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The Rutgers Turfgrass Proceedings is published yearly by the Rutgers Center for Turfgrass Science, Rutgers Cooperative Extension, and the New Jersey Agricultural Experiment Station, Cook College, Rutgers, The State University of New Jersey in cooperation with the New Jersey Turfgrass Association. The purpose of this document is to provide a forum for the dissemination of information and the exchange of ideas and knowledge. The proceedings provide turfgrass managers, research scientists, extension specialists, and industry personnel with opportunities to communicate with co-workers. Through this forum, these professionals also reach a more general audience, which includes the public.

This publication includes lecture notes of papers presented at the 2001 New Jersey Turfgrass Expo. Publication of these lectures provides a readily available source of information covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Dr. Ann Brooks Gould, Editor
Dr. Bruce B. Clarke, Coordinator

INCIDENCE OF NEOTYPHODIUM ENDOPHYTE IN SEED LOTS OF CULTIVARS AND SELECTIONS OF THE 1999 NATIONAL PERENNIAL RYEGRASS TEST

Melissa M. Mohr, William A. Meyer, and Carrie Mansue¹

Endophytes are naturally occurring fungi that live symbiotically in certain grasses and protect plants from a variety of insects, diseases, and drought stress. Endophytes are transmitted from plant to plant by seed. After germination, the endophyte mycelium grows within the sheath, stem, and leaf tissues of the maturing plant, eventually entering the flowering stem and seed. To maintain the viability of the endophytes, seed should be stored at cool temperatures and dry conditions. Although endophytes are a remarkable discovery to the turf grass industry, they can have a detrimental impact on grazing livestock. For this reason, grasses infected with endophyte should never be used in pasture situations. The level and toxicity of endophyte in grasses varies extensively. Endophytes have been found in perennial ryegrass, tall fescue, and the fine fescues, but no strains have been found to survive in Kentucky bluegrass and bentgrass that do not also cause severe choke.

In 1999, the National Turfgrass Evaluation Program (NTEP) distributed seed for a National Perennial Ryegrass Test. Seed was sent to various locations around the country and tests will be evaluated for a number of years under many different conditions. The remnant seed from the 134 entries was analyzed to determine the percentage of seed infected with endophyte.

PROCEDURE

A sample of seed was taken from each entry in the 1999 National Perennial Ryegrass Test and stained using the rose bengal staining method (Saha et al., 1988). Seeds were soaked in an alkaline solution (5.0% aqueous ethyl alcohol, 0.5% rose bengal,

and 2.5% sodium hydroxide) for 20 to 24 hours, rinsed thoroughly in water, and then soaked in a 0.25% aqueous rose bengal solution for 6 hours. Samples were then refrigerated until screened. Fifty individual seeds were squashed and analyzed under a microscope at 200X for indication of endophyte.

RESULTS AND DISCUSSION

Results of the endophyte analysis are presented in Table 1. All entries screened had some level of endophyte present; the amount and frequency of endophyte, however, varied greatly. The greatest infection of endophyte was 98%, and the least infection found was 4%. Since endophyte infected seed can lose viability over time and improper storage, it is possible that some turf plots in the 1999 National Perennial Ryegrass Test may have lower levels of infection than indicated in Table 1.

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LITERATURE CITED

Saha, D. C., M. A. Jackson, and J. M. Johnson-Cicalese. 1988. A rapid staining method for detection of endophytic fungi in turf and forage grasses. *Phytopathology* 78:237-239.

¹Soil and Plants Technician, Research Professor, and Research Technician, respectively, New Jersey Agricultural Experiment Station, Cook College, Rutgers, The State University of New Jersey, New Brunswick, NJ 08901-8520.

Table 1. Endophyte infection of seeds from cultivars and selections entered in the 1999 National Perennial Ryegrass Test. (NOTE: The endophyte in these seeds are not necessarily viable and the infection rate in the resulting turf plots may be lower.)

