

Introduction to Eastern Subterranean Termites

Order: *Isoptera*

Family: *Rhinotermitidae*

Scientific Name: *Reticulitermes Flavipes (Kollar)*

Termites are relatively common pests, which can cause structural damage to houses if left uncontrolled. Termites infest more than 600,000 homes each and every year, causing more damage than fires, storms or earthquakes, causing an estimated \$2 billion in the United States alone.



There are many species of termites, but the Eastern Subterranean Termite is the most common and widely distributed termite in the United States. As the word “subterranean” implies, these termites sometimes live underground. This wood-destroying insect is well known for its damage to urban dwellings and structures. They occur South of the line where the average annual minimum temperature is -22°F (-30°C). This includes Southern Ontario, Canada through the Eastern United States and into Texas.

A mature colony of Eastern Subterranean termites can range from a low of 20,000 to a high of 5 million workers, with an average of 300,000. The colony’s queen will add 5,000 to 10,000 eggs per year to the total. The king and queen in a colony can live for 10 to 30 years, while workers live for about two years.

Pest status is given to termites when a colony is foraging on food sources with economic value. However, this insect is beneficial when it infests dead wood in forests, providing nutrients for new vegetative growth.

BIOLOGY

Swarming:

After a termite colony matures (requiring about 2 to 4 years) swarmers are produced. Swarming usually occurs from January through April, during the daylight hours, usually after rain. Environmental factors such as heat, light, and moisture trigger the emergence of swarmers. Each species has a definite set of conditions under which it swarms. The number of swarmers produced is proportionate to the age and size of the colony. Emergence can occur inside a structure and become a nuisance. These pests can be collected with a vacuum cleaner or otherwise disposed of without the use of pesticides.



Colony Establishment:

Both male and female swarmers fly from the colony and travel varying distances. As they are very weak flyers, wind currents carry those that travel any distance. All but a few fall prey to birds, toads, insects, and other predators. Many die from dehydration or injury. A surviving pair lands and immediately seeks cover under rocks or other materials. The pair makes a very small nest before. Initially, the queen lays few eggs. The male remains, as periodic mating is required for continued egg development. Subterranean termites have the ability to adjust the depth of their

colony in soil depending on temperature and moisture requirements. The colony may be 18-20 feet deep in the ground.

Colony Development:

Eggs are not deposited continually. Only a few hundred are deposited during the first year. In subsequent years, the young queen grows larger and lays more eggs. The new king and queen care for larvae. The larvae then molt into workers, soldiers, or nymphs (immature reproductives, though it takes two years for a colony to begin producing them). The king and queen feed these first workers with pre-digested food until they are able to digest wood on their own – at which point the workers begin the duties of building and feeding the colony. After the workers mature, the king and queen will no longer feed on wood. The colony stabilizes when the queen reaches maximum egg production. If the queen dies, secondary reproductives take over the queen's duties.

Colony Maturity:

The maximum size of a colony depends on such factors as location, food availability, and environmental conditions – especially temperature and moisture. Some colonies remain small; others contain up to several thousand individuals.

Sub colonies or Colony Splitting:

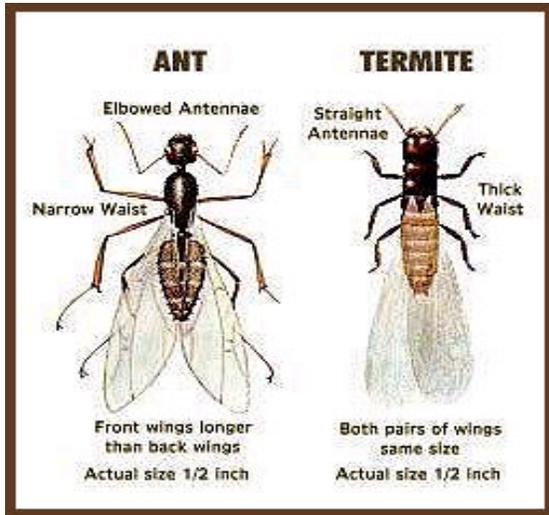
New colonies form when the old colony produces swarmers or when groups of termites become isolated from the main colony and establish subcolonies. This is called colony splitting. These subcolonies may exist independently or unite with the main colony.

IDENTIFICATION

Distinguishing Termites from Ants

Termites are about the same size as ants, and are often inaccurately called “white ants.” It is

important to be able to distinguish between swarming termites and ants. They often swarm around the same time of year, but control measures for each differ greatly.



