

Family FORMICIDAE

(Figs. 85–92)

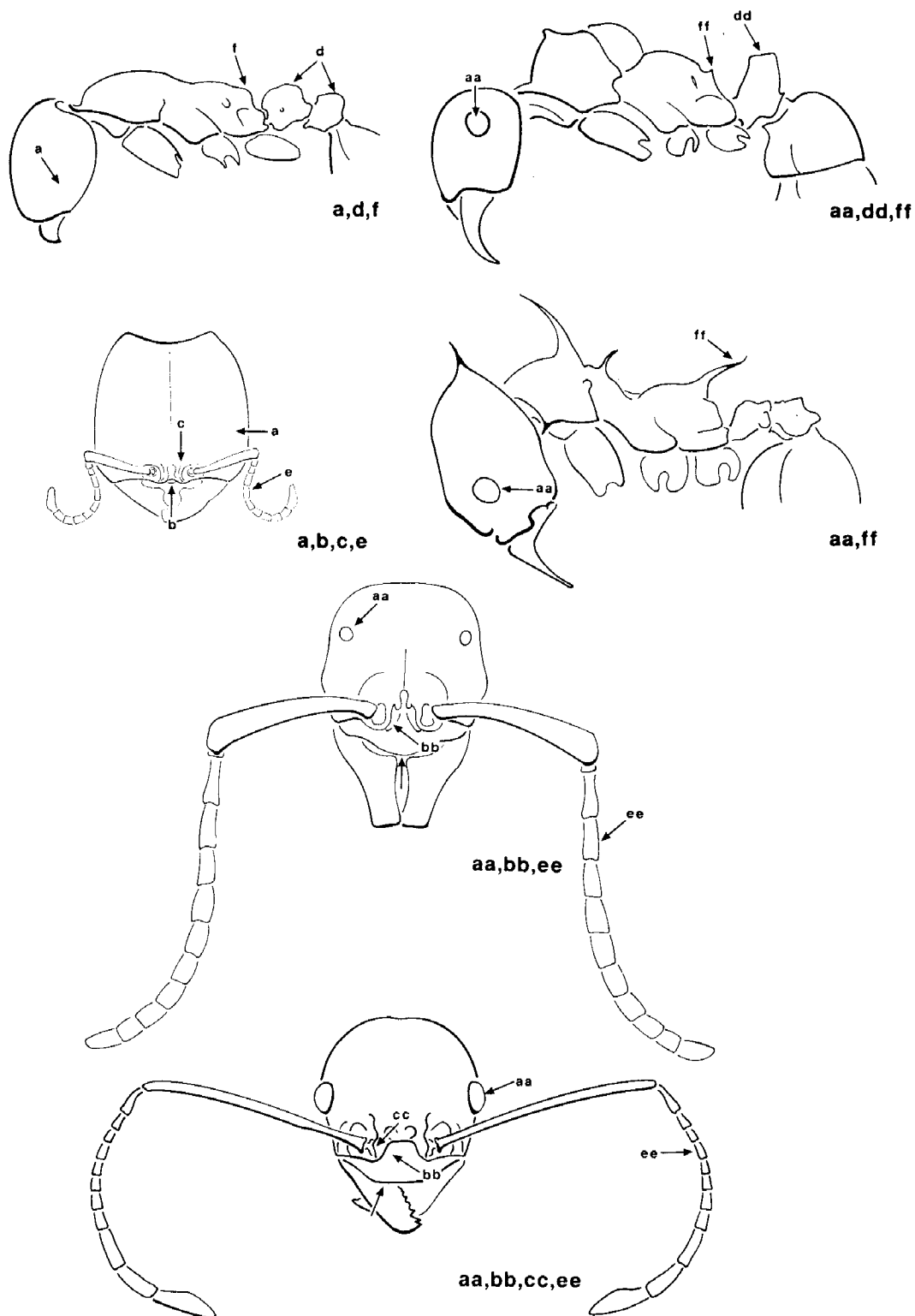
Diagnosis Dorsal rim of torulus often tuberculate or concealed under vertical laminate carina of frons, rim sometimes simple; eye with inner margin more or less straight or convex. Pronotum with posterodorsal margin weakly concave to U-shaped and with posterolateral apex truncate anterior to tegula; metapleural gland usually opening above metacoxa, the opening and/or gland rarely absent; mesocoxae and metacoxae contiguous; hind wing usually without distinct claval lobe but claval lobe rarely indicated, and usually without distinct jugal lobe but jugal lobe rarely present; posterior (inner) spur of metatibia modified as a calcar. Metasoma petiolate; metasomal segment 1 usually strongly constricted at each end, forming a true node, but rarely unconstricted posterodorsally; metasomal sternum 1 separated from sternum 2 by a deep constriction; male metasomal sternum 8 (hypopygium) simple, not concealed. Sterile worker caste present but rarely absent. Sexual dimorphism slight to extreme: reproductives of both sexes usually macropterous, but female rarely brachypterous or sometimes apterous (often dealate) and male rarely apterous; sterile female apterous; apterous form with mesosoma somewhat different from that in macropterous and brachypterous forms, with pronotum usually freely articulating but sometimes fused with mesothorax, with mesonotum and metanotum—propodeum rarely articulating but usually fused with the suture

