

# Overseed Performance of Sea Isle 2000 Seashore Paspalum

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## **Abstract**

*The new Seashore paspalum 'Sea Isle 2000' is being used as a greens surface in many tropical – semi tropical climates where saline water is available for irrigation. While its color retention in the fall in Tucson Arizona is good, it still enters full winter dormancy, and requires overseeding with a cool season grass for late fall, winter, and spring play. A two year test was conducted to evaluate the tolerance of Sea Isle 2000 to overseeding, and to evaluate overall turf performance of perennial ryegrass (PR), Poa trivialis (PT) and a mixture of the two when used for overseeding over Sea Isle 2000. PT alone was slow to establish as an overseed in year one, but not in year two. Turfgrass color, quality density and texture were acceptable throughout the test, noting that the 100% perennial ryegrass plot demonstrated a short-term loss of performance during the cold January of 2004. After the initial grow in period, absolute BRD was greatest when growing conditions were less than optimum in mid-winter, and again at the seasons end at the beginning of spring transition (May). This was true in both years. BRD was generally not different between the three overseeding regimes, either when turfs were double mowed prior to BRD measurements, or when a single rolling event was added on the day that BRD was assessed. The 100% PR overseed treatment showed the largest numerical increases in BRD from rolling. This was 6.5 inches in year one and 9.2 inches in year two. Yearly BRD averages of all overseeded surfaces for turfs that were double mowed in year one ranged from 91.5 to 92.4 inches, and in year two from 92.2 to 93.3 inches. Average yearly BRD values among all overseed turfs when rolling was included (including double mowing) in year one ranged from 95.8 to 98.2 inches and from 99.2 to 100.5 inches in year two. Maximum BRD values obtained were 107.8 and 114.3 inches in year one, and 100.0 and 111.1 inches in year two for the mowed only turfs, and mowed and rolled turfs, respectively.*

## **Introduction**

Sea Isle 2000 as a greens surface requires overseeding with a cool season grass in order to maintain a year round playing surface in the Desert Southwest. As Sea Isle 2000 does maintain green color somewhat longer than Tifgreen bermudagrass, it still enters a winter dormant stage accompanied by straw leaves. Since Seashore paspalum scalps easily and regrowth is extremely slow from most forms of mechanical injury, it is imperative to investigate the response of Sea Isle 2000 to overseeding and to evaluate commonly used overseeding species. With these objectives in mind, a two-year field trial was conducted on Sea Isle 2000 at the University of Arizona Karsten Turfgrass Research Center.

## Materials and Methods

Overseed treatments included turf-type perennial ryegrass (PR) seeded at 40 lbs. PLS/M, 'Sabre' Poa trivialis (PT) seeded at 9 lbs. PLS/M, and a mixture of perennial ryegrass and Poa trivialis (25 lbs. PLS/M ryegrass: 6 lbs. PLS/M Poa trivialis) (PR/PT).. Each treatment appeared four times in a CRD field design. Plots were 3.0 wide x 13.0 feet in length. The paspalum was prepared by decreasing irrigation, increasing mowing heights from 1/8" to 5/32", followed by repeated mowing at 1/8". This was followed by several light-medium intensity vertical mowing passes to remove upright leaves and stem tips to thin leaf density and to maximize retention of upright stems. The green was overseeded on October 10 in 2002, and October 9 in 2003. After seed was sown with a calibrated drop sprayer, 3/16" of dry topdressing sand was applied. The green was then rolled twice with an 875-lb. roller and irrigated for emergence. The greens were mowed at 3/8" and decreased to 5/16", 1/4", 3/16", "5/32" (mid-November) and then to 1/8" by mid-December.

Visual agronomic data included observations on all plots for visual turfgrass color, quality, density, texture and uniformity using the NTEP progressive scale system (1-9, 1 = dead, 5 = marginal, 6 = acceptable, 9 = best possible).

Percent turfgrass cover composition (amounts of paspalum versus overseed species) were rated visually during grow in and in early summer as well.

Ball roll distance (BRD) was taken six times during the overseed season by rolling three balls in each of two directions. The average of all six rolls was used in the analysis. BRD were taken after a standard double mowing event (45 degree opposed) and again immediately after all plots were rolled once with an 875 lb. smooth roller (Brouer 36" walk behind roller at a 45% angle to ball release). Therefore plots were rolled only once a month, on the day of BRD measurement.