Ants have small, constricted waists; wings of unequal length, with the front pair longer than the hind pair; and antennae bent at right angles about

mid-length.

Termite bodies are not narrowed at the middle; their wings are of equal length; and their antennae are rather straight with bead-like segments.

Subterranean termites are social insects that live in nests or colonies in the soil, hence their name "subterranean." The reproductives, which are most commonly seen, are about 3/8 inch long.

Their body is dark brown to almost black.

Castes:

Colonies contain three forms or castes: reproductives, workers, and soldiers – in addition to the king and queen.



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**Arid Subterranean Reproductives Subterranean Workers Subterranean
Soldier**

Queen:

The queen termite is an egg-laying machine. Her body is enormous compared to her offspring. She can live more than 25 years and produce more than 2,000 eggs a day. Supplementary reproductives in the colony (generally white to cream-colored and may have short wing buds) are developed as needed. They develop in addition to the primary queen and lay eggs for the colony, but also can replace the primary queen when she is injured or dies.

King:

The king lives with the queen in a central chamber where they are both tended to by workers. Periodic mating is required for continued egg development.

Workers:



The workers are by far the largest caste in the termite colony and the one that does the most damage. They are a creamy translucent color, soft-bodied, and carry out all work in the nest, including gathering food (timber and other cellulose); constructing tunnels; repairing and enlarging the colony nest; grooming each other and feeding the soldiers, the king, queen, and also caring for the young nymphs until

mature. They have no wings, are sterile and blind; and work 24 hours a day for several years life span in some species. Only the worker caste can digest timber by use of symbiotic protozoa in their gut, which provide enzymes to allow them to digest cellulose. Worker termites feed their partially digested semi-liquid food, regurgitated from their mouth or passing from their anus, to the other termites – a process known as trophallaxis.

Soldiers:

The soldiers have an orange colored armored head with mandibulate pinchers, which can be used to crush an attacker, such as ants. Some have hard pointed snouts that eject a white sticky latex to ensnare their enemies. The soldier termite is usually the first to be seen in large numbers when any active termite workings (shelter tubes or damaged timber) are opened.

Soldier termites will rush out to guard the opening whilst the worker termites repair the breach.

Soldiers can live up to 5 years.

Swarmers or Reproductives:

Swarmers, also known as *alates*, are commonly seen when they swarm on humid summer evenings around dusk. They have eyes and wings which mean they fly, but are swept along by the wind. The swarmers are emitted by the thousands when a mature termite nest is large and established. They land, shed their wings, and attract a mate by pheromone chemical signal. If you find swarming termites, it is a sure sign that a large termite colony nest

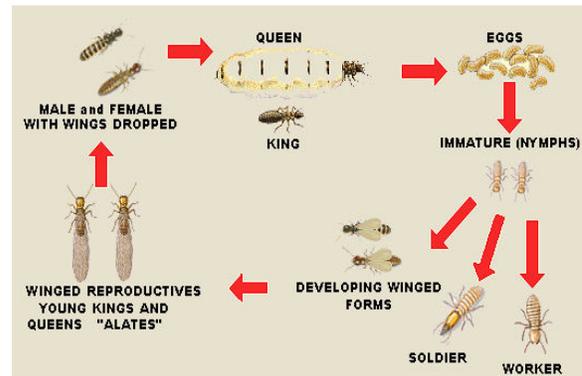


is close by. Colors vary by species from coal black to pale yellow-brown. Wings may be pale or smoky gray to brown and have few distinct veins. Swarmer termites are about 1/4 to 3/8 inch long.

LIFE CYCLE & REPRODUCTION

Termites have simple metamorphosis; from egg to nymph to adult. As social insects they have a division of labor through a caste system. The queen lays eggs, and the workers tend and feed the developing termites after egg hatch. Workers also construct and repair the nest, and forage for cellulose-containing food sources. Soldiers protect both the colony from nest invaders and the workers while outside the colony. The reproductive caste includes winged primary reproductives (alates) and wingless secondary reproductives. The latter are found in mature colonies and serve as replacements if something happens to the primary reproductives.

Metamorphic Stages: The Subterranean termite life cycle is made up of a series of metamorphoses, beginning with the egg and larval stages. A larva can then grow into an adult of any caste depending upon the colony's need. Most common will be the worker, followed by the soldier caste. The nymph stage is an intermediate version of the mature alates (winged reproductives). The larva may also mature into the supplemental reproductive as needed, which are used exclusively within the colony.



