



Extension FactSheet

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Relative Effectiveness of Herbicides Commonly Used to Control Woody Vegetation in Forest Stands

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Forest stand improvement is the selective removal or deadening of less desirable trees, shrubs, and vines in a forest stand to improve the stand's species composition, age structure, condition, health, and growth. It is an important forest management practice to help woodland owners and forest managers achieve management objectives. Deadening is most often the method of choice when the removal of the less desirable trees, shrubs, and vines is not economically feasible. The most commonly used methods of deadening undesirable trees, shrubs, and vines are girdling, frilling, herbicide injection, basal herbicide spraying, and cut stump herbicide application. These techniques are described in a variety of publications, including Ohio State University Extension (OSUE) Fact Sheet F-45.

Several of these techniques require the use of an herbicide while with others the use of an herbicide is optional. When use of an herbicide is desired, the selection of a specific herbicide is usually based on a number of considerations. The first consideration is the technique being utilized. Herbicides are labeled for specific uses. An herbicide may, for example, be labeled for girdling or injection but not for basal spraying. It is important that herbicides be used only for their labeled purposes. This information is clearly stated on the herbicide label and is summarized in OSUE Fact Sheet F-45 for many of the more commonly used herbicides.

Other important considerations when selecting an herbicide include ease of use, relative availability, worker exposure, environmental safety, personal experience, and the relative effectiveness of the herbicide in controlling the target plant species. While the relative importance of these considerations may vary with the situation and the individual, it is always important to select an herbicide that will effectively control the target species.

Unfortunately, there are few published evaluations of the effectiveness of herbicides in deadening specific species of woody plant. Too often woodland owners and forest managers select an herbicide because it is readily available or is the least expensive, only to be disappointed later when control is unacceptable. Certainly cost and availability are important considerations. However, it is important to select an herbicide that will be effective, even if it is not the least expensive.

This publication contains two tables that provide estimates of the relative effectiveness of several commonly used herbicides in controlling specific woody species. The evaluations were developed from several sources, including personal experience, manufacturers' recommendations, and several publications¹.

The evaluations are not absolutes; many factors other than species determine how effective a particular herbicide is in controlling a particular plant (*e.g.*, the health and vigor of the plant, the amount and concentration of herbicide used, the method and season of application, etc.). The evaluations can, however, provide important guidance when personal experience with a particular plant species and/or herbicide is lacking.

Table 1 should be used as a guide to the relative effectiveness of all of the listed herbicides when frilling or girdling (or injecting, if so labeled). It can also be used as a guide to the effectiveness of the water-soluble herbicides in the table (all but 2,4-D + 2,4-DP) in preventing sprouting when applied to a stump immediately after cutting. Table 2 should be used as a guide to the relative effectiveness of the oil soluble herbicides listed when applied as basal sprays or as cut stump treatments to prevent sprouting.

In both tables relative control is categorized as susceptible (S), intermediate (I), and resistant (R), or occasionally border-

line between two categories (*e.g.*, S-I). A ranking of Susceptible means that the particular species is usually susceptible to the herbicide, and little if any retreatment should be necessary. A ranking of Intermediate means that while not usually as effective as an herbicide ranked S, the herbicide will kill a high proportion of the treated stems. When an herbicide ranked I is used, a portion of the stems may require retreatment. A ranking of Resistant means that the herbicide will usually provide relatively poor control of that particular species. Where no estimate is provided (a blank in the table), no evaluation is implied. The blank simply means we do not have enough information or experience to provide a reasonable estimate of control.

When using an herbicide the importance of careful, proper application according to label directions cannot be over stressed. Not only will this minimize personal and environmental risks, but it will maximize herbicide effectiveness. In particular, the care and skill with which herbicides classified as I or S-I are applied can dramatically impact their effectiveness.

¹ Including: Anderson, D. and M. McGlamery. 1992. Brush Control in Illinois. Chapter 23. In: 1992. *Illinois Pest Control Handbook*; and Arnold, G. and g. LaBarage. 1994. Weed Control in Non-Cropland Areas. Ohio State University Extension (OSUE) Bulletin 821-9.

Table 1. Relative effectiveness in controlling woody vegetation of selected herbicides injected or applied to a frill or girdle according to label recommendations. Also the relative effectiveness of all of the water soluble herbicides in the table (all except 2,3-D + 2,4-DP) when applied to stumps immediately after cutting to prevent sprouting. Note that specific example products may be labeled for only some of the listed applications. Be sure to check the label of the individual product to verify that it is labeled for your intended use.