between them often distinct, and with mesosomal sclerites sometimes entirely fused with all sutures indistinguishable.

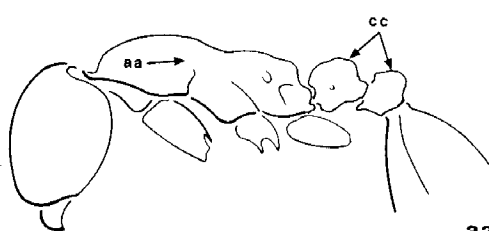
Comments Formicidae (ants) is a cosmopolitan but predominantly tropical family, containing about 8800 species in 10 subfamilies: Aneuretinae, Dolichoderinae, Dorylinae (including Aenictini and Ecitonini), Formicinae, Leptanillinae, Myrmeciinae, Myrmicinae, Nothomyrmecinae, Ponerinae (including Cerapachyini), and Pseudomyrmecinae; the recognition of more subfamilies as suggested in recent publications awaits more general acceptance. Many species are widespread or cosmopolitan as a result of introductions by humans. Adults are generally more or less uniformly black, brown, reddish, or yellowish. All are highly social, but some are slave makers or social parasites in which the worker caste has been lost, and a few have laying workers instead of queens. The larvae are fed by the workers on a wide variety of substances of animal or vegetable origin, in chambers constructed by the workers. Pupation occurs within the chamber, and adult eclosion from the cocoon (when present) usually cannot take place without assistance from workers. About 590 species in about 73 genera (six in subfamilies) occur in North America, including 111 species in about 28 genera in Canada.

Key to subfamilies of FORMICIDAE (workers)

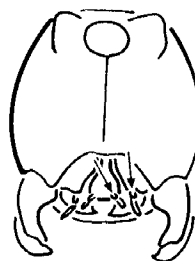
(modified from Snelling 1981)



- 1
- a. Eye vestigial or absent.
 - b. Clypeus short, the antenna thus inserted near anterior margin of head.
 - c. Frontal carina short and vertical, not covering torulus.
 - d. Metasoma usually with 2 anterior nodes.
 - e. Antenna usually short.
 - f. Propodeum usually without spines 2
 - aa. Eye fully developed **and/or**:
 - bb. Clypeus long, the antenna thus inserted far from anterior margin of head **and/or**:
 - cc. Frontal carina long and oblique, covering torulus **and/or**:
 - dd. Metasoma with 1 anterior node **and/or**:
 - ee. Antenna long **and/or**:
 - ff. Propodeum with spines 3

