



Herbaceous Weed Control Recommendations for Planted Longleaf

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The key to successful longleaf pine stand establishment is site preparation prior to planting to control hardwoods, shrubs, established grass sod, vines, and other perennial plants using machinery, fire, and herbicides. Because longleaf pine is sensitive to plant competition, herbaceous weed control (HWC) after planting can improve survival and growth, in particular the emergence from the grass stage as tree height growth is initiated. Selective herbicides can be applied over the top of planted pines to control grasses and broadleaf weeds with good pine tolerance. It is best to apply HWC treatments early in the spring when the site greens up with newly emerged weeds. Options for later in the growing season are limited. It is best to plant longleaf pine seedlings before the end of January and wait to early April or later before spraying over longleaf seedlings to ensure new pine root growth. Dig up a few seedlings and check for new (white) feeder root growth from two to three or more lateral roots prior to spraying. Herbicides may be applied as a broadcast treatment over the field in cases where trees are not in rows, difficult to control grasses (e.g., bermudagrass) are present, or vines are abundant. But in most cases, a four- to six-foot-wide band centered on tree rows uses less herbicide and can be just as effective. This publication summarizes options for treatment prior to weed emergence or when weeds have just emerged (pre- and early post-emergence) and some options for established weeds later in the growing season (post-emergence).

I. PRE- AND EARLY POST-EMERGENCE SELECTIVE HERBICIDES APPLIED OVER THE TOP OF NEWLY PLANTED LONGLEAF SEEDLINGS TO CONTROL GRASSES AND BROADLEAF WEEDS

Application of selective herbicides over the top of pines requires careful control of the herbicide dose which is specified as the pounds of active ingredient (ai) or acid equivalent (ae) per acre or other unit of area sprayed. The amount of a **specific product** per area also provides the dose information, which is given for products in this publication. When using comparable labeled herbicides, such as one of the generic products, ensure that product is labeled for the intended use and follow that label directions. Applicators must determine the total amount spray per acre or other unit of area to apply the correct dose. If not familiar with this process, we recommend that you contact your county Extension office or licensed applicator.

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ARSENAL® Applicators Concentrate (AC), manufactured by BASF, contains 53% imazapyr salt and provides 4 lb acid equivalent imazapyr per gallon, the active ingredient.

- Longleaf seedlings are prone to damage or mortality with this herbicide if the selective dose is exceeded. Imazapyr, the active ingredient, is persistent and gives lasting control but repeated applications should be avoided without prior experience on similar sites.
- Arsenal® AC provides very effective control of perennial grasses, including difficult to control species such as bermudagrass, seedling Johnsongrass, and Panicum species.
- This herbicide provides weak control of broadleaf weeds in the composite group and legumes such as coffee-weed, sicklepod, and Lespedeza species. A common broad-spectrum tank mixture to improve broadleaf control in newly established longleaf plantings is 3 oz Arsenal AC plus 2 oz Oust® XP product per acre.
- The usual application rate for longleaf pine is 4 – 6 fluid oz Arsenal product per acre. Use the low rate on sandy sites.
- Arsenal is effective on established weeds. Application timing is from pre-emergence to post-emergence of weeds, from March to June, but April to May is best.
- Do not add surfactant. This will minimize herbicide uptake by pine foliage and improve selectivity without significantly reducing weed control.
- Arsenal provides grass and broadleaf weed control including, but not limited to bahiagrass, barnyardgrass, bluegrass (annual, Kentucky), bermudagrass, crabgrass, fescue, foxtail, Italian ryegrass, Johnsongrass, lovegrass, panicum (fall), sandbur, smooth brome, wild barley, 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), shepherd's purse, stinging nettle, sowthistle, annual spurge, sunflower, tansymustard, wild carrot, wild parsnip, and wild turnip.

OUST® XP, manufactured by Bayer, contains 75 % sulfometuron methyl by weight, the active ingredient.

