

Turfgrass Variety Trial Williamson County Center

Cooperators

Williamson County Commissioners Court

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Purpose:

The purpose of this trial was to evaluate nineteen different turfgrass varieties over a three year period for their use in home landscapes and commercial sites in Williamson County.



Picture 1. Site for nineteen turfgrass variety trial at Williamson County facility.

Materials and Methods:

A. Varieties:

St. Augustinegrass	Zoysiagrass	Hybrid bluegrasses	Bermudagrass	Buffalograss
AmeriShade	Empire	Reveille	Celebration	Density
DelMar	Palisade	100 series	GN-1	Nebraska 609
Floritam	Royal	300 series	TifSport	
Palmetto	Zeon			
	Zorro			
	Variety X			

SeaShore paspalum

SeaIsle 1

B. Establishment:

All but five of the turfgrass varieties were sodded on June 4, 2002. The remaining five turfgrass varieties (Reveille, 100 series, 300 series, Density and Palmetto) were sodded on August 22, 2002. All turfgrass varieties were established from sod. Prior to planting the sod, the test site was fertilized with 100 pounds of a 13-13-13 which equaled 1.0 lbs. of actual nitrogen per 1,000 sq.ft. After planting, the plots were then fertilized twice in 2002 using a 21-7-14 at 1.0 lb. of nitrogen per 1,000 sq.ft. and a 21-0-0 at 1.0 lb. of nitrogen per 1,000 sq.ft. Once the sod was planted, the plots were then mowed at a height of 1.5 inches for the remainder of the year. In the fall of 2002, all plots were treated with Chipco 26 GT for brown patch activity.

C. plot size: 8 x 23'

D. Reps: 3

E. Maintenance:

For 2003 through 2005, the turfgrass variety trial plots were mowed weekly at a height of approximately 1.5 inches. The plots were fertilized twice a year, once in the spring and once in the fall with 1.5 pounds of nitrogen per 1,000 sq.ft. Plots were treated on an as needed bases for any disease and insect activity.

F. Ratings:

Starting in 2003, plots were rated on a monthly basis for color, density and turfgrass quality. A 1 through 9 rating scale was used to rate the plots. For color, a rating of 1 equaled brown turfgrass, while 9 equaled dark green color. Note, each turfgrass variety was rated for acceptable color by species. For density, a 1 equaled 100% dirt (no grass), while 9 equaled 100% turfgrass coverage. For turfgrass quality, a 1 equaled the poorest overall quality, while 9 equaled the highest quality. Note, a rating below 6.0 is generally considered unacceptable.

Results and Discussion:

For this report, we have included the color and quality ratings for April, July and October for the years 2003, 2004 and 2005. These three different times of the year provide a snapshot of how well the 19 different turfgrass varieties performed during the spring, summer and fall times of the year.

A. 2003 color and quality ratings:

Tables 1, 2 and 3 contain the color ratings results for April, July and October of 2003. For April, the variety SeaIsle 1 had the highest color rating with a mean of 8.00. It was closely followed by Royal and Celebration with a mean color rating of 7.66. Floratam, Empire and Density had the least significant color rating for all 19 varieties for April with a mean of 6.00. In July, Zeon, Zorro, SeaIsle 1, AmeriShade, Royal and TifSport had the highest overall color rating with a mean rating of 8.00. In July, Floratam had the lowest average color rating with a mean color rating of 6.33. For October, there was no significant difference for color among the nineteen turfgrass varieties. However, Reveille, 300 series hybrid bluegrass, Palisades, TifSport, SeaIsle 1 and Delmar had the highest average color rating with a mean of 8.00, while Floratam and GN-1 had the lowest average color rating with a mean color rating of 7.00. For 2003, the turfgrass variety SeaIsle 1 was the only variety that had a mean color rating of 8.00 for all three months.

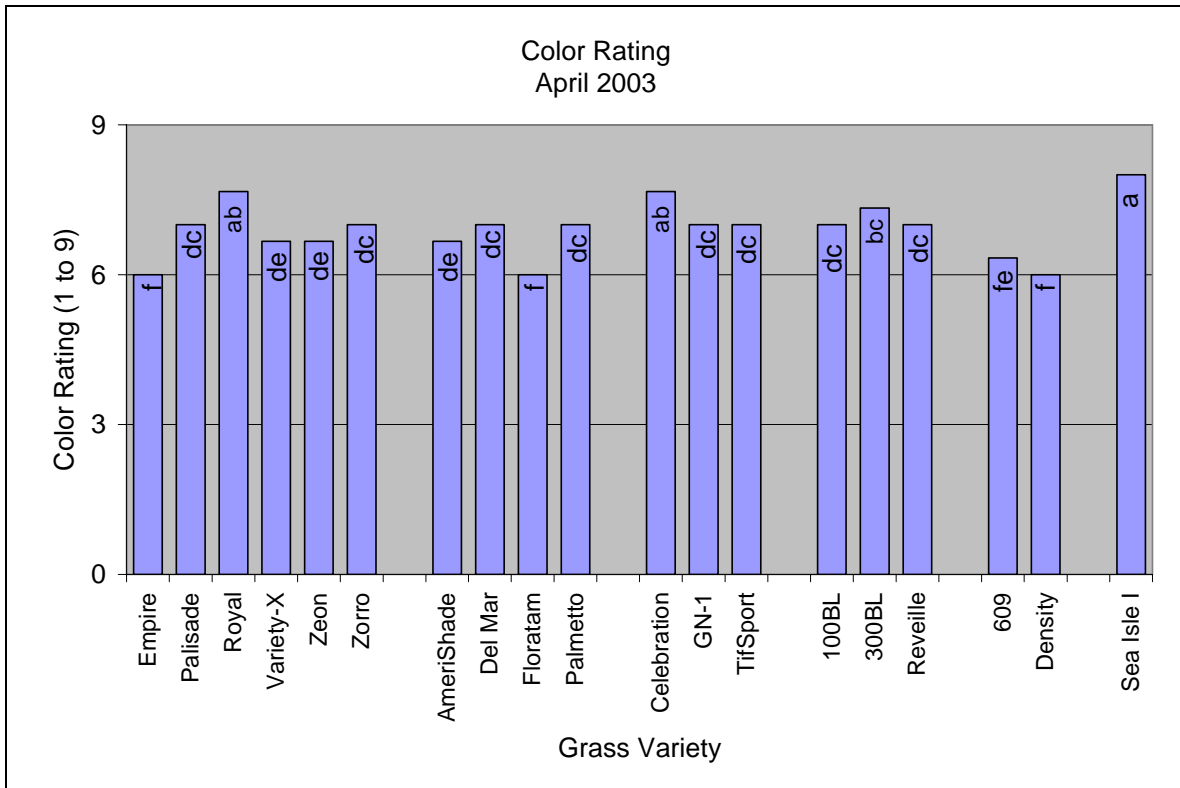


Table 1. April 2003 Color Ratings for Nineteen Turfgrasses. Any bars containing the same letters are not significantly different.

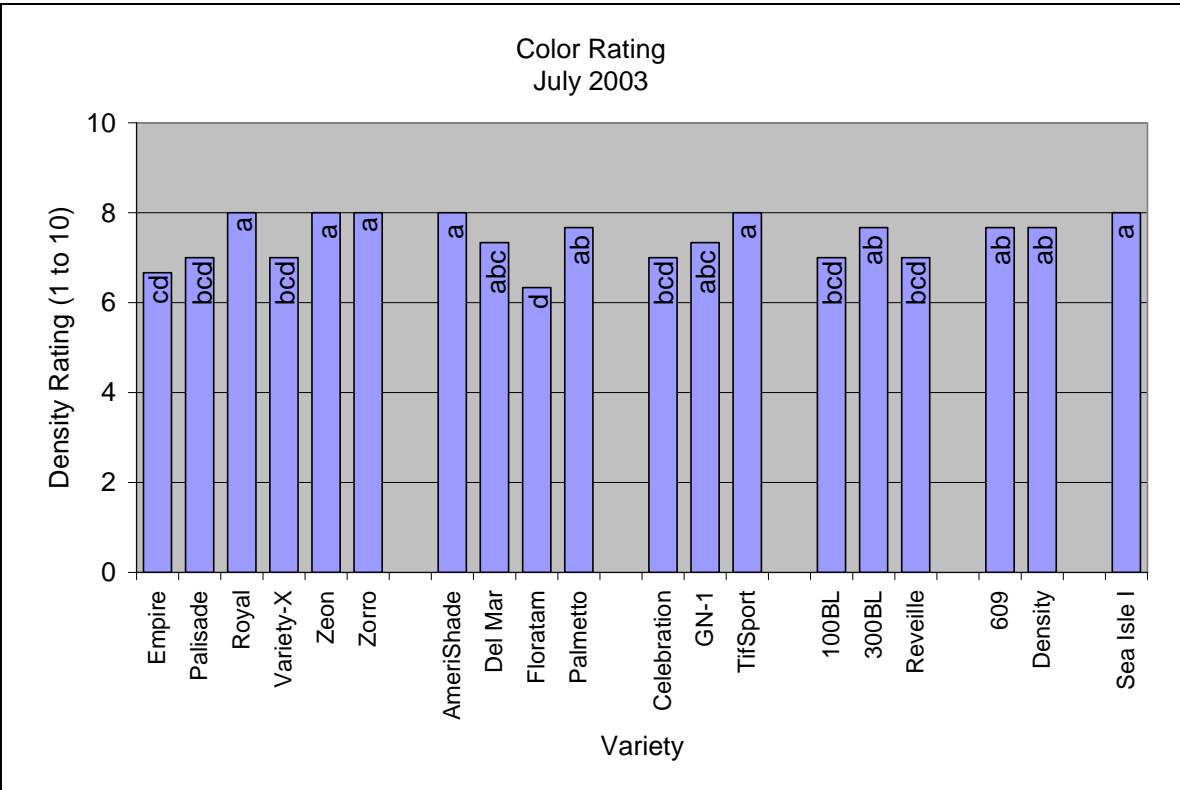


Table 2. July 2003 Color Ratings for Nineteen Turfgrasses. Any bars containing the same letter are not significantly different.

