



Diversity Of Soil Organisms
Mesofauna – Formicidae

Morphology

Ants are social insects, among the most abundant in the world. Many ants have a sting but some groups have lost theirs and instead spray formic acid. They are distinguished from other closely related groups by the petiole (a constriction between the abdomen and thorax with either one- or two-nodes or scales) and their elbowed antennae. Ants live in large complex colonies with a division of labour, involving reproductive and non-reproductive individuals, cooperative care of the young and overlapping generations. This defines them as eusocial insects. This division of labour leads to different castes (groups of individuals with the same function). The reproductive caste is the queen, while the sterile caste are workers (and in a few species also soldiers). Reproductively active males are produced only during the breeding season and die soon after mating. The workers perform all the other functions of the colony, including protection, foraging, cleaning, building nests and care of the larvae.

Taxonomy

Ants have been around for over 120 million years. They belong to the family Formicidae of the order Hymenoptera (the group containing also bees and wasps).

Microhabitat

Ant colonies form nests in which the colony lives. In most cases the colony centre is fixed, but some army ants have no fixed colony centre. Ants can have nests that are arboreal (in tree canopies), epigeic (on the soil surface) or hypogeic (underground). Ants that nest underground dig tunnels that are interconnected by larger chambers, some of which give access to the outside world. The chambers can have specific functions, such as nurseries, larders and rubbish dumps. Among the ants that nest in the ground some of the most impressive are the leaf-cutter ants, especially in the genus *Atta*, that build very large nests up to 300 m² in surface area, and excavate a great deal of soil. *Atta laevigata* nests may be up to 7 m deep and contain over 7,800 chambers.

Many ants are predators or herbivores, but others are omnivorous or are specialist predators (e.g. on termites). Leaf-cutting ants use leaves as a substrate for their symbiotic which they use as food source. Ants interact closely with many other organisms and are fundamental for some functions of ecosystems; for example, protection of certain plant species from herbivory and facilitation of seed germination in appropriate locations by carrying them to their nests. Ants also play an important role in the maintenance and functioning of soils, as they dig tunnels and chambers, thus promoting nutrient cycling through soil bioturbation and water infiltration. They produce soil organic debris, thus enabling the processes of decomposition performed by fungi and bacteria and increasing the heterogeneity of the soil resource.

Diversity, abundance and biomass

The family Formicidae is subdivided into 22 extant subfamilies, 300 genera and 14 000 described species. The diversity of species varies among world regions, with peaks in South America, Central and South Africa and Australia. They are dominant invertebrates in many ecosystems, particularly tropical ones, and occur on all continents except Antarctica. The biomass of ants in tropical rainforests is often thought to be greater than that of all vertebrates in the rainforest combined.

Farming Secrets says: Ants are just one sign of a healthy soil and ecosystem.

Ref: A Global Atlas of Soil Biodiversity p 56

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