

Rutgers University

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

Dr. C. Reed Funk
Principal Investigator

1. The first certified seed crops were harvested from Repell II, Yorkstown III, Advent, Gettysburg, and Delaware Dwarf perennial ryegrasses; Rebel Jr., Tomahawk, Duke, Safari, and Montauk tall fescues; and Washington Kentucky bluegrass.

2. Acremonium endophyte enhanced resistance to the dollar spot disease was observed in field trials at Adelphia, New Jersey. Three sources of endophyte in strong creeping red fescue, one endophyte in Chewings fescue, and an endophyte in hard fescue were associated with significantly improved resistance to this important disease of turfgrass. Fine fescues containing endophytes generally showed a brighter, often lighter green color contrasted to the duller green of endophyte-free grasses.

3. Endophyte-enhanced turf performance was observed in a number of field trials of tall fescues at Adelphia and North Brunswick. Endophyte-infected turfs showed greater density, a brighter color and substantially less damage from insect feeding. Significantly lower numbers of billbug larvae, billbug adults, and sod webworm larvae were found in endophyte-infected turfs.

4. Tall fescues containing some sources of Acremonium endophytes showed greater damage from the Pythium blight disease than similar tall fescues free of endophyte. This association of endophyte-enhanced susceptibility with at least some strains of Acremonium endophytes was observed only when disease incidence was light to moderate.

5. Many experimental and some widely used cultivars of Kentucky bluegrass are showing severe damage from stripe smut in turf trials at Adelphia and North Brunswick. Baron, Merit, Gnome, Victa, Abbey, and Nassau are being heavily damaged by stripe smut. The widespread use of Baron-type Kentucky bluegrasses has apparently resulted in an increased abundance of a race or races of the stripe smut fungus able to infect these varieties.

6. Dramatic differences were observed in damage from billbugs among various Kentucky bluegrass cultivars and selections. In newly established turf trials where most bluegrasses showed little or no injury, some of newer cultivars, primarily of European origin, showed substantial damage.

In older tests where billbug damage was much more severe, most of the widely grown turf-type Kentucky bluegrasses showed severe damage. However, a few turf-type and many common-type

bluegrasses showed good performance. These included Mystic, Eagleton, Princeton P-104, Wabash, Delwood Fine, and Roselawn.

7. Striking differences were noted in the turf performance of many so called common Kentucky bluegrass.

8. Considerable variation was observed in damage from white grubs among Kentucky bluegrass cultivars and selections in a test established in 1987 at North Brunswick, NJ.

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C. Reed Funk, William K. Dickson, Ronald Bara,
Suichang Sun, Dirk Smith, Lora Betts,
James Murphy and Bruce B. Clarke

New Jersey Agricultural Experiment Station
November 1991

1. The first certified seed crops were harvested from Repell II, Yorkstown III, Advent, Gettysburg, and Delaware Dwarf perennial ryegrasses; Rebel Jr., Tomahawk, Duke, Safari, and Montauk tall fescues; and Washington Kentucky bluegrass. Production fields were established to produce Palmer II, Prelude II, APM and Affinity perennial ryegrasses; Rebel 3D tall fescue; Bridgeport Chewings fescue; Shamrock Kentucky bluegrass and Southshore creeping bentgrass. Germplasm obtained from the New Jersey Agricultural Experiment Station was used in the development of these cultivars.
2. Acremonium endophyte enhanced resistance to the dollar spot disease was observed in field trials at Adelphia, New Jersey. Three sources of endophyte in strong creeping red fescue, one endophyte in Chewings fescue, and another endophyte in hard fescue were associated with significantly improved resistance to this important disease of turfgrass. Fine fescues containing endophytes generally showed a brighter, often lighter green color contrasted to the duller green of endophyte-free grasses.
3. Endophyte-enhanced turf performance was observed in a number of field trials of tall fescues at Adelphia and North Brunswick. The 1988 seeded turf test at Adelphia was subjected to a prolonged severe drought during June and July. Following irrigation in early August, endophyte-containing tall fescues showed more rapid and more complete recovery. They produced turfs with greater density, a brighter color and showed substantially less damage from insect feeding. Significantly lower numbers of billbug larvae, billbug adults, and sod webworm larvae were found in endophyte-infected turfs. The 1989 seeded tall fescue turf trial at Adelphia was irrigated, as needed, throughout the 1991 growing season. However, substantial insect damage was observed in endophyte-free turfs in September and October. Feeding by a second generation of billbug larvae produced most of the injury. Endophyte-infected tall fescues showed significantly fewer billbug larvae, billbug adults, sod webworm larvae, and white grubs in this test.
4. Tall fescues containing some sources of Acremonium endophytes showed greater damage from the Pythium blight disease than similar tall fescues free of endophyte. This association of endophyte-enhanced susceptibility with at least some strains of Acremonium endophytes was observed only when disease incidence was light to moderate. When Pythium blight was severe, all tall

