UCRTRAC Accumulative Research Summary
Section D: Unbiased Cultivar Evaluations
Project 1

Title: UCR Bentgrass Variety Trials, 1995-1999.

Objective: To evaluate a representative collection of creeping bentgrass cultivars in three southern California climates: south coastal valley and plains (Rancho Santa Fe Golf Club); south coast interior valley (Industry Hills Golf Courses); and southern California desert (The Springs Club). There are 18 cultivars that are common to the three locations. Primary data include visual turfgrass quality and genetic color. Secondary data may include pest tolerance, heat and wear tolerance, shoot and leaf density, root mass density, and thatch/mat accumulation.

Location: A nursery, built on a sand root-zone, located at each golf course. The nursery is maintained as a putting green. As might be expected, these nurseries do not receive golfer foot traffic nor play. Individual cultivar plot size: Industry Hills GC and The Springs Club = 5.0 x 7.0 ft; Rancho Santa Fe GC = 4.5 x 5.0 ft.

Duration: 3 or more years.

Funding Source: Considerable assistance from Golf Course Superintendents, Tim Barrier, Mike Kocour, and Bert Spivey; and UCCE Farm Advisors, Janet Hartin, Mike Henry, and David Shaw. Also, Tracey Barcelona participated in most of the evaluations.

Findings:

- Data for each location is presented in the following tables.

Status: Information associated with this study, including a summary of 1996 and 1997 data, was presented at the UCR Turfgrass Research Conference and Field Day. Information associated with this project was published in an abstract from the presentation, *Turf Tales Magazine*, and *California Fairways*.

Rancho Santa Fe Bentgrass Trial

Seeded November 20, 1995

	1 7	2 18	3 2	4 8	5 13	6 3	7 10	8 14	9 20	10 5
I	11 12	12 15	13 11	14 6	15 19	16 1	17 24	18 9	19	20 4
	21	22 23	23 4	24 7	25 13	26 2	27 11	28 15	29 5	30 10
	31	32 12	33 20	34	35 19	36 14	37 8	38 24	39 6	40
II	41 18	42 9	43 3	44 1	45 23	46 12	47	48 7	49	50 10
	51 13	52 4	53 11	54 5	55 2	56 14	57 19	58 6	59 18	60 15
III	61 3	62 8	63 24	64 9	65 1	66 20	67 20	68 12	69	70 3
	71 11	72 4	73 2	74 18	75 13	76 7	77 23	78 9	79 1	80 8
IV	81	82 15	83 5	84 19	85 14	86 10	87 6	88 24	89 23	90

GENOTYPE	COMPANY
1. Providence (SR1019)	Seed Research
2. PennLinks	Tee-2-Green
3. 18th Green	Johnson Seeds
4. Penncross	Tee-2-Green
5. Putter	Jacklin Seed Co.
6. Viper	International Seeds
7. Cobra	International Seeds
8. SR1020	Seed Research
9. Southshore	Lofts
10. Cato	Pickseed West
11. Crenshaw	Lofts
12. A-1	Penn State

GENOTYPE	COMPANY
13. A-4	Penn State
14. G-6	Penn State
15. SYN1	Pickseed
16. (not used)	
17. (not used)	
18. Backspin	Turf Merchants
19. Trueline	Turf Merchants
20. L-93	Lofts
21. (eliminated from trial)	
22. (eliminated from trial)	
23. SR1019 / SR1020	Seed Research
24. Cato / Cobra	Pickseed West / Int'l Seeds

Table 1. Percent cover, visual putting green quality and color ratings and visual scalping ratings for 22 creeping bentgrass cultivars and blends evaluated in the south coast valley and plains climate at Rancho Santa Fe Golf Club, Rancho Santa Fe, Calif. from 15 Dec. 1995 to 22 Dec. 1997.

