

Herbaceous Weed Control Recommendations for Planted Loblolly Pine Sites

Revised 26 July 2016

David J. Moorhead – Silviculture Professor; University of Georgia Warnell School of Forestry and Natural Resources, Pat Minogue – Silviculture Assistant Professor; University of Florida School of Forest Resources and Conservation, and E. David Dickens – Forest Productivity Professor; University of Georgia Warnell School of Forestry and Natural Resources,

- ◆ Read the herbicide label prior to (1) the purchase (to verify that the herbicide is labeled for the intended use, including for (a) conifer use (preferably down to the pine species), (b) the phase and (c) the environment, (2) needed protective clothing, (3) the herbicide use (mixing, rate, dosage, timing, and other specifics), (4) the herbicide storage and (5) the herbicide container disposal.
- ◆ Herbicide labels are periodically updated and wording changes may cause the herbicide to be used in a different matter (direct spraying avoiding contact with pine foliage vs spraying over the top of pine seedlings).
- ◆ Herbaceous weed control (HWC) during the spring following planting loblolly pine seedlings can be critical to growth and survival on old-field, pasture, hayfield, and cut-over sites, particularly in droughty years.
- ◆ A four to six foot wide band is often as effective as a broadcast treatment.
- ◆ Wait at least one to two months after planting prior to over-the-top herbicide application to obtain best pine tolerance and growth response.

HERBICIDES FOR CONTROL OF BROADLEAF WEEDS AND GRASSES

*****all treatments applied over-the-top of pines unless noted otherwise*****

ARSENAL® AC (BASF; 53% imazapyr; 4 lb per gal)

- ◆ Very effective on perennial grasses, including difficult to control species like Bermudagrass and seedling Johnsongrass
- ◆ Weak on broadleaf weeds in the composite group (see Oust® XP®)
- ◆ Effective on established weeds
- ◆ Apply 4 – 6 fluid oz product per acre
- ◆ Do not add surfactant
- ◆ Optimum timing: Early post to post emergence of weeds (April to May)

- ◆ Grass and broadleaf weed control including, but not limited to: bahiagrass, barnyardgrass, bluegrass (annual, Kentucky), Bermudagrass, crabgrass, fescue, foxtail, Italian ryegrass, Johnsongrass, lovegrass, panicums, sandbur, wild oats, witchgrass, camphorweed, carpetweed, chickweed, clovers, cocklebur, dandelion, dogfennel, horseweed, goldenrod, knotweed, lambsquarters, milkweed, ragweed (common, giant), pepperweed, pigweed, plantain, pokeweed, purslane, pusley (Florida), shepard's purse, sowthistle, stinging nettle, annual spurge, sunflower, tansymustard, wild carrot, wild parsnip, wild turnip

OUST® XP® (DuPont prior to 1 January 2015, thereafter Bayer; 75 % sulfometuron methyl)

- ◆ Very effective on a broad spectrum of broadleaf weeds, including composites
- ◆ Weak on perennial grasses including Bermudagrass, some panicums, and broomsedge species (see Arsenal® AC)
- ◆ 1st Year plantings: apply 2-4 oz Oust product per acre
- ◆ Optimum timing: Pre-emergence to early post emergence (March-April)
- ◆ Do not use Oust when soil pH > 6.2
- ◆ Grass & broadleaf control including, but not limited to: chickweed, crabgrass, dogfennel, fescue, fireweed (willowweed), goldenrod, horseweed, Kentucky bluegrass, nutsedge (yellow), panicum (broadleaf), pokeweed, ragweed, shepherd's purse, white snakeroot, yellow sweetclover, annual bluegrass, barnyardgrass, foxtail barley, foxtail fescue, Italian ryegrass, jointed goatgrass, bromes (red, ripgut), reed canarygrass, signalgrass, yellow foxtail, mustard, pepperweed, pigweed, sunflower, vetch, wild carrot, wild oats

Oust® XP® (DuPont prior to 1 January 2015, thereafter Bayer; 75% sulfometuron methyl) + **Arsenal® AC** (BASF; 53% imazapyr, 4 lb ae/gal)

- ◆ Common tank mixture where both perennial grasses and broadleaf weeds are to be controlled
- ◆ Apply 2-3 oz Oust product + 4 oz Arsenal AC product per acre
- ◆ Do not add surfactant
- ◆ Optimum timing is early post-emergent (March – April)
- ◆ Do not use when soil pH is greater than 6.2
- ◆ See weeds controlled in Arsenal AC and Oust XP sections above.

