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Chemical Weed Control in Trees

Leon J. Wrage, Extension Agronomist-Weeds
Paul O. Johnson, Extension IPM Coordinator

Weed control is necessary for trees to survive and grow. Weeds compete for moisture and nutrients. They also harbor small rodents and insects which damage trees.

Cultivation controls weeds between the rows. Herbicides control weeds in the row, eliminating time consuming handwork.

Eliminate perennials with repeated tillage or with non-residual herbicides before trees are planted. It is much more difficult to control weeds after trees are planted.

Soil Applied Herbicides

Preplant incorporated herbicides are mechanically incorporated into the soil.

Preemergence herbicides must be applied before weeds emerge. Fall is the best time to use most preemergence herbicides. Fall and early spring moisture moves the chemical into the soil so weeds are controlled as seed germinates. Fall is more convenient in most work schedules.

Results are best if the soil surface is free of plant residue. Trash interferes less with granules than with sprays. Remove very heavy weed growth before application.

Do not disturb soil in treated areas until weeds begin emerging. Avoid throwing untreated soil onto the treated areas when cultivating between the rows.

Too much herbicide will injure trees. Use higher rates on high organic matter, heavy textured soil. Use lower rates for low-organic-matter, sandy soil. Some herbicides cannot be used on gravelly, sandy, or high pH soils. Severe tree injury can occur. A soil test will give this information.

Follow label directions for species that may be treated. Some trees are very sensitive to herbicides.

Soil-applied herbicides have residual properties. Replacement trees may be injured from carryover if they are planted in treated areas. To keep treated soil from coming in close contact with the tree roots, remove the top 2 to 3 inches of soil before digging the planting hole.

Postemergence Herbicides

Postemergence herbicides are applied after weeds have emerged. The chemical is absorbed through the leaves. Translocated herbicides move to other parts of the plant.

Use extreme care to keep spray off trees. Spray only when it is calm. Even very light wind will carry enough fine droplets to cause damage. A protective shield is helpful for small trees.

How To Apply

Apply herbicides accurately and uniformly. Refer to Fact Sheet 342, "Checking Weed Sprayers", or Fact Sheet 353, "Calibrating Small Plot Sprayers", for instructions on calibrating equipment.

Apply herbicides in a band 4 feet wide. A trip down each side of the tree row spraying a 2-foot band works best. Mechanical agitation is required to keep wettable powders from settling. A 50 mesh screen is required.

Treat small areas with hand equipment. Shake hand sprayers frequently to keep wettable powders in solution. Screens in some single nozzle hand equipment are too fine. Measure the correct amount of herbicide for the area into a gallon of water. Refer to Table 1 for amount to use. Spray over the area several times until the solution is gone. Some postemergence herbicides are mixed at a given solution. In this case, the weeds are sprayed to wet the foliage. Use hand-operated granular applicators to apply granules on small areas.

Herbicide Suggestions

Information in this publication is based on South Dakota Agricultural Experiment Station research, research from other experiment stations, or observations. Herbicides are included only after the chemical is registered by the Environmental Protection Agency (EPA).

Tradenames are for reader convenience and do not imply product endorsement. Users are responsible for following all label directions and precautions.

RATe. Rates for each herbicide are stated as the amount of product per acre on a broadcast basis. Adjust rates accordingly for band application. For example, a 4-foot band on 10,590 feet (about 2 miles) of tree row equals approximately one acre of area.

TIME TO APPLY - HERBICIDES.

PREPLANT INCORPORATED: Incorporate as directed before trees are planted.

PREEMERGENCE: after planting, but before weeds emerge.

POSTEMERGENCE: after weeds emerge.

Abbreviations Used

pt = pint
qt = quart
gal = gallon
lb = pound
act = active ingredient or acid equivalent
lb/gal = pound per gallon active ingredient or acid equivalent
W = wettable powder
G = granule
SP = soluble powder
DF = dry flowable (spray)
L = liquid
SAFETY FIRST

Follow the Label. It is a violation of federal pesticide laws to use an herbicide inconsistent with its labeling. Read the entire label before using.

Applicator Safety. The most serious risk of exposure from chemicals is during handling and mixing of the concentrated product. Use protective equipment specified on the label. Use chemical resistant gloves, eye shield, long-sleeved clothing, rubber boots, and appropriate respirator as required.

