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Chemical Weed Control in Tree Planting Projects Part II - Post-emergence Herbicides

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Weed control in tree planting projects can be grouped into two broad categories: the control of woody vegetation, annual and perennial grasses, and broadleaf weed species before their seeds germinate and the control of established weed species. This publication will discuss using post-emergence herbicides to control established or emerged weed species in forestry, wildlife habitat and conservation tree planting projects.

Weed control may be the most important post-planting maintenance activity that you can perform to ensure the success of your new tree planting project. Controlling volunteer woody vegetation, annual and perennial grasses, and broadleaf weeds may be necessary throughout the life of your plantation. However, it will be most important during the first three to five years after the seedlings are planted. Eliminating competing weed species can greatly improve the survival and growth of your seedlings. They will compete with your tree seedlings for soil moisture, nutrients, sunlight and space, and provide cover for rodents that can damage young trees.

There are several methods that can be used to control weed species within and between the tree planting rows. These include mechanical cultivation (hoeing, rototilling, etc.), mowing or shredding, mulching (straw, wood chips or other organic mulches), and chemical control (pre- and post-emergence herbicides). If herbicides are used, their selection will depend on site conditions, tree species in your plantation and the weeds to be controlled.

Site Preparation

The best time to begin your weed control program is before the trees are planted. New planting sites usually require some type of mechanical soil preparation before the trees are planted. Herbicides can be used to destroy existing vegetation before the soil is tilled and/or after the soil has been tilled to prevent the germination of weed seeds.

Mechanical site preparation should be completed in the fall of the year before the trees are planted. Spring tillage should be limited to a pre-planting disking or harrowing that is designed to reduce competition; pre-emergence herbicides can be incorporated into the soil at this time. Where mechanical preparation is not possible post-emergence herbicides, like Roundup or 2,4-D can be used to control established woody vegetation, grasses and broadleaf weeds. Post-emergence herbicides can also be used to control woody vegetation, grasses and perennial weeds that are encroaching on areas where mechanical site preparation has been completed.

Herbicide Application

Post-emergence herbicides are applied directly to the foliage of established, actively growing weeds. These herbicides kill weed species by interfering with their normal development through the disruption of bio-chemical processes within the plant. The effectiveness of post-emergence herbicides depends on having adequate contact with the shoots and leaves of the target plants. Herbicide application rates, the amount of active ingredient applied per acre, will vary according to the weed species and other factors including plant size and age, water stress, air temperature and relative humidity. Each of these factors can affect the amount of herbicide that enters the plant. Additives such as crop oil concentrates, surfactants and liquid fertilizer solutions can help increase herbicide uptake.

Post-emergence herbicides can be applied at any time during the growing season. However, the effectiveness of your herbicide application will decrease as weed species become larger and more established. Also, hot and dry conditions that create water stress within the plant can decrease herbicide effectiveness. Post-emergence herbicides are usually applied as directed sprays. When applied as a directed spray it is critical that you minimize contact of spray, drift or mist with foliage, green bark or non-woody surface roots of desirable species. Some post-emergent herbicides, like Accord, Garlon 4 and Kerb 50-W can be applied as a broadcast application in conifer plantations. However, broadcast applications must be made after formation of final conifer resting buds in the fall or prior to initial bud swelling in the spring.

The proper calibration of your spray equipment is important to ensure an accurate and uniform herbicide application. Applying the right herbicide at the proper rate is important if you want to keep your costs down and avoid injury to the trees in your plantation. Herbicides are especially dangerous when improperly handled, applied or disposed of. They can cause injury to desirable plants, wildlife and fish, and they can contaminate water supplies. Always read and follow the directions on the herbicide label and follow all precautionary statements. It is a violation of federal laws to use any pesticide in a way that is inconsistent with its label. The label will list the tree and shrub species on which it can be used, the weed species it will control, recommended application rates, timing of applications, disposal and other directions and precautions.