All data was analyzed using the ANOVA technique using SAS software. LSD values were calculated as the mean separation statistic only when the F ratio for the treatment overseed main affect was significant at P=0.05, or less. The values of non-seeded controls are included in tables for reference purposes, but are not included in the ANOVA which included the treatments of perennial ryegrass, Poa trivialis, and the mixture of the two.

## Results and Discussion

### Establishment/Composition:

At two weeks after overseeding, the strait perennial ryegrass had the greatest amount of cool season grass cover, compared to the PT and the mixture of PR/PT. This was true in year one (21 October 2002). However, in year two (record high monthly temperatures); all three grasses had the same total cool season percent plot cover (72-77%) on 22 October 2003. In year one, plots averaged 70% cool season plot cover at 27 DAP (7 November 2002) and 94-98% cool season plot cover by 18 December 2002 (Table 1). Similarly, plot cover from overseed grass was 93-98% by 3 December 2003. Therefore, all three overseed mixtures did provide adequate cover, including the 40 lb. rate of perennial ryegrass. Popular literature (based on observations only) discounted the use of perennial ryegrass on paspalum greens due to the large seed size being an issue with canopy penetration at overseed. This was not an issue in either year of the test. In the second year of the test, visible straw (of dormant paspalum) was visible in late January for a short period of time. The strait perennial ryegrass allowed for a visible detection of the straw, while the PT allowed for the least. Likewise, the mixture was intermediate (2, 6 and 12%, respectively on 31 January 2004). (Table 1).

### Other agronomic responses:

Turfgrass color scores for overseeded turf ranged from 4.0 to 8.0 in year one (2003) and from 4.0 to 8.3 in year two (2004) (Table 2). The 'treatment effect' for color was statistically significant on all dates, for season averages, and for the two-year average. Poa trivialis produced the lightest color turf; perennial ryegrass produced the darkest color turf, while the mixture was intermediate. Note that the non-overseed paspalum held its color well into November in each year, but succumbed to repeated frosts and was nearly fully dormant by December in both years (Table 2).

Overall turfgrass quality scores ranged from 4.5 to 8.3 in 2002 and 2003. Year one quality averages were 6.9, 7.4 and 5.8 for PT, PR, and PT/PR mixture respectively (Table 3). Year two averages were 6.8, 6.9 and 7.0 for PT, PR, and PT/PR mixture, respectively. The mixture was slightly less uniform in appearance in year one, but this was not the case in year two (Table 3). In essence, all three overseed treatments produced satisfactory turf cover overall. The PR/PT species mixture was fully acceptable, but lower in quality for the two-year average (6.4) (Table 3). Note in year two that under repeated cold temperatures, that 100% PT produced good quality turf, and ryegrass did not (31 January 04). This was short lived however (Table 3). Of the 13 evaluation dates for quality, the treatment main affect was significant on 8 dates.

Visual density analysis showed that the treatment main effect was significant on 6 of 11 evaluation dates in the two-year test (Table 4). For the two year average, PT produced the denser looking overseed turfs, followed by the mixture of PT/PR. When PR was seeded alone at 40 lbs. PLS/M, it did produce a relatively dense turf as well (Table 4). Over the entire two-year test period, all treatments produced acceptable turf density (7.2-7.5 two-year average). Note again that ryegrass did show a decrease in visual density (and quality) for a short period in year two (31 January 2004) (Tables 3, 4).

Of the ten rating dates for overall plot texture, the treatment main affect was significant on six evaluation dates (Table 5). In year one, it was the mixture of PT/PR that ranked lowest for texture, due to the noticeable difference in leaf widths between PT and PR in the same plot (mixture). In year two, this was not the case, as the 100% PR proved to have the wider leaf blades (as expected) (Table 5). Note that mean texture scores were fully acceptable for all three overseed treatments throughout the entire test. PT alone always ranked first for texture on all dates and for yearly and overall test averages as well (Table 5).

