Auburn University Southern Forest Nursery Management Cooperative

RESEARCH REPORT 13-04

ANNUAL SEDGE (*CYPERUS COMPRESSUS*) CONTROL IN LOBLOLLY PINE

By

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INTRODUCTION

Annual sedge (*Cyperus compressus* L.) is a troublesome weed in the nursery setting because it grows in thick clumps and often emerges later in the growing season. Sedges prefer poorly drained and wet soil, and consequently, the regular irrigation regime in bareroot nurseries provides adequate moisture for competitive annual sedge growth. Because it is an annual weed, its growth cycle and propagation characteristics allow for more opportunities to control and manage of this weed over yellow or purple nutsedge, two closely related perennial sedges. The Nursery Cooperative has been working for years to identify a selective herbicide to effectively control sedges. During the 2012 growing season herbicides including Goal® 2XL (22.3% oxyfluorfen), Cobra® (24% lactofen), Ronstar® Flo (34.1% oxadiazon), Pendulum® AquaCap (38.7% pendimethalin), and Certainty® (75% sulfosulfuron) were tested at different rates and application times, and in various tank mixes at the Quail Ridge Nursery in Aiken, SC nursery to 1) evaluate loblolly pine seedling tolerance to the selective herbicides and 2) to determine if annual sedge was controlled by the applications of selective herbicides.

METHODOLOGY

All treatments were compared to the operational treatment which consisted of a pre-emergent application of Goal® 2XL (32 oz/ac) followed by four post-emergent applications including two applications of Goal® 2XL (16 oz/ac) and two applications of Cobra® (13 oz/ac) during the growing season. A pre-emergent tank-mix with Ronstar® Flo (40 oz/ac), Pendulum® AquaCap (34 oz/ac), and Goal® 2XL (32 oz/ac) on April 27, 2012. The herbicide treatments were applied with a CO_2

hand sprayer calibrated at 22 gallons per acre. Each treatment plot was one seedling bed wide by 10 feet in length and replicated five times that had been sown on April 25, 2012. The experimental area were the seedlings in one treatment plot that consisted of 450 feet (10 ft plots X 9 treatments X 5 replications) of nursery bed space (Table 1).

At the end of the growing season, seedlings in each treatment plot were lifted from inside a 3 ft^2 frame placed in the center of each plot. At the Nursery Cooperative laboratory at Auburn University, seedlings were counted and designated as a cull or non-cull. Seedling density was calculated based on the total number of seedlings lifted from the frame. The root collar diameter, height, and root/shoot dry weights were measured on 25 non-cull seedlings.   Soil samples were collected from the first six inches of soil in each treatment plot and analyzed for organic matter, pH, and soil texture (sand, silt, and clay contents). Percent of annual sedge was evaluated for each treatment in June and September 2012.

RESULTS AND DISCUSSION
Soil samples collected within the treatment plots indicated the soil texture was a loamy sand with a pH of 5.4 and an organic matter content of 1.1%.   Annual sedge was present within the non-treated and operational plots as early as May 2012 with weed pressure continued in those plots throughout the growing season.   As far as weed control, a pre-emergent tank-mix with Ronstar[®] Flo (40 oz/ac), Pendulum[®] AquaCap (34 oz/ac), and Goal[®] 2XL (32 oz/ac) increased the number of plantable seedlings when compared to all other treatments (Figure 1). Additionally, the pre-emergent applications containing Ronstar[®] Flo controlled the annual sedge population throughout the growing season that plots were monitored. All pre-emergent applications of Ronstar[®] Flo contained between 2-7% annual sedge compared to the operational control containing 69% annual sedge near the end of the growing season in October 2012 (Figure 2). The presence of annual sedge in the control plots and the operational plots affected seedling numbers and quality as measure by culls per square foot (Figure 4).

Seedling height (Figure 3) and the number of plantable seedlings were negatively influenced by the post-emergent application of Certainty[®] in the treatment including a pre-emergent application of Ronstar[®] Flo (80 oz/ac) plus a post-emergent application of Certainty[®] (1.25 oz/ac). Although it cannot be proved from this trial that the post-emergent application of Certainty[®] effectively controlled annual sedge because of the pre-emergent application of Ronstar[®] Flo within the same treatment, it can be proved that Certainty[®] reduced plantable seedling density and stunted seedling height growth compared to the operational control. The treatment with the post-emergent application of Certainty[®] and the operational control both produced a high amount of cull seedlings compared to all other treatments with the pre-emergent application of Ronstar[®] Flo (Figure 4). The Nursery Cooperative will continue testing Ronstar[®] Flo across different soil types on loblolly pine seedbeds during the 2013 growing season to determine the best rate to control annual sedge and seedling tolerance to the herbicide as pre and post-emergence applications.

