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In Cooperation With

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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% agueous 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 loose 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.

ACKNOWLEDGMENTS

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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.

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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.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.)

Table 1 (continued).

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 95 Panther 80 96 Panther 80 97 ABT-99-4.464 80 98 Phine 80 91 ABT-99-4.464 80 92 Charismatic 80 13 APR 1235 78 14 Calypso II 78 15 Paragon 80 83 APR 1235 76 14 Calinat 76 15 Radiant 76 16 Palmer III 76 73 Catalina 76 <th>NTEP Number</th> <th>Cultivar or Selection</th> <th>Endophyte Infection¹ (%)</th> <th></th>	NTEP Number	Cultivar or Selection	Endophyte Infection ¹ (%)	
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98 APR 776 82 70 Manhattan 4 82 36 Gator 3 82 19 APR 1234 82 19 APR 1234 82 19 APR 1234 82 19 APR 1234 82 129 Summerset 80 94 Wilmington 80 97 ABT-99-4,464 80 39 Divine 80 15 Paragon 80 15 Paragon 80 15 Paragon 80 16 Paragon 80 17 Paragon 80 18 ABT-99-4,834 78 19 Calypso II 78 12 ABT-99-4,625 76 118 ABT-99-4,625 76 18 ABT-99-4,625 76 18 ABT-99-4,8165 72 19 Paradigm 76 12 MP8 7	6	Pick PR 1-94	84	
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94 Wilmington 80 85 Parther 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 78 122 ABT-99-4.965 76 132 Radiant 76 122 ABT-99-4.965 76 132 Radiant 76 143 ABT-99-4.339 76 76 Palmer III 76 73 Catalina 76 74 Salinas SLT 76 75 Salinas SLT 76 74 Galaxy 76 74 Paradigm 76 75 Premier 76 74 Salinas SLT 74 74 Paradigm 72 74 Paradigm 72 74 Paradigm 72 74	126	SR 4820	80	
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67 Salinas SLT 76 54 Galaxy 76 52 Premier 76 24 Paradigm 76 112 MP88 74 33 Allstar2 74 12 Secretariat 74 112 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	73	Catalina	76	
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	35	CIS-PR-84	69	
131 MB 414 68	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 SD 4500	64
102	SR 4300 DST 28DE	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 50	PSI-2RI Plazar IV	54
59	Buccaneer	52
34	Caho	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		26
23	Koos P 71	20
75	Charger II	20
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.