

# Stem Injection Application

## General description

Stem injection is a relatively new technique that has been developed for controlling bushes where each stem >3 cm diameter and can be individually accessed. The basic technique has been fully tested and found to be effective on the west coast of Scotland and North Wales, and is a potential means of control in SW England. Some aspects of the technique, e.g. time of year for application, are still being trailed and results presented here are based on limited evidence.



A reservoir for herbicide can be drilled into larger stems with chisel bit (a detailed step by step guide is presented in section 6.1), but on smaller stems a hand held axe or heavy bladed implement must be used.

## Site factors

None.

## Equipment

- A hand-held cordless drill with several re-chargeable batteries
- Hand held axe or billhook.
- Selectokil Forestry Spot Gun.
- Protective safety clothing of the appropriate type for mixing and handling herbicides must be worn during application.

## Application rates

A 25% solution of glyphosate is recommended. No additives are required.

## Time of application

Applications during March, April and October have been successful in giving complete control of target bushes. It is expected that applications in all months will give good control, but this has not been fully assessed. Winter applications are likely to take longer to have an effect than those during the growing season.

## Additional Considerations

- One of the main advantages of this technique is the controlled application of herbicide to target plants, and the reduction in damage to other species of plant adjacent to treated bushes.
- Treatments early in the growing season prevent flowering, and reduce seed dispersal and the potential for colonisation of cleared sites at a later date.
- Dead bushes can be left on site to rot, or can be removed using manual cutting or flailing techniques at a later date (see sections 4.8 & 4.9). Dead material is also easier to light and burn.



## Application of Herbicide by Stem Injection.

- 1. Choose a position on the stem as close to the main root system as possible and at least below the last fork.** Glyphosate is not readily transported around the bush, therefore all branches above an application point will be controlled, but not those on adjacent stems.
- 2. Drill as vertically as possible into the stem to create a hole that will contain all the herbicide solution.** The size of drill bit used should be between 11 mm and 16 mm diameter (sold as carpentry chisel bits in most hardware stores). The smaller diameter bit can be used to treat smaller stems, but the larger bit size has the advantage of allowing more herbicide contact with the cambial layer. The hole needs to be deep enough to contain 2-ml of herbicide on a level stem (we recommend the application of 2 ml of herbicide solution per stem, see next section).
- 3. Apply 2 ml of herbicide to the hole immediately after it's made.** Care must be taken to prevent herbicide overflowing the hole and running down the stem. The use of Selectokil Forestry Spot Guns with a calibrated 10 ml chamber is recommended. This allows for the accurate application of a calibrated 2 ml of herbicide per hole. The Spot Gun has a 5 litre pack that is sufficient to treat 2,500 stems. One operator doing both the drilling and herbicide application is more efficient and will lead to fewer bushes being missed.
- 4. Plugging or covering the hole after application is not necessary.**
- 5. Marking treated bushes is advisable.** When the operation is in two phases (i.e. one operator drilling holes and a second applying herbicide) spray coloured paint or attach coloured bio-degradable tape to indicate which bushes have been treated. This should also be considered in areas where several operators are working, or the area is too large to treat in one day.
- 6. Applications can be made in light rain** provided water is not running down the stem into the application hole and washing herbicide solution out into the surrounding area.
- 7. Bush death should be complete in 9 months from application,** but this will depend on the date of initial application. Leaf death begins 4 – 6 weeks following herbicide application. Complete defoliation and bush death usually occur within 9 months on small bushes, and 31 months on those of stem diameters >10 cm.