

WELCOME TO MODULE 4

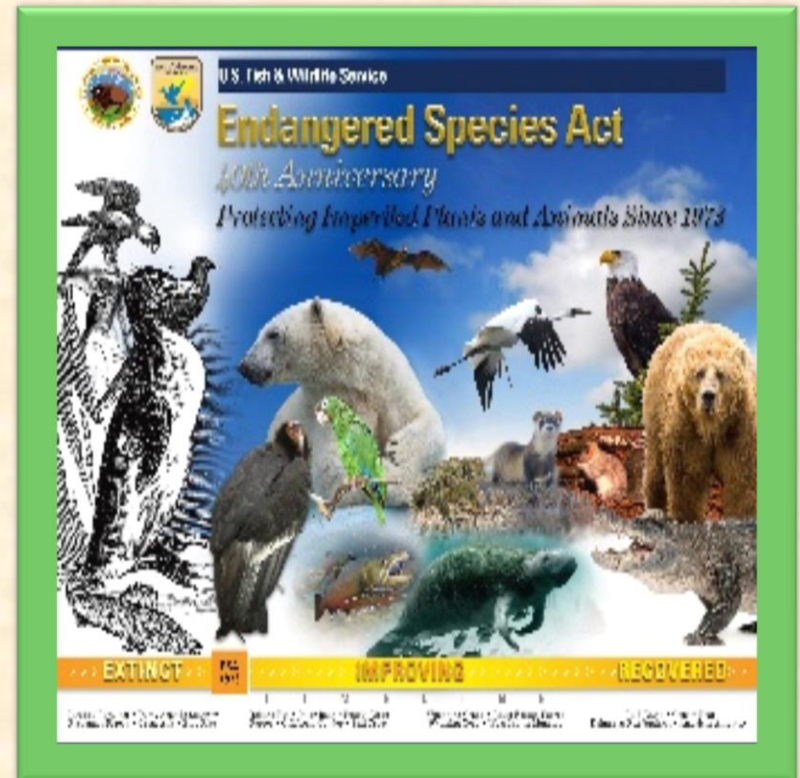
Welcome to Module 4 of the course on
Wood-Destroying Organisms



THE FOCUS

In this 4th and final module of the course the focus will be on the following topics:

- Chemical and Non-Chemical Treatment Procedures
- Insecticides – Current Treatments and Proper Applications
- Treatments of Existing Infestations – Baiting Procedures
- Treatment of Chemical Odors
- The Endangered Species Act
- Federal laws concerning The Control of Wood -Destroying Insects
- National Pest Management Association form NPMA---33: Wood--Destroying Insect Inspection Report



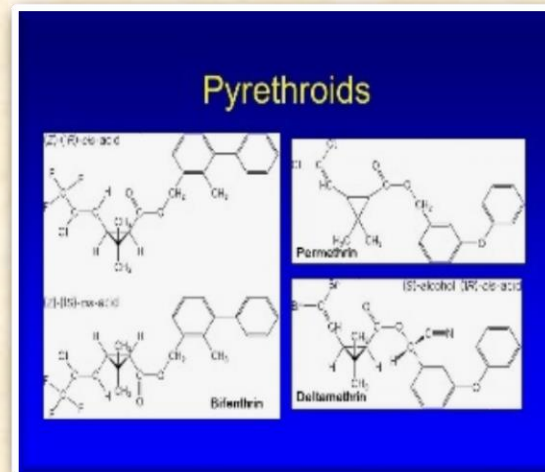
CHEMICAL TREATMENT – THE PRODUCTS

IMPORTANT NOTE: As in the previous modules, this is an introduction to these topics, but not an exhaustive review of all the material or information related to these subjects. Further research is highly recommended.

- Examples of termiticides used for soil treatment include ***cypermethrin, fipronil fenvalerate, imidacloprid and permethrin.***
- Any of these can be used to establish a chemical barrier that kills or repels termites.
- Label directions for these materials should be followed closely for the concentration and rate of application to be used.
- The judgment and experience of the termite specialist is important when selecting the termiticide that best suits the particular type of construction and the soil conditions.
- Below are descriptions of the various products and classes of chemicals that can be used in termite control.