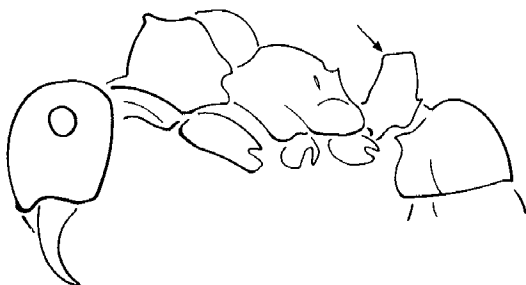


aa,cc



bb

- 2(1)
- a. Body at most 2.5 mm long and markedly elongate and slender; groove between pronotum and mesonotum distinct.
 - b. Maxillary palpus not segmented or with 2 segments; labial palpus not segmented.
 - c. Metasoma with 2 anterior nodes **Leptanillinae**
 - aa. Body more than 3 mm long, usually not markedly elongate and slender, and/or groove between pronotum and mesonotum weak or not discernible.
 - bb. Maxillary and labial palpi each with 2 or 3 segments.
 - cc. Metasoma with 1 or 2 anterior nodes **Dorylinae**

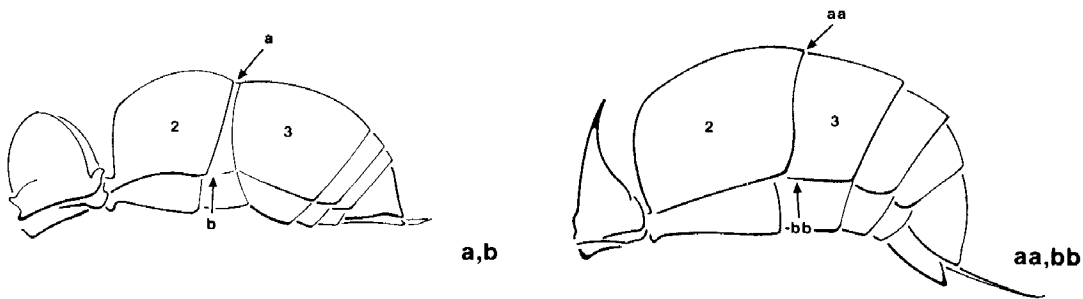


a

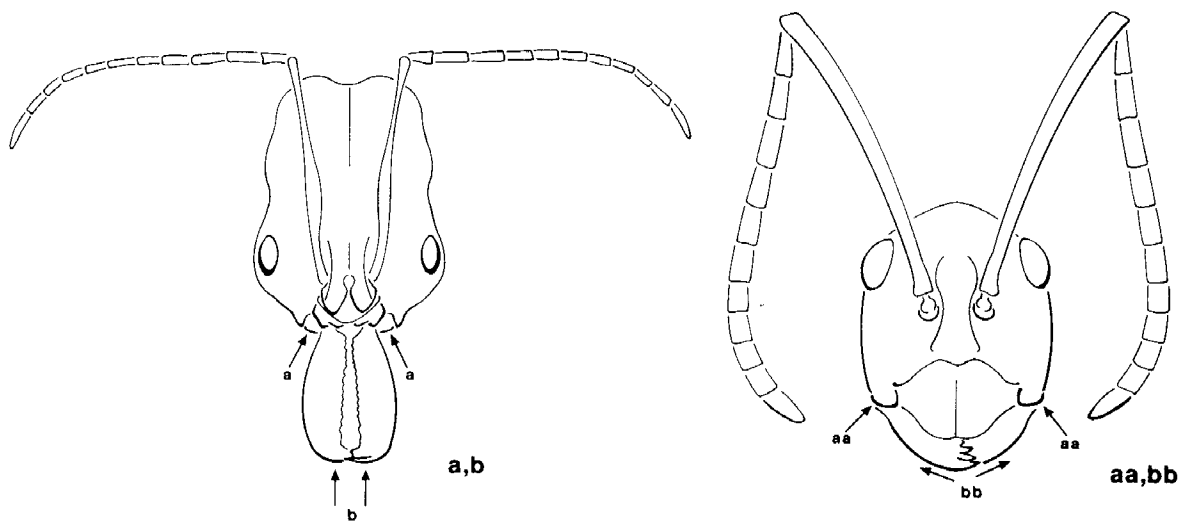


aa

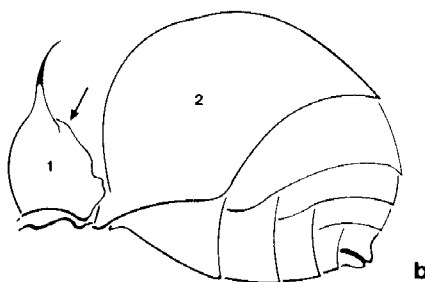
- 3(1)
- a. Metasoma with 1 anterior node 4
 - aa. Metasoma with 2 anterior nodes 9