OUST® XP® (DuPont prior to 1 January 2015, thereafter Bayer ; 75% sulfometuron methyl) + **VELPAR L®** (DuPont prior to 1 Jan 2015, Bayer; 25% hexazinone, 2 lb ai/gal) or **OUST® XP®** + **VELPAR® DF** (DuPont, 75% hexazinone)

- ◆ Broad spectrum weed control of broadleaf weeds and most grasses, weak on Bermudagrass, some panicums, and broomsedge
- ◆ Hexazinone may cause pine seedling mortality on sandy sites, ensure proper calibration and follow label directions regarding appropriate rates for various soil types
- ◆ Apply 2-4 oz Oust product + VELPAR L 2 - 3 pints (or Velpar DF 10 – 16 oz

- product) per acre depending on soil texture (see product label)
- ◆ Optimum timing: Pre to early post emergence of weeds (March - early May)
- ◆ Do not use Oust when soil pH > 6.2. Use low rate of Oust + Velpar L or Velpar DF on coarse textured (sand, loamy sand, and sandy loam) soils and where soils are low in organic matter (see label)
- ◆ Grass & broadleaf control including, but not limited to: chickweed, crabgrass, dogfennel, fescue, fireweed (willowweed), goldenrod, horseweed, Kentucky bluegrass, nutsedge (yellow), panicum (broadleaf), pokeweed, ragweed, shepherd's purse, white snakeroot, yellow sweetclover. annual bluegrass, barnyardgrass, foxtail barley, foxtail fescue, Italian ryegrass, jointed goatgrass, bromes (red, ripgut), reed canarygrass, signalgrass, yellow foxtail, mustard, pepperweed, pigweed, sunflower, vetch, wild carrot, wild oats, asters, brackenfern, fleabane

OUSTAR® (DuPont prior to 1 January 2015, thereafter Bayer; 11.8% sulfometuron methyl and 63.2% hexazinone)

- ◆ Similar to Oust XP + Velpar products as above, but in a packaged mixture
- ◆ The ratio of active ingredients is set; hexazinone rate tends to be too high on sandy sites
- ◆ 1st Year weed control application product rates per acre:
 - 10-12 oz Course textured soils (sand, loamy sand, sandy loam)
 - 12-16 oz Medium textured soils (loam, sandy clay loam, silt loam)
 - 16-19 oz Fine textured soils (clay loam, sandy clay, silty clay loam, silty clay)
- ◆ After 1st year weed control application product rates per acre:
 - 12-16 oz Course textured soils
 - 16-19 oz Medium textured soils
 - 18-24 oz Fine textured soils
- ◆ Do not use Oustar when soil pH > 6.2
- ◆ Optimum timing: Pre to early post emergence (March - early May)
- ◆ Grass & broadleaf control including, but not limited to: chickweed, crabgrass, dogfennel, fescue, fireweed (willowweed), goldenrod, horseweed, Kentucky bluegrass, nutsedge (yellow), panicum (broadleaf), pokeweed, ragweed, shepherd's purse, white snakeroot, yellow sweetclover

OUST® XP® + AATREX® 4L (Syngenta; 42.6% atrazine)

- ◆ Apply 2-4 oz Oust product + 4-8 pints Aatrex 4L product per acre (lower rate on coarse textured soils and higher rate on medium to fine textured soils)
- ◆ Pre to early post emergence weeds <1.5" tall over dormant pines in early spring
- ◆ For grass & broadleaf weed control including plants listed by Oust XP as well as: barnyardgrass*, giant foxtail*, green foxtail*, large (hairy) crabgrass*, wild oats, witchgrass*, yellow foxtail*, cocklebur*, groundcherry, jimsonweed, lambsquarters, annual morningglory, mustards, nightshade, pigweed, purslane, ragweed, sicklepod*, velvetleaf,* buttonweed* using Attrex 4L.
* indicates partial control using Attrex 4L

OUST® EXTRA (DuPont prior to 1 January 2015, thereafter Bayer; 56.25 % sulfometuron methyl + 15% metsulfuron methyl)

- ◆ Apply 2 2/3 to 3 oz Oust Extra product per acre
- ◆ Early post to post emergence
- ◆ Note Escort XP + Oust XP for plants controlled

ESCORT® XP® (DuPont prior to 1 January 2015, thereafter Bayer; 60% metsulfuron methyl)

