossa, not the paraglossa. Also note that there are hairs attached to the glossa.



Hylaeus

150+ species (20 subgenera)

Widespread

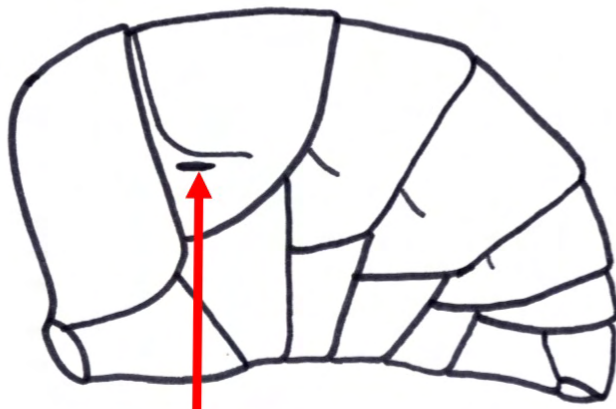
Houston, T. (1981) A revision of the Australian hylaeine bees (Hymenoptera: Colletidae). II. *Australian Journal of Zoology, Supplementary Series*, 80: 1–128.

Photo: Tobias Smith

Line drawings by Tobias Smith (based on diagrams in Michener (2007 top left and 1965))

Hylaeinae – Couplet 6 (5)

- ❖ Foveae of second metasomal tergum linear and horizontal ... 7
- ❖ Foveae of second metasomal tergum punctiform (point/dot like) or absent ... 8



Fovea of T2

Note: Foveae (fovea, singular) are depressions in the cuticle. Foveae of the second metasomal tergum are hairless grooves. To see foveae, try looking from various angles to try to see the shadow of the depression. Diffused light can be beneficial too.



Photo: Tobias Smith

Amphylaeus

T2 fovea, linear and horizontal



Amphylaeus

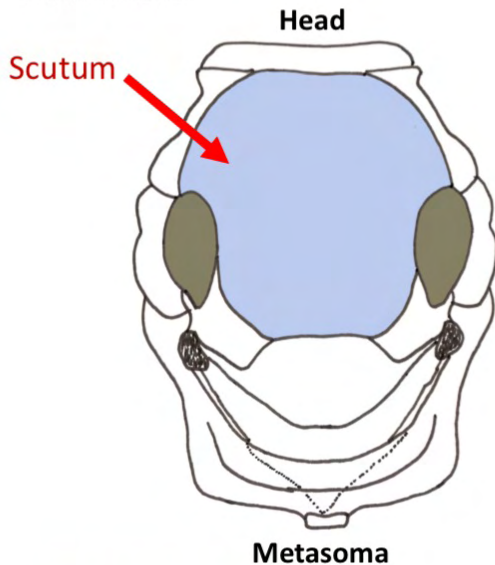
Photo: Tobias Smith

Line drawing by Tobias Smith (based on diagram in Michener 2007)

Hylaeinae – Couplet 7 (6)

- ❖ Genae and scutum with yellow markings; first metasomal segment appearing constricted in side view **...Hemirhiza**
- ❖ Genae and scutum without pale markings; first metasomal segment not appearing constricted in side view **... Amphylaeus**

Mesosoma, view from above



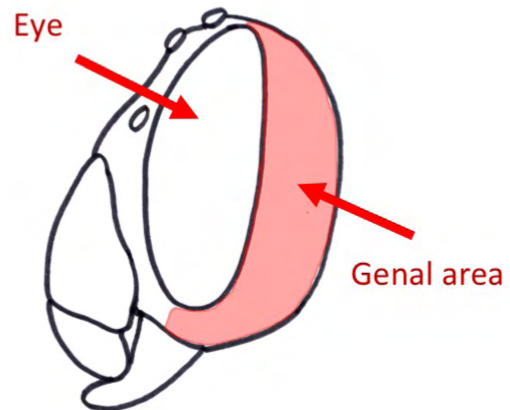
1st metasomal segment appearing constricted