THE PYRETHROIDS

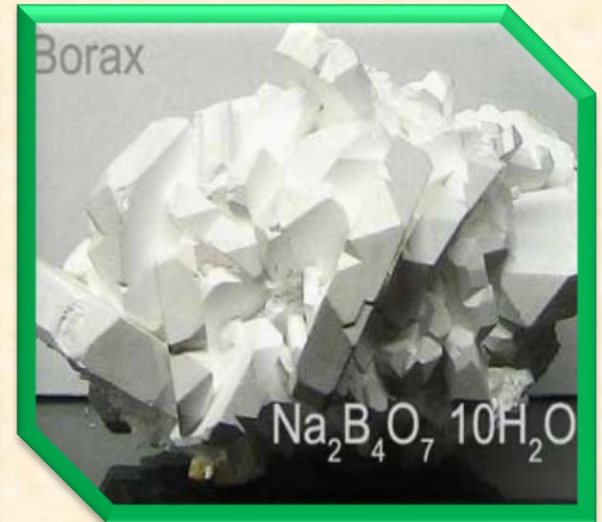
- The pyrethroids are a large family of modern synthetic insecticides similar to the naturally **derived botanical pyrethrins**.
- They are **highly repellent to termites**, which may contribute to the effectiveness of the termiticide barrier.
- They have been modified to increase their stability in the natural environment.
- They are widely used in agriculture, homes, and gardens. Some examples are bifenthrin, cyfluthrin, cypermethrin, deltamethrin, and permethrin. They may be applied alone or in combination with other insecticides.
- Pyrethroids are formulated as emusifiable concentrates (EC), wettable powders (WP), granulars (G), and aerosols.



Chemical compounds of
Pyrethroids

BORATES

- “Borate” is a generic term for compounds containing the elements boron and oxygen. Boron never occurs alone naturally, but as calcium and sodium borate ores in several places in the world.
- At low levels, however, boron is only minimally toxic, and perhaps beneficial, to humans, other mammals, and growing plants.
- Use of borate-treated wood for construction of homes and their wood-based contents, appears to offer many advantages to today’s environmentally sensitive world.
- Unlike most other wood preservatives and organic insecticides that penetrate best in dry wood, borates are diffusible chemicals—they penetrate unseasoned wood by diffusion, a natural process.
- Wood moisture content and method and length of storage, are the primary factors affecting penetration by diffusion.



ORGANOPHOSPHATES & CARBAMATES

- These are two very large families of insecticides.
- Indeed, they have been the primary insecticides for the past 25 to 30 years.
- They range in toxicity from slightly to highly toxic.
- They are formulated in all kinds of ways
- from highly concentrated emulsifiable concentrates (ECs) to very dilute granular (G) formulations.
- These insecticide families are similar in their modes of action—they are all nervous system poisons. Insects and all other animals, including humans, have nervous systems that are susceptible.
- Both insecticide families are efficiently absorbed by inhalation, ingestion, and skin penetration.



Home Inspectors must take great care when working with these toxic chemicals

INSECT GROWTH REGULATORS

- ***An insect growth regulator (IGR) is a synthetic chemical that mimics insect hormones.***
- ***Hormones regulate a wide array of body and growth (physiological) functions. IGRs may interfere with molting, pupal emergence, or body wall formation.***
- IGRs are often specific for an insect species or a group of very closely related species. They often have delayed effects, because they are taken into the insect and stored, until the insect reaches the right growth stage.
- This may range from days to weeks or even months. For example, if the IGR stops the insect from molting and a given insect is exposed just after a molt, it would continue to function normally, until the next molt before dying.

There are numerous products on the market used to inhibit insect growth

NICOTINOIDS

- Nicotinoids are similar to and modeled after the natural nicotine. Imidacloprid is an example of this type of chemistry that is used as a termiticide.
- Imidacloprid was introduced in Europe and Japan in 1990 and first registered in the U.S. in 1992. It acts on the central nervous system of termites, causing irreversible blockage of postsynaptic nicotinic acetylcholine receptors.
- Imidacloprid is registered for use as a termiticide under the name Premise®. It is non-repellent to termites and has contact activity as well as activity as a stomach poison.
- ***This class of drugs has been implicated in the death of honey bees and their hives around the world. This is currently being investigated.***



Is this class of drugs harming the world's population of honeybees?