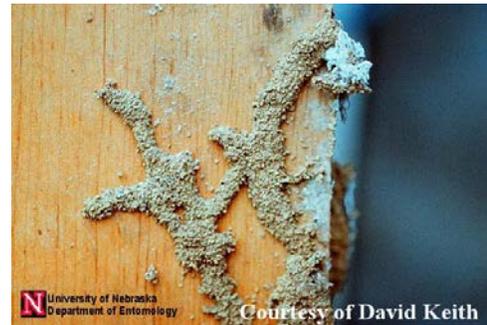
HABITAT

A moist environment is vital for subterranean termites, which have very little resistance to dehydration. To survive, they must maintain an atmosphere of high humidity, contact with the soil (their primary source of moisture) or other above-ground moisture sources, such as

structures with defective plumbing or guttering. Termites may constructs “sub-nests” in particularly moist areas. This dependence on \moisture makes termites particularly vulnerable to control at or below the ground level.

Mud Tubes:

Subterranean termites also must protect themselves from temperature extremes and attack by such natural enemies as ants and other insects. Termites foraging for food above ground protect themselves with shelter tubes. These air-tight conduits also keep the termites in a moist atmosphere, instead of venturing into the dry air outside the nest. Worker termites build the tubes from particles of soil or wood and bits of debris held together by salivary secretions. The tubes may be thinly constructed or large and thick-walled to accommodate many termites moving vertically between the soil and the food source. This construction material is also found lining the galleries built in wood being attacked and aids in identifying termite-damaged wood. Shelter tubes often are used to bridge masonry or other objects, allowing termites access to a food source (wood) above ground.



Communication

Pheromones: Termites communicate predominantly via chemicals called pheromones. Each colony develops its own characteristic odor. Any intruder is instantly recognized and an alarm pheromone is released that triggers the soldiers to attack the intruder. If a worker finds a new source of food, it recruits others to that food source by laying a chemical trail. The proportion of

castes in the colony is also regulated chemically. Nymphs can develop into workers, soldiers, or reproductive adults, depending on colony needs.

Sound: Sound is another means of communication. Soldiers and workers can bang their heads against tunnel walls. The vibrations are perceived by other termites in the colony and serve to mobilize the colony to defend itself.

Familiarity: Mutual exchange of foods enhances recognition of colony members.

DIET

Subterranean termites are beneficial in nature, breaking down many dead trees and other wood materials that would otherwise accumulate. The biomass of this breakdown process is recycled to the soil as humus.

This native American pest feeds on such cellulose materials as structural wood, wood fixtures, paper, books, and cotton. Occasionally, it will even attack the roots of shrubs and trees. Termites are very attracted to the odors of wood-decaying fungi that, through the decay process, make the wood easier to penetrate. In some instances, the fungi provide a source of nitrogen in the termite diet.

Eastern Subterranean Termites eat wood, but usually wood that is already damaged from moisture and rot. This helps decompose (break down) old branches, trees, and stumps so that the nutrients can go back into the soil to be used later by new plants. These termites have an important organism living in their stomachs. This tiny, microscopic organism, called

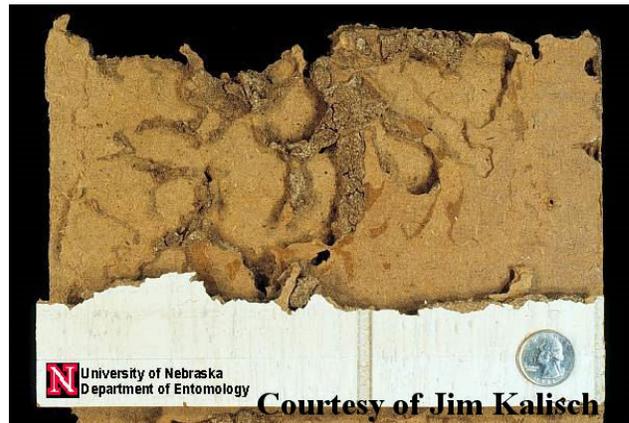
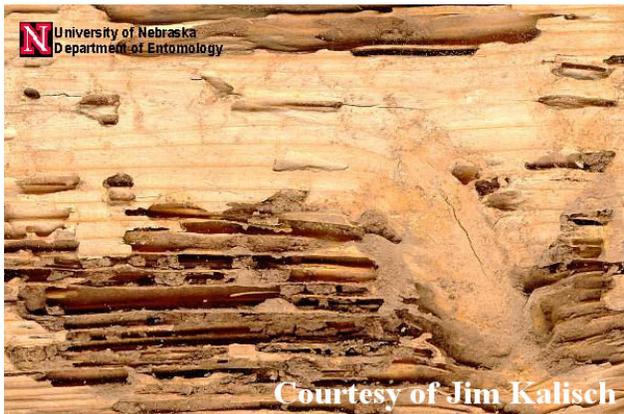
Tricohonympha agilis, is the one who actually breaks down the wood. By themselves, the termites could not digest it.