#### Ball Roll Distance (BRD):

BRD was taken on all plots on twelve occasions (after double mowing and again after an additional rolling event was executed) during the two year test. Thus, analysis was performed for the three overseed treatments for double mowed turf, rolled turf, and the difference between rolled and double mowed only turfs. When treatments were double mowed, BRD in year one (2002-2003 overseed season) ranged from 74" to 108", and from 79" to 105" in year two (2003-2004 overseed season).

When double mowed only, the treatment main effect was significant for BRD on two of twelve evaluation dates only (25 November 2003: 24 May 2004). In these cases, the PR had the lowest BRD in the first fall and the highest BRD in late spring of the second year (Table 6, 7). Ranges for BRD among overseed turfs when double mowed were approximately 6.0 inches. When overseed treatments were double mowed, the maximum ball speeds occurred in year one during late January (test mean = 108 inches) and in year two in early February (test mean = 100.0"). The lowest overall BRD values occurred in both years in November (3/16" or 5/32 mowing height) closest to overseeding date in each case. Season averages for treatments for double mowed turfs were not significantly different from each other and all treatments were within 2.0 inches of each other when averaged over the entire season (Table 6, 7). The grand mean for double mowed overseed treatments was 92.4 and 92.6 inches for both overseed seasons, respectively.

When turfs received additional rolling on the day of BRD measurement the treatment affect was significant on two of twelve dates over the entire test period. This occurred on 28 March 2003 and on 24 May 2004. In both of these cases, the 100% PR turfs had the greatest mean BRD values when rolling was added. On average, rolling added an additional 8 inches in BRD for the 100% ryegrass overseed treatment. Increases from rolling on individual dates ranged from 3 to 14 inches for the turfs overseeded with 100% perennial ryegrass. The addition of rolling itself caused the most noticeable increases in BRD on 28 January 2003 and 8 February 2004. On these two dates, rolling added 6.5 and 11.1 inches respectively to BRD, when averaged over all overseed treatments. Rolling also increased BRD at the end of the test on May 24 2004, adding 11.3 inches in BRD when averaged across all three overseed treatments, and all overseed treatments benefited equally from rolling.

Statistically, the 'overseed composition' treatment main affect was not significant for seasonal averages of BRD when turfs received additional rolling (on the day BRD was taken). In 2002 and 2003, PT, PR and the PT/PR mixture averaged 95.8, 98.9 and 98.2 inches respectively for rolled BRD values. In 2003 and 2004, BRD values for PT, PR and the PT/PR mixture were 100.5, 102.6 and 99.2 inches respectively. In both years. Rolling once on the day BRD was taken added 6.5 inches to PR in year one, and 9.2 inches in year two. In essence, overseed treatment

were not greatly (statistically) different in BRD, whether mowed only, or when they received rolling in one direction the day BRD was taken (once/monthly). Rolling did increase BRD values 5.4 inches in year one and 8.3 inches in year two, noting that the increase in BRD from rolling was not different between the three individual overseed treatments, but that they all responded with similar increases in BRD from the additional roll event itself. Regular rolling as a cultural practice should be investigated.

#### Spring Transition:

In both years, spring transition from the overseed back to paspalum was smooth, without loss of any turf cover. The amount of overseed species in the overseed treatment was proportional to the amount of paspalum in the plots (Table1). The PR always ranked first for transition, followed by the PT/PR mixture, with 100% PT having the least amount of paspalum. The treatment main effect was statistically significant for the % paspalum plot cover on 10 May 2003, 24 April 2004 and 2 June 2004 when transition data was taken. Transition occurred naturally, without vertical mowing, plant growth regulators, or use of herbicides.