MANAGEMENT IMPLICATIONS

1. The application of Certainty® significantly stunted loblolly pine seedlings when applied as a post-emergent herbicide to control annual sedge. The Nursery Cooperative does not recommend using this product over loblolly pine.

2. Ronstar® Flo was effective at controlling annual sedge at all rates tested and will be expanded in other nurseries with other soil texture types in 2013 to monitor for loblolly pine tolerance.

Table 1. Treatment, rates and timing of herbicides used in annual sedge trial.

|	Treatment	Pre-emergence Herbicide	A.I./ acre (lb)	Product/ Acre (oz)	Post-emergence Herbicide	Product/ Acre (oz)
1	Control	-------	0	0	-------	0
2	Operational	Goal	0.5	32	Goal+Cobra+Goal+Cobra	16+13+16+13
3	GP+GC	Goal+PAC	0.5+2	32+64	Goal+Cobra+Goal+Cobra	16+13+16+13
4	R2+GC	Ronstar 2X	2	80	Goal+Cobra+Goal+Cobra	16+13+16+13
5	R2+R1	Ronstar 2X	2	80	Ronstar 1X	40
6	R2+R2	Ronstar 2X	2	80	Ronstar 2X	40
7	R2+Cert	Ronstar 2X	2	80	Certainty	1.25
8	R1+P1+G1	Ronstar 1X+PAC 1X+Goal 1X	1+1+0.5	40+34+32	-------	-------
9	R2+P2+G2	Ronstar 2X+PAC 2X+Goal 2X	2+2+1	80+64+64	-------	-------

Figure 1. Plantable seedlings by herbicide treatment at the Quail Ridge Nursery 2012.
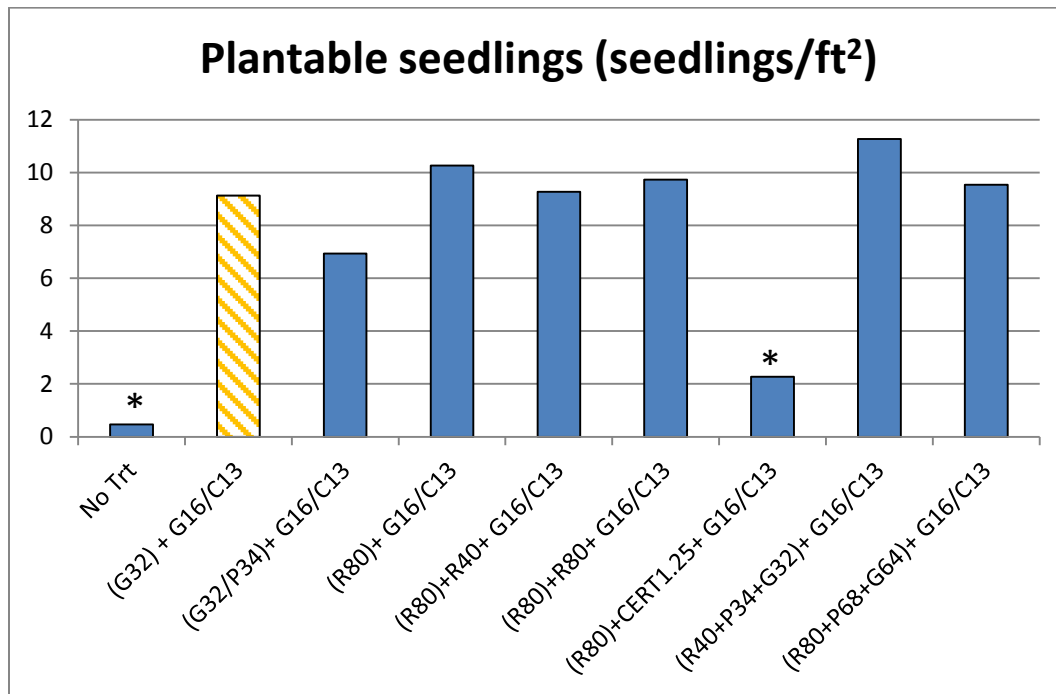
*Denotes significant differences between a treatment and the operational treatment; dashed bar.

