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REFINING RATES AND TREATMENT SEQUENCES FOR COGONGRASS (*IMPERATA CYLINDRICA*) CONTROL WITH IMAZAPYR AND GLYPHOSATE. J.H. Miller, USDA Forest Service, Southern Research Station, Auburn University, AL 36830.

ABSTRACT

Cogongrass (*Imperata cylindrica* (L.) Palisot) is an aggressive invasive plant on all continents and has been spreading northward in the Southeast's Gulf Coastal Plain and into Florida for 80 years. It spreads by prolific windblown seeds and with movement of infested soils while infestations increase in size and become more dense by rhizome spread. Much research has been reported worldwide on cogongrass control, while especially crucial in our region has been that performed by the team led by Dr. Donn Shilling at the University of Florida. The research by Schilling's team has found that the most effective forestry herbicides for cogongrass control are Accord (glyphosate) and Arsenal (imazapyr); the most effective application times for both herbicides are in late summer; and that the total application volume is best at 5 gallons per acre (gpa) for Accord and 25 gpa for Arsenal. All research has shown that repeated applications are needed for eradication.

To further refine treatment effectiveness, the objectives of the current research were to (1) test a range of rates for Accord and Arsenal so as to define the dose-response curves, (2) refine late-summer timing by testing both September and October applications, and (3) in an adjunct study, test a mixture of Accord and Arsenal using three different spray volumes. The research was performed at two sites: infestations under a 50-year old longleaf pine (*Pinus palustris* Miller) plantation (old patch) and in a 2-year-old loblolly pine (*P. taeda* L.) plantation (new patch). The treatments were tested using three replications in blocks at each site. Plots were 12 x 24 feet, split to 6 x 24 feet for retreatments one year after the initial treatments. Applications used a CO₂ sprayer with two 9502E nozzles and 20 psi. Accord was tested at 0, 2, 4, 8, and 16 quarts per acre and Arsenal was tested 0, 8, 16, 32, and 64 ounces per acre. Accord was applied at 10 gpa and Arsenal was applied at 25 gpa total volume. The trial on the mixture of the two herbicides tested 10, 25, and 40 gpa of spray volume. To assess control, I performed ocular estimates of volume reduction relative to non-treated check plots at 1 and 2 years after treatment (YAT) and then at 1 and 2 years after retreatment (YART). ANOVA's were calculated along with contrasts, and percents were transformed using arcsine square root.

This research found that Arsenal was significantly more effective than Accord at the rates tested for 1 YAT and 1 YART. The differences were non-significant for most second year responses. September applications were significantly more

effective than October treatments and retreatments, especially with Accord. Control 1 YAT and 1 YART increased with increasing rates with both herbicides, especially at lower rates, and then became more level with less increase between the higher rates (diminishing returns). Maximum rates of Arsenal and Accord resulted in greater than 90 percent and 74 percent control, respectively, 1 YAT and 1 YART. Recovery between 1 and 2 YAT on the old patch was 10 to 40 percent loss in control and on the new patch it was 20 to 80 percent loss in control. Excavation of areas within plots found that regrowth originated from recovering plants on lower rates and from partially-controlled rhizomes on higher rate plots. Results from applying the mixture of Arsenal and Accord found that the volume of spray solution did not significantly influence control.

The best current recommendations for cogongrass control using registered forestry herbicides is Arsenal at 32 ounces per acre at 25 gpa volume, Accord at 4 quarts per acre at 5 to 10 gpa volume, or a mixture of Accord at 4 quarts + Arsenal 16 ounces per acre at 10 to 40 gpa volume. These applications are best in September. It is assumed that pines can be planted on treated sites and oversprayed with lower rates during establishment in an attempt to shorten the reclamation process, which is the approach being pursued in tropical countries with cogongrass.