

## TRUNK INJECTION OF THE FUNGICIDE *PHOSPHITE* FOR PROTECTION AGAINST *PHYTOPHTHORA* DISEASE

### INTRODUCTION

Western Australian Banksia and Jarrah trees are protected against infection from *Phytophthora* disease for up to five years by injecting them with the systemic fungicide Phosphite.<sup>1</sup> It should be noted that native trees might die from a number of causes, some of which have similar symptoms to *Phytophthora* dieback disease. The only way of being sure is to engage the services of a professional interpreter. It would be far cheaper in most cases to treat suspected trees with Phosphite anyway. Chemical costs range between \$0.70 and \$2.00 per tree (1997 figures) depending on size. Injection of the fungicide can be done using large syringes or with specially made stem injection equipment. Treatment can be done at any time of year, but for syringe injection the best period appears to be early spring to autumn.

### EQUIPMENT

**Syringe injection:** Disposable 50 ml catheter-tip syringes are recommended, and are available through medical suppliers. A good quality, high-speed, cordless electric drill is required to drill the hole into which the syringe is placed. The drill bit must be sharp so that it allows ready uptake of the phosphite. New syringes need a small hole drilled on both sides of the end of the plunger handle, opposite each other, so that springs can be fitted to maintain pressure on the plunger once the syringe is inserted into the tree (see diagram overleaf). Use a small wire-loop spring approximately 60 mm long, 6 mm outside diameter, 0.7 mm galvanised wire with a loop on each end. In addition a spring retention plate needs to be made. Use a metal strip about 60 mm wide and 2 mm thick cut into 100 mm lengths. Drill a small hole in each end to anchor the springs, and a 10 mm hole in the middle through which the syringe tip is placed (see diagram overleaf).

**Hydraulic injectors:** Various hydraulic injectors are available, but some may not be suitable for jarrah or other Western Australian hardwood trees. Amongst the commercially available injectors the "Rawlins Hydraulic Injector" has been tested and found suitable by CALM.

A good quality electric drill is important. Cheaper drills may not stand up to the rigours of frequent use in Western Australian hardwoods.

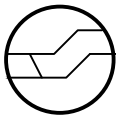
An important factor, whichever type of injector is used, is to ensure that there is a good seal between the injector nozzle and the surrounding wood. A poor seal will lead to the chemical leaking out of the tree. Sometimes this leakage may not be observed because it is obscured by the bark of the tree.

### APPLICATION RATE

For Jarrah and most Banksia species a solution of 5% phosphite (active ingredient) is the highest recommended rate. Some species, such as thick-barked banksias, including *Banksia attenuata* and *B. grandis*, a 10% solution can be used. Caution must be used when selecting the concentration to inject. An inappropriately high rate may disrupt the tree's natural defence mechanism and result in the acceleration of infection and increased deaths compared to untreated trees.

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<sup>1</sup> Phosphite is marketed under several brandnames.



## METHOD OF APPLICATION: SYRINGES

Make up the solution. To obtain a 5% mixture, dilute 1 part of 20% phosphite product (eg. 'FOS-JECT 200') with 3 parts of water.

Measure the circumference of the tree at about waist height and inject 1 ml per cm of circumference. Injections should be made at several places around the trunk because there is a minimal radial movement of the phosphite solution. For instance, a tree with a circumference of 60 cm would be treated with 60 ml applied in four syringes containing 15 ml each, spaced equidistant around the tree

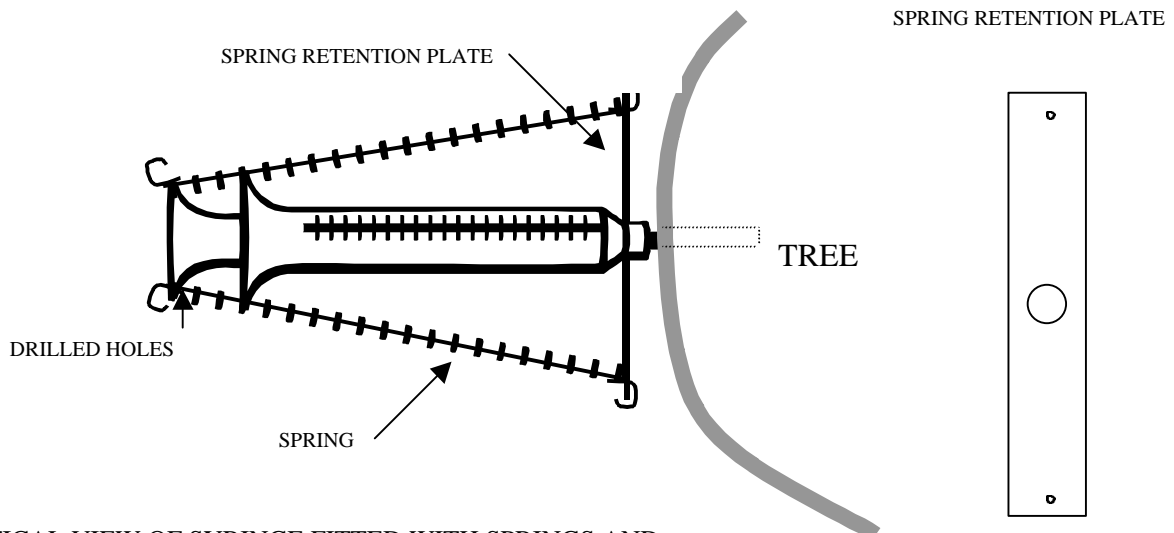
Drill holes at about waist height on a slight downward angle and about 25 mm deep. Drill into the sapwood but not through it. Some eucalypts have very thick bark so scrape off some of the outer bark around each injection site before drilling.

Draw up the required volume into the syringe, hold it with the nozzle up and push the plunger up to expel air from the syringe. Place a spring plate over the nozzle. Insert the nozzle into the hole by pushing firmly while turning to give a snug, airtight fit. Pull back the plunger with one hand while holding the syringe with the other hand. If there is no back-pressure, air is being sucked in (you should hear it) and the intended dose will leak down the tree trunk. Force the syringe in tighter and recheck. If there is back-pressure and small bubbles appear the fluid should be taken up by the tree without leaking. Attach the springs to the plunger – this maintains a constant pressure during uptake.

The time required for the fluid to be taken in varies greatly depending on the health and type of tree. A healthy Bull Banksia will take-up the dose in 2-10 minutes, while a sick Jarrah may require 24 hours. If no fluid at all has gone in after about 1 hour then consider drilling a new hole and trying again. A good seal between the nozzle and the tree must be obtained. When the fluid has gone remove syringes, or the injector nozzle. The holes will callus over within 12 months.

## METHOD OF APPLICATION: TRUNK INJECTORS

The first three steps, including concentrations and dosages, for trunk injection using commercially available injectors are the same as described for the use of syringes. The principle of injection is the same but instead of plungers and springs the liquid is forced into the tree by the use of a lever and hydraulic cylinder or an air pump. For details of method see manufacturers' instructions.



VERTICAL VIEW OF SYRINGE FITTED WITH SPRINGS AND RETENTION PLATE TO FORCE FLUID INTO TREE.