



Grasses for overseeding bermudagrass fairways: Part 2

Making the transition from overseeding grass to bermudagrass in the spring is extremely difficult, but using the right overseeding grass can only help.

In much of the southern half of the United States, overseeding bermudagrass (*Cynodon* species) fairways is a common practice. Overseeding can add to a course's bottom line by increasing rounds, but overseeding also provides better tolerance of golf car traffic, divots and weed invasion than dormant bermudagrass. However, with overseeding, superintendents must manage a cool-season grass that loves milder temperatures seeded into a warm-season grass base that thrives in much warmer weather. Optimally managing one grass without hurting the other, while maintaining a high-quality surface, is *the* challenge of many superintendents.

Many factors determine the success or failure of overseeding. One key factor is the species and/or cultivar of grass selected for overseeding. Desirable grasses establish quickly, exhibit exceptional playability, are aesthetically pleasing and require fewer inputs. To identify grasses that meet these criteria, GCSAA, the USGA Green Section and the National Turfgrass Evaluation Program developed and jointly sponsored two research projects to evaluate cultivars, blends and mixtures for overseeding bermudagrass fairways. The first project evaluated 42 grasses, blends and mixtures at 10 golf courses from September 1999 to July 2001 (1,2). A second project was conducted from September 2004 to July 2006, evaluating 31 grasses and blends at 12 golf courses. This article summarizes the results of the second project.

site overseeding trials (Table 1). Because overseeding grasses provide a temporary playing surface for fall, winter and spring and are reseeded each year, cultivars were seeded in two consecutive years (fall 2004 and fall 2005). Speed, ease and uniformity of transition from the bermudagrass to the overseeded grass in fall and back to the bermudagrass in spring are some of the biggest concerns when overseeding. Therefore, entries were seeded in exactly the same location on each course in both years, allowing researchers to identify entries that persisted over time.

Entries

NTEP solicited entries for the trial from sponsoring companies (Table 2). Trials were conducted with named cultivars and commercially available blends or mixtures. In addition, experimental entries that were to be commercialized in the immediate future (that is, before the end of the testing cycle) also were permitted.

Various species used in overseeding, such as perennial ryegrass (*Lolium perenne* L.) and *Poa trivialis* were allowed. Both single cultivars and blends of perennial ryegrass were entered as well as single cultivars of *P. trivialis*. In addition, two cultivars of intermediate ryegrass and one mixture of perennial ryegrass and intermediate ryegrass were included in the trial. Intermediate ryegrasses are developed by crossing annual and perennial ryegrass and then selecting plants that have the best traits of both species. Plant breeders have worked

Methods

Twelve golf courses were chosen to host the on-



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This trial site at Indian Wells (Calif.) CC shows differences in color and density among entries. Photos by Kevin Morris

to develop intermediate ryegrasses that provide a smooth spring transition back to bermudagrass but with finer leaf texture and darker green color.

Trial locations

Trials were established on active play sites where golfers hit fairway golf shots and/or drove golf cars. Plots were carefully seeded either by hand or using a drop spreader. Because seeding rates vary widely from one region to another, scientists at each location were consulted concerning typical overseeding rates for the area. Consequently, three seeding rates for the ryegrasses (300, 450 and 600 pounds/acre or 33.6, 50.4 and 67.3 grams/square meter), two rates for *Poa trivialis* (100 and 200 pounds/acre or 11.2 and 22.4 grams/square meter) and two rates for mixtures (250 and 400 pounds/acre or 28.0 and 44.8 grams/square meter) were used. The most appropriate rate for each grass type was assigned to each location (Table 3).

Plots and data collection

The experimental plot size was large, 5 feet × 20 feet (1.5 meters × 6.1 meters), replicated three times. A large plot size allowed greater distribution of traffic and divots. Each host club provided daily maintenance of its fairway site(s). An advisory committee consisting of representatives from GCSAA, USGA, NTEP, universities and the turfgrass seed industry recommended establishment and maintenance procedures.