McKennan Hospital, Sioux Falls, S.D. 1-800-952-0123
Dakota Midland Hospital, Aberdeen, S.D. 1-800-592-1889
Rapid City Regional Hospital, Rapid City, S.D. (605) 341-3333

Water Protection. Water quality is a public concern. Preventing spills and accidents during handling and mixing reduces risk of groundwater and surface water contamination. Mix herbicides away from wells and water sources. Prevent back-siphoning into wells. Install anti-backflow devices in irrigation equipment used for pesticides. Triple rinse containers. Store herbicides properly. Identify high-risk areas, such as coarse soils or areas where the water table is near the surface. Be aware of herbicide properties that increase the risk of contamination in the critical area.

SHELTERBELT HERBICIDES

This section includes herbicides commonly used for weed situations in most shelterbelts. These herbicides may be used on tree and shrub species frequently used in farm shelterbelts. See each herbicide section for specific listing.

Rates for each herbicide are stated as the amount of product per acre on a broadcast basis. Adjust accordingly for band application. Refer to Table 1 for amount to use when treating small areas with hand equipment.

Princep (SIMAZINE) ($7.10-14.15)

2.5-5 lb Princep 80W or 2.2-4.4 lb Princep Caliber 90DF or 2-4 qt Princep 4L or 50-100 lb Princep 4G (2-4 lb act)

Preemergence herbicide. For labeled species in established shelterbelts or new planting if transplants are at least 3 years old.

Consult label for complete list of approved species. The label include Ponderosa, Austrian, and Scotch pine; Black Hills, white, and Norway spruce; red and white cedar; Siberian elm, barberry, boxelder, caragana, dogwood, honey locust, and Russian olive. Lilac, cottonwood, poplar or some other species not listed on the label will be injured and should not be treated.

Gives fair to good control of several annual grasses including downy brome, foxtail and wild oats and very good to excellent control of annual broadleaves including sunflower, lambsquarters, pigweed, purslane, Russian thistle, smartweed, and mustard. Control has been consistent in SDSU tests. Higher rates are required for kochia and Russian thistle. A special treatment gives fair quackgrass control. Established broadleaved perennials are not controlled.

Fair to good tolerance. Do not use on sandy or gravelly, low organic matter soil. More risk of injury on high pH (over 7.5) soil. Don’t exceed label rates. New plantings are less tolerant. Avoid application where herbicides may be concentrated into planting furrow. Use lower rate on first-year plantings. Delay application on new plantings until trees are established 6 weeks or preferably don’t treat until late fall.

Higher rates are for heavy, high organic matter and for full season control in established plantings. Use low rate on questionable soils and on new plantings.

Quackgrass requires the maximum rate applied in the fall, or use a split application of half the maximum rate in fall and half the maximum rate in early spring after quackgrass growth begins.

Apply in late fall for best results. Spring application is more erratic. Rainfall required. Emerged weeds are not controlled.

Remove excessive plant residue before application. Trash interferes less with granules. Apply spray formulations in 25 gpa water. Agitation is required. Little risk of burn if spray contacts the leaves; however, avoid excessive leaf contact. Apply after leaf drop on deciduous species.
**Karmex (DIURON)**

2.5-5 lb Karmex 80DF (2-4 lb act)

Preemergence herbicide. For plantings established at least one year. Consult label for complete list of approved species. The label includes caragana, cottonwood, green ash, honeysuckle, red cedar, Russian olive, Siberian elm, Douglas fir, Ponderosa pine and others. Fair control of several annual grasses such as barnyardgrass, foxtail, and sandbur; fair to good control of several annual broadleaves including mustard, pennycress, shepherdspurse, smartweed, and kochia. Does not control established perennials.

Fair to very good tolerance. Do not use on sand, loamy sand, gravelly soil, or on exposed subsoil. Use lower rate on questionable soils. Do not treat trees in low areas.

Apply 2.5 to 5 lb/A Karmex 80DF on a broadcast basis in the area treated. The high rate has provided the most consistent results in SDSU tests. Control usually persists into late season.

Labeled for early spring application before weeds emerge and before new leaves develop. Do not allow spray to contact tree leaves. Late fall applications have given very good results and are suggested for most situations. Emerged weeds are not controlled. Rainfall required. Remove excessive trash before application. Agitation required. Apply in minimum of 25 gpa water.

