

Converting Switchgrass Fields Into Soybean Production

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Introduction

Switchgrass (*Panicum virgatum*) is a warm-season perennial grass native to the Southeast. In recent years, switchgrass has been evaluated extensively in Tennessee as a potential biofuel crop. With the volatility of commodity prices and the lack of a market for switchgrass biomass, some producers have inquired about how best to convert mature stands of switchgrass back to row crop production.

In general, perennial grasses are controlled more easily with fall applications of herbicides that are applied late enough to be translocated to plant roots when the plants begin to store up carbohydrates for the winter. Attempts to control perennial grasses with herbicide applications in the spring often lead to less than desirable results.

Spring Switchgrass Management Study

In late spring 2011, a decision was made to convert a mature stand of switchgrass at the AgResearch and Education Center at Milan into soybeans (Figure 1). The switchgrass had not been harvested for biomass during the previous two years, resulting in dense surface residue; therefore, the plot area was burned off with fire on April 7, 2011 (Figure 2). The switchgrass rapidly regrew after the fire, and the stand was allowed to grow for approximately five weeks.

On May 12, 2011, four herbicide treatments and two tillage treatments (Table 1) were initiated into switchgrass regrowth that ranged in height from 18-36 inches tall.



Figure 1. Successful conversion of unwanted switchgrass stand to soybean crop at the Milan AgResearch Center, 2011.

Figure 2. Fire removed the heavy surface residue and allowed for easier switchgrass control.



**Table 1. Herbicide product, rate and tillage treatment
(Milan AgResearch and Education Center, 2011).**

Product Used	Herbicide Rate	Tillage Treatment
Roundup Powermax (glyphosate)	1 qt/A	No-till
Roundup Powermax (glyphosate)	1 qt/A	Disk fb TurboTill
Roundup Powermax (glyphosate)	2 qt/A	No-till
Roundup Powermax (glyphosate)	2 qt/A	Disk fb TurboTill
Roundup Powermax (glyphosate) + Select Max (clethodim)	1 qt/A + 12 oz/A	No-till
Roundup Powermax (glyphosate) + Select Max (clethodim)	1 qt/A + 12 oz/A	Disk fb TurboTill
Roundup Powermax (glyphosate) + Select Max (clethodim)	2 qt/A + 12 oz/A	No-till
Roundup Powermax (glyphosate) + Select Max (clethodim)	2 qt/A + 12 oz/A	Disk fb TurboTill

All herbicides were applied with a CO₂ backpack sprayer equipped with six nozzles. The sprayer was calibrated to apply 10 GPA at 40 psi. All herbicides were applied in strips with two replications. The plot size was 10 feet wide by 50 feet long. Two strips were tilled across each herbicide treatment to evaluate the effects of tillage in combination with herbicide activity. A portion of all plots was tilled three different times with a tandem disc on May 28, June 2 and June 6. The switchgrass did not disk well due to excessive biomass and heavy root masses from the switchgrass, so on June 6 a heavier tandem disc was used to till the strips a final time. The tilled portion of the plots was smoothed with a Turbo-Till on June 7, 2011, and soybeans were planted across both the tilled and no-tilled portions of the plots on June 10, 2011, with a John Deere 1560 no-till planter with 15-inch row spacing.

After the initial treatments were applied, the entire test was sprayed with 40 ounces of Sequence on June 30, 2011, and Select Max at 12oz/a + 1%v/v crop oil concentrate was applied on August 8, 2011, to provide season-long weed control in the soybean crop.

Results

Herbicidal Control — Visual estimates of switchgrass control were made at eight, 15 and 28 days after application (DAA). At eight and 15 DAA, switchgrass control was not acceptable for

any of the four herbicide treatments (Figure 1). By 28 DAA, treatments with either 2 qt/A of Roundup PowerMax or 12 oz/A of Select Max provided greater than 70 percent control of switchgrass. Good control at 28 DAA was achieved with a combination of a high rate (2 qt/A) of Roundup PowerMax tank-mixed with 12 oz/A Select Max and may be the best option where herbicidal control is needed with a spring application.

Tillage — Visual evaluations of switchgrass control in tilled versus no-tilled areas indicated that disking 16 to 21 days after herbicide treatment improved switchgrass control to greater than 95 percent, regardless of herbicide treatment (data not shown). Figure 4 shows the control with tillage across herbicide strips.

Switchgrass Control 8-28 Days After Application

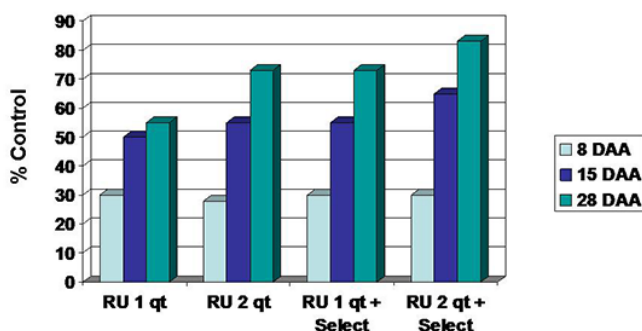


Figure 3. Visual estimate of switchgrass control obtained with RU (Roundup Powermax) and Select (Select Max) herbicides at Milan AgResearch and Education Center in 2011.



