

Forestry Herbicides for Site Preparation of Pine Plantations

► There is limited information on site preparation herbicides for pine plantations in Alabama. This Extension publication will help forest landowners and forestry professionals gain a better perspective on forestry herbicides available for site preparation. We compiled a list of site preparation herbicides and included: rates to apply them, species of pine, target species, resistant species, time of year for application, soil activity, and when to replant pine seedlings.

It is important to control competing vegetation prior to planting pine seedlings. Competition control will improve seeding survival and growth, along with future wood quality of pine plantations. If no competition control measure is conducted prior to planting, pine seedlings will be competing for nutrients, water, and sunlight with grasses, hardwoods, natural pine seedlings, other broadleaf species, and invasive plants. This can reduce the future economic value of the pine plantation. Chemical site preparation is a competition control measure and involves the application of herbicides. Herbicides are an effective method to control competition prior to planting pine seedlings and have been found to be cost-effective in pine plantation management. Remember, *a pine is not just a pine*. Be sure to follow herbicide recommendations for the pine species you are planting. Herbicides are often used in conjunction with prescribed burning to reduce competition and woody debris during site preparation. When planting longleaf pine, oftentimes you can apply the lower application rate for the herbicides recommended for longleaf plantings because prescribed fire can be used after planting. Longleaf can tolerate prescribed fire at a young age, whereas loblolly, slash, and shortleaf cannot tolerate fire at a young age.

Most forestry herbicides are non-restricted and can be purchased at local farm stores. It is important to read the label of each herbicide prior to every use and to keep records of application date, method of application, herbicide, and rate. Herbicide labels provide a list of the personal protective equipment (PPE) required, active ingredient, rate of application, soil activity (effects replanting timeframe), target and resistant plant species, time of year for application, and if a surfactant is recommended. Herbicide labels are found on each herbicide container but can also be found online at



www.cdms.net. This website is very helpful to review herbicides prior to purchasing. After going to the website, click on the Label Database+ link, enter the herbicide trade name in the search bar, click on the herbicide, and select label.

It has been found that when the correct herbicide(s) are applied at the proper rate, pine seedlings will have increased survival and growth after planting. When utilizing a tank mix of herbicides, be sure the labels do not prohibit mixing and follow the most restrictive label. The label is the law. For a better understanding of forestry herbicides to use for site preparation of pine plantations, we have compiled a table of herbicides to make it easier to know which herbicide(s) to select and rates to apply them (Table 1).

Table 1. Site Preparation of Pine Plantations

Active Ingredient	Herbicide Trade Name(s)	Time of Year	Pine species	Rates	Surfactant	Soil Activity	Target Plants	Resistant Plants	Notes	Replanting Timeframe
Imazapyr	2 lb. Arsenal, Chopper Gen 2 4 lb. Arsenal AC, Polaris AC	Growing season once full leaf expansion of target species	Loblolly, Longleaf, Slash, Shortleaf	Loblolly, Longleaf, Shortleaf 2 lb. - 48 - 80 oz/ac 4 lb. - 24 - 40 oz/ac Slash 2 lb. 40 - 64 oz/ac 4 lb. 20 - 32 oz/ac	If not already included: Non-ionic surfactant 0.25% v/v OR Methylated Seed Oil - 1.5 to 2 pt/ac	High	Most hardwoods, annual and perennial grasses and forbs. Bermuda, fescue, crabgrass, dog fennel, pigweed, greenbriar, morning glory	Elms, woody legumes, wax myrtle, croton spp., rubus, buckeye, baccharis, pine, hickory	Rates may be excessive on well drained sites. On cutover sites, 48 oz or less may be sufficient. If treating old-fields sites with improved forages, 64 (32) oz/ac+ may be needed; expect a retreatment with glyphosate on resprouting improved forages.	Delay planting at least 60 days after imazapyr application. May need longer on sandy sites or when less than normal rainfall has occurred.
Glyphosate	Accord XRT I, Rodeo, Touchdown Total, Glyphosate 5.4, Touchdown Pro, Glyphosate 4 Plus	Growing season once full leaf expansion of target species	Loblolly, Longleaf, Slash, Shortleaf	4 lb. 1.5 - 8 qt/ac 3 lb. 2 - 10.6 qt/ac	If not already included, Non-ionic surfactant 0.25% v/v	None	Natural pine seedlings, most hardwoods (black locust, persimmon, sassafras, sumac, sweetgum, yellow-poplar), most annual and perennial grasses, and forbs	Red maple, oaks, ash, hickory, dogwood, rubus, greenbriar, Virginia creeper, trumpet vine	For good results, add to a tank mix for site-prep	Recommended to wait 3-7 days after application
Triclopyr	Element, Garlon 3A, Garlon 4,	During periods of active growth	Loblolly, Longleaf, Slash, Shortleaf	6.3 lb - 2.5 - 4 qt/ac 4 lb. 4 - 6 qt/ac 3 lb. up to 2 gal/ac	Non-ionic surfactant 0.25-0.5% v/v	Low	Most hardwoods, southern pine (natural pine), waxy species such as bay, gallberry, wax myrtle, and yaupon, forbs, dog fennel, pigweed, greenbriar, and morning glory, rubus	Grasses	Can be applied throughout the growing season, including late in the growing season. Wait 4-6 weeks after application for conducting a site-prep burn.	Wait at least 30 days to avoid conifer seedling injury

