

Desert Termites

Gnathamitermes tubiformans

Alyson K. McDonald, Mark A. Muegge, and Chris Sansone*

About ten species of termites can be found in the semi-arid and arid regions of the American Southwest. The desert termite, *Gnathamitermes tubiformans*, is one of the most common species in western Texas, New Mexico and Arizona. People often mistake desert termites for subterranean termites in the genus *Reticulitermes*. Although both live in the soil, only the *Reticulitermes* subterranean termite is considered a structural pest.

Desert termites do not damage man-made structures and rarely harm rangeland, crops or turfgrass. In fact, desert termites are generally considered beneficial because they break down plant material into useable soil nutrients, and their nesting behavior can improve soil structure and moisture retention. The desert termite is considered a keystone species in the Chihuahuan Desert because it plays a critical role in this ecosystem despite its small size and relatively low numbers (Whitford, 1991).

Termites are social insects and live in colonies. The three castes within a colony are 1) workers, 2) soldiers, and 3) male and female reproductives—a king and a queen.

The worker termites are the most abundant; they perform various tasks such as foraging, caring for young, and building and repairing the nest.

*Extension Program Specialist—Range Management, Associate Professor and Extension Entomologist, and Associate Department Head and Extension Program Leader for Entomology, The Texas A&M System.

As the name suggests, termite soldiers protect the colony. If the earthen structure of the colony is breached, soldiers line the hole ready to attack intruders while workers seal off the opening. Any soldiers left outside are lost from the colony.

Within the reproductive caste there are three forms—primary, secondary and tertiary. Primary reproductives have wings, while secondary and tertiary forms do not. Females of all reproductive forms can lay eggs to produce offspring. Primary reproductive termites are also called swarmers or alates. Swarmers eventually leave the colony, find locations for new colonies, and become kings and queens. Secondary and tertiary reproductive females can replace the queen if she is injured or dies. The queen is the largest termite in the colony. She lays eggs only when environmental conditions are right and may stop producing eggs altogether during the winter.

Winged termite reproductives are often mistaken for winged ants. The two can be easily distinguished by examining the wings, antennae and body (Fig. 1). The hind wings of ants are always much smaller than the forewings; the hind and forewings of termites are nearly equal in size and length. The antennae of ants have a characteristic elbow, while termite antennae are straight. Finally, a termite's waist is broad, while an ant's waist is thin.

Distinguishing among termite species can be difficult even for experts; however, differentiating a desert termite from the more damaging subterra-

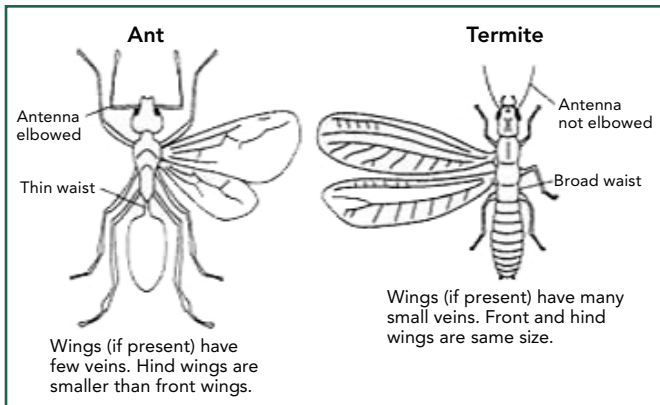


Figure 1. Differences between ants and termites.

nean termite is relatively easy. Desert termite alates are larger ($\frac{1}{2}$ to $\frac{5}{8}$ inch long) than subterranean termites (less than $\frac{1}{2}$ inch long). The desert termite body and wings are light brown, while subterranean termite wings are transparent and the body dark brown to black (Fig. 2). Behavioral characteristics also can help with identification. A key difference is the time of day and season when they swarm. Desert termites frequently swarm just before sunset after a summer rainstorm. Subterranean termites often swarm during the day after rainfall from January through April.



Figure 2. Desert Termite alate (top) and Subterranean Termite alate (bottom).

Because they are fragile and soft-bodied, termites are very susceptible to environmental hazards and dehydration. They survive these problems by building tubes or sheets made of carton around a food source. Carton consists of moist soil particles and feces glued together with saliva. Tubes are often destroyed by rainfall, but termites rebuild them quickly when the rain is over.

The presence of desert termites is dictated more by soil type than by vegetation type. They usually occur on finer textured clayey and silty soils; sand is less suitable for tube construction.

The abundance of termites is related to range condition and early spring rainfall. Populations will decline when pasture conditions are degraded and during drought, but the mud tubes may be more visible in overgrazed pastures or during drought when plants are less dense and productive (Nash et al., 1999; Tracy et al., 1998).

