Final report: Top-ranked tall fescue cultivars in 1988-91 tests

Name	Ar1	Az1	Ca1	Ca2	Ca3	Dc2	Ga1	Ia1	Id2	Il1	Il2	In1	In2	Ks1	Ks2	Md1	Mi1	Mo1	Mo3	Ne1	NJ1	NJ2	NJ3	NY1	NY2	Oh2	Ok1	Or1	Or2	RI1	Tx1	Tx2	Ub1	Ub2	Va1	Va2	Va3	VA4	VA6	WA4	WA6	**Mean**
*Hubbard 87	5.2	6.5	6.9	6.2	6.8	4.7	7.0	7.1	6.4	7.5	5.9	7.5	4.7	7.5	7.6	6.3	6.3	5.5	6.4	6.6	6.1	7.2	5.7	5.7	6.1	7.1	5.6	6.8	5.6	6.2	5.1	5.1	7.7	6.9	6.4	6.0	5.9	6.5	4.8	6.8	3.7	**6.2**
*Shenandoah	6.0	6.6	6.8	6.2	6.8	4.1	6.9	7.4	6.4	7.7	6.4	7.1	4.9	7.4	7.6	6.4	5.4	5.4	6.2	6.3	5.9	6.9	5.6	5.1	5.4	7.3	5.9	6.6	5.3	5.9	4.7	5.0	7.7	7.1	6.4	5.6	5.9	6.6	5.3	5.9	4.7	**6.2**
*Safari	4.2	6.8	6.6	6.1	6.7	4.4	6.8	6.6	5.9	7.3	5.3	6.7	4.5	7.4	7.3	6.1	6.2	5.3	6.4	6.2	6.2	6.8	5.8	5.3	5.5	7.1	5.6	6.5	5.1	6.3	4.7	5.2	7.5	6.8	5.9	5.6	5.7	6.0	4.4	6.9	6.7	**6.1**
*Guardian	6.2	6.6	6.8	6.1	6.7	3.1	7.0	6.7	5.7	7.3	5.6	6.9	4.8	7.4	7.1	6.3	5.7	5.2	6.1	6.5	6.1	7.0	5.7	4.9	5.4	6.9	5.5	6.6	5.3	5.6	4.7	5.2	7.7	6.9	6.2	5.5	5.7	6.4	4.7	6.9	4.7	**6.0**
*Austin	4.8	6.6	6.4	6.2	6.7	5.7	7.0	6.9	6.4	7.7	.	7.0	.	7.1	7.1	6.0	5.4	5.6	5.6	6.0	5.5	6.0	5.1	5.2	5.6	6.8	5.5	5.8	5.1	6.2	4.9	4.8	7.4	6.7	6.2	5.1	5.6	5.8	5.0	.	5.3	**6.0**
*Cochise	5.7	6.4	6.2	6.0	6.6	5.0	7.1	6.5	5.9	7.5	5.9	6.8	4.6	7.4	7.0	5.8	6.3	5.5	6.4	5.8	6.3	6.8	5.5	5.1	5.6	6.7	5.3	6.4	5.1	6.0	4.8	4.6	7.6	7.1	6.0	5.2	5.8	6.3	4.4	5.1	5.7	**6.0**
*Aztec	5.2	6.5	6.8	6.2	6.7	3.4	6.7	6.1	6.0	7.3	6.0	6.6	4.4	7.6	7.2	6.3	5.6	4.9	6.3	5.6	6.4	6.6	5.9	4.7	5.2	6.8	5.3	6.4	4.9	5.9	5.2	4.7	7.7	7.0	6.0	5.4	5.7	6.2	4.5	6.0	7.3	**6.0**
PE-7	5.3	6.5	6.6	6.1	6.8	3.9	7.2	6.6	6.2	7.5	5.1	7.0	4.7	7.4	7.7	6.3	6.0	5.3	6.4	6.3	5.7	6.8	5.5	5.0	5.3	7.1	5.7	6.2	5.0	5.9	5.0	4.5	7.7	7.2	6.2	5.3	5.6	5.9	4.6	6.3	3.3	**6.0**