- Oust® XP is very effective on a broad spectrum of broadleaf weeds, including composites.
- This herbicide is weak on perennial grasses, including bermudagrass, broomsedge, and some Panicum species. As noted above, a common broad-spectrum tank mixture is 3 oz Arsenal AC plus 2 oz Oust XP per acre.
- Apply 2 – 4 oz Oust XP per acre depending on soil texture and weed species (see label).
- Optimum application timing is an early pre-emergence spray (March-April), just as the site “greens up” in the spring. It will not control established weeds, those greater than ankle high.
- Do not use Oust XP when soil pH > 6.2 because of greater pine root absorption at higher soil pH.
- Oust provides grass and broadleaf control including, but not limited to chickweed, crabgrass, dogfennel, fescue, fireweed (willowweed), goldenrod, horseweed, Kentucky bluegrass, nutsedge (yellow), broadleaf Panicum, 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, and wild oats.

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A common tank mixture is **OUST® XP** (manufactured by Bayer, containing 75% sulfometuron methyl by weight) plus **Velpar® DF VU** (Bayer, 75% hexazinone by weight).

- Both sulfometuron methyl and hexazinone, the active ingredients of these herbicides, have persistence in the soil and hexazinone may cause pine seedling mortality on sandy sites or where soil organic matter is low. However, longleaf pine has good tolerance to hexazinone relative to other southern pines. Ensure proper calibration of the herbicide rate applied and follow label directions regarding appropriate rates for various soil textures.
- Do not use Oust XP when soil pH > 6.2 because of greater availability in soil at high pH which reduces pine tolerance.
- This herbicide combination provides broad spectrum weed control of broadleaf weeds and most grasses but is weak on bermudagrass and broomsedge.
- Apply the combination of Oust XP plus Velpar DF VU at the product rates per acre appropriate for various soil texture classes as shown below. (From FIFRA Section 2(ee) Recommendation for the states OK, TX, LA, AR, MS, AL, FL, GA, TN, VA, NC, and SC)

Table 1

Oust XP oz/Acre	Velpar DF VU oz/Acre	Soil texture classification
1.6 – 2.0	8 – 10	Coarse textured soils (loamy sand, sandy loam)
2.0 – 2.5	10 – 13	Medium texture soils (loam, silt loam, silt, clay loam, sandy clay loam)
2.5 – 3.0	13 – 16	Fine textured soils (silty clay loam, clay loam, sandy clay, silty clay, clay)

- Optimum application timing is pre- to early post-emergence of weeds (March - early May).
- This tank mixture provides grass and broadleaf control including, but not limited to chickweed, crabgrass, dogfennel, fescue, fireweed (willowweed), goldenrod, horseweed, Kentucky bluegrass, nutsedge (yellow), broadleaf Panicum, pokeweed, ragweed, shepherd’s purse, white snakeroot, yellow sweetclover, annual bluegrass, barnyardgrass, foxtail barley, foxtail fescue, Italian ryegrass, jointed goatgrass, bromes (red, rippgut), reed canarygrass, signalgrass, yellow foxtail, mustard, pepperweed, pigweed, sunflower, vetch, wild carrot, wild oats, asters, brackenfern, and fleabane.

OUSTAR®, manufactured by Bayer, contains 11.8% sulfometuron methyl and 63.2% hexazinone by weight.

- This herbicide is a packaged mix like the tank mix using Oust® XP plus Velpar® DF VU described above.
- The ratio of active ingredients is set; the hexazinone rate tends to be too high on sandy and low soil organic matter sites.
- For first year applications, use these labeled rates of product per acre for various textures:
 - 10 – 12 oz Course textured soils (loamy sand, sandy loam)
 - 12 – 16 oz Medium textured soils (loam, silt loam, silt, clay loam, sandy clay loam)
 - 16 – 19 oz Fine textured soils (silty clay loam, clay loam, sandy clay, silty clay, clay)
- Do not use Oustar® when soil pH > 6.2 because of greater sulfometuron methyl soil availability and potential pine damage.
- Optimum application timing is pre- to early-post emergence (March - early May).
- Oustar provides grass and broadleaf control including, but not limited to chickweed, crabgrass, dogfennel, fescue, fireweed (willowweed), goldenrod, horseweed, Kentucky bluegrass, nutsedge (yellow), broadleaf Panicum, pokeweed, ragweed, shepherd's purse, white snakeroot, yellow sweetclover, blackberry, and dewberry.

VELPAR® DF VU, manufactured by Bayer, contains 75% hexazinone by weight, the active ingredient.

