



## FLORIDA FOREST SERVICE

# Insecticides for Bark Beetle Management

Leaflet Number 14

### OVERVIEW

Pine bark beetles are among the most common and destructive pests of pines in the Southeast. Forest and shade tree pest specialists are often asked to recommend insecticide treatments to treat or prevent bark beetle infestations. Although insecticides can be an effective tool against bark beetles in some circumstances, in many cases they are not practical, cost-efficient or effective as the primary management method. Reasons for this include the following:

- **Most pine bark beetle infestations are secondary.** The two most commonly encountered types of pine bark beetle in Florida, ips pine engraver beetles and black turpentine beetle, mainly infest trees that are severely stressed, declining or recently dead for some other reason such as drought, flooding, storms, root damage, disease or other insects. A healthy tree is generally not attractive or susceptible to these beetles, and an unhealthy one may die even if it is protected from infestation. The main exception to this rule is the southern pine beetle (SPB), which can attack and kill healthy trees during an outbreak. But in most years SPB infestations are uncommon, and they never occur in South Florida.
- **Current insecticide options are for prevention only.** There are currently no insecticides available to reliably save a tree that is already infested. The available products are formulated either as bark surface sprays that kill beetles as they attempt to enter through the outer bark, or systemic treatments that kill beetles as they begin to tunnel through the inner bark layers (phloem and cambium).
- **Infested trees usually die.** Even low levels of infestation by ips engraver beetles or southern pine beetle will usually result in the death of a tree. Therefore, there is likely no benefit to treating trees that are infested with those bark beetle species. There is an exception: trees that are infested only with black turpentine beetles, and at low levels, can often recover. Insecticide treatments may be useful in such cases, to prevent further attacks (see Leaflet Number 4, "Black Turpentine Beetle").
- **Insecticides can kill beneficial insects.** Residual pesticide treatments often will also kill the predatory and parasitic insects that naturally control bark beetles. These beneficial species are known to be very important in preventing and controlling southern pine beetle outbreaks.
- **Insecticide treatment is costly and temporary.** In production forests, the cost of repeated insecticide treatments for bark beetle prevention often exceeds the value of the timber that would be saved by the treatments.



Spraying to coat the bark of a pine tree with an insecticide, to prevent bark beetle infestation. This often requires high-pressure spray equipment and extensive personal protective equipment (PPE). (Image by Christopher Fettig, USDA Forest Service)

Bearing all of that in mind, there are some circumstances where the use of insecticide treatments may be justified, such as to protect high-value landscape trees that are temporarily at increased risk of bark beetle attack due to a short-term stress factor and/or the presence of increased bark beetle activity in nearby areas.

# BARK BEETLE INSECTICIDES

The following is a summary of insecticides that are effective and registered for use against pine bark beetles in Florida at the time of this writing. Insecticide registrations and regulations are constantly changing and different product formulations may have different requirements, restrictions and application rates, even if the active ingredient is the same. As with any pesticide, be sure to read and obey all instructions and restrictions on the label of the insecticide product you are considering. If the pesticide label contradicts any information you see in this publication, the label should be followed instead. Remember, **THE LABEL IS THE LAW!**

**Bark Surface Sprays:** To prevent pine bark beetles from entering the tree, the bark can be coated with an insecticide product that has a long residual effect. The bark surface must be thoroughly sprayed to the point of runoff. To prevent southern pine beetle, the entire trunk should be treated, from ground level to mid-crown. Where ips pine engravers are a concern, branches 5 cm (2 in.) in diameter or larger should also be treated. These treatments generally require either a lift bucket or a high-pressure sprayer, and it is recommended to hire a licensed commercial pest control operator. If only black turpentine beetle is a concern, then it's only necessary to treat the base of the tree, up to height of 8-10 feet (2.5-3 meters). Some trials have found that bark spray treatments can remain effective for up to 2 years, but more frequent applications (e.g. every 6 months) may be needed when a tree is at high risk of infestation.

Three insecticides are registered for this purpose and known to be effective: permethrin, bifenthrin and carbaryl. Permethrin and bifenthrin are effective against all of the primary pine bark beetle species found in Florida. However, they are not registered for use in forest settings and can only be utilized for ornamental landscape trees. Carbaryl is permitted for use on trees in both forests and ornamental settings, and is effective against ips pine engraver beetles and black turpentine beetle. However, carbaryl is ineffective against southern pine beetle. Currently, there are no bark-sprayed insecticides available that are both effective against SPB and legal for use in forest settings. All three of these chemicals are toxic to aquatic organisms and cannot be used near surface waters.

Chemical Name	Product Examples	Sites permitted	Notes
Carbaryl	Sevin® SL or XLR Plus, Carbaryl 4L	Forests or ornamental/urban landscapes	Not effective against SPB. Must wait at least 6 months between treatments.
Bifenthrin	Onyx®, Bifen® XTS, Baseline®	Ornamental/urban landscapes only	Some formulations are Restricted Use Pesticides, available only to certified applicators.
Permethrin	Astro®, Dagnet®, Hi-Yield 38 Plus®	Ornamental/urban landscapes only	Available under many brand names; read the label to make sure it is a formulation intended for use on trees.

**Systemic Insecticide Treatment:** Systemic insecticides are absorbed and transported through a plant's active tissues, rather than just coating the surface. A single treatment can often remain effective for two to three years. There is a much lower risk of killing beneficial or non-target insect species, because the targeted insects are exposed to the chemical when they feed on the tree. Injected systemic insecticides also may have a lower risk of accidental harm to human health and the environment. However, there can be a delay in effectiveness while a systemic insecticide moves through the tree's tissues, so where immediate protection is desired, systemic insecticides alone may not be the best option. Also, these products do not protect the tree against the bluestain fungi (*Ophiostoma* spp.) that many bark beetles carry; these fungi may be introduced into the tree even if the beetle is killed after reaching the inner bark, although it is not clear whether that infection alone would be enough to kill the tree.



An injection system delivering systemic insecticides into a pine tree stem, to protect against bark beetles. (Image by Christopher Fettig, USDA Forest Service)

Currently, only one systemic insecticide is registered for this purpose, and known to be effective: emamectin benzoate (e.g. TREE-äge®). It is applied using injection equipment, which may require the assistance of an arborist or pest control operator who is trained in such treatments. Systemic insecticide products containing imidacloprid (e.g. Bayer Advanced® Tree and Shrub, Merit®) are commonly available and used for many tree pests, but imidacloprid has not been shown to be effective against pine bark beetles.

For more information on pine bark beetles, see the separate publications for Southern Pine Beetle (Leaflet Number 1), Ips Pine Engraver Beetles (Leaflet Number 2), and Black Turpentine Beetle (Leaflet Number 4).

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