



TERMITES

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Termites found in Washington state are ant-like insects. They have several sizes and colors. The queen and king - or reproductives - are large, winged, and black or brown in color. Soldiers, workers and immatures are much smaller, wingless and white or cream colored. Termites are social insects, living together in large colonies, and caring for their queen and her young. This document covers Integrated Pest Management (IPM) techniques for control of the two species in Washington, **dampwood** and **subterranean** termites.

HOW TO TELL A TERMITE FROM AN ANT.

Termites are similar in appearance to ants but it is not difficult to tell them apart if you have a specimen to look at. A dampwood queen is about 1 inch long and workers are about 1/2 inch long. The subterranean termite queen is about 1/2 inch long and workers are about 3/16 inch long.

TERMITES:



Note flexible antenna.
Note lack of “waist”.
May or may not have wings.



(CARPENTER) ANT:

Note “elbow” in antenna.
Note “waist”.
May or may not have wings.

If you identify a termite, have an experienced pest control professional determine the species and extent of infestation. The methods used to control termites depend on which species you have. **Dampwood** and **subterranean** termites are the most common species in Washington.

Subterraneans are the termites responsible for 95 percent of termite damage. It is possible to have both species infesting the same structure. **Drywood** termites may be imported in lumber from outside the state, but are not likely to establish a lasting colony.

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FACTS ABOUT TERMITES

HAZARDS OF TERMITES

Termites eat and tunnel into wooden structures and sometimes furniture. They may also attack stored books or other paper materials. Termite colonies grow slowly and the damage is done slowly. Because they are hard to detect, the damage can be extensive by the time it is discovered. They do not pose a risk to human health, only to property.

BENEFITS OF TERMITES

Termites are beneficial insects in the natural environment because they break down wood debris to convert it to soil.

They should be left alone if they are in a location where they are not bothering humans.

TERMITE FOOD

Termites only eat wood or wood products such as paper and cardboard. The workers and nymphs can convert the cellulose in wood fibers to sugar with the aid of a microorganism in their gut. They feed other colony members through regurgitation and excretion of digested wood.

ATTRACTIVE NEST LOCATIONS

Dampwood termites can only live in or very near to wet wood. They are more common in western Washington than eastern Washington. They leave large numbers of fecal pellets in their wood galleries, however the pellets will not be seen unless the galleries are uncovered.

Subterranean termites live in moist ground and travel into the along the foundation to either wet or dry wood. They may live in wet wood if it is constantly wet. Subterraneans are more common in eastern Washington. They do not leave fecal pellets in their galleries.

THE TERMITE LIFE CYCLE

New winged reproductives (kings and queens) **swarm** or leave the established colonies where they were hatched, usually on warm evenings and especially after rain. If climatic conditions are right, termites may swarm at other times of the year.

- ☑ **Dampwood** termites and **western Washington subterranean** termites typically swarm in the late summer or early fall.
- ☑ **Eastern Washington subterranean** termite kings and queens usually swarm in the spring.

The reproductives find a mate, find a suitable site, eat a gallery into the wood and seal themselves into it. The queen begins to lay **eggs** and both the king and queen feed their first offspring. The eggs hatch as **nymphs** of one of **three adult castes** with different social tasks - **soldiers, workers** in some species, and **reproductives**. When those first worker or soldier nymphs are old enough, they take over the task of feeding the reproductives and caring for the new eggs.

Workers and soldier nymphs are the ones that damage and feed on wood. Unlike ants, workers and soldiers are

both male and female. Ants are the major natural threat, especially for a small, new colony.

It takes several years before the colony grows large enough to swarm. An established colony often has more than one pair of reproductives and may swarm every year. Kings and queens live and reproduce for many years.

HOW TERMITES GET INTO SCHOOLS

Dampwood termites usually enter a building where there is wood-soil contact or wood that is consistently wet from water damage. They can extend their activities to dry wood once they have a nearby base in wet wood.

Most **subterranean** colonies were in the ground beneath or near the school before it was built. The termites are coming into the buildings through the utilities holes and other cracks and gaps in the concrete slab and foundations. Often they travel into a structure through mud tubes which they build if they have to cross an exposed area between the soil and wood.

THE KEY TO CONTROLLING TERMITES

The keys to successful control of **dampwood** termites are:

- periodic monitoring for moist wood and termite activity,
- repairing conditions that cause damp wood and replacing or drying the wood.

There is usually no need to spray insecticides since dampwood termites cannot live without wet wood.

The keys to successful control of **subterranean** termites are:

- constructing the school buildings to exclude termites,
- periodic inspections for termite activity if the school is in a subterranean termite area,
- hiring a licensed pest control professional with termite experience to:
 - ◆ apply a chemical barrier treatment to the soil and wood beneath and around the foundation,
 - ◆ and / or use a bait program to kill termites in their nests.