Recommended Post-emergence Herbicides¹

Glyphosate (*Accord, Roundup*)

Accord is labeled for site preparation and weed control in conifer and deciduous plantations. Accord can be applied as a broadcast application to provide post-emergence control of grasses and broadleaf weeds in conifer plantations. The manufacturer recommends that broadcast applications be made after formation of final conifer resting buds in the fall or prior to initial bud swelling in the spring. Accord can also be applied as a directed spray during the growing season to provide post-emergence control of grasses and broadleaf weeds in both coniferous and deciduous trees, and shrub plantings. When applied as a directed spray it is critical to minimize contact of spray, drift, or mist with foliage, green bark or non-woody surface roots of desirable species.

Fluazifop (*Fusilade DX*)

Fusilade is labeled for site preparation and weed control in conifer plantations, and selected bearing and non-bearing fruit and nut trees plantations. Fusilade should be applied as a directed spray when used to provide post-emergence control of annual and perennial grasses. When applied as a directed spray it is critical that you minimize contact of spray, drift, or mist with foliage, green bark or non-woody surface roots of desirable species.

Pronamide (*Kerb 50-W*)

Kerb 50-W is labeled for weed control in Christmas tree plantations, fruit tree and vine plantations and woody ornamentals. Kerb will provide both pre- and post-emergence control of selected grasses and pre-emergence control of selected broadleaf weeds. Kerb can be applied as a broadcast application in the fall prior to leaf drop and soil freeze-up. Kerb is not recommended for use on seedlings that are less than one year old or on spring transplanted stock during the first growing season. Dependable rainfall or overhead irrigation is essential following application for effective weed control.

Sethoxydim (*Vantage*)

Vantage is labeled for weed control in Christmas tree plantations and deciduous tree farms. Vantage can be applied as a broadcast application when used to provide post-emergence control of annual and perennial grasses.

2,4-D (*2,4-D L.V.4, Weedone LV4*)

Weedone is labeled for site preparation and weed control in conifer plantations. Weedone will provide post-emergence control of selected broadleaf weeds and can be applied as a broadcast application. The manufacturer recommends that broadcast applications must be made after formation of final conifer resting buds in the fall or prior to initial bud swelling in the spring. Weedone can also be applied as a directed spray while conifers are actively growing; however, it is critical that you minimize contact of spray, drift or mist with foliage, green bark or non-woody surface roots of desirable species.

Recommended Post-emergence Herbicides Limited to Specific Uses.

Triclopyr (*Garlon 3A or Garlon 4*)

Garlon is labeled for site preparation and weed control in conifer plantations. Garlon can be applied as either a broadcast or directed spray application to provide post-emergence control of grasses and broadleaf weeds in conifer plantations. The manufacturer recommends that broadcast applications must be made after formation of final conifer resting buds in the fall or prior to initial bud swelling in the spring. Broadcast applications of Garlon may cause discoloration of needles and temporary growth reduction in some conifers; however, they should recover and grow normally. Garlon can also be applied as a directed spray during the growing season to provide post-emergence control of grasses and broadleaf weeds. When applied as a directed spray it is critical that you minimize contact of spray, drift or mist with foliage, green bark or non-woody surface roots of desirable species.

Clopyralid (*Stinger*)

Stinger is labeled for weed control in Christmas tree plantations. Stinger will provide post-emergence control of selected broadleaf weeds and can be applied as a broadcast application over actively growing trees. Tree injury may occur if Stinger is applied with a surfactant.

Herbicide Comparison Tables

The tables that follow provide information from each herbicide's label concerning which tree and shrub species the maker has tested and approved for use with each herbicide, weed species that each herbicide controls, and a comparison price list based on current retail prices.

