Rutgers University

Summary

Breeding and Evaluation of Kentucky Bluegrass, Tall Fescue, Fine Fescues, Perennial Ryegrass and Bentgrass for Turf.

C. Reed Funk, Principal Investigator

1. Promising turfgrass germplasm was collected from old turfs in New Jersey, Georgia, and England. This included an extensive search for useful endophytes in fine fescues, _Agrostis_, and _Poa_. New sources of endophytes were found in Chewings fescue, strong creeping red fescue, and blue fescue. Collections of native species of _Poa_ including big bluegrass, mutton bluegrass, Sandberg bluegrass, and Nevada bluegrass were made in Utah, Arizona, Nevada, and Idaho in cooperation with Genesis Seed Company. The _Poa_ collection will be screened for useful endophytes this coming winter.

2. Acremonium endophyte enhanced resistance to the dollar spot disease was observed in field trials of strong creeping red fescue, Chewings fescue, hard fescue, and blue fescue at Adelphia and North Brunswick. Both mycelial growth on and damage by the dollar spot fungus was greatly reduced on fine fescues containing endophyte.

3. An insecticide (Diazinon) significantly reduced dollar spot on endophyte-free fine fescues and Kentucky bluegrass. This might indicate that (1) dollar spot infection is increased by feeding injury of sod webworms, chinch bugs and other insects, and/or (2) the better growth of grasses free of insect and/or nematode predation enhance recovery from the dollar spot disease.

4. Severe turf loss was observed on all endophyte-free hard fescues in the 1989 National Fine Fescue Test at Adelphia, NJ. Endophyte-infected hard fescues showed little or no damage. Large populations of chinch bugs were present on the damaged endophyte-free hard fescues and undoubtedly increased turf damage and slowed recovery. However, it is unlikely that chinch bugs were the primary or sole cause of the damage as they did not cause serious damage on adjacent endophyte-free plots of strong creeping red or Chewings fescue. The better cultivars of hard fescue continue to perform exceptionally well in all turf trials at Rutgers that receive low maintenance. The severe turf loss on endophyte-free hard fescues in the 1989 seeded test might well have been associated with the excessive density of the hard fescue maintained at medium high fertility, irrigation, and frequent medium close mowing.

5. Complete loss of endophyte infection was observed in over 200 interspecific hybrids of endophyte-infected big bluegrass X endophyte-free Kentucky bluegrass. Hybrid seedlings from crosses using endophyte-infected big bluegrass as the maternal parent contained an Acremonium endophyte a few months after germination. However, none of the hybrids contained endophyte after spending the winter in spaced-plant field nurseries at Adelphia.

Turfgrass Breeding at Rutgers (1992 Report)

C. Reed Funk, David Huff, James Murphy, Richard D. Ilnicki, Bruce B. Clarke, William K. Dickson, Ronald Bara, Suichang Sun, Dirk Smith, Janice Bara, Randy Prostak, and Lora Betts.

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2. Over 6,000 new turf evaluation plots and over 7 acres of spaced-plant nurseries were established in 1992.

3. Preliminary studies indicate that a herbicide management program might be developed to selectively remove rough bluegrass from Kentucky bluegrass turfs.

4. Over 300 turf-type tall fescue progenies were sent to Dr. Ronny Duncan at the Georgia Agricultural Experiment Station at Griffin, GA for evaluation on highly acid soils (pH 4.0) in an area which also receives severe stress from summer heat, drought, and many diseases, insects, and nematodes. A few attractive, dark green plants appear promising in preliminary studies. The study was also designed to assess the role of various Acremonium endophytes on various aspects of turf performance under these conditions.

5. Acremonium endophyte enhanced resistance to the dollar spot disease was observed in field trials of strong creeping red fescue, Chewings fescue, hard fescue, and blue fescue at Adelphia and North Brunswick. Both mycelial growth on and damage by the dollar spot fungus was greatly reduced on fine fescues containing endophyte.

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9. Cool-season applications of nitrogen fertilizers were much more effective in controlling red thread and dollar spot in perennial ryegrasses than nitrogen fertilizers applied during the summer months. Summer fertilization reduced effective root growth and activity leading to rapid wilting.

10. Kentucky bluegrass cultivars and selections showed significant differences in degree of wilting under drought stress. Differences in the ability of different cultivars to absorb water and depth of rooting may have been more important than water use rate in explaining differences in wilting. Soil under wilted cultivars contained significantly less moisture. Turfgrass species and cultivars might differ in their resistance to various thatch inhabiting microorganisms that inhibit water intake.

11. Striking differences were observed amoung Kentucky bluegrass cultivars and selections in the rate and degree of recovery from the yellow ring disease. All Kentucky bluegrasses in the high maintenance national test established in 1990 at North Brunswick, NJ showed extensive and severe yellow ring disease symptoms beginning in early July of 1992. Many entries showed rapid recovery and displayed no visual symptoms by mid-September. However, many widely used cultivars incuding Baron, Gnome, Merit, and Kelly were continuing to show serious yellowing in late October.

12. The first certified seed crops were harvested from Affinity, Palmer II, Prelude II, and Brightstar perennial ryegrasses; Rebel 3D and Pixie tall fescues; Nu Blue and Shamrock Kentucky bluegrasses; Southshore creeping bentgrass; SR-3100 hard fescue; and Bridgeport Chewings fescue.

Publications

1. White, James F. Jr., P.M. Halisky, S. Sun, G. Morgan-Jones, and C.R. Funk. 1992. Endophyte-host associations in grasses. XVI. Patterns of endophyte distribution in species of the tribe Agrostideae. Amer. J. of Botany 79:472-477.

2. Brede, A.D., R.H. Hurley, A.W. Jacklin, L.A. Brilman, and C.R. Funk. 1992. Registration of Suffolk Kentucky Bluegrass. Crop Sci. 32:827.

3. Hurley, R.H., W.A. Meyer, C.A. Rose-Fricker, M.L. Kemp, and C.R. Funk. 1992. Registration of Rebel Jr. tall fescue. Crop Sci. 32:831.

4. Brede, A. Douglas, D.R. Huff, and C.R. Funk. 1992. United States Plant Variety Protection Certificate No. 9200126. Nu Blue Kentucky bluegrass. Issued August 31, 1992.

5. Dickson, W.K., R.F. Bara, S. Sun, D.A. Smith, B.B. Clarke, and C.R. Funk. 1992. Performance of bentgrass cultivars and selections in New Jersey turf trials. Rutgers Turfgrass Proceedings 23:81-88.

6. Dickson, W.K., R.F. Bara, D.A. Smith, S. Sun, B.B. Clarke, and C.R. Funk. 1992. Performance of tall fescue cultivars and selections in New Jersey turf trials. Rutgers Turfgrass proceedings 23:89-106.

7. Dickson, W.K., R.F. Bara, D.A. Smith, L.L. Betts, B.B. Clarke, and C.R. Funk. 1992. Performance of perennial ryegrass cultivars and selections in New Jersey turf trials. Rutgers Turfgrass Proceedings. 23:107-126.

8. Smith, D.A., R.F. Bara, W.K. Dickson, M.L. Fraser, R.W. Duell, L.L. Betts, S. Sun, B.B. Clarke, and C.R. Funk. 1992. Performance of fine fescue cultivars and selections in New Jersey turf trials. Rutgers Turfgrass Proceedings 23:127-143.

9. Dickson, W.K., R.F. Bara, D.A. Smith, S. Sun, B.B. Clarke, and C.R. Funk. 1992. Performance of Kentucky bluegrass cultivars and selections in New Jersey turf trials. Rutgers Turfgrass Proceedings 23:144-191.