

Agri-Fos Use Guidelines and Application Protocol

This protocol is designed to give the applicator practical information for successfully applying Agri-Fos® systemic fungicide to Oak and Tanoak trees for the treatment of sudden oak death (SOD). Two application methods are currently available, injection under the bark directly into the sapwood and topical application of the product, mixed with Pentra-Bark™ surfactant, onto the trunk of the tree. Both methods have been found effective at controlling the growth of *Phytophthora ramorum* the causal agent of the disease.

The choice of application method is dependent upon a number of factors including the equipment costs, volume of chemical used, and the cosmetic appearance of the tree, post treatment. Both treatments have been shown to be effective on oaks; only injections have been shown to be effective for tanoaks. In general, injection treatments require additional equipment in the form of syringe-type injectors that maintain a positive pressure or a backpack mounted hydraulic injector. The injections are made through multiple holes drilled in the trunk. But injections use significantly less product, usually about 10-80ml, to treat a tree. The trunk spray on the other hand can use a simple spray rig, is very quick, and does not leave holes in the tree. The spray method however requires considerably more product and may damage surrounding vegetation, including moss and lichens.

Applications should be made when the tree is actively transpiring. Avoid treating trees during very hot or very cold weather, or when new leaves are emerging. Treatments applied during leaf expansion are generally seriously compromised due to the accumulation of the applied chemical in the leaves rather than in the tree trunk, where it is needed. Currently in northern California two applications per year is recommended, one treatment in November or December and a second treatment approximately six months later. Preventative treatment, before infection has occurred, has been found to be more effective than curative treatments. At least 4 weeks are necessary for the applied chemical to take full effect.

Injection Treatments

1. Calculate the number of injection sites:

1 injection per 1 yard canopy diameter measured at the drip line

or

1 injection per 6 inches of trunk circumference measured at 4 feet above the soil line

Example: Canopy diameter = 24 feet (8 yards) and trunk circumference = 48 inches ($48/6=8$). Prepare 80ml of treatment solution, 8 injections of 10ml each.

The applicator should use their judgment to determine the best method for determining dose. For example, multiple trunks or an asymmetrical crown may make it difficult to calculate the number of injections. If in doubt take both measurements and use the one that results in the higher dose.

2. Prepare the treatment solution as per the label and load 10ml per injection site:

1 part Agri-Fos + 2 parts water
equals

3.5ml (0.1oz) Agri-Fos + 6.5ml (0.2oz) water (makes 10ml)
equals

324ml (11oz) Agri-Fos + 624ml (21oz) water (makes 1 quart)

Wear gloves and safety glasses during preparation and application. Use a 5% bleach solution to disinfect syringes to prevent spread of the pathogen.

3. Drill 5mm (3/16in) diameter hole into live sapwood. Insert injector and inject the treatment solution. Remove injectors after the treatment solution has been dispensed.

The drill bit diameter is dependent on the type of injector used. Sharp bits and slower drill speeds perform better as they cut rather than tear the wood. The drill depth is dependent upon the type and age of the tree as well as the thickness of the bark. With experience the applicator will learn to feel the change in wood density or slight “pop” as the drill enters the sapwood. The hole should be drilled perpendicular to the tree trunk or at a *very slight* downward angle. Run the bit in and out of the completed hole to clear out wood chips that may interfere with the injection. Place injections about 6 inches apart where there is a clear translocation path up the tree. Stagger the injections vertically to prevent bark delamination. Avoid drilling below limb stubs or near shakes, cracks, depressions, or into soft or punky wood. Check for leaks around the injection site. On actively transpiring trees the treatment solution will be absorbed in 1 to 5 minutes. High injection pressures can cause damage to the tree at the injection site. If the injection fails to be absorbed by the tree try cleaning out the hole with the drill bit or move to another site and drill a new hole. Injection holes may be left open, covered with a sealant such as grafting wax, or plugged with specifically designed plastic pegs.

Checklist for injection treatments:

Agri-Fos systemic fungicide

Water

Bleach

Liquid measuring devices, pipettes, conical tubes, or beakers

Plastic mixing containers, beakers etc.

5 gal bucket for carrying syringes, washing, and disinfecting

Rechargeable cordless drill

3/16 in drill bit

Syringe-type tree injectors Chemjet®, Marley®, Sidewinder®, etc.

Examination gloves

Safety glasses

Basal Spray Treatments

1. Calculate the amount of treatment solution needed:
The spray mix is applied from as high as possible down to ground level. Full sized, adult oak trees may require between 500ml and 1 liter of spray mix per tree.
2. Prepare the product as per the label and pour mixture into spray tank:

1.9 L Agri-Fos + 1.9L water + 95ml Pentra-Bark surfactant
equals
62.4oz Agri-Fos + 62.4oz water + 3.2oz Pentra-Bark surfactant

Wear gloves and safety glasses during preparation and application. A plastic face shield and long sleeves may be worn during application as the mixture is slightly irritating to the skin. A variety of spray applicators may be used including hydraulic sprayers, hand pumped sprayers, and backpack sprayers. The spray mixture will foam if shaken or agitated. Use of a spray tank dedicated to Agri-Fos/Pentra-Bark application will allow you to mix the solution directly in the tank and avoid some of the foaming.

3. Apply the treatment solution to the tree trunk. Treatment is generally effective if it is applied uniformly from 3-4m (9-12feet) height (or as high as you can without spraying the foliage) down to the ground level. Soak the tree trunk thoroughly until the spray treatment solution just starts to run off at the base of the tree.

Pay special attention to fissures and cracks, etc in the bark. Multiple or spit trunks should be thoroughly treated, just as the main trunk. Rain or moisture does not appear to affect the application of Agri-Fos with Pentra-Bark surfactant, but applications should be made when the tree is actively transpiring (see Injection Treatments). Use caution and watch your overspray! Application of Agri-Fos with Pentra-Bark to foliage will cause significant damage to the leaves of most plants, including oaks, tanoaks, rhododendrons, moss, lichen, etc.

Checklist for basal spray application:

- Agri-Fos systemic fungicide
- Pentra-Bark surfactant
- Water
- Liquid measuring devices, pipettes, conical tubes, or beakers
- Plastic mixing containers, beakers etc.
- Spray equipment, hydraulic, pump-up type, or backpack mounted.
- Examination gloves
- Safety glasses or face shield

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