



## Eastern Subterranean Termites

**Introduction:** Eastern subterranean termites, *Reticulitermes flavipes* (Kollar), are present on Long Island and often damage structural timbers in buildings. When this damage becomes evident, it is usually the result of a few years of infestation. 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.

Termites feed upon wood, including structural wood especially that which is in contact with soil. In addition they can also feed on old roots, stumps of trees, fallen tree limbs and branches on the ground, and similar materials. Termites have also been known to attack swimming pool liners and PVC pipes. They are beneficial when they aid in reduction of wood and similar cellulose products into compounds that can be used again by other living organisms. Occasionally termites attack living plants, including the roots of shrubs and trees. In buildings, in addition to structural wood, termites feed on cellulose materials such as wood fixtures, paper, books, cotton, and related products.



**Fig. 1** Subterranean termite workers (top and bottom) and a soldier (middle). Note the large yellowish head on the soldier in comparison to the much smaller and lighter color head on the workers. (photograph courtesy of Tom Murray [www.pbase.com/tmurray74](http://www.pbase.com/tmurray74) )

**Description of termites:** Subterranean termites are social insects that live in colonies within the ground and have specialized castes to perform specific colony functions. The termite colony has three castes: workers, soldiers, and the reproductives (primaries queens and males and the secondaries). The creamy-white workers (**Fig. 1**) are seldom seen unless a termite tube or infested wood is broken open. It is the workers that feed on the wood and cause damage. Individual workers are believed to survive for up to five years. Soldiers have elongated yellowish heads with large jaws and are about the same size as the adult worker - one quarter-inch (**Fig. 1**). They are fewer in number than their associated workers, and must rely on the workers to feed them. Whenever the colony is invaded or a hole is made in a mud tube or piece of infested wood, the soldiers will use their jaws to defend the breach. The secondaries are supplementary reproductive females that occur in mature colonies under favorable conditions. The queens and males are dark-brown or black about 3/8 – 1/2 inch long and have two pairs of translucent wings of equal length (**Fig 2.**) that break off shortly after swarming. Very often their shed wings are the only evidence of termites in a building. On Long Island, swarms of winged termites usually emerge between late February and June.

**Life Cycle:** During late winter or early spring, swarms of the reproductive caste may be noticed in infested buildings. These dark-colored, winged termites are the stage most commonly seen, since the

other castes do not expose themselves to light. Winged termites are attracted to light, and when they emerge within buildings, they swarm about doors and windows. After crawling or fluttering about for a short time, the termites break off their wings (**Fig. 3.**) and locate a mate (not necessarily in that order). Each pair attempts to locate moist wood in contact with the soil so as to start a new colony, but few succeed. **No damage is done by the winged forms.**

**How to recognize termites and termite damage:** The presence of swarming termites or their wings alone is a sure sign that termites are working in a building. Winged termites are often confused with winged ants. Most species of ants in the house are only nuisances and, except for carpenter ants, do not damage wood. Because termites can cause severe structural damage it is necessary to be able to identify them. To tell the differences between termites and ants look at their waists (**Figs. 3 & 4**). An ant has a narrow, wasp-like waist, a termite a broad waist. The antennae or “feelers” of ants are L-shaped (elbowed) compared

to those of termites which are straight. Furthermore, the four wings of termites are of equal length and nearly twice as long as the termite body, while ant wings are approximately equal to the length of the ant, and the fore and hind wings are of unequal length.



**Fig. 2.** A primary reproductive subterranean termite. Note the translucent wings that extend well beyond the end of its body. (Photograph by Tom (photograph courtesy of Tom Murray [www.pbase.com/tmurray74](http://www.pbase.com/tmurray74) )



**Fig. 3.** A primary reproductive subterranean termite after the wings have broken off. Note the straight antennae and "broad waist". (Photograph by Tom (photograph courtesy of Tom Murray [www.pbase.com/tmurray74](http://www.pbase.com/tmurray74) )



**Fig. 4.** A pavement ant. Note the elbowed antennae and the "pinched waist". (Photograph by Tom (photograph courtesy of Tom Murray [www.pbase.com/tmurray74](http://www.pbase.com/tmurray74) )

Wood attacked by termites has runways or passages that are coated with an earth-like material glued to the wood by the termites (**Fig. 5.**). Where the wood has been infested for some time, it may be largely hollowed out with passages. Upon breaking open such wood with a screwdriver or similar tool, many of the hidden worker termites spill out. Another sign of termites in the house is the presence of termite mud tubes (**Fig. 6.**). The tubes are earth-colored because they are composed of soil, mostly sand particles. These shelter tubes are made by termites primarily as a protected runway from the earth to the wood they feed on. These tubes also may serve as swarming exits for the winged termites. Look for these tubes on the basement foundation walls, on wooden posts, studs, mudsills, door and window trim. Wood embedded in earth or in concrete cellar floors (if it contacts soil, if the concrete is cracked, etc.) is especially susceptible to termites.

