

2000 RUTGERS Turfgrass Proceedings



THE NEW JERSEY TURFGRASS ASSOCIATION

In Cooperation With

RUTGERS COOPERATIVE EXTENSION
NEW JERSEY AGRICULTURAL EXPERIMENT STATION
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
NEW BRUNSWICK

Distributed in cooperation with U.S. Department of Agriculture in furtherance of the Acts of Congress of May 8 and June 30, 1914. Cooperative Extension work in agriculture, home economics, and 4-H. Zane R. Helsel, Director of Extension. Rutgers Cooperative Extension provides information and educational services to all people without regard to sex, race, color, national origin, disability or handicap, or age. Rutgers Cooperative Extension is an Equal Opportunity Employer.

2000 RUTGERS TURFGRASS PROCEEDINGS

of the

**New Jersey Turfgrass Expo
December 12-14, 2000
Trump Taj Mahal
Atlantic City, New Jersey**

**Volume 32
Published July, 2001**

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 University 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 2000 New Jersey Turfgrass Expo. Publication of these lectures pro-

vides 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.

Special thanks are given to those who have submitted papers for this proceedings, to the New Jersey Turfgrass Association for financial assistance, and to those individuals who have provided support to the Rutgers Turfgrass Research Program at Cook College, Rutgers, The State University of New Jersey.

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

EVIDENCE OF RESISTANCE TO POWDERY MILDEW IN KENTUCKY BLUEGRASS CULTIVARS AND SELECTIONS IN THE 2000 NATIONAL KENTUCKY BLUEGRASS TEST

Stacy A. Bonos, Eric Watkins, Ronald F. Bara, Melissa M. Mohr, and William A. Meyer¹

INTRODUCTION

Powdery mildew of Kentucky bluegrass, caused by the fungus *Erysiphe graminis*, is a serious disease of many cultivars subject to shaded environments, periods of low light intensity, or poor air circulation (Smiley et al., 1992; Turgeon, 1991). The disease first appears as small, superficial patches of white mycelium on the outer leaf surface (Turgeon, 1991). Patches enlarge and rapidly coalesce to cover much of the leaf surface, at which time the leaves become chlorotic and may die (Smiley et al., 1992; Turgeon, 1991). Large infected areas look as if flour or lime has been dusted over the turfgrass plants (Smiley et al., 1992). The causal fungus is an obligate parasite, living its entire life on living plant tissue; it overwinters as mycelial mats on living plants or as cleistothecia on dead plant tissue (Turgeon, 1991).

Powdery mildew is prevalent under cool, moist conditions in the greenhouse. In the field, the disease is generally observed during the spring and fall, as spore production and infection of leaves are favored during cool (65°F), humid, and cloudy periods. It can be especially severe on Kentucky bluegrass growing in shaded areas that have been heavily fertilized with nitrogen-containing fertilizers (Smiley et al., 1992).

Fungicides are effective for controlling this disease. Selective pruning of trees and shrubs to improve penetration of sunlight to the turfgrass canopy and increase air circulation may also reduce disease development. The most effec-

tive control, however, is the use of shade-tolerant species or disease resistant cultivars of Kentucky bluegrass developed for shaded, disease-prone sites.

PROCEDURES

During the winter of 2001, 337 entries of Kentucky bluegrass were established under greenhouse conditions to evaluate powdery mildew susceptibility. Entries evaluated included all the entries in the 2000 National Kentucky bluegrass test sponsored by the National Turfgrass Evaluation Program (NTEP) as well as collections from the United States and Europe, new material developed in the breeding program, and selections developed by other breeders.

Entries were sown by hand using a maximum of 0.08 g of seed per 3.5 X 3.5 inch pot (2.0 lb/1000 ft²) and arranged in a randomized complete block design with four replications on 29 January, 2001. The seedlings were fertilized with a complete water-soluble fertilizer (20-20-20) during the period of establishment at a rate of 0.75 nitrogen/1000 ft². Plants were inoculated with the powdery mildew fungus, and at the first evidence of disease were watered at the base of the plant to minimize spread. Seedlings (5 weeks old) were rated on 8 March for degree of powdery mildew disease on a 1 to 9 scale, where 9 represented the least disease (Table 1). Seedlings were also rated on 6 March for plant height on a 1 to 9 scale, where 9 represented the tallest height.