METHODS IN INTEGRATED PEST MANAGEMENT TERMITE CONTROL

TECHNIQUES FOR SCHOOL PERSONNEL

IDENTIFY THE PROBLEM

Watch for termite activity inside the buildings

This is important if you have either **dampwood** or **subterranean termites** in your area. Dampwood termites only live in or very near to wet wood. Subterranean termites may live in wet wood if it is constantly wet.

- Check where a swarm has been seen or a small pile of discarded wings was found.
- Check in construction voids and/or moist fungus infested wood.
- Look for and remove any cement form boards left behind during construction. They most likely to be next to foundations or sidewalks and either inside or outside crawlspaces.
- Check where mud tubes from soil enter the building.
- Listen for rustling noises in structural spaces such as walls, floor or ceiling.

Have the presence of termites verified

Termites do not generally like to be exposed to light and air currents so they seal themselves in a network of tunnels where there is a consistent microclimate. This makes them more difficult to detect. A thorough termite inspection to locate all sites of termite activity requires a pest control professional with termite experience and special equipment.

HABITAT ALTERATIONS THAT MAKE YOUR SCHOOL UNATTRACTIVE TO TERMITES

Make repairs to keep termites from finding moist wood in or near the building:

Find wood moisture problems

- Check for structural water leaks from roofs, walls, gutters and downspouts, flashings and where paving or grading directs water toward the building.
- Check for leaking plumbing, drains and fixtures.
- Check appliances such as dishwashers and ice makers to see if they need to be ventilated.
- Check for moisture accumulation in attics and crawl spaces.
- Use moisture meters, a screwdriver or an ice pick to find damp wood.

Repair the conditions that cause the wood to get wet

This will starve the termites unless they can find another source of moist wood.

- Fix leaks.
- Ventilate attics and crawl spaces.
- Install vapor barriers under crawl spaces.

Repair any damages

- If the damage is bad and the wood is infested with termite colonies and galleries, remove and repair the wood.
- If it is minimal damage and you have repaired the leak or moisture source, buy replacement wood that has been treated with a borate based wood preservative.

Make repairs in the landscape

- Remove all infested dead wood in the landscape.
- Prune or trim back trees and vegetation so that branches do not reach the buildings.

- ☑ Attempt to find and remove wood debris and buried wood within 10 feet of the buildings

Prevent outside termites from coming into the school

- ☑ Keep structural wood away from soil. The University of California at Davis Extension recommends a minimum of 12 inches. The University of Washington Extension recommends a minimum of 8 inches of space between soil and wood. If the space between wood and soil contact is less than 8 inches, fix it by replacing wood with cement or installing a metal or cement barrier.
- ☑ Use wood preservatives or borates to treat wood that cannot be moved far enough from soil level or if access makes it too difficult to replace the wood with cement or metal.
- ☑ Look for and remove any cement form boards left behind during construction. They most likely to be next to foundations or sidewalks and either inside or outside crawlspaces.
- ☑ Show / report any mud tubes of subterranean termites to a pest control professional.

REDUCE OR ELIMINATE DAMPWOOD TERMITE POPULATIONS

Most effective and non-toxic methods

Habitat alterations and repairs by the school staff will prevent new populations from moving in. Removing damaged wood and repairing the causes of damp wood will eliminate dampwood termites. No other treatment is necessary.

Vacuum termites out of an indoor nest

The most effective way to eliminate either dampwood termites or carpenter ants is to open up the damaged area and destroy the insects by using a vacuum. The moisture source and damage has to be repaired to prevent them from re-establishing the nest if they return. Insects can be vacuumed out of their nest with some cornstarch in the vacuum bag to suffocate them.

- ☑ Use a vacuum with a High Efficiency Particulate Air (HEPA) filter to protect workers from insect particles which can cause allergic reactions in individuals with shellfish allergies (insect exoskeletons and crustacean shells are composed of the same biological substance - chitin). HEPA filters can be purchased for conventional shop vacuums.
- ☑ Use a mask with a HEPA filter for personal protection.
- ☑ Always remove the vacuum bag, tape or seal the openings, and dispose of it promptly to prevent any living termites from escaping.

Other methods

Removable baseboards can be used for monitoring behind wall voids in vulnerable areas. They can be removed to look for termite tubes or damage and can also be used for setting out glue boards for roach or rodent control where staff and students cannot see them.

Ineffective methods

Ultrasonic Devices

Devices that emit sound beyond the human range of hearing are advertised as a way to repel a variety of insects or animals. In 1984 the Federal Trade Commission studied them and determined **they do not work**.

TECHNIQUES FOR THE PEST CONTROL PROFESSIONAL

IDENTIFY THE PROBLEM

Have a pest control professional experienced with termites verify their presence and determine the extent of the problem.

Inspection every one to five years is necessary if your school is in an area with termite problems because the nests are likely to be areas that cannot be easily inspected. Self inspection for termites is very difficult because it requires a thorough knowledge of termite behavior and of building construction. It is very easy to miss areas of infestation. Most termite problems will not be visible until the reproductives swarm or unless mud tubes or damaged wood are found.