Hemirhiza melliceps



Photo: PaDL - Sarah McCaffrey

Head, viewed from side



Yellow on genae

Yellow on scutum

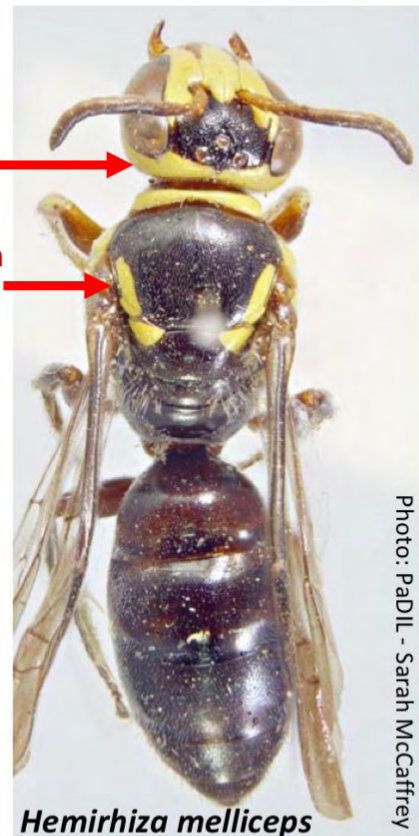


Photo: PaDL - Sarah McCaffrey

Photo: Tobias Smith



Amphylaeus

4 species

Only known from eastern states

Houston, T. (1975) A revision of the Australian hylaeine bees (Hymenoptera: Colletidae). *Australian Journal of Zoology, Supplementary Series*. 36: 1–135.

Hemirhiza

1 species, *H. melliceps*

Only known from east coast

Line drawings by Tobias Smith (based on diagrams by E.R.S. Hodges in Michener, McGinley & Danforth, 1994)

Hylaeinae – Couplet 8 (6)

- ❖ Face with large lateral depressions from sides of clypeus to above antennal sockets; gradulus of second metasomal tergum exposed and curved posteriorly medially; hind tibia with one or two spines on outer apical margin (*see couplet 9 for full description of tibial spines*) ... **Meroglossa (page 82)**
- ❖ Face without large lateral depressions; gradulus of second metasomal tergum normally concealed and transverse; hind tibia without spines on outer apical margin ... **Palaeorhiza (page 82)**

Photo: PaDIL - Sarah McCaffrey



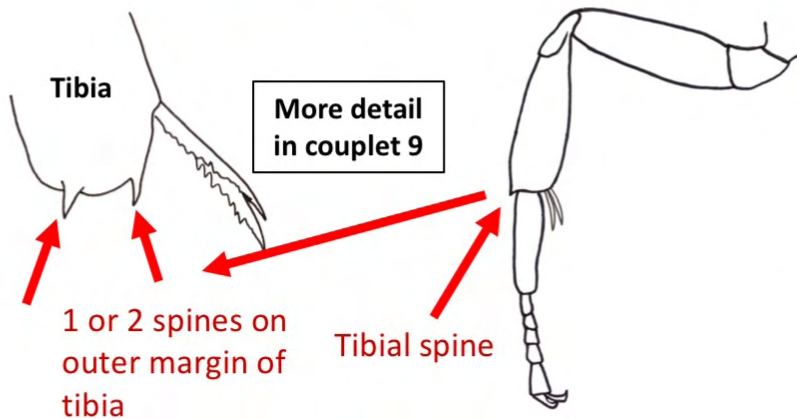
Note: A good way to see the depressions here is to move your specimen around, trying to create shadows using the angle of your lights.