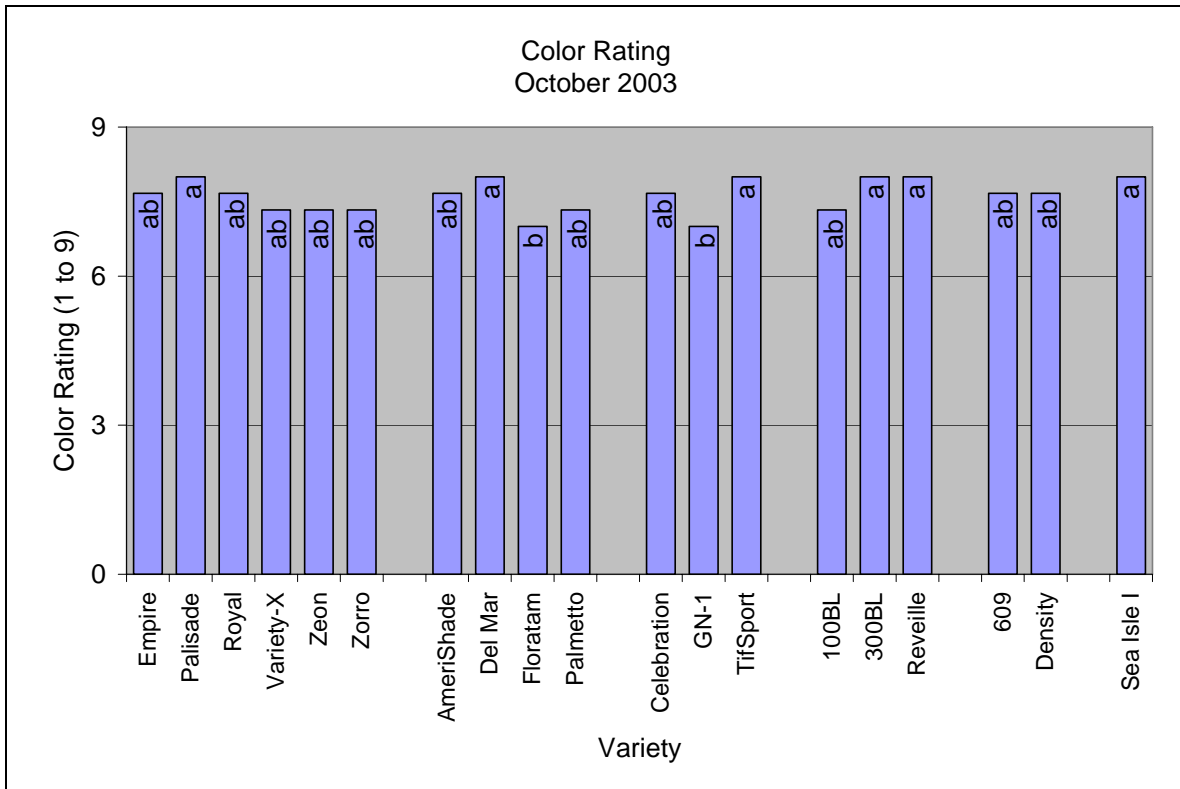


Table 3. October 2003 Color Ratings for Nineteen Turfgrasses. Any bars containing the same letter are not significantly different.

Tables 4, 5 and 6 contain the results for 2003 quality ratings for the months of April, July and October. For April 2003, Palmetto and SeaIsle 1 had the highest quality rating with a mean of 8.00. These were followed by Celebration, 100 series hybrid bluegrass, 300 series bluegrass, Zorro, Zeon and TifSport with a mean quality rating of 7.66. For April, the turfgrass variety Variety X had the lowest quality rating with a mean of 6.00. In July, AmeriShade, Palmetto and SeaIsle 1 had the highest quality rating with a mean of 8.00. These were closely followed by Floritam, Palisades and Delmar with a mean quality rating of 7.66. Celebration had the lowest quality rating for July 2003 with a mean quality rating of 5.66. In October 2003, Palisades, Floritam and 300 series hybrid bluegrass had the highest quality rating with a mean of 8.00. The three bermudagrasses (Celebration, GN-1 and TifSport), Reveille and 609 buffalograss were all significantly lower in quality from the other turfgrass varieties for October 2003. TifSport and Reveille had a quality rating of 5.00, while GN-1 the lowest rating with a mean of 4.67. The lower quality ratings for the bermudagrasses can be attributed to scalping injury (see picture 2) in late summer and early fall months, while the lower quality ratings for 609 and Reveille can be attributed to encroachment of weeds.

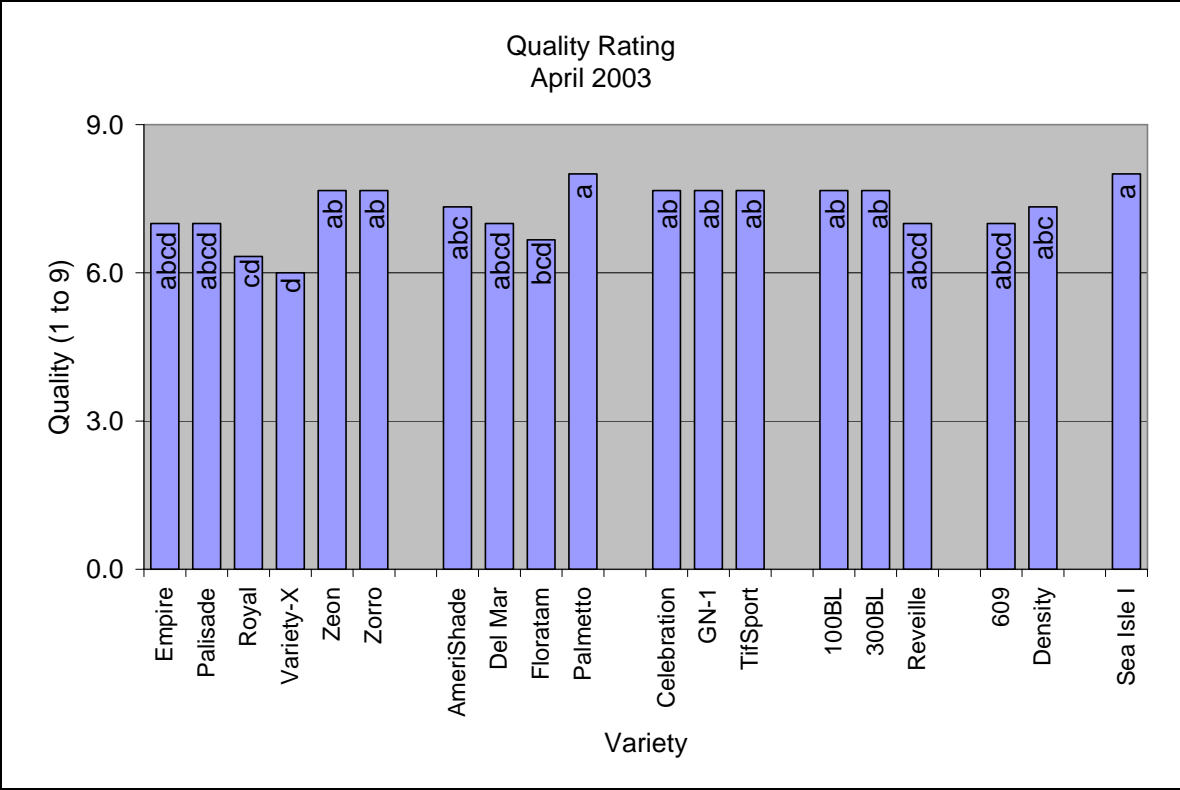


Table 4. April 2003 Quality Ratings for Nineteen Turfgrasses. Any bars containing the same letter are not significantly different.

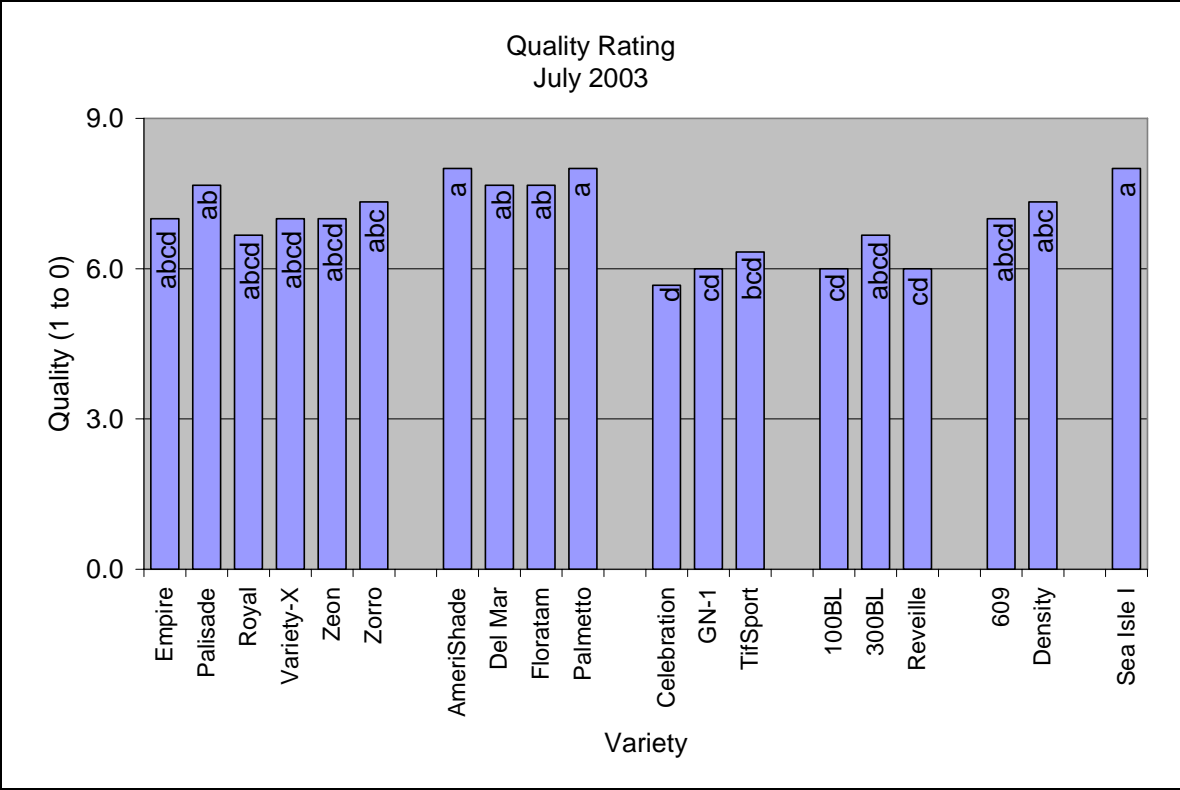


Table 5. July 2003 Quality Ratings for Nineteen Turfgrasses. Any bars containing the same letter are not significantly different.