	Percent cover (establishment)			Visual putting green quality ratings[z]											Visual putting green color ratings[y]				Scalping rating[x]
	Date			Date											Date				Date
Cultivar	15 Dec. 1995	3 Jan. 1996	26 Jan. 1996	30 May 1996	11 July 1996	22 Aug. 1996	4 Oct. 1996	10 Dec. 1996	26 Feb. 1997	25 Apr. 1997	20 Jan. 1997	16 Oct. 1997	22 Dec. 1997	Overall	30 May 1996	11 July 1996	22 Dec. 1997	Overall	4 Oct. 1996
Providence (SR1019)	31.3	55.0	92.5	6.4	6.3	6.3	6.3	6.2	6.5	6.9	6.8	6.2	6.1	6.4	3.0	2.8	3.9	3.2	8.3
PennLinks	27.5	50.0	86.3	5.9	5.9	6.1	5.9	6.1	5.8	6.6	6.4	6.0	6.0	6.1	2.5	2.0	3.9	2.8	8.5
18th Green	28.8	47.5	72.5	6.0	6.1	6.4	5.9	6.1	6.1	6.6	6.6	5.9	5.7	6.1	3.0	2.5	3.0	2.8	8.5
Penncross	36.3	66.3	90.0	5.3	5.1	5.3	5.5	5.5	5.4	5.9	5.7	5.8	5.3	5.5	2.0	1.0	3.0	1.9	9.0
Putter	32.5	55.0	82.5	6.3	6.4	6.1	5.9	5.9	5.8	6.3	6.3	6.1	5.9	6.1	3.3	3.3	3.3	3.3	8.5
Viper	37.5	51.3	88.8	6.0	6.1	6.1	5.6	6.3	6.1	6.3	6.3	6.0	5.6	6.0	3.5	2.3	3.0	2.9	8.5
Cobra	32.5	60.0	92.5	5.6	5.6	5.6	5.6	5.9	5.8	6.3	6.3	5.8	5.8	5.8	1.3	1.0	3.4	1.9	7.8
SR1020	37.5	57.5	92.5	6.9	6.9	6.6	6.3	6.3	6.6	6.8	7.0	6.3	6.3	6.6	3.3	2.8	3.8	3.2	8.5
Southshore	30.0	55.0	87.5	6.6	6.6	6.8	6.8	6.6	6.8	7.3	7.1	6.3	6.4	6.7	3.0	2.8	3.8	3.2	8.0
Cato	36.3	51.3	81.3	6.8	6.9	6.4	6.4	6.5	6.5	6.5	6.5	6.3	6.4	6.5	2.3	3.5	3.5	3.6	8.8
Crenshaw	25.0	48.8	82.5	6.7	6.9	6.9	6.8	6.6	6.4	7.1	7.3	6.4	6.3	6.7	4.3	3.8	3.4	3.8	8.3
A-1	32.5	61.3	90.0	6.9	6.9	6.8	7.0	6.9	6.7	7.4	7.4	6.4	6.6	6.9	4.3	3.5	4.1	4.0	8.3
A-4	30.0	53.8	90.0	7.4	7.7	7.5	6.0	7.1	7.2	7.6	8.1	6.2	7.4	7.2	4.3	4.3	4.6	4.4	6.8
G-6	35.0	60.0	90.0	7.7	7.7	7.3	6.6	7.4	7.6	7.9	8.3	6.6	7.8	7.5	5.0	4.3	4.6	4.6	6.8
SYN1	33.8	61.3	88.8	5.9	5.7	5.4	5.5	5.8	5.7	6.2	6.0	5.9	5.8	5.8	1.8	1.3	3.7	2.1	9.0
SR1119	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SR1120	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Backspin	25.0	52.5	83.8	7.1	7.1	7.2	6.3	6.7	6.6	7.2	7.4	6.2	6.4	6.8	3.3	3.3	3.9	3.5	7.3
Trueline	27.5	50.0	87.5	5.4	5.5	5.8	5.5	5.9	5.8	6.1	6.3	5.9	5.5	5.8	2.3	1.5	3.1	2.3	9.0
L-93	30.0	47.5	91.3	6.6	6.8	6.9	6.6	6.5	6.6	7.1	7.1	6.2	6.5	6.7	3.5	3.8	3.5	3.6	7.8
SR1019/SR1020	32.5	58.8	90.0	6.2	6.1	6.6	6.4	6.5	6.3	7.0	6.6	5.9	5.9	6.3	3.0	2.8	3.3	3.0	8.3
Cato/Cobra	32.5	51.3	87.5	5.9	6.1	6.3	5.9	6.4	6.4	6.6	6.7	6.2	5.9	6.2	3.8	2.3	3.3	2.6	8.0
LSD, $P = 0.05$[v]	NS	NS	NS	0.4	0.4	0.4	0.7	0.3	0.5	0.5	0.4	NS	0.5	0.2	0.9	0.9	0.6	0.5	1.3
Mean	31.7	54.7	87.4	6.4	6.4	6.4	6.1	6.3	6.3	6.8	6.8	6.1	6.2	6.4	3.1	2.7	3.6	3.1	8.2
C.V. (%)[u]	21.9	23.4	9.5	4.6	4.6	4.0	8.3	3.9	6.1	5.0	4.1	6.2	5.6	5.3	21.2	23.1	11.2	17.6	11.2

[z] Visual putting green quality ratings on a 1 to 9 scale with 1 = lowest quality, 5 = minimally acceptable and 9 = highest quality putting surface. Visual putting green quality ratings were a composite of leaf texture; leaf and shoot density; color; uniformity of leaf texture, density, orientation, and color; and surface smoothness.

[y] Visual genetic color ratings on a 1 to 5 scale with 1 = pale, lime green or unattractive color and 5 = deep, dark green.

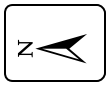
[x] Visual scalping ratings on a 1 to 9 scale with 1 = complete scalping and 9 = no scalping.

[v] LSD, $P = 0.05$: Least significant difference. Two cultivar / blend quality means (averages) are significantly different **only** if their difference is ≥ the LSD value.

[u] CV (%): Coefficient of variation. The relative measure of variation of a particular type of data.

Industry Hills Bentgrass Trial

Seeded November 9, 1995



	1 7	2 18	3 2	4 8	5 13	6 3	7 10	8 14	9 20	10 5	11 12
I	12 15	13 11	14 6	15 19	16 1	17 17	18 9	19	20 4	21	22 16
	23 4	24 7	25 13	26 2	27 11	28 5	29 15	30 10	31 16	32 12	33 20
II	34	35 19	36 14	37 8	38 17	39 6	40	41 18	42 9	43 3	44 1
	45 16	46 12	47	48 7	49	50 10	51 13	52 4	53 11	54 5	55 2
III	56 14	57 19	58 6	59 18	60 15	61 3	62 8	63 17	64 9	65 1	66 20
	67 20	68 12	69	70 3	71 11	72 4	73 2	74 18	75 13	76 7	77
IV	78 9	79 1	80 8	81	82 15	83 5	84 19	85 14	86 10	87 6	88

GENOTYPE	COMPANY
1. Providence (SR1019)	Seed Research
2. PennLinks	Tee-2-Green
3. 18th Green	Johnson Seeds
4. Penncross	Tee-2-Green
5. Putter	Jacklin Seed Co.
6. Viper	International Seeds
7. Cobra	International Seeds
8. SR1020	Seed Research
9. Southshore	Lofts
10. Cato	Pickseed West
11. Crenshaw	Lofts
12. A-1	Penn State

GENOTYPE	COMPANY
13. A-4	Penn State
14. G-6	Penn State
15. SYN1	Pickseed
16. SR1119	Seed Research
17. SR1120	Seed Research
18. Backspin	Turf Merchants
19. Trueline	Turf Merchants
20. L-93	Lofts
21. (eliminated from trial)	
22. (eliminated from trial)	
23. (not used)	
24. (not used)	

Table 2. Visual putting green quality ratings for 20 creeping bentgrass cultivars and blends evaluated in the south coast interior valley climate at Industry Hills Golf Courses, City of Industry, Calif. from 7 June 1996 to 16 Aug. 1999.