PYRROLES

- Chlorfenapyr is the only termiticide from the pyrrole family of chemistry and is active primarily as a stomach poison with some contact activity.
- It is also non-repellent to termites. Chlorfenapyr is registered as a termiticide under the tradename Phantom®.
- Chlorfenapyr acts on the mitochondria of cells and uncouples or inhibits oxidative phosphorylation, preventing the formation of the crucial energy molecule adenosine triphosphate (ATP).
- As a result, energy production in the cells shuts down, resulting in cellular and, ultimately, termite death.



TERMIDORE

- Fipronil is the only insecticide in this new class, introduced in 1990 and registered in the U.S. in 1996.
- It is marketed as a termiticide under the tradename Termidor®.
- This termiticide is a non-repellent material with contact and stomach activity.
- Fipronil works by blocking the gamma-aminobutyric acid (GABA) regulated chloride channel in neurons, thus disrupting the activity of the insect's central nervous system.



BIOTERMITICIDES

- Biotermiticides — such as fungi, nematodes, bacteria, and so forth—still need further research and development to maximize their potential.
- *Metarhizium anisopliae* can be injected into galleries, infested walls, and other moist areas where the humidity accelerates the fungal growth.
- Several forms of nematodes are sold for termite suppression. Nematodes are applied to the soil or directly into mud tubes.
- As with all new methods of control, more research is needed to determine the advantages and limitations of such organisms.



Organic or natural treatments are a growing industry, but more research is required.



INSECTICIDE APPLICATION

Foaming Agents

- Foam formulations of soil-applied termiticides, can deliver termiticide to areas difficult to reach, with liquid formulations.
- Borates are foamed for application in wall voids. Foams penetrate into hard-to-reach cavities and voids, and they improve termiticide distribution in soils.
- The most difficult area to achieve uniform and continuous insecticide distribution is under slabs, where the termite control specialist is unable to see the actual deposition of the termiticide.
- The foam carries the liquid termiticide in the spaces between the bubbles. As the foam breaks down, it leaves a thin residue on the surfaces it had contact with.
- The fact that foam is less dense than liquid, enables it to dispense uniformly. The foaming agent delays collapse of the bubbles, providing more time for the insecticide to reach desired areas.

FUMIGANTS

- Pests that can be treated with fumigation include drywood termites, Anobiid powderpost beetles (usually in softwoods such as floor joists, etc.), Lyctid powderpost beetles (sapwood of hardwoods such as moldings, cabinets, and flooring), and old house borers (sapwood of softwoods in beams, rafters, etc.).
- Fumigants are usually quick-acting, diffuse throughout the structure and can eradicate many types of pests. However, they are **TOXIC TO HUMANS AND ANIMALS**.
- They must be applied in an enclosed area, many items may need to be removed in order to prevent damage, occupants must vacate the premises, and home inspectors must have certification and licensure to apply fumigants.



Fumigating one's home can be effective, but, it's also toxic, expensive, and can cause disruptions to one's life.

BAIT PLACEMENT

- Baits take advantage of the social nature and foraging behaviors of subterranean termites.
 - Foraging worker termites consume the bait and then share it with the rest of the colony, resulting in a slow colony decline and, depending on the active ingredient, eventual elimination.
 - Below-ground monitoring stations (without any active insecticide) are sometime used to establish a feeding site for the foraging termite workers, and then the baited stations are installed.
- These are often placed every 10 to 20 feet around the perimeter of the building, 2 feet out from the foundation.
 - The number and placement of bait stations vary, depending on the product used, the characteristics of the site, and the amount of termite activity.
 - A station generally contains a cellulose-based material impregnated with an IGR or a slow-acting toxicant. The bait is usually placed inside a tamper-resistant housing.

COMMERCIAL BAITING PRODUCTS

NOTE: The provision of this information on commercial baiting products, does not in any way serve as an endorsement of this procedure, or these products.

- Sentricon™ System, developed by Dow AgroSciences for professional use, combines monitoring with the use of permanent stations. Stations are installed in areas where termites exist and around the perimeter of a structure and in the yard.
- Each station contains a wood stake and must be periodically monitored for termite activity. After termites attack, the wood is removed and replaced with a bait tube.
- Termites from the wood must be transferred to the bait tube, which is left in the station until termite activity ceases.
- Then, the bait tubes are replaced with new wood stakes, and monitoring, for new infestations resumes.



