Agricumbia Study

Two Year Fertilization Study of Two Bermudagrass Cultivars

Summary:

- Objective: to compare the response of Celebration® Bermudagrass and Tifway 419 to reduced nitrogen fertilizer rates in both a sod production and home owner maintenance regime.
- Two year study;
  - First year based on a Sod Production prospective
  - Second year based on Homeowner Maintenance

First Year Results:

- With or without Nitrogen top dressing, Celebration is a faster growing bermudagrass variety than Tifway 419. At 40 lbs of N/ac, Celebration filled in much faster than 419 (Cel=95% of coverage; 419=84% of coverage.)
- Quality Celebration sod can be produced with 40 units of Nitrogen per acre. Tifway 419 production required at least 80 units of N.
- Re-growth from scalping was much faster with Celebration. One week after scalping, Celebration (88% recovery) recovered much better than 419 (58% recovery) at 40lbs N/ac.
- Celebration Bermudagrass sod can be produced faster than Tifway 419. Increasing the N levels in Celebration plots did not result in a significant increase in maturity. Celebration can be lifted up one week earlier than 419 using the same amount of Nitrogen.

Background: Celebration bermudagrass is a selection of bermudagrass released by Sod Solutions, Inc. of South Carolina. The cultivar is being grown throughout the southern and western United States. Observations have shown it to have advantages over other bermudagrass cultivars. Among them are the intense blue-green color, wearability, drought tolerance, very rapid lateral growth, less mowing and a potential for lower nitrogen fertilizer requirement. These attributes appear to be standard for the cultivar grown both under a sod production management regime as well as for a home owner maintenance program. The implications of a lower nitrogen-requiring-turfgrass such as Celebration are many, but most important are the economics of production and the reduced possibility of off site movement and contamination of coastal waters with fertilizer. A cultivar which can be grown satisfactorily by both the sod producer and the homeowner with less fertilizer could well be perceived as "environmentally friendly" and more readily accepted for that reason.

YEAR 1 (2007)

In the case of the sod production fertilizer programs, a replicated trial will be established at the Agricumbia Resources Company research site south of Wharton, Texas. N fertility will be the main plots and cultivar will be the sub plots. Experimental design will be a randomized complete block containing 4 replications. Plots will include plantings of both Celebration and Tifway 419. Plot size will be 13' wide by 20' long. Within the plot, the two turfgrasses will be planted and allowed to establish in a 120 ft sq area. A 14" alley will be maintained between the two cultivars within the plot. A 3" alley will separate the replications. Sod used in this trial will be obtained from Turfgrass Producers of Texas (TPT) member sources, and if at all possible, sod should be certified material. Trial will require approximately 2 pallets of sod of each cultivar. Sod will be planted using a commercial sod cutter/planter. The turfgrasses will be established in the spring of 2007 and allowed to grow until filled in and deemed ready for harvest (lifting). After planting, the nitrogen fertilizer treatments will be initiated. Subsequent timings of nitrogen fertilizer applications will be according to local grower practices to maximize production, maintain quality and reduce the interval between sod lifting.

The first application will be initiated just after establishment and subsequent applications will be approximately every 25 to 35 days or as close to grower timings as possible. Mowing height will be maintained at between ¾ and 1". The normal grower's fertility program will be considered as the standard treatment. Other treatments will include nitrogen rates/A that are 1/8, ¼; ½; and ¾ of the grower standard treatment. (Table 1) P and K will be applied across all treatments according to soil test for that location. ARC will manage mowing, pest control and irrigation according to normal practices.

YEAR 2 (2008)

In the case of the homeowner maintenance fertility program, plots established in the spring of 2007 will be used in 2008. Rates and timings of N application will be those found in Table 2. Parameters evaluated (according to NTEP guidelines) of the plots are those listed in Table 3.