	Visual putting green quality ratings[z]																		
	Date																		
Cultivar	7 June 1996	26 July 1996	30 Aug. 1996	16 Oct. 1996	20 Dec. 1996	13 Feb. 1997	11 Apr. 1997	9 May 1997	10 July 1997	22 Sept. 1997	7 Nov. 1997	3 Apr. 1998	29 June 1998	3 Aug. 1998	3 Dec. 1998	14 Apr. 1999	25 May 1999	16 Aug. 1999	Overall
G-6	7.4	7.8	8.4	7.4	7.1	7.1	7.8	7.6	7.6	7.0	7.2	7.3	7.1	7.4	7.1	7.4	7.4	7.4	7.4
A-1	7.1	7.3	8.1	7.3	7.0	7.1	7.4	7.3	7.4	7.3	7.4	7.2	7.3	7.4	6.7	7.2	7.0	7.2	7.3
A-4	7.3	7.9	8.4	7.6	7.1	7.0	7.4	7.4	7.4	7.4	7.6	7.3	7.1	7.4	6.3	7.3	6.9	7.3	7.3
Crenshaw	6.8	6.9	7.9	7.5	6.8	6.8	7.2	7.0	7.4	7.4	7.2	7.0	6.8	7.4	7.1	6.9	7.1	7.3	7.1
L-93	6.6	7.2	8.0	7.3	6.6	6.4	6.9	6.9	7.1	6.9	7.3	7.1	6.6	7.1	6.8	6.9	7.0	6.9	7.0
Backspin	6.5	6.8	7.7	7.2	6.8	6.5	7.2	7.0	7.0	7.1	7.2	6.8	6.8	7.1	6.3	6.8	7.1	7.3	6.9
Southshore	6.3	6.7	8.0	7.3	6.6	6.7	7.1	6.9	6.8	7.1	7.2	6.7	6.6	6.9	6.5	6.8	6.9	6.9	6.9
SR1119	6.6	7.0	7.8	7.1	6.6	6.4	6.9	7.0	6.9	7.3	6.6	6.7	6.8	7.1	6.8	6.9	7.0	6.9	6.9
SR1120	6.3	6.8	8.0	7.1	6.6	6.4	6.8	6.8	6.8	6.8	6.5	6.7	6.3	7.1	7.1	6.7	7.0	7.0	6.8
SR1020	6.1	6.9	7.5	6.9	6.4	6.2	6.7	6.7	6.4	6.8	6.6	6.2	5.9	7.0	6.5	6.8	6.7	6.8	6.6
Cato	6.3	6.8	7.8	7.1	6.3	6.2	6.3	6.4	6.3	6.6	6.2	6.0	5.8	6.6	6.8	6.4	6.6	7.0	6.5
Providence (SR1019)	6.4	6.4	7.6	7.0	6.5	6.4	6.8	6.5	6.4	6.7	6.3	6.1	5.7	6.6	6.6	6.4	6.7	6.8	6.5
PennLinks	5.9	6.4	7.1	6.8	6.2	6.1	6.4	6.3	6.1	6.7	6.2	5.6	5.9	6.6	6.6	6.7	6.6	6.6	6.4
18th Green	5.6	6.4	7.0	6.4	6.1	6.1	6.3	6.1	6.2	6.3	6.1	5.7	5.6	6.9	6.3	6.4	6.4	6.6	6.3
Putter	5.8	6.3	7.1	6.6	6.1	6.1	6.0	6.0	6.1	6.3	6.0	6.1	5.7	6.6	6.8	6.4	6.7	6.7	6.3
SYN1	5.4	6.1	6.6	6.3	6.0	6.1	6.4	6.1	6.0	6.4	6.3	6.2	5.9	6.5	6.7	6.2	6.9	6.8	6.3
Viper	5.9	6.6	7.1	6.6	5.9	5.9	5.9	5.9	6.0	6.1	5.5	5.7	5.8	6.5	6.4	6.2	6.5	6.8	6.2
Cobra	5.5	6.3	6.9	6.4	6.0	5.7	5.8	5.9	5.8	6.1	5.7	5.5	5.4	6.3	6.5	6.3	6.4	6.6	6.1
Trueline	5.4	5.8	6.5	6.6	6.1	5.9	5.9	5.9	6.0	6.5	5.8	5.8	5.6	6.5	6.4	6.1	6.5	6.8	6.1
Penncross	5.1	5.7	6.3	5.7	5.6	5.6	5.5	5.5	5.4	5.7	5.4	5.3	5.1	5.8	6.3	6.0	6.3	6.6	5.7
LSD, $P = 0.05$[y]	0.4	0.4	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.2	0.3	0.1
Mean	6.2	6.7	7.5	6.9	6.4	6.3	6.6	6.5	6.5	6.7	6.5	6.3	6.2	6.8	6.6	6.6	6.8	6.9	6.6
C.V. (%)[x]	4.8	3.7	4.8	4.8	3.3	3.6	3.7	3.3	3.2	5.1	5.8	5.0	4.5	3.8	4.2	3.3	2.4	2.9	4.0

[z] Visual putting green quality ratings on a 1 to 9 scale with 1 = lowest quality, 5 = minimally acceptable and 9 = highest quality putting surface. Visual putting green quality ratings were a composite of leaf texture; leaf and shoot density; color; uniformity of leaf texture, density, orientation, and color; and surface smoothness.

[y] LSD, $P = 0.05$: Least significant difference. Two cultivar / blend quality means (averages) are significantly different **only** if their difference is ≥ the LSD value.

[x] CV (%): Coefficient of variation. The relative measure of variation of a particular type of data.

Table 3. Visual putting green color ratings for 20 creeping bentgrass cultivars and blends evaluated in the south coast interior valley climate at Industry Hills Golf Courses, City of Industry, Calif. from 7 June 1996 to 16 Aug. 1999.