FIRSTLINE BAIT™ STATIONS

- FMC Corporation manufactures bait stations for suppression of subterranean termite colonies.
- The FirstLine™ aboveground termite bait station is applied directly to active termite infestations.
- The active ingredient in FirstLine™ termite bait stations is sulfluramid, a slow-acting stomach poison.
- The philosophy behind the FirstLine™ products is that many termites will feed on the bait and over time will die.
- Research with these bait stations demonstrate that reduction of the termite population is possible, but not elimination.



This is one of a new line of products used as termite baiting technologies.

EXTERRA INTERCEPTION & BAITING SYSTEM

- Ensysstex Incorporated manufactures a termite baiting system called Exterra® Termite Interception and Baiting System.
- The in-ground stations are designed to permit visual inspection without removing or disturbing the stations.
- The chitin synthesis inhibitor diflubenzuron (Labyrinth®) is the active ingredient in the bait matrix, a shredded paper towel material.



Bait cartridges

BIOBLAST™

- An example of a biotermiticide is BioBlast™, manufactured by EcoScience.
- BioBlast™ is an EPA registered wettable powder containing live spores of the insect killing fungus *Metarhizium Anisopliae*.
- This product is injected into the termite galleries. The spores germinate, penetrate the cuticles of termites and kill them.
- Spores are carried throughout the colony in a manner known as “horizontal transfer.” BioBlast™ controls termites in localized areas if conditions are right for the fungus to grow.



SUBTERFUGE™ BAIT SYSTEM

- BASF manufactures Subterfuge® termite bait with hydramethylnon as the active ingredient mixed into bait matrix.
- This baiting system places the active ingredient in the ground, at the same time the station is placed in the ground.
- Hydramethylnon is a member of the amidinohydrazone family of chemistry, and is primarily active as a stomach poison.
- It is also non-repellent to termites. It works on the mitochondria of cells and ultimately shuts down energy production, resulting in death in a manner similar to chlorfenapyr.



Bait and
trap
system

BAITING TECHNOLOGY

- When deciding whether or not to use baits,
- it is important to remember that this is a
- relatively new technology.
- Baits are still being evaluated and their long-term success is unproven.
- However, the concept of controlling termites with baits is promising.
- You, the termite control professional, must determine which approach, colony elimination or suppression, will succeed in each situation.



Baiting
technology is
new, but
promising

ADVANTAGES & DISADVANTAGES TO APPLICATION PROCEDURES

- There are always advantages and disadvantages to any procedure one is going to choose.
- It's critical to discuss these issues thoroughly with one's clients.
- They need to have all the information in order to make an informed decision.
- Otherwise, the procedure can end up causing chaos, and worse, legal hassles.
- Take the time to learn as much as possible about all of the pros and cons to the various procedures before going forwards with any treatment plans.



To be a treatment professional means learning as much as you can about application procedures.

SELECT THE RIGHT EQUIPMENT

- Selecting and using the right type of equipment are essential to the success of any termite control program.
- The equipment must be in good repair, appropriate for the size and nature of the job, durable, and resistant to corrosion by pesticides.
- Pest management professionals are responsible for protecting themselves and the environment by preventing accidents and spills, harm to nontarget organisms, and contamination of water sources, and by wearing personal protective equipment (PPE).
- The pest management professional must be familiar with the types of equipment available and their proper use to apply pesticides safely and effectively.
- Keeping up-to-date with improvements and innovations in pest control equipment and methods will help ensure successful termite control operations.



The right
equipment is
essential

BE INFORMED

- The pest management professional must be
- familiar with the various classes of chemicals used in termite control and know the advantages and disadvantages of each.
- For every termite control situation, the pest
- management professional must determine what, if any, pesticide should be applied.
- The least amount of pesticide should be used that will control the pest to the customer's satisfaction.
- If use of the pesticide poses a significant risk to people or the environment, (e.g., contamination of well water), the customer should be advised of alternative methods.

STAY INFORMED!

Know and use the resources available to you!