**Casoron (DICHLLOBENIL)**

8-12 lb Casoron 50W or 100-200 lb Casoron or Norosac or Dyclomec 4G (4-8 lb act)

Preemergence herbicide. For labeled species in established shelterbelts or on new plantings established at least 4 weeks. The label includes ash, barberry, boxelder, caragana, cottonwood, dogwood, hackberry, honeysuckle, lilac, maple, popular, Russian olive, and willow. Consult label for complete list of approved species.

Fair control of some annual grasses including foxtail and crabgrass and several annual broadleaves including lambquartes, peppergrass, pigweed, shepherdspurse, smartweed, Russian thistle, and wild mustard. The label for granules also includes artemisia, Canada thistle, curly dock, dandelion, leafy spurge, Russian knapweed, and quackgrass.

Tolerance appears acceptable. Avoid use on very fine, light, sandy soil.

Weed control has been somewhat variable, however some results have been very good. Granules have been more consistent. Some reports indicate satisfactory perennial control with granules. Provides shorter residual control of annuals than Karmex or Princep. Control is reduced considerably if applied when soil temperature is over 50 degrees F. Granular form used for most situations.

For annuals, apply 8 to 12 lb/A Casoron 50W or 100 to 150 lb/A of 4G to the surface on a broadcast basis for the area treated. To control annual weeds, apply in early spring before weed seeds germinate. Shallow incorporation or sprinkler irrigation is recommended when application is made during periods of high soil temperature (over 50 degrees F.). Minimum carrier is 50 gpa water for wettable powder.

For perennials, apply 150 to 200 lb of 4G to the surface on a broadcast basis for the area treated in late fall after a killing frost but before soil freezes. Early spring application less desirable. May be shallowly incorporated, especially if spring applied. Do not remove dead weed growth before surface application. Do not make surface application to areas which have been cultivated during the season prior to application. Do not apply more than 150 lb/A granules to plantings less than one year old. The higher granular rate is suggested for deep-rooted perennials such as leafy spurge and Canada thistle.

**Treflan (TRIFLURALIN)**

1-2 pt Treflan 4L or 10-20 lb Treflan 5G (.5-1 lb act)

Preplant incorporated. For new plantings or established trees. Usually used before planting as it is difficult to incorporate satisfactorily in the row after trees are planted. Treflan liquid and granule formulations have a specialty product label for uses on certain trees, ornamentals, and shrubs. Labeling on products for field crops does not include these uses. The Treflan 10G used on field crops is twice as concentrated as the specialty Treflan 5G product for ornamentals.

Several species of trees and ornamentals have excellent tolerance. Labeled species include white ash, red cedar, cottonwood, honeysuckle, lilac, and several species of maple, pine, and spruce.

Treflan gives excellent control of many annual grasses including foxtail, barnyardgrass, sandbur, and annual bromes, and good control of some annual broadleaves including pigweed and lambquartes. Perennials are not controlled. Grass control usually persists into late season. Cultivation is required for broadleaved weeds during the first season.

Treflan must be incorporated into the top 2 to 3 inches of soil. Immediate incorporation is preferred, but incorporation must be delayed for 4 to 20 hours if the soil is dry and wind velocity is low. Incorporate with a tandem disk set to cut 4 to 6 inches deep, field cultivator, or power driven tiller. A second pass insures thorough mixing with the soil.

Apply 1 to 2 pt/A of Treflan or 10 to 20 lb/A of Treflan 5G. Higher rates are not labeled for preplant incorporated applications. Use minimum of 5 gpa carrier for the spray formulation.
Roundup (GLYPHOSATE) ($19.00-94.95)

1-5 qt Roundup 3L (.75-3.75 lb act)


Annual weeds controlled include downy brome, foxtail, kochia, lambsquarters, pigweed, ragweed, Russian thistle, and sandbur. Perennials controlled include field bindweed, curlydock, bluegrass, quackgrass, bromegrass, Canada thistle, and common milkweed.

