

# Formosan Subterranean Termites

## History and Spread

The Formosan subterranean termite, *Coptotermes formosanus* Shiraki, is considered one of the most destructive and aggressive species of termites in the world. It was reported in Alabama in 1987. Since then, many infestations have been reported in Mobile and Baldwin Counties.

On May 6, 1989, one infestation was reported in Lee County. Since that time, the Alabama Cooperative Extension System has received several of these termites for identification from other locations in Lee County. In 1996, winged reproductives (alates) were found in a window sill in a house in Jackson County, but termites were not detected in the soil.

In 1998, one case of established infestation was found in a house in Calhoun County. Intensive eradication measures using baits and soil treatment were conducted by a pest control company. Though no termite activity in and around that house has been detected since 2000. Several established infestations have been identified in other locations in Calhoun County in 2001 by the Alabama Cooperative Extension System.

The Formosan subterranean termite is native to China. It has been introduced into Japan, Guam, Sri Lanka, South Africa, and Hawaii. It arrived in the continental United States on military ships returning from World War II and carrying supplies from the Pacific. It was first discovered at a Houston, Texas, shipyard in 1965. A year later well-established colonies of the Formosan subterranean termite were discovered in New Orleans and Lake Charles, Louisiana, and in Houston and Galveston, Texas.

In 1967, it was found in Charleston, South Carolina. Well-established colonies were first detected in Florida in 1980.

Ships have facilitated the introduction and spread of the Formosan subterranean termite throughout the world. Once introduced, swarming is the termite's natural method of spread. Since the Formosan subterranean termite is a weak flier and does not spread rapidly by itself, the movement of infested soil or material such as lumber, wooden crates, other wooden products, or even living trees is another important method by which they spread. These termites are commonly associated with the railroad ties used for landscaping.

In the United States, the Formosan subterranean termite generally has been confined to the southeast at about 32.5 degrees N latitude. As of 2000, the distribution of Formosan subterranean termites includes Alabama, Arizona, California (isolated infestation in San Diego County), Florida, Georgia, Hawaii, Louisiana, Mississippi, New Mexico, North and South Carolina, Tennessee, Texas, and Virginia. However, the widespread use of central heating in the United States may encourage the spread of the Formosan subterranean termite. Central heating provides a warm environment conducive to the survival of termites during winter.

## Biology and Habits

### Swarming

Major swarms of the Formosan subterranean termite begin in May or June and last until about July or August. On humid, still evenings, usually around dusk, large numbers of swarming alates can be seen around light sources. They are attracted to light.

After a short flight, alates drop to the ground, shed their wings, and pair off. If they successfully find a small crevice containing moist wood, the pair forms a chamber and lays eggs. It usually takes 3 to 5 years to develop a mature colony. A mature colony can contain between 1 and 10 million termites, and its foraging territory may cover several acres of land.

### Food

Like other termites, Formosan subterranean termites feed on cellulose. Cellulose is the major component in wood and paper products. Formosan subterranean termites attack the bases of poles, old tree stumps, or other wood in contact with soil. In addition to feeding on the wood in our homes, they have attacked more than 50 species of living plants, including citrus, pecan, wild cherry, cherry laurel, sweet gum, cedar, willow, wax myrtle, Chinese elm, pines, oaks, and maples. They can construct galleries to the upper stories of buildings to feed on the wood.

Formosan subterranean termites have also been known to attack (but not eat) non-cellulose material such as thin sheets of soft metal (lead or copper), asphalt, plaster, mortar, creosote, rubber, and plastic in search of food and moisture. However, their highly publicized ability to chew through concrete is a fallacy. Instead of chewing through the concrete, Formosan subterranean termites are uncanny in finding small cracks in concrete that they use as foraging routes.

### Nests

Formosan subterranean termite nests are made of "carton" that consists of chewed wood, saliva, and excrement. Nests can be con-

structed in the ground or aerially (no ground connection). Auxiliary nests are often constructed in the food source, tightly filling wall voids or chimneys.

Formosan subterranean termites can produce tightly packed, massive carton nests. Native subterranean nests generally are more loosely constructed and smaller.