*Monarch	5.6	6.2	6.8	6.2	6.7	3.9	6.8	6.3	6.2	7.1	5.9	6.9	4.6	7.1	7.6	5.9	5.7	5.0	6.1	5.8	6.6	6.5	5.6	4.8	5.0	6.8	5.4	6.5	5.1	6.3	4.6	4.7	7.5	6.9	6.1	5.2	5.9	6.2	4.5	4.8	7.7	**6.0**
*Amigo	5.6	6.5	6.6	6.1	6.7	4.1	6.7	6.6	6.2	7.5	5.0	6.8	4.7	7.3	7.6	6.1	6.0	5.5	5.9	5.9	5.7	6.1	5.4	5.3	5.6	7.0	5.1	6.9	5.2	6.1	5.1	4.8	7.5	6.8	6.1	5.6	5.6	6.3	4.5	5.6	5.3	**6.0**
*Crossfire	6.4	6.2	6.7	6.2	6.7	4.4	7.3	6.6	6.1	7.2	5.8	6.8	4.5	7.6	7.5	6.2	6.1	4.7	6.3	5.4	6.4	6.8	5.6	4.7	5.7	6.8	6.0	6.4	4.8	6.3	4.8	5.0	7.5	6.9	6.0	5.5	5.5	6.3	4.2	5.1	3.7	**6.0**
*Avanti	4.6	6.5	6.7	6.3	6.7	4.0	6.9	6.5	6.2	7.0	5.7	6.6	4.5	7.9	7.0	6.1	5.7	5.0	6.2	6.4	6.2	6.6	5.5	4.6	5.4	6.7	5.5	6.6	5.2	5.9	5.0	4.8	7.5	7.1	6.0	5.6	5.6	6.1	4.7	6.3	5.0	**6.0**
*Vegas	6.2	6.2	6.3	6.1	6.7	4.0	6.5	7.2	5.7	7.0	6.1	6.5	4.7	7.5	7.5	5.8	5.1	5.6	6.4	5.7	6.5	6.9	5.6	4.8	5.0	6.5	5.4	6.5	5.0	5.6	5.0	5.1	7.6	7.1	5.8	5.7	5.7	6.4	4.7	5.9	4.3	**5.9**
*Tribute	5.4	6.6	6.2	6.1	6.8	4.4	7.1	7.2	6.0	7.0	5.8	6.7	5.0	7.1	7.3	6.2	5.9	5.6	5.8	6.0	5.7	5.8	5.0	4.5	4.9	6.9	5.7	6.1	5.0	6.2	5.0	4.7	7.4	6.8	6.1	5.6	5.7	6.3	4.8	5.3	3.7	**5.9**
*Phoenix	4.9	6.4	6.5	6.0	6.7	5.3	6.9	6.8	6.2	7.6	5.8	6.9	4.5	7.0	7.2	6.4	5.9	5.6	6.1	6.0	5.1	5.9	5.0	4.8	5.5	7.0	5.5	6.0	5.2	6.1	4.8	5.1	7.2	6.7	6.2	5.6	5.7	5.9	4.9	5.7	2.3	**5.9**
*Thoroughbred	5.4	6.6	6.4	6.0	6.8	6.1	6.7	6.5	6.3	7.2	5.0	6.9	4.6	6.9	7.1	5.9	6.1	5.0	5.7	6.3	5.1	5.8	5.3	4.6	4.7	6.9	5.6	5.7	5.2	6.3	4.1	4.8	7.2	6.6	6.0	5.3	5.5	6.0	4.8	6.6	5.7	**5.9**