NTEP Number	Cultivar or Selection	Endophyte Infection ¹ (%)
125	PST-2L96	98
95	Pacesetter	98
117	ABT-99-4.560	96
100	APR 1232	96
86	Seville II	96
81	ABT-99-4.721	96
55	Extreme	96
51	Premier II	96
25	Nexus	96
20	APR 1233	96
17	Pick EX2	96
120	ABT-99-4.724	94
101	SRX 4801	94
90	DP 17-9069	94
88	DP 17-9496	94
57	Edge	94
46	Exacta	94
26	DLF-LDD	94
128	Courage	92
108	EPD	92
99	APR 1231	92
87	Pennant II	92
37	Inspire	92
31	Kokomo	92
28	Roberts-627	92
16	Pick RC2	92
14	Promise	92
97	Prowler	90
49	Barlennium	90
47	Affirmed	90
30	Applaud	90
27	Pentium	90
2	Racer	90
133	Jet	88
68	Citation Fore	88
116	ABT-99-4.115	86
61	Pick PR B-97	86
53	Monterey II	86
124	PST-2JH	84
119	ABT-99-4.709	84
80	ABT-99-4.600	84
74	Manhattan 3	84
69	Catalina SLT	84
56	Admire	84
50	Pinnacle II	84

Table 1 (continued).

NTEP Number	Cultivar or Selection	Endophyte Infection ¹ (%)
48	LTP-ME	84
41	Pleasure XL	84
6	Pick PR 1-94	84
98	APR 776	82
70	Manhattan 4	82
36	Gator 3	82
19	APR 1234	82
129	Summerset	80
126	SR 4820	80
94	Wilmington	80
85	Panther	80
79	ABT-99-4.464	80
39	Divine	80
29	Charismatic	80
15	Paragon	80
83	ABT-99-4.834	78
43	APR 1235	78
1	Calypso II	78
132	Radiant	76
122	ABT-99-4.965	76
118	ABT-99-4.625	76
78	ABT-99-4.339	76
76	Palmer III	76
73	Catalina	76
67	Salinas SLT	76
54	Galaxy	76
52	Premier	76
24	Paradigm	76
112	MP88	74
33	Allstar2	74
12	Secretariat	74
11	Yatsugreen	74
9	LPR 98-143	74
82	ABT-99-4.815	72
71	PST-2LA	72
42	Amazing	72
127	Gallery	70
104	SRX 4RHT	70
84	Cathedral II	70
44	APR 1237	70
32	CIS-PR-75	70
22	WVPB-R-82	70
18	Affinity	70
7	Passport	70
35	CIS-PR-84	69
131	MB 414	68

Table 1 (continued).

NTEP Number	Cultivar or Selection	Endophyte Infection ¹ (%)
105	Elfkin	66
72	Brightstar II	66
66	PST-2M4	66
60	Pick PRNGS	66
38	Majesty	66
3	Fiesta 3	66
121	A5C	64
102	SR 4500	64
64	PST-2SBE	64
13	Pizzazz	64
115	MEPY	63
123	Stellar	60
63	Brightstar SLT	60
40	Ascend	60
109	EP53	58
45	Churchill	56
8	Headstart	56
134	BY-100	54
130	Splendid	54
93	Line Drive	54
62	PST-2RT	54
59	Blazer IV	54
5	Buccaneer	52
34	Cabo	48
89	DP LP-1	46
91	DP 17-9391	44
113	MP107	38
65	PST-2CRR	38
103	SRX 4120	34
10	LPR 98-144	34
110	Superstar	32
58	Pick PR QH-97	30
107	MDP	26
23	WVPB-R-84	26
21	Koos R-71	26
75	Charger II	24
111	Skyhawk	14
92	Allsport	14
4	Linn	14
106	CAS LP84	8
96	Prosport	8
77	Phantom	8
114	MP103	4

¹Percent infection based on 50 seeds examined from each entry.