### Damage

Most subterranean termites feed along the grain of the wood eating the softest portions of the wood (Figure 1). Soil and dirt are within galleries. The Formosan subterranean termites are less discriminating feeders, often hollowing tree trunks or wooden beams (Figure 2). If the hollow is a large tree or timber, it is then filled with carton material to form a nest (Figure 3). In Hawaii, where unprotected homes were built over large colonies, records show that the Formosan subterranean termite caused major structural damage in 6 months and almost complete destruction in 2 years.



**Figure 1.** Formosan subterranean termite damage in structural log (2 feet in diameter), cross-section



**Figure 2.** Formosan subterranean termite damage in structural beam (Courtesy of Ed Freytag, New Orleans Mosquito and Termite Control Board)



**Figure 3.** Hollowed palm tree trunk and carton nest from Formosan subterranean termite damage

### Moisture Requirements

Formosan subterranean termites, like all subterranean termites, must have moisture to survive. They usually use the soil for a source of moisture. They also survive on moisture from plumbing leaks, roof leaks, air conditioning condensation, foam insulation and stucco, or any wall veneer that is installed below grade.

### Identification

Termites are social insects with three commonly seen forms—alates, soldiers, and workers. Soldiers and alates are used for identification. The size and the color of their heads easily distinguish soldiers and workers. Soldiers have enlarged, brownish-colored heads, while workers have normal-sized, cream-colored heads.

#### Soldiers

The Formosan subterranean termite soldier has a teardrop-shaped head, while the native subterranean termite has a rectangular shaped head (Figure 4). Good evidence for a Formosan subterranean termite infestation is when wood is broken and many soldiers emerge, exuding a milky white secretion from the top of their heads (fontanelle) (Figure 5).

#### Alates

The alates of the Formosan subterranean termite are yellowish-brown and are 12 to 15 mm long (0.5 to 0.6 inches). Native subterranean termites are about 10 mm long (0.4 inches).



**Figure 4.** Teardrop soldier head of the Formosan subterranean termite (left) and rectangular head of the native subterranean termite (right) (Courtesy of Gregg Henderson, Louisiana State University)

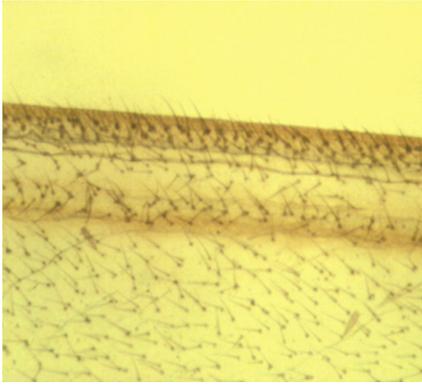


**Figure 5.** Milky white secretion from the head of Formosan subterranean termite

The wings of the Formosan subterranean termite are very hairy, compared with the nearly bare wings of the native subterranean termite, when observed with a low magnification hand lens (Figure 6).

### Submitting Specimens for Identification

Collect at least 10 soldiers or alates with wings. Termite alates cannot be identified without wings. Preserve all specimens in rubbing alcohol. Note time of year and time of day that swarming took place. Send suspect samples to your county Extension office.



**Figure 6.** Distinctive hairs on the wing of the Formosan subterranean termite alate under low magnification (Used by permission of the University of Florida Entomology and Nematology Department, Ft. Lauderdale Research and Education Center)

## Finding Formosan Subterranean Termites

### Where to Look

Formosan subterranean termites can be found in all types of structures, piers, pilings, posts, logs, utility poles, wooden fences, mulch, timber in contact with soil, landscape plants and vegetables, or foam insulation and wall facades that are installed below grade.

Formosan subterranean termites generally invade structures from the ground. They commonly enter through expansion joints, cracks, utility conduits in slabs, and holes for tub drains. These termites construct mud tubes, lined with carton material, to their food source.

Once they find food and moisture sources inside houses, they may establish aerial colonies that do not always require a ground connection. Look for infestation signs inside and outside of house; pay special attention to bathrooms, kitchen, attics, crawl space, garage, and foundation.

### What to Look For

Look for three signs of infestation: (1) alates, (2) mud tubes, and (3) hollow sound in wood.

Watch for large flights of alates in late spring to summer. Formosan subterranean termites swarm at night and are attracted to lights in large numbers. Inspect light fixtures and other well-lighted areas. Inspect cobwebs, window sills, and other areas that collect debris for wings of termites.