Bel 86-2	5.4	6.4	6.9	6.1	6.7	3.1	7.0	6.7	6.0	6.8	5.7	6.9	4.7	7.3	7.1	6.5	5.6	5.2	5.9	6.2	5.3	5.4	5.2	4.6	5.1	7.1	5.3	6.0	5.3	6.1	4.8	4.6	7.4	6.9	6.4	5.6	6.0	6.7	4.7	6.4	3.7	**5.9**
*Eldorado	5.0	6.4	6.4	6.1	6.7	5.3	6.6	6.6	6.2	7.1	5.5	6.6	4.6	7.4	7.0	6.0	5.9	5.4	6.2	5.8	6.2	6.8	5.3	4.5	5.1	6.6	5.4	6.2	5.0	5.4	4.6	5.0	7.5	6.9	5.7	5.8	5.7	5.8	5.1	4.7	4.3	**5.9**
PST-5AG	5.2	6.3	6.5	6.2	6.7	4.3	6.2	6.2	6.1	7.4	5.5	6.8	4.7	7.1	7.0	6.2	6.3	4.7	6.0	6.0	5.0	5.0	5.3	4.7	5.1	6.9	5.8	6.7	5.3	6.3	4.9	5.0	7.1	6.8	6.2	5.4	5.4	6.4	4.2	6.2	5.3	**5.9**
*Shortstop	5.4	6.2	6.5	6.2	6.6	3.2	6.3	6.5	5.8	6.9	5.6	6.6	4.8	7.6	7.3	5.8	6.3	5.4	5.9	5.9	5.7	6.3	5.5	4.5	4.6	6.5	5.3	6.4	5.0	5.1	4.5	4.7	7.6	7.0	6.0	5.5	5.8	6.4	4.4	6.0	6.3	**5.9**
*Olympic II	6.0	6.4	6.6	6.1	6.7	4.1	6.9	6.2	5.4	6.9	5.5	6.8	4.5	7.0	7.4	6.1	6.1	5.0	5.8	5.2	5.3	5.5	5.2	4.9	5.3	6.9	5.7	6.1	4.8	6.0	5.0	5.1	7.2	6.4	5.8	5.5	5.6	6.1	5.3	6.2	5.3	**5.8**
*Rebel II	5.4	6.5	6.4	6.1	6.8	5.9	6.9	6.4	6.0	7.2	5.4	6.9	4.6	6.8	7.1	6.4	6.1	5.4	5.7	5.5	5.1	5.3	5.4	4.7	5.1	7.0	5.5	6.0	4.9	6.5	4.6	4.7	7.2	6.5	6.2	5.6	5.4	6.1	4.9	5.3	4.3	**5.8**
*Bonanza	5.2	6.2	6.5	6.0	6.7	5.6	6.6	6.4	6.0	7.5	5.4	6.9	4.8	6.8	7.1	6.1	6.1	5.1	6.1	5.8	5.4	5.6	4.9	4.8	5.1	7.4	5.6	6.0	4.8	6.0	5.0	4.7	7.4	6.7	5.9	5.1	5.6	6.2	4.9	5.3	4.0	**5.8**
PST-5AP	5.2	6.5	6.1	6.1	6.6	4.2	6.4	6.9	5.9	7.3	6.1	6.6	4.7	7.1	7.2	6.1	5.8	5.4	5.9	6.0	5.1	5.7	4.9	4.7	5.0	6.6	5.9	5.6	5.0	5.8	4.9	4.5	7.2	6.6	5.9	5.7	5.4	6.0	4.7	6.3	5.3	**5.8**
*Wrangler	5.4	6.1	6.7	6.0	6.7	5.4	6.3	6.2	6.2	7.3	5.9	7.0	4.7	6.9	6.8	6.2	6.1	5.3	5.8	5.8	5.1	5.7	5.2	5.0	5.2	7.0	5.6	6.2	5.2	5.8	4.7	4.6	7.3	6.4	6.0	5.4	5.4	6.1	5.1	4.4	4.7	**5.8**
