

Timber Stand Improvement – Chemical Treatments

Table 1. Herbicides commonly used when girdling or frilling undesirable trees in a timber stand improvement operation. Column one contains the common names of frequently used herbicides; column two contains one or more examples of commonly used brands along with their manufacturers or distributors; and column three contains a brief summary of use recommendations.

COMMON NAMES	BRAND NAMES (MANUFACTURER OR DISTRIBUTOR)	RECOMMENDATIONS
Dicamba	Banvel CST (Riverdale)	Spray or paint cut surface of girdle with undiluted Banvel CST.
Glyphosate	Accord (Monsanto)	Spray or paint Accord on the cut surface of girdle or frill at a rate of 1 ml for each 2 inches of trunk diameter, either undiluted or mixed with water at a concentration of no less than 25 percent. For best results, application should be made during periods of active growth and full leaf expansion.
	Roundup (Monsanto)	Spray or paint Roundup on the cut surface of girdle or frill at a rate of 1 ml for each 2 to 3 inches of trunk diameter, either undiluted or mixed with water at a concentration of no less than 50 percent. For best results, application should be made during periods of active growth and full leaf expansion.
Imazapyr	Chopper	Mix 8-12 oz. of Chopper in one gallon of water, diesel oil, or penetrating oil (such as Cide-Kick, Cide-Kick II, or ArborChem Basal Oil) and spray or paint mixture on cut surface of girdle or frill. Apply enough of the spray mixture to completely wet the cut surface.
Picloram + 2,4-D	Pathway, Tordon RTU	Spray or paint the girdle or frill with undiluted Pathway or Tordon RTU. Apply enough herbicide to wet the cut surface completely.
Triclopyr	Garlon 3A	Wet the cut surface of a single girdle that completely encircles the tree with Garlon 3A, undiluted or diluted 1:1 with water.
2,4-D + 2,4-DP Ester	Weedone 170	Fill frill with mixture of Weedone 170 or Brush Killer 2D + 2DP and oil mixed at a rate of 3.8 to 5.1 ounces of herbicide in 1 gallon of oil.
2,4-D + 2,4-DP Amine	Riverdale 2D +2DP Amine	Fill fresh frill with mixture equivalent to 3.8-5.1 oz. of Riverdale 2D + 2DP Amine in 1 gallon of water.
2,4-D + 2,4-DP Ester + Dicamba	Acme Super Brush Killer	Fill fresh frill full with mixture equivalent to 3.8-5.1 oz. of Acme Super Brush Killer or BK 800 in 1 gallon of diesel oil or mineral oil.

The effectiveness of both girdling and frilling can be increased by using herbicides (Table 1). With frilling and girdling, water soluble forms of herbicides are most commonly used to get maximum movement of herbicide within the plant. When using water-soluble herbicides, the herbicide/water mixture is commonly applied by squirting it on the girdle or frill until the cut surface is wet. Hand-held, pint or quart spray bottles, such as those available at local garden stores, are ideal for applying herbicide to the girdle (Figure 4). Exceptions to the above recommendations are the commonly-used forestry herbicides that contain the ester formulation of 2,4-D + 2,4-DP, such as Weedone 170 and Acme Super Brush Killer. They are labeled for use with frilling in an oil carrier, and the recommendation is to fill the frill with the mixture. They are commonly applied with a backpack or hand-held, hand-pumped sprayer.

Spaced Cuts - Tree Injection

Tree injection involves introducing an herbicide into the undesirable tree through spaced cuts made around the trunk of the tree with an ax, hatchet or tree injector (Figure 5). The procedure can be visualized as a discontinuous frill with a small amount of herbicide placed in each cut. With an ax or hatchet, non-overlapping horizontal cuts penetrating into the sapwood (the outer area of lighter-colored wood in the stem cross section) are made completely around the tree. Cuts are approximately 2 inches long and are spaced 1 to 3 inches apart, depending on tree species and specific herbicide being used. A small amount of herbicide is then placed in each cut (Table 2). This can be done conveniently with a pint or quart spray bottle (such as those available at garden stores). The amount of herbicide to be placed in the cut is specified on the herbicide label, but is generally 1 to 2 milliliters. There are also various tree injectors available including the "hypo-hatchet," which is a hatchet constructed to inject herbicide when it is struck into the tree.



