

Stem treatment methods for woody plants

Guy Kyser, Scott Oneto, and Ken Moore

In most herbicide applications, the chemical is applied to leaves (foliar applied), where it is absorbed through the leaf. From there, the chemical enters the phloem stream and is translocated throughout the plant.

However, foliar applications to large shrubs and trees can be difficult, inefficient, and subject to drift. As a result, several methods have been developed for introducing herbicides more-or-less directly to the phloem stream – i.e., stem treatments. These techniques range from very simple hand methods to elaborate mechanical means. As with all weed control options, there are advantages and disadvantages to using stem control methods.

In spring, woody plants pull up their root reserves to put on new growth and new leaves; thus most of the carbohydrate movement in the plant is from the ground up. In autumn, woody plants tend to pull sugars and nutrients out of the leaves, translocate them downward, and store them in the stem and roots. The most effective time to apply herbicides to woody plants is in autumn, when herbicidal materials will be translocated down in to the roots.

Standing tree stem treatments

Advantages:

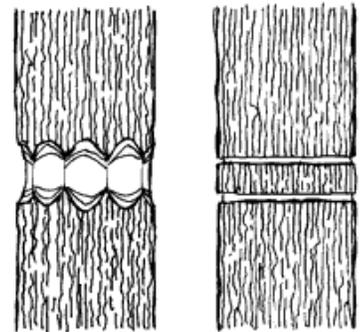
1. The most cost effective and fastest way to kill very large plants.
2. In situations where public safety is not an issue, trees can be left standing as snags, providing habitat for beneficial species. They drop their limbs gradually, lessening the impact when the tree finally falls.
3. There is no visible change on the site.
4. Because the trunk is left standing, root sprouting is not stimulated.

Drawbacks:

1. If trees must later be cut down and removed, the wood will harden in the first few years, making sawing difficult.
2. If many trees are killed together in a group, it may draw negative attention.

Girdling and Frilling

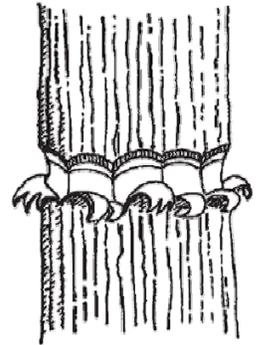
Girdling is the removal of a band of bark all the way around the tree. It kills the tree by severing the cambium layer, preventing the flow of water and nutrients up and down the trunk. It can be done without herbicides effectively on some species; however, most weedy brush and tree species will re-sprout from the stump/roots, complicating future efforts. Several mechanical systems exist for girdling trees, including chainsaws, girdling knives, hatchets, and even torches. To assure a more effective kill, the inner bark should



be removed continuously around the tree in a band at least one inch wide. If a chainsaw is used, two encircling cuts will be required, to a depth of one to two inches.

In *frilling*, a hatchet or similar tool is used to slash downward through the bark and the cambium in a continuous ring around the trunk. In young and thin-barked species such as broom and small acacia or eucalyptus trees, the bark may be then peeled down the stem to the root crown and this alone may produce mortality.

These methods can be combined with herbicide application. If you use an herbicide, you must apply the product to the cut area as soon as possible to assure its uptake. It is important to make sure no portion of the cambium is left untreated. Glyphosate, triclopyr and imazapyr are most often used, but many other herbicides have also been used with success.



Stem injection and drilling

These techniques, used with larger trees (at least 4 to 5 inches in diameter), involve making wounds in the bark and introducing an herbicide.

In *stem injection* (or “hack and squirt”), a hatchet is used to make a series of downward cuts in the bark around the circumference of the tree trunk. For most species, it takes one cut for every 2 to 3 inches of trunk diameter. Immediately apply 1 ml of undiluted herbicide (Glyphosate, triclopyr or imazapyr) into each cut. Avoid application during heavy upward sap flow in the spring, when sap flowing out of the wound will prevent absorption.