- 4(3)
- a. Metasoma with distinct constriction between segments 2 and 3.
 - b. Metasomal segment 3 with tergum and sternum fused anteriorly some **Ponerinae**
 - aa. Metasoma without distinct constriction between segments 2 and 3.
 - bb. Metasomal segment 3 usually with tergum and sternum free but sometimes fused anteriorly **5**

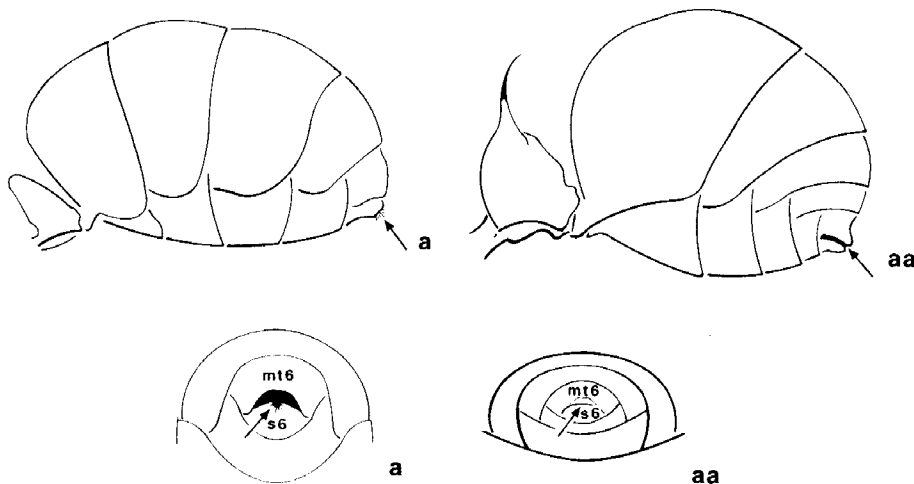


- 5(4)
- a. In anterior view, mandibles originating close together near middle of anteroventral margin of head.
 - b. Mandibles parallel to each other when closed, forming a straight line when fully open.
 - c. Metasomal segment 3 with tergum and sternum fused anteriorly some **Ponerinae**
 - aa. In anterior view, mandibles originating a distance apart, at lateral extremities of anteroventral margin of head.
 - bb. Mandibles usually distinctly converging when closed, forming an acute or obtuse angle when fully open.
 - cc. Metasomal segment 3 with tergum and sternum free **6**



6(5)

- a. Sting absent or vestigial.
- b. Metasomal segment 1 very much shorter than 2 and usually scale-like (anteroposteriorly flattened and without narrow anterior stalk), but segment rarely less flattened 7
- aa. Sting fully developed and protrusible.
- bb. Metasomal segment 1 more than half length of 2, widely swollen posteriorly, and with narrow anterior stalk 8