Roundup is the most effective treatment to control broadleaved perennials before planting or to control these weeds in established plantings. Weed control of 60 to 90% has been reported in SDSU tests. Retreatment the following year is required for eradication. Roundup gives excellent control of annual grasses and very good to excellent control of perennial grasses. May also be used to control emerged annual broadleaf weeds during the season.

ANNUAL WEEDS. Apply 1 qt/A if weeds are under 6 inches or 1.5 qt/A for weeds over 6 inches tall. Treat when weeds are actively growing and before flowering.

PERENNIAL WEEDS. Rate varies according to weed species. Apply 2 to 3 qt/A for quackgrass and Canada thistle, 3 qt/A for milkweed, and 4 qt/A for field bindweed. Use 3 to 5 qt/A for other perennial weeds listed on the label. Weeds should be actively growing and not stressed for moisture. Apply at bud to early bloom stage for broadleaves or when grasses are from 6 inches to boot stage. Areas should not be tilled in the fall or spring before application. Do not till treated areas for 7 to 10 days after application. Fall application usually more effective than spring.

May be applied over the root area but do not allow spray to come in contact with tree leaves or green bark on young trees. Use a shield to protect trees. Use low pressure and coarse spray to reduce droplet drift. Spray only when calm. Vapor drift is not a problem. Apply in a minimum of 20 gpa water. Avoid spray runoff.

Use 2.66 tablespoons/gallon for small annual weeds or 5.25 tablespoons/gallon for perennials when treating small areas with hand sprayers. Spray to wet foliage.

2,4-D ($2.25-4.45)

1-2 qt 2,4-D 3.8L or 1.1-2.2 lb Lithate 90SP (1-2 lb act)

Postemergence. Selective, translocated herbicide that is effective only on broadleaved weeds. Useful to reduce stands of perennial weeds including field bindweed, Canada thistle, or leafy spurge.

2,4-D must be applied carefully under proper conditions to avoid injury to trees. Very small amounts of herbicide from vapor or droplet drift can seriously damage or kill deciduous trees. Conifers are somewhat less sensitive, especially when not actively growing.

Reduce droplet drift. The herbicide should not come in contact with leaves, twigs, or bark. Use low pressure, coarse spray droplets, and spray only when calm.

Reduce vapor drift. Use oil soluble amine (such as Dacamine or Emulsamine) or lithium salt (Lithate) or amine salt formulation. Apply when temperature is under 80 degrees F. Ester formulations are not recommended in trees.

Apply 1 to 2 lb/A acid equivalent when weeds are at early bud stage. Make a second application to control regrowth in late August or September. Use the high rate for leafy spurge, hoary cress, and Russian knapweed.

Poast (SETHOXIDIM) ($18.40-30.70)

1.5-2.5 pt Poast 1.5L (.33-.5 lb act)

Postemergence. Poast is a foliage applied translocated herbicide. It is labeled for over-the-top use on several species of seedling, new transplants, and established ornamental plants. Labeling also includes several trees and shrubs such as green ash, dogwood, fir, silver and red maple, Russian olive, common lilac and several species of pine, spruce, honeysuckle, and juniper. The label does not include all common shelterbelt species.

Provides very good control of most annual grasses. High rates suppress quackgrass. Does not control broadleaved weeds. There is no residual. May be applied over tree foliage.

The rate for Poast is 1.5 pt/A for annual grass up to 6 inches and 2.5 pt/A for grass up to 12 inches. Use the high rate for quackgrass. Add crop oil concentrate at 2 pt/A. Use a minimum of 20 to 40 gpa carrier.

For small areas, use 2.5 tablespoons Poast and 2.5 tablespoons crop oil per gallon of water. Spray until foliage is wet.
Fusilade 2000 (FLUAZIFOP-BUTYL)  

1-1.5 qt Fusilade 2000 1L (.25-.38 lb act)

Postemergence. Fusilade 2000 is a foliage applied translocated herbicide. It is labeled for over the top use on over 400 species of established ornamental plants and flowers and on several species of firs, pines, spruce, juniper, maple, also cotoneaster, honeysuckle, Russian olive, oak, weeping willow, and Korean lilac. Labeling also includes several less tolerant species that may show 20 to over 50% foliage burn from over-the-top application. Labeling also includes several species of nonbearing fruit trees. The label does not include all common shelterbelt species. Check the complete list on product label.

