COMPARING HEXAZINONE FORMULATIONS FOR SITE PREPARATION. J.L. Yeiser, Stephen F. Austin State University, Nacogdoches, TX 75962 and A.W. Ezell, Mississippi State University, Mississippi State, MS39762.

ABSTRACT

Site preparation rates of Velpar L and the new Velpar DF alone and in combination with Garlon 4 were assessed for the brownout of grass, broadleaf and woody plant groups. In Texas, Velpar L+Accord and Krenite S+Arsenal AC were also tested. The Texas site was treated on June 1 and the Mississippi site on June 5. Both sites were evaluated on July 30, 1999, approximately eight weeks after treatment, for brownout. In Mississippi and Texas, brownout by the new Velpar DF was commonly as good or better than that by Velpar L for the grass, broadleaf and woody species tested. When tolerant species, such as American beautyberry were assessed in Texas, mixtures of hexazinone+Garlon 4 and hexazinone+Accord provided better brownout than hexazinone alone or Krenite S+Arsenal AC. Mangers should consider hexazinone tank mixtures as an option when site preparing with herbicides followed by burning.

INTRODUCTION

Numerous studies have documented the benefits of site preparation prior to planting (1,2,3,4) and consequently, the number of acres managers chemically prepare for planting increases annually (5). Products used during chemical site preparation include, but are not limited to, Arsenal AC, Accord, Garlon 4, Velpar L and Krenite S. DuPont has developed a new formulation of hexazinone and its potential contribution for grass, broadleaf and hardwood control during the preparation of pine sites is unknown. The objectives of this study were to compare the brownout and stem reduction resulting from site preparation applications of Velpar L and The new Velpar DF, a new extruded formulation of hexazinone, alone and in combination with Garlon 4 for the control of unwanted woody species occupying pine sites.

METHODS

A site in Texas and Mississippi were selected for testing. The Texas test site was in the Upper Coastal Plain near Diboll (Angelina County). The soil was a moderately well drained sandy loam with a top 6-in. pH of 4.5. This site supported a mixed pine hardwood stand prior to clearcutting in the fall of 1998. Yaupon (*Ilex vomitoria* Ait.), sweetgum (*Liquidambar styraciflua* L.) and mixed red oak (*Quercus falcata* Michx. and *Q. nigra* L.) were the dominant species occupying the site. Sweetgum and oak were very uniform in height and commonly 3-ft. tall. Yaupon was somewhat less uniform in height and varied from 1.5- to 4-ft. in height. Minor components of green ash (*Fraxinus pennsylvanica* Marsh.), hickory (*Carya tomentosa* (Poir.) Nutt), honeylocust (*Gleditsia triacanthos* L.) and fringetree (*Chionanthus virginicus* L.) were present in too few plots or occurred too infrequently to justify an individual species assessment. These species were also commonly 3-ft. tall when herbicides were applied. At treatment time, light grass (*Dichanthelium* spp) and light broadleaf (*Callicarpa americana* L.) communities were present, perhaps due to the heavy litter layer. Soil moisture was good. Plots were geo-referenced to facilitate plot assessment over time. Loblolly pine (*Pinus taeda* L.) seedlings will be planted in research plots this dormant season.

The Mississippi site was in the Upper Coastal Plain approximately 5 miles west of Ackerman, MS. The soil was a clay loam with a pH of 5.6. The site supported a mixed pine-hardwood stand prior to clearcutting in October 1998. The major undesired woody species occupying the site were sweetgum, mixed red oaks (*Quercus phellos* L., *Q. nigra* L., *Q. falcata* Michx. and *Q. pagoda* Raf.), and red maple (*Acer rubrum* L.). Lesser amounts of post oak (*Q. stellata* Wangenh.) and black cherry *Prunus serotina* Ehrh.) were scattered across plots. At the time of treatment, moderate grass (panicgrasses *Dichanthelium* spp, and sedges *Carex* spp) and broadleaf communities (ragweed (*Ambrosia artemisiifolia* L.), goldenrod (*Solidago odora* Ait.), dock (*Rumex* spp), dogfennel (*Eupatorium capillifolium* (Lam.) Small) and mares-tail (*Conyza canadensis* (L)) existed. Soil moisture was moderate.