*Winchester	4.8	6.5	6.3	5.9	6.7	4.4	6.8	6.6	6.1	7.0	5.7	6.6	4.6	7.0	7.2	6.0	5.9	5.4	6.0	5.6	5.1	6.1	5.0	4.2	4.9	6.9	5.5	5.4	4.9	6.1	4.9	4.5	7.3	6.7	5.9	5.6	5.7	5.9	5.3	5.6	6.7	**5.8**
*Maverick II	5.1	6.3	6.5	6.1	6.7	4.0	6.8	6.3	5.6	7.1	5.7	6.7	4.1	7.3	7.2	5.7	6.0	4.8	5.7	5.9	5.5	6.5	5.4	4.8	5.3	6.5	5.6	5.9	4.6	6.0	5.0	4.7	7.3	6.8	5.8	5.5	5.5	6.3	5.3	6.7	4.0	**5.8**
*Chieftain	4.7	6.4	6.3	6.1	6.7	4.0	6.5	6.3	6.1	7.2	5.4	6.9	4.5	7.1	6.9	6.5	5.9	5.3	6.0	5.6	5.2	5.9	5.4	4.9	5.6	7.3	5.6	6.2	5.1	6.3	4.8	4.4	7.2	6.5	5.9	5.6	5.7	6.1	4.7	5.7	3.3	**5.8**
*Mesa	5.3	6.5	6.2	6.0	6.7	5.9	7.0	7.1	6.0	7.5	5.4	6.6	4.8	6.9	7.2	6.2	6.0	5.4	5.8	5.5	5.0	5.5	4.5	4.5	4.7	6.9	5.5	5.8	4.9	5.5	4.5	4.8	7.1	6.6	6.0	5.0	5.5	6.1	4.9	5.0	5.7	**5.8**
*Anthem	5.1	6.4	6.4	6.1	6.7	3.6	6.9	6.8	6.7	7.4	5.3	6.6	4.5	7.2	6.9	5.6	5.9	5.5	6.5	5.0	5.8	6.9	5.3	4.1	4.8	6.7	5.2	6.2	5.0	5.7	4.5	4.5	7.5	6.7	5.9	5.2	5.6	6.2	5.5	6.7	2.7	**5.8**
PST-5EN	5.6	6.5	.	6.0	6.7	4.9	6.6	6.7	6.2	7.1	5.0	6.6	4.7	6.9	6.9	6.3	5.8	5.3	5.9	5.5	5.0	5.1	4.8	4.8	5.3	6.8	5.2	5.7	5.3	5.7	4.9	4.7	7.2	6.6	6.0	5.5	5.5	6.1	4.7	5.8	4.0	**5.8**
*Trailblazer	4.3	6.2	6.6	6.1	6.8	4.2	5.7	6.2	5.8	7.1	5.3	6.7	4.5	7.4	7.1	5.7	5.9	5.4	6.2	5.3	5.7	6.0	5.1	4.8	5.4	7.2	5.8	6.3	5.5	5.5	5.4	4.8	7.2	6.7	5.6	5.0	5.3	5.6	4.7	6.1	4.3	**5.8**
*Arriba	5.2	5.9	6.8	6.1	6.7	3.2	6.6	6.6	5.9	7.0	5.7	6.7	4.6	7.0	6.6	6.2	5.5	5.0	5.8	6.1	5.3	6.3	5.2	4.7	5.2	6.8	5.6	6.0	5.2	6.1	4.8	4.6	7.3	6.3	6.1	5.3	5.6	6.2	4.5	4.4	5.7	**5.8**
LSD Value	0.6	0.6	0.3	0.2	0.3	1.7	0.6	0.7	0.7	0.5	1.1	0.3	0.5	0.3	0.6	0.7	0.4	1.4	0.5	0.8	0.4	0.5	0.4	0.6	0.5	0.5	0.5	0.4	0.6	0.8	0.8	0.9	0.4	0.3	0.3	0.5	0.5	0.3	0.7	1.1	2.9	**0.1**