- ◆ Apply 1/3 - 2 oz Escort XP product per acre
- ◆ Pre to early post emergence
- ◆ Blackberry control + broadleaf weeds & grasses: annual sowthistle, aster, bahiagrass, beebalm, bittercress, bitter sneezeweed, blackberry, blackeyed-susan, blue mustard, bull thistle, buttercup, chicory, cocklebur, common chickweed, common groundsel, common purslane, common yarrow, common sunflower, conical catchfly, corn cockle, crown vetch, curly dock, dandelion, dewberry, dogfennel, false chamomile, fiddleneck tarweed, field pennycress, garlic mustard, goldenrod, henbit, honeysuckle, multiflora rose and other wild roses, lambsquarters, lettuce (miners, wild), marestail/horseweed*, maximilian sunflower, mustard (transy-, treacle, wild), oxeye daisy, Pennsylvania smartweed, plantain, pigweed (redstem, smooth), plumless thistle, prostate knotweed, redstem filaree, sericea lespedeza, sheperd's purse, silky crazyweed (locoweed), false flax, sweet clover, tansey ragwort, teasel, wild carrot, wild garlic, woolly croton, wood sorrel, yankeeweed with the use of Escort XP.

* Certain biotypes of marestail/horseweed are less sensitive to Escort XP.

OUST® EXTRA + ARSENAL® AC

- ◆ Apply 2 oz Oust Extra + 4 oz Arsenal product per acre
- ◆ Early post to post emergence
- ◆ Refer to list of plants controlled for Escort XP, Oust XP and Arsenal

ESCORT XP + VELPAR L or VELPAR DF

- ◆ Apply ½ - 1.0 oz Escort XP product + Velpar L or Velpar DF product (see label for specific VELPAR rates) per acre
- ◆ Early post to post emergence
- ◆ Blackberry control + broadleaf weeds and grasses (refer to Escort XP and Velpar for lists of plants controlled)

ESCORT XP + ARSENAL AC

- ◆ Apply ½ to 1 oz Escort XP product + 4 oz Arsenal product per acre
- ◆ Early post to post emergence
- ◆ Refer to list of plants controlled for Escort XP and Arsenal

VELPAR DF (DuPont prior to 1 January 2015) **VEPLAR DF VU** (Bayer as of 1 January 2015; 75% hexazinone)

- ◆ May cause mortality where excessive rates are applied on sandy soils, ensure

- proper sprayer calibration to apply precise herbicide rate per acre, following label recommendations regarding specific herbicide rates for various soil types
- ◆ 1st Year weed control application product rates per acre (the same amounts can be applied in years 2, 3, and 4):
 - 1 1/3 lb Course textured soils (loamy sand, sandy loam)
 - 1 1/3 – 1 1/2 lb Medium textured soils (loam, sandy clay loam, silt, silt loam)
 - 1 1/2 - 1 4/5 lb Fine textured soils (sandy clay, silty clay loam, silty clay, clay, clay loam)
- ◆ Weed control application product rates per acre for established trees (≥ 4-yrs-old):
 - 1 1/3 – 1 2/3 lb Course textured soils
 - 1 2/3 – 2 1/3 lb Medium textured soils
 - 2 1/3 – 2 2/3 lb Fine textured soils
- ◆ Optimum timing: Pre to early post emergence (March – early May)
- ◆ Grass & broadleaf control including, but not limited to: Asters, barnyardgrass, annual bluegrass, brackenfern, bromegrass, fleabane, foxtail, horseweed, ragweed, ryegrass, blackberry (dewberry)

VELPAR L (DuPont prior to 1 January 2015) **VELPAR L VU** (Bayer as of 1 January 2015; 25% Hexazinone)

- ◆ May cause mortality where excessive rates are applied on sandy soils, ensure proper sprayer calibration to apply precise herbicide rate per acre, following label recommendations regarding specific herbicide rates for various soil types
- ◆ 1st Year weed control application product rates per acre (the same amounts can be applied in years 2, 3, and 4):
 - 21 to 32 oz Course textured soils (loamy sand, sandy loam)
 - 24 to 40 oz Medium textured soils (loam, sandy clay loam, silt, silt loam)
 - 28 to 48 oz Fine textured soils (clay, clay loam, sandy clay, silty clay loam, silty clay)
- ◆ After 4th year weed control application product rates per acre:
 - 21 to 40 oz Course textured soils
 - 28 to 56 oz Medium textured soils
 - 36 to 64 oz Fine textured soils
- ◆ Optimum timing: Pre to early post emergence (March - early May)
- ◆ Grass & broadleaf control including, but not limited to: Asters, barnyardgrass, annual bluegrass, brackenfern, bromegrass, fleabane, foxtail, horseweed, ragweed, ryegrass, blackberry (dewberry)