(   ) Denotes a Pre-emergent application. G=Goal® 2XL, P=Pendulum® AquaCap, C=Cobra®, R=Ronstar® Flo, CERT=Certainty®, number denotes oz/ac, G16/C13 denotes four applications including two Goal® 2XL and two Cobra® post-emergent applications.
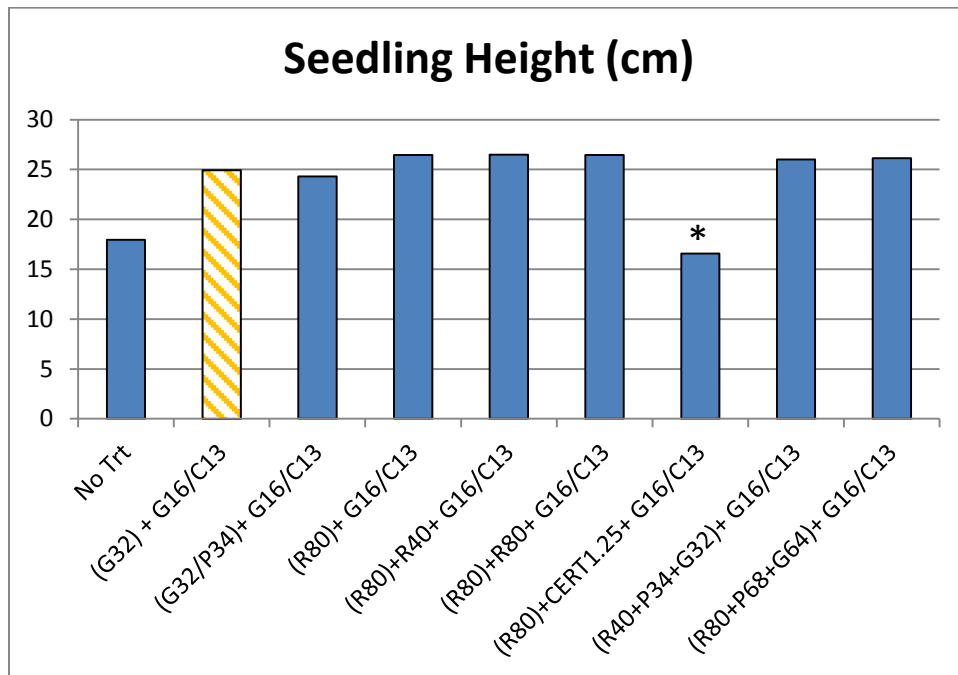
Figure 2. Presence of annual sedge by herbicide treatment at the Quail Ridge Nursery in 2012.
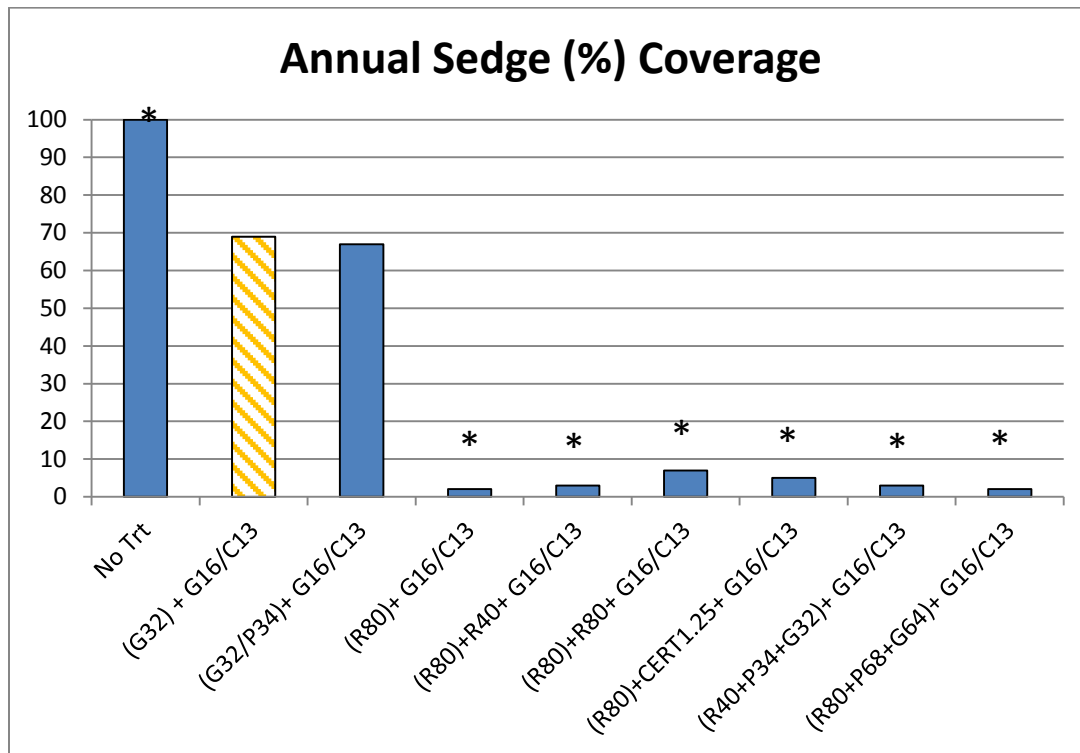
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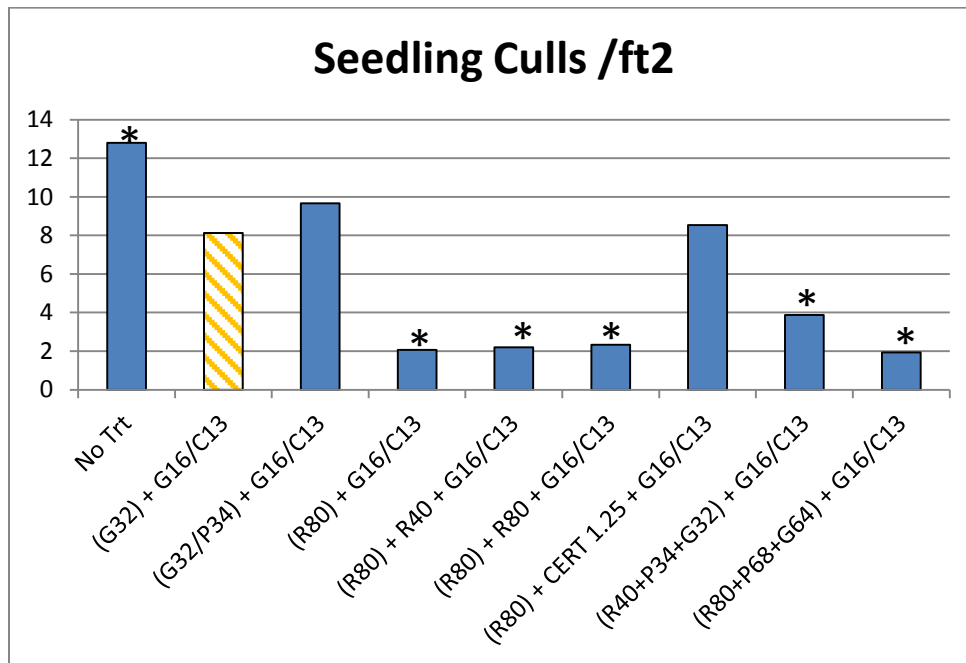
Figure 3. Seedling height by herbicide treatment at the Quail Ridge Nursery in 2012.

*Denotes significant differences between a treatment and the operational treatment; dashed bar.

( ) Denotes a Pre-emergent application. G=Goal® 2XL, P=Pendulum® AquaCap, C=Cobra®, R=Ronstar® Flo, CERT=Certainty®, number denotes oz/ac, G16/C13 denotes four applications including two Goal® 2XL and two Cobra® post-emergent applications.

Figure 4. Number of seedling culls by herbicide treatment at the Quail Ridge Nursery in 2012.

*Denotes significant differences between a treatment and the operational treatment; dashed bar.

( ) Denotes a Pre-emergent application. G=Goal® 2XL, P=Pendulum® AquaCap, C=Cobra®, R=Ronstar® Flo, CERT=Certainty®, number denotes oz/ac, G16/C13 denotes four applications including two Goal® 2XL and two Cobra® post-emergent applications.