The researcher at each cooperating university was responsible for data collection. The following

data were collected from each trial site:

- Percent establishment rate (four to six weeks after seeding)
- Turfgrass quality (monthly during winter, minimum of three times during fall transition period, five to seven times during spring transition period)
- Plot color, genetic color (twice: late fall/early winter and spring)
- Rate or speed of transition from bermudagrass to overseeded grass in fall (minimum of three ratings)
- Rate or speed of transition from overseeded grass to bermudagrass in spring (five to seven ratings)
- Density and leaf texture (once each in spring)

Trial locations and cooperators

Research location	Golf course	Superintendent	Cooperator	University
Marana (Tucson), AZ	Heritage Highlands CC	David Herman, CGCS	David Kopec, Ph.D.	University of Arizona
Indian Wells, CA	Indian Wells CC	David Hay, CGCS	Robert Green, Ph.D. Sowmya Mitra, Ph.D.	UC-Riverside Cal-Poly Pomona
Gainesville, FL	University of Florida	Todd Wilkinson	Grady Miller, Ph.D.	University of Florida
Pensacola, FL	Osceola GC	Eddie Daigle	Bryan Unruh, Ph.D.	University of Florida
Stockbridge (Atlanta), GA	Eagles Landing CC	Cecil Smith	Clint Waltz, Ph.D.	University of Georgia
Starkville, MS	Mississippi State Univ.	Pat Sneed, CGCS	Wayne Philley	Mississippi State
Las Cruces, NM	New Mexico State Univ.	Bruce Erhard	Bernd Leinauer, Ph.D.	New Mexico State
Pinehurst, NC	Pinehurst CC #3	Bob Farren, CGCS	Art Bruneau, Ph.D.	North Carolina State
Oklahoma City, OK	John E. Kirkpatrick Five-Hole Demonstration GC	David Gerken	Dennis Martin, Ph.D.	Oklahoma State
Myrtle Beach, SC	Blackmoor	Bob Zuercher, CGCS	Bruce Martin, Ph.D.	Clemson University
Bryan (Houston), TX	The Traditions Club	Sean Hogan	David Chalmers, Ph.D.	Texas A&M
Roanoke, VA	Roanoke CC	Dan Wheeler, CGCS	Michael Goatley, Ph.D.	Virginia Tech

Table 1. Locations of trials for on-site overseeding of bermudagrass fairways.



- Environmental stress, traffic and divot damage, disease and insect damage and other data deemed appropriate and feasible by the research cooperator.

Results and discussion

Fall 2004–spring 2005 data collection

The trial contained 31 entries, consisting of perennial ryegrass cultivars, perennial ryegrass blends, intermediate ryegrass and *Poa trivialis*. These entries were seeded in September or October at the 12 golf course sites. Establishment was good; no problems were seen with any entries. Data collected from fall 2004 to spring 2005 were compiled, statistically analyzed and reported

Entries and sponsors

Entry no./name	Species or composition	Sponsor
1. Charger	perennial ryegrass	standard entry
2. Winterplay	<i>Poa trivialis</i>	standard entry
3. ProSelect	40% Jet, 40% Sonata, 20% Integra perennial rye blend	Pennington Seed Co.
4. Marvelgreen Supreme	40% Palmer IV, 40% Prelude IV, 40% Sunkissed perennial rye blend	ProSeed Marketing
5. ALS2	perennial ryegrass	Lesco
6. PRS2	perennial ryegrass	Lesco
7. Overseeding Eagle Blend	33% Greenville, 33% ProSport, 34% Pacesetter perennial rye blend	Lesco
8. Futura 2500	30% Blazer 4 p. rye, 30% Sunshine II perennial rye, 40% Pick Lh A-00 intermediate rye	Pickseed West
9. Pick SD	perennial ryegrass	Pickseed West
10. Playmate	50% Headstart 2, 50% Pick HS-01-09 perennial rye blend	TurfOne
11. BMX 020383	perennial ryegrass	Lewis Seed Co.
12. RAD-OS3	intermediate ryegrass	Lewis Seed Co.
13. RAM-100	<i>Poa trivialis</i>	Lewis Seed Co.
14. IS-OS	perennial ryegrass	DLF International Seeds
15. Top Hat	perennial ryegrass	standard entry
16. IS-IR3	intermediate ryegrass	DLF International Seeds
17. Champion GQ	34% SR 4550, 33% SR 4420, 33% SR 4220 perennial rye blend	Seed Research of Oregon
18. Magnum Gold	34% Peregrine, 33% Hawkeye, 33% Penguin perennial rye blend	Seed Research of Oregon
19. Flash II	perennial ryegrass	Mountain View Seed
20. MTV-124	perennial ryegrass	Mountain View Seed
21. OS	perennial ryegrass	Mountain View Seed
22. STP	perennial ryegrass	Mountain View Seed
23. PR 17	perennial ryegrass	Mountain View Seed
24. Starlite	<i>Poa trivialis</i>	Mountain View Seed
25. CRR	perennial ryegrass	Novel AG
26. League Master	40% Ringer, 20% Omega 2, 20% 04-BRE, 20% 04-BEN perennial rye blend	Oregro Seeds
27. OSC110	perennial ryegrass	Olsen Seed Co.
28. OSC108	perennial ryegrass	Olsen Seed Co.
29. Covet	perennial ryegrass	Olsen Seed Co.
30. OSC116	perennial ryegrass	Olsen Seed Co.
31. Colt	<i>Poa trivialis</i>	standard entry