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

RESULTS

Results are presented in Table 1. Entries are ranked according to the degree of powdery mildew disease. There was a wide range of resistance to powdery mildew among the Kentucky bluegrass cultivars and selections evaluated (Table 1). Cultivars such as Blackstone, Serene, Limerick, and Boomerang showed excellent resistance to powdery mildew. Cultivars that exhibited moderate resistance to the disease were Bodacious, Julius, Washington, Langara, and Moonlight. Midnight, Touchdown, Rita, Award, and Liberator all exhibited very poor resistance to powdery mildew.

There are distinct differences in growth rate among Kentucky bluegrass cultivars and selections. Cultivars such as Washington and Kenblue had the greatest growth rate (Table 1). Cultivars such as Wildwood, Preakness, Rita, and Bordeaux had a medium growth rate, while cultivars such as Broadway, Allure, and the experimental selections A98-363 and A98-3368

were among the shortest of the Kentucky bluegrasses evaluated.

REFERENCES

- Smiley, R. W., Dernoeden, P. H., and Clarke, B. B. 1992. Compendium of turfgrass diseases. APS Press, St. Paul, MN.
- Turgeon, A. J. 1991. Turfgrass management. Regents/Prentice Hall. Englewood Cliffs, NJ.

ACKNOWLEDGMENTS

New Jersey Agricultural Experiment Station Publication No. D-12264-5-01. This work was conducted as part of NJAES Project No. 12264, supported by the New Jersey Agricultural Experiment Station, State, and Hatch Act funds, the Rutgers Center for Turfgrass Science, other grants, and gifts. Additional support was received from the United States Golf Association, NTEP, and the New Jersey Turfgrass Association.

Table 1. Performance of Kentucky bluegrass cultivars and selections in a greenhouse trial established in 2001 at Adelphia, NJ. (Includes entries of 2000 NTEP Medium-High Maintenance Test.)

Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
1 * HV 140	8.5	8.0
2 * Blackstone	8.5	7.3
3 W102-A-K	8.5	4.0
4 * Limerick	8.0	5.8
5 * SRX OG245	8.0	4.8
6 IM 65	8.0	4.5
7 SRX 2U22	8.0	8.8
8 A98-15	7.8	6.0
9 A94 LM-344	7.8	7.0
10 * Boomerang	7.5	7.5
11 * Kenblue	7.5	8.5
12 * Unique	7.5	4.8
13 RUGC	7.5	7.3
14 * H92-203	7.3	4.0
15 A97-1475	7.3	3.5
16 * Jewel	7.0	7.3
17 * DLF-76-9038	7.0	4.3
18 A98-13	7.0	6.5
19 H94-731	7.0	4.3
20 SRX 2U33	7.0	6.0
21 * BAR Pp 0471	6.8	2.8
22 * Barzan	6.8	5.8
23 A96-265	6.8	4.5
24 A98-305	6.8	3.3
25 B4-122	6.8	3.3
26 * Wellington	6.5	8.0
27 * PST-106-27	6.5	3.3
28 * Apollo	6.5	5.0
29 * PST-H6-150	6.5	2.8
30 * NA K992	6.5	5.8

Table 1 (continued).

Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
31 * Showcase	6.5	4.8
32 * Princeton P-105	6.5	6.8
33 A95-572	6.5	2.8
34 PST-1304	6.5	3.0
35 * A98-304	6.4	4.2
36 * PST-B5-89	6.3	3.0
37 * Brilliant	6.3	3.8
38 * Pick 232	6.3	6.3
39 * B3-171	6.3	4.0
40 * A97-1330	6.3	4.8
41 * A98-1275	6.3	6.0
42 A96-526	6.3	4.8
43 A97-1560	6.3	3.8
44 IQG-38	6.3	2.3
45 * Bodacious	6.0	6.5
46 * Pp H 7929	6.0	5.3
47 * Julius	6.0	5.8
48 * SRX 27921	6.0	6.8
49 * DLF-76-9032	6.0	4.8
50 * Washington	6.0	9.0
51 * BAR Pp 0468	6.0	3.8
52 A97-1462	6.0	3.0
53 W501-G5	6.0	2.8
54 SRX 2U36	6.0	7.5
55 CNS-254	6.0	6.0
56 A98-290	5.8	4.7
57 * PST-1701	5.8	6.3
58 * SRX 2284	5.8	3.8
59 A96-299	5.8	6.8
60 A98-890	5.8	3.8
61 A97-1263	5.8	2.5
62 B3-168	5.8	2.8
63 * Lily	5.5	6.5
64 * A96-402	5.5	5.8
65 * Pick 113-3	5.5	5.3

Table 1 (continued).

Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
66 * Langara	5.5	5.8
67 * Moonlight	5.5	3.8
68 A98-463	5.5	4.5
69 * A98-183	5.3	3.5
70 * A96-296	5.3	7.3
71 A96-482	5.3	6.3
72 A97-1347	5.3	5.0
73 A98-867	5.3	5.0
74 A95-1048	5.3	3.8
75 A97-1541	5.3	3.5
76 SRX 2U5	5.3	5.5
77 IQG-28	5.3	1.3
78 * A97-1432	5.0	5.3
79 * B3-185	5.0	3.5
80 * IB7-308	5.0	2.8
81 * BA 00-6001	5.0	3.5
82 * A96-451	5.0	4.0
83 * Boutique	5.0	4.5
84 A98-434	5.0	4.3
85 A95-284	5.0	3.8
86 A98-201	5.0	5.3
87 A98-240	5.0	4.0
88 A98-155	5.0	5.0
89 99AN-59	5.0	4.5
90 * PST-161	4.8	6.8
91 * A97-1567	4.8	6.3
92 * SRX 2114	4.8	5.3
93 * Jefferson	4.8	8.0
94 * A98-365	4.8	4.3
95 * GO-9LM9	4.8	9.0
96 * B3-170	4.8	4.3
97 A98-288	4.8	3.8
98 A98-194	4.8	3.3
99 A98-530	4.8	3.5
100 A98-746	4.8	5.5

Table 1 (continued).

	Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
101	99AN-39	4.8	4.5
102	99AN-88	4.8	3.5
103	* Bedazzled	4.5	4.3
104	* A94-293	4.5	4.8
105	* A97-1439	4.5	5.5
106	* Fairfax	4.5	5.0
107	* SRX 2394	4.5	5.5
108	* A98-407	4.5	3.5
109	* A96-739	4.5	5.5
110	NB 8-99	4.5	4.5
111	A98-205	4.5	3.8
112	B6-63	4.5	1.3
113	A98-490	4.5	4.0
114	PST B6-60	4.5	3.8
115	A96-418	4.5	3.0
116	A95-414	4.5	3.5
117	* A97-1336	4.3	5.0
118	* PST-222	4.3	3.5
119	* A97-1449	4.3	4.8
120	* B5-144	4.3	3.8
121	* SI A96-386	4.3	3.5
122	* B4-128A	4.3	2.5
123	Grande Cow Pasture	4.3	9.0
124	A95-288	4.3	3.3
125	A96-1251	4.3	5.0
126	A97-1524	4.3	6.0
127	F124	4.3	6.3
128	K994	4.3	7.0
129	A6-214	4.3	5.5
130	Voyager	4.3	6.3
131	A98-363	4.2	2.5
132	* PpH 7907	4.0	6.0
133	* Coventry	4.0	5.3
134	* PST-604	4.0	3.8
135	* Chateau	4.0	3.3

Table 1 (continued).

Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
136 * Chelsea	4.0	5.0
137 * SRX 2453	4.0	4.8
138 * A89-139	4.0	8.0
139 * A96-746	4.0	7.0
140 * BAR Pp 0573	4.0	3.8
141 * Northstar	4.0	4.8
142 A96-1252	4.0	5.5
143 A98-430	4.0	4.0
144 A98-2038	4.0	1.8
145 A98-516	4.0	3.9
146 95AN-10	4.0	5.3
147 A98-344	3.9	4.2
148 * Baron	3.8	5.3
149 * Hallmark	3.8	6.8
150 * PST-B5-125	3.8	4.8
151 * PST-108-79	3.8	3.5
152 * PST York Harbor 4	3.8	4.8
153 * B5-43	3.8	4.8
154 * B5-45	3.8	5.0
155 * PST-B4-246	3.8	3.8
156 * Misty	3.8	6.5
157 * BH 00-6003	3.8	5.0
158 * Ba 93-113	3.8	6.5
159 * A96-427	3.8	4.0
160 * BAR Pp 0566	3.8	3.0
161 * Bartitia	3.8	5.8
162 * Serene	3.8	6.8
163 A97-2175	3.8	4.3
164 H94-293	3.8	4.3
165 H94-321	3.8	6.5
166 SR 2000	3.8	4.5
167 Merit	3.8	4.3
168 IQG-36	3.8	4.8
169 * Wildwood	3.5	6.0
170 * Alpine	3.5	4.8

Table 1 (continued).

Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
171 * Envicta	3.5	6.0
172 * Ascot	3.5	4.3
173 * Marquis	3.5	5.0
174 * Sonoma	3.5	5.0
175 * Bordeaux	3.5	5.5
176 * DLF-76-9034	3.5	8.0
177 * 99AN-53	3.5	3.0
178 * PST-731	3.5	4.3
179 * Rita	3.5	6.3
180 NB 67-6	3.5	6.3
181 A98-1001	3.5	3.9
182 A98-1330	3.5	5.8
183 A97-293	3.5	4.8
184 A94-703	3.5	5.5
185 A94-214	3.5	5.3
186 A98-962	3.5	3.5
187 97-6 GD	3.5	5.3
188 A94 MH-94	3.5	5.8
189 H86-376	3.5	3.0
190 A98-481	3.5	2.0
191 K984	3.5	6.8
192 K993	3.5	7.3
193 SRX 2207B	3.5	3.5
194 Canon	3.5	5.5
195 SRX 2U21	3.5	7.0
196 B5-50	3.5	2.8
197 B6-58	3.5	4.3
198 A98-361	3.5	3.8
199 * Eagleton	3.3	7.0
200 * A93-200	3.3	5.8
201 * Limousine	3.3	5.3
202 * BHOO-6002	3.3	5.3
203 * Raven	3.3	5.3
204 * CVB 20631	3.3	3.8
205 * Champagne	3.3	7.8

Table 1 (continued).

Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
206 * DLF-76-9036	3.3	6.0
207 * H5-35	3.3	5.3
208 * Barquis	3.3	7.5
209 A98-1337	3.3	6.0
210 A98-3368	3.3	2.3
211 A98-3369	3.3	3.0
212 A97-2043	3.3	4.5
213 H86-1248	3.3	5.3
214 A94-976	3.3	5.8
215 Parade	3.3	5.8
216 SR 2U20	3.3	4.3
217 SRX 2U17	3.3	3.8
218 SRX 27753	3.3	5.3
219 IB7-231	3.3	4.8
220 A97-1799	3.3	4.5
221 SCR-320	3.3	3.3
222 Preakness	3.3	6.0
223 * Pp H 6370	3.0	6.0
224 * PpH 6366	3.0	1.8
225 * Pp H 7832	3.0	6.8
226 * PST-739	3.0	4.5
227 * PST IBMY	3.0	3.8
228 * HV 238	3.0	7.0
229 * Abbey	3.0	5.0
230 * A97-1409	3.0	4.5
231 * Allure	3.0	2.5
232 * A98-1028	3.0	5.5
233 * J-1513	3.0	5.8
234 * Baronie	3.0	7.0
235 A94 HM-133	3.0	6.0
236 A98-914	3.0	5.8
237 A95-1610	3.0	7.0
238 A94 HM-181	3.0	5.5
239 A98-877	3.0	4.5
240 A98-661	3.0	6.3

Table 1 (continued).

	Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
241	A98-999	3.0	5.0
242	H92-333	3.0	7.5
243	A95-1624	3.0	7.5
244	K995	3.0	3.5
245	Broadway	3.0	1.8
246	SR 2109	3.0	4.0
247	Eclipse	3.0	7.8
248	* Shamrock	2.8	5.3
249	* Pick 417	2.8	5.5
250	* Quantum Leap	2.8	6.0
251	* Ba 81-058	2.8	6.3
252	* A97-944	2.8	6.0
253	* Arcadia	2.8	6.3
254	* SRX 26351	2.8	4.8
255	* Blue Knight	2.8	5.5
256	* A98-881	2.8	5.0
257	* NuGlade	2.8	5.3
258	* J-1368	2.8	5.0
259	* J-1665	2.8	5.5
260	* Baritone	2.8	6.3
261	A98-948	2.8	5.3
262	A94 HM-27	2.8	4.0
263	A98-192	2.8	3.8
264	A98-1092	2.8	2.0
265	A96-1246	2.8	3.5
266	H94-702	2.8	6.8
267	97-7 GD	2.8	5.0
268	Explorer	2.8	3.3
269	SR 2205	2.8	3.0
270	SR 2100	2.8	5.0
271	Livingston	2.8	5.0
272	A98-726	2.8	3.8
273	SCEC-183	2.8	6.8
274	99AN-50	2.8	4.5
275	* Midnight	2.5	4.8

Table 1 (continued).

Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
276 * PST-1804	2.5	5.3
277 * Goldrush	2.5	4.8
278 * Ba 84-140	2.5	3.3
279 * H92-558	2.5	5.3
280 * Cabernet	2.5	4.5
281 * A97-1715	2.5	3.0
282 * Total Eclipse	2.5	6.0
283 * J-1515	2.5	5.0
284 * J-1838	2.5	5.5
285 * J-2885	2.5	5.0
286 * Everglade	2.5	4.8
287 * Rugby II	2.5	4.8
288 * Freedom II	2.5	4.5
289 A95-1934	2.5	7.0
290 A98-1025	2.5	4.9
291 Indigo	2.5	3.3
292 Crest	2.5	4.5
293 Touchdown	2.5	5.0
294 SRX 2U15	2.5	2.8
295 99AN-16	2.5	4.5
296 * Pick 453	2.3	6.3
297 * Ba 82-288	2.3	5.0
298 * NA K991	2.3	6.3
299 * Unknown	2.3	5.0
300 * Impact	2.3	6.5
301 * J-2890	2.3	5.5
302 * J-2561	2.3	5.3
303 * Everest	2.3	5.3
304 * J-1420	2.3	6.0
305 * J-1648	2.3	5.0
306 * J-2695	2.3	5.8
307 * J-1880	2.3	5.3
308 * Award	2.3	6.0
309 Cynthia	2.3	5.3
310 99PH3-2	2.3	4.5

Table 1 (continued).

Cultivar or Selection	Powdery Mildew ¹	Plant Height ²
311 Pp 8	2.3	3.8
312 * Julia	2.0	7.0
313 * Odyssey	2.0	5.3
314 * Chicago II	2.0	3.8
315 * J-2487	2.0	5.5
316 * Rambo	2.0	5.5
317 * Liberator	2.0	5.8
318 A94-706	2.0	3.8
319 A94-611	2.0	4.5
320 99AN-12	2.0	1.8
321 * A97-857	1.8	4.5
322 A98-737	1.8	3.5
323 SCR-282	1.8	5.0
LSD at 5% =	1.1	1.2

¹9 = least disease

²9 = tallest plant height

* NTEP entry