

STOP: 2

Developing a Perennial Ryegrass Management System

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In Michigan, perennial ryegrasses are usually short-lived perennials. Perennial ryegrass is a bunch type grass having rapid germination, rapid establishment from seed and rapid vertical shoot growth rates compared to Kentucky bluegrass and fine fescues. Because of these characteristics, it has been recommended to never put more than 20 to 30% perennial ryegrass in a mixture.

However, with the advent of the new perennial ryegrass cultivars, many of these undesirable characteristics are no longer valid. Some of the improvements include:

- 1) Slower vertical growth rate.
- 2) Finer texture or leaf width.
- 3) Darker green color.
- 4) Improved mowing quality.
- 5) Reduced seedling competition.
- 6) Greater tolerances to environmental extremes.

As these ryegrasses are increasing in use, other undesirable characteristics are becoming important considerations.

These include:

- 1) Susceptibility to diseases including brown patch, red thread rust, and snow mold.
- 2) Lack of ability to creep and fill in void areas.
- 3) Non-uniform establishment and thus an eventual tufted appearance when overseeded into deteriorated lawn areas.

As a result of these problems, an investigation was initiated to search for proper methods of establishing and managing the new perennial ryegrasses. The site chosen was seeded in September of 1977. Two separate areas were established which included 8 perennial ryegrass varieties and 8 mixtures of perennial ryegrass, Kentucky bluegrass and fine fescue. One area was later maintained at 3/4 in. mowing height and the other at 1 1/2 in. mowing height. In the mixtures, the Kentucky bluegrass component was made up of equal parts of Parade, Baron, and Touchdown, while the fine fescue component was equal parts of Pennlawn and Wintergreen. Manhattan was chosen as the perennial ryegrass in these mixtures.

In addition, a block of the same fine fescues and a block of the same bluegrasses were seeded in 1977. On May 16, 1979, after full establishment, Loretta perennial ryegrass was overseeded into these areas with the Rogers Model 524 seeder.

Table A. Relative abundance of 6 species of ryegrasses in two treatments.

Part of this site was maintained at 3/4 in. and the remaining section at a 1 1/2 in. mowing height. Nitrogen in the form of urea and as contained in a complete fertilizer was evaluated. At the time of writing, perennial ryegrass was not successfully competing in the sward.

In summary, it is important to remember that a major shift to high use of Perennial ryegrasses will necessitate a new management system to assure their growth and survival. Research at Michigan State University is beginning to determine that management system.

Table B. Perennial ryegrass yield in two treatments.

Treatment	Yield (lb/acre)	Relative Yield (%)
1. 3/4 in. mowing	1.5	100
2. 1 1/2 in. mowing	1.2	80
3. 3/4 in. mowing + N	1.8	120
4. 1 1/2 in. mowing + N	1.4	93
5. 3/4 in. mowing + N + P	2.0	133
6. 1 1/2 in. mowing + N + P	1.6	107
7. 3/4 in. mowing + N + P + K	2.2	147
8. 1 1/2 in. mowing + N + P + K	1.8	120

Table C. Perennial ryegrass yield in two treatments with different fertilizer levels.

Table A . Relative Susceptibility of 8 Perennial Ryegrasses to Rust (Puccinia sp.)

Relative Rank	Cultivar	Quality Rating (1-best; 9-poorest)*
1	Loretta	2.0 A
2	Omega	3.3 B
3	Citation	4.3 BC
4	Manhattan	4.7 CD
5	Derby	5.0 CD
6	Diplomat	5.3 CD
7	NK-200	5.3 CD
8	Yorktown	5.7 D

* Means having the same letter are not significantly different at the 5% level, Duncan's MRT.

Table B . Perennial Ryegrass Cultivar Recovery From Leaf Rust Three Months After Infestation

Relative Rank	Cultivar	Quality Rating (1-best; 7-poorest)*
1	Loretta	2.3 A
2	Omega	4.0 B
3	Manhattan	4.3 B
4	Yorktown	4.3 B
5	Citation	4.7 B
6	Derby	5.7 BC
7	Norlea	6.7 C
8	NK-200	7.0 C

* Means having the same letter are not significantly different at the 5% level, Duncan's MRT. $S_{\bar{x}} = 0.5352$

Table C . Perennial Ryegrass Mixtures with Kentucky Bluegrass and Fine Fescue

Cutting Height	Average Number Plants/dec ²
3/4 inch	32
1 1/2 inch	26

Table D . Mixture Influence on the Percent of Total Seeds that Remained as Plants After 10 Months

	Percent by weight			Percent
	KB	FF	PR*	
1.	80	0	20	10.3
2.	20	60	20	16.7
3.	75	0	25	9.5
4.	15	45	40	14.5
5.	40	0	60	8.4
6.	10	30	60	10.9
7.	20	0	80	9.8
8.	5	15	80	16.7

*KB = Kentucky bluegrass
 FF = Fine Fescue
 PR = Perennial Ryegrass

Table E . Percent Distribution Comparison Between % by Seed Number of Seed Mixture and Plant Population

	Percent by Seed #			- Cutting Height -					
	KB	FF	PR*	3/4 in.			1 1/2 in.		
	KB	FF	PR*	KB	FF	PR	KB	FF	PR
1.	97	0	3	71	4	25	65	8	27
2.	54	40	7	21	60	19	29	50	21
3.	92	0	8	58	4	38	71	5	24
4.	48	36	16	26	41	32	25	39	36
5.	84	0	16	35	4	62	31	6	63
6.	40	30	30	15	30	55	21	26	53
7.	67	0	33	15	30	55	21	26	53
8.	27	20	53	7	24	69	9	20	71

* KB = Kentucky bluegrass
 FF = Fine fescue
 PR = Perennial ryegrass

Table F . Percent Distribution Comparison Between % by Weight of Seed Mixture and Plant Population

	Percent by wt.			- Cutting Height -					
	KB	FF	PR*	3/4 in.			1 1/2 in.		
	KB	FF	PR*	KB	FF	PR	KB	FF	PR
1.	80	0	20	71	4	25	65	8	27
2.	20	60	20	21	60	19	29	50	21
3.	60	0	40	58	4	38	71	5	24
4.	15	45	40	26	41	32	25	39	36
5.	40	0	60	35	4	62	31	6	63
6.	10	30	60	15	30	55	21	26	53
7.	20	0	80	23	0	77	32	4	64
8.	5	15	80	7	24	69	9	20	71

*KB = Kentucky bluegrass
 FF = Fine Fescue
 PR = Perennial ryegrass