	Visual putting green color ratings[z]								
	Date								
Cultivar	7 June 1996	16 Oct. 1996	11 Apr. 1997	7 Nov. 1997	3 Apr. 1998	29 June 1998	14 Apr. 1999	16 Aug. 1999	Overall
A-4	4.5	4.3	4.0	3.8	3.8	3.5	3.3	3.6	3.9
G-6	4.5	4.0	4.0	3.5	4.0	2.7	3.8	3.6	3.8
A-1	4.3	3.3	4.0	3.8	3.8	3.3	3.5	3.8	3.7
Crenshaw	3.8	4.5	3.5	3.3	3.8	3.3	3.0	4.1	3.6
L-93	3.8	4.3	3.3	3.5	3.8	2.8	3.1	3.4	3.5
Southshore	3.3	3.5	3.5	3.0	3.0	3.0	3.0	3.1	3.2
SR1119	4.0	4.0	3.7	2.7	3.0	2.3	3.2	3.0	3.2
SR1120	3.3	4.3	3.3	3.0	3.3	2.3	3.0	3.2	3.2
Backspin	2.8	1.3	3.8	3.3	3.3	3.0	3.0	3.7	3.0
Cato	3.0	3.5	3.0	3.0	2.8	2.0	2.9	3.6	3.0
Providence (SR1019)	3.0	3.8	3.5	2.8	3.0	2.0	2.8	3.0	3.0
SR1020	3.3	2.3	3.5	3.0	2.8	2.0	3.1	2.9	2.8
Viper	2.5	3.5	3.0	2.3	2.5	2.3	2.3	2.8	2.6
PennLinks	2.3	2.5	3.3	2.8	2.3	2.0	2.8	2.5	2.5
Putter	2.8	2.3	2.8	2.3	2.8	2.0	2.5	2.8	2.5
18th Green	1.5	2.3	3.0	2.5	3.0	2.0	2.5	2.5	2.4
Cobra	2.0	2.3	3.0	2.8	2.8	2.0	2.3	2.5	2.4
SYN1	1.8	1.8	2.8	3.3	2.8	2.3	2.4	2.6	2.4
Trueline	1.8	2.8	3.0	2.3	2.8	2.0	2.3	2.8	2.4
Penncross	1.0	1.3	2.0	2.3	2.0	2.0	2.5	2.4	1.9
LSD, $P = 0.05$[y]	1.0	1.2	0.6	0.7	0.6	0.5	0.5	0.7	0.2
Mean	2.9	3.0	3.3	2.9	3.0	2.4	2.8	3.1	2.9
C.V. (%)[x]	23.0	26.5	11.9	17.4	13.5	14.1	11.2	14.8	16.9

[z] Visual genetic color ratings on a 1 to 5 scale with 1 = pale, lime green or unattractive color and 5 = deep, dark green.

[y] LSD, $P = 0.05$: Least significant difference. Two cultivar / blend color means (averages) are significantly different **only** if their difference is ≥ the LSD value.

[x] CV (%): Coefficient of variation. The relative measure of variation of a particular type of data.

Table 4. *Poa annua* coverage of 20 creeping bentgrass cultivars and blends evaluated in the south coast interior valley climate at Industry Hills Golf Courses, City of Industry, Calif. on 9 Feb. 2000.

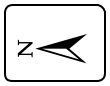
	Percent *poa annua* coverage
	Date
Cultivar	9 Feb. 2000
Viper	22
Penncross	20
Cobra	17
Cato	15
SYN1	15
18th Green	14
PennLinks	14
Putter	14
Trueline	14
SR1020	11
A-1	10
SR1119	10
SR1120	10
Crenshaw	9
L-93	9
Providence (SR1019)	9
Southshore	9
Backspin	7
G-6	6
A-4	4
LSD, $P = 0.05$[z]	5
Mean	12
C.V. (%)[y]	29.8

[z] LSD, $P = 0.05$: Least significant difference. Two cultivar / blend *poa annua* coverage means (averages) are significantly different **only** if their difference is ≥ the LSD value.

[y] CV (%): Coefficient of variation. The relative measure of variation of a particular type of data.

The Springs Club Bentgrass Trial

Seeded November 21, 1995



I	1 7	2 18	3 2	4 8	5 13	6 3	7 10	8 14	9 20	10 5	11 12
	12 15	13 11	14 6	15 19	16 1	17 17	18 9	19 23	20 4	21 24	22 16
II	23 4	24 7	25 13	26 2	27 11	28 15	29 5	30 10	31 16	32 12	33 20
	34 23	35 19	36 14	37 8	38 17	39 6	40 24	41 18	42 9	43 3	44 1
III	45 16	46 12	47 23	48 7	49 24	50 10	51 13	52 4	53 11	54 5	55 2
	56 14	57 19	58 6	59 18	60 15	61 3	62 8	63 17	64 9	65 1	66 20
IV	67 20	68 12	69 24	70 3	71 11	72 4	73 2	74 18	75 13	76 7	77 14
	78 9	79 1	80 8	81 23	82 15	83 5	84 19	85	86	87 6	88 10

GENOTYPE	COMPANY
1. Providence (SR1019)	Seed Research
2. PennLinks	Tee-2-Green
3. 18th Green	Johnson Seeds
4. Penncross	Tee-2-Green
5. Putter	Jacklin Seed Co.
6. Viper	International Seeds
7. Cobra	International Seeds
8. SR1020	Seed Research
9. Southshore	Lofts
10. Cato	Pickseed West
11. Crenshaw	Lofts
12. A-1	Penn State

GENOTYPE	COMPANY
13. A-4	Penn State
14. G-6	Penn State
15. SYN1	Pickseed
16. SR1119	Seed Research
17. SR1120	Seed Research
18. Backspin	Turf Merchants
19. Trueline	Turf Merchants
20. L-93	Lofts
21. (not used)	
22. (not used)	
23. SR1019 / SR1020	Seed Research
24. Cato / Cobra	Pickseed West / Int'l Seeds

Table 5. Visual putting green quality and color ratings and percent cover for 22 creeping bentgrass cultivars and blends evaluated in the south California desert climate at The Springs Club, Rancho Mirage, Calif. from 3 Apr. 1996 to 9 Aug. 1996[z].