Table 2. Entries and sponsors in on-site testing of grasses for overseeding of bermudagrass fairways.

(available at www.ntep.org/onsite/ost.htm).

The following general observations concern the first year of the study (fall 2004 – spring 2005).

- The perennial ryegrasses overall provided the best turfgrass quality. However, at most locations, there was little statistical difference among the entries. This result is similar to results from previous overseeding trials.
- The *P. trivialis* varieties were slower to establish and develop into a dense stand, and they were lighter green in color than the perennial ryegrasses. The four *P. trivialis* entries had the lowest turfgrass quality ratings at most locations.
- The two intermediate ryegrass entries differed somewhat in their appearance and overall performance. The entry IS-IR3 performed better than RAD-OS3 at some locations, where it was statistically equal to many perennial ryegrass entries. This performance was not consistent, as the intermediate ryegrasses finished in the bottom for turfgrass quality at several other locations.
- The transition in spring from overseeding grass to actively growing bermudagrass did not reveal large differences in performance among entries. In some cases, the *P. trivialis* entries were poorer in this respect, resulting in reduced overseeding cover when the bermudagrass was not growing enough to provide adequate ground cover. At other locations, there was virtually no difference among any entries.

Fall 2005 – spring 2006 data collection

The same 31 entries seeded in fall 2004 were seeded again in September or October 2005 at the same 12 golf course sites. The same physical location on the golf course was used with the following two exceptions. An error occurred after seeding at the Myrtle Beach site, resulting in contamination of the entire trial. Therefore, no data were collected from this site during the 2005-2006 trial. A different area was used in 2005 at Eagles Landing CC (Stockbridge, Ga.) because the previous site had drainage problems.

A progress report containing 2005-2006 data and management information on this project is available on the NTEP Web site (www.ntep.org/onsite/ost.htm).

The following observations concern the second year of this trial (2005-2006).

- At most locations, the perennial ryegrass entries or blends of perennial ryegrasses were the best performers. Often, there was little or no statistical difference among the perennial ryegrasses for overall quality and fall and spring transition.



Cultivars and mixtures used for overseeding establish at different rates as seen at the trial site at Eagles Landing CC in Stockbridge, Ga.

- The fewest differences in overall turfgrass quality among entries were seen at Las Cruces, N.M. The greatest spread in overall turfgrass quality was recorded at Pinehurst, N.C. The Bryan, Texas, location showed greater differences among entries in 2005-2006 than in 2004-2005.
- The intermediate ryegrasses were the top performers only at the Roanoke, Va., site, and the *Poa trivialis* entries as a group also performed better at this location than at any others. The strong showing by both species is most likely attributable to Roanoke's status as the northernmost location for this trial.
- At many locations, the *P. trivialis* entries established significantly more slowly than the perennial ryegrasses, requiring 30-40 days after seeding to establish the same percentage ground cover as the perennial ryegrasses. This difference was most evident at Gainesville, Fla., where the *P. trivialis* entries provided only 70%-75% ground cover by the end of winter, compared to 85%-90% cover for the perennial ryegrasses.
- Again, the intermediate ryegrass entries, which do not have the density and dark green color of the best perennial ryegrasses, generally had lower quality ratings than the perennial ryegrasses. However, at several locations, the turfgrass quality of the intermediate ryegrasses was not significantly different from that of the perennial ryegrasses. The higher-ranking intermediate ryegrass entry, IS-IR3, finished in the

top statistical grouping for turfgrass quality at eight of the 11 locations.