Post-emergence Herbicide Selection Guide*

<i>Tree Species</i>	<i>Fluazifop</i>	<i>Glyphosate</i>	<i>Pronamide</i>	<i>Sethoxydim</i>	<i>2,4-D</i>
Conifers					
Eastern redcedar		d	b/d	d	b/d
Rocky Mountain juniper		d	b/d	d	b/d
Austrian pine	d	b/d	b/d	d	b/d
Jack pine	d	b/d	b/d	d	b/d
Ponderosa pine	d	b/d	b/d	d	b/d
Scotch pine	d	b/d	b/d	d	b/d
Colorado blue spruce	d	b/d	b/d	d	b/d
Deciduous					
Green ash		d	b/d	d	
Manchurian apricot		d	d	d	
River birch		d	b/d	d	
Black cherry		d	d	d	
Cottonwood		d	b/d	d	
Crabapple		d	b/d	d	
Siberian elm		d	b/d	d	
Hackberry		d	d	d	
Hawthorne		d	b/d	d	
Honey locust		d	b/d	d	
Kentucky coffeetree		d	d	d	
Amur maple		d	b/d	d	
Silver maple		d	b/d	d	
Mulberry		d	d	d	
Bur oak		d	b/d	d	
Red oak		d	b/d	d	

Swamp white oak		d	b/d	d
Osage-orange		d	d	d
Russian olive		d	d	d
Harbin pear		d	d	d
Black walnut	d	d	b/d	d

Shrubs

Buffaloberry		d	d	d
Chokeberry		d	d	d
Elderberry		d	d	d
Juneberry		d	d	d
Winterberry		d	b/d	d
Choke cherry		d	d	d
Nanking cherry		d	d	d
Sand cherry		d	d	d
Cotoneaster		d	b/d	d
Golden currant		d	d	d
American hazel		d	d	d
Honeysuckle		d	d	d
Lilac		d	b/d	d
American plum		d	d	d
Siberian peashrub		d	d	d
Skunkbush sumac		d	d	d

* The herbicides Garlon and Stinger were excluded from this table due to the limited number of species that these herbicides are labeled for use with. The letter "b" indicates that a herbicide can be used with this species as a broadcast application. Follow label instructions for broadcast applications. The letter d indicates that a herbicide can be used with this species as a directed spray application. Follow label instructions for directed spray applications.

Comparison List of Weeds Controlled

<i>Tree Species</i>	<i>Fluazifop</i>	<i>Glyphosate</i>	<i>Pronamide</i>	<i>Sethoxydim</i>	<i>2,4-D</i>
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Grasses

Barnyard grass	c	c		c	
Downy brome		c	c		

Smooth brome		c		
Cheat grass		c	c	
Foxtail	c	c	c	c
Johnsongrass	c	c		c
Panicum	c	c	c	c
Sandbur	c	c		c
Shattercane	c	c		c
Broadleaf Weeds				
Bindweed		c		c
Buffalobur		c		
Cocklebur		c		c
Henbit		c	c	
Jimsonweed		c		c
Knotweed		c	c	p
Kochia		c		p
Lambsquarters		c	c	c
Morning glory		c	c	c
Wild mustard		c	c	c
Nightshade		c	c	
Pigweed		c		c
Puncture vine		c		
Purslane		c	c	
Ragweed		c		c
Russian thistle		c		p
Smartweed		c	c	p
Spurge		p		p
Velvetleaf		c		c

This table is a partial list of weeds that often show up in tree planting projects across Nebraska. The level of control that any herbicide will provide is dependant on a complex series of factors.

A blank space indicates that a herbicide has no substantial effect on the listed weed species; a "p" indicates partial control; and a "c" indicates that the herbicide, when used properly, will provide good control.

Comparison List of Herbicide Application Rates and Cost per Acre

<i>Herbicide</i>	<i>Application Rate per Acre</i>	<i>Approximate Cost per Acre</i>
Accord	2 - 10 qts/ac	\$24.99 - 124.93
Fusilade DX	1 - 1 1/2 pts/ac	\$13.49 - 20.23
Garlon 4	3 - 6 qts/ac	\$63.03 - \$126.06
Kerb 50-W	2 - 4 lbs/ac	\$52.76 - \$105.52
Stinger	1/4 - 1/2 pts/ac	\$13.58 - \$27.16
Vantage	2 1/4 - 3 3/4 pts/ac	\$28.79 - \$47.98
Weedone LV4	1 1/2 - 3 qts/ac	\$5.24 - \$10.48

¹The use of trade names is for the convenience of the reader and does not imply any endorsement by the University of Nebraska Cooperative Extension or the Nebraska Forest Service.

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