	Visual putting green quality ratings[y]						Visual putting green color ratings[x]				Percent cover[w]
	Date						Date				Date
Cultivar	3 Apr. 1996	2 May 1996	28 May 1996	3 July 1996	26 July 1996	Overall	3 Apr. 1996	2 May 1996	28 May 1996	Overall	9 Aug. 1996
Providence (SR1019)	6.5	6.3	6.4	6.9	6.0	6.4	3.5	3.0	3.5	3.3	32.5
PennLinks	6.0	5.8	5.9	6.2	5.8	5.9	2.0	1.8	2.3	2.0	26.3
18th Green	5.8	6.3	6.1	6.8	6.1	6.2	1.3	3.0	3.3	2.5	13.8
Penncross	5.8	5.5	5.3	5.7	5.3	5.5	1.5	1.5	1.5	1.5	62.5
Putter	6.0	6.0	6.2	6.7	5.9	6.2	3.0	3.0	2.8	2.9	46.3
Viper	6.3	6.0	6.1	6.6	6.5	6.3	3.3	2.8	2.8	2.9	75.0
Cobra	6.0	5.8	6.1	6.2	5.4	5.9	2.0	1.5	2.5	2.0	30.0
SR1020	6.6	6.8	6.6	6.9	5.4	6.5	3.5	3.8	3.3	3.5	8.8
Southshore	6.6	6.6	6.9	6.6	6.1	6.6	3.3	4.0	3.8	3.7	42.5
Cato	6.6	6.1	6.1	6.9	5.8	6.3	4.0	3.3	2.5	3.3	30.8
Crenshaw	7.0	6.9	6.9	7.4	6.4	6.9	4.0	3.8	4.0	3.9	30.8
A-1	6.8	7.0	7.1	7.2	5.6	6.7	3.5	4.0	4.5	4.0	5.5
A-4	7.6	7.4	7.4	7.3	6.3	7.2	4.8	4.3	4.8	4.6	23.5
G-6	7.9	7.6	7.4	7.6	6.4	7.4	5.0	5.0	4.8	4.9	10.8
SYN1	6.0	5.9	5.9	5.8	5.2	5.7	1.5	2.3	2.8	2.2	41.3
SR1119	6.9	6.8	6.8	7.0	6.2	6.8	4.0	4.0	4.3	4.1	30.0
SR1120	6.3	6.3	6.4	6.7	6.0	6.4	3.7	3.7	3.7	3.7	70.0
Backspin	7.0	6.5	7.1	7.2	6.6	6.9	3.3	2.5	2.8	2.8	23.8
Trueline	6.0	6.3	6.1	6.5	5.6	6.1	2.5	2.8	2.8	2.7	25.3
L-93	6.9	6.5	6.7	6.9	6.0	6.6	3.8	3.8	3.5	3.7	25.8
SR1019/SR1020	6.8	6.6	6.1	6.8	6.2	6.5	3.8	3.8	2.8	3.4	46.3
Cato/Cobra	6.1	6.3	5.8	6.8	5.7	6.1	3.0	3.3	2.5	2.9	43.3
LSD, $P = 0.05$[v]	0.4	0.8	0.6	0.6	0.7	0.3	0.7	1.6	1.1	0.6	32.3
Mean	6.5	6.4	6.4	6.7	5.9	6.4	3.2	3.2	3.2	3.2	33.5
C.V. (%)[u]	4.2	8.7	6.1	5.9	8.3	7.2	15.7	34.7	24.8	23.6	67.3

[z] Plot originally seeded on 21 Nov. 1995. Due to heat and drought stress the plot was later re-seeded on 4 Dec. 1996.

[y] Visual putting green quality ratings on a 1 to 9 scale with 1 = lowest quality, 5 = minimally acceptable and 9 = highest quality putting surface. Visual putting green quality ratings were a composite of leaf texture; leaf and shoot density; color; uniformity of leaf texture, density, orientation, and color; and surface smoothness.

[x] Visual genetic color ratings on a 1 to 5 scale with 1 = pale, lime green or unattractive color and 5 = deep, dark green.

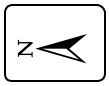
[w] Percent cover after recovery from heat and drought stress.

[v] LSD, $P = 0.05$: Least significant difference. Two cultivar / blend quality means (averages) are significantly different **only** if their difference is ≥ the LSD value.

[u] CV (%): Coefficient of variation. The relative measure of variation of a particular type of data.

The Springs Club Bentgrass Trial

Seeded December 4, 1996



I	1 7	2 18	3 2	4 8	5 13	6 3	7 10	8 14	9 20	10 5	11 12
	12 15	13 11	14 6	15 19	16 1	17 24	18 9	19 23	20 4	21	22 16
II	23 4	24 7	25 13	26 2	27 11	28 15	29 5	30 10	31 16	32	33 20
	34 23	35 19	36 14	37 8	38 12	39 6	40 24	41 18	42 9	43 3	44 1
III	45 16	46 12	47 23	48 7	49 24	50 10	51 13	52 4	53 11	54 5	55 2
	56 14	57 19	58 6	59 18	60 15	61 3	62 8	63	64 9	65 1	66 20
IV	67 20	68 12	69 24	70 3	71 11	72 4	73 2	74 18	75 13	76	77 14
	78 9	79 1	80 8	81 23	82 15	83 5	84 19	85 16	86 7	87 6	88 10

GENOTYPE	COMPANY
1. Providence (SR1019)	Seed Research
2. PennLinks	Tee-2-Green
3. 18th Green	Johnson Seeds
4. Penncross	Tee-2-Green
5. Putter	Jacklin Seed Co.
6. Viper	International Seeds
7. Cobra	International Seeds
8. SR1020	Seed Research
9. Southshore	Lofts
10. Cato	Pickseed West
11. Crenshaw	Lofts
12. A-1	Penn State

GENOTYPE	COMPANY
13. A-4	Penn State
14. G-6	Penn State
15. SYN1	Pickseed
16. SR1119	Seed Research
17. (not used)	
18. Backspin	Turf Merchants
19. Trueline	Turf Merchants
20. L-93	Lofts
21. (not used)	
22. (not used)	
23. SR1019 / SR1020	Seed Research
24. Cato / Cobra	Pickseed West / Int'l Seeds

Table 6. Visual putting green quality ratings for 21 creeping bentgrass cultivars and blends evaluated in the south California desert climate at The Springs Club, Rancho Mirage, Calif. from 10 Apr. 1997 to 15 July 1998[z].

