

Identification of New Sources of Resistance to Sclerotinia Blight in Peanuts

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2002 progress made possible through OPC support

- Twenty germplasm lines from the USDA core collection were confirmed to be highly resistant to Sclerotinia blight.
- Thirty-two additional germplasm lines from the USDA core collection were resistant.
- Several of the highly resistant and resistant entries had yields that were statistically similar to Tamsan 90.

Sclerotinia blight remains a destructive disease in Oklahoma. It is prevalent in all areas of the state except in far southwestern Oklahoma. In 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. The entries were planted in two-row, non-replicated plots at the Caddo Research Station in a field with a history of severe Sclerotinia blight in 2001. 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% disease) and 31 were resistant (less than 10% disease).

Replicated trials with two-row plots were planted in 2002 at the Caddo

Research Station in a field with a history of Sclerotinia blight. Seed availability was limited for some of the selections. Therefore, three trials containing two, three, and four replications each were established. Resistant (Tamsan 90), moderately resistant (Tamrun 96), and susceptible (Okrun) check varieties were included in each trial for reference.

Stand establishment was excellent, but plant growth was slow, possibly because of nematode damage. Most of the rows never lapped. Development of Sclerotinia blight was also delayed along with the plant growth. Compared to nearby trials where Sclerotinia blight appeared in mid-August, sufficient disease development for evaluation did not occur until mid-September. The foliar disease pepper spot became severe in many of the entries. Sclerotinia blight increased to

moderate levels throughout October when it remained too wet to harvest. The final disease evaluation was taken on October 30 when the vines exhibited a moderate level of frost damage. The plots were harvested on November 13 when frost damage was severe. Overall, plot yields were not significantly correlated with levels of Sclerotinia blight. This was attributed to the late-season disease development and the low yield potential for many of the entries.

In Trial 1, which contained two replications, Okrun and Tamrun 96 were among the most susceptible entries to Sclerotinia

blight, while Tamspan 90 was among the most resistant (Table 1). Three of the entries, along with Tamspan 90, were highly resistant and showed no infection. Another eight were resistant and had less than 10% infection. Of the highly resistant and resistant entries, lines 505 and 143 had better yields than Tamspan 90. All of the other entries, which had appeared resistant or highly resistant in 2001, must have been escapes because they were more susceptible in 2002. Except for entry 505, which was resistant to pepper spot and Sclerotinia blight, most of the entries that were resistant to pepper spot were susceptible to Sclerotinia blight, and

Table 1. Reaction of selected peanut entries from the USDA core collection to Sclerotinia blight and pepper spot, Trial 1 (2 replications) - Caddo Research Station, 2002.

Entry	Maturity (1-6) ¹	Plant Type (1-6) ²	Sclerotinia Blight (%)	Pepper Spot (%)	Yield (lb/A)
Okrun	3	3	46	0	2105
329	4	2	41	0	1162
Tamrun 96	3	3	32	0	2396
238	3	4	32	0	1270
466	3	5	32	5	617
763	3	5	32	0	762
599	3	5	22	0	690
92	3	5	19	0	472
804	3	4	19	0	472
780	2	5	4	25	726
828	3	5	4	40	653
399	2	5	2	60	617
820	2	5	2	5	762
786	2	5	1	65	799
505	3	5	1	7	1597
273	3	4	1	25	1125
67	2	5	1	35	907
143	2	5	0	65	1888
785	2	5	0	50	1053
Tamspan 90	2	5	0	25	1270
569	2	5	0	55	1234
LSD 0.05 ³			20	26	609

1 1=early, 4=late
2 1=very flat, 2=very erect
3 Least significant difference.

vice versa. Five entries (505, 273, 143, 785, and 565) appeared to warrant further evaluation as sources of resistance to Sclerotinia blight.

In Trial 2, which contained three replications, Okrun was susceptible to Sclerotinia blight, Tamrun 96 showed moderate resistance, and Tamspan 90 was resistant (Table 2). Entries 570 and 481 were highly resistant to Sclerotinia blight and showed no infection. Nine other entries were resistant to Sclerotinia blight and had less than 10% infection. Except for lines 321 and 766, which

were resistant to both Sclerotinia blight and pepper spot, most of the entries that were resistant to Sclerotinia blight were susceptible to pepper spot and vice versa. Except for lines 158 and 128, most of the entries that were among the most susceptible to Sclerotinia blight in 2002 had appeared resistant or highly resistant in 2001. Overall, yields were low in this trial as indicated by the low productivity of Tamrun 96 and Tamspan 90. Of the entries that were highly resistant or resistant to Sclerotinia blight, 766, 469, 321, and 821 had yields that were statistically similar to Tamspan 90. All of the entries with an

Table 2. Reaction of selected peanut entries from the USDA core collection to Sclerotinia blight and pepper spot, Trial 2 (3 replications) - Caddo Research Station, 2002.