A backpack aerial simulator was used to apply broadcast tank mixtures in Texas on June 1 and in Mississippi on June 5. The sprayer boom supported a single, KLC9 flood nozzle 12 ft. above the ground. Tank mixtures were applied with a single pass across treatment plots. Treatment plots were 100' X 30' with an internal measurement plot of 80' X 10'. The test treatments are listed in Table 1. All test treatments at both sties contained 2.5% Timberland 90 surfactant.

Vegetation cover was evaluated 8 weeks after treatment (WAT) on July 30 in Texas and in Mississippi. Vegetation was categorized as grass, broadleaf or hardwood and visually evaluated in each plot for percent brownout relative to untreated checks. These classes are consistent for species across plots. In Texas, overall assessment of brownout was also assigned for non-grass species in each plot regardless of composition. Estimates of brownout ranged from 0% to 100% such that 0% indicated no browning and 100% total browning. Since brownout may or may not indicate total vegetation control, total stem counts for each species and measurement plot were also tallied for determination of stem reduction 16 months following treatment. Only brownout data is available at this time.

Seven treatments in Texas and five treatments in Mississippi were established in each of three blocks according to a randomized complete block design. Texas data were adjusted for brownout in the untreated check plot prior to analysis and are not presented. Data were analyzed according to an analysis of variance and the GLM procedure of SAS (6). Means were separated using Duncan's New Multiple Range test. All tests were conducted at the p=0.05 level.

RESULTS

In Texas, grasses were browned similarly by all treatments. The broadleaf, American beautyberry, was browned neither by the current nor by the new hexazinone formulation. When Accord and Garlon 4 were tank partners with hexazinone, brownout of American beautyberry increased significantly. Krenite S+Arsenal AC provided similar brownout as did hexazinone mixtures of American beautyberry. Brownout of woody species by hexazinone+Garlon 4 was uniquely visible one WAT. Brownout continued to increase on these plots and, in addition to Velpar L+Accord, provided best brownout eight WAT. Overall best brownout of all woody and broadleaf species (non-grasses) was achieved with treatments containing hexazinone mixed with Garlon 4 or Accord. Brownout recorded for overall species was lower than that recorded for woody and broadleaf species. This is due to the inclusion of minor species in the overall assessment of brownout.

In Mississippi, similar brownout of grass, broadleaf and woody species was observed for new or current formulations of hexazinone. Best brownout of grass, broadleaf and woody species was achieved with hexazinone+Garlon 4 mixtures. The new Velpar DF alone provided similar broadleaf and Velpar L similar woody brownout as hexazinone+Garlon 4 combinations.

CONCLUSION

In conclusion, current and new formulations of hexazinone provided similar brownout of the grass, broadleaf and woody species tested in Mississippi and Texas. When tolerant species, such as American beautyberry were assessed in Texas, mixtures of hexazinone+Garlon 4 and hexazinone+Accord provided better brownout than hexazinone alone or Krenite S+Arsenal AC. Mangers should consider hexazinone tank mixtures as a spring option when site preparing with herbicides followed by burning. These results are preliminary. Counts of surviving stems will be assessed in the fall of 2000.

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Table 1. Mean brownout (%) of species groups eight weeks after treatment on June 1 in Texas and June 5 in Mississippi with site preparation rates of hexazinone formulations.