Summary

After two years of this study and the previous study, we can draw the following conclusions about overseeding.

- Many perennial ryegrasses perform well in overseeding, and often there is no statistical difference among the entries. We have seen this trend in other overseeding trials.
- The usefulness of *Poa trivialis* in overseeding fairways is questionable. It is slower to establish than perennial ryegrass, and when *P. trivialis* is weakened by heat or disease, it seems to disappear

Seeding rates

Grass type	Location [†]											
	AZ	CA	FL(G)	FL(P)	GA	MS	NM	NC	OK	SC	TX	VA
Perennial ryegrass [§]	600	600	450	450	450	300	450	450	450	300	450	450
<i>Poa trivialis</i> [¶]	100	200	100	200	100	100	200	100	100	200	200	200
Mixtures ^{//}	400	400	400	400	400	250	400	250	250	250	400	250

[†]Locations are identified according to state abbreviation, but all the locations are the ones listed in Table 1. FL(G) is Gainesville, Fla., and FL(P) is Pensacola, Fla.

[‡]100 pounds/acre = 11.2 grams/square meter; 200 pounds/acre = 22.4 grams/square meter; 250 pounds/acre = 28.0 grams/square meter; 300 pounds/acre = 33.6 grams/square meter; 400 pounds/acre = 44.8 grams/square meter; 450 pounds/acre = 50.4 grams/square meter; 600 pounds/acre = 67.3 grams/square meter.

[§]Single cultivars or blends of perennial ryegrass.

[¶]Single cultivars of *Poa trivialis*.

^{//}Mixtures of perennial ryegrass or intermediate ryegrass and *P. trivialis*.

Table 3. On-site fairway overseeding trial location seeding rates.



Trials were established on active play areas, such as this site at Osceola GC in Pensacola, Fla., where golfers hit fairway golf shots and/or drove golf cars.



The research says

- In this study, 31 grasses and blends for overseeding bermudagrass were evaluated at 12 golf courses.
- At most locations, the perennial ryegrass entries or blends of perennial ryegrasses were the best performers.
- The *Poa trivialis* varieties had the lowest turfgrass quality ratings at most locations, were slower to establish and were lighter green in color than the perennial ryegrasses.
- The newer intermediate ryegrasses have quality closer to that of perennial ryegrass, and they tend to die back earlier, allowing the bermudagrass to grow in.
- Making the transition from overseeding to bermudagrass in spring is extremely difficult, and the results are greatly influenced by weather. Courses committed to overseeding should have realistic expectations of the outcome.

quickly, leaving insufficient green bermudagrass to provide acceptable turf quality. *Poa trivialis* is also a lighter green color than most perennial ryegrasses. However, because of its small size, *P. trivialis* seed is able to sift through the bermudagrass canopy and make soil contact even when the bermudagrass has not been physically disturbed. In these cases, *P. trivialis* produces a better turf stand than perennial ryegrass.

- The intermediate ryegrasses may be useful in fairway overseeding. The newer cultivars have quality closer to that of perennial ryegrass, but they tend to die back earlier, allowing the bermudagrass to grow in.
- Weather can affect establishment rate or success and initiation and speed of transition from overseeding grass to bermudagrass. Because weather always has the potential to disrupt transition, it is crucial for the superintendent to have the ability and the authority to adjust management schemes as needed.
- Making the transition from a turf stand dominated by overseeding grass to a stand of growing bermudagrass in spring is the most difficult task a superintendent faces during the overseeding period. The cooler, more northern sites, where overseeding grasses are strong going into winter, may not have sufficient bermudagrass to provide adequate cover and quality in spring. In all locations, the higher the quality of the overseeding in early fall, the more overseeding —

and the less bermudagrass cover — is present in spring. The result is a more difficult spring transition. When the quality of fall overseeding is low, overseeding in spring is weak, often leading to a better spring transition. Using a weaker cultivar or species may result in a better spring transition, but early heat and humidity may cause weaker overseeding grasses to transition sooner than expected.

The practice of overseeding bermudagrass fairways continues throughout the southern United States, but not without risk. Golf courses that subscribe to fairway overseeding must have clear goals and objectives and realistic expectations of the outcome. Success in overseeding needs to be carefully defined, considering expectations of the clientele tempered with a healthy dose of reality.

Literature cited

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