### **Conclusions**

1. Sea Isle 2000 as a putting greens surface on a USGA sand green mowed at 1/8" did accept and perform well with an overseed of either 40 lbs. PLS/M perennial ryegrass, 9 lbs. PLS/M of *Poa trivialis*, or 25 lbs. PLS/M perennial ryegrass plus 6 lbs. PLS/M of *Poa trivialis*.
2. PT alone was slow to establish as an overseed in year one, but not in year two.
3. Turfgrass color, quality density and texture were acceptable throughout the test, noting that the 100% perennial ryegrass plot demonstrated a short-term loss of performance during the cold January of 2004.
4. BRD was generally not different between the three overseeding regimes, either when turfs were double mowed prior to BRD measurements, or when a single rolling event was added.
5. 100% PR overseed showed the largest numerical increases in BRD from rolling. This was 6.5 inches in year one and 9.2 inches in year two.
6. After the initial grow in period, absolute BRD was greatest when growing conditions were less than optimum in mid-winter, and again at the seasons end at the beginning of spring transition (May). This was true in both years.
7. Maximum BRD values were 107.8 and 114.3 inches in year one, and 100.0 and 111.1 inches in year two for mowed only and mowed and rolled turf, respectively.
8. Yearly BRD averages of all overseeded surfaces for mowed only turf in year one ranged from 91.5 to 92.4 inches, and in year two from 92.2 to 93.3 inches.
9. Average yearly BRD values among all overseed turfs when rolling was included (after double mowing) in year one ranged from 95.8 to 98.2 inches, and from 99.2 to 100.5 inches in year two.

Table 1. Percent canopy composition of an Overseeded Paspalum green, Fall '02 - Spring '03 (Year 1) and Fall '03, Spring '04, (Year 2) Karsten Turfgrass Research Facility, University of Arizona, Tucson AZ

Overseed	% overseed 21-Oct-02	% overseed 7-Nov-02	% overseed 18-Dec-02	% paspalum 10-May-03	% overseed 22-Oct-03	% paspalum 22-Oct-03	% straw 3-Dec-03	% straw 31-Jan-04	% paspalum 24-Apr-04	% paspalum 2-Jun-04
Poa trivialis	15.5	70.0	94.3	41.9	77.5	22.5	7.5	2.0	23.5	55.5
P. Rye	42.5	68.0	98.3	76.6	72.5	27.5	3.0	12.5	31.3	84.5
Poa + Rye	29.5	71.8	96.5	52.8	76.3	23.8	2.3	6.0	19.3	67.8
Non-seeded control	0	0	15	100.0	0.0	100.0	98.0	0.0	94.0	100.0
<i>test mean</i>	29.2	69.9	96.3	57.1	75.4	24.6	4.3	6.8	24.7	69.3
<b>LSD</b>	11.4	ns	3.6	12.2	ns	ns	ns	5.3	6.3	10.1

Note: test mean does NOT include Non-seeded control

%composition = (0-100%) of plot. Values are the mean of four replications.

test mean = men of all overseeded plots only. Values are the mean of four replications

LSD= tretament mean separation statistic.

Table 2 Visual COLOR of Overseed on a Paspalum green, Fall '02 - Spring '03 (Year 1) and Fall 03, Spring 04 (Year 2).  
 Kersten Turfgrass Research Facility, University of Arizona, Tucson AZ

Overseed	Year 1								Year 2				All Years Avg			
	21-Oct-02	7-Nov-02	7-Dec-02	18-Dec-02	28-Jan-03	27-Feb-03	12-Apr-03	Avg	22-Oct-03	15-Nov-03	3-Dec-03	31-Jan-04		27-Mar-04	24-Apr-04	Avg
Poa trivialis	53	53	50	43	40	45	45	47	50	50	45	40	55	50	48	47
P. Rye	60	58	68	65	75	78	80	69	68	75	70	60	83	70	71	70
Poa+Rye	53	68	53	53	50	55	53	55	60	60	53	50	60	50	55	55
Non-seeded control	4	8	4	20	10	20	70	40	80	80	10	10	40	60	47	43
<i>test mean</i>	55	59	57	53	55	59	59	57	59	62	56	50	66	56	58	57
<b>LSD</b>	0.7	0.8	0.7	0.8	0.5	0.9	0.7	0.8	0.9	0.9	0.7	0.2	0.7	0.2	0.9	0.8

Note: test mean does NOT include Non-seeded control

Color = (1-9) 1=dead, 5=light/med green, 6=med green, 9=dark green. Values are the mean of four replications.

test mean = mean of all overseeded plots only. Values are the mean of four replications

LSD = treatment mean separation statistic.

