

Breeding and Evaluation of Kentucky Bluegrass, Tall Fescues, Fine Fescues, and Perennial Ryegrass for Golf Turf Use.

C. Reed Funk, Melodee Kemp, Jennifer M. Johnson-Cicalese, Suichang Sun, Ronald Bara, and William K. Dickson.

EXECUTIVE SUMMARY

The New Jersey Agricultural Experiment Station of Rutgers University continues to devote considerable resources to the turfgrass breeding program. We are directing much of our work on the major turfgrass species including the perennial ryegrasses, tall fescues and Kentucky bluegrass to more basic studies. Most of our cultivar development work involves cooperative efforts with breeders in major seed producing regions. We are also directing increased effort to germplasm enhancement of turfgrass species that have been neglected by other breeders. We see great opportunities for the continued genetic improvement of turfgrasses using innovative conventional breeding techniques while keeping abreast of new technologies that will result from advances in turfgrass science, stress physiology, plant pathology, entomology, soil science, and molecular genetics.

Breeding and Evaluation of Kentucky Bluegrass, Tall Fescue,
Fine Fescues and Perennial Ryegrass for Golf Turf Use

C. Reed Funk, Melodee Kemp, Jennifer M. Johnson-Cicalese,
William K. Dickson, Ronald Bara, and Suichang Sun

Soils and Crops Department
New Jersey Agricultural Experiment Station
Cook College
Rutgers University
October 1988

1. Turfgrass germplasm collected from old turfs in Pennsylvania, New Jersey, Colorado, and Utah were added to the over 40,000 turfgrass entries currently being evaluated at Adelphia and North Brunswick. This is part of our program to develop turfgrasses with increased pest resistance, improved stress tolerance and lower maintenance requirements.

2. The first certified seed crops were harvested from Pinnacle perennial ryegrass, Sherwood perennial ryegrass, Blazer II perennial ryegrass, Dandy perennial ryegrass, Chieftain tall fescue, Tribute tall fescue, Thoroughbred tall fescue, Accolade perennial ryegrass, Calypso perennial ryegrass, Wrangler tall fescue, and Cobra creeping bentgrass. Germplasm obtained from

the New Jersey Agricultural Experiment Station was used in the development of these varieties.

3. Extensive new turf evaluation trials of tall fescue (2135 plots), Kentucky bluegrass (1830 plots), perennial ryegrass (1505 plots), and fine fescues (1090 plots) were established at the Soils and Crops Research Station at Adelphia during September 1988. Six acres of spaced-plant nurseries were also planted during 1988.

4. Increasing emphasis and resources are being devoted to the development and characterization of lower-growing "Dwarf-type" cultivars of tall fescue, perennial ryegrass, creeping bentgrass, hard fescue, Chewings fescue, strong creeping red fescue, blue fescue, and Kentucky bluegrass. Lower-growing turfgrasses should require less fertilizer, have reduced mowing requirements, show increased shade tolerance, provide a denser more compact turf, and lose less water to evaporation and transpiration. However, such cultivars will need increased resistance to density associated disease such as Pythium blight and Phizoctonia brown patch. They should also have deep roots and good recuperative ability. Excellent heat and drought tolerance will be needed for most turf situations but may actually be a disadvantage in cool-season grasses used for the winter overseeding of dormant warm season turfs.

5. We are continuing research on the utilization of endophytic fungi in enhancing turf performance and pest resistance in perennial ryegrass, tall fescue, hard fescue, Chewings fescue, strong creeping red fescue, and blue fescue. Germplasm collections are being screened for new sources of potentially useful endophytes. An endophyte that we found in Poa annua has been identified as Acremonium typhium. We are currently attempting to transfer this endophyte into Kentucky bluegrass. Choke expression was more abundant on Acremonium endophyte infected Chewings' fescues growing under low soil fertility compared to ample soil fertility.

6. A collection of over 5,000 billbug adults made during 1986, 1987, and 1988 revealed that four billbug species occurred in almost equal abundance on New Jersey turfgrasses. These species are Sphenophorus parvulus, S. venatus, S. inaequalis, and S. minimus. Important differences were observed in life cycles with S. inaequalis adults being active a month earlier in the spring and later into the fall than the other species. S. venatus continues adult activity through the summer and egg-laying into September indicating a partial second generation. All four billbug species were present and apparently able to survive on and cause injury to Kentucky bluegrass, tall fescue, perennial ryegrass and five fescues. Acremonium endophyte infection significantly reduced billbug survival on potted tall fescue plants and on tall fescue and perennial ryegrass tillers placed in petri dishes.

7. High nitrogen fertility and soil compaction increased the incidence and severity of the summer patch disease on hard fescues and blue fescues.