



KENTUCKY CHRISTMAS TREE PRODUCTION WORKBOOK



VEGETATION CONTROL

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Regardless of the species of Christmas trees grown or the type of vegetation surrounding them, vegetation (brush, grass, weeds) control is the most important cultural practice during a plantation's life. Control will ensure high quality tree production at a minimum cost. The reasons for vegetation control are numerous:

- to reduce competition for light, moisture and nutrients that will hinder tree growth,
- to prevent unsatisfactory tree shapes from developing,
- to reduce the potential for insect and disease damage,
- to reduce interference with labor and equipment movement,
- to improve the plantation's appearance for consumers,
- to reduce the hazard of fires,
- to prevent accidental damage to or mowing of young, short trees,
- to reduce the potential for damage by animals (voles, rabbits, etc.).

The amount of vegetation control necessary will depend on how dense the cover is and how much competition it represents. A vigorously growing fescue pasture will require extensive control, whereas a sparse fescue/weed cover or a moderate clover cover may require no more than a yearly mowing and herbicide or mechanical treatment immediately around each tree.

Timing of vegetation control is important with regard to both the tree's age and its stage of growth. It is far more important around newly planted and young trees than around older trees. It is also more important during the most active growing season (May and June) than at other times except for appearance's sake and the possibility of fires.

The three major ways in which vegetation is controlled are mowing and other mechanical controls, chemical application and mulching. Mowing is most common,



This Christmas tree plantation should have vegetation control.

followed by combinations of mowing between rows and chemical application or mechanical trimmer control of weeds within rows and immediately around the trees. Mulching is not widely used at this time, but shows great promise.

Mowing

The type of mowing equipment used ranges from low horsepower rotary lawnmowers to large horsepower tractors pulling a variety of mowing implements. The size and type of mower used will depend on mower cost, labor available to do mowing, frequency at which mowing must be done, topography of the land, and, of major importance, tree spacing both between and within rows.

If a grower already owns mowing equipment, the plantation design should be based on the size and maneuverability of the equipment. The larger the



A good mower for steep slopes.

equipment the greater the spacing must be and the more room required for turning the equipment.

Growers should keep in mind that as trees grow, the area to be mowed will be reduced. Consequently, with large equipment, the potential for damaging the trees will increase. The use of deflection shields may therefore be necessary to minimize damage to larger trees. Trunk damage must be prevented to reduce entry ports for disease and insect organisms.

When mowing around newly planted and young trees, it is helpful to flag or stake enough trees so that rows are easily recognized. If flags are used when a plantation is laid out, they can be left through the first season to facilitate accurate mowing.

The number of mowings per year will depend upon the type of vegetation, soil fertility and weather conditions. Mowing should be done frequently enough to keep the vegetation from adversely affecting the trees, but not so frequently that it becomes an unreasonable expense.

Chemical Control

Various herbicides are available for preplant, pre- and post-emergent control of vegetation. **For chemical application to be effective, herbicides must be properly matched with the grasses and weeds to be controlled, the herbicide must be applied at the correct time and the proper rate must be used.** Before you select herbicides, consider all the following factors or you may get poor or no weed control and injure the Christmas trees.

1. Tree species being grown. Read the herbicide label information to be sure that the herbicide is labeled for the species, and even the cultivar (with Scots pine) of tree being grown. Not only is tree species important but also tree or seedling age. If in doubt, treat only a small area, then evaluate the results under your conditions.

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2. Weed species to be controlled. Be sure to identify properly all weeds to be controlled. Learn whether they are annual or perennial weeds, and the stages of growth during which they are most easily controlled: preplant (applied before plantation is established), pre-emergence (before weeds appear above ground) vs. post-emergence (after weed seedlings have appeared). There is no point in using a grassy weed herbicide on broadleaf weeds unless it is labeled for your specific problems. Also, mowing or treating adjacent areas from which weed seeds may blow in, or removing trees and shrubs that are a weed source (boxelder, eastern redcedar, black locust, sumac), may be necessary.