Large lateral depressions

No depressions



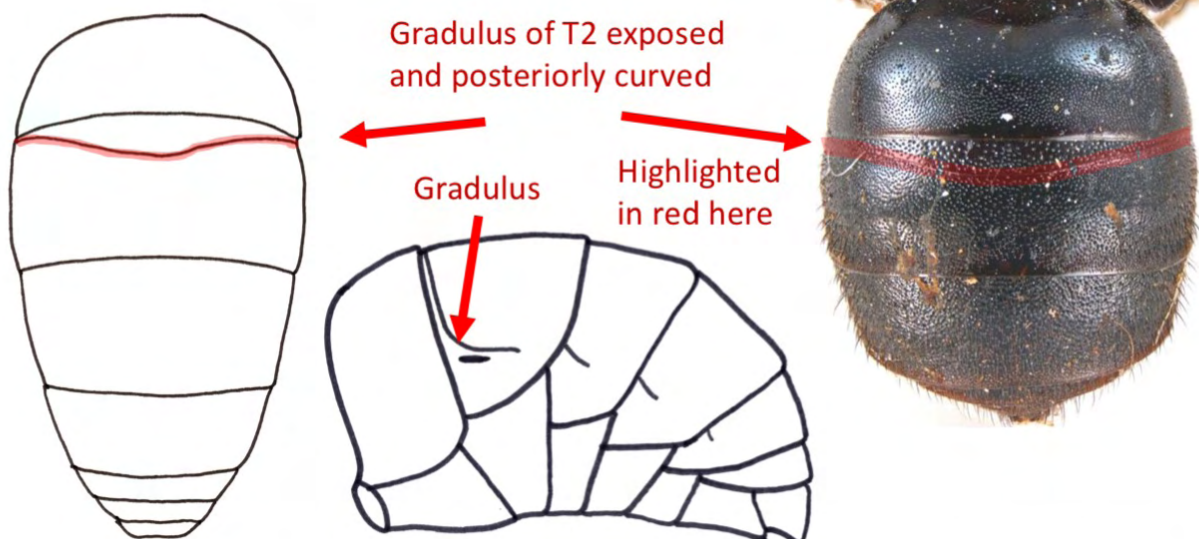
Photo: PaDIL – Michael Batley



1 or 2 spines on outer margin of tibia

Tibial spine

Photo: PaDIL - Caroline Harding



Gradulus of T2 exposed and posteriorly curved

Gradulus

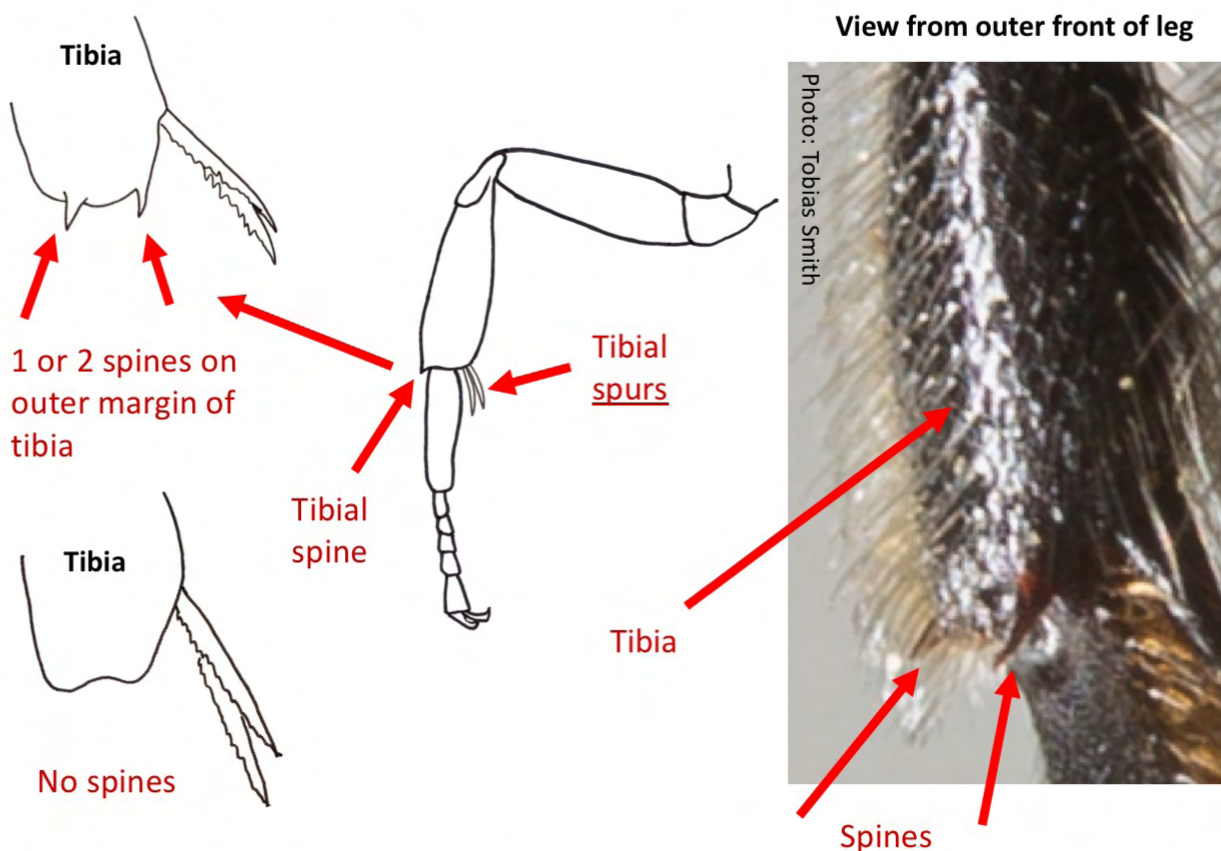
Highlighted in red here

Line drawings by Tobias Smith (based on diagrams in Michener 2007 & Houston 1975 (dorsal view metasoma))

Hylaeinae – Couplet 9 (4)

- ❖ Outer apical margin of hind tibia usually with a pair of spines ... 10
- ❖ Outer apical margin of hind tibia without spines ... 11

Note: Don't get the hind tibial spines confused with the hind tibial spurs. The spines are different, and protrude from the outer/front side of the tibia, whereas the tibial spurs protrude inwards/back towards the body. These tibial spines can be partially