Table 3. Visual QUALITY of Overseed on a Paspalum green, Fall '02 - Spring '03 (Year 1) and Fall '03, Spring '04 (Year 2).  
 Karsten Turfgrass Research Facility, University of Arizona, Tucson AZ

Overseed	Year 1								Year 2						All years Avg	
	21-Oct-02	7-Nov-02	7-Dec-02	18-Dec-02	28-Jan-03	27-Feb-03	12-Apr-03	Avg	22-Oct-03	15-Nov-03	3-Dec-03	31-Jan-04	27-Mar-04	24-Apr-04		Avg
Poa trivialis	55	83	78	53	70	70	78	69	75	75	48	65	75	73	68	69
P. Rye	68	80	68	63	80	78	80	74	70	78	63	45	85	70	69	71
Poa+Rye	60	65	68	45	55	58	58	58	78	78	65	55	85	70	70	64
Non-seeded control	4	6	3	20	20	20	60	36	40	60	10	10	40	50	35	35
<i>test mean</i>	61	76	71	53	68	68	72	67	74	77	58	55	82	71	69	68
LSD	1.0	1.0	ns	1.4	0.5	1.3	0.7		ns	ns	1.4	1.6	ns	ns	ns	ns

Note: test mean does NOT include Non-seeded control

Quality=(1-9) 1=dead, 5=marginal, 6=fully acceptable, 9= best possible. Values are the mean of four replications.

test mean = mean of all overseeded plots only. Values are the mean of four replications

LSD=treatment mean separation statistic.

**Table 4. Visual canopy DENSITY of Overseed on a Paspalum green, Fall '02- Spring'03  
Kersten Turfgrass Research Facility, University of Arizona, Tucson AZ**

Overseed	Year 1							Year 2					All Years Ag	
	21-Oct-02	7-Nov-02	7-Dec-02	28-Jan-03	27-Feb-03	12-Apr-03	Ag	15-Nov-03	3-Dec-03	31-Jan-04	27-Mar-04	24-Apr-04		Ag
Poa trivialis	53	85	80	78	85	85	78	85	58	63	80	80	73	75
P. Rye	60	85	75	75	80	75	75	75	73	45	78	73	69	72
Poa+Rye	53	70	78	80	78	83	73	88	83	58	85	78	78	75
Nonseeded control	3	5	4	10	20	60	35	60	20	10	30	50	34	35
<i>test mean</i>	55	80	78	78	81	81	76	83	71	55	81	77	73	75
<b>LSD</b>	ns	1.1	ns	ns	07	09	ns	09	1.5	08	ns	ns	ns	ns

**Note: test means do NOT include Nonseeded control**

Density=(1-9) 1=dead, 5=marginal, 6=fully acceptable, 9=best possible. Values are the mean of four replications.

test mean=mean of all overseed plots only. Values are the mean of four replications.

LSD=treatment means separation statistic.



Table 5. Visual canopy TEXTURE of Overseed on a Paspalum green, Fall '02 - Spring '03 (Year 1) and Fall 03', Spring 04' (Year 2).  
 Karsten Turfgrass Research Facility, University of Arizona, Tucson AZ.

Overseed	Year 1						Year 2					All years Avg.	
	7-Nov-02	7-Dec-02	28-Jan-03	27-Feb-03	12-Apr-03	Avg.	15-Nov-03	3-Dec-03	31-Jan-04	27-Mar-04	24-Apr-04		Avg.
Poa trivialis	8.3	7.8	8.3	7.8	8.5	8.1	8.0	8.0	7.3	8.3	6.3	7.6	7.8
P. Rye	8.0	6.5	6.8	6.8	7.8	7.2	7.0	6.5	6.0	6.5	5.5	6.3	6.7
Poa + Rye	7.0	7.0	7.8	6.5	7.5	7.2	8.0	7.5	6.8	8.8	6.3	7.5	7.3
Non-seeded control	5	4	1	2.0	6.0	3.6	6.0	4.0	1.0	3.0	5.0	3.8	3.7
<i>test mean</i>	7.8	7.1	7.6	7.0	7.9	7.5	7.7	7.3	6.7	7.8	6.0	7.1	7.3
<b>LSD</b>	1.2	1.0	1.3	0.8	ns		ns	1.1	ns	0.8	ns	1.1	ns

Note: test mean does NOT include Non-seeded control

Texture = (1-9) 1=dead, 5=marginal, 6 = fully acceptable, 9= best possible. Values are the mean of four replications.

test mean = mean of all overseeded plots only. Values are the mean of four replications

LSD= treatment mean separation statistic.