- This herbicide may cause mortality where excessive rates are applied, especially on sandy or low-organic soils (see label), but as noted above, longleaf pine is relatively tolerant to hexazinone.
- For first year plantings, use these labeled rates of Velpar DF product per acre for various soil textures:
 - 1.3 lb Course textured soils (loamy sand, sandy loam)
 - 1.3 – 1.6 lb Medium textured soils (loam, silt loam, silt, clay loam, sandy clay loam)
 - 1.6 – 2.0 lb Fine textured soils (silty clay loam, clay loam, sandy clay, silty clay, clay)
- Optimum application timing is pre- to early post-emergence, typically in March and early May.
- Velpar DF provides grass and broadleaf control including, but not limited to Asters, barnyardgrass, annual bluegrass, brackenfern, bromegrass, fleabane, foxtail, horseweed, ragweed, ryegrass, blackberry, and dewberry.

HERBICIDES FOR CONTROL OF ANNUAL & PERENNIAL GRASSES ONLY

- All grass control herbicides listed below are postemergence, foliar active herbicides.
- 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 of new green growth and a second when re-growth is less than 4 inches. Multiple applications are also needed for Johnsongrass.
- 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.
- Herbicide spray solution (water) volumes are typically between 10 to 20 gallons per sprayed acre (GPA) up to 40 GPA; read label for specifics.
- Do not apply herbicides when pine seedlings and desirable grasses are under drought or other stress.
- Do not apply herbicides when rainfall is expected within one hour.

ENVOY® PLUS (Valent; active ingredient 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 nonionic 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; active ingredient 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, and 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. Do not apply overtop applications of Fusilade® DX.**

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ARROW® 2EC (Makhteshim Agan of North America (MANA); active ingredient 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 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 nonionic surfactant at 0.25% volume/volume (1 qt per 100 gallons).

SEGMENT® II (BASF; active ingredient 18.0% sethoxydim, 1.5 lb sethoxydim per gallon, contains petroleum distillates)

- Apply 1.5 pints per acre for annual and perennial grasses up to 6 inches tall.
- Apply in 20 gallons of water per acre.
- Use crop oil concentrate at 2.0 pints per acre or methylated seed oil at no less than 1.5 pints per acre.
- Apply during spring after 4 to 6 inches of new growth but prior to seedhead formation. Apply before conifer budbreak or conifer injury is possible.
- Repeat applications may be necessary. Poor grass control may occur if grass is stressed.

Table 2: WEED TOLERANCE TO SELECTED HERBICIDES

Herbicide	Weeds tolerant to the herbicide listed
ARSENAL	sicklepod, tropic croton, blackberry, most legumes
AATREX	Bermudagrass, lespedeza, Johnsongrass, broomsedge, blackberry
ARROW 2EC, ENVOY PLUS, SELECT II	All broadleaf weeds
ESPLANADE F	Bermudagrass, tropic croton, broomsedge, Johnsongrass, lespedeza, blackberry
FUSILADE DX	All broadleaf weeds
OUST XP	Bermudagrass, croton, Johnsongrass, trumpetcreeper, broomsedge
PENDULUM 2G	Bermudagrass, morningglory spp., croton, broomsedge, blackberry, most legumes
VELPAR L VU, VELPAR DF VU	Bermudagrass, broomsedge, cocklebur, Johnsongrass, sicklepod, trumpetcreeper, morningglory spp.

Table 3: GRASS WEED RESPONSE TO HERBICIDES

WEED	Post Emergence Chemical		
	FUSILADE	SEGMENT II	ENVOY
Perennial Grasses			
Bermudagrass	G - E	F - G	G - E
bahiagrass	G	F	
Johnsongrass (rhizome)	E	G	E
tall fescue	F	G	
nutsedge	P	P	P
Annual Grasses			
broadleaf signalgrass	E	E	E
crowfootgrass	F	G	G
crabgrass	F	G - E	G
fall panicum	G	G	G
foxtail		E	
goosegrass	F - G	F - G	F - G
Johnsongrass (seedling)	G - E	G - E	E
sandbur	G	G	G - E
Texas panicum	G - E	E	E
Italian ryegrass		E	

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. Fluazifop-P-butyl rating based on Fusilade DX trials, Clethodim ratings based on Select® and Arrow® trials, Sethoxydim (Segment II) ratings based on Poast trials.

