Scrutinizing ryegrasses

Major strides continue to be made in breeding research

By MARK LESLIE

Ryegrass breeding has progressed with such fervor in the last nine years that researchers may have reached perfection in some areas, according to an eminent ryegrass expert.

Dr. Reed Funk of Rutgers University said: "Up until the present, every time we made a variety lower, darker, finer, denser, or better mowing, it was an improvement. But I think we're at the point right now that it's questionable whether we want them any darker than the darker varieties that are coming out. It's a question whether we want them any finer.

"We have plateaued in some characteristics."

Funk said tough challenges do lie ahead for ryegrass breeders in areas where "limited progress" has been made — such as in resistance to crown rust, red thread and dollar spot diseases.

"We need new sources of germplasm. We need better straining techniques," he said.

Plant breeding has been on a rocket ship

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Name	CO1	DC1	IA1	ID2	ID3	IL1	IL2	KS2	KY1	NJ1	NJ2	NJ3	OH1	ON1	OR7	OR9	RI1	UB1	VA1	WA1	WA3	Mean
* Affinity (Gen-90)	7.2	3.5	5.9	6.5	6.6	8.7	7.2	8.0	5.8	6.9	7.2	6.3	7.4	6.4	5.9	6.6	4.0	7.6	4.6	7.2	6.6	**6.5**
* Brightstar	7.8	3.4	6.5	7.4	6.8	7.0	6.5	7.7	6.0	7.8	7.9	6.0	6.7	6.4	5.3	6.5	3.1	8.1	4.8	7.3	6.4	**6.5**
ZPS-28D	7.8	3.4	5.7	7.4	5.3	8.3	7.1	8.7	6.6	7.3	7.3	6.0	6.6	6.0	5.3	6.6	4.2	7.4	4.9	6.4	6.1	**6.4**
Pick 89-4	8.2	3.8	6.5	6.9	5.9	8.0	7.8	8.7	6.6	6.9	6.4	6.5	5.8	6.2	4.9	6.3	3.5	7.5	4.5	7.3	6.0	**6.4**
*Prelude II (2P2-90)	8.2	3.2	6.1	6.7	6.4	7.3	6.3	8.3	5.3	6.8	7.5	6.1	6.9	6.2	5.1	6.4	4.6	7.8	4.1	8.1	6.5	**6.4**
*APM	8.2	3.7	5.7	6.3	6.3	7.3	6.7	9.0	6.1	6.9	6.9	5.3	6.8	6.3	5.2	6.4	5.0	7.5	4.5	7.6	6.0	**6.4**
*Yorktown III (LDRF)	8.0	3.0	5.8	6.5	5.9	8.0	6.4	8.3	6.6	6.8	6.7	5.8	6.6	6.3	5.5	6.3	4.5	7.5	4.4	8.3	6.3	**6.4**
*Assure	8.2	3.4	5.7	7.1	6.6	8.0	6.9	8.3	6.2	6.7	6.3	6.1	6.8	6.2	4.5	6.3	4.7	7.3	4.0	7.9	6.4	**6.4**
Pick DKM	7.0	3.4	6.3	7.1	6.1	7.7	7.2	7.7	7.3	6.8	7.0	6.3	6.8	6.2	5.3	6.2	3.6	7.3	4.3	7.6	6.3	**6.4**
*Eagle (WVPB-89PRA3)	8.0	3.6	6.2	6.9	6.6	7.7	6.1	8.3	6.2	6.4	6.3	6.1	6.7	6.2	5.3	6.0	4.5	7.3	4.1	8.0	6.3	**6.3**
PS-105	7.7	3.6	6.1	6.8	6.5	7.7	6.0	7.7	6.5	7.3	7.0	5.7	6.9	6.2	4.7	6.2	4.1	7.3	4.3	8.0	6.5	**6.3**
*Pinnacle	8.7	3.3	6.0	6.5	6.5	8.7	6.7	8.3	6.1	6.9	6.3	5.5	7.0	6.3	4.3	6.3	4.7	7.0	4.2	7.0	6.3	**6.3**