Chronology:

(Production)

April:	Plots Planted
May:	1st N Application
June:	2nd N Application
July:	3rd. N Application
August:	4th. Final Application

(Homeowner)

March:	Spring application
June:	Summer application
September	Fall application

March: Recommended rates of N treatments will be applied in the form of ammonium sulfate or other suitable nitrogen source material acceptable to sponsor. Treatments will be applied again during the summer and fall. Evaluations were made every two weeks or as determined by the Certified Research Operator.

Evaluations:

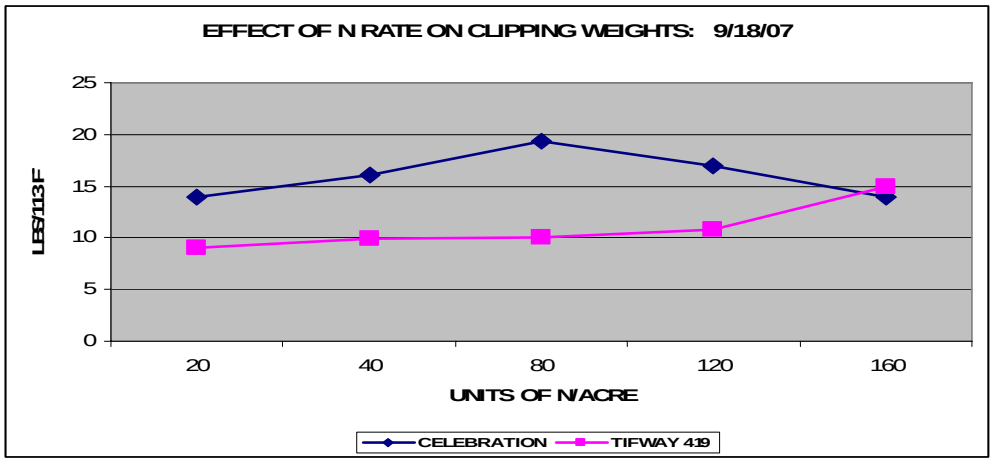
The following parameters will be collected from each plot during the experimental period:

- Turf color and quality, according to NTEP Guidelines, collected approximately 1 and 3 weeks after each N application
- % fill in of plots
- Monthly clipping yield (April - Sept), collected at 3 weeks after fertilizer application
- Interval from planting date to lifting date (days to harvest)
- Winter color retention and spring green up, each year in fall and spring, respectively - Also, percent winterkill ratings, if needed

2007 Results:

Clipping weights:

Results of the 2007 sod production regime study indicated that the Celebration variety seldom showed a positive response to fertilizer rates above 40 units per acre. An evaluation of leaf clippings (graph below) taken on September 18th actually showed a reduction of leaf mass taken off the plots when the rate of N was increased beyond the 80 unit per acre dosage. While previous clipping evaluations of Tifway 419 variety plots were essentially flat, the evaluation taken on September 18th indicated a nonsignificant straight line rate increase as the level of N fertilizer was increased.



Color:

Data indicates no strong color increase in the Celebration variety after the 40 unit N per area level is achieved. Plots treated with 20 units of N per acre did not display the same intense, bold blue green color as where higher levels of N were applied. Initially Tifway 419 treated plots did not show a color response to the various levels of nitrogen. However, after the third application of fertilizer had been applied, a positive rate response was observed. Although not statistically significant, the level of color from the 20 unit of N per acre was visibly less green and attractive.

% Fill in:

Even prior to the initial nitrogen fertilizer application, observations made on May 29th showed greater fill in growth from the Celebration variety as compared to the Tifway 419. Subsequent evaluation made on July 25th and August 15th showed that unit for unit of nitrogen applied, the Celebration plots were consistently more filled in than the equivalent Tifway 419 plots. (Table 1) The Celebration variety tended to show a decrease in % fill in when the Nitrogen levels are increased beyond 80 units per acre. This decrease was, however, not significant.
Plots of the Tifway 419 cultivar showed only a slight positive rate response as the N levels were increased.