hidden by hairs. Use the sharp end of an entomology pin to carefully scrape off some hairs, which will come off easily in dried specimens. You can also use an entomology pin to try and 'feel' the spines.



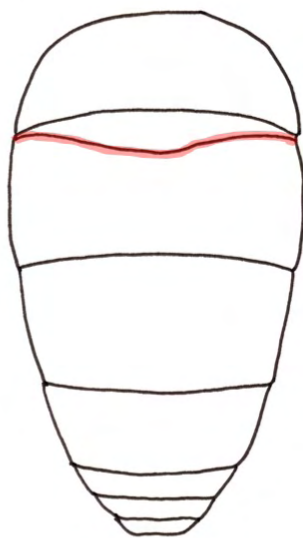
Descriptions below for genera keyed out on other pages of this Hylaeinae key	
<p><i>Meroglossa</i> 21 species Widespread</p> <p>Houston, T. (1975) A revision of the Australian hylaeine bees (Hymenoptera: Colletidae). <i>Australian Journal of Zoology, Supplementary Series</i>, 36: 1–135.</p>	<p><i>Palaeorhiza</i> 25 species Coastal QLD and northern NSW</p> <p>Houston, T. (1975) A revision of the Australian hylaeine bees (Hymenoptera: Colletidae). <i>Australian Journal of Zoology, Supplementary Series</i>, 36: 1–135.</p>

Line drawings by Tobias Smith (tibial spines based on diagrams in Michener (2007))