	Visual putting green quality ratings[y]																
	Date																
Cultivar	10 Apr. 1997	7 May 1997	18 June 1997	25 July 1997	20 Aug. 1997	23 Sept. 1997	23 Oct. 1997	19 Nov. 1997	17 Dec. 1997	20 Jan. 1998	19 Feb. 1998	18 Mar. 1998	22 Apr. 1998	20 May 1998	17 June 1998	15 July 1998	Overall
Providence (SR1019)	5.9	6.0	5.9	5.4	5.5	4.3	6.3	6.8	6.6	6.6	6.8	6.5	5.9	6.1	6.0	6.3	6.0
PennLinks	5.9	6.1	5.8	5.4	5.3	5.1	6.4	7.4	6.8	6.6	6.9	6.6	6.1	6.1	6.0	5.8	6.1
18th Green	5.6	5.4	5.8	4.4	4.0	3.1	5.0	5.5	3.8	4.8	5.5	4.7	5.0	5.7	5.5	5.7	4.9
Penncross	6.3	6.1	5.9	5.3	5.3	5.8	6.5	6.8	6.4	6.4	7.0	6.3	5.4	5.9	5.1	5.1	6.0
Putter	5.4	5.5	5.5	5.0	5.4	4.6	5.8	6.4	5.8	6.3	6.5	5.6	5.4	6.1	5.6	5.5	5.6
Viper	5.6	6.0	5.8	5.3	5.3	4.6	6.4	6.5	5.6	6.4	6.6	6.1	5.6	5.9	4.9	5.5	5.8
Cobra	5.5	5.9	5.6	4.9	4.9	4.5	6.1	6.6	5.9	6.3	6.5	6.0	4.9	5.8	4.9	5.4	5.6
SR1020	5.4	6.3	6.1	5.8	5.9	5.3	6.6	7.3	6.3	7.1	7.3	6.9	6.4	6.8	6.4	6.1	6.4
Southshore	5.4	5.9	5.6	4.8	4.9	3.5	5.8	6.8	6.3	6.6	6.8	6.3	5.8	6.4	6.3	6.3	5.8
Cato	5.3	5.0	5.5	4.1	3.6	2.9	4.0	5.5	4.5	5.8	5.7	5.7	4.7	5.7	4.8	5.2	4.8
Crenshaw	6.1	6.3	6.0	5.6	5.8	5.3	7.7	7.2	7.2	7.0	7.3	6.8	6.8	7.0	6.7	6.8	6.6
A-1	5.9	6.1	6.3	5.0	4.5	3.6	5.6	6.8	6.9	7.0	7.1	6.9	6.3	7.3	6.8	6.4	6.1
A-4	6.8	7.0	6.3	6.1	6.8	6.3	7.4	8.0	7.6	8.1	8.4	8.0	7.3	7.4	6.4	6.5	7.1
G-6	6.0	6.3	6.1	5.5	4.8	4.3	6.1	7.1	6.9	7.4	7.5	7.5	6.8	7.3	6.4	6.4	6.4
SYN1	5.4	5.4	5.0	4.8	4.7	5.2	6.3	6.5	6.5	6.5	6.8	6.7	5.7	6.5	5.5	6.2	5.8
SR1119	5.8	6.0	6.1	5.9	6.0	5.3	7.3	7.9	7.3	7.4	7.5	7.3	6.1	6.8	6.4	6.9	6.6
SR1120	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Backspin	5.3	5.3	5.5	5.5	5.3	5.4	6.6	7.5	6.4	6.9	7.8	7.3	6.8	6.9	6.3	6.4	6.3
Trueline	6.0	6.1	5.9	4.8	4.9	4.9	6.3	6.8	6.8	6.5	6.8	6.1	5.4	6.0	5.5	5.8	5.9
L-93	5.9	5.8	5.9	5.8	5.8	4.4	6.5	6.8	7.3	6.9	7.1	7.1	6.3	6.6	6.4	6.3	6.3
SR1019/SR1020	5.0	5.3	5.3	5.1	5.4	4.6	6.4	7.3	6.5	7.1	6.8	6.9	6.1	6.6	5.9	6.0	6.0
Cato/Cobra	5.1	5.3	5.1	4.4	4.8	3.9	5.3	6.6	5.9	6.4	7.0	6.1	5.5	6.4	5.8	5.1	5.5
LSD, $P = 0.05$[x]	0.9	NS	NS	1.0	1.1	1.6	1.1	0.9	1.2	0.8	0.9	0.9	0.9	0.6	1.1	0.7	0.2
Mean	5.7	5.8	5.8	5.2	5.2	4.6	6.2	6.9	6.4	6.7	7.0	6.6	5.9	6.4	5.9	6.0	6.0
C.V. (%)[w]	11.0	13.6	11.1	13.2	15.1	24.4	12.5	8.9	12.9	8.6	8.6	9.5	10.2	6.5	12.3	8.2	9.4

[z] Plot originally seeded on 21 Nov. 1995. Due to heat and drought stress the plot was later re-seeded on 4 Dec. 1996.

[y] Visual putting green quality ratings on a 1 to 9 scale with 1 = lowest quality, 5 = minimally acceptable and 9 = highest quality putting surface. Visual putting green quality ratings were a composite of leaf texture; leaf and shoot density; color; uniformity of leaf texture, density, orientation, and color; and surface smoothness.

[x] LSD, $P = 0.05$: Least significant difference. Two cultivar / blend quality means (averages) are significantly different **only** if their difference is ≥ the LSD value.

[w] CV (%): Coefficient of variation. The relative measure of variation of a particular type of data.

Table 7. Visual putting green color ratings for 21 creeping bentgrass cultivars and blends evaluated in the south California desert climate at The Springs Club, Rancho Mirage, Calif. from 20 Aug. 1997 to 22 Apr. 1998[z].