TRANSLINE (Dow AgroSciences; 40.9% clopyralid)

- ◆ Release treatments many be made any time during the growing season. Some needle/leaf curling may occur if applied during active tree growth
- ◆ Treatments may be made broadcast over trees of any age
- ◆ Broadcast applications can be applied using 11 to 21 fl. oz. per acre of Transline
- ◆ Controls clover, coffeeweed, cocklebur, kudzu, maretail/horseweed, morning glory, partridge pea, ragweed, sicklepod, vetch, wisteria

- ◆ Do not apply if weeds are in drought stress

Also consider:

- (1) The herbicide purchaser and applicator need to look closely at the herbicide label to make sure that the herbicide product used is: (a) labeled for the particular use site (e.g. “for use in forest sites”, “for use in conifer plantations”, etc.) (b) labeled for the pine crop species (or genus in some cases), and (c) labeled for the particular application (“herbaceous weed control in pine plantations”, “herbaceous release”, etc.). Herbicide products, even those with the same trade name (such as “Roundup”), may have different amounts of the active ingredient per gallon, so always follow the rates specified on the label of the particular container being used.
- (2) Remember rates are per acre treated. Here are two examples of calculating the herbicide needed for a banded herbicide application using 10 oz Oustar product per acre treated, assuming 12 feet between the rows: (a) spraying a 4 foot wide band, 10 oz Oustar will take care of 3 acres total land area. In effect, one acre is banded and two acres are untreated, so herbicide is applied to one-third of the area. A total of 400 oz (25 lbs) of Oustar would be needed for a 120 acre field where one-third the area is treated in bands. (b) When spraying a 6 foot wide band on rows 12 feet apart, 10 oz Oustar will take care of 2 acres total land area. One acre is banded and one acre is untreated, so herbicide is applied to half the area. A total of 600 oz (37.5 lbs) of Oustar would be needed for a 120 acre field where herbicide is applied to one-half the area in bands.
- (3) There are generics for some of the above listed herbicides and various product labels for the same active ingredient do vary. Read the product labels to make sure that your intended use is consistent with labeling.

Please read and follow all label recommendations. Inclusion of a product trade name or a company name in this publication does not constitute an endorsement of a product or a company, as other products manufactured by different companies might be equally suited for the intended herbicide use.

HERBICIDES FOR CONTROL OF ANNUAL & PERENNIAL GRASSES ONLY

- (1) All grass control herbicides listed below are postemergence, foliar active herbicides.
- (2) Best control for all grass species is obtained when grasses are in an early growth stage. For Texas panicum, apply when the grass is less than 4 inches tall. For Bermudagrass two applications are usually needed; the first when less than 6 inches tall and a second when re-growth is less than 4 inches. Multiple applications are also needed for Johnsongrass.
- (3) Herbicides in this group generally do not mix well with other herbicide products. However, it is very important to add surfactants (wetting agents) to improve plant uptake. See information below and product labels for details.
- (4) Herbicide spray solution (water) volumes are typically between 10 to 20 gallons per sprayed acre (GPA) with a range 5-40 GPA; read label for specifics.
- (5) Do not apply herbicides when pine seedlings and desirable grasses are under drought or other stress
- (6) Do not apply herbicides when rainfall is expected within one hour.

ENVOY® PLUS (Valent; 12.6% clethodim, 0.97 lb clethodim per gallon, contains petroleum

distillates)

- ◆ Apply 9 to 16 fluid oz per acre for annual grasses, 12 to 32 oz/acre for perennial grasses
- ◆ Add crop oil concentrate which contains at least 15% emulsifier at 1% volume/volume (1 qt per 25 gallons spray solution, but no less than 1 pint per acre) or non-ionic surfactant at 0.25% volume/volume (1 qt per 100 gallons)
- ◆ Apply in 10 to 40 gallons of water per acre
- ◆ Do not apply more than 64 oz/ac/ per season, make a minimum 14 day interval between applications, do not apply more than 32 oz/ac per application

FUSILADE® DX (Syngenta; 24.5% fluazifop-P-butyl, 2 lb per gallon fluazifop-P-butyl)

- ◆ Apply 16-24 fluid oz product per acre per application
- ◆ Use a lower dose for annual grasses, a higher dose for perennial grasses
- ◆ Add 1% crop oil concentrate (1 quart per 25 gal) or 0.25% nonionic surfactant (1 quart per 100 gal)
- ◆ Do not apply more than 72 fluid oz Fusilade DX per acre, per season
- ◆ **Avoid contact of spray with foliage and terminal bud by using directed sprays**