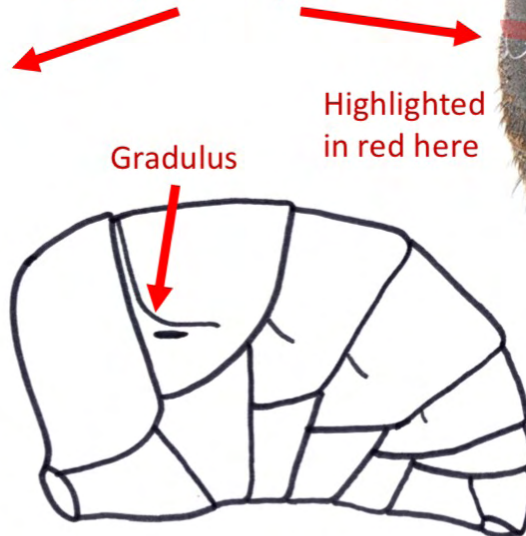
Hylaeinae – Couplet 10 (9)

- ❖ Gradulus of second metasomal tergum usually exposed and posteriorly curved medially; foveae of second metasomal tergum absent or punctiform (see Hylaeinae key couplet 6) ... *Meroglossa* (page 82)
- ❖ Gradulus of second metasomal tergum usually hidden and procurved medially; foveae of second metasomal tergum linear ... *Amphylaeus* (page 80)

Meroglossa metasoma



Gradulus of T2 exposed and posteriorly curved



Gradulus

Highlighted in red here

Photo: PaDIL - Caroline Harding



Amphylaeus metasoma



Gradulus not exposed when metasoma flat



But, when metasoma is bent forward, gradulus of T2 is exposed, and procurved (highlighted in red here)

Amphylaeus metasoma



Photo: Tobias Smith

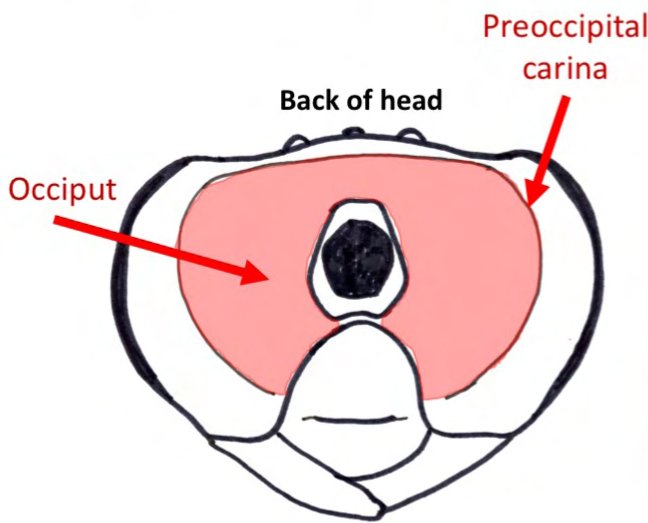
Photo: PaDIL - Sarah McCaffrey

Line drawings by Tobias Smith (based on diagrams in Michener 2007 & Houston 1975 (left))

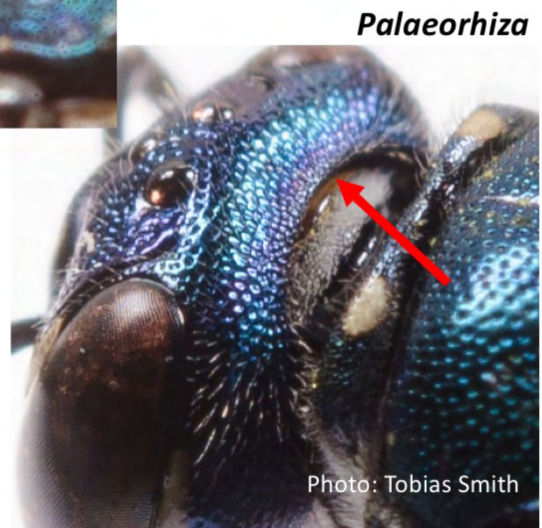
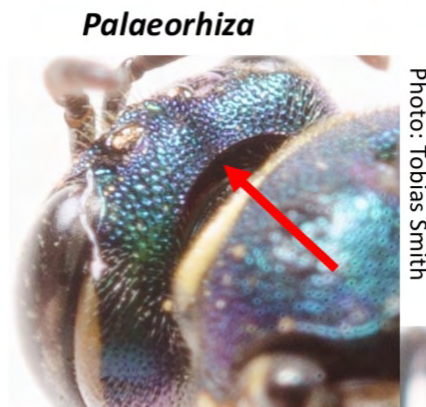
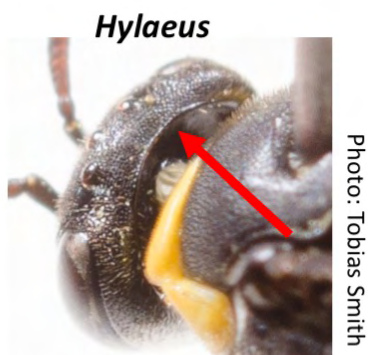
Hylaeinae – Couplet 11 (9)