Effects of Nitrogen Fertilizer on % Fill In (Diagram 1)

		% FILL IN				
		UNITS OF NITROGEN FERTILIZER PER ACRE				
DATE	**CULTIVAR**	**20**	**40**	**80**	**120**	**160**
7/25/2007						
	CELEBRATION	**94**	**95**	**93**	**91**	**92**
	TIFWAY 419	**88**	**89**	**84**	**89**	**86**
8/15/2007						
	CELEBRATION	**93**	**94**	**95**	**94**	**89**
	TIFWAY 419	**85**	**84**	**88**	**87**	**87**

Regrowth:

After the plots were mowed and the clipping weights evaluated on September 18th, the plots were again mowed (intentionally scalped) to a ½" height to measure the regrowth effects of the Nitrogen levels in the two bermudagrass varieties. In every case the Celebration plots filled in faster than the corresponding Tifway 419 plots. (Table 2) There was no significant Nitrogen induced rate response regardless of bermudagrass variety.

Effect of Nitrogen Dosage on % Regrowth after Scalping (Diagram 2)

	% REGROWTH 9/26/07				
	UNITS OF NITROGEN FERTILIZER PER ACRE				
CULTIVAR	**20**	**40**	**80**	**120**	**160**
CELEBRATION	**88**	**88**	**86**	**88**	**88**
TIFWAY 419	**55**	**54**	**56**	**60**	**66**

Weeks to Lift:

As a rule, all Celebration plots matured faster, and were chronologically closer to harvest than their corresponding Tifway 419 plots. An evaluation of crop maturity by a successful area sod producer with numerous years of harvest experience showed (table 3) that the effects of Nitrogen on Celebration over Tifway 419 to be 0.6 weeks; 0.6 weeks; 0.7 weeks; and 1 full week earlier in maturity than Tifway from the 20; 40; 80; and 120 units of N respectively. At 160 units N/A

there was no differences between the two cultivars. Tifway 419 plots tended to be slightly earlier where the higher levels of N were applied.

Effects of Nitrogen Dosage on Maturity (Weeks to Lift) – (Diagram 3)

	WEEKS TO LIFT (HARVEST) FROM 9/10/07 UNITS OF NITROGEN FERTILIZER PER ACRE				
CULTIVAR	20	40	80	120	160
CELEBRATION	2.9	2.9	2.8	2.5	2.8
TIFWAY 419	3.5	3.5	3.5	3.5	2.8

Conclusions:

1) With or without Nitrogen top dressing, Celebration is a faster growing bermudagrass variety than Tifway 419.

2) Quality Celebration sod can be produced with 40 units of Nitrogen per acre. There was no real advantage to the application of higher levels of N. Tifway 419 production did require at least 80 units of N.

3) Regrowth from a scalping, for whatever reason, was much faster with Celebration. Nitrogen levels did not appear to make a great difference.

4) Celebration Bermudagrass sod can be produced faster than Tifway 419. Increasing the N levels in Celebration plots did not result in a significant increase in maturity.

Table 1. Rates/A of N fertilizer for the Year 1 Production trials

Tmt No.	Total rate of N per Acre	% of Standard	Application Timing/1/4 of total applied
1	160 lb/A	Grower Standard.	Post lifting + every 25-35 days
2	120 lb/A	3/4 of Grower Standard	Post lifting + every 25 -35 days
3	80 lb/A	½ of Grower standard	Post lifting + every 25 -35 days
4	40 lb/A	¼ of Grower Standard	Post lifting + every 25-35 days
5	20 lb/A	1/8 of Grower Standard	Post lifting + every 25-35 days

Table 2. Rates/1000ft2 of N Fertilizer for the Year 2 Maintenance Plots.

Tmt No.	Rate of N/1000ft2	Application Timing
1	2.5	Green up+Summer+Fall
2	3.5	Green up+Summer+Fall
3	5.0	Green up+Summer+Fall
4	1.5	PROCESSED CHICKEN MANURE
5	3	PROCESSED CHICKEN MANURE