Provides good to very good control of most annual grasses. Repeat applications give fair to good control for quack grass. Does not control broadleaved weeds. There is no significant residual effect. Potential use is for controlling emerged grasses, including those in the tree row.

The rate for Fusilade 2000 is 1 to 1.5 qt/A for annual grasses, including foxtail, barnyardgrass, sandbur, wild oats and others. Grasses should be 2 to 8 inches. Use the high rate for quackgrass; apply when it reaches 6 to 10 inches. Add .5 pt non-ionic surfactant per 25 gallons of solution. Do not use crop oil concentrate on ornamentals or trees. Control is reduced if plants are under stress from drought or cold weather. Apply before grasses are tilled or headed. Direct the spray to reduce spray contact with the foliage. Good weed coverage is important. Use minimum of 5 gpa carrier.

For small areas, use 2.5 tablespoons of Fusilade 2000 and surfactant for 1,000 square feet.

OTHER SHELTERBELT HERBICIDES

Several other herbicides may have limited general usefulness in shelterbelts but may have use in special situations. Frequently, the approved species list fails to include many common trees and shrubs, or weed control is short term or limited to a few kinds of weeds.

Amitrole-T, Cytrol (AMITROLE)  

1-2 gal Amitrole-T or Cytrol 2L (2-4 lb act)

Postemergence. Amitrole is a non-selective, foliage applied, translocated herbicide with short soil residual. It may be used in non-cropland, including shelterbelts if the area is not grazed and if food or feed crops are not harvested from treated areas.

Amitrole will control several annual and perennial grasses and broadleaves. It is frequently used to control emerged annual weeds at the time a preemergence residual herbicide is being applied. It is also used to treat small patches of Canada thistle or quackgrass. Amitrole is less effective on leafy spurge. Retreatment is required.

Use .5 to 1 gal/A of Amitrole-T or Cytrol to control annuals. Apply when plants are actively growing. Apply when weeds are 3 to 4 inches tall. Use caution to prevent spray drift from contacting foliage or bark. Severe damage can result. Use 1 to 2 gal/A for perennials. Apply when weeds are at bud to early bloom stage. Use the high rate for leafy spurge and hoary cress. Good coverage is essential. Use minimum of 40 gpa carrier.

Cytrol + Princep (AMITROLE + SIMAZINE)  

.5 gal Cytrol 2L + 4 lb Princep 80W (1 + 3.25 lb act)

7 lb Amazine

Postemergence. May be used in established shelterbelts. Tank-mix Cytrol and Princep or use Amazine premix containing 45% simazine and 15% amitrole.

Amitrole controls emerged weeds and simazine provides residual. Apply in early spring when weeds are small. In later season, tall weeds should be mowed and the herbicide applied when new growth is small.

Species on the Amazine label include Chinese elm, white ash, and several species of pine and spruce. Lilac, honeysuckle, and cottonwood are not tolerant to simazine and should not be treated.
Cytrol + Princep Continued...

Refer to Princep section for information on tree tolerance and soil limitation factors. Cytrol is non-selective. Use a shield to protect trees, as contact with any part of the tree will cause injury.

Apply .5 gal/A Cytrol + 4 lb/A Princep 80W or 7 lb/A Amazine on a broadcast basis for the area treated. Use 80 to 100 gpa water.

Devinrol (PROPIONAMIDE) ($70.00)

8 lb Devrinol 50W or 40 lb Devinrol 10G (4 lb act)

Preemergence incorporated. For use on several species of established fruit and nut trees. Label does not include common shelterbelt species.

Provides good control of several annual grasses. Kochia and Russian thistle usually not controlled. Apply wettlable powder as a directed spray in late fall or early spring. Avoid spray contact with tree foliage. Incorporate spray or granules if rainfall is not received within 24 hours after application.

The rate is 8 lb/A Devrinol 50W or 40 lb/A Devinrol 10G on a broadcast basis in the area treated. List of approved species appears to limit its use in shelterbelts. Use minimum of 20 gpa carrier.

Gallery (ISOXABEN)

.66-1.33 lb Gallery 75DF (.5-1 lb act)

Preemergence herbicide. For labeled species in ornamentals, noncropland, nursery stock and non-bearing fruit, nuts, and vineyards.