ARROW® 2EC (Makhteshim Agan of North America (MANA); 26.4% clethodim, 2.0 lbs clethodim per gallon, contains petroleum distillates)

- ◆ Apply 6 to 8 fluid oz product per acre for annual grasses and 8 to 16 oz/acre for perennial grasses
- ◆ Add a crop oil concentrate which contains at least 15% emulsifier at 1% volume/volume (1 qt per 25 gallons spray solution, but no less than 1 pint per acre) or non-ionic surfactant at 0.25% volume/volume (1 qt per 100 gallons)

WEED TOLERANCE TO SELECTED HERBICIDES

Herbicide	Weeds tolerant to the herbicide listed
ARSENAL	sicklepod, tropic croton, blackberry, most legumes
AATREX	Bermudagrass, lespedezia, Johnsongrass, broomsedge, blackberry
ARROW 2EC, ENVOY Plus	All broadleaf weeds
FUSILADE DX	All broadleaf weeds
OUST	bermudagrass, croton, Johnsongrass, trumpet creeper, broomsedge
VELPAR	bermudagrass, broomsedge, cocklebur, Johnsongrass, sicklepod, trumpet creeper, morningglory

GRASS WEED RESPONSE TO HERBICIDES

WEED	^a Fluazifop-P-butyl	^b Clethodim

Perennial Grasses		
bermudagrass	G - E	G - E
Bahiagrass	G	
Johnsongrass (rhizome)	E	E
tall fescue	F	
nutsedge	P	P
Annual Grasses		
broadleaf signalgrass	E	E
crowfootgrass	F	G
crabgrass	F	G
fall panicum	G	G
goosegrass	F - G	F - G
Johnsongrass (seedling)	G - E	E
sandbur	G	G - E
Texas panicum	G - E	G

E=Excellent (>90% control); G=Good (80-89% control); F=Fair(70-79% control); P=Poor(<70%). Citations: Guillebeau, P. (ed). 2005 & 2008. Georgia Pest Mgmt. Handbook. Special Bulletin 28. UGA Coop. Ext. Service. Athens, GA 30602. pp. 112, 156-57, 198-99. ^aFluazifop-P-butyl rating based on Fusilade DX trials, ^bClethodim ratings based on Select® and Arrow® trials.

Old-field non-scalped post-plant herbaceous weed control timing considerations for the Georgia Coastal Plain and Central to Northern Florida

Soil drainage class	Pre- to early post emergence herbicide	Early post to post emergence herbicide
Somewhat excessively to excessively well	March	March to early April
Moderately well to well	March to early April	mid-March to mid-April
Poorly to somewhat poorly	April to early May	mid-April to mid-May

* For scalped sites, herbicides applied from mid-April into mid- to late May have given good survival and growth results based on recent studies as long as seedlings are not under stress (especially drought stress).

Organization of GA (FL, AL, and SC in some cases) Coastal Plain Soil Series in Management Groups (Larry Morris "Forest soils and management decisions" workshop 2005)

Subsoil Type:		None (Sandy to loamy sand)	Loamy	Clayey	Spodic	
Drainage	Surface Depth (inches)				+ Arg	- Arg.
Very poorly		Rutledge	Torhunta Surrency	Bayboro		Murville Wesconnet
Poorly to Somewhat Poorly	0-10	Chipley Osier Scranton	Rains Lynchburg	Bladen Coxville Grady	Rigdon	Ridgeland
	10-20				Mascotte Sapelo	Leon Mandarin
	20-40		Pelham	Nanhunta		
	40-80		Albany Plummer	Kanapaha		Hurricane Pottsburg
Moderately Well to Well Drained	0-10	Resota Pactolus Ortega	Goldsboro	Faceville	Onslow	
	10-20		Tifton Dothan	Nankin Greenville	Seagate	Baymeade
	20-40		Lucy Fuquay Stilson			Echaw
	40-80		Bonifay			
Somewhat to Excess. Well	40-80	Lakeland Kershaw	Troup			Rimini Kureb

Citation: Moorhead, D.J., P. Minogue; and E.D. Dickens. 2016 (Revised). Herbaceous weed control for planted loblolly pine sites. www.bugwood.org and www.forestproductivity.net 9 p.

Athens, Georgia 30602-2152
 Phone: 706.542.6819 • fax: 706.542.5073
 An Equal Opportunity/Affirmative Action Institution