	Visual putting green color ratings[y]			
	Date			
Cultivar	20 Aug. 1997	17 Dec. 1997	22 Apr. 1998	Overall
Providence (SR1019)	3.3	3.6	3.5	3.5
PennLinks	3.1	3.4	3.4	3.3
18th Green	3.2	2.5	2.5	2.8
Penncross	3.1	3.6	3.0	3.2
Putter	3.3	3.3	3.1	3.2
Viper	3.1	2.8	3.1	3.0
Cobra	2.9	3.1	3.1	3.0
SR1020	3.4	3.2	3.5	3.4
Southshore	3.1	3.4	3.4	3.3
Cato	3.1	3.3	3.2	3.2
Crenshaw	3.8	3.6	3.8	3.7
A-1	3.1	3.6	4.1	3.6
A-4	3.8	3.8	4.1	3.9
G-6	3.3	3.6	4.1	3.7
SYN1	3.0	3.3	3.2	3.1
SR1119	3.8	3.9	3.6	3.8
SR1120	–	–	–	–
Backspin	3.1	3.4	4.0	3.5
Trueline	3.0	3.4	3.3	3.2
L-93	3.3	3.6	3.9	3.6
SR1019/SR1020	3.3	3.4	3.6	3.5
Cato/Cobra	3.1	3.1	3.1	3.1
LSD, $P = 0.05$[x]	0.4	0.5	0.5	0.3
Mean	3.2	3.4	3.5	3.4
C.V. (%)[w]	9.3	10.5	10.0	10.3

[z] Plot originally seeded on 21 Nov. 1995. Due to heat and drought stress the plot was later re-seeded on 4 Dec. 1996.

[y] Visual genetic color ratings on a 1 to 5 scale with 1 = pale, lime green or unattractive color and 5 = deep, dark green.

[x] LSD, $P = 0.05$: Least significant difference. Two cultivar / blend quality means (averages) are significantly different **only** if their difference is ≥ the LSD value.

[w] CV (%): Coefficient of variation. The relative measure of variation of a particular type of data.

Figure 1. Monthly average maximum and minimum air temperatures recorded from CIMIS weather stations located at Pomona (POM) (nearest to Industry Hills GC; south coast interior valley climate), Oceanside (OCN) (nearest to Rancho Santa Fe GC; south coast coastal valley and plains climate), and Cathedral City (CTH) (nearest to The Springs Club; southern California desert climate) for 1996-97. Monthly averages are calculated from daily maximum and minimum air temperatures.

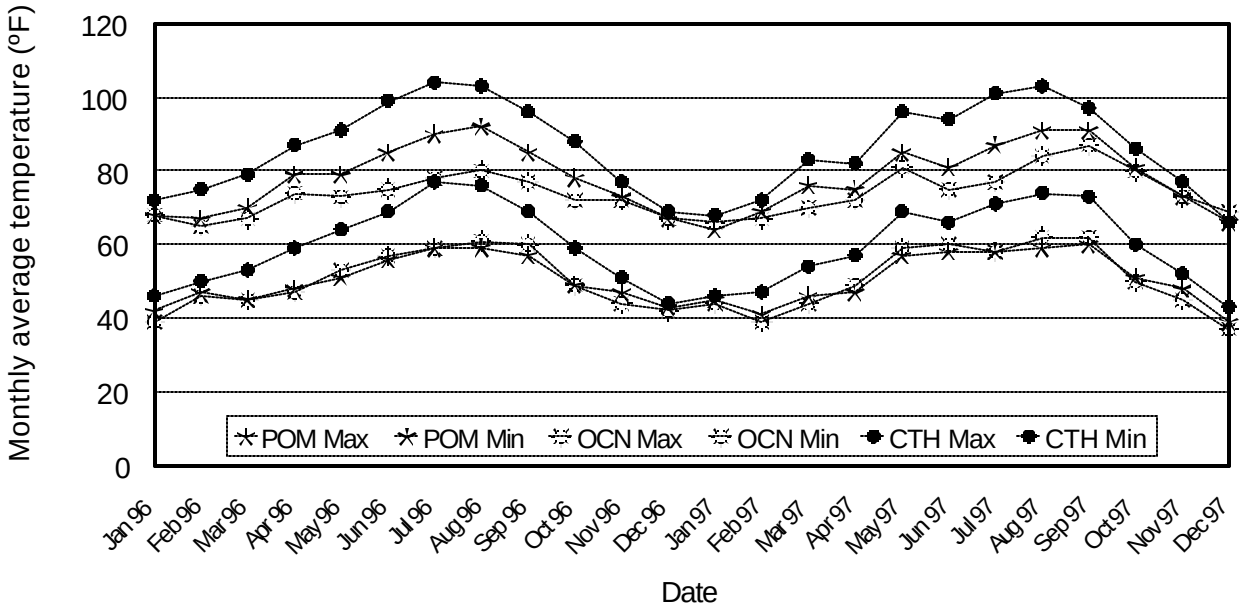
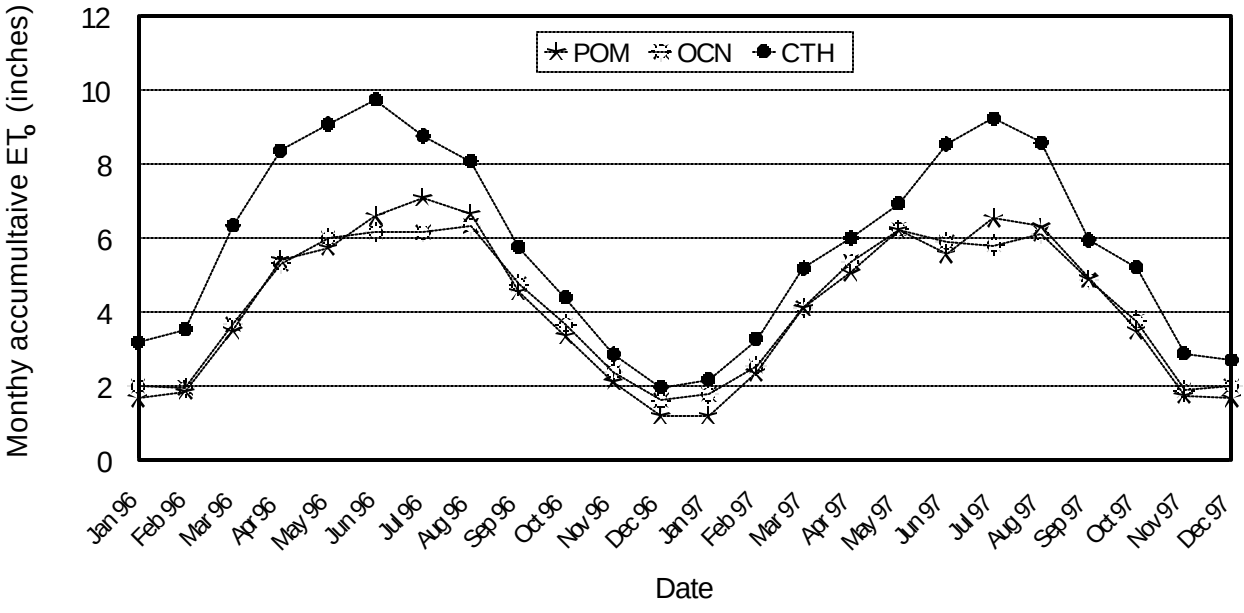
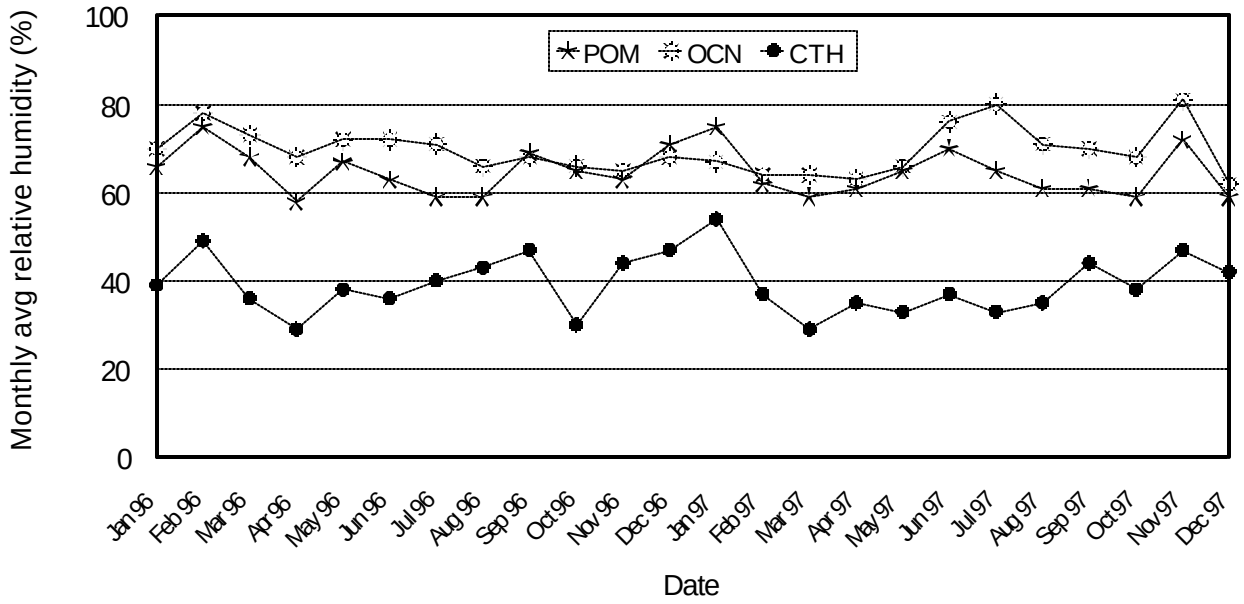