TERMITICIDE APPLICATION & WATER SUPPLY

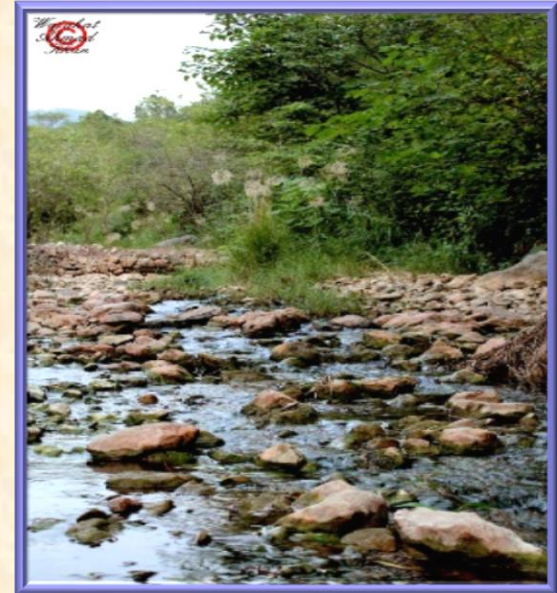
- To apply termiticides safely and effectively, you need to understand and recognize situations where application of liquid termiticides could lead to contamination of airflow systems, or water sources.
- These situations include plenum crawl spaces, air ducts in non-plenum crawl spaces, sub-slab heating ducts, drains leading into basement sumps, and wells, cisterns, or other water sources located on a property.
- The pest management professional must be trained in methods for preventing termiticide contamination and leaks.
- In some situations, use of liquid termiticides may not be possible, and the pest management professional may need to rely on alternative methods, such as termite baits, mechanical alteration, and/or wood treatment for control.



Water supplies must be
protected

HOUSES & WATER SOURCES

- For owners of houses with wells, cisterns, springs, high water table or near ponds, lakes or streams, the inspection professional must take care to protect the water source.
- It is your responsibility to apply the termiticide without contaminating water supplies.
- Take special precautions if wells, cisterns or springs are located near the treatment area.
- You should know the restrictions placed on termiticide application by state, or local pesticide regulations regarding the minimum acceptable distance between wells and sources of pollution.
- You must comply with these regulations, and label directions for the chemical being used.



To apply termiticide responsibly, one must know how to protect the local water supply.

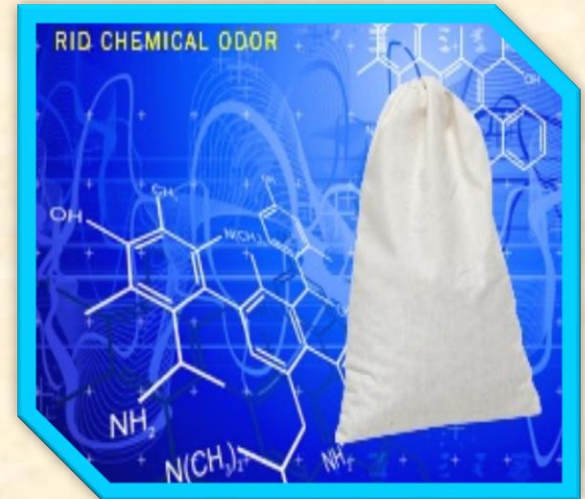
THE LAW

- *The Applying Pesticides Correctly Bulletin* (825) discusses federal and state laws that govern the handling and use of pesticides. Review the core manual and understand how laws and regulations affect pesticide practices and use.
- These laws include federal laws such as the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Occupational Safety and Health Act (OSHA), and the Endangered Species Act.
- These are just some of the laws that affect commercial pesticide applicators.



TREATMENT OF CHEMICAL ODORS - 1

- Clients should be informed that there may be some odors associated with the treatment for three or four days.
- To prevent odor build-up when treating structures, the structure must be ventilated. Windows and doors should be open, and fans can be used to circulate air.
- Air conditioners should be turned off, and close off upstairs doors when possible. Seal any uncapped masonry voids before or immediately after treatment.
- Aerosol foam insulation, strips of roofing material or tarpaper anchored by roofing cement or solid bricks or caps can be used to seal the voids.