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Active Ingredient	Trade Name(s)	of Year			Surfactant				
Metsulfuron Methyl	Escort XP, MSM-60	Apply after weeds have emerged or after undesirable hardwoods have broken winter dormancy and have reached the point of full leaf expansion	Loblolly, Slash	up to 4 oz/ac	Non-ionic surfactant 0.25 v/v	Wide range of annual and perennial broadleaf weeds and woody plants, kudzu, multiflora rose	Grasses, yellow poplar, loblolly pine	Longleaf not listed on label but not prohibited. Label states "In the absence of prior experience, in order to avoid unacceptable injury, other species should be planted on a small scale to determine safety before large-scale plantings are made."	Planting season following herbicide application
Sulfometuron Methyl	Oust XP	Before herbaceous weeds emerge or shortly thereafter	Loblolly, Longleaf, Slash	2 to 8 oz/ac	Non-ionic surfactant 0.25 v/v	Annual grasses and forbs and certain perennial herbs	Bermuda, broomsedge, croton spp., trumpet vine, panicum's, natural pines, most hardwoods	Use a low rate on coarse-textured soils (i.e. loamy sands, sandy loams) and a higher rate on fine-textured soils (i.e. sandy clay loams and silty clay loams).	Planting season following herbicide application
Sulfometuron Methyl + Metsulfuron Methyl	Oust Extra	Before herbaceous weeds emerge or shortly thereafter	Loblolly, Longleaf, Slash	Longleaf and Slash 3-4 qt/ac Loblolly 3-5.5 qt/ac	Non-ionic surfactant 0.25 v/v	Undesirable woody plants, vines, and many broadleaf weeds and grasses	Loblolly	Can be tank mixed with glyphosate, imazapyr, and triclopyr for applications in late summer to broaden undesirable hardwood control	Planting season following herbicide application

