



ISOPTERA

Termites / White Ants

The name Isoptera, derived from the Greek "*iso*" meaning equal and "*ptera*" meaning wings, refers to the similar size, shape, and venation of the four wings.

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Life History & Ecology:

The termites are another group of insects that appear to be closely related to cockroaches. This conclusion is based on behavioral and ecological similarities between termites and wood roaches (members of the family Cryptocercidae). These cockroaches live in fallen timber on the forest floor, feeding on wood fibers which are then digested by symbiotic microorganisms within their digestive systems. They live in small family groups where each female provides care for her young offspring. Termites and wood roaches are thought to be close relatives because they both occupy similar habitats, share the same type of food resources, have the same intestinal symbionts, and provide care for their offspring.

Termites are the only hemimetabolous insects that exhibit true social behavior. They build large communal nests that house an entire colony. Each nest contains adult reproductives (one queen and one king) plus hundreds or thousands of immatures that serve as workers and soldiers. Like cockroaches and mantids, the termites are most abundant in tropical and subtropical climates.

Distribution:

Extremely common in tropical and subtropical climates. Generally less abundant in temperate regions.

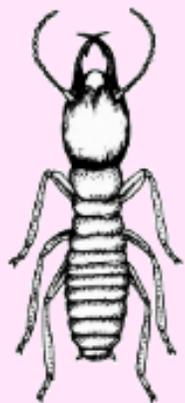
	North America	Worldwide
Number of Families	4	7
Number of Species	44	~2300

Classification:

Hemimetabola
incomplete development (egg, nymph, adult)

Orthopteroid
closely related to Blattodea and Mantodea

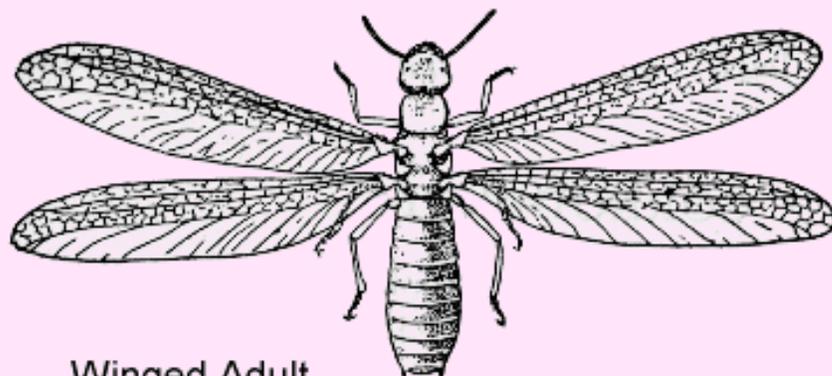
Physical Features:



Soldier



Worker



Winged Adult

Immatures (Workers & Soldiers)	Adults (Reproductives)
<ol style="list-style-type: none"> 1. Body pale in color, somewhat ant-like in appearance but with a broader junction between thorax and abdomen 2. Compound eyes small or absent 3. Head large and cylindrical or small and round 4. Antennae beaded 5. Mouthparts chewing; sometimes with large mandibles 	<ol style="list-style-type: none"> 1. Body may be darkly pigmented 2. Head well-developed, with chewing mouthparts and beaded antennae 3. Compound eyes present 4. Two pairs of membranous wings, all similar in shape and size; wings are shed after mating

Economic Importance:

Termites are an important part of the community of decomposers. They are abundant in tropical and subtropical environments where they help break down and recycle up to one third of the annual production of dead wood. Termites become economic pests when their appetite for wood and wood products extends to human homes, building materials, forests, and other commercial products. In the United States alone, annual losses due to termite infestations are estimated at more than 800 million dollars.

Major Families:

- **Rhinotermitidae** (Subterranean termites) -- These insects build nests in the soil and generally infest wood that is in contact with the ground. This family includes the most destructive species found in the United States: the eastern subterranean termite (*Reticulitermes flavipes*), the western subterranean termite (*R. hesperus*), and the Formosan subterranean termite (*Coptotermes formosanus*).
- **Hodotermitidae** (Rottenwood termites) -- Generally found inhabiting moist wood. Contact with the soil is not a requirement. This family includes the Pacific dampwood termite, *Zootermopsis angusticollis*.
- **Kalotermitidae** (Drywood and dampwood termites) -- These insects nest in the wood itself and do not require contact with the soil. Pest species include the western drywood termite (*Incisitermes minor*) and the forest tree termite (*Neotermes connexus*).

- **Termitidae** -- This is the largest family of termites worldwide, but all of the North American species are relatively minor in importance.

Fact File:

- Termites are usually the most dominant organisms in tropical forest environments. Their populations typically range from 2000 to 4000 individuals per square meter but may occasionally run as high as 10,000 individuals per square meter. Their biomass (up to 22 g/sq. m.) exceeds the combined biomass of all vertebrate species living in the same area.
- Some termites build large and elaborate nests. In Australia, nests of *Nasutitermes triodidae* may be 20-25 feet tall and 10-12 feet in diameter. A single nest may house nearly a million workers. *Armitermes meridionalis* lives in tall, flat-sided mounds that are always built in a North-South orientation.
- Termites cannot digest wood fibers. Their digestive systems contain symbiotic protozoa or bacteria that digest the cellulose in wood. Termites live on the by-products of this digestion, and on the bodies of the symbionts themselves.
- The Macrotermitinae is a subfamily of Termitidae in which the member species cultivate fungus gardens. Workers make a paste of plant fibers and inoculate it with spores of a symbiotic fungus. The termites feed on special structures produced by the fungi.
- In the African termite, *Macrotermes subhyalinus*, the queen's body becomes so swollen with eggs that she is incapable of movement. When fully engorged, she may be 14 cm long, 3.5 cm in diameter, and capable of producing up to 30,000 eggs per day.

Hot Links and Illustrations:

- [Orkin's Termite Page](#)
- [Gordon Ramel's Isoptera Page](#)
- [CSIRO Entomology - Termites](#)

- [Urban Entomology Program - University of Toronto](#)
- [Ecowatch Isoptera Page](#)
- [Tree of Life Web Project - Isoptera](#)
- [Discover Life - Isoptera](#)

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[John R. Meyer](#)
Department of
Entomology
NC State University

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