SPECIES	TRICLOPYR (<i>e.g.</i> , Garlon 3A)	PICLORAM (<i>e.g.</i> , Tordon & Pathway)	IMAZAPYR (<i>e.g.</i> , Chopper, Stalker, & Arsenal)	2,4-D + 2,4-DP (<i>e.g.</i> , Patron 170)	GLYPHOSATE
					(Accord, Roundup Rodeo, Glyphos, Glypro, & Glyphomax Herbicides, and many others)
Alder	S	S	S	I	I
Apple	S	S	S	I	I
Ash	S	S-I	S	I-R	S-I
Ash, Green	S	S-I	S	I	S-I
Ash, White	S	S-I	S	I	I-S
Aspen	S	S	S-I	S	I
Balsam Poplar	S	S	S-I	I	I
Basswood	S	S	S	I	I
Beech, American	S	S-I	I-S	I	S-I
Birch	S	S	S	S-I	I
Blackgum	S	S	S	S-I	I
Boxelder	R	S-I	S	I	I
Cherry	S-I	S	S	S-I	I
Cottonwood, E.	S	S	S	I	I-S
Crabapple	S	S	S	S-I	I
Dogwood	S	S-I	S	S-I	I
Elderberry	S	S	S	R	I
Elms	S-I	S-I	I-R	I	I
Grapes, Wild	S	S	S	S	I
Hackberry	S	S	R	I	I
Hawthorn	S	S-I	S	I	I
Hazel, American	S	S	S	I	I
Hickory	S	S	S	I	I
Honeylocust	I-R	S	I-S	S	I
Honeysuckle	S	S	S	I	I
Hophornbeam, E.	S	S	I	I-R	I
Hornbeam, A.	S	S	I	I-R	I

Table 1 (continued). Relative effectiveness of selected herbicides.

SPECIES	TRICLOPYR (<i>e.g.</i> , Garlon 3A)	PICLORAM (<i>e.g.</i> , Tordon & Pathway)	IMAZAPYR (<i>e.g.</i> , Chopper, Stalker, & Arsenal)	2,4-D + 2,4-DP (<i>e.g.</i> , Patron 170)	GLYPHOSATE
					(Accord, Roundup Rodeo, Glyphos, Glypro, & Glyphomax Herbicides, and many others)
Locust, Black	S	S	R	I	I
Maple	S-I	S-I	S	I	R-I
Maple, Red	S-I	S-I	S	I	R-I
Maple, Silver	S	S	S	I	R-I
Maple, Sugar	S	S-I	S	I	R-I
Mulberry, Red	S	S	S	I	I
Oaks	S	S	S	S-I	S
Olive, Autumn	S	S	I	I	I
Olive, Russian	S	S	I	I	I
Osage Orange	S-I	S-I	R	I	R
Persimmon, E.	S-I	S	S	I	I
Plum	S-I	S-I	S	I	I
Poison Ivy	S	S	S		R
Poplar, Yellow	S	S	S		S
Prickly-Ash	I-S	S	S-I		I-R
Redbud, E.	S	S-I	S		I-R
Rose, Multiflora	S	S	S		S
Sassafras	S	S	S	I	I
Serviceberry		S	S-I		I
Sumac	S	S	S	S-I	I
Sweetgum	S	S-I	S		S
Sycamore	S	S	S		S
Tree of Heaven	R	S-I	S	R	I
Trumpetcreeper	R	I-S	S		I
Virginia Creeper	I	S-I	S		I
Walnut, Black	S	S	S-I	S-I	S-I
Willow	S	S	S	I	I

Table 2. Relative effectiveness in controlling woody vegetation of selected oil-soluble herbicides applied as a basal spray or cut stump treatment according to label recommendations.¹

SPECIES	TRICLOPYR	IMAZAPYR	2,4-D + 2,4-DP
	(<i>e.g.</i> , Garlon 4)	(<i>e.g.</i> , Chopper, Stalker)	(<i>e.g.</i> , Patron 170)
Alder	S	S	I-R
Ash, White	S	S	R
Aspen	S	S	S
Balsam Poplar	S	S	S-I
Beech, American	S-I	I-S	S-I
Birch	S	S	I-S
Boxelder	I-S	S	I
Cherry	S-I	S	I-R

Table 2 (continued). Relative effectiveness in controlling woody vegetation of selected oil-soluble herbicides applied as a basal spray or cut stump treatment according to label recommendations.¹

SPECIES	TRICLOPYR (<i>e.g.</i> , Garlon 4)	IMAZAPYR (<i>e.g.</i> , Chopper, Stalker)	2,4-D + 2,4-DP (<i>e.g.</i> , Patron 170)
Cottonwood, E.	S-I	S	R
Dogwood	S-I	S	I-R
Elderberry	S	S	S-I
Elms	S-I	I-R	S-I
Grapes, Wild	S-I	S	I
Hackberry	I-R	R	S
Hawthorn	S-I	S	I
Hickory	S-I	S	I-R
Honeylocust	S	I-S	I
Honeysuckle	S	S	S
Locust, Black	S	R	I
Maple	S-I	S	I
Maple, Red	S-I	S	R
Maple, Silver	S	S	I
Maple, Sugar	S	S	I
Mulberry, Red	S-I	S-I	I-R
Oaks	I-R	S	S
Osage Orange	R	R	I-R
Persimmon, E.	S	S	I-R
Plum	I-R	S	S-I
Poison Ivy	I-S	S	I
Poplar, Yellow	S-I	S	S
Rose, Multiflora	S-I	S	I
Sassafras	S-I	S	I-R
Sumac	I	S	I-R
Sweetgum	S-I	S-I	R
Sycamore	S	S-I	S-I
Tree of Heaven	I-R	S	I-R
Trumpetcreeper	I-R	S	R
Virginia Creeper	S	S	R
Willow	S	S	S

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