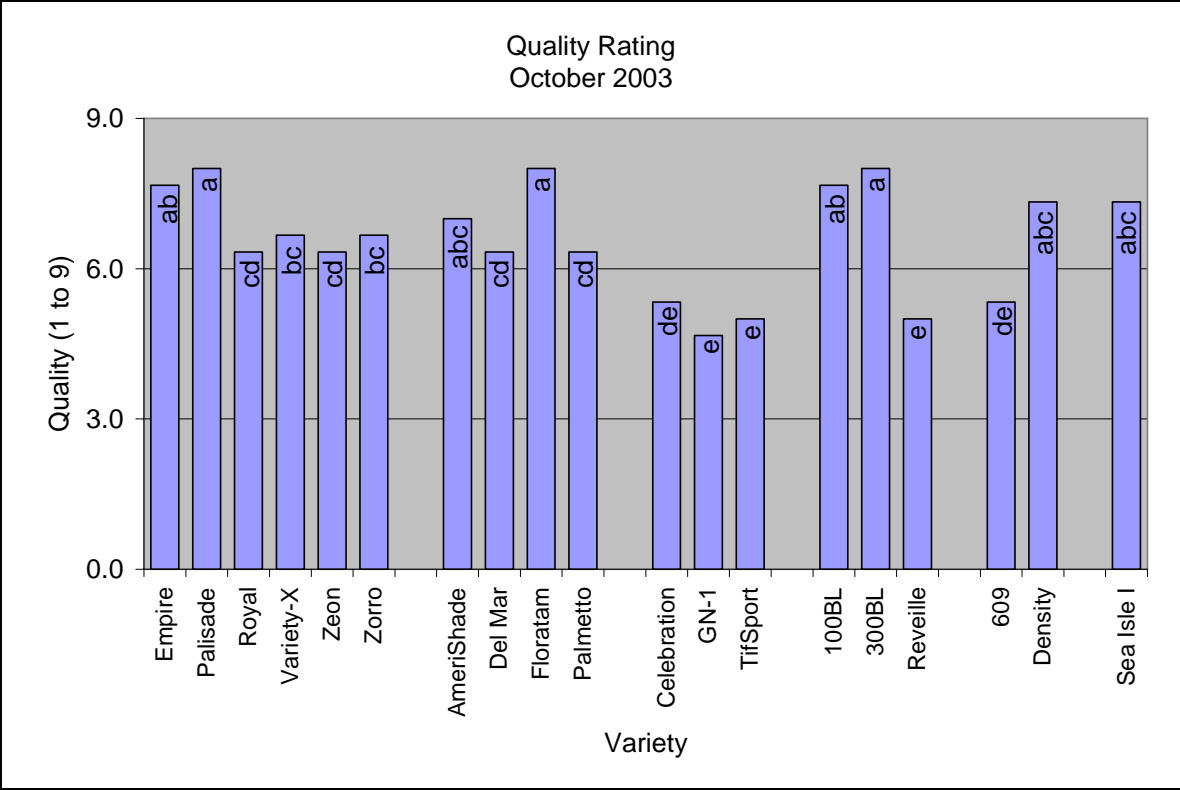


Table 6. October 2003 Quality Ratings for Nineteen Turfgrasses. Any bars containing the same letter are not significantly different.

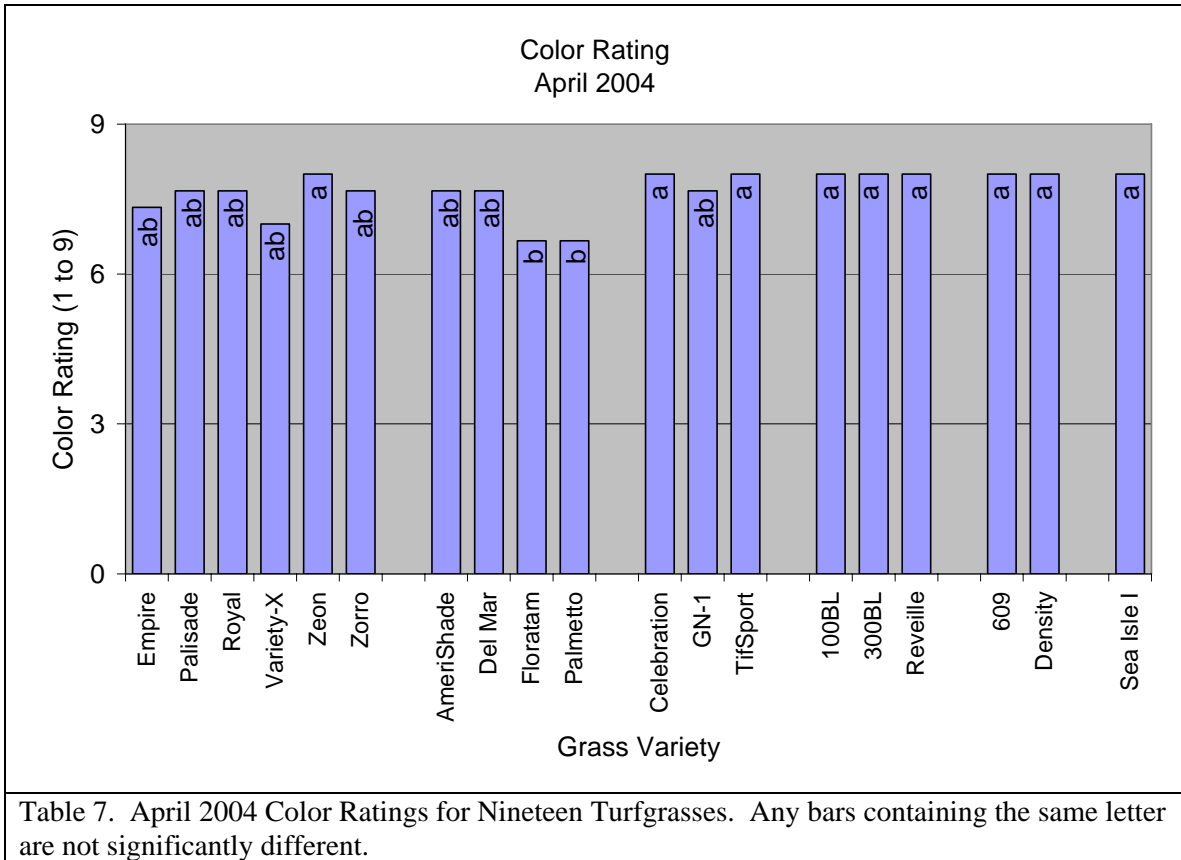


Picture 2. Scalping injury to GN-1 bermudagrass in late summer months.

B. 2004 Color and Quality Ratings:

Tables 7, 8 and 9 contain the 2004 color ratings for April, July and October. In April of 2004, there was no significant difference in color for any of the nineteen turfgrass varieties included in this trial. Zeon, Celebration, TifSport, Reveille, 100 series hybrid bluegrass, 300 series bluegrass, Nebraska 609, Density and SeaIsle 1 had the highest color rating with a mean of 8.00 for April 2004. Floratam and Palmetto had the lowest color ratings for April 2004 with a mean of 6.66. By July 2004, we discontinued rating all three reps for the two bluegrasses Reveille and 300 series, while for the 100 series hybrid bluegrass we were only able to rate two of the three reps. Ratings were discontinued for the bluegrasses in July 2004 because the bluegrass plots had all been taken over by turfgrasses in the neighboring plots and there was not enough bluegrass left to rate. Picture 3 shows an example of the 100 series hybrid bluegrass plot being completely taken over by Amerishade St. Augustinegrass. The front part of the picture (darker area) is the area where the 100 series bluegrass was, while the top part of the picture is Amerishade. Of the turfgrasses rated in July 2004, SeaIsle 1 had the highest color rating with a mean of 8.00, closely followed by Palisades and TifSport with a mean of 7.66. Celebration had the lowest color rating in July 2004 with a mean of 6.00. For October 2004, there was not a significant difference for color rating for any of the turfgrass varieties that were rated. Note, by October 2004, we had to also stop ratings for the Nebraska 609 buffalograss because the 609 had been taken over by the

turfgrasses growing in the neighboring plots. Royal, Variety X, Delmar, Celebration, TifSport, Density and SeaIsle 1 had the highest color rating with a mean of 8.00, while Amerishade and Palmetto had the lowest color rating with a mean of 7.00.