II. POST-EMERGENCE SELECTIVE HERBICIDES APPLIED OVER THE TOP OR APPLIED AS A DIRECTED SPRAY IN ESTABLISHED PLANTED LONGLEAF SEEDLINGS TO CONTROL GRASSES AND BROADLEAF WEEDS

ARSENAL® Applicators Concentrate (AC), manufactured by BASF, contains 53% imazapyr salt and provides 4 lb acid equivalent imazapyr per gallon, the active ingredient.

- In established longleaf pine stands, Arsenal® AC may be applied as a broadcast spray at 4 – 6 oz per acre to control broadleaf weeds and grasses and may suppress hardwood competition.
- Do not add surfactant when spraying over of the top of longleaf pines in herbaceous weed control treatments.
- Arsenal AC may be applied to control labeled brush, tree, and herbaceous weeds as a low volume directed spray in longleaf stands of all ages by targeting the unwanted vegetation and avoiding direct application to longleaf pines (see first paragraph of “Conifer Release Treatment” on the label).
- Do not use Arsenal AC again if it was applied as a pre- and early post-emergence treatment earlier in the year. If so, consider Velpar® DF or Milestone® as an alternative treatment.

MILESTONE®, manufactured by Corteva, contains 40.6% aminopyralid salt and provides 2 lb acid equivalent aminopyralid per gallon, the active ingredient.

Recent FIFRA Section 24-C “Special Local Need Registrations” (SLNR) in AL, FL, GA, LA, MS, NC, TX, and VA for aminopyralid herbicide (Milestone®) provide new options for post-emergence applications in newly planted and young longleaf pine plantations. This selective herbicide may be applied over the top of longleaf pine seedlings to control broadleaves, blackberry, other vines, and provides some hardwood brush suppression. Effectiveness is best in spring or early summer, but it may be applied later in the growing season. A single annual application may be made starting two months after planting, with treatments typically made during the first or second growing seasons when seedlings are in the grass stage. Note that this herbicide may damage pines during growth flush of the apical leader as longleaf trees emerge from grass stage and this timing should be avoided. The SLNR labels for LA, MS, TX, and VA have a specific recommendation for a tank mix with imazapyr (Arsenal® AC) which will improve hardwood brush control.

- Apply as a broadcast spray, as a band over the top of longleaf pine rows, or as a directed spray. It is typically applied in the first or second year after planting when pines are in the grass stage but may be used during the third growing season. May cause some transient needle curling, twisting, or droop.
- Application as a directed spray avoiding longleaf foliage minimizes pine damage.
- Broadcast applications can be applied using up to 7 fl. oz. of Milestone per acre alone or in a tank mix with 5 fl. oz. Arsenal AC per acre (labeled as SLNR in LA, MS, TX, and VA).
- Applications should be made when target weeds are actively growing with healthy and abundant foliage.
- Controls blackberry, clover, coffeeweed, kudzu, marestail, horseweed, morning glory, partridge pea, pigweed species, ragweed, sicklepod, vetch, and wisteria.
- Do not add a surfactant.

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TRANSLINE[®], manufactured by Corteva, contains 40.9% clopyralid salt and provides 3 lb acid equivalent clopyralid per gallon, the active ingredient.

- Not labeled for use in the State of Florida.
- Transline[®] provides selective control of established broadleaves and is an option for late growing season applications.
- Broadcast applications can be made over longleaf pines at any age using 4 to 21 oz Transline per acre, depending on weed species (see label).
- Applications may be made at any time during the growing season, but some needle curling may occur if applied during active tree growth. Addition of surfactant may increase needle curling.
- Transline kills many legumes which may be desired in longleaf restoration activities. Weeds controlled include clover, coffeeweed, cocklebur, kudzu, marehail, horseweed, morning glory, partridge pea, ragweed, sicklepod, vetch, and wisteria.
- Transline will not control mustards, henbit, chickweed, lambsquarters, pigweed, and field bindweed.
- Do not apply if weeds are in drought stress.

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.

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