Chemical
odors can be
problematic

TREATMENT OF CHEMICAL ODORS - 2

Crawl spaces pose special problems. Install vents if they are not present.

If there is excess moisture or dampness, postpone treatments until the soil dries.

If a clump of soil squeezed in your hand retains its shape without flaking or falling apart, the soil is probably too wet.

Remember, most labels have strong statements about treating wet or frozen soil.

The excess moisture causes the odors to linger for several days.

Treated soil can be covered with a layer of untreated soil, and vapor can be placed over treated soil.

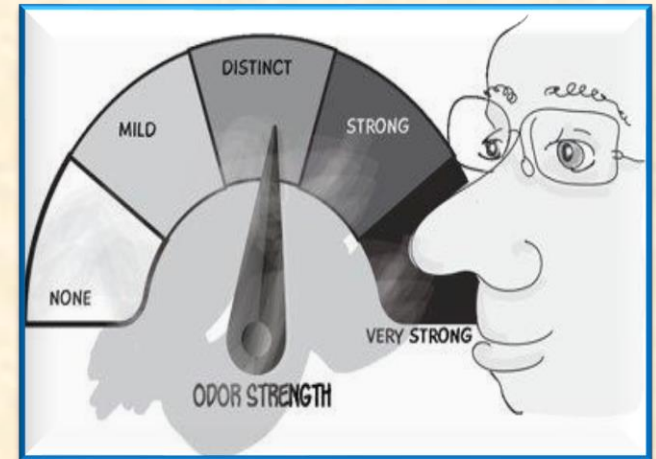
There are also masking or odor reducing products that can be added to the spray tanks.



Odor protection may be required

TREATMENT OF CHEMICAL ODORS - 3

- Finally, caulk, fill or seal openings through the floor of a crawl space, such as plumbing, air vents and bath traps.
- Take special care if there is a furnace or ductwork in the crawl space.
- All ductwork must be sealed, and some types of systems may not be treatable without major odor problems.
- If ductwork is accidentally treated with one of the new termiticides, there are ways of decontaminating the site, but they are very expensive.
- If you have any concern with a potential odor problem, seek additional help before treatment, and explain the problem to the customer.



FEDERAL LAWS

FIFRA

- This is the basic federal law administered by the Environmental Protection Agency (EPA) that regulates pesticides—their use, handling, storage, transportation, sale, disposal, etc. FIFRA defines a pesticide as a substance or mixture of substances intended to kill, repel, or mitigate a pest.
- Some of the provisions of FIFRA are that the EPA must register all pesticides before they can be sold or used.
- The pesticides must be classified as either “**general-use**” or “**restricted use.**”

FIFRA

- ❖ Federal Insecticide, Fungicide, & Rodenticide Act
- ❖ Enacted by U.S. Congress in 1947
- ❖ Administered by the Environmental Protection Agency (EPA)



THE ENDANGERED SPECIES ACT

- This Act requires the U.S. EPA to ensure that endangered or threatened plant and animal species are protected from pesticides.
- This act requires each pesticide label to limit its use in areas where these species could be harmed.
- Category 10b applicators must consider the possibility that endangered or threatened species may be affected by pesticides applied in and around buildings.
- One of the goals of pest management is to protect off-target plants and animals from pesticides, whether they are endangered or not.



NATIONAL PEST MANAGEMENT ASSOCIATION REPORT

- We have now come to the final topic for this module and the course, the National Pest Management Association Report.
- Form NPMA-33 MUST be used by wood destroying insect (WDI) inspectors to report the results of WDI inspections for any HUD/VA guaranteed property transactions.
- The NPMA-33 is also typically used for conventional transactions.
- If a state, through regulation or statute, requires the use of a state approved form and excludes the use of all other forms, the state mandated form must be used.

- Under generally accepted practices, it is the responsibility of the inspector/ inspecting company to inspect for, and report on visible evidence of wood destroying insects, visible damage and of possible previous treatment.
- Inspected areas of the structure(s) inspected may vary according to local and regulatory requirements and practice.
- *The proper form can be accessed at:*
<https://npmapestworld.org/>



END OF COURSE

This concludes Module 4. Please proceed to the quiz. Thank-you so much for joining us, and we hope to see you again soon.



Congratulations! You have successfully navigated this course. Well done!