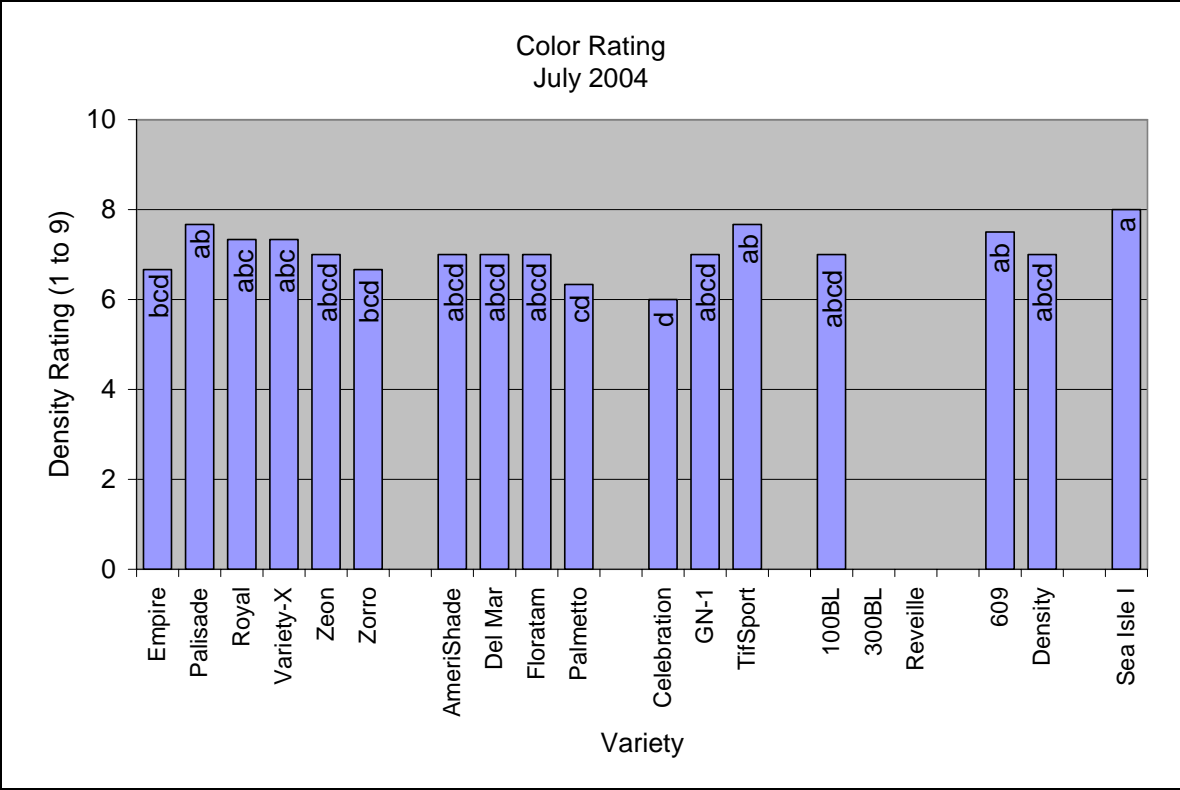


Table 8. July 2004 Color Rating for Seventeen Turfgrasses. Any bars containing the same letters are not significantly different.



Picture 3. Darker green area is 300 series hybrid bluegrass plot that has been taken over by Amerishade St. Augustinegrass. Very top portion of picture is Amerishade.

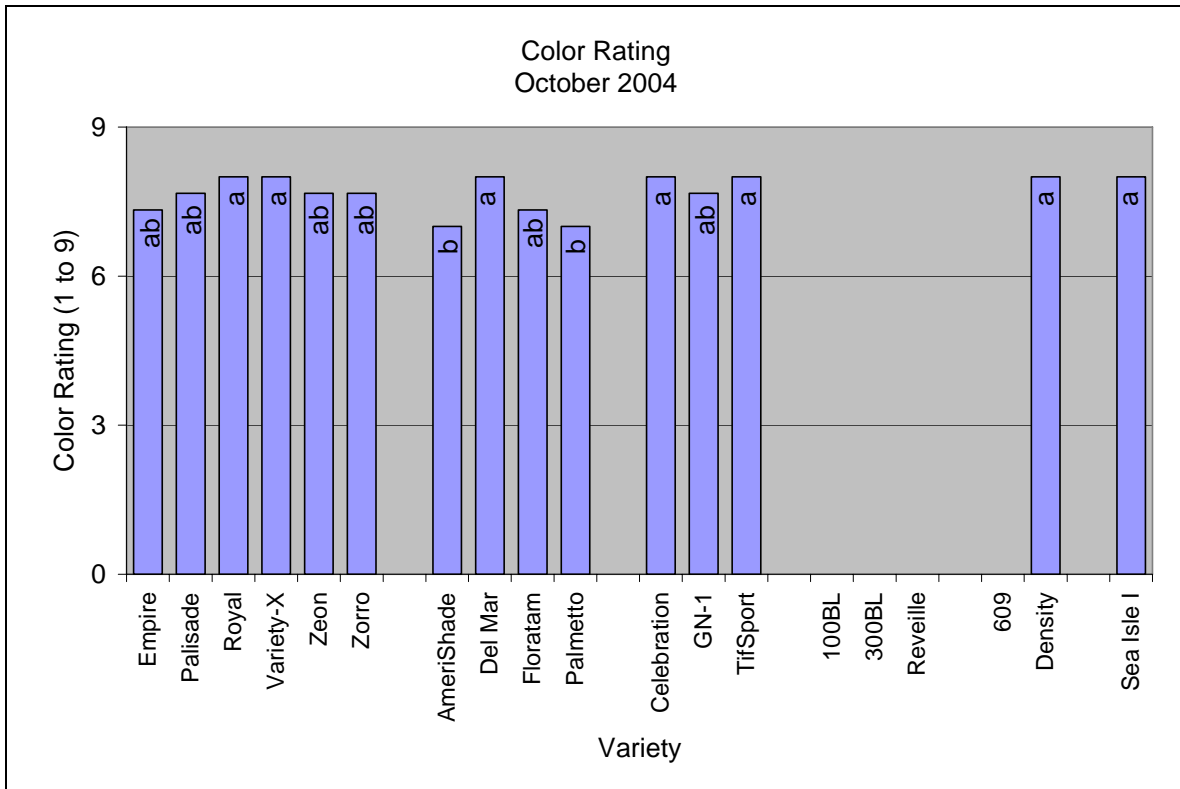


Table 9. October 2004 Color Rating for Fifteen Turfgrasses. Any bars containing the same letters are not significantly different.

Tables 10, 11 and 12 contain the quality ratings for April, July and October in 2004. In April 2004, the 100 series hybrid bluegrass had the highest quality rating with a mean of 8.33. This was closely followed by 300 series hybrid bluegrass and Density with a mean rating of 8.00. Zorro with a mean rating of 2.66 and Royal with a mean rating of 2.00 had the least significant color rating for April 2004. These two zoysiagrass varieties were very slow to green up and start growth in the spring of 2004. For July 2004, of the turfgrass varieties rated, Palisades had the highest quality rating with a mean of 7.66 and was followed by Delmar, Floritam and SeaIsle 1 with a mean quality rating of 7.00. The Nebraska 609 was significantly lower in quality for July 2004 than all the other varieties with a mean of 4.50. In October 2004, Floritam and SeaIsle 1 had the highest quality rating with a mean of 8.00, followed by Variety X with a mean quality rating of 7.66. Density buffalograss had the lowest quality rating for October 2004 with a quality rating of 5.00.

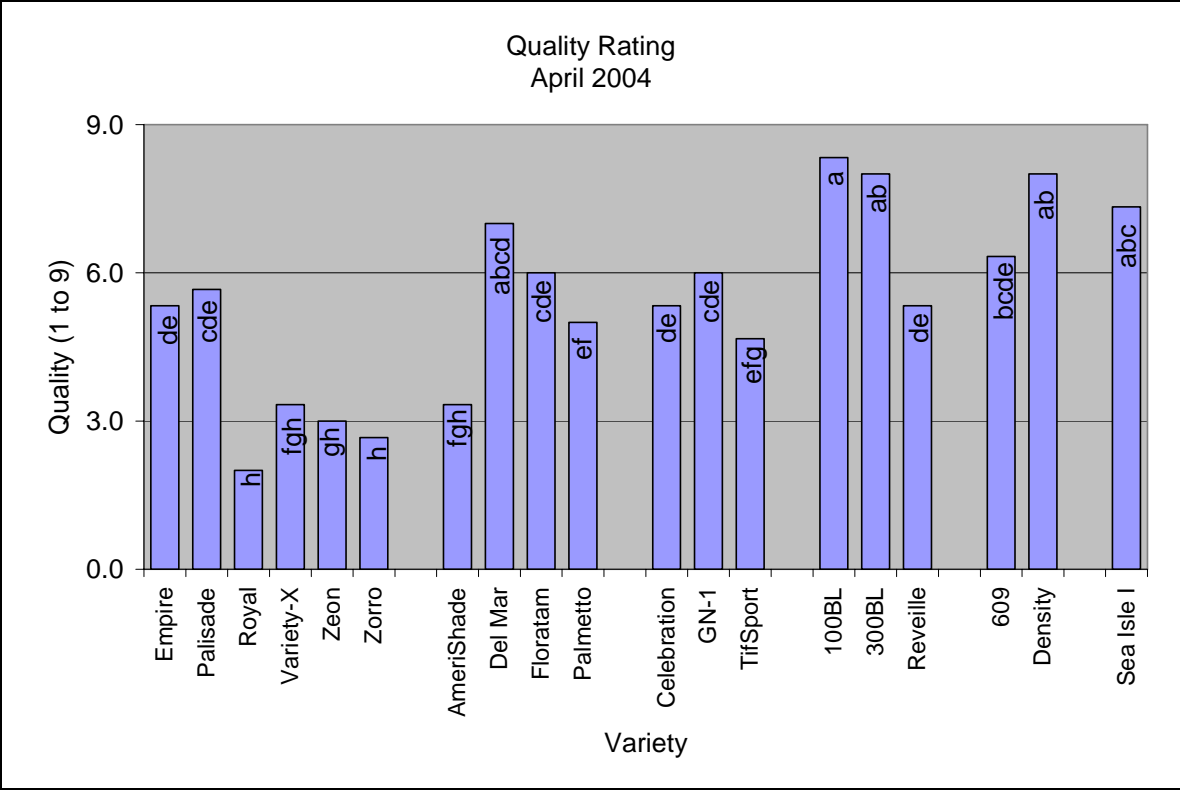


Table 10. April 2004 Quality Ratings for nineteen turfgrasses. Any bars containing the same letters are not significantly different.