HERBICIDES[1]	RATE (Product per acre)	GRASS	BROADLEAF[2]	WOODY[3]	OVERALL[4]
Mississippi					
Velpar L+Garlon 4	8 qt.+2 qt.	93a	95a	83a	-
New Velpar DF+Garlon 4	5.3 lb.+2 qt.	95a	93a	87a	-
Velpar L	8 qt.	73c	83b	87a	-
New Velpar DF	5.3 lb.	82b	92a	72b	-
Check		3d	5c	0c	-
Texas					
Velpar L+Garlon 4	6 qt.+2 qt.	100a	69a	90a	78a
New Velpar DF+Garlon 4	4 lb.+2 qt.	100a	59a	90a	78a
Velpar L	6 qt.	100a	4b	76b	50b
Velpar DF	4 lb.	100a	0b	81ab	50b
Velpar L+Accord	6 qt.+2 qt.	100a	66a	79b	68a
Krenite S+Arsenal AC	4 qt.+16 oz.	100a	53a	42c	39b

[1] Treatment means within a column sharing the same letter are not significantly different (Duncan's New Multiple Range Test, p=0.05).

[2] In Texas, American beautyberry only. In Mississippi, ragweed, goldenrod, dock, dogfennel and mare's tail.

[3] The average of red oak, red maple and sweetgum in Mississippi and red oak, sweetgum and yaupon in Texas.

[4] No assessment made in Mississippi. In Texas, all non-grass species in the plots were included in the assessment.

FIRST-YEAR BROWNOUT OF VEGETATION USING TANK MIXTURES OF FOSAMINE, IMAZAPYR, GLYPHOSATE AND METSULFURON. L.R. Nelson and A.W. Ezell. Clemson University, Clemson, SC and Mississippi State University, Starkville.

ABSTRACT

Herbicide treatments were installed during the 1999 growing season at two locations to evaluate the performance of fosamine tank mixtures for forest site preparation. Study sites included a piedmont site near Abbeville, SC and an upper coastal plain site near Louisville, MS. Dominant hardwood species were sweetgum, water oak and winged elm in SC and sweetgum, red maple, red oak spp. and winged elm in MS. Herbicide treatments included fosamine @ 4 lb ai/ac + imazapyr (Chopper®) @ 6 oz ai/ac + surfactant (Dynamic®) @ .25 % v/v, fosimine @ 4 lb ai/ac + imazapyr (Chopper) @ 6 oz ai/ac + metsulfuron @ .9 oz ai/ac + surfactant (Dynamic) @ .25 % v/v, fosamine @ 4 lb ai/ac + imazapyr (Chopper) @ 6 oz ai/ac + glyphosate (Accord®) @ 1.5 lb ai/ac + MON 59120 @ .25 % v/v and fosamine @ 4 lb ai/ac + imazapyr (Arsenal Applicators Concentrate®) @ 6 oz ai/ac + surfactant (dynamic) @ .25 % v/v. Treatments were applied with a CO_2 backpack-pole sprayer in mid-August. A randomized complete block experimental design was used at both locations. Plots were 100 ft x 25 ft with 3 replicates. Evaluations were conducted 8 WAT. Measurements included ocular estimates of percent foliar brownout of hardwoods and understory grasses and forbs. Foliar brownout of hardwoods was measured on a per species basis in SC.

All treatments provided effective brownout of grasses. Fosimine + imazaypr (Chopper) + Glyphosate + surfactant resulted in 95 % brownout at both locations. Brownout with the other treatments ranged from 63 to 88 %. All treatments were significantly different than the check plots which were rated at 5 and 0 % in MS and SC, respectively.

Herbicide treatments did not differ statistically with respect to percent brownout of broadleaf forbs. Percent brownout ranged from 83 to 100 %. All treatments differed from check plots which were rated at 7 and 0 % in MS and SC, respectively.

Herbicide treatments did not differ statistically with respect to overall percent brownout of hardwood species. Foliar brownout ranged from 70 to 95 %. All treatments differed from the check plots which were rated at 0 % at both locations. Herbicide treatments were particularly effective on sweetgum in SC. Brownout ranged from 95 to 100 %. Low levels of brownout occurred on water oak with a range of 23 to 42 %. Two treatments were effective on winged elm. Applications of Fosamine + imazapyr (Chopper) + metsulfuron and Fosamine + imazapyr (Chopper) + glyphosate resulted in 100 and 95 % brownout, respectively. Remaining treatments provided less than 50 % brownout.