*Advent	8.3	3.6	5.9	6.1	6.2	8.3	6.6	8.0	5.7	6.9	6.4	5.1	6.8	6.0	5.2	6.2	4.3	7.3	4.9	8.0	6.4	**6.3**
*4DD-Delaware Dwarf	8.0	4.1	6.3	6.8	6.7	8.0	6.9	8.7	7.0	6.2	5.8	4.9	6.9	6.3	4.6	5.9	4.1	7.0	4.2	7.3	6.1	**6.3**
PST-28M	7.5	3.2	6.3	5.9	5.8	8.0	7.3	8.7	6.2	6.6	7.1	5.7	6.8	6.0	4.8	6.6	3.9	7.6	4.6	6.7	6.4	**6.3**
*Quickstart (PST-2FQR)	8.2	2.8	6.1	6.5	6.3	8.0	6.8	8.3	5.5	6.8	7.1	6.0	6.2	6.6	4.6	6.4	4.3	7.2	4.2	7.0	6.7	**6.3**
89-666	7.7	3.8	5.9	7.3	6.5	8.0	6.9	8.0	6.8	6.5	6.0	5.2	6.6	6.1	4.4	5.9	4.4	7.0	4.3	7.4	6.6	**6.3**
*Repell II (LDRD)	7.8	37	5.2	6.3	6.0	8.0	6.1	8.3	6. 5	6.9	7.3	6.2	6.1	6.2	4.8	6.3	4.0	7.8	4.5	6.9	6.0	**6.2**
PST-290	7.2	3.9	5.2	6.3	6.9	8.0	6.2	8.3	6.3	6.8	6.9	5.3	6.3	6.5	4l8	6.5	4.0	7.2	4.3	8.2	5.9	**6.2**
*SR 4200	8.2	2.9	5.7	5.8	6.1	8.3	6.2	8.3	6.1	7.2	6.8	5.7	6.6	6.4	5.5	6.3	3.7	7.7	4.1	6.8	6.5	**6.2**
*Palmer II (P89)	7.8	3.4	5.5	5.3	6.1	7.0	6.8	8.3	6.5	6.9	7.8	6.2	6.0	6.1	5.0	6.3	3.8	7.8	4.3	7.7	5.9	**6.2**
Pick 9100	7.0	3.3	5.1	7.5	6.8	7.0	6.6	9.0	6.4	6.3	7.0	5.8	5.8	6.3	4.8	6.5	3.7	7.5	4.3	7.7	5.9	**6.2**
Legacy	7.8	3.8	5.8	5.3	6.7	8.3	6.3	8.3	6.6	6.7	7.0	5.9	5.8	6.2	5.1	6.5	3.5	6.9	4.0	7.3	6.3	**6.2**
SYN-P	8.2	3.6	5.8	5.7	6.1	7.3	6.9	8.0	6.3	7.1	7.0	5.8	6.2	6.8	4.3	6.1	4.0	7.0	4.4	6.9	6.3	**6.2**
PST-2FF	7.5	3.5	5.7	6.3	5.7	x	6.8	8.7	6.5	7.3	6.9	5.8	6.6	6.1	4.6	6.8	3.7	7.5	4.3	7.2	6.4	**6.2**
*Seville	7.7	3.9	5.1	6.6	6.1	8.3	6.0	8.3	5.9	6.3	6.6	5.3	7.1	6.4	4.5	6.3	3.9	6.8	4.1	7.9	6.4	**6.2**
Pick 1800	8.0	3.8	5.8	6.1	5.7	7.3	7.5	8.3	6.7	6.5	6.1	5.8	6.4	5.9	4.8	6.1	4.0	7.4	4.5	6.8	5.7	**6.2**
*Dandy	7.8	3.7	5.7	6.5	6.3	7.7	6.7	7.3	6.3	6.0	6.0	5.1	7.2	6.3	4.8	6.3	4.2	6.8	4.3	7.6	6.2	**6.1**
Pick 89LLG	8.2	3.1	6.6	7.6	6.3	x	5.8	8.0	4.3	5.5	5.7	5.8	6.3	6.3	6.0	6.3	4.0	7.2	4.9	7.9	6.5	**6.1**
*Navajo (PST-2DPR)	8.0	3.8	6.0	6.7	6.9	7.7	5.7	8.7	58	5.7	6.2	5.4	5.8	6.3	5.3	5.9	3.9	7.0	4.2	7.0	6.2	**6.1**
Pick EEC	7.7	3.4	5.3	7.1	5.7	6.3	6.5	7.3	5.9	7.0	6.9	5.7	5.7	6.1	4.9	6.5	4.1	7.7	4.4	7.7	6.1	**6.1**
MOM LP 3147	7.5	3.2	5.7	6.5	6.0	9.0	6.8	7.0	6.1	6.8	5.9	5.3	6.8	6.1	4.9	6.3	3.8	6.8	4.2	7.1	6.2	**6.1**
PST-2B3	8.0	3.3	5.9	5.8	7.2	7.3	6.1	8.0	5.5	6.3	5.7	5.5	6.5	6.4	5.0	6.2	4.3	6.9	4.4	7.0	6.4	**6.1**
LSD Value	**1.0**	**1.1**	**0.9**	**1.5**	**1.1**	**1.6**	**0.8**	**0.9**	**0.8**	**0.8**	**0.9**	**0.8**	**0.8**	**0.6**	**0.9**	**0.4**	**0.7**	**0.7**	**0.7**	**1.5**	**0.8**	**0.2**