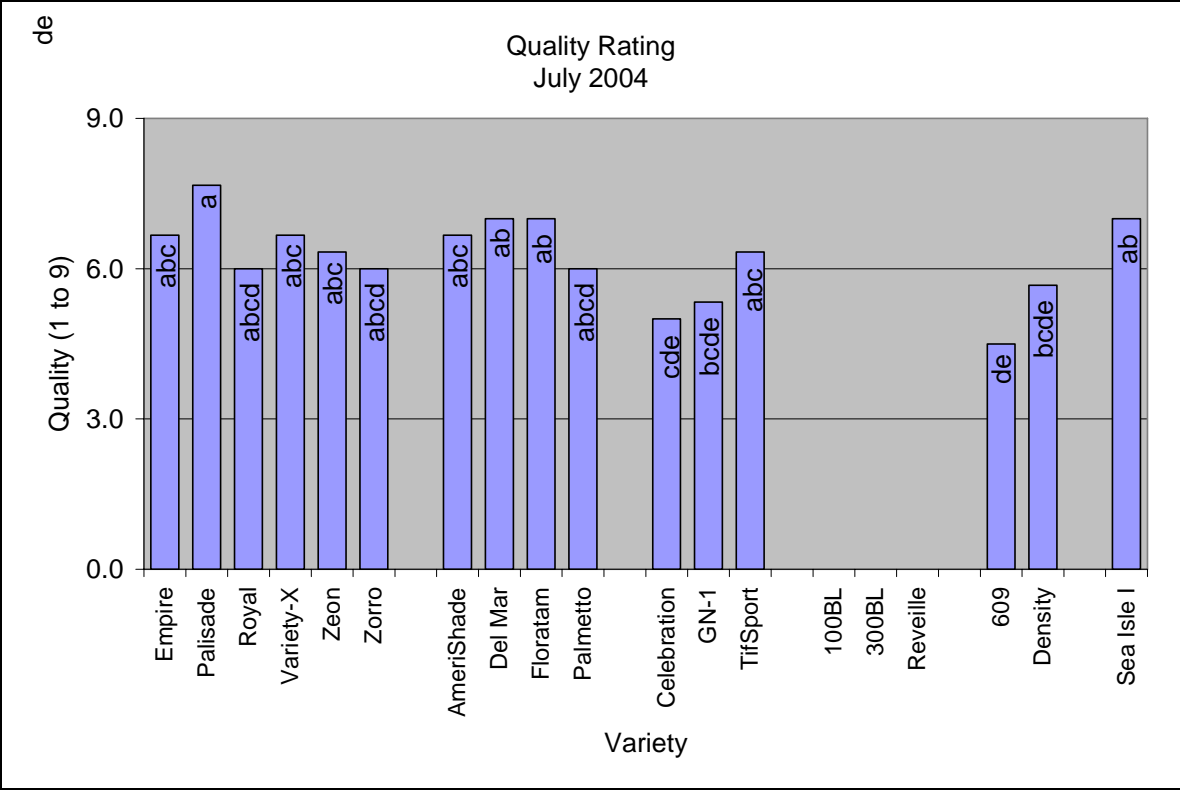
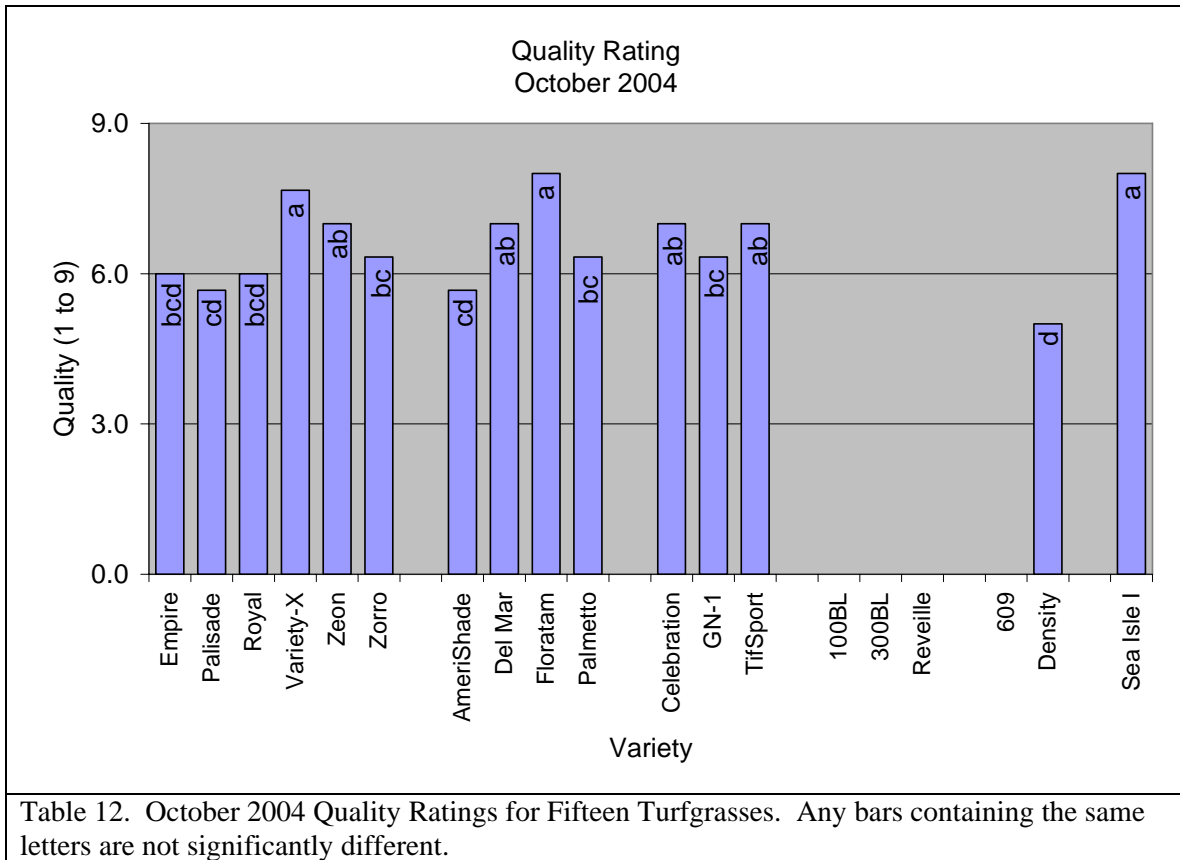


Table 11. July 2004 Quality Ratings for Sixteen Turfgrasses. Any bars containing the same letters are not significantly different.



C. 2005 Color and Quality Ratings:

Tables 13, 14 and 15 contain the April, July and October color ratings for the year 2005.

Starting in April of 2005, ratings were taken only for the zoysiagrasses, St. Augustinegrasses, bermudagrasses and SeaShore paspalum. By 2005, there was not enough of the three hybrid bluegrasses and the two buffalograsses left to rate.

In April of 2005, SeaIsle 1 had the highest color rating with a mean of 8.00. It was followed by Celebration, Delmar, TifSport, Royal and Palisades with a mean color rating of 7.66. Variety X, Floratam and GN-1 had the lowest color rating in April of 2005 with a mean color rating of 6.66. For July, Zeon, Celebration, TifSport, GN-1 and SeaIsle 1 had the highest color rating with a mean rating of 8.00. These five varieties were closely followed by Zorro with a mean color rating of 7.66. Palmetto and Empire had the lowest color rating for July 2005 with a mean color rating of 6.66. In October 2005, there was no significant difference in color for the fourteen turfgrass varieties that were still being rated. Amerishade, Celebration, TifSport, Zorro, Zeon and SeaIsle 1 had the highest color rating with a mean rating of 8.00. These six varieties were closely followed by Palisades with a mean color rating of 7.66. Palmetto, Floratam and Empire had the lowest mean color rating for October 2005 with a rating of 7.00.

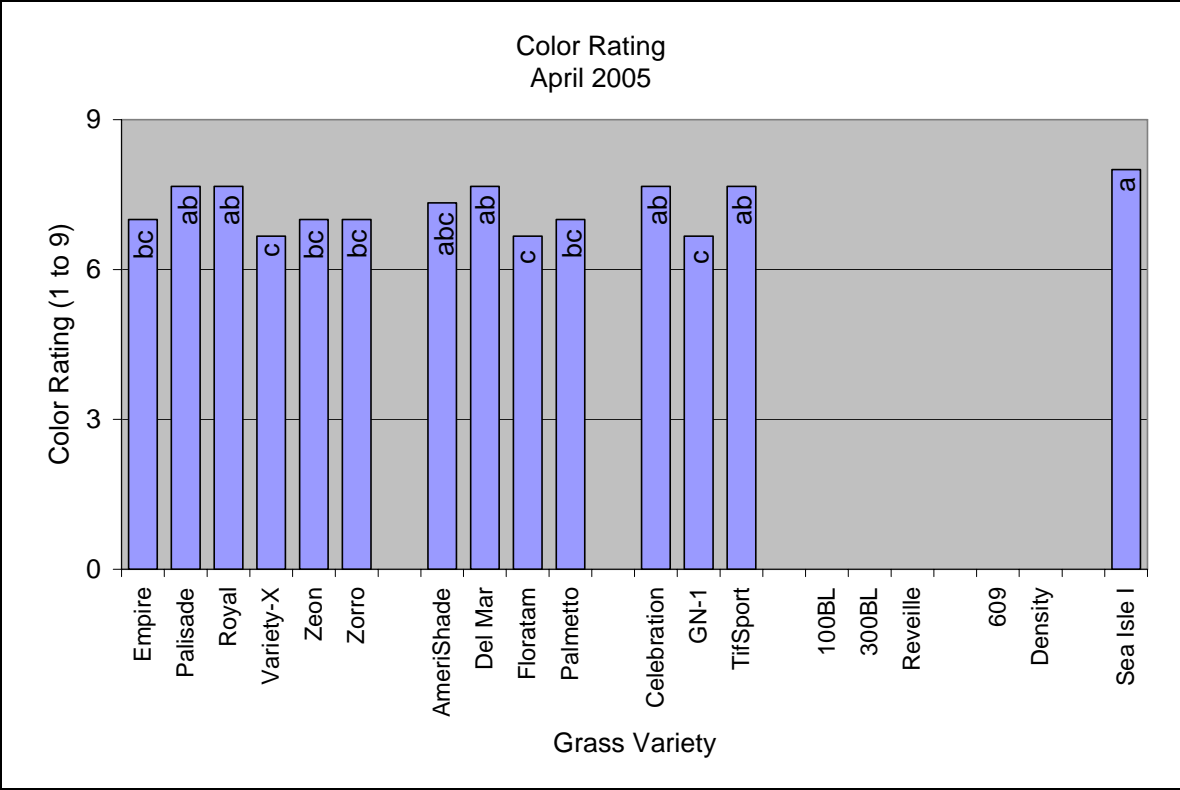


Table 13. April 2005 Color Ratings for Fourteen Turfgrasses. Any bars containing the same letters are not significantly different.