* — Commercially available in the United States.

The following are conditions at the sites of the tall fescue national tests, including, in order, location, soil texture, soil pH, nitrogen applied (in pounds per 1,000 square feet), mowing height (in inches) and irrigation practiced.

AR1 — Fayetteville, Ark., silt loam and silt, 6.1-6.5, 3.1-4.0, 2.6-3.0, to prevent dormancy.

AZ1 — Tucson, Ariz., sandy loam, 7.6-8.5, 2.1-3.0, 2.1-2.5, to prevent stress.

CA1 — Santa Clara, Calif., loam, 6.1-6.5, 3.1-4.0, 1.6-2.0, to prevent stress.

CA2 — Santa Ana, Calif., silty clay laom, 6.6-7.0, 5.1-6.0, 1.6-2.0, to prevent stress.

CA3 — Riverside, Calif., sandy loam, 6.6-7.0, 5.1-6.0, 1.6-2.0, to prevent stress.

DC2 — National Mall, District of Columbia, loam, 6.6-7.0, 1.1-2.0, 2.1-2.5, no irrigation.

GA1 — Griffin, Ga., sandy clay loam, 5.6-6.0, 3.1-4.0, 2.1-2.5, to prevent stress.

IA1 — Ames, Iowa, sandy clay loam, 7.1-7.5, 1.1-2.0, 2.6-3.0, no irrigation.

ID2 — Post Falls, Idaho, loam, 4.6-5.5, 2.1-3.0, 1.1-1.5, to prevent stress.

IL1 — Urbana, Ill., silt loam and silt, N/A, 3.1-4.0, 1.6-2.0, to prevent stress.

IL2 — Carbondale, Ill., silty clay and clay, 6.1-6.5, 2.1-3.0, 2.1-2.5, to prevent dormancy.

IN1 — West Lafayette, Ind., (high maintenance), silt loam and silt, 6.6-7.0, 3.1-4.0, 2.1-2.5, to prevent stress.

IN2 — West Lafayette, Ind., (low maintenance) silt loam and silt, 6.6-7.0, 0.0-1.0, 3.6-4.0, no irrigation.

KS1 — Manhattan, Kan., sandy clay laom, 7.1-7.5, 3.1-4.0, 3.1-3.5, to prevent stress.

KS2 — Wichita, Kan., sandy loam, 6.6-7.0, 3.1-4.0, 2.1-2.5, to prevent dormancy.

MD1 — Silver Spring, Md., sandy loam, 6.6-7.0, 3.1-4.0, 2.1-2.5, to prevent dormancy.

MI1 — East Lansin, Mich., sandy loam, 7.1-7.5, 2.1-3.0, 1.6-2.0, to prevent stress.

MO1 — Columbia, Mo., silt loam and silt, 6.1-6.5, 2.1-3.0, 2.1-2.5, to prevent stress.

MO3 — St. Louis, Mo.,silty clay loam, 7.1-7.5, 3.1-4.0, 2.6-3.0, only during severe stress.

NE1 — Lincoln, Neb., sandy clay loam, 6.6-7.0, 3.1-4.0, 2.1-2.5, to prevent stress.

NJ1 — North Brunswick, N.J., loam, 6.1-6.5, 0.0-1.0, 1.6-2.0, to prevent dormancy.

NJ2 — Adelphia, N.J., sandy loam, 6.1-6.5, 4.1-5.0, 1.1-1.5, to prevent stress.

NJ3 — Martinsville, N.J., N/A, N/A, N/A, 1.6-2.0, no irrigation.

NY1 — Ithaca, N.Y., (low mowing), sandy loam, 5.6-6.0, 2.1-3.0, 1.1-1.5, to prevent dormancy.

NY2 — Ithaca, N.Y., (high mowing), sandy loam, 5.6-6.0, 2.1-3.0, 2.6-3.0, to prevent dormancy.

OH2 — Marysville, Ohio, silty clay loam, N/A, 3.1-4.0, 1.6-2.0, only during severe stress.

OK1 — Stillwater, Okla., N/A, N/A, N/A, 2.1-2.5, to prevent stress.

OR1 — Hubbard, Ore., silt loam and silt, 5.6-6.0, 4.1-5.0, 1.1-1.5, to prevent dormancy.

OR2 — Corvallis, Ore., silty clay loam, 5.6-6.0, 4.1-5.0, 1.6-2.0, to prevent dormancy.

RI1 — Kingston, R.I., silt loam and silt, 6.1-6.5, 3.1-4.0, 1.1-1.5, to prevent stress.

TX1 — Dallas, Tex., (high mowing), tilty clay and clay, 7.6-8.5, 1.1-2.0, 2.1-2.5, to prevent stress.

TX2 — Dallas, Tex., (low mowing), silty clay and clay, 7.6-8.5, 1.1-2.0, 1.1-1.5, to prevent stress.

UB1 — Beltsville, Md., (high maintenance), sandy loam, 6.1-6.5, 3.1-4.0, 2.1-2.5, to prevent dormancy.

UB2 — Beltsville, Md., (low maintenance), sandy loam, 6.1-6.5, 0.0-1.0, 2.6-3.0, no irrigation.