Turfgrass tests very useful — if you use them correctly

By KEVIN N. MORRIS

The National Turfgrass Evaluation Program (NTEP) was initiated in 1980 to coordinate uniform evaluation trials of turfgrass varieties and promising selections in the United States and Canada. Tests are conducted at universities and some private institutions with most states evaluating at least one NTEP test.

Since its inception, the NTEP has collected information on more than 50 turfgrass characteristics from approximately 800 experimental and commercial cultivars encompassing 17 turfgrass species.

Annual progress reports containing data collected the previous year are released for each species tested. A final report containing all data collected is produced at the end of the testing period. These progress reports are available to anyone who requests them.

The number of experimental and commercial cultivars in NTEP tests has increased greatly the last few years — with 123 entries in the current national perennial ryegrass test — making decisions about varieties more difficult for consumers. Therefore, to use NTEP information most effectively, it is important to know how to correctly interpret the NTEP progress reports.

The first step in this interpretation process is to look at Table A - "Locations, Site Descriptions and Management Practices." This table gives information on soil type and pH, levels of soil phosphorus and potassium, whether the test was conducted in sun or shade, the amount of nitrogen and irrigation applied and the mowing height.

Make sure the tests that you are scrutinizing are managed in a similar manner as your site. Data from a Kentucky bluegrass test mowed at one inch and irrigated to prevent any stress would be of little value to you if your site is a non-irrigated home lawn.

Table B — "Locations and Data Collected" — summarizes the data that each location collected. This is especially helpful for monthly quality data as some locations may collect data from only one or two months within a year. In this case, the data presented for that location is not very representative of a cultivar's performance for an entire growing season.

Turfgrass quality ratings are collected monthly and are an overall visual evaluation of each grass. Quality ratings encompass all the factors that affect the quality of a turf stand including genetic color, density, percent ground cover, disease and insect injury, heat and drought tolerance and uniformity.

Past research has found that most researchers evaluating NTEP tests emphasize color and density when rating turfgrass quality.

Turfgrass quality is contained in three tables in all NTEP progress reports. One table displays data from each test location and an overall average (mean). To best use this table, you must determine what locations are the closest geographically to your location.

The overall average is useful to gauge the cultivars' performance over many locations and is helpful in regional and national marketing. However, national averages can be misleading to the average consumer working within only one city or state.

The second table gives the same turfgrass quality data but presents it for each month collected. Evaluating this table can lead to a better understanding of the varieties that perform better or worse during particular months or seasons.

Many people use this table when deciding on blends of varieties. An individual may want to blend a grass that performs well in spring but poor in summer with a good summer-performing grass.

When considering data from any NTEP table, there is a figure at the bottom — the "LSD Value" — that needs your attention. LSD (Least Significant Difference) Value is a statistical tool to determine if the difference in cultivars is a real difference or just happened by chance. To determine if a statistical difference exists among two cultivars, subtract the cultivar with the smaller value from the cultivar with the larger value. If the difference between the two numbers is not as large as

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Leading ryegrasses in genetic color

