Research Newsflash

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Turfgrass Science News from the Annual Agronomy Meetings

American Society of Agronomy

Summarized by Christian Baldwin, Doug Brede, and Susan Samudio

Every autumn, turf scientists from around the world gather at the American Society of Agronomy meetings to share their latest research findings. This year's meetings were held in Long Beach, CA. Jacklin Seed researchers Christian Baldwin and Jon Schnore both presented scientific papers at the meeting.

Research results at these meetings are preliminary and intended for fellow scientists. Full results can take two or more years to make their way through the review process and into the popular press. For your benefit, we have summarized below some of the important trial results, providing you with an advanced glimpse of the latest findings and hottest topics from the world of turfgrass research.

Responses of creeping bentgrass to salt stress during in vitro germination

Sheng Wang and Qi Zhang

Researchers at North Dakota State Univ. determined the salt tolerance of several commercially available creeping bentgrass cultivars at the seedling stage. Salt levels tested included 5, 10, 15 or 20 dS m^{-1}. By comparison, 10 dS would be considered brackish, and 20 dS would be almost half-strength sea water.

Seeds of each cultivar were placed in petri dishes and maintained in a growth incubator for 4 weeks. Final germination rate and daily germination speed were recorded. Based on these parameters, the researchers were able to classify the creeping bentgrass cultivars as either salt-tolerant or salt-sensitive (see table below for results).

	Final Germination	Daily Germination
Salt-tolerant group	**T-1** Declaration Seaside II Bengal Independence	**T-1** Declaration Seaside II Bengal
Salt-sensitive group	Tyee SR1150 Kingpin	Tyee SR1150 Kingpin Penn A-4 Alister

Results showed that **T-1** was one of the most salt-tolerant cultivars. Specifically, it required a salt level of 16.7 dS m^{-1} to reduce **T-1**'s final germination percentage by 50% and 10.7 dS to reduce final germination by 10%. Other Jacklin cultivars also performed well: **Alpha**, **L-93**, **Southshore**, and **Putter** were classified as moderate in salt-tolerance relative to other cultivars tested.

So, does this mean that **T-1** can tolerate brackish water when maintained on a golf course? Unlikely, since short-term and long-term salinity exposure are different phenomena. Moreover, earlier studies have shown that closer cut bent is more sensitive to salt than taller turf. It does indicate however that <u>**T-1** is equal to or better than any other creeping bentgrass variety in salinity tolerance</u>.

These results indicate substantial variation in creeping bentgrass salt tolerance at the seedling stage. While the tolerance of these cultivars will likely be much lower in the field, trends of cultivar performance should remain similar, regardless of salinity level. Complete results were recently published in HortScience 45(11):1747-1750.

Putting green surface firmness as affected by bentgrass cultivar and cultivar blends

William T. Tudor and Cale A. Bigelow

Researchers at Purdue Univ. evaluated numerous creeping bentgrass cultivars for shoot density, organic matter accumulation, surface firmness, ball roll and summer turfgrass quality in 2010. Plot maintenance included a 0.125 inch mowing height 7 days a week, aerification twice a year, and topdressing every 2 to 3 weeks. Plots were planted in 2008. Jacklin cultivars in the study included **T-1, Alpha, L-93, Putter, Southshore**, and **V8** (a new Jacklin variety). Several cultivar blends and experimentals were included in the study but were omitted from the table below.

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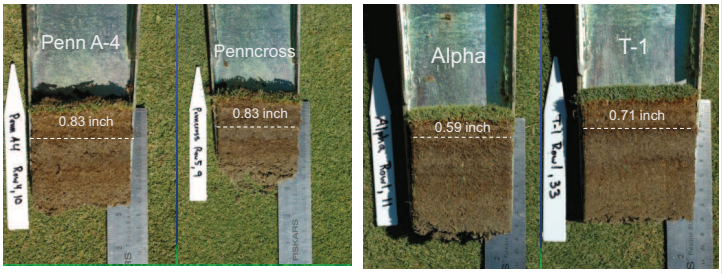
Attribute	Jacklin entries	Other entries
Best summer quality	**T-1**, **V8**	Tyee, SR1150, 007, PinUp
Greatest density	**V8**, **Alpha**, **T-1**	Authority, Dominant Extreme, Tyee, 007, Penneagle II
Fastest greens speed	**T-1**	Penncross, Penn A-1, Tyee
Firmest putting surface	**Southshore, Putter**	Penncross, Penn A-1
Lowest organic matter accumulation	**T-1**, **L-93**	Authority, Penn G-2, Backspin, Mackenzie

Putting green firmness, continued

Hot and humid weather: The summer of 2010 in Indiana will be remembered as one of the hottest in recent memory. A lot of golf courses lost portions of creeping bentgrass turf due to the relentless heat and humidity. Therefore, this was a good year to evaluate creeping bentgrass performance in the summer heat. **T-1**, **V8**, Tyee, SR1150, 007, and PinUp were the only cultivars to score a summer quality rating of 7 or higher (see table for other results).