VA1 — Blacksburg, Va., silt loam and silt, 6.1-6.5, 3.1-4.0, 2.6-3.0, only during severe stress.

VA2 — Blackstone, Va., sandy loam, 5.6-6.0, 2.1-3.0, 1.1-1.5, only during severe stress.

VA3 — Richmond, Va., sandy loam, 6.1-6.6, 3.1-4.0, 2.1-2.5, only during severe stress.

VA4 — Virginia Beach, Va., sandy loam, 6.1-6.5, 3.1-4.0, 2.1-2.5, to prevent stress.

VA6 — Norton, Va., sandy clay, 6.6-7.0, 3.1-4.0, 2.1-2.5, no irrigation.

WA4 — Ritzville, Wash., (dense shade), silt loam and silt, 6.6-7.0, 0.0-1.0, 2.1-2.5, only during severe stress.

WA5 — Mukilteo, Wash., loam, 4.6-5.5, 1.-2.0, 2.1-2.5, no irrigation.

WA6 — Yakima, Wash., (partial shade), sandy loam, 7.1-7.5, 0.0-1.0, 2.1-2.5, to prevent stress.

Tall fescue breeding programs reported bearing fruit

Continued from page 11

in the Northwest. But Funk pointed to hope offered by the work of Duncan and his team in Georgia; Dr. Melody Kemp Fraser of Pure Seed Testing in North Carolina; North Carolina State University; and Bob Mazur at Clemson University in South Carolina.

Kevin Morris, national director of the U.S. Department of Agriculture's National Turfgrass Evaluation Program, added that major research is being done by Seed Research of Oregon, Pickseed and others.

Duncan believes he is knocking on the door to significant improvements, and that golf courses would be a Utopia for the new varieties he is breeding.

He is using an approach never used in the turf industry before, he said. That is, he is developing and testing cultivars in the most stressful conditions he can put them in for heat stress, acidic soils and high soil compaction — conditions common to the South.

"I'm screening fescues at pHs of 3.6 to 4.0. This is extremely toxic," Duncan said. "I want it so stressful that if I can get two, three or four plants to live, I've got material that I can work with from a breeding standpoint.

'As we get finer and finer textures and improve adaptability to lower mowing heights, we'll see it more in the high-traffic areas... It will give golf courses more flexibility than they have now.'

— Dr. Ronny Duncan, Univ. of Georgia

"When that material is put on a normal golf course situation, which is going to be up at 6 [pH] or above, that plant will feel like it is in heaven."

Duncan's idea is to get the cultivars buffered against extremes like very compacted, acidic soils and extreme moisture availability situations.

"That plant has to be able to react to those wide swings. If it can do that, it's going to persist over time," he reckons.

GOLF COURSE APPLICATIONS

What does this mean for golf courses?

"We're going to start seeing it used more and more on golf courses," Duncan said. "People on golf courses don't like to have to replant year after year."

He predicted new tall fescues will initially be used more in the roughs.

"Then, as we get finer and finer textures and improve adaptability to lower mowing heights, we'll see it more in the high-traffic areas. It's just a matter of time. It will give golf courses more flexibility than they have now," he said.

Duncan predicted the new generation will be overseeded on warm-season grasses, and used in blends with cool-season grasses.

"It might replace ryegrass in overseeding," he added.

"The domino effect from this will be tremendous," he said. "You will see a lot more blending, rather than single-species planting."

Funk pointed out that present varieties aren't as adaptable to the closer mowing heights as traditional golf-type species.

"In the future that may change," he said.

Tall fescues, Funk said, do have the advantages of a deep-root system and of having Acremonium endophytes, which greatly enhance their disease- and stress resistance.

Duncan said the near future holds in store substantially improved disease resistance.

"But I have to improve these other characteristics and get a healthy plant first," he said. "We've indirectly begun working on the pathogen problem [with pythium blight and rhizoctonia brown patch]."

"We haven't found any good stable genetic resistance to pathogens yet. But I think if we can improve stress tolerance, we may see these genes expressed if they're out there. And if Reid Funk doesn't have them, I don't know who does. He's got the most complete collection of tall fescues in the world."

Pointing out that tall fescues traditionally haven't done well in the South, Duncan said, "We're going to change that."