

Using Fungicides to Control Bonsai Diseases

by Nina Shishkoff, PhD

Introduction

This was originally a post that appeared on the Internet Bonsai Club mail list in November 1996. It was updated in February 1997. Nina is a plant pathologist who worked at the Long Island Horticultural Research Lab at that time but has since moved to Maryland to work as a research scientist for the USDA.

Read the Label

Although it's nice to control pests organically, it isn't always possible. Pesticides used properly are safe and effective. However, if used improperly they can make you sick or damage your bonsai. Here are a few suggestions for their safe use.

First, go out and buy the proper product: don't borrow your Uncle Ed's bottle of DDT that's been sitting in the garage for 25 years. It's no longer legal and it's past its expiration date. Next, before using any pesticide, read the label. It will tell you whether the product will work for the disease you want to control. Some chemicals may be effective for a use, but for whatever reason, have not been officially tested. This is a particular problem for bonsai, since some plants are unknown outside of the community of bonsai growers, and no pesticide company is going to spend thousands of dollars to register a pesticide for a rare plant. You have to check the label for wording like "for greenhouse use" or "for use on landscape plantings". This means the product is broadly labeled (but a product labeled for indoor use should not be used in the backyard!). It's a good idea to test the product on a small portion of the plant or on a less valuable specimen of the same species to make sure it isn't, damaging or killing leaves.

The label will also give you information on how to safely apply the chemical. **Toxicity** is the degree to which an insecticide is poisonous; **Hazard** is the risk of being exposed. The label will instruct you on the use of protective clothing and precautions. In general it is a good idea to avoid skin contact with the pesticide, to avoid inhaling it, to wash skin and clothing after use, and to store it safely (in a cool, well-ventilated area away from children and pets).

Types of Control

Different fungicides have different properties. A **protectant** is a fungicide that will shield healthy tissue from invasion. An **eradicant** will kill fungi that have already invaded the plant. A **systemic** fungicide spreads within the plant and can protect areas that weren't directly hit (for example, the undersides of leaves would be protected even if only the top surface of the leaf was hit by spray droplets).

Different fungi are... different. They are a diverse group of organisms, some of which are only distantly related to the others (for example, members of the water molds, are really more closely related to algae than to true fungi). Furthermore, they occupy different parts of the plant. For these reasons, not all fungicides will be equally effective on all fungi. If your bonsai shows symptoms of root rot, you need to treat the tree as quickly as possible, but without knowing what is causing the root rot, you may not be able to control the fungus in time to save the tree. Many root rot fungi can be controlled with Thiophanate methyl or PCNB, but water molds require fungicides like Fosetyl-A1 or Metalaxyl. Most of these fungi will not be controlled with a protectant if rotting has already occurred because once in tissue, the fungus can spread throughout the root system; an eradicant is necessary. Because roots are hard to treat directly, either the fungicide must be applied as a SOIL DRENCH, or it has to travel systemically through the plant. Furthermore, because soil is wet and contains diverse microbes, a fungicide may degrade rapidly, requiring multiple applications.

Obviously, for a protectant to work most effectively, it must be sprayed before disease occurs and reapplied until there is no longer danger of infection. This, however, can be expensive, *and the more fungi are exposed to a fungicide, the more likely they are to develop resistance to it*. Common sense is required. If you live near an apple orchard and grow crabapple bonsai, you may need to spray your plants regularly to prevent infection by common apple pathogens. If you live above the timberline on Mt. Shasta, however, the uses of protectants just in case are a waste of money.

Fungicides

The following is a list of some fungicides that can be used in New York State for diseases of trees and shrubs. To make absolutely sure you are spraying the right fungicide for your situation, call your local Cooperative Extension agent.

For leaf spots: Triadimefon, Chlorothalonil, Benomyl, Mancozeb, Propiconazole.

For powdery mildew: Triadimefon (but some mildews are resistant).

For rusts: Mancozeb, Chlorothalonil, Propiconazole

For root rots caused by water molds (*Phytophthora* or *Pythium*): Fosetyl- A1, Metalaxyl

Seed treatments: Captan