

Subterranean Termites

We are fortunate in Oregon in that *subterranean termite* infestations in homes are less common here than they are in other parts of the country. Only the southwestern counties bordering on California experience consistent problems with these wood destroying insects. Nonetheless, subterranean termites are considered by many experts to be the most important wood-destroying insects in buildings throughout the world, so homeowners all over Oregon should be aware of their potential for damage.

Termites are social insects that live in colonies where labor is divided among a **caste** system. All members of a colony are related, originating from a single founding pair. Within the caste system there are three distinct types of individual termites: **reproductives** (kings and queens), **soldiers** and **workers**. Reproductives are sexually mature males and females and are responsible for producing offspring and establishing new colonies (swarming). Soldiers have somewhat larger heads and mandibles (jaws) that function in defense of the colony. Workers make up the largest portion of the colony and are responsible for feeding and enlarging the colony. Soldiers and workers are sterile and have no reproductive function.

A mature colony of termites will produce large numbers of winged kings and queens each year. The number will vary with the age and condition of the colony. When environmental conditions are proper and winged termites are developed, the workers make openings to the outside, and the winged reproductives leave rapidly. The vicinity around the emergence point may be filled with these "swarmers" for brief periods. In a given location, thousands of swarmers may emerge from numerous colonies simultaneously. This allows intermixing of individuals from many populations. The triggering mechanisms for swarming are very precise. Flights occur for the purpose of dispersing the species over a larger area.

Termites are weak fliers. They flutter close to the ground where wind currents influence direction and distance of the flights; they are attracted to lights. After the flight wings are shed, breaking off at a line of weakness near the base. The potential kings and queens then mate. The female assumes a "calling" position with her abdomen elevated at a right angle to the rest of her body. She releases a chemical messenger (pheromone) which attracts nearby males. Once a male encounters a calling female, she moves off. He follows close behind and they search for a suitable site for the establishment of a nest. As soon as the pair have located a suitable site, they excavate with their jaws a small chamber large enough for the two of them and then seal the entrance. Mating usually occurs within a few hours to weeks after the pair becomes established.

The single female cannot start a new colony. Establishment of a colony is dependent upon the survival of both sexes in the nest site and have mated. The pair continue to live together for life, and they usually mate periodically. The first eggs are laid within one to several weeks after mating, depending on the nutrition available to the female. When the first eggs hatch, the new nymphs are cared for by the young pair. After two molts, the nymphs assume their role as workers and begin to feed and care for the original pair.

Development of the colony is very slow for several years. Eggs are not deposited continuously. After the first group of eggs has been laid, there is a period of several months before another group is laid. This process continues for several years. As the young queen matures, she lays a greater number of eggs, and her abdomen becomes enlarged from developing eggs. Eventually, a point is reached where the colony size stabilizes. That is, the queen has reached maximum egg production, and the loss of older individuals by death or swarming is approximately the same as the number of new individuals produced each year. As the colony becomes even older a greater number of swarmers is produced each year. It requires a minimum of 3 to 4 years--and as much as 8 to 10 years--for a colony of our native subterranean termites to become large enough and strong enough to start dispersal flights. When swarming occurs in a relatively new structure, it is because it was built over or near a strong colony that was not severely damaged during the construction process.

Termites derive food from wood and other cellulosic materials. In nature, they feed exclusively on wood, primarily digesting out the cellulose and passing most of the remaining components as waste. In man-invaded environments, termites attack many additional products and commodities. They still depend primarily on cellulose for their nutrition, but will damage many materials they encounter. Damaged materials may include plastics, rubber, asphalt, metal, mortar and others. Wood products like paper are favorite foods of termites because they are nearly pure cellulose. Cotton, burlap and other plant fibers are actively consumed by termites as well.

Strange as it may seem, the termites cannot digest the cellulose directly. They are dependent on one-celled animals, called protozoans, that live in their gut. These protozoans engulf the wood particles as they pass through the intestine and break down the cellulose into simpler compounds that the termite can absorb. This relationship is beneficial to both species, since the protozoans cause no harm and are provided with food and a protected environment by the termites.

Fungi also play a role in termite nutrition. Certain wood decay fungi are highly attractive to termites. Partially decayed wood is more easily digested by termites, and the fungus may provide a needed source of nitrogen. Ultimately, wood-destroying fungi exhaust the nutritive value of wood for termites, and extensive decay in wood is of no benefit to foraging termites. Conversely, when termites attack wood, they usually bring fungus spores on their bodies. When liquid water reaches the damaged wood, it is more easily trapped.

Moisture is vital to the survival of termites. Subterranean termites obtain most of their moisture from the soil. They maintain contact with the soil in order to survive. The type of soil has a great effect on the ability of subterranean termites to flourish. They generally prefer sandy soil over a clay base. They can and do survive in many other types of soil, however.

Termites have very little tolerance to dry conditions, or extremes of hot and cold. But they often must forage far, sometimes above ground, from their initial workings to find food. They move underground through tunnels. Whenever the termites leave the confines of the soil or the wood in which they are feeding, they construct shelter tubes in which to move from the

soil to the wood or the above-ground nest.

When subterranean termites invade the wood of a structure that is separated from the soil by intervening concrete, masonry or other impervious material, they construct shelter tubes over the surface to the wood. Periodically, they return to the moist galleries. Contrary to published reports, shelter tubes do not necessarily conduct moist air from the soil to the wood. Shelter tubes also provide some protection from air movement and prevent excess water loss. The primary function of shelter tubes probably is protection from natural enemies.

Once termites have established contact with wood above ground and feeding progresses some distance from the initial shelter tunnel, they often will drop shelter tubes straight down from the wood. Evidence of tube building will be found directly below a suspended tube. Under certain conditions a fourth type of tube is constructed. Called swarming tubes, or swarming "castles" they are constructed as flight platforms for swarmers and they have many turret-like projects and flattened horizontal branches that vaguely resemble castle towers. They usually are constructed on the ground to a height 4 to 8 inches (10-20 cm), but sometimes are found projecting from heavily infested wood above ground. When swarmers are leaving the colony via these tubes, or directly through a hole in wood or soil, the openings are heavily guarded by soldiers and workers.

The amount of damage that an infestation of subterranean termites might inflict on a structure depends on many factors. The number and size of the attacking colonies and the quality of the environmental conditions (including the wood) are the most important. Damage usually starts at the mudsill in houses built over a crawl space and with the sole plates of those houses built on concrete slabs. Given enough time, subterranean termites will extend the damage into the wooden floor members, the interior trim and furnishings, and into the walls to the roof timbers.

Severe damage by subterranean termites is not likely to occur in the first 8 or 10 years after construction. If treatment is undertaken with the first evidence of infestation, very little serious structural damage is ever likely to occur. Houses should be carefully inspected *at least once a year* in all regions. This will allow detection before damage is a problem. Should evidence of termites be found, there is no cause for extreme alarm or undue haste. Treatment within 6 months is recommended.