Figure 2. Monthly accumulative evapotranspiration (ET) recorded from CIMIS weather stations located at Pomona (POM) (nearest to Industry Hills GC; south coast interior valley climate), Oceanside (OCN) (nearest to Rancho Santa Fe GC; south coast coastal valley and plains climate), and Cathedral City (CTH) (nearest to The Springs Club; southern California desert climate) for 1996-97.



The combination of soil evaporation (E) and plant transpiration (T) make up the total water use of a plant. This sum is commonly referred to as evapotranspiration (ET). Reference evapotranspiration (ET) approximates the ET of a 4- to 7-inch tall, unstressed, cool-season grass. In California, solar radiation, air temperature, humidity, and wind data are collected at CIMIS stations and then inputted into a FAO Penman-Monteith equation to estimate ET .

Figure 3. Monthly average relative humidity recorded from CIMIS weather stations located at Pomona (POM) (nearest to Industry Hills GC; south coast interior valley climate), Oceanside (OCN) (nearest to Rancho Santa Fe GC; south coast coastal valley and plains climate), and Cathedral City (CTH) (nearest to The Springs Club; southern California desert climate) for 1996-97. Monthly averages are calculated from daily averages of relative humidity.



Measurements of Bentgrass Variety Trials

Visual Quality Ratings (A composite of the following)

Texture: Those varieties with narrower, shorter (finer) leaves are rated higher than those with longer, wider (coarser) leaves.

Leaf/Shoot Density: The varieties differ in the number of shoots and leaves within a given area. Based on visual estimation those varieties with greater density are given higher ratings than those that are more open.

Uniformity: Is the leaf size and orientation consistent throughout the plot? Varieties that posses uniform leaf texture and upright leaf orientation are given higher ratings. Varieties are marked down for having leaves of various textures and orientations.

Smoothness: Will ball roll be influenced by any characteristics of the variety?

Color: See below

* 1 to 9 scale: 1 = lowest
5 = minimal acceptable playing quality
9 = highest

At the beginning of the rating session, the group established the best plot and the lowest acceptable plot. This was done to provide a means of comparison for the rest of the ratings.

Color Ratings

* 1 to 5 scale: 1 = pale, lime green or a generally unattractive color.
5 = deep, dark green (almost a pine green)

It is possible for a variety to have low color but good quality.

Scalping Ratings

* 1 to 9 scale: 1 = complete scalping
9 = no scalping

The removal of all green leaf tissue in a given area as a result of mowing. Plots were penalized if there was obvious scalping. However, they were only marked down if the scalping was caused by the nature of the variety and not because of some inadequacy of the surface.

% Green Cover

The plots at the Springs Club were unfortunately subjected to low water stress at the beginning of August. I went down immediately following the first notification of the circumstances. There was no reason to rate the plots for quality because none of them met minimal standards. However, we did rate them on how well they survived the lack of water. Each individual plot was given a percentage rating based on the amount of viable green leaf tissue still present.