Subterranean termites derive their nutrition from wood and other material containing cellulose. Paper, cotton, burlap or other plant products often are actively attacked and consumed by termites. These termites do not attack live trees. Subterranean termites cannot digest cellulose directly. They depend on symbiotic protozoa living in the worker caste's and older nymphs hind gut to down the cellulose to simple acetic acid, digestible by termites. The worker caste passes this semi-liquid fluid on to the other members of the colony.

Pest status is given to termites when a colony is foraging on food sources with economic value. However, this insect is beneficial when it infests dead wood in forests, providing nutrients for new vegetative growth.

DAMAGE

Eastern Subterranean Termites are the most economically damaging. They are also the most destructive pest in the US, and the most common termite in the country. They cause more than \$2 billion in damage every year – more property damage than that caused by fire and windstorm combined. Termites often infest and cause damage to lumber, wood panels, flooring, artwork, sheetrock, wallpaper, plastics, paper products, furniture and fabric made from plant fibers. The most serious damage involves the loss of structural strength. They can cause substantial damage, especially if it goes undetected in structure.



Although damage by termites is a serious problem it is not a sudden onslaught that will cause a building to collapse in a few days. Generally, termite problems occur some years after construction. The risk of infestations can be reduced by avoiding certain faults or errors in construction, site grading and maintenance, or controlled through the application of insecticides.

Dead trees and brush are the original food source of subterranean termites. When land is cleared of this material and houses are built on these sites, termites attack the structures. Termites can enter buildings through wood in direct contact with the soil, by building shelter tubes over or through foundations, or by entering directly through cracks or joints in and under foundations. Any material in direct contact with the soil – such as trees, vines, or plumbing fixtures – serve as an avenue of infestation. Subterranean termite swarmers may also be blown into or on structures and then start a new colony.

SIGNS OF INFESTATION

Swarmers: Generally, the first sign of infestation noticed by homeowners is the presence of swarming reproductives on windowsills or near indoor light. Swarmers inside the house nearly

always indicate an active infestation in the structure. The presence of swarmers outdoors is a natural phenomenon, but should warn that termites are near and possibly attacking a nearby building.

Wings: Another indication is the presence of wings, discarded by swarmers as a normal part of their behavior, found near emergence sites, on windowsills or in cobwebs.

Mud Tubes: Infestations also can be detected by the presence of shelter tubes going up the sides of piers, utility entrances, or foundation walls.

Damaged Wood: Wood damage often is not found initially, but it definitely indicates termite infestation. Any wood-to-soil contact is a potential site of entry into a home. Wood that yields a dull, thudding sound when struck by a screwdriver or hammer should be examined. Careful probing of suspected areas with a sharp, pointed instrument such as an ice pick will disclose termite galleries or damage.

Characteristics of Damaged Wood:

Subterranean termite damage is almost always confined to the soft, springwood growth of the wood. Tunnels tend to follow the wood grain.

Look for moisture sources that may cause wood decay, which can encourage subterranean termite infestation.

Extensive deterioration from wood decay can be confused with termite damage.

Other insects attack wood and their appearance or the nature of their damage varies widely.

MANAGEMENT

Inspection: Thorough inspections can determine whether infestations and damage are present, whether remedial control measures are needed, and what conditions can encourage termite attack. Tools and equipment needed for an inspection include a flashlight, ice pick or sharp screwdriver, ladder, and protective clothing. A clipboard, graph paper, and floor plan help in recording inspection findings accurately and ensuring that the entire structure has been examined. A moisture meter can often detect increased moisture levels in the shelter tubes hidden behind the walls, as well as high moisture conditions that encourage subterranean termite infestations.

PREDATORS

Predators of Eastern Subterranean Termites include ants, other termites, birds, and bats. Birds and bats will eat the flying alates when they swarm in the Spring. Other insect predators, such as moles, shrews, and frogs will eat termites as well.