- ❖ Preoccipital carina present ... 12
- ❖ Preoccipital carina absent ... 13

Note: A carina is a ridge, or a sharp line in the cuticle. If a specimen has a sharp ridge/line in the preoccipital area (back of the head, edge of the occiput), then it has the carina present. If the preoccipital area is smooth or rounded without a line or ridge, then the carina is absent.



Red arrows below indicate the presence of preoccipital carina



Line drawing by Tobias Smith (based on diagram by E.R.S. Hodges in Michener, McGinley & Danforth, 1994)

Hylaeinae – Couplet 12 (11)

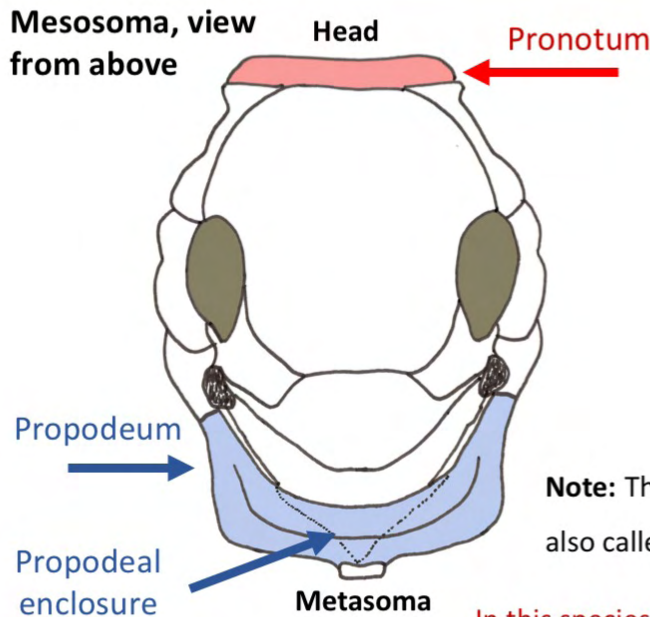
❖ White to yellow markings on genae and mesosoma, body usually of metallic colouration; Propodeal enclosure nearly all on dorsal surface of propodeum

... *Palaeorhiza* (page 82)

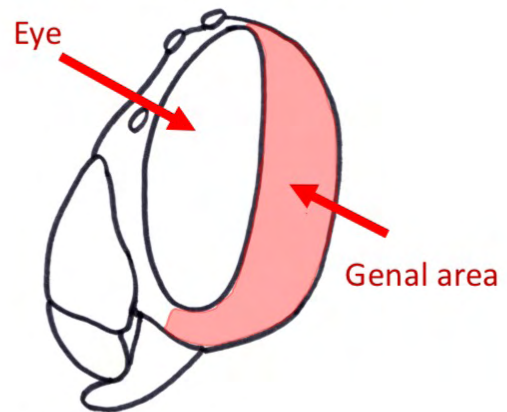
❖ Genae and thorax (except pronotum) without white to yellow markings; Propodeal enclosure with less than three-quarters of its length on dorsal surface of propodeum