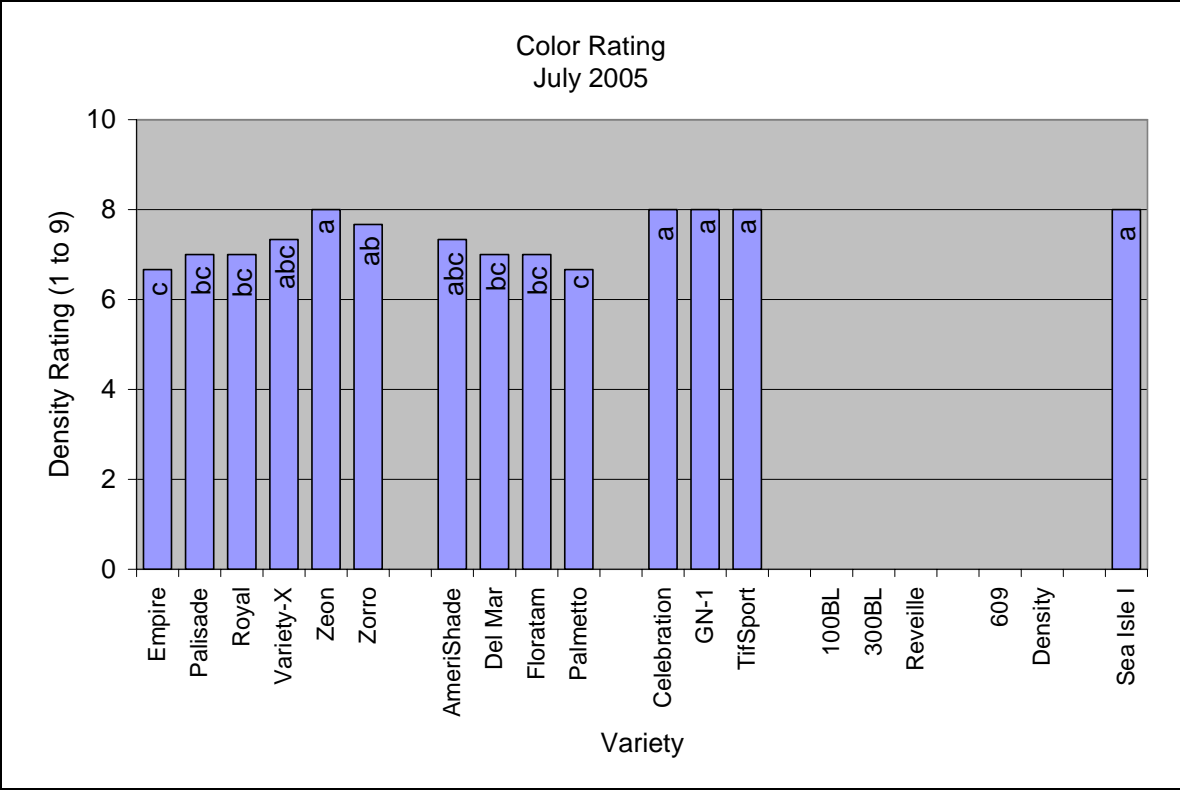


Table 14. July 2005 Color Ratings for Fourteen Turfgrasses. Any bars containing the same letters are not significantly different.

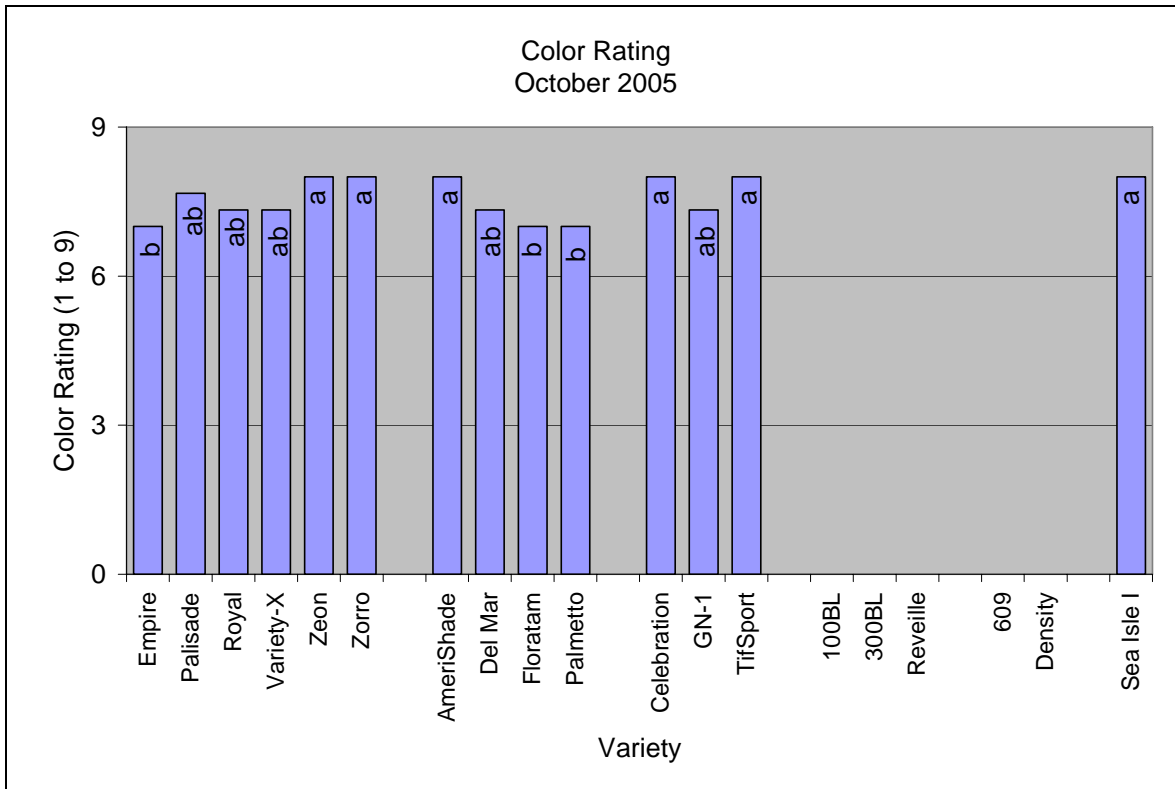


Table 15. October 2005 Color Ratings for Fourteen Turfgrasses. Any bars containing the same letters are not significantly different.

Tables 16, 17 and 18 contain the April, July and October quality ratings for the year 2005.

In April 2005, SeaIsle 1 had the highest quality rating with a mean rating of 7.66. This variety was closely followed by Celebration with a mean quality rating of 7.33. Variety X had the lowest quality rating for April 2005 with a mean quality rating of 4.66. It should be noted that all the St. Augustinegrass varieties had a quality rating below 6.0, minimum standard, for April 2005. The St. Augustinegrasses were much slower to green up in the spring of 2005 than the rest of the fourteen varieties being rated at this time. For July 2005, SeaIsle 1 had the highest quality rating with a mean quality rating of 8.00. This variety was closely followed by Floratam with a mean quality rating of 7.33. GN-1 had the lowest quality rating for July 2005 with a mean rating of 4.66. Celebration followed the GN-1 as the lowest quality rating for July 2005 with a mean rating of 5.33. The only bermudagrass to have an acceptable quality rating for July was TifSport with a mean quality rating of 6.00. Again, the lower quality ratings for the bermudagrasses in the summer months can be attributed to scalping injury as the result of thatch accumulation (see picture 4). In October 2005, Floratam, SeaIsle 1, Delmar, Empire and Palisades had the highest quality rating with a mean quality rating of 7.00. GN-1 had the lowest quality rating for October 2005 with a mean quality rating of 5.33. This variety was closely followed by Royal and Zorro for lowest quality rating with a mean quality rating of 5.66.