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Herbicide		Time		Pine species		Rates		Soil		Resistant		Replanting	
Active Ingredient	Trade Name(s)	Time of Year	Time of Year	species	species	Rates	Rates	Surfactant	Activity	Target Plants	Plants	Notes	Timeframe
Imazapyr + Metsulfuron Methyl	Lineage Clearstand	Growing season once full leaf expansion of target species	Growing season once full leaf expansion of target species	Loblolly, Slash	Loblolly, Slash	up to 25 oz/ac but for target plants listed 8-16 oz/ac	up to 7 oz/ac	Non-ionic surfactant 0.25% v/v OR Methylated Seed Oil - 1.5 to 2 pt/ac	High	Ash, blackgum, cherry, hawthorn, honeysuckle, hophornbeam, persimmon, oaks, sassafras, sweetgum, and vaccinium species. Suppresses blackberry, dogwood, elms, myrtle dahoon, hickory, and red maple		Burn only after adequate rainfall to allow for proper movement of herbicide into the soil	Planting season following herbicide application
Aminopyralid	Milestone	Anytime during the growing season	Anytime during the growing season	Loblolly, Longleaf, Slash, Shortleaf	Loblolly, Longleaf, Slash, Shortleaf	up to 7 oz/ac	up to 7 oz/ac	Non-ionic surfactant 0.25-0.5% v/v	Moderate	Rubus, morning glory, horseweed, pigweed, sicklepod, ragweed, wilding pines, boxelder, cherry, cottonwood, elm, maple, poplar, oak, hackberry, Russian and Autumn olive, salt-cedar, thistle, natural pines (except longleaf)	Grasses	Good natural pine control. Use caution when treating areas adjacent to susceptible and desirable species to avoid root uptake and possible injury when using Milestone or other soil active herbicides	Planting season following herbicide application
Clopyralid	Translime	Anytime during the growing season	Anytime during the growing season	Loblolly, Longleaf, Slash, Shortleaf	Loblolly, Longleaf, Slash, Shortleaf	1/4 - 1 1/3 pt/ac	1/4 - 1 1/3 pt/ac	Non-ionic surfactant 0.25-0.5% v/v	Low	Certain broadleaf weeds including thistle, kudzu, sicklepod, morning glory, ragweed, coffeeweed, most legume species	Most established grasses, woody plants, mustards, henbit, chickweed, kochia, lamb-quarters, pigweed, Russian thistle and field bindweed.	Use caution when wanting to retain plants in the legume family (such as locust, redbud, mimosa and lupine) and box elder, persimmon or sassafras	Planting season following herbicide application

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Active Ingredient	Trade Name(s)									
Hexazinone	Veipar L, Veipar DF, Pronone Power Pellet	Early spring to early summer after bud break but before the foliage has hardened off	Loblolly, Longleaf, Slash, Shortleaf	Liquid - 4 - 10 qt/ac DF - 2 2/3 - 6 2/3 lb./ac Power Pellet - 1,700 - 5,800 pellets/ac	Not advised	High	Most hardwoods, rubus, crabgrass, fescue, lespedeza, horseweed, dog fennel, annual and perennial rye grass, black cherry, blackgum, dogwood, elm, hawthorn, hickory, oaks, red maple, sweetgum and sumac	Yellow-poplar, eastern redbcedar, sassafras, blackgum, hollies, American beautyberry, bermuda grass, white snakeroot, broomsedge, Johnson grass, sicklepod, trumpet vine, morning glory	Herbicide applied to the soil. Application rates are dependent on soil texture. Use the lower rates on coarse textured soils and soils low in organic matter. Requires 1/4 - 1/2 inch of rainfall to activate. Allow foliage to defoliate twice before conducting a site-prep burn or drum chopping.	Planting season following herbicide application
Dicamba	Vanquish	During periods of active growth	Loblolly, Longleaf, Slash, Shortleaf	1 qt/ac maximum	Non-ionic surfactant 0.25-0.5% v/v	Moderate	Undesirable conifers, annual and perennial broadleaf weeds, woody brush, multiflora rose (when dormant)			Planting season following herbicide application
Fosamine	Krenite S	Apply during the growing season; after full leaf out before fall coloration	Loblolly, Longleaf, Slash, Shortleaf	2 - 4 qt/ac when burning is allowed. 4-6 qt/ac with no burn	Non-ionic surfactant 0.25 v/v	Low	Postharvest control of natural pine and hardwood species for southern pine planting site preparation	Non-woody plants (usually) and waxy leaved species		Based on label recommendation of tank mixed product
Picloram	Tordon K, Trooper 22K (Restricted Use)	During periods of active growth	Loblolly, Longleaf, Shortleaf	2 qt/ac	Non-ionic surfactant 0.25-0.5% v/v	High	Annual and perennial broadleaf weeds, woody plants especially legumes and southern pine species (natural pines) and vines	Most grasses are resistant		Allow at least 6 months after treatment before planting pines

Adapted from: 2017 Quick Guide to Forestry Herbicides Used for Softwood and Hardwood Site Preparation and Release. NC State Extension



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