... *Hylaeus* (page 78)

Mesosoma, view from above

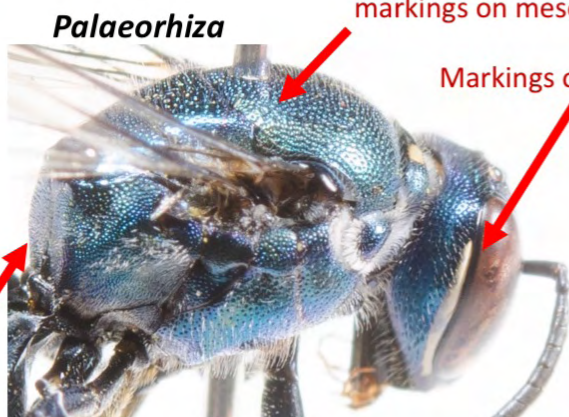


Head, viewed from side



Note: The propodeal enclosure is also called the metapostnotum.

Photo: Tobias Smith



Palaeorhiza

In this species no markings on mesosoma

Markings on genae

Propodeal enclosure on dorsal surface

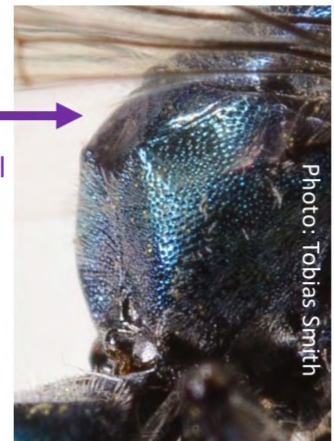
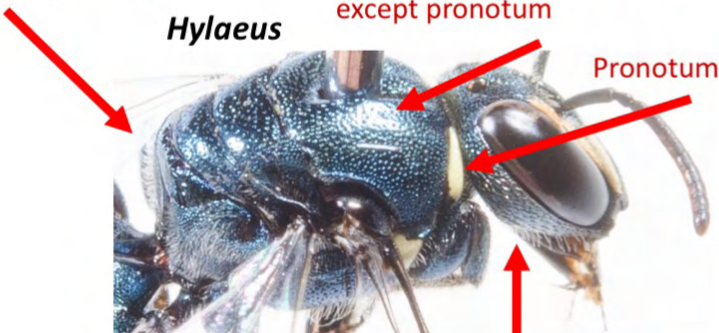


Photo: Tobias Smith

Propodeum



Hylaeus

No markings on mesosoma, except pronotum

Pronotum

Propodeal enclosure further down/back

Photo: Tobias Smith

No markings on genae



Photo: Tobias Smith

Line drawings by Tobias Smith (based on diagrams by E.R.S. Hodges in Michener, McGinley & Danforth, 1994)

Hylaeinae – Couplet 13 (11)

- ❖ Genae and scutum with yellow markings; propodeal enclosure smooth, shiny and evenly rounded; sixth metasomal tergum with a distinct pygidial plate

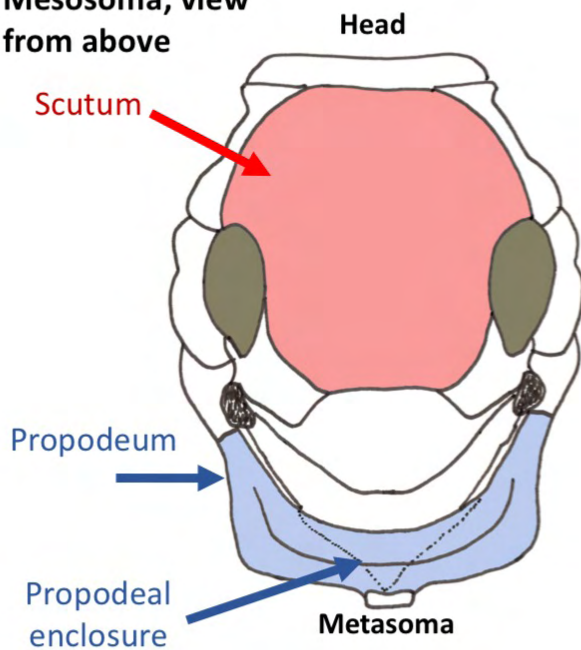
... *Hemirhiza* (1 species)