- ☑ **Dampwood** termites require periodic monitoring for moist wood and termite activity.
- ☑ **Subterranean** termites require periodic inspections for termite activity if the school is in a subterranean termite area. To keep **subterranean termites** out, it is most effective to have constructed the school buildings to exclude termites.

REDUCE OR ELIMINATE SUBTERRANEAN TERMITE POPULATIONS

The focus here is on keeping them out of the building. It is not possible to find and eliminate all of their nests in the soil. Often they are in the soil under concrete building slabs. Subterraneans are only a problem in some areas of both Western and Eastern Washington.

Most effective and lower toxicity methods:

“Effective” and “lower toxicity” are relative terms. A compound will have varying degrees of effectiveness or risk to the organism (insect or human) that is exposed to it, depending on the age, physical condition and chemical sensitivity of particular individuals. Different pathways of exposure for the same compound, for example by mouth, through the skin and/or by inhalation through the lungs have very different effects. In this context, “most-effective lower-risk” means the most effective compound against the pest, with the lowest toxic risk to non-target organisms.

With any pesticide or toxic substance it is essential to read and follow the label, both for self-protection and for the most effective use against the pest. The label is the law. Manufacturer’s Material Safety Data Sheets must be kept on file where they can be accessed in case of an emergency or accidental exposure.

Pesticides are mixed in many different formulations designed for different pests and locations. A lower toxicity ingredient may have other higher toxicity ingredients added to it, or a product may be used or misused in a method of application or a location where its effects are much more toxic.

Perimeter barrier soil drenches

Treatment of the soil beneath and around the foundation of a building may be necessary if subterranean colonies are persistent and are near the foundation or beneath the slab. Pesticide barriers may also be necessary if the building has damp areas that can’t be accessed for repair or if the school

site has a large amount of buried woody debris that can't be located or removed. This type of treatment is expensive and disruptive. It involves drilling through concrete floors and pulling up or cutting plugs out of carpeting. Sometimes the applications can be made in a spot treatment and sometimes larger areas need to be treated.

Applicators must be careful that the pesticides used do not leach through the soil to contaminate groundwater. Heating ducts, plumbing, radiant heat pipes in concrete floors, wells and nearby bodies of water must be considered in the decision to use a soil treatment. The type of soil and the weather at the site affect the mobility of the insecticide in the soil.

Pyrethroids

Pyrethroids are synthetic insecticides chemically similar to pyrethrin extracts of natural chrysanthemums. They are formulated to be more persistent in the environment than pyrethrins. Pyrethroids are less likely to cause allergic reactions than pyrethrins. They are applied as a liquid drench directly to the soil. Cypermethrin, fenvalerate and permethrin are registered for subterranean termites.

Organophosphates

Organophosphates are moderately toxic to highly toxic insecticides which interfere with the actions of the enzyme cholinesterase, affecting the nervous system and thus the muscular control of vertebrates. Insects are eventually killed by paralysis of the muscles responsible for breathing. The product most commonly used against termites is chlorpyrifos (Dursban®).

Perimeter wood treatment

Borate-based wood treatments can be applied as a barrier against termites who come into a building. Termites do not like to bite into borate treated wood. It will slowly poison them if they come into contact with it. Tim-Bor® is a natural mineral wood preservative that is sold for use by pest control operators. It will eventually leach out if the wood is exposed to rain.

Other methods

Poison baits

The newest termiticides are the baits. Poison baits for insects have advantages for an IPM program because the pesticides are concentrated where the insects come to get them rather than being spread all over the building or room. Bait station containers can easily be moved or removed and usually can easily be hidden from children. Baits for termites

have not been very effective in the past but some new systems and formulations are available that may be much more useful. At the present time they have not been on the market long enough to know how effective they are.

Desiccating dusts

Diatomaceous earth, silica aerogel and **boric acid** could be used in wall voids and other protected dry wood areas but are not effective on the main termite population because some do not come into the building. Desiccating dusts work by absorbing the protective coating on an insect's cuticle (protective shell) which causes it to die of dehydration.

Chlordane

Chlordane is a chlorinated hydrocarbon-based termiticide that was banned for use in the United States due to its persistence in the environment and its adverse health effects. If you have any of this around, contact the Washington State Department of Agriculture for disposal advice.

PUBLICATIONS

In this fact sheet, staff working on the Integrated Pest Management in Schools Project have created eight other documents that describe the least toxic methods for controlling pests in a school setting. Call (360) 407-7472 to request any of the documents listed below:

<u>Number</u>	<u>Title</u>
	<i>Integrated Pest Management in Schools Project: Carpenter Ants</i>
	<i>Integrated Pest Management in Schools Project: Fleas</i>
	<i>Integrated Pest Management in Schools Project: Flies</i>
	<i>Integrated Pest Management in Schools Project: Head Lice</i>
	<i>Integrated Pest Management in Schools Project: Cockroaches</i>
	<i>Integrated Pest Management in Schools Project: Rodents</i>
	<i>Integrated Pest Management in Schools Project: Yellowjackets and other Wasps</i>
	<i>Integrated Pest Management in Schools Project: Nuisance Ants</i>

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