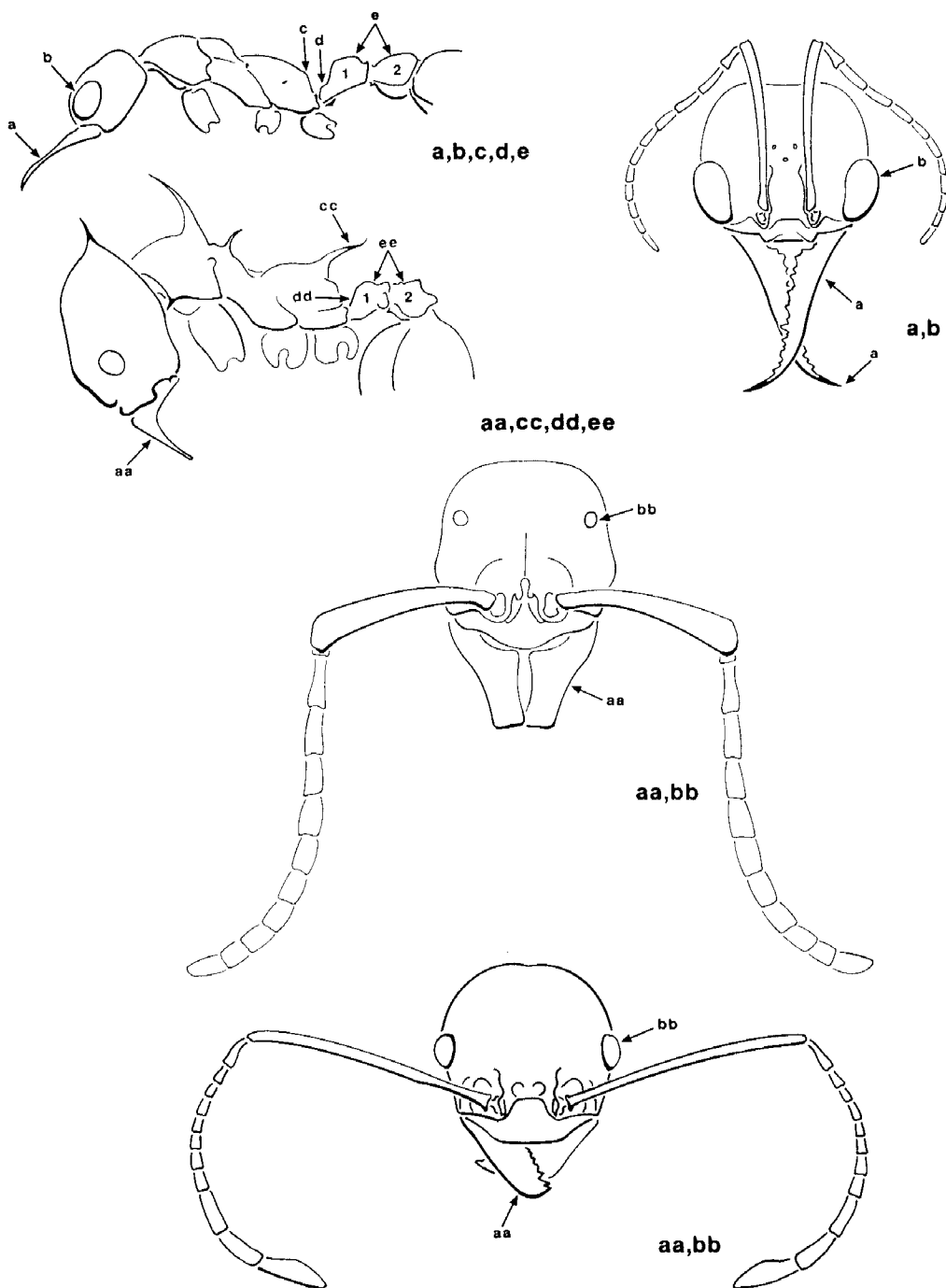


7(6)

- a. Opening at apex of metasoma formed by last sternum (s_6); opening terminal, semicircular to circular, usually nozzle-like and/or surrounded by a fringe of hairs.
- b. If opening at apex of metasoma concealed by last tergum **then** antenna inserted well posterior to posterior clypeal margin (otherwise antenna at posterior clypeal margin) **Formicinae**
- aa. Opening at apex of metasoma formed by last tergum (mt_6) and sternum (s_6); opening terminal or subterminal, slit-like and without a fringe of hairs.
- bb. Antenna inserted at posterior clypeal margin **Dolichoderinae**

8(6)