3. Type of soil. Refer to each herbicide label to determine the correct herbicide rate based on soil clay content and organic matter. Organic matter and clay particles will absorb certain herbicides, reducing their effectiveness.

Cautions

Remember when using any pesticide (herbicide, insecticide, fungicide, etc.) to follow label instructions carefully. Not following label specifications is illegal and nullifies the manufacturer's liability.

Considerable concern now exists regarding the negative impacts of chemicals on our groundwater systems. There are some simple things you can do to avoid groundwater contamination.

- With preemergent herbicides known to be susceptible to leaching, use minimum recommended application rates.
- Alternate persistent herbicides from year to year.
- Calibrate accurately and apply herbicides with precision. Contact the University of Kentucky Department of Horticulture for *Weed Control Suggestions for Christmas*



Mechanical cultivation is one method of vegetation control.

Trees, Woody Ornamentals, and Flowers, AG-427, North Carolina State University.

- Treat trees individually, not the whole area -- use band or spot treatment instead of broadcast treatment.
- Mix and load sprayers carefully to avoid point source pollution of either surface or groundwater.

Use separate application equipment (spreaders, sprayers) for herbicides and any other type of pesticides. Buy a sprayer just for herbicides and label it as such, and a second sprayer for insecticides, fungicides.

Table 1 lists herbicides that can be used in Christmas tree cultivation. Some of the labeled herbicides (particularly contact herbicides) can be damaging to the trees if the chemical contacts the tree foliage. You may want to apply herbicides selectively with a rope wick rather than spraying. Figure 1 illustrates how to make your own rope wick.

Mechanical Trimmers

Where vegetation within rows and immediately around trees is not controlled by mowing or herbicides, weed trimmers are often used. A variety of styles are available with different power sources, some doing trimming with a monofilament line, some with metal or plastic blades.

Often a weed trimmer can serve a dual function and be used in the shearing operation also by addition of a cutting blade. Great care should be exercised when using a weed trimmer because it is very easy to cut off a small tree or branches if the line or blade gets too close.

Other Methods of Vegetation Control

Mulches - Vegetation can be controlled around Christmas trees by one or more varieties of mulch. Whether composed of organic materials (grass clippings, nut hulls, wood chips, compost, bark, sawdust) or simply

physical barriers (asphalt shingles, rubber mats, straw mats, plastic sheeting of various kinds), mulches serve two purposes. All of them provide a physical barrier that limits or excludes the growth of weeds. They also keep the soil immediately around the seedling cooler and moister; both of these conditions are usually helpful to the growth of the seedling.

True physical barriers, such as shingles or plastic, do not allow percolation of water into the soil from rainfall, but they do restrict the amount of evaporation away from the soil. Porous physical barriers, such as the ground rubber and straw mats, do allow rainfall percolation.

Organic mulches have the additional advantage of releasing nutrients as they decay. **It is important you use old (> 6 months) sawdust, bark or chip mulch so that the initial decay process has already started and the time for early nitrogen demand necessary for that process has already passed. The idea is to have the organic mulch release nutrients, not absorb them.**

The use of mulches is practical only if a local, inexpensive source is readily available and if the topography allows easy application. Some of the physical barrier mulches are initially far more expensive, but may be more economically practical in the long run, as several of them could be used for more than one Christmas tree rotation. The initial application of organic mulches (which need to be applied in a minimum 2-foot diameter circle around each seedling to a depth of 2 to 3 inches) will only be effective for a couple of years, at which time they should be re-applied.

We are testing the effectiveness of ground rubber mulch mats and sawdust mulch in comparison to herbicide application on a Scots and white pine plantation at Robinson Forest starting in 1991. We are also documenting all the costs (initial costs, labor involved in application, survival and growth of trees under each treatment) of these methods.

Cultivation - Vegetation around the base of trees can be controlled by hand or mechanical cultivation (disking, rototilling). Cultivation may need to be more frequent than other methods for effective control, but probably is impractical on sloped land due to possible erosion, and could damage tree roots unless it is kept shallow (2" depth or less).