**Table 6. Ballroll distance (BRD) (inches) using a USGA stimpmeter of an overseeded Paspalum green after double-mow and after rolling with a weighted roller, Fall '02 - Spring '03.  
Karsten Turfgrass Research Facility, University of Arizona, Tucson AZ**

Overseed	25-Nov-02			7-Dec-02			28-Jan-03			10-Mar-03			28-Mar-03			14-May-03			season average		
	*	△		*	△		*	△		*	△		*	△		*	△		*	△	
Poa trivialis	78.9	82.3	3.4	95.8	98.3	2.5	108.4	111.6	3.2	82.9	88.0	5.1	87.1	89.3	2.2	100.5	105.2	4.7	92.2	95.8	3.5
P. Rye	73.7	80.8	7.1	94.0	98.1	4.1	107.4	114.9	7.5	86.0	94.5	8.5	91.3	99.8	8.5	101.6	105.0	3.5	92.3	98.9	6.5
Poa+Rye	77.6	82.0	4.4	97.3	97.0	-0.3	107.7	116.5	8.8	83.3	94.2	10.9	92.7	97.3	4.6	100.9	102.5	1.5	93.3	98.2	5.0
Non-seeded control	79.7	84.3	4.7	93.7	99.5	5.8	88.5	101.0	12.5	86.8	93.3	6.5	94	99.3	5.3	101.3	96.8	-4.5	90.7	95.7	5.1
<i>test mean</i>	76.7	81.7	5.0	95.7	97.8	2.1	107.8	114.3	6.5	84.1	92.2	8.1	90.4	95.5	5.1	101.0	104.2		92.6	97.6	5.4
<b>LSD</b>	24	ns		ns	ns		ns	ns		ns	ns		ns	8.0		ns	ns		ns	ns	ns

**Note: test mean does NOT include Non-seeded control**

**BRD= average of 6 releases from two directions. Values are the mean of 24 measurements.**

**test mean = mean of all overseeded plots only. Values are the mean of four replications**

**LSD= treatment mean separation statistic.**

Table 7. Ballroll distance (BRD) (inches) using a USGA stimpmeter of an overseeded Paspalum green after double-mow and after rolling with a weighed roller, Fall '03 - Spring 04'.

Karsten Turfgrass Research Facility, University of Arizona, Tucson AZ

Overseed	19-Dec			31-Jan			8-Feb			9-Mar			10-Apr			24-May			season avg		
	*	△		*	△		*	△		*	△		*	△		*	△		*		
Poa trivialis	79.1	88.7	9.6	95.3	104.2	8.9	101.3	114.6	13.3	85.0	85.5	0.5	101.4	110.8	9.4	92.3	99.5	7.3	92.4	100.5	8.2
P. Rye	83.7	87.6	3.9	94.3	106.6	12.3	97.5	110.0	12.5	84.6	88.0	3.4	99.6	107.8	8.1	100.5	115.3	14.8	93.4	102.6	9.2
Poa + Rye	81.3	84.6	3.3	94.2	102.5	8.3	101.1	108.6	7.5	81.5	85.5	4.0	98.4	109.4	11.0	92.8	104.5	11.7	91.5	99.2	7.6
Non-seeded control	84.3	99.0	14.7	91.5	102.0	10.5	99.8	119.8	20.0	82.7	92.5	9.8	105.0	119.0	14.0	92.3	103.3	11.0	92.6	105.9	13.3
<i>test mean</i>	81.4	87.0	5.6	94.6	104.4	9.8	100.0	111.1	11.1	83.7	86.4	27.0	99.8	109.3	9.5	95.2	106.5	11.3	92.4	100.8	8.3
<b>LSD</b>	ns	ns	ns	ns	ns	ns	ns	4.3	ns	ns	ns	ns	ns	ns	ns	6.2	ns	ns	ns	ns	ns

Note: test mean does NOT include Non-seeded control

\* Rolled with weighed roller after double-mow. Rolling factor = 0.07 Kg-cm

BRD= average of 6 releases from two directions. Values are the mean of 24 measurements.

test mean = mean of all overseeded plots only. Values are the mean of four replications

LSD= treatment mean separation statistic.