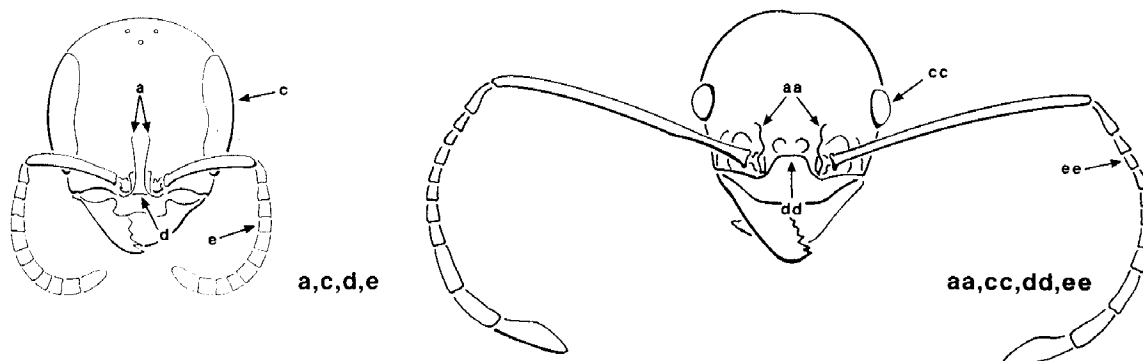
- a. Clypeus with anteroventral margin emarginate in middle.
- b. Eye small, positioned below mid height of lateral margin of head.
- c. Propodeum angulate in lateral view, with strong spine at posterodorsal angle **Aneuretinae**
- aa. Clypeus with anteroventral margin convex in middle.
- bb. Eye large and convex, positioned slightly above mid height of lateral margin of head.
- cc. Propodeum rounded in lateral view, without spines **Nothomyrmecinae**



9(3)

- a. Mandible very long, more or less straight, narrow, apically acute and toothed along entire inner margin.
- b. Eye positioned slightly below mid height of lateral margin of head.
- c. Propodeum without spines.
- d. Metasomal segment 1 gradually swollen and often with narrow anterior stalk.
- e. Metasomal segment 2 cup-shaped or bell-shaped and larger than 1 **Myrmeciinae**
- aa. Mandible short and/or curved and/or wide and/or apically truncate and/or not toothed along entire inner margin **and/or**:
- bb. Eye positioned above mid height of lateral margin of head **and/or**:
- cc. Propodeum with spines **and/or**:
- dd. Metasomal segment 1 abruptly swollen and/or without narrow anterior stalk **and/or**:

- ee. Metasomal segment 2 not cup-shaped or bell-shaped, similar in size to 1 or smaller than 1
 10



- 10(9) a. Frontal carinae usually close together, narrow, and not covering toruli.
 b. Body markedly elongate, often very slender.
 c. Eye very large and elongate.
 d. Clypeus with dorsal margin rounded, not produced dorsally between frontal carinae.
 e. Antenna short **Pseudomyrmecinae**
 aa. Frontal carinae usually well-separated, large, and covering toruli.
 bb. Body compact **and/or:**
 cc. Eye small and rounded **and/or:**
 dd. Clypeus with dorsal margin narrow and produced dorsally between frontal carinae **and/or:**
 ee. Antenna long **Myrmicinae**

Subfamily Myrmeciinae

(Fig. 85)

This Australian subfamily (bulldog ants) includes about 90 species in one genus. Adults are moderate to large predators; female reproductives are macropterous, and workers can sting. Nests are permanent and in the soil.

Subfamily Pseudomyrmecinae

(Fig. 86)

This cosmopolitan subfamily (tree ants) includes about 150 species in two genera; some authorities consider the Cerapachyini to constitute a separate subfamily. Adults are small to moderate-sized predators; female reproductives are macropterous, and workers can sting. Nests are permanent and in hollow stems or thorns of trees or other plants. Five species in one genus occur in North America, none in Canada.

Subfamily Ponerinae

(Fig. 87)

This cosmopolitan subfamily includes about 600 species in about 55 genera. Adults are small to large predators; female reproductives are

macropterous or apterous, and workers can sting. Nests are permanent and are usually constructed in the soil or rotting logs. Thirty-three species in 16 genera occur in North America, including four species in about three genera in Canada.

