

Identification of New Sources of Resistance to Sclerotinia Blight in Peanuts

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2003 progress made possible through OPC support

- Sixty-two entries from the USDA core collection of peanut germplasm were screened for reaction to Sclerotinia blight for a second year.
- Disease pressure was high in 2003 and entries that were highly resistant (0 percent disease) in 2002 were only resistant in 2003 (<10 percent disease).
- Twelve entries were resistant to Sclerotinia blight and had levels of disease similar to or less than the resistant check variety Tamspan 90.
- While most resistant and moderately resistant entries had upright, Spanish plant types; there were two runner and two semi-runner type entries that had better resistance than Tamrun 96.

Sclerotinia blight is a destructive disease in Oklahoma. It is prevalent in all areas of the state except in far southwestern Oklahoma. In the hopes of identifying new sources of resistance to Sclerotinia blight, the core collection, a subset of the USDA peanut germplasm collection comprising 745 entries, was obtained from Corley Holbrook, USDA-ARS Tifton, GA. In 2001, the entries were planted in two-row, non-replicated plots at the Caddo Research Station in a field with a history of Sclerotinia blight. Considerable variability in disease reaction was observed. A total of 81 lines were selected for further evaluation. Of the 81 retained lines, 43 were highly resistant (0 percent disease) and 31 were resistant (<10 percent disease). In 2002, replicated trials with two-row plots were planted at the Caddo Research Station. Disease pressure was lower in 2002, and twenty

entries were highly resistant to Sclerotinia blight. Thirty-two additional entries were resistant. Several of the highly resistant and resistant entries had yields that were statistically similar to Tamspan 90.

In 2003, 62 entries were selected for evaluation in a replicated trial for a second year. Five of the entries had runner plant types, six had semi-runner (bunch) plant types, while the remainder had upright (Spanish) plant types. Entries were compared to resistant (Tamspan 90 and Southwest Runner), moderately resistant (Tamrun 96 and Georgia Hi OL) and susceptible (Okrun) check varieties. Plots received three applications of Tilt®/Bravo® to control foliar diseases and three applications Folicur® to control foliar diseases and southern blight. Sclerotinia blight appeared in late August and reached severe levels by harvest on October 24. As

expected, Okrun was highly susceptible to Sclerotinia blight, while Tamspan 90 and Southwest Runner were resistant (Table 1). Tamrun 96 had more disease than in previous years. Normally, the disease level for Tamrun 96 is about 50 percent less than for Okrun. However, Tamrun 96 only had about 20 percent less Sclerotinia blight than Okrun in this trial. None of the entries were highly resistant (0 percent disease) in 2003. However, 12 entries were resistant (<10 percent disease) and did not have disease levels that differed statistically from Tamspan 90. Most of the resistant entries were early maturing and had upright (Spanish) plant types. However, entry 273 had a semi-runner plant type. Thirty-one entries were moderately resistant (10 to <25 percent disease) and did not differ statistically in disease level from Southwest Runner and were significantly better than Tamrun 96. Among the moderately resistant entries, 582 and 208 had runner plant types. The remaining entries were moderately susceptible (25-50 percent disease). However, 14 of these entries were statistically better in reaction to Sclerotinia blight compared to Tamrun 96.

In addition to Sclerotinia blight, the foliar diseases pepper spot and web blotch reached moderate levels in the trials. There was significant variability among the entries in reaction to these diseases (Table 1). Except for Southwest Runner, entries and varieties with runner or semi-runner plant types were resistant to pepper spot. Conversely, all of the entries and the variety Tamspan 90 that were susceptible to pepper spot were upright, Spanish plant types. Entries 273 and 103 were resistant to Sclerotinia blight and pepper spot. Entries 92, 804, 777, 378, 208, 128, 582, and 828 were moderately resistant to Sclerotinia blight and resistant to pepper spot.

Yields were generally higher for the entries in 2003 compared to 2002. None of the entries had yields equivalent to Tamrun 96 and Georgia Hi OL. However, the resistant entries 562, 374, 103, and 380 had yields that did not statistically differ from Tamspan 90. Similar yield levels were achieved for the moderately resistant entries 143, 460, 129, 66, 777, 569, and 481.

Table 1. Reaction of Selected Peanut Entries from the USDA Core Collection to Sclerotinia Blight and Foliar Diseases – Caddo Research Station, 2003.

Entry	Maturity (1-6) ¹	Plant type (1-6) ²	Sclerotinia blight (%)	Pepper spot (%)	Web blotch (%)	Yield (lbs/a)
Okrun	4	2	73	6	0	2093
632	3	4	57	12	24	1149
Tamrun 96	4	2	57	1	24	2783
799	3	4	55	4	2	2480
454	3	5	50	55	6	1960
464	4	3	50	5	0	2021
409	3	5	46	20	11	1283
Georgia Hi OL	4	2	43	9	0	2759
532	3	6	40	35	6	1851
81	2	5	39	45	15	1488
461	3	4	39	2	0	1621
723	3	3	39	4	14	1815
505	3	5	35	7	32	1972
158	4	3	35	0	5	1537
307	2	5	34	42	37	1706
827	3	6	34	17	21	1198
474	3	5	33	27	25	1682
486	2	5	29	42	14	1621
145	3	5	28	5	24	1791
786	2	5	25	55	10	1391
766	3	5	25	6	0	2033
724	3	5	25	7	37	1948
398	2	5	23	25	0	1585
481	2	5	22	20	30	2190
391	3	5	22	45	19	1924
828	3	5	21	6	20	1391
582	3	3	20	2	6	1355
780	2	5	20	25	11	1573
321	3	5	20	37	14	1960
128	3	4	19	7	0	1754
569	2	5	16	57	9	2384
208	3	3	15	4	6	1391
176	3	5	15	37	6	1706
379	3	5	15	57	17	2045
33	2	5	15	59	6	1718
570	2	5	14	52	7	1549
378	3	5	14	7	29	2021

Table 1. Continued.

Entry	Maturity (1-6) ¹	Plant type (1-6) ²	Sclerotinia blight (%)	Pepper spot (%)	Web blotch (%)	Yield (lbs/a)
399	2	5	14	42	0	1283
67	2	5	13	47	22	1283
180	2	5	13	47	10	1597
469	2	5	13	31	14	2069
777	2	5	12	5	27	2456
66	2	5	12	32	25	2251
479	2	5	12	35	21	1972
129	2	5	12	60	25	2105
Southwest Runner	4	2	12	50	25	2843
804	3	4	12	5	2	1198
205	2	5	11	49	7	1863
92	3	5	11	0	0	1646
820	2	5	10	40	0	1416
460	2	5	10	40	20	2323
143	2	5	10	32	16	2214
377	3	5	10	70	6	1960
437	2	5	10	62	14	1525
Tamspan 90	2	5	9	34	24	2420
380	3	5	9	47	2	2154
60	2	5	9	55	0	1476
103	4	5	8	0	0	2287
374	2	5	8	60	5	2311
273	3	4	7	12	19	2057
785	2	5	7	47	0	1452
361	2	5	7	60	11	1585
426	2	5	5	61	1	1549
73	2	5	5	56	16	1597
821	2	5	4	55	12	1803
184	2	5	4	50	2	1283
562	2	5	3	57	9	2178
LSD 0.05 ³			14	19	11	315

¹ 1=early, 5=late

² 1=very flat, 6=very erect

³ Least significant difference