Using a flashlight and a probe (such as a screwdriver or pen knife), inspect the inside and outside of structures for tunneling and mud tubes. Look for tunnels that disappear into cracks on masonry, in and around doors and window frames, and along siding.

A hollow sound in walls, baseboards, and floors might indicate an infestation. Check for mud tubes and other evidence of infestation in crawl spaces under structures. Termite tunnels may not always be evident in wood or wood products. It is best to probe such samples for evidence of infestation.

## Control

### Prevention

The best control of the Formosan subterranean termite is prevention. The best time to provide protection against termites is during the planning and construction of the structure.

- Contract the services of a professional pest control operator. Termites, especially the Formosan subterranean termite, should be handled by a professional. After all, a home is a large investment. Why risk its protection? Professional pest control operators have access to chemicals, equipment, and training that homeowners do not.

- Have a pest control professional pretreat the soil under and around a building with a registered liquid termiticide before adding slabs and piers, followed by a perimeter treatment. The U.S. Housing and Urban Development (HUD) changed its 99A form to allow direct wood pretreatment of borate product as a primary tool against termites in new home construction. Recently, several new borate products have been labeled for preventative treatment and for remedial control.

- Avoid wood/soil contact. All wood contacting with soil should be pressure treated.

- Do not install foam board insulation, stucco, or wall sidings below grade during construction.

- Make thorough inspections for evidence of termite activity at least once a year, preferably more. A professional pest control operator who has experience with subterranean termites should perform the inspection.

- See Extension publication ANR-1022, "IPM Tactics for Termite Control," for more information on termite control methods if termites are found infesting a structure.

### Fumigation

Generally, fumigation is not recommended to control Formosan subterranean termites. However, it may be necessary to apply fumigant gas to kill nests that are trapped within structures. Fumigation is only effective if the soil has been properly treated first. If a house is fumigated and the soil is not treated, there is nothing to prevent reentry of the termites from the soil.

### New Termiticides and Baits

Termiticide treatment involves applying termiticide to the soil by trenching around the structure and sometimes drilling into the slab to create a complete barrier. The barrier is applied to kill any termites that would tunnel up to it. New termiticides are more effective because they are nondetectable by termites.

Termite baits are a new option with non-intrusive, consumer-friendly advantages for control of subterranean termites. The baits use significantly fewer chemicals than traditional methods of control use and with good results. The baits not only kill those workers feeding on the baits, but also those nestmates, queen, and kings who rely on workers for food, thus controlling the whole colony of subterranean termites. An understanding of termite biology and behavior is necessary for successful baiting. Some pest control professionals have had extensive authorization training in order to use the baits. The baits can be installed

below ground or aboveground. Check with your pest control professional about this option.

### **Treatment of Infested Trees**

Formosan termites are more likely to attack living plants, including trees, ornamentals, flower plants, and many vegetables. In some cases, a termite colony in living trees near a house is the source of house infestation. Formosan termites can be controlled in living trees by drilling holes above the soil line and injecting or foaming the registered termiticide into the void created by the termites.

### **Choosing a Pest Control Company**

- Get at least three quotes. The lowest price does not always mean the best deal. When shopping for a pest control professional, ask specifically for the amount of experience they have in dealing with subterranean termite control. Clarify the type of coverage (such as service after the sale) you can expect with a particular contract.

- The pest control company should make a complete inspection of the entire building to determine the origin and the extent of the infestation. This inspection is extremely important because without a thorough inspection, proper treatment cannot be recommended. You should be given a written report stating the extent of the infestation and probable origin (ground or aerial) with a graph indicating areas of activity. The report also details what structures or areas will be treated and how, what product or insecticide and rate will be used, and any warranty or limitations to the treatment.

- Ask if the contract makes any distinction between the Formosan subterranean termite and native subterranean termite. Any company whose contract makes a distinction probably realizes the need for this separation.

- Ask for references on completed Formosan subterranean termite work. Do not be pressured by a company to treat your structure immediately (today). Taking a couple of weeks to thoroughly research treatment options and different pest control companies is not unreasonable. Ask if they object to a second opinion concerning the method of treatment or extent of damage.

- Call the Better Business Bureau in your area to see if a company has any outstanding complaints against them. The key to any decision is confidence in the company you choose. Get value and service for your money.

- Contact the Alabama Cooperative Extension System if you have other questions and to record pertinent information about the Formosan subterranean termite infestation.

### **References**

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