Subfamily Dorylinae

(Fig. 88)

This cosmopolitan subfamily of army and driver ants includes about 170 species in about seven genera; some authorities consider the Aenictini and the Ecitonini to comprise separate subfamilies. Adults are small to large predators or rarely phytophagous; female reproductives are apterous, and workers can usually sting. Colonies are nomadic, and the workers usually establish bivouacs in the soil or in sheltered places above ground. Twenty-five species in three genera occur in North America, none in Canada.

Subfamily Leptanillinae

This Australian, Oriental, and southern Palaearctic subfamily includes about 20 species in four genera. Adults are minute to small and probably predacious; female reproductives are apterous, and workers can sting. Nests are constructed in the soil.

Subfamily Myrmicinae

(Fig. 89)

This cosmopolitan subfamily includes about 2000 species in about 140 genera. Adults are small to moderate-sized predators, granivores, or fungivores; female reproductives are macropterous, and workers can or cannot sting. Nests are permanent and are usually constructed in the soil, in rotting wood, under objects, or in trees (including carton-making species); some species are social parasites. About 310 species in 35 genera occur in North America, including 37 species in about 15 genera in Canada.

Subfamily Nothomyrmecinae

This Australian subfamily includes one monotypic genus. Adults are moderate-sized predators; female reproductives are brachypterous, and workers can sting. Nests are permanent and are constructed in the soil.

Subfamily Aneuretinae

This Oriental subfamily includes one monotypic genus. Adults are small predators; female reproductive are macropterous, and workers can sting. Nests are permanent and are constructed in the soil.

Subfamily Dolichoderinae

(Fig. 90)

This cosmopolitan subfamily includes about 230 species in about 22 genera. Adults are small to moderate-sized and polyphagous; female reproductives are macropterous, and workers cannot sting. Nests are permanent and are usually constructed in the soil, in rotting wood, or under objects. About 17 species in six genera occur in North America, including three species in two genera in Canada.

Subfamily Formicinae

(Figs. 91, 92)

This cosmopolitan subfamily, which is commonest in temperate regions, includes about 1400 species in about 50 genera. Adults are small to moderate-sized and mostly phytophagous; female reproductives are macropterous, and workers cannot sting. Nests are permanent and are usually constructed in the soil, in rotting wood, or under objects; a few species are social parasites. About 200 species in 12 genera occur in North America, including 67 species in about eight genera in Canada.

References The best general work on ants is by Hölldobler and Wilson (1990), which includes comprehensive regional keys to the world genera, a discussion of ant morphology, and detailed coverage of all aspects of ant biology. Wheeler (1922), Taylor (1978), Snelling (1981), Wheeler and Wheeler (1972, 1985), and Bolton (1990*a*, 1990*b*, 1990*c*,) evaluated and/or keyed the subfamilies. Wheeler (1922) keyed and Brown (1973) listed the world genera and their distributions. The fauna was revised as follows: Creighton (1950) for North America, Smith (1936) for Puerto Rico, Snelling and Hunt (1976) for Chile, Bernard (1968) for Europe, Bolton and Collingwood (1975) for Britain, Arnold (1915–1926) for South Africa, Wilson and Taylor (1967) for Polynesia, and Brown (1958) for New Zealand. Wheeler and Wheeler (1990) keyed the Nearctic genera, Kusnezov (1978) keyed the genera of Argentina, and Bolton (1973) those of West Africa. Chapman and Capco (1951) provided a checklist of the Asian species. Kempf (1972) cataloged the Neotropical species, and Taylor and Brown (1985) the Australian species. Ogata and Taylor (1991) reviewed Myrmecinae. Wheeler and Wheeler (1976) surveyed the larvae. Ant biology has been studied by numerous authors and was surveyed by Wheeler (1910) and Wilson (1971). Peeters and Crozier (1988) analyzed the concept of caste, Baroni Urbani (1989) evaluated biological features as related to phylogeny, and Smith (1979) summarized biological and taxonomic information for the Nearctic species. Schneirla (1971) treated the biology of Dorylinae, and Weber (1972) that of Attini (Myrmicinae).