**Where are some of the places you should look if you believe you have termites?** On Long Island most termite infestations occur in the basement or cellar areas and in the structural timbers immediately above the cellar walls, such as a mudsill, the studs, joists, subflooring, and the floors. Wood such as posts, steps, door frames, and trim embedded in an earth or concrete floor is especially susceptible to termite infestation. Wood siding, window frames, steps, and similar materials covered by earth or resting on the ground may also be attacked by termites. Where the termite infestation is extensive, the flooring and framework in the walls can be damaged by termites: this is often the case where houses are built on concrete slabs. Termites especially favor areas around furnaces, chimneys, hot water heaters, and hot water pipes that provide warmth during cold months.

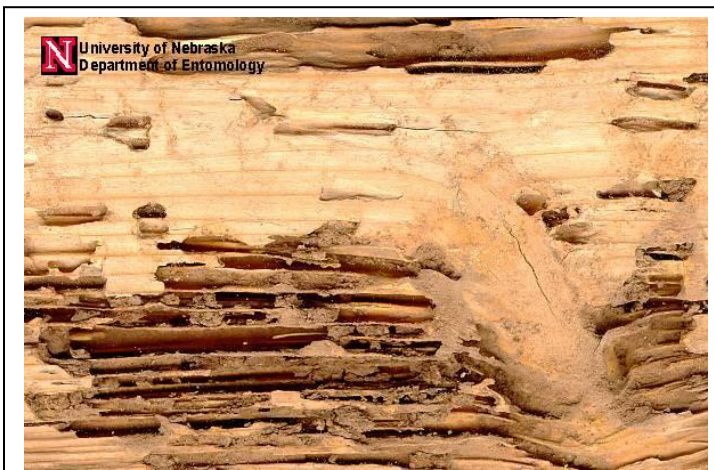
The extent of damage to structural timbers and woodwork can be determined by a careful inspection of the building. Although you may choose to make the inspection yourself, we recommend you have a professional pest control operator (PCO) or a qualified consulting engineer inspect the building. These individuals have the experience in detecting termite infestations that many people would otherwise overlook.

All woodwork in suspect areas should be probed for soundness and visually inspected for any sign of mud tunnels. An awl, ice pick, screwdriver, or similar instrument is commonly used to probe the wood. After the area and extent of infestation are determined, control measures can be planned.

**Termite control:** Control of termites in a building can involve structural alteration and/or the application of an insecticide registered for use in controlling termites. Either method when used alone may provide the desired results, but the most satisfactory results are often obtained when the two methods are combined.

**Structural Control Methods** - The less suitable the site or structure is for termites, the less likely a colony will become established and flourish. Therefore, the following are considered beneficial in preventing and controlling termites:

1. Remove all wooden debris from the vicinity of the building (do not bury wooden debris near the building). Replace any wooden posts, steps, trellises, and so forth that are in contact with the soil with non-cellulose-type materials or pressure-treated lumber.
2. Replace badly damaged timbers with sound materials. Use pressure-treated wood at surfaces where wood must be in contact with soil. Treat all cut ends of pressure-treated timbers with a suitable preservative according to label directions. Where possible, do not permit any wood within 18 inches of the soil.
3. Provide adequate ventilation and drainage for basements, cellars, and crawl spaces under the building. Be certain that the grade level will drain away from the building.
4. Fill all visible cracks and voids in the foundation with concrete or suitable caulking compound.
5. Reduce the soil moisture in the vicinity of the structure by directing run-off away from the foundation; gutters, downspouts, and French drains should be correctly installed and operational; surface drainage should flow away from the structure.



**Fig. 5.** Exposed runways or passages in wood damaged by termites. Note the earth-like material glued to runways formed in the wood. (Photograph courtesy Jim Kalisch, University of Nebraska, Department of Entomology)

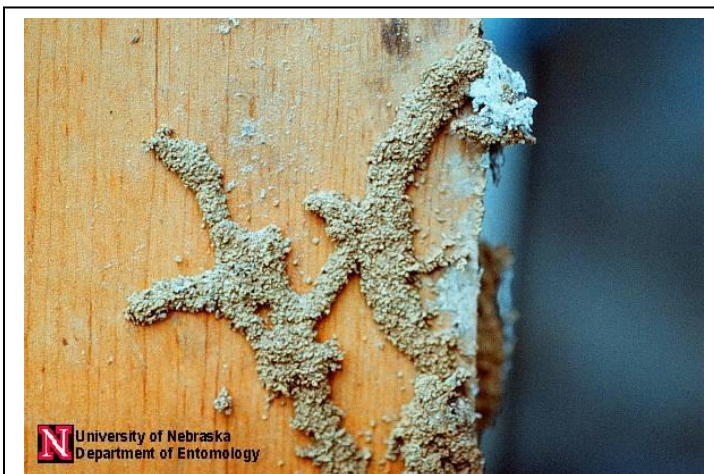
**Insecticidal Management** - Companies doing termite treatment will provide you with an estimate (proposal) that includes an inspection report, a contract, a detailed map of your house or building showing the exact locations and types of treatment, and a guarantee of their work. Obtain more than one estimate for the sake of comparison.