Name	ID2	ID3	KS2	NJ1	NJ3	OH1	OR9	WA3	Mean
Brightstar	8.0	7.7	8.7	9.0	6.7	8.0	7.0	7.7	7.8
Palmer II	7.3	8.0	9.0	9.0	7.0	8.0	7.3	5.7	7.7
Pick 89-4	7.7	7.3	8.7	9.0	6.7	7.7	7.3	7.0	7.7
Pick 9100	7.7	7.7	9.0	8.0	6.0	7.7	7.0	7.0	7.5
Pick DKM	7.7	8.0	8.0	8.3	6.0	8.0	7.0	7.0	7.5
PST-2FF	7.3	8.0	9.0	8.3	6.0	7.3	7.0	7.0	7.5
Gettysburg	7.0	7.7	8.7	8.0	6.7	8.0	6.7	7.0	7.5
Pick EEC	7.3	8.0	8.7	8.3	5.7	7.7	7.0	7.0	7.5
ZPS-28D	8.0	7.7	8.3	8.0	6.0	7.3	7.0	7.0	7.4
Pick 89LLG	7.7	7.7	8.0	8.0	6.0	7.7	7.0	7.0	7.4
Poly-SH	7.3	7.7	9.0	8.7	6.3	7.7	7.3	5.0	7.4
Quickstart(PST-2FQR)	7.3	7.0	9.0	7.7	6.0	8.0	7.0	7.0	7.4
LSD Value	**1.2**	**1.0**	**0.9**	**1.0**	**0.8**	**0.6**	**0.7**	**0.9**	**0.3**

Heat, drought sock seed yield, mean high prices

Low seed yields will result in higher prices this fall as late-June temperatures climbed into the high-90s and low-100s throughout the grass-rich Willamette Valley. July brought no relief.

The high temperatures were part of a devastating 1-2 punch that saw the region's rainfall during the September-June grass-growing season fall 14 inches below the average 35 to 40 inches.

As a result, fine and tall fescue production will only reach 30 to 40 percent of their normal yields, predicted Seed Research of Oregon President Mike Robinson. The ryegrass crop will be off 10 percent and maybe more if the hot, dry weather continues, he added.

"I saw one 50-acre field yesterday (June 23) that will be a total write-off," Robinson said. "This is the critical time when seeds begin dropping. The fields don't fill well in weather like this, especially in sandy areas. Many of the fields in gravelly areas along the rivers are gone."

More water-retentive, clay-soil fields are in far better shape, Robinson said. So, too, are the bentgrass plots, although a continued heat wave could also affect them. Oregon has had the greatest increase in average temperature of any of the 50 states this year," Robinson said. "Last year it rained almost every day through July 4 and we were afraid the grass would never produce. It's always feast or famine here."

According to Barry Norris, an engineer for the Oregon Department of Water Resources, drought conditions have persisted for six years now. A lack of precipitation has been exacerbated by this year's record-setting temperatures.

"It's been extremely warm here," said Norris. "We've had record high temperatures broken on several occasions. We've also had record-breaking low flows in rivers across the state—not just record-breaking, record-shattering. These rivers are down 33 percent."

News of the poor seed harvest didn't surprise Norris. "If they're depending on high-precipitation this year, they're hurting."

Ryegrass breeders pursuing major results

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since the discovery in 1983 of endophyte, a fungus that lives within plants and gives them natural resistance to certain surface insects.

"Soon, with that (endophyte) clue, we found resistance to sod webworm and later to billbugs and chinchbugs and so forth," Funk said.

And the list of improvements goes on, although presence of endophytes in a grass matters less if it is being used to overseed.

Funk pointed out that of the top 45 varieties of ryegrass in the 1991 first-year results of the National Turfgrass Evaluation Program, only two were in the previous test.

Kevin Morris, director of the NTEP, said: "In this test we have almost twice as many entries as the last one. I suspect of the 123 varieties this year, 80 to 90 have never been in the test before."

Saturn, which topped the list in 1986, rated 45th in the 1991 results, which were released in July. Dimension was near the top in 1986 and is ranked 35th now in overall average.

"Most of the varieties that performed with higher averages are just coming on the market," Funk said. "They are darker, lower-growing, more stress-tolerant, more resistant to brown patch, better mowing."

Funk said plant breeders can "build on every previous cycle" of breeding.

"We've made a lot of progress in the last 30 years. I think we'll make even more in the next 30 years," he said. "A big factor is we've been able to attract a number of very competent young men and women into turfgrass breeding. They will do better than the old professors that started out knowing less than they do. "

Funk said more of those plant breeders are working at commercial firms than at universities.

Morris explained that more companies today want their own varieties. "They then don't have to pay royalty fees and they have more control of the supply," he said.

Asked why a seed ompany would enter so many varieties of ryegrass in the national test knowing they might not rank highly, Morris said, "Companies in the lead usually offer a great difference in seed. They may be looking for varieties that produce well or to put into blends and sell on the consumer market."

"In the golf industry," he said, "the superintendent usually wants the best and has the money for it. But he also has out-of-play areas he doesn't want to pay so much for."