Results: Perhaps the most interesting portion of this study examined the relationship between organic matter accumulation, shoot density, and surface firmness. It is often assumed that the new generation of creeping bentgrass cultivars with high shoot density will be naturally high thatch producers. However, like many attributes, "thatchy" cultivars can be identified during the breeding process and eliminated due to this undesirable trait. While significant differences occurred for organic matter accumulation, the researchers could not detect a clear cause-and-effect relationship between shoot density and surface firmness, or lack thereof. This likely indicates that new generation of high quality, dense creeping bentgrass does not directly translate to a softer, more thatchy surface.



Trial results from the Purdue study corroborate findings from a thatch and organic matter study run on Jacklin Seed's test plots in 2006-08. In the Jacklin study (photos above), Alpha and T-1 had less thatch than Penncross and Penn A-4 after 4 years, in spite of having significantly higher shoot densities.

Conversion of mixed species golf course fairways to creeping bentgrass using glyphosate

Samuel Bauer, Brian Horgan, Aaron Hathaway, Ronald Calhoun, Andrew Hollman, Eric Watkins and Kevin Frank

Samuel Bauer and a long list of colleagues at the Univ. of Minnesota in St. Paul and at Michigan State Univ. in East Lansing tested **T-1** creeping bentgrass using a Turfco Tri-Wave® slit-seeder for fairway renovation. Their objective was to determine the most effective glyphosate rate and application timing necessary to convert existing mixed species (mainly Poa) fairways to a monostand of creeping bentgrass by interseeding, while keeping the golf course fairway playable. Bauer mentioned that in a recent survey, 88% of Minnesota superintendents said they always or sometimes lost turf in winter, mainly due to ice or freezing damage on *Poa annua*. The goal of their study was to find the right glyphosate rate and timing to minimize brown turf, keeping the course green for the longest possible time.

Materials and methods: The study was conducted during the summer of 2010 at Les Bolstad Golf Course (St. Paul, MN), Keller Golf Course (Maplewood, MN), and Michigan State Univ. Turfgrass Research Facility. Glyphosate was applied to plots at 14, 7, or 0 days before seeding at rates of 0, 0.28, 0.42, 0.84, 1.68, or 5.62 kg a.i. /ha. **T-1** creeping bentgrass was slit-seeded into the plot area in two directions at a total rate of 73 kg/ha, or 1.5 lbs./1000 sq. ft. in each of 2 passes.

Turfco Triwave seeder

Results: At all 3 locations there was a sizable turf population of *Poa annua* and a formidable seed bank in the soil. Heavier rates of glyphosate gave a stair-step higher quantity of bentgrass at the end of the study. The highest glyphosate rate contained 82% **T-1** bent. Timing of glyphosate application was important to minimizing brown time. "The glyphosate applications at 7 and 0 days before seeding had the longest duration of acceptable turf quality and the least amount of disturbance from slit-seeding," they concluded. In most plots, it took 5 weeks to recover to good turf quality. The check plots (no glyphosate) had the most Poa and the lowest turfgrass scores over the duration of the study.

Salt tolerance of some potential low-input turfgrass species

Rebecca Brown

Dr. Brown at the Univ. of Rhode Island evaluated hydroponic salt screening on over 200 plant lines from the USDA plant introduction collection in hopes of identifying salt-tolerant lines. Hydroponic screening uses sand-filled pots filled with nutrient solution supplemented with sodium chloride. Brown tested 4 species of low maintenance grasses: *Festuca rubra*, *Festuca ovina*, *Koeleria macrantha*, and *Deschampia cespitosa.*

Plants were seeded and allowed to grow 2-3 months before salt treatments began. Salt levels were increased every two weeks and green cover was evaluated before increasing to the next salt level. A wide range of salt tolerance was found both between and within each species. She used LD_{50}'s (the salt level at which treated pots had 50% reduction in green cover compared to untreated control pots) and maximum salt levels to classify varieties.

Jacklin Seed breeder, Susan Samudio, has employed many of the same USDA plant lines in her breeding program in the last few years and has made selections for quality and yield improvements. Some of these plant lines we now know may handle up to 20000 ppm of salt. Brown's work compliments what we are doing by expanding our knowledge into development of salt tolerant fine fescues.

LD_{50} (dose for 50% browning) and total maximum salt tolerance of low maintenance species, in parts per million of salt.

	LD_{50} ppm (NaCl)		Total Salt ppm (NaCl)	
Species	Minimum	Maximum	Minimum	Maximum
Festuca rubra	5000	20000	7500	20000
Festuca ovina	7500	12500	10000	15000
Koeleria	5000	12500	7000	14000
Deschampia	7500	20000	7500	20000
Alkaligrass		20000		