During a 3-year study on the Texas High Plains, desert termite population densities averaged 8.6 million per acre and peaked at 39 million per acre. Termites consumed 366 pounds per acre of litter and forage during the growing season, about 2.4 percent of their body weight each day (Bodine and Ueckert, 1975).

Desert termites feed on living, dead or decomposed plant material, but they prefer live and dead grasses, forbs and livestock manure (Fuchs et al., 1990; Allen et al., 1980) (Fig. 3). In West Texas, live grass plants (red threeawn, buffalograss and blue grama) are the main food sources during the spring and summer. During the fall, desert termites feed primarily on standing dead grasses and plant litter (46 percent and 34 percent, respectively, of overall diet) and less on live grasses (16 percent) (Watts et al., 1989; Allen et al., 1980). When they have difficulty finding preferred foods, they will feed on creosotebush leaf litter, standing and fallen mesquite, and prickly pear pads (Whitford, 1991; Fuchs, et al., 1990). There is no evidence that desert termites consume plant roots (Bodine and Ueckert, 1975).

Termites are cold-blooded, so during the winter they tunnel deeper into the soil where temperatures are more stable. Their tunneling makes soil more porous, which improves the infiltration of rainfall and can improve plant growth in arid areas. In fact,

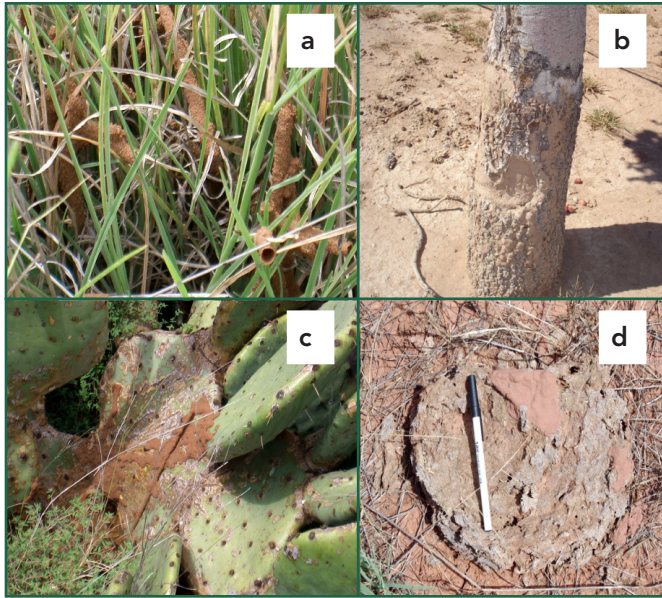


Figure 3. Termite gallery carton on a) grass, b) tree bark, c) prickly pear, and d) cattle dung.

perennial shortgrass cover completely disappeared after termite control at a site near Las Cruces, New Mexico, where average annual rainfall is 8 inches. Conversely, in the Texas High Plains where annual rainfall is about 18 inches, termite control did not improve the moisture retention properties of soil. Instead, termite control at this location increased plant litter accumulation, which enhanced rainfall infiltration and improved soil nutrients (Spears et al., 1975).

Desert termites help regulate the flow of carbon and nitrogen in an ecosystem. They process as much as half the dead roots and litter in annual and perennial grasslands. Bacteria in the termite's hindgut convert atmospheric nitrogen to ammonia. Some of this nitrogen is incorporated into gallery carton as feces and some becomes energy for predators such as skunks and other insects that eat termites. Carton material is recycled relatively quickly and the associated nutrients become available for plant growth (Schaefer and Whitford, 1981).

Management

There has been little research to determine the economic feasibility of controlling desert termites, and no insecticides are labeled for desert termite con-

trol. Therefore, no specific management suggestions can be made. However, before undertaking any control measures it is important to know the expected forage production of the area to be treated, how much of that forage will be consumed by termites, termite density, the cost of the control measures, and the value of the forage per unit (dollars per pound).

Insecticides labeled for other insects in rangeland and pastures may control foraging termites temporarily. Using a spring-toothed harrow or light disc harrow to break up termite cartons will expose developing termites to predators and hot, dry conditions and may control termites.

In prolonged droughts, desert termites may remove enough soil surface litter that rainfall infiltration is impaired. In this situation it is important to use practices that enhance rainfall infiltration and restore rangeland productivity, including proper grazing management, control of undesirable weeds and woody plants, ripping, contour furrowing, and pitting (Ueckert and McGinty, 2008).

Controlling desert termites in turfgrass is not recommended. Good lawn care with adequate water and fertilizer usually overcomes any problems caused by termite feeding.

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