A specialized “injecting hatchet” may also be used. Injecting hatchets apply a pre-measured dose of herbicide through a tube from a separate tank as the hatchet is used.

With the introduction of higher voltage cordless drills, *drilling* has become a practical option for stem treatment. Drill approximately 3/8” holes at a downward angle, about 3” apart in a line around the base of the tree, and quickly fill each hole with herbicide. If you are treating large numbers of trees, you will want to use at least an 18-V drill and have some extra batteries. If you charge the batteries with your vehicle through a 12 volt inverter, take care to avoid draining the vehicle battery. Spade bits are preferable to wire bits because they are inexpensive, easy to sharpen in the field, and less likely to clog.



Injection

Tools are commercially available which inject herbicide, or pellets containing herbicide, into the tree through a tube. Best results occur when injections are made every 2 to 6 inches around the tree. The tool is expensive, making this technique more practical on larger size trees and large scale jobs.



Basal bark treatment

This involves the application of herbicide directly to the bark of the tree. The bark is not cut through or altered in any way, which makes it a desirable option in high visibility areas. It is most effective on trees up to about 10" in diameter. Bark on larger trees may be too thick for herbicide solution to penetrate, so it is necessary to use one of the methods listed above to provide a direct pathway for herbicide entry into the plant's vascular system. The product is applied by painting or spraying all sides of the lower 12 to 18 inches of the trunk or stem from early spring to mid-fall. Some species can be treated during the winter. The selected herbicide is mixed with an oil- or petroleum-based carrier and applied until the bark is saturated. Low volatile ester or oil-soluble formulations are best for this use. We have had good results with 20% triclopyr or imazapyr product in 80% crop oil.

Low volume basal bark spray is similar to basal bark treatment with two differences. The concentration of herbicide is higher and the size of tree that can be treated is limited to trees of six inches in diameter at the base. Since the concentration of chemical is higher, less volume of chemical is used.

In some cases where imazapyr is used for basal bark treatment, excess herbicide can wash off the bark and create a dead zone in the soil around the tree.



Thin line / drizzle

Thin line treatment, also known as ultra low volume application, is used on trees of less than six inches in diameter at the base. A thin stream of undiluted or highly concentrated herbicide is applied in a horizontal line around each stem. Approximately 2 to 15 milliliters of undiluted herbicide is used per stem. It is recommended that a meter be used to regulate the amount of chemical used. A metering device is commercially available and can be ordered from most spray equipment dealers.

Drizzle treatment is similar to thin line, except that it is aimed more at the foliage. Typically, a spray gun with a #02 orifice disk is used to fire a thin stream over the top of the plant; the stream breaks up into droplets as the operator waggles the gun around. A drizzle treatment uses a solution of 20% herbicide product applied at rates of 2 gallons per acre. For foliar-only applications, glyphosate (20% commercial concentrate + 80% water) can be used. If a bark-penetrating spray solution is used (20% triclopyr product or imazapyr product in 20% crop oil and water), then the material will be effective on both foliage and stems; this might be a good approach when treating a dense stand of saplings.

Cut stump treatment

Advantages:

1. Useful in situations where immediate results are desired.

Drawbacks:

1. Trees must be cut down before treatment.
2. Because herbicide should be applied soon after cutting, a crew of two is generally needed for treatment.
3. Tends to attract attention both during and after treatment.
4. In some species, cutting off the main trunk may stimulate root sprouting.



In a cut stump treatment, the tree is cut down (usually with a chainsaw), and herbicide solution is dribbled onto the stump. The herbicide doesn't need to cover the whole face of the stump, just a ring around the outer edge (i.e., around the cambium). We have used glyphosate (50% product in water), triclopyr, and imazapyr (each 20% product in crop oil) successfully.

Common sense suggests treating the stump as soon as possible after cutting so that the herbicide can make contact with the tree's vascular system before it seals off, but we have treated trees up to an hour after cutting with no reduction in efficacy.

