

Phosphonates for Control of SOD

Revised 10/10/2017



NEW 2017-2018

- Injection dosages changed, one injection every two years typically between Halloween and Christmas at the new reduced rates detailed below.
- Phosphonates can be either injected or applied topically on oaks. For trees greater than 18" (45cm) DBH injections may be more effective than topical treatments.
- Topical treatment unchanged, one topical treatment in the Fall each year, but with Gypsum amendment, detailed below, one topical treatment every two years should suffice.
- Soil amendment with Gypsum highly recommended but only if treating together with phosphites. Gypsum amendments are not effective by themselves and are recommended for calcium poor soils only.

Phosphonate Use Guidelines and Application Protocol

This protocol is designed to give the applicator practical information for successfully applying phosphonate (aka phosphite) (ex. Reliant®, Agri-Fos® systemic fungicides) 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 a spreader/sticker surfactant (ex. Penetra-Bark™ penetrating surfactant), onto the trunk of the tree. Both methods have been found to be effective at controlling the growth of *Phytophthora ramorum*, the causal agent of the disease, in oaks and tanoaks.

Application Protocol Pt. 2

Injection treatments require additional equipment in the form of spring-loaded, hydraulic, or air pressure injectors that maintain a positive pressure required for introducing the diluted product into the tree. The injections are made through holes drilled into the trunk and use relatively small amount of chemical usually about 50-200ml (1.5 – 7oz), to treat a tree.

The topical application, on the other hand, uses commonly available liquid spray equipment and does not leave holes in the tree. The topical method however requires considerably more product (2-15L, 0.5-4gal) and overspray may damage surrounding vegetation, including moss and lichens.

Phosphonate Application Materials and Supplies



Face Shield

Water

Spray Rig

Mixing Bucket

Drill Bit

Drill

Disinfectant

Measuring

Gloves

Injectors

Pentra-bark
Surfactant

Phosphonate

Application Protocol Pt. 3

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.

Currently in Northern California one injection application every two years is recommended or apply a spray application every year, preferably in the Fall or late winter. Subsequent injection treatments should be made once every two years, preferably in the Fall, you can alternate between injection and topical application methods.

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.

List of Application Materials and Supplies

Checklist for injection treatments:

- Phosphonate (Reliant®, Agri-fos®, etc.)
- Water
- Disinfectant
- 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 and bit
- Syringe-type tree injectors Chemjet®, Arborjet®, Sidewinder®, etc.
- Examination gloves
- Safety glasses or face shield

Checklist for topical application:

- Phosphonate (Reliant®, Agri-fos®, etc.)
- 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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Topical (spray) Application

Prepare the treatment solution as per the label:

1.9 L phosphonate + 1.9 L water + 95 ml Pentra-Bark surfactant

which in English measurements equals

62.4 oz phosphonate + 62.4 oz water + 3.2 oz Pentra-Bark surfactant

Adult trees may require between 2 and 15 L (0.5 - 4gal) of mix per tree depending on their size.

Measure phosphonate
and water and mix in
tank.



Measure Pentra-Bark surfactant and add to tank just prior to application.

Stir to mix tank contents.

The mixture will foam if shaken or agitated heavily.



Apply treatment solution uniformly to the tree trunk from 3-4m (9-12') height, or as high as you can reach without spraying the foliage.

Soak the tree trunk thoroughly until the application solution just starts to run off at the base of the tree.

Avoid overspray. Application to foliage will cause damage to the leaves of most plants including oaks.



Gypsum amendments

(Anhydrous Calcium Sulfate)



About 3 feet around trunk

- 3 to 5 lbs of granular Gypsum per tree, depending on tree size.
- Mix with top layer, in an area with radius of about 3 feet around trunk.
- Apply possibly one to two weeks before phosphonate treatment, or at the latest at the same time as treatment. Gypsum amendments are not effective by themselves.
- Increases efficiency of both injections and bark treatments.
- Bark treatments plus gypsum can be applied once every two years rather than yearly.
- Gypsum amendments are recommended for calcium poor soils only.

Injection Application

There are 2 formulations that you can use depending on the type of injection equipment available.

1 part phosphonate + 29 parts water = 1:30 delivered in 20ml doses (typical of the Chemjet type injector – 20psi).

1 part phosphonate + 59 parts water = 1:60 delivered in 40ml doses (typical of the Arborjet type injector – 35psi).

Calculate the number of injection sites:

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

or

1 injection per 1 yard of canopy diameter, measured at the drip line.

Example: Trunk circumference = 48 inches ($48/6=8$) and the canopy diameter = 24 feet (8 yards). Prepare 8 injections of phosphonate.

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.



Measure volume of phosphonate and water.



Prepare injectors.

Place injections where there is a clear translocation path up the tree. Avoid drilling below limb stubs or near shakes, cracks, depressions, or into soft or punky wood.



Drill injection holes in bark.

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. There is a 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.



Insert Injectors

Check for leaks around the injection site. On actively transpiring trees the treatment solution will be absorbed in 5 to 15 minutes.

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.



Sanitation

Use Lysol or bleach to disinfect equipment and prevent the spread of SOD.

Clean and rinse injectors between applications.

Disinfect boots, vehicles, and equipment thoroughly.



Safety

Read and follow all label instructions.

Follow safety guidelines.

Wear appropriate clothing and equipment.

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