Domestic animals - Livestock are occasionally used for vegetation control, especially where trees are planted in pasture. Stock normally will not browse on Christmas trees as long as other good forage is available, although they can do damage by brushing against large trees or stepping on small trees. Sheep are probably less likely to be a problem than cows or horses. Conservative timing (short grazing rotations) is essential.

Ideally, vegetation control should be an integrated system that includes alternative ground covers, sanitation, mulches, mechanical weed control and conservative use of chemicals.

Table 1. Chemical Weed Control for Kentucky Christmas Trees*

Herbicide (Mfg.)	Weeds Controlled	When Applied	Formulation Rate/Acre	Registered Conifers	Note
Aatrex, Atrazine (WP,F,DG) (atrazine) (Ciba-Geigy)	Winter annuals	PE, PO	1 lb a.i.††	Several firs, pines	
Basagran (SL) (bentazon) (BASF)	Seedling broadleaf weeds	PO	1.5-2.0 pt.	Douglas-fir, fraser fir, several pines and spruces	Use care with over-the-top spraying.
Dacthal (WP,G) (DCPA) (Diamond Shamrock)	Annual grasses, limited broadleaves	P, PE	12 to 16 lb; 150-200 lb	Fir, pine, spruce	Fall or spring; can be applied immediately following planting.
Devrinol (WP,G) (napropamide) (Stauffer)	Annual grasses, broadleaves	PE	6 to 8 lb	Fir, pine, spruce, Douglas-fir	Best applied to weedfree soil.
Fusilade (EC) (Fluazifop) (ICI Americas)	Annual & perennial grasses	PO	1 pt + 1/2 pt non-ionic surfactant	Pine, spruce, fir, Douglas-fir	Can be sprayed over trees, but do not use surfactant.
Goal (EC) (oxyfluorfen) (Rohm and Haas)	Broadleaves, annual grasses	PE, PO	1 to 2 pt	Seeded + transplanted pine, spruce, fir, Douglas-fir	Weeds must be small for PO control.
Kerb (WP) (pronamide) (Rohm and Haas)	Winter broadleaves, annual grasses	PE, PO	2 to 4 lb	1 year or older firs, pines, Douglas-fir	Fall or early spring; grasses must be less than 2 inches; not recommended on fine textured soils of high organic content.
Oust (DG) (Sulfometuron methyl) (DuPont)	Grasses, broadleaves	PE, PO	2 to 8 oz	Red, Virginia pines, (white + Scots being tested.)	
Paraquat, Gramoxone (S,L) (paraquat) (Chevron)	All	PO, PD	1 to 2 qt + non-ionic surfactant	Douglas-fir, white + Colorado blue spruce	Contact burn-down. Do not get on trees.

†† a.i. = active ingredient

Table 1.- Chemical Weed Control for Kentucky Christmas Trees (continued)

Herbicide (Mfg.)	Weeds Controlled	When Applied	Formulation Rate/Acre	Registered Conifers	Note
Pennant (EC,G) (metolachlor) (Ciba-Geigy)	Annual grasses, some broadleaf plants	PE	2.0-2.5 qts	Douglas-fir, fir, pine, spruce	Injures white pine if over- sprayed during candle elongation.
Poast, Vantage (EC) (Sethoxydim) (BASE Wyandotte)	Annual & perennial grasses	PO	1.5 -2.5 pt + 2 pt oil concentrate	Several firs, spruces + pines	Trees can be sprayed; rates vary based on grass height; labeled for white and Virginia but not Scots pine.
Princep (WP,F,DG) (simazine) (Ciba-Geigy)	Some broad- leaves, annual grasses	PE	2.5-5.0 lb; 2 to 4 qt 50 to 100 lb	3 yr old or older spruces firs, pines, Douglas-fir	Or use atrazine for more PO con- trol fall OR spring. Do not apply more than once a year.
Redeem, Garlon 3a (SL,EC) (triclopyr) (Dow/Elanco)	Broadleaf weed control, woody plant suppression	PO	1.3-2.6 pts		Plantations established 3 full years
Ronstar (G,WP) (oxadiazon) (Rhône-Poulenc)	Broadleaves, annual grasses	PE	100 to 200 lb	Pine seedlings pine + spruce transplants	Can apply to newly trans- planted white pines. Do not incorporate.
Roundup (SL) (glyphosate) (Monsanto)	All	PP, PD	Spray-1 to 5 qt (less for annuals, more for perennials) (usually 100:1 water: chemical = 1 Tbsp in 1 gal water) Wick-usually 3:1 water:chemical	Preplant in all; directed in fir, pine, spruce	Contact, systemic. Do not get on trees. Use shield or rope wick. Do not use in galva- nized sprayers.
Stinger (SL) (clopyralid) (Dow/Elanco)	Aster, legume and smartweed families of broadleaf plants	PO	5.5-11.0 fl. oz.	Douglas-fir, fraser fir, Scots/white pines	Safe for over- spray during growing phase.
Stomp (EC) (pendimethalin) (American Cynamid)	Most annual grasses, some broadleaf weeds	PE	2.5-4.5 qts	Douglas-fir, Colorado blue spruce	Mix with Simazine or Princep for broad spectrum control

