CHOPPER GEN2 + GLYPHOSATE EFFICACY FOR HEIGHT CLASSES OF HARDWOOD SPROUTS RECOLONIZING SIX CLEARCUT PINE SITES

Jimmie Yeiser and Andrew Ezell[1]

The purpose of this study was to assess sprout size as a determinant of subsequent control by a standard, single rate of imazapyr + glyphosate applied during site preparation. All study sites were in the hilly upper coastal plain of Mississippi (Winston or Oktibbeha Counties) or Louisiana (Sabine or Winn Parishes) and supported loblolly pine (*Pinus taeda* L.) plantations prior to installation of this project. In total, six sites, three in Mississippi and three in Louisiana, were tested. In Mississippi in 2007, two sites were tested, one with a harvest date before August 1 and one with a harvest date after August 1. In 2008, one test site was selected with indifference to harvesting date. The same design was followed in Louisiana. The Mississippi pre-August 1 site was lost to operational overspray.

An untreated check and four herbicide treatments (five total treatments) were installed at each site. Herbicide was applied for site preparation at four defined stages in hardwood sprout development. Treatments were: (1) untreated check (no herbicide); and (2) 0-foot (was applied to bare ground prior to hardwood sprouting). Subsequent treatment timings were applied when hardwood sprouts reached the following height classes: (3) 0.5- to < 1-foot; (4) 1- to < 2-feet; and (5) 3- to 4-feet. Sites harvested prior to August 1 received all 5 treatments. Sites harvested after August 1 received only treatments 1, 2, and 3. Herbicide treatments were as follows: 40 ounces of Chopper GEN2 only on treatment 2 and 40 ounces of Chopper GEN2 plus 2 quarts Accord plus 1 percent NIS per acre on all other treatments.

Treatment plots were 30- by 100-feet; measurement plots were 10- by 80-feet and centered in treatment plots. Herbicides were applied with a backpack pole sprayer equipped with a KLC-9 flood nozzle in a total volume of 15 gallons per acre. Herbicides were mixed and sprayed immediately.

Sweetgum (*Liquidambar styraciflua* L.*)* and mixed oaks (*Quercus* spp.) were present at all test sites. Oak species varied by site but were commonly water (*Q. nigra* L.), willow (*Q. phellos* L.*)*, southern red (*Q. falcata* Michx.), white (*Q. alba* L.), and post (*Q. stellata* Wangenh.) oaks. Non-sweetgum and non-oak species were lumped into a category named 'other'.

Mississippi sites had three replications in a completely randomized design. In Louisiana, sites had four blocks in a completely randomized block design. Efficacy of treatments was evaluated based on the total cumulative linear height of all hardwood sprouts evaluated 0, 1, and 2 years after treatment. Year 2 results are presented here. Ratios were computed using the cumulative linear heights for the untreated check in the numerator and the treatment of interest in the denominator.

The cumulative linear height classes for sprouts are presented in table 1. Two years after treatment, the cumulative linear heights of sweetgum, oak, and other species were reduced by treatments. Values in table 1 may be visually separated into three groups: (1) the untreated check; (2) bare ground and sprout height class 0.5- to < 1-foot; and (3) sprout height classes 1- to < 2-feet and 3- to 4-feet.

Growth ratios show the ability of treatments to reduce and stunt sprout growth (table 1). Using other species as an example, cumulative linear sprout height ratios for untreated checks and

[1]Provost/Vice Chancellor for Academic Affairs, University of Arkansas at Monticello, Monticello, AR 71656; and Professor, Mississippi State University, Department of Forestry, Mississippi State, MS 39762.

Citation for proceedings: Holley, A. Gordon; Connor, Kristina F.; Haywood, James D., eds. 2015. Proceedings of the 17th biennial southern silvicultural research conference. e–Gen. Tech. Rep. SRS–203. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 551 p.

Table 1--Total cumulative heights and ratios for sprout classes receiving a single application of 40 ounces of Chopper GEN2 + 2 quarts Accord + 1 percent NIS per acre and totaled for 3 sites in Louisiana and 2 sites in Mississippi two growing seasons after treatment

Sprout height classes	------Cumulative heights--------			----------Ratios----------		
	Oak	Sweetgum	Other	Oak	Sweetgum	Other
	----------*feet*----------					
Untreated check	162.2	166.6	790.4			
0 (bare ground)	39.9	31.0	171.7	4.1	5.4	4.6
0.5 to < 1.0	31.9	41.8	132.2	5.1	4.0	6.0
1.0 to < 2.0	3.7	6.6	29.9	43.8	25.2	26.4
3 to 4	4.8	3.4	40.9	33.8	49.0	19.3

treatments with sprouts < 1.0-foot tall (treatments 1 and 2) averaged 5.2 (e.g. 790.4/152.0 = 5.2) (table 1). The same ratio between untreated checks and sprouts > 1.0-foot tall is 22.3 (e.g. 790.4/35.4 = 22.3). Values of 5.2 and 22.3 are in sharp contrast and illustrate the potential growth surge of unwanted woody sprouts < 1.0-foot tall not appropriately treated with this one rate of imazapyr + glyphosate. That is, for the same cost, by waiting until sprouts are > 1.0-foot tall, managers can significantly reduce hardwood competition beyond that achieved by spraying bare ground or sprouts < 1.0-foot tall.

Total hardwood linear height (feet) for all species and sites was 3,952; 859; 661; 150; and 205 feet for treatments 1 through 5, respectively. As these values show, an herbicide application to bare ground (treatment 2) was better than doing nothing (treatment 1); however, control of unwanted hardwoods increased as sprout height at application increased (treatments 3, 4, and 5). Results suggest there is substantial benefit to allowing hardwood competition to sprout prior to herbicide application. Allowing sprouts to exceed 1 foot in height appears to be the threshold necessary to optimize hardwood control, without increasing herbicide rate or cost.