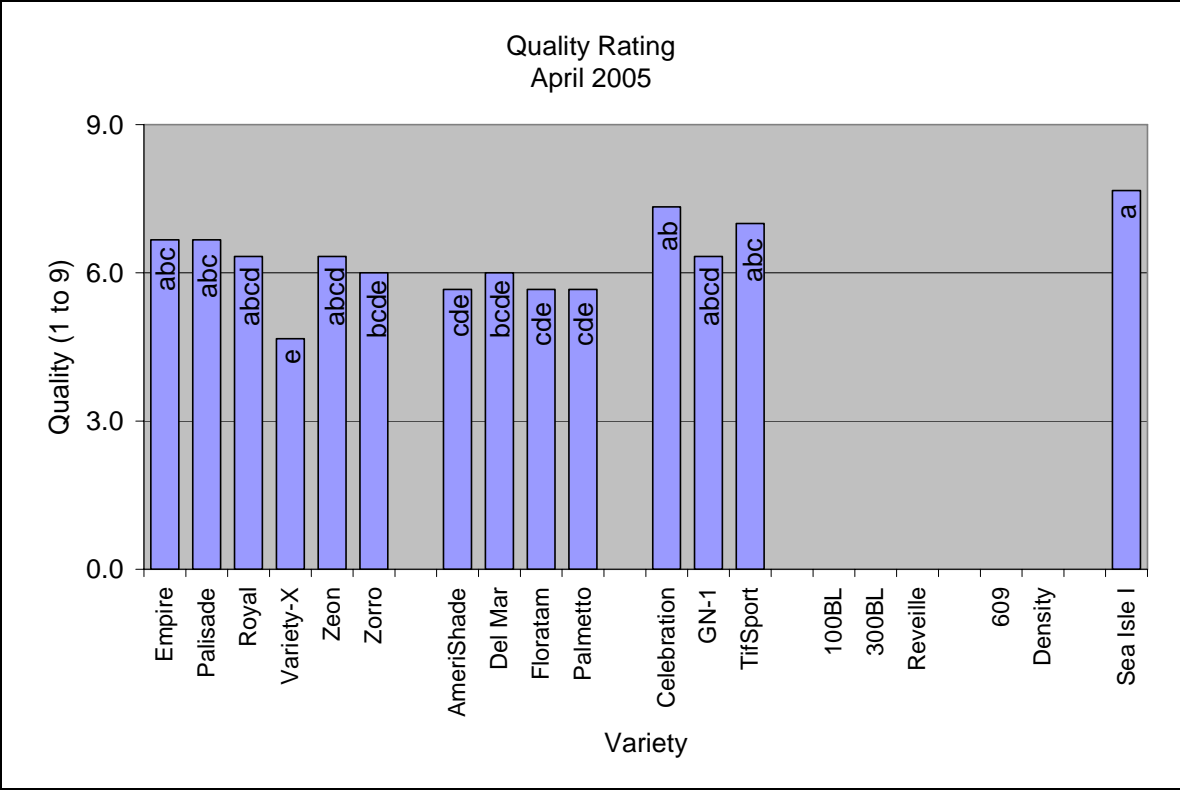


Table 16. April 2005 Quality Ratings for Fourteen Turfgrasses. Any bars containing the same letters are not significantly different.

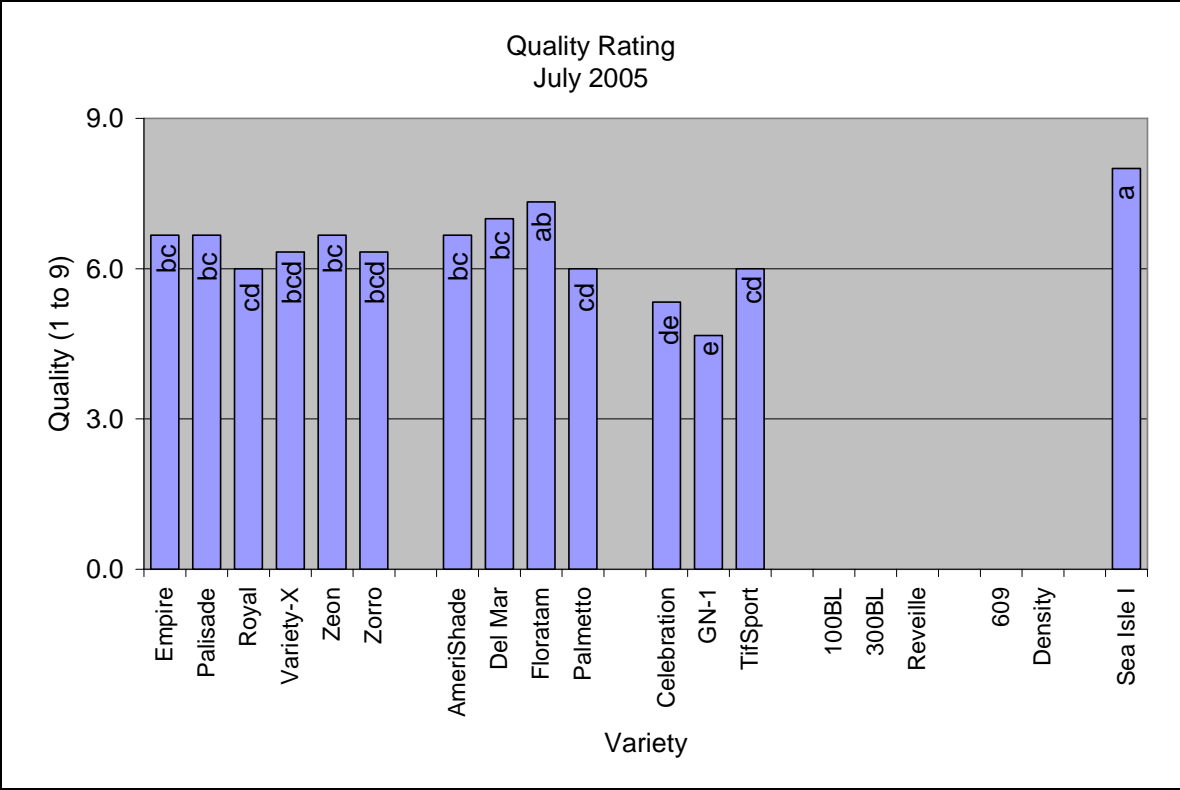
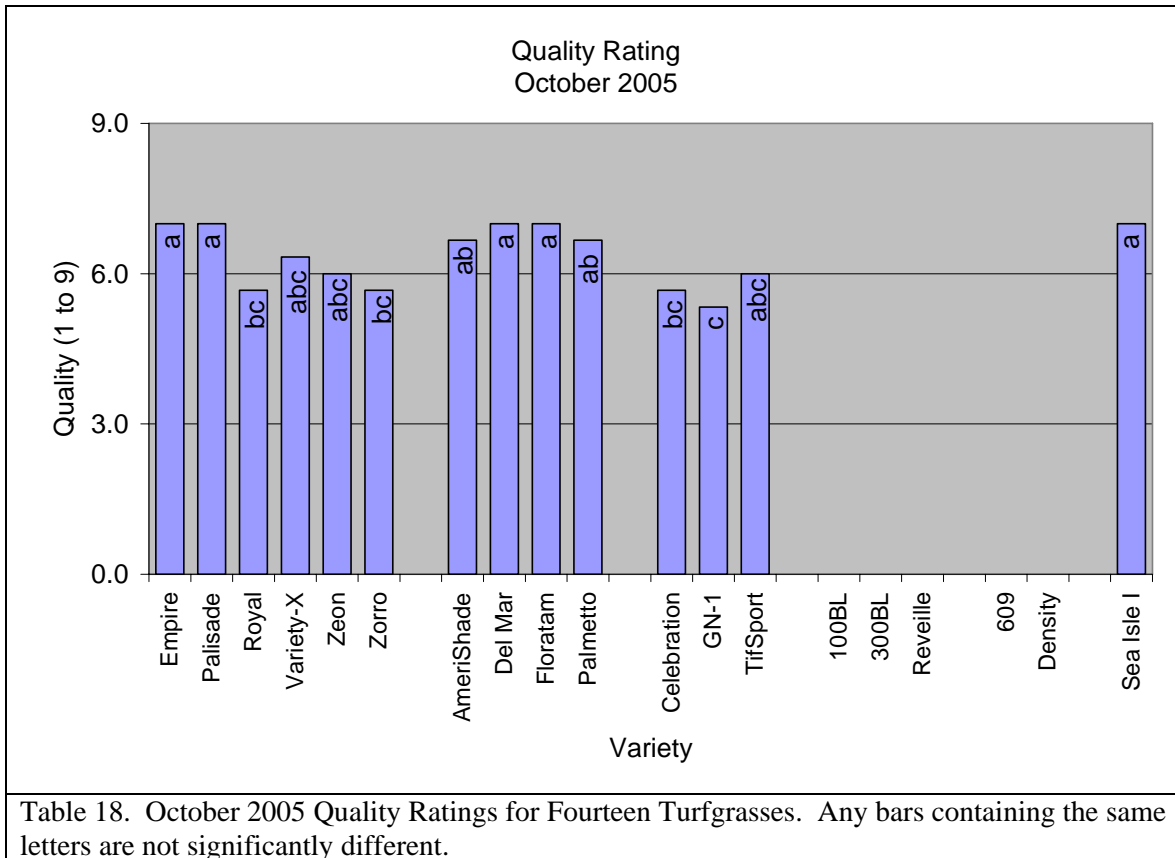


Table 17. July 2005 Quality Ratings for Fourteen Turfgrasses. Any bars containing the same letters are not significantly different.



D. Pest Activity:

When rating the different turfgrass varieties for color, density and quality, ratings were also taken for insect and disease activity during the three years. There was very little insect activity on any of the grasses during the three year trial. During the first two years of the trial, several of the fine textured zoysiagrasses were infested with a small amount of zoysiagrass mite (not an insect) activity. These included Variety X, Zeon, Zorro and Royal. Neither Palisades nor Empire zoysiagrass had any mite activity during the three year trial. The only other turfgrass variety to have any mite activity was celebration bermudagrass and this also occurred in the first couple of years.

The only major disease that was observed during the three year trial was brown patch. In fact, brown patch was a major problem for most of the turfgrasses in the fall of 2002, the year the plots were established. Zoysiagrass and St. Augustinegrass as a group had the most problems with brown patch during this trial. Table 19 contains the brown patch activity in zoysiagrasses for the fall of 2002, 2003, 2004 and 2005. Palisades and Empire both had the largest amount of brown patch activity during the three years. The fine textured zoysiagrasses such as Zeon, Zorro, Variety X, and Royal had very little brown patch activity compared to the coarse textured zoysiagrasses. The only exception to this was for Royal in the fall of 2002 with a average rating of 43%. Picture 4 contains a picture of brown patch activity in one of the Palisade plots for the fall of 2003.

% Brown Patch Activity (Zoysiagrasses)

Turfgrass	2002	2003	2004	2005
Variety X	---	---	---	2
Empire	24	24	22	2
Palisades	32	32	37	---
Royal	43	---	---	---
Zorro	< 1	---	7	---
Zeon	---	---	---	---

Table 19. Percent brown patch activity in zoysiagrasses. The numbers represent the average brown patch activity for the three reps for each variety.