Entry	Maturity (1-6) ¹	Plant Type (1-6) ²	Sclerotinia Blight (%)	Pepper Spot (%)	Yield (lb/A)
Okrun	3	3	54	0	1791
463	4	3	46	0	1839
227	4	2	38	0	1307
345	3	3	36	0	1283
241	3	3	32	2	1355
Tamrun96	3	3	22	0	2057
158	4	3	20	0	1089
723	3	3	15	10	1452
128	3	4	12	13	605
103	4	5	10	0	1234
321	3	5	8	3	1234
Georgia Hi O/L	3	2	6	0	2154
766	3	5	4	7	1694
409	3	5	4	33	823
176	3	5	3	50	1016
469	2	5	2	37	1379
Tamspan 90	2	5	2	47	1742
454	3	5	2	35	823
821	2	5	2	53	1162
570	2	5	0	67	532
481	2	5	0	43	1065
LSD 0.05 ³			17	26	667

1 1=early, 4=late
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erect plant type were resistant or highly resistant to Sclerotinia blight. Entries with a more prostrate plant type, typical of runner varieties, were more susceptible to Sclerotinia blight.

Pressure from Sclerotinia blight was lower in Trial 3, which contained four replications, compared to the other two trials. Okrun again was among the most susceptible entries in the trial, and Tamrun 96 was resistant with less than 10% infection (Table 3). The lower disease pressure was reflected in yields of 3000 lb/A or more for Okrun and Tamrun 96. Fifteen entries along with Tamspan 90 were highly resistant and had 0% Sclerotinia blight. All of these entries had upright plant types and were susceptible to pepper spot. The highly resistant entries 361, 379, 380, 66, 391, 562, and 129 had yields that were similar statistically to Tamspan 90. Another 17 entries were resistant and had less than 10% infection. Among the resistant entries, lines 464, 799, 374, 377, 474, and 125 had yields that were similar statistically to Tamspan 90. Two resistant entries (464 and 582) had a prostrate

(runner) plant type, but one (582) was low yielding. All of the entries that were not classified as resistant and had more than 10% Sclerotinia blight were resistant to pepper spot. However, some of the entries that were resistant to Sclerotinia blight were also resistant to pepper spot.

Among the 81 entries selected from the core collection in 2001 for resistance to Sclerotinia blight, 74 produced sufficient seed for evaluation in replicated plots in 2002. Of the 74 entries, 20 were confirmed to be highly resistant and another 32 were confirmed to be resistant with less than 10% infection. Those with decent yield potential will be evaluated again in replicated trials in 2003 and their response to fungicide treatment will be determined to further confirm their resistance. Each entry in the core collection represents a larger group of related entries in the USDA peanut germplasm collection. Therefore, about 10 of the best entries will be selected and related germplasm from the USDA collection will be obtained and evaluated.

Table 3. Reaction of selected peanut entries from the USDA core collection to Sclerotinia blight and pepper spot, Trial 3 (4 replications) - Caddo Research Station, 2002.

Entry	Maturity (1-6) ¹	Plant Type (1-6) ²	Sclerotinia Blight (%)	Pepper Spot (%)	Yield (lb/A)
Okrun	3	3	32	0	3176
679	3	3	31	0	2178
326	4	3	29	0	2124
457	4	3	26	0	1597
341	3	3	19	0	2178
352	3	3	18	0	1543
459	3	3	15	0	1270
532	3	6	10	0	2069
461	3	4	9	0	1416
464	4	3	7	0	1742
799	3	4	7	0	2850
Tamrun 96	3	3	6	0	3557
125	2	5	5	0	1633
474	3	5	5	32	1797
632	3	4	4	12	1307
582	3	3	4	2	926
377	3	5	3	47	1779
827	3	6	2	0	944
81	2	5	1	70	962
398	2	5	1	40	1398
479	2	5	1	37	1434
184	2	5	1	57	1089
437	2	5	1	75	1053
374	2	5	1	47	2124
486	2	5	1	45	1307
378	3	5	1	26	1488
307	2	5	0	47	1307
361	2	5	0	50	1761
379	3	5	0	40	1888
426	2	5	0	75	980
380	3	5	0	32	1924
460	2	5	0	45	1488
60	2	5	0	69	817
Tamspan 90	2	5	0	49	2015
180	2	5	0	44	1488
33	2	5	0	61	1089
205	2	5	0	56	1488
66	2	5	0	55	1652
73	2	5	0	60	817
391	3	5	0	42	1633
562	2	5	0	50	1960
129	2	5	0	55	1761
LSD 0.05 ³			10	18	459

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