- ❖ Genae and scutum without yellow markings or, if with them, then propodeal enclosure not smooth, nor shiny, nor evenly rounded, pygidial plate absent

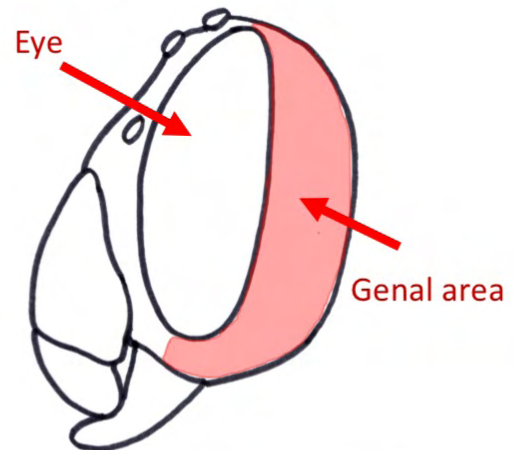
...*Hylaeus* (page 78)

* See *Apidae* Couplet 9 for description of pygidial plate

Mesosoma, view from above



Head, viewed from side



Hemirhiza melliceps

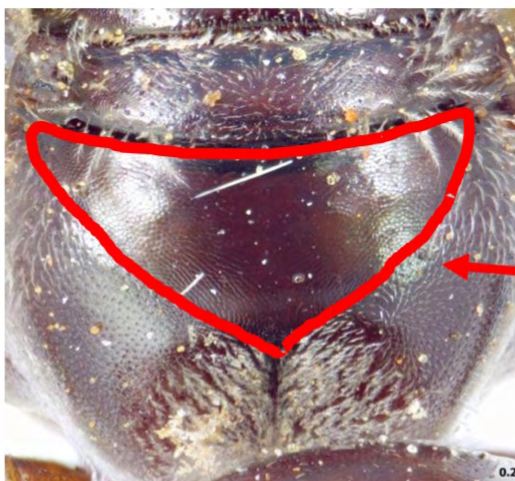


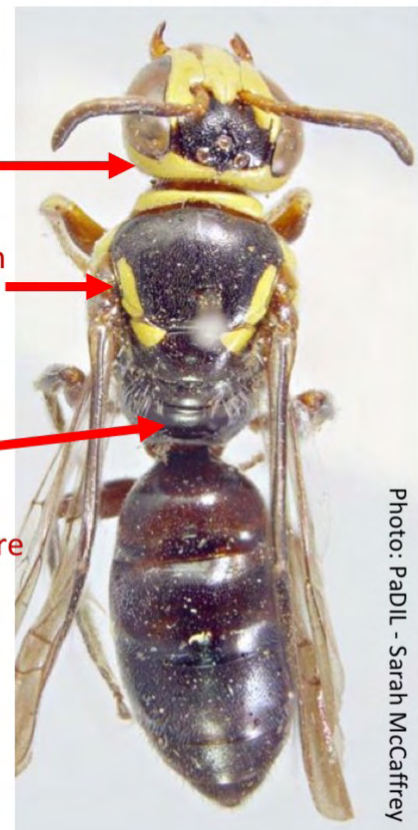
Photo: PaDIL - Sarah McCaffrey

Yellow on genae

Yellow on scutum

Smooth & shiny propodeal enclosure

Hemirhiza melliceps



Note: The propodeal enclosure, or propodeal triangle, is more correctly termed the metapostnotum, but you will find all three used.

***Hemirhiza*, see page 80**

Line drawings by Tobias Smith (based on diagrams by E.R.S. Hodges in Michener, McGinley & Danforth, 1994)