**Soil termiticide barriers** – The objective is to place a chemical (termiticide) barrier between termites and the structure to be protected. Pre-construction treatment consists of applying a termiticide before the foundation is poured to create a vertical barrier onto sub-slab soil and a horizontal barrier to soil around the perimeter of the foundation. Post-construction treatment consists of drilling holes through slabs and applying a termiticide into the sub-slab soil and/or applying a termiticide to the soil around the perimeter of the foundation. Pyrethroid termiticides such as permethrin, cypermethrin, and bifenthrin repel termites from the treatment barriers.

**Termiticide foam** - The soil termiticide is mixed with a foaming agent inside special foam-generating equipment which mixes the foam to the proper consistency. The termiticide foam is used in areas that can not be treated with a soil termiticide such as inaccessible voids and/or around wells or cisterns. Foams are used to supplement the soil termiticide in completing the chemical barrier. They do not replace the soil termiticide.

**Baits** – In recent years baits have become available for population control of subterranean termites. One such approach is the monitoring-baiting program that incorporates an insecticide within a cellulose bait matrix. When worker or soldier termites encounter the bait they leave a chemical (pheromone) trail that is followed by other colony members to the bait. Termites, which feed on the bait, are killed, and when enough colony members die, so does the colony. Stations containing a monitoring device are first installed in

the soil around a structure. When termites are found in the station, the monitoring device is replaced with insecticide laced



**Fig. 6.** Earth-colored mud tubes attached to the outside surface of a piece of wood. (Photograph courtesy David Keith, University of Nebraska, Department of Entomology)

bait. Insecticides such as Hexaflumuron and diflubenzuron are insect growth regulators that prevent successful molting and development of subterranean termites. Sulfluramid is a slow acting insecticide.

**Wood treatments** - Products containing disodium octaborate tetrahydrate (borates) are designed to treat the termite's food source, wood. These products are applied directly to bare wood, where they penetrate and deposit micro-crystals of boric acid in the wood, eliminating active infestations of termites and providing a degree of protection against future infestations. These products are also used on a pre-treatment basis in the early stages of home construction when they can be applied to exposed wood.

**Where can I find product names for the termiticides mentioned above?** The Pesticide Management Education Program (PMEP), in cooperation with the New York State Department of Environmental Conservation (NYSDEC), maintains a web site with a searchable database for pesticide products currently registered in New York State. Homeowners who have Internet access can locate currently registered products at <http://pmep.cce.cornell.edu/pims/current>. Several different queries are available that will produce a summary for the product(s) that the system locates. If the system fails to locate the product in question, then that product is not currently registered in New York State. The database also provides a summary of important information related to every product currently registered. Two data fields "Status" and "Expiration Date" are provided in each summary. Products with a status of "Registered - Discontinued" are currently registered but will probably be discontinued for use, sale, and distribution in New York State after the date noted in the "Expiration Date" field.

**Who can legally apply termiticides in New York State?** In New York State all insecticides that are labeled for soil application for termites are restricted use insecticides. Therefore they can only be purchased and applied by professional certified pesticide applicators who are licensed with the New York State Department of Environmental Conservation.

The University of Kentucky Entomology web site (<http://www.ca.uky.edu/entomology/dept/entfacts.asp#home>) has detailed information that individual homeowners may find useful regarding the differences between the various termite management techniques.

**Resource:** Jacobs, Steven B. *Eastern Subterranean Termites*, Extension Circular 400. College of Agricultural Sciences Cooperative Extension, Pennsylvania State University.

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**This publication contains pesticide recommendations. Changes in pesticide regulations occur constantly and human errors are still possible. Some materials mentioned may no longer be available, and some uses may no longer be legal. All pesticides distributed, sold or applied in New York State must be registered with the New York State Department of Environmental Conservation (DEC). Questions concerning the legality and/or registration status for pesticide use in New York State should be directed to the appropriate Cornell Cooperative Extension specialist or your regional DEC office. Read the label before applying any pesticide.**

TK 11/2008, AW: 11/2011