GTI RESEARCH HILITE

Prof. Chris Hall, Prof. Jack Eggens, Ms. Karen Sagan and Dr. Ken Carey have been cooperating for the past three years on non-herbicide weed control for turf. They believed that which turfgrass species or cultivar was planted, and the nitrogen regime which is used in the maintenance of the turf will have significant effects on the invasion of the turf by broadleaf weeds.

Previous work had demonstrated that increasing the mowing height from one inch to three inches significantly reduced the weed infestation on Kentucky bluegrass. Nitrogen fertility tended to have a variable effect.

In this experiment several cultivars of Kentucky bluegrass, perennial ryegrass, Chewings fescue, hard fescue and tall fescue were compared under four levels of nitrogen. The nitrogen levels were (a) no application over the three years, (b) 0.5 kg N/ 100 m^2 as a dormant November application, (c) a split treatment of 0.5 kg N/m^2 in May and in November, and (d) a split application of 0.25 kg in May, 0.25 kg in August and 0.50 kg in November. A mowing height of 1.5 inches was used.

The plots were rated visually for broad leaf weed invasion on a scale of 1 - 5 with 5 being a heavy infestation of more than 50% of the plot area. The visual estimates were checked against area-quadrat estimates to ensure reliability. The ratings were made on nineteen occasions over a three year period which began with establishment of the new turf.

Kentucky bluegrass was the least resistant species, followed by the fine fescues (Table 1). Both tall fescue and perennial ryegrass were relatively resistant to broadleaf weed invasion. The difference in resistance to invasion was largely a result of differences in the rate of establishment. Kentucky bluegrass and the fine fescues germinated relatively slowly, and the broadleaf weeds were easily able to establish in the new turf.

Significant differences were also observed between cultivars of a species, particularly among the bluegrasses and the fine fescues. Victory fine fescue ranked two full units superior to Agram fescue. Likewise Touchdown Kentucky bluegrass was a unit better than American. The poorest ryegrass or tall fescue was still superior to any of the bluegrass or fescues.

The level of nitrogen nutrition had a significant effect on the weed resistance in all species (Table 2). Increasing the nitrogen nutrition and distributing the nutrition more evenly over the season reduced the weed infestation in all species. Kentucky bluegrass showed the strongest response to nitrogen. The tall fescue and perennial ryegrass showed the least improvement from nitrogen fertilization and remained relatively weed free, even without nitrogen.

In conclusion low weed environments may be maintained through selection of the appropriate grass species and cultivar; species which germinate rapidly and maintain a dense turf. Adequate nitrogen nutrition is an important factor in maintaining a low weed population.

Table 1: A comparison of the broadleaf weed infestation of six turf species.

Turf Species	Rating (rating of 0 to 5, 5 = 50%+ of plot area)
Tall fescue	0.66
Perennial ryegrass	0.71
Kentucky bluegrass	2.03
Creeping red fescue	1.27
Hard fescu	1.92
Chewings fescue	1.95

Table 2: Improved nitrogen nutrition aids in improving the resistance of turf species to broadleaf weed infestation.

Nitrogen Nutrition	Tall Fescue	Ryegrass	Bluegrass	Fine Fescue
	(rating of 0 to 5, 5 = 50% of plot area)			
No nitrogen	1.09	1.16	3.00	2.20
0.5 kg dormant	0.59	0.89	2.28	1.59
0.5 kg in May 0.5 kg dormant	0.50	0.54	1.75	1.32
0.25 kg in May 0.25 kg in August 0.50 kg dormant	0.49	0.34	1.21	1.14