Figure 1.



Figure 2.

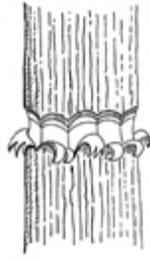


Figure 3.

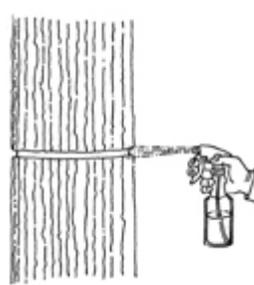


Figure 4.

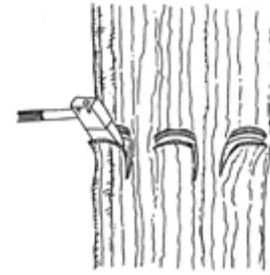


Figure 5.

Table 2. Herbicides commonly used when injecting undesirable trees in a timber stand improvement operation. Column one contains the common names of frequently used herbicides; column two contains one or more examples of commonly used brands along with their manufacturers or distributors; and column three contains a brief summary of use recommendations.

COMMON NAMES	BRAND NAMES (MANUFACTURER OR DISTRIBUTOR)	RECOMMENDATIONS
Glyphosate	Accord (Monsanto)	Inject the equivalent of 1 ml of Accord for each 2 inches of trunk diameter full strength or diluted with water to a concentration of not less than 25%. Injections should be evenly spaced around tree. With larger trees, a continuous frill is more effective than spaced injections. Best results will be obtained if treatment is made during periods of active growth and after full leaf expansion.
	Roundup (Monsanto)	Inject the equivalent of 1 ml of Roundup for each 2½ inches of trunk diameter full strength or diluted with water to a concentration of not less than 50%. Injections should be evenly spaced around tree. With larger trees, a continuous frill is more effective than spaced injections. Best results will be obtained if treatment is made during periods of active growth and after full leaf expansion.
Picloram + 2,4-D	Pathway, Tordon RTU	Inject 1 ml of undiluted Pathway solution around the tree trunk at intervals of 2 to 3 inches between edges of the injector wounds. Treatment can be done any time during the year except for species which have a spring sap flow. Those species, such as the maples, should not be treated during the flow period. Difficult to control species, such as dogwood, hickory, and sugar maple, may require edge to edge injections, essentially a complete frill.
2,4-D Amine	Weedar 64	In one injection per inch of trunk diameter (measured 4½ feet above the ground), inject 1 to 2 ml of undiluted Weedar 64. Injections must penetrate the bark. For best results, injections should be made during the growing season, May 15 through October 15.
	Weedestroy AM-40	In injections spaced 2 inches apart (edge to edge) around the tree trunk, inject 1 ml of undiluted Weedestroy AM-40. Injections must penetrate the bark. For difficult to control species, such as hickory, dogwood, red maple, and blue beech, space injections 1½ inches apart. For best results, injections should be made during the growing season, May 15 through October 15.
	Solution Water Soluble	Dissolve a 2 lb. 13 oz. packet of Solution Water Soluble in 1½ gallons of water. Inject ¾ ml of the solution in each injection. For most species, space injections 2 inches apart, edge to edge. For hard to kill species, such as hickory, dogwood, red maple, blue beech, and ash, space injections 1½ inch apart, edge to edge. For best results, injections should be made during the growing season, May 15 through October 15.
2,4-D Ester	2,4-D L.V. 4 Ester	In injections spaced 2 inches apart (edge to edge) around the tree trunk, inject 1 ml of undiluted 2,4-D L.V. 4 Ester. Injections must penetrate the bark. For difficult to control species, such as hickory, dogwood, red maple, and blue beech, space injections 1½ inches apart. For best results, injections should be made during the growing season, May 15 through October 15.

Tree injection is generally more effective than mechanical girdling or frilling without herbicide because of the use of the herbicide. However, on difficult-to-control species, such as red maple, hickories and dogwoods, a continuous frill or girdle with herbicide may be necessary to obtain acceptable control. For this reason, many commercial TSI (timber stand improvement) contractors routinely use a single chainsaw girdle with herbicide on all species to maximize effectiveness.

As with most of the herbicides suggested for use with girdling and frilling, the herbicides for tree injection are mostly water-soluble materials that move vertically and horizontally within the tree to complete a chemical girdle.