Consult label for complete list of approved species. The label includes ash, birch, cedar, spruce, elm, fir, maple, oak, pine, willow and lilac. Non-bearing fruit such as apply, grape, pear, plum and walnut.

Limited test results at this time. Label lists several common annual broadleaves (mustard, pigweed, lambsquarter, chickweed, knotweed and velvetleaf) controlled at lower rates. Higher rate is for less susceptible broadleaves and annual grasses such as purselane, prostrate spurge, barnyardgrass, crabgrass, and foxtails.

Apply Gallery in late summer to early fall or in early spring prior to germination of target weeds. Areas to be treated should be free of established weeds or existing weeds should be controlled with postemergence herbicides. Gallery can be tankmixed with other herbicides labeled for use in noncropland areas. Use minimum of 10 gpa carrier.

Dual (METOLACHLOR) ($13.40-20.10)

2-3 pt Dual 8L (2-3 lb act)

Preemergence. For use on a limited number of newly planted or established ornamental species, including honeysuckle, lilac, dogwood, yew, and juniper. Labeling does not include common shelterbelt species.

Apply as a direct spray in early spring before weed emergence. Dual gives very good to excellent control of annual grasses for 8 to 12 weeks. Late season weeds are not controlled. Broadleaf control is limited. Rates are 2 to 3 pt/A Dual on a broadcast basis in the area treated. Dual may be mixed with 1.6 to 2 pt/A Princep to improve broadleaf control and to increase residual activity.

Present labeling appears to limit its use in shelterbelts. Use minimum of 10 gpa carrier.

Lasso (ALACHLOR) ($22.60)

4 qt Lasso 4L or 27 lb Lasso II 15G (4 lb act)

Preemergence. For use on a limited number of newly planted or established ornamental species including yew and juniper. Labeling does not include common shelterbelt species.

Apply in early spring before weed emergence. Liquid is applied as a directed spray. Not recommended for over the top application.

Lasso gives very good to excellent control of annual grasses for 8 to 12 weeks. Late season weeds are not controlled. Broadleaf control is limited. Rates are 4 qt/A Lasso or 27 lb/A Lasso II on a broadcast basis in the area treated. Use minimum 10 gpa carrier.

Present labeling appears to limit its use in shelterbelts. Restricted Use Pesticide.
Oust (SULFOMETHURON METHYL)

Oust 75DF

Preemergence. Label directions are for non-crop weed control. Several pine species are tolerant; the herbicide may be used on sites where these are present. Other common shelterbelt species are not listed. Some deciduous species are considered sensitive.

Injury has been observed with high rates in limited tests. Do not apply Oust over the tree foliage. Weed control is promising. Oust gives excellent full season control of most common annual grasses and annual broadleaves, including foxtail, kochia, and Russian thistle.

Experimental rates tested are .5 to 2 oz/A product on a broadcast basis. Rates suggested for non-crop areas range from 4 to 8 oz/A product. Apply in early spring. Has limited postemergence activity. May be mixed with Karmex to give residual control of additional weed species or with Roundup if weeds are emerged. Use minimum 15 gpa carrier.

Not recommended for use until additional data and labeling for rates and tolerant species are available.

Ronstar (OXADIAZON) ($101.00-202.00)

100-200 lb Ronstar 2G (2-4 lb act)

Preemergence. For use on several species of newly transplanted or established ornamental shrubs and trees. Approved species in established plantings include ash, honeysuckle, lilac, Russian olive, and spruce.

Limited tests indicate fair to good control of annual grasses including foxtail and barnyardgrass and control of some annual broadleaves such as pigweed, lambsquarters, and purslane.

Ronstar may be applied any time during the season; however, early spring before weed emergence is recommended. Provides control for 2 to 4 months. Rainfall or irrigation soon after application improves performance.

Rates are 100 to 200 lb/A Ronstar 2G on a broadcast basis in the area treated. The higher rate is suggested for most situations. Retreatment may be required for full season control. Do not apply when foliage is wet.

Surflan (ORYZALIN) ($37.75-75.50)

2.66-5.33 lb Surflan 75W or 2-4 qt Surflan 4L (2-4 lb act)

Preemergence. Labeled for application in several fruit, nut, and woody ornamental species. Many of the uses are for container grown plants only. Label does not include common shelterbelt species. Use only specialty product labeled for ornamentals. Labeling on product for field crops does not include these uses.