fescues showed considerable damage. An attempt is being made to identify strains of Acremonium endophytes which are not associated with enhanced susceptibility to Pythium blight.

5. Many experimental and some widely used cultivars of Kentucky bluegrass are showing severe damage from stripe smut in turf trials at Adelphia and North Brunswick. Baron, Merit, Gnome, Victa, Abbey, and Nassau are being heavily damaged by stripe smut while Merion shows only a few infected tillers. This is in marked contrast to the situation in the 1960's when Merion was widely used and frequently showed severe damage from stripe smut in older plantings. The widespread use of Baron-type Kentucky bluegrasses has apparently resulted in an increased abundance of a race or races of the stripe smut fungus able to infect these varieties. The stripe smut race or races able to damage Merion appears to be much less abundant, at present, at Adelphia and North Brunswick. However, it is also important to note that many varieties including Glade, Touchdown, Ram I, and Midnight continue to show good resistance to stripe smut after many years of use. We recommend that turf managers include at least two unrelated cultivars with good stripe smut resistance in all Kentucky bluegrass blends.

6. Dramatic differences were observed in damage from billbugs among various Kentucky bluegrass cultivars and selections. In newly established turf trials where most bluegrasses showed little or no injury, some of the newer cultivars, primarily of European origin, showed substantial damage. They included Broadway (3.3), Noblesse (3.7), Miranda (3.7), Ampellia (4.3), and Paso (4.3). Other cultivars showing moderate damage included Miracle (5.0), Fylking (5.0), PR-1 (5.0), Donna (5.7), and AG 508 (5.7).

In older tests where billbug damage was much more severe, most of the widely grown turf-type Kentucky bluegrasses showed severe damage. However, a few turf-type and many common-type bluegrasses showed good performance. These included Mystic, Eagleton, Princeton P-104, Wabash, Delwood Fine, and Roselawn.

7. Striking differences were noted in the turf performance of many so called common Kentucky bluegrasses. Many showed good resistance to billbugs but some were highly susceptible. Garfield and Pomeroy became very difficult to mow under heat stress in late summer and suffered from an undetermined patch disease whereas many common-types showed little damage from this disease and mowed cleanly. Alene showed excellent winter vigor but suffered from stem rust in late summer and early fall when many common types showed good rust resistance. Ginger showed the earliest spring greenup but showed over 90 percent turf loss during summer stress conditions tolerated by a number of common-types. Others were intermediate. Differences were also noted in rate of vertical leaf elongation, shade of color, amount of

purple pigmentation during winter, resistance to leaf rust and powdery mildew, and ability to recover from leaf spot.

Common Kentucky bluegrass seed is often sold as a commodity item. The cultivar name is frequently not included on the seed label. Off grade or surplus seed of propriety turf-type bluegrasses is sometimes labelled and sold as common. Considerable amounts of seed of common-type cultivars of Kentucky bluegrass is produced very economically under dryland conditions in eastern Washington, northern Idaho and other locations. Most common-type Kentucky bluegrasses were selected for efficient seed production in these areas. The Best of these varieties are useful for many types of low maintenance turfs in many regions. However, we need information on the relative performance of these cultivars for different uses and a more informative label to allow proper choice of the best varieties.

8. Considerable variation was observed in damage from white grubs among Kentucky bluegrass cultivars and selections in a test established in 1987 at North Brunswick, NJ. A few bluegrasses showed very little damage where surrounding entries showed severe injury from root feeding by white grubs. Resistance appeared to be associated with an ability to regenerate new roots following feeding injury. It is proposed that resistance was exhibited by heat tolerant cultivars able to maintain adequate net photosynthesis at high temperatures. Resistance may have also been associated with the ability of root systems to tolerate high soil temperatures. Rather high populations of white grubs were found in the soil beneath resistant bluegrasses. Drought stress, at a critical time, might limit the usefulness of this type of resistance.