Table 1.- Chemical Weed Control for Kentucky Christmas Trees (continued)

Herbicide (Mfg.)	Weeds Controlled	When Applied	Formulation Rate/Acre	Registered Conifers	Note
Surflan (WP,F) (oryzlin) (Elanco)	Annual grasses	PE	2 to 4 qt	Established firs, pines, spruce, Douglas-fir	Do not use in soils containing more than 3% organic matter. Can tank mix with Princep for a very complete weed control.
Treflan (G,EC) (trifluralin) (Elanco)	Annual grasses, small seeded broadleaves	PE	10 to 20 lb incorp.; 80 lb unincorp.; 1 to 2 pt	Douglas-fir, pine	Works best incorporated to a depth of 2 inches; use higher rate on fine textured soils.
Velpar (SL,SP) (hexazinone) (DuPont)	Annual grasses, broadleaves	PE, PD	4 to 8 pt; 1 to 2 lb	Austrian, Scots pines ONLY	Do not use on white pines!

Formulation:

DG = water dispersible granule
 **EC = emulsifiable concentrate
 F = flowable suspension
 G = granules - applied dry
 L = liquid (or S = solution)
 SL = water soluble liquid
 SP = water soluble powder
 **WP = wettable powder

P = at planting time
 PP = preplant
 PE = pre-emergence
 PO = post-emergence
 PD = post-emergent directed

*Reference to a herbicide, either by trade or common name, in no way represents a recommendation or endorsement of that chemical.

**Generally added to water and applied as sprays. Agitation needed to prevent settling out.

Figure 1.

Rope Wick Herbicide Applicator

The handheld wick can easily be made with the following items:

1. 3 ft. of 3/4 in. PVC pipe (Note: be sure to get PVC and not CPVD pipe)
2. (3) 3/4 in. PVC male threaded PVC pipe ends
3. (1) 3/4 in. PVC tee
4. (1) 3/4 in. screw on cap (PVC or galvanized)
5. 1 can of PVC cement
6. 1 complete rope wick kit (which consists of 1 rope, 2 female threaded ends and 2 rubber grommets) (see FOR-34)

The cost of materials will vary depending on availability of the wick kit. If you have difficulty obtaining any of the parts, notify the Department of Forestry, University of Kentucky.

First: Take the 3 ft. of pipe and cut it to a length of 32 in. Cement the tee on one end and one of the male threaded pipe ends on the other end (a).

Second: Take the remaining 4 in. of pipe and cut it in half so that you have two 2 in. pieces. Cement one piece onto each open end of the tee. Take the remaining two male threaded pipe ends and cement one onto each 2 in. piece of pipe (b).

Finally: Thread the female threaded ends (screw threads facing ends of rope) onto the rope. Put the grommets onto the rope wick so that the rope fits tightly onto the ends of the tee part of the applicator (c). Screw the ends in tightly and put the cap on the top end of the applicator.

Note: Take a measuring cup of water and fill applicator so you will know exactly how much your wick will hold (expect 12-16 oz.). See herbicide label for proper mixing instructions.