Figure 4. Note the switchgrass control for the two strips that were disked perpendicular to the herbicide application.

Conclusions

Glyphosate tank-mixed with clethodim will provide more thorough switchgrass control than glyphosate alone. Spring herbicide applications did not provide consistent switchgrass control and required a high rate of glyphosate plus Select Max in order to achieve 80 percent kill at four weeks (Figure 3) and as part of a

season-long program (Figure 5). It is believed that fall applications of these treatments would have controlled switchgrass more effectively, although fall treatments were not tested in this study. Spring tillage where appropriate in combination with herbicides provided the best control (Figure 4).

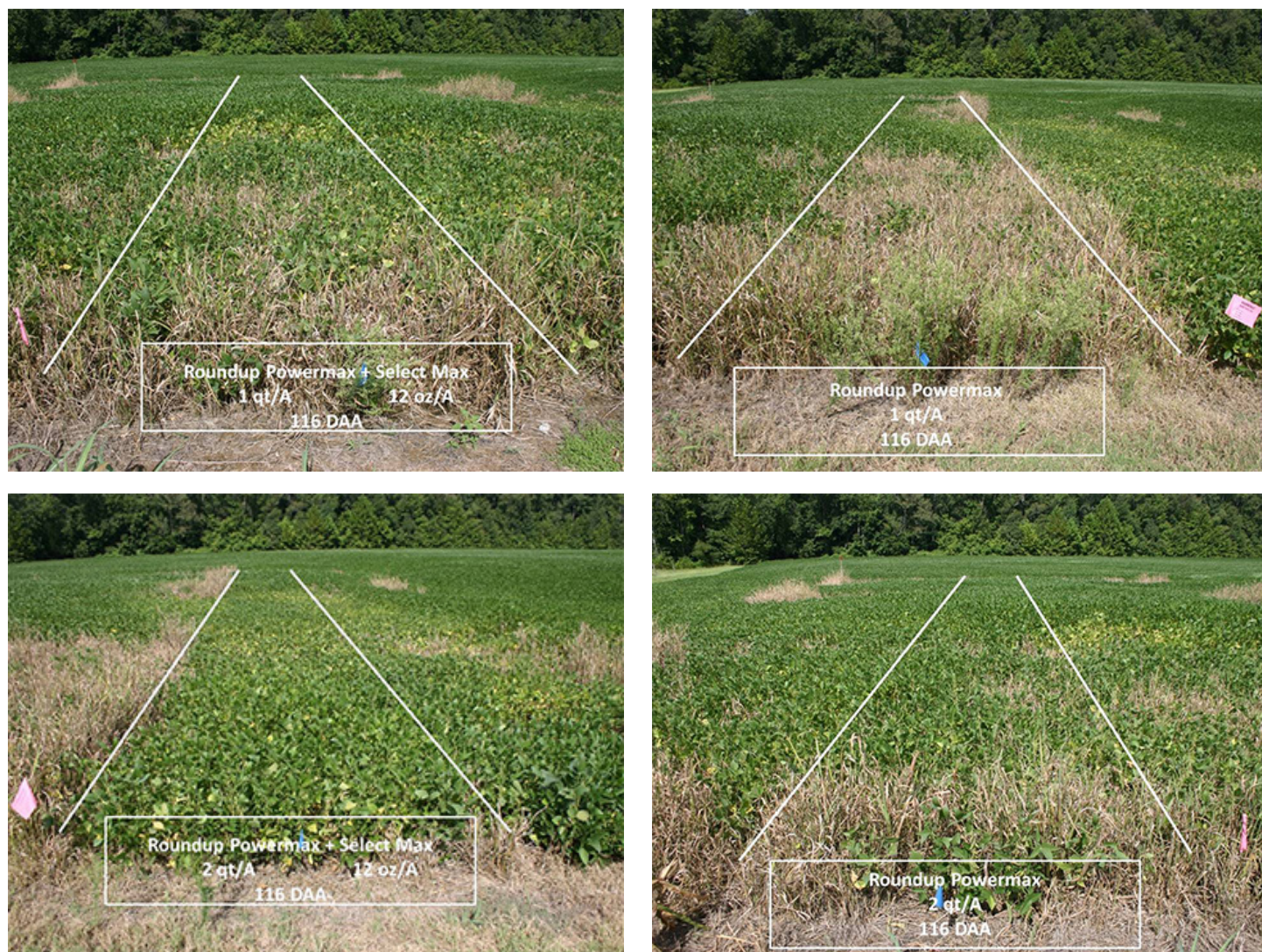


Figure 5. Visual control 116 days after initial switchgrass treatments were applied and then followed with 40 ounces of Sequence and 12 ounces of Select Max later in season.