Gives very good to excellent annual grass control. Will not control emerged weeds. May also be tank-mixed with Princep or Karmex for improved broadleaf control. May be tank-mixed with Roundup to control emerged vegetation if trees are protected from the spray.

The rate is 2.66 to 5.33 lb/A Surflan 75W or 2 to 4 qt/A Surflan on a broadcast basis in the area treated. Use the high rate for most situations. Apply as a directed spray or over the top of the trees before weeds emerge. Combinations with Roundup must be applied as a directed spray. Use minimum 20 gpa carrier.

Princep + Surflan (SIMAZINE + ORYZALIN) ($44.85-89.65)

2.5-5 lb Princep 80W or 2.2-4.4 lb Princep Caliber 90DF or 2-4 qt Princep 4L + 2.33-5.33 lb Surflan 75W or 2-4 qt Surflan 4L (2-4 + 2-4 lb act)

Preemergence. Tank-mix. Primarily for Christmas tree plantings. Use on labeled species for each product plus several other fir and pine species.

Combination provides very good to excellent control of several annual grasses and broadleaved weeds including foxtail, lambsquarters, pigweed, sunflower and kochia. Will not control emerged weeds. Surflan improves grass control when compared to Princep alone.

Apply as a directed spray to the soil surface or over the top using 2.5 to 5 lb Princep 80W plus 2.66 to 5.33 lb Surflan 75W or equivalent amounts of other formulations. The higher rate of Surflan and lower rate of Princep provides best crop tolerance, especially in new plantings. Refer to application directions and precautions for each product used alone. Use minimum of 25 gpa carrier.
Velpar (HEXAZINONE) ($29.00-58.00)

1.1-2.2 lb Velpar 90SP or 2-4 qt Velpar 2L (1-2 lb act)

Preemergence or early postemergence. Label limited to use as a directed spray on Scotch or Austrian pine release sites. Deciduous species and other woody plants may be killed.


Table 1. Guide for Small Areas

Summary of several herbicides used in shelterbelts. Refer to the section for each herbicide or product labels for information on other rates.

<table>
<thead>
<tr>
<th>CHEMICAL TRADENAME, FORMULATIONS</th>
<th>RATE LB/A ACTIVE</th>
<th>PER ACRE</th>
<th>4-FOOT BAND ON 100 FEET OF ROW</th>
<th>1/</th>
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<tr>
<td>Princep Caliber 90DF</td>
<td>4</td>
<td>4.4 lb</td>
<td>3 Tbsp</td>
<td></td>
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<tr>
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<td>4</td>
<td>5 lb</td>
<td>3.3 Tbsp</td>
<td></td>
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<td>Princep 4G</td>
<td>4</td>
<td>100 lb</td>
<td>2 Cup</td>
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<td>4 qt</td>
<td>2.66 Tbsp</td>
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<td>Karmex 80DF</td>
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<td>5 lb</td>
<td>3 Tbsp</td>
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<td>Casoron 50W</td>
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<td>12 lb</td>
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<td>Casoron, Norosac 4G</td>
<td>6</td>
<td>150 lb</td>
<td>3.66 Cup</td>
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<td>20 lb</td>
<td>2/3 Cup</td>
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<td>2.5 pt</td>
<td>.75 Tbsp</td>
<td></td>
</tr>
<tr>
<td>Fusilade 1L</td>
<td>.38</td>
<td>1.5 qt</td>
<td>1 Tbsp</td>
<td></td>
</tr>
<tr>
<td>Cytrol; Amitrole-T, 2L</td>
<td>4</td>
<td>2 gal</td>
<td>5.33 Tbsp</td>
<td></td>
</tr>
<tr>
<td>Roundup, 3L</td>
<td>3</td>
<td>1 gal</td>
<td>2.66 Tbsp</td>
<td></td>
</tr>
<tr>
<td>2,4-D, 4L</td>
<td>2</td>
<td>2 qt</td>
<td>4 tsp</td>
<td></td>
</tr>
<tr>
<td>2,4-D Lithate 90SP</td>
<td>2</td>
<td>2.25 lb</td>
<td>1 Tbsp</td>
<td></td>
</tr>
</tbody>
</table>

1/ Approximate amount

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