Picture 4. Brown patch activity in Palisades zoysiagrass in the fall of 2002.

Table 20 contains the average brown patch activity for all the St. Augustinegrasses for the fall of 2002, 2003, 2004 and 2005. Delmar had the highest amount of brown patch activity each year for all the St. Augustinegrass varieties. Floratam had the least amount of brown patch activity for the St. Augustinegrasses with less than 1% for the fall of 2002. Amerishade and Palmetto were very similar in the amount of brown patch activity over the three year trial. Picture 5 shows brown patch activity in Delmar St. Augustinegrass in the fall of 2002.



Picture 5. Brown patch activity in Delmar St. Augustinegrass in fall of 2002.

% Brown Patch Activity (St. Augustinegrasses)

Turfgrass	2002	2003	2004	2005
Amerishade	5	---	17	7
Delmar	28	46	22	5
Floritam	< 1	---	---	---
Palmetto	5	---	12	17

Table 20. Percent brown patch activity in the St. Augustinegrasses. Numbers represent the average brown patch activity for the three reps for each variety.

Table 21 contains the percent brown patch activity for the bermudagrass varieties in the fall of 2002, 2003, 2004 and 2005. The bermudagrasses were only affected by brown patch activity in the fall of 2002. Both Celebration and TifSport had some brown patch activity in the fall of 2002, while the GN-1 did not have any brown patch activity in the fall of 2002 or for any of the other years.

% Brown Patch Activity (Bermudagrasses)

Turfgrass	2002	2003	2004	2005
Celebration	17	---	---	---
GN-1	---	---	---	---
TifSport	9	---	---	---

Table 21. Percent brown patch activity in the bermudagrasses. The number represent the average brown patch activity for the three reps for each variety.

Table 22 contains the percent brown patch activity for the SeaIsle 1 (Seashore paspalum) for the fall of 2002, 2003, 2004 and 2005. The SeaIsle 1 was only affected by brown patch in the fall of 2002 and not for any of the other three years.

% Brown Patch Activity (SeaShore paspalum)

Turfgrass	2002	2003	2004	2005
Sealsle 1	14	---	---	---

Table 22. Percent brown patch activity for Sealsle 1. The numbers represent the average brown patch activity for the three reps for each variety.

Density and Nebraska 609 buffalograss did not have any brown patch activity during this three year trial. Also, the three hybrid bluegrasses did not have any brown patch activity during the three year trial. The Reveille hybrid bluegrass did have some disease activity in the first couple of summers, but this disease problem was never positively identified.

Summary:

In 2003, all turfgrasses provided good to excellent color ratings for the entire year. Also, with the exception of the bermudagrasses, all other turfgrasses provided good to excellent quality ratings for the entire year. The low quality rating for the three bermudagrasses included in this variety trial can be attributed to the accumulation of thatch (see picture 6) in the plots which then resulted in scalping injury to the bermudagrasses in the summer an early fall months. The three hybrid bluegrasses provided the highest average color ratings for the year of all the turfgrasses. However, this yearly average for the bluegrasses is higher primarily due to the green color of these plots in the winter months when the warm season turfgrasses were dormant to semi-dormant. If you factor out the dormant months for the warm season turfgrasses, then the SeaShore paspalum Sealsle 1 provided the highest yearly average for color of all the turfgrasses in year 2003.



Picture 6. Thatch accumulation in Celebration bermudagrass in the first year of trial.

When looking at the turfgrass varieties by species in 2003, Palisades had the highest average quality rating for the zoysiagrasses with an average of 7.4. This was closely followed by Zorro at 7.2 and then Zeon and Empire at 7.1. Variety X had the lowest quality rating for 2003 with an average of 6.6 for the year. For the St. Augustinegrasses, Palmetto had the highest yearly average for quality with an average rating of 7.3. This was followed by Amerishade at 7.2 and Floratam at 7.0. Delmar had the lowest yearly average for quality rating with an average of 6.8. Heavy brown patch activity was the main factor for the lower quality rating of Delmar in 2003. There was essentially no difference in quality ratings for the three bermudagrasses in 2003. TifSport had the highest yearly average for quality with a rating of 6.3, followed by Celebration at 6.2 and GN-1 at 6.1. For the two buffalograsses, Density had the highest yearly average for quality with an average of 7.0 for the year, while Nebraska 609 had an average of 6.6 for the year. The 100 and 300 series hybrid bluegrasses were essentially the same with an average quality rating of 7.7 and 7.6. Reveille had the lowest average quality rating for the hybrid bluegrasses in 2003 with an average of 6.3. Disease activity during the summer months and weed encroachment in one of the Reveille reps accounted for the lower quality ratings of Reveille. The SeaShore paspalum, SeaIsle 1 had a yearly average quality rating of 7.1 for the 2003 year. Heavy seedhead production in late spring and early summer months contributed to a overall lower quality rating for the SeaIsle 1 in 2003.

By mid-year in 2004, we had to discontinue rating of the three hybrid bluegrasses and the two buffalograsses. Due to heavy encroachment of neighboring grasses into these five varieties, there was not enough turfgrass left in each of the plots to provide an accurate rating. Overall, the SeaShore paspalum variety SeaIsle 1 provided the highest overall yearly average for quality with a rating of 7.5 in 2004. As a group, the St. Augustinegrasses were the overall best performers for 2003, followed closely by the zoysiagrasses.

When evaluating the grasses by species in 2004, Palisades provided the highest yearly quality rating for the zoysiagrasses with an average of 6.8. The Palisades was followed by Empire at 6.5 and then Zeon at 6.4. Royal had the lowest yearly average quality rating for 2004 with an average of 5.9. For the St. Augustinegrasses, Delmar provided the highest yearly quality rating with an average of 7.0 and was closely followed by Floratam at 6.8. Palmetto and Amerishade were the two lowest varieties for quality ratings in 2004 with an average quality rating for the year of 6.0. In 2004, TifSport had the highest quality rating for the year with an average rating of 6.5. TifSport was followed by GN-1 at 6.2 and Celebration at 5.9. Again, the SeaShore paspalum variety SeaIsle 1 provide the highest overall quality rating for 2004 with an average rating of 7.5.

In 2005, the bermudagrasses produced the highest overall color rating for the year. However, the average quality rating for the bermudagrasses was much lower than the zoysiagrasses and St. Augustinegrasses.. Again, lower quality ratings are a direct result of heavy scalping injury in the bermudagrasses due to the accumulation of thatch. In 2005, overall color rating for zoysiagrasses was slightly higher than that for the St. Augustinegrasses.

When evaluating the grasses by species in 2005, for the zoysiagrasses Palisades had the highest yearly average for quality rating with an average of 6.8 for the year. Palisades was closely followed by Empire with a yearly average of 6.6 for quality. The next two highest quality rating in the zoysiagrasses were for Zeon at 6.3 and Zorro at 6.1. Variety X and Royal were the two lowest rated zoysiagrasses for quality in 2005 with an average of 5.9 for the year. For the St. Augustinegrasses in 2005, Floratam had the highest yearly average for quality with a rating of 6.7. The second highest St. Augustinegrass in 2005 was Delmar at 6.4. Both Amerishade and Palmetto had the lowest yearly average rating for quality with a rating of 6.2. For the bermudagrasses in 2005, all three varieties in this trial had a yearly average rating below 6.0 (minimum acceptable value). Again, these low quality ratings in 2005 can be attributed to the accumulation of thatch in the plots which resulted in scalping injury during the summer and early fall months. TifSport had the highest yearly average quality rating for the year with a rating of 5.7. TifSport was then followed by Celebration at 5.6 and GN-1 at 5.3.

Comments:

1. The maintenance schedule used for this trial was not favorable to the buffalograsses. Applying 1.0 inch of supplemental irrigation per week when adequate rainfall did not occur, is too much water for proper growth and development of buffalograss. This excess application of water encouraged weed growth in the buffalograsses and also the encroachment of the more aggressive turfgrass varieties, especially the St. Augustinegrasses and the bermudagrasses. There is no doubt that when maintained properly, both of these buffalograsses would perform well in the central Texas area of the state.
2. For the hybrid bluegrasses, encroachment of the more aggressive warm season turfgrass varieties in summer months was also a problem. The hybrid bluegrasses could provide an acceptable cover when grown in a lawn by themselves. However, it will take a higher level of irrigation to maintain these grasses in the summer months.
3. This study demonstrated that St. Augustinegrass is still one of the best turfgrass choices for the central Texas area. In this study, for the three year period, Floratam and Delmar provided the best overall quality ratings for the St. Augustinegrass varieties included in this three year trial.
4. The zoysiagrasses, particularly the coarse textured zoysia japonica varieties such as Palisades and Empire, provided good to excellent quality ratings for the three year trial.

While the fine textured zoysiagrasses such as Zeon and Zorro produced excellent color ratings, their quality ratings were lower than the coarser textured zoysiagrasses. At the 1.5 to 2.0 inch height of cut, these fine textured zoysiagrasses were subject to scalping injury in the summer and fall months and also had a more puffy type appearance, which resulted in a lower quality rating.

5. For this three year trial, the quality rating for the fine textured bermudagrasses were right at or below the minimum acceptable level. Thatch accumulation which contributed to scalping injury was the primary cause for the lower overall quality ratings in these bermudagrasses. Due to the higher maintenance requirements for these fine textured bermudagrasses, these bermudagrasses would not generally be recommended for home lawn use in central Texas.
6. The SeaShore paspalum variety, SeaIsle 1, was actually the overall best performer in this three year turfgrass variety trial. With proper maintenance, the SeaIsle 1 will provide an excellent lawn for the central Texas area of the state. This means weekly mowings at 1.5 to 2.0 inches and the addition of supplemental irrigation during dry periods of the year. If mowed infrequently, the SeaIsle 1 is subject to scalping injury and if not watered properly, it will turn brown quickly. The SeaIsle 1, as is most SeaShore paspalums, very slow to recover from scalping injury and/or drought injury.