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Sirel Report + Summary

National Peanut Proposal

Project Title: Use of Greenhouse Leaf Assays to Predict Peanut Lines with Sclerotinia Blight Resistance.

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Materials and Methods: Peanuts are grown in a growth chamber and four leaflets are inoculated with Sclerotinia minor for 1 ½ days under humid conditions. The amount of disease on the leaflets is measured. The average for eight replications was analyzed for differences between breeding lines. A list of the most resistant lines based on this assay was presented to Dr. Burow to assist in deciding what to put in their Sclerotinia nursery at Stephenville.

Results: We had excellent disease in our 2009 spring test with average disease ranging from 29 to 71% of the leaflets (Table 1). However, for the last four replications of the test, we began to measure the leaflet length and width and use that as a factor when analyzing the disease data. We determined that leaf length and width was more highly correlated with disease than the lines. We have ranked the lines in terms of both disease, and disease when leaflet length and width were used as covariates. The covariate analysis disease means is adjusted as if all the lines had similar length and width, while the regular disease ranking is without regarding leaflet length and width. For example, the best 30 lines based on lowest amount of disease without regard to leaf size, contained only 17 of the top rankings when leaflet length and width covariates were used (Table 1). The susceptible check Florunner ranked 64th with just disease and 109th when a covariate was used. Tamrun OL07 (resistant check) ranked 85th with just disease and 5th with a covariate. Tamrun OL02 (partially resistant check) ranked 124th with just disease and 52nd with a covariate. The importance of leaflet length and width needs more study. We did a series of tests in the fall of 2009 with a set of 30 runner and 30 spanish lines and our S. minor isolate E1750. These lines have been tested for two years in the Sclerotinia nursery at Stephenville. Initial analysis indicated that leaflet length and width was much more important on disease levels than genotype. We will continue to investigate this during 2010 with another isolate of the fungus before committing to more screening with this technique.

Table 1. Percentage of disease on different peanut genotypes screened with a leaflet assay in the spring of 2009.

Genotype	% Disease cov	Rank cov	%Disease	Rank	Length ^a	Width ^b
TXL076206-013	35	16	29.4	1	3.3	2
TXL076215-004	27.53	2	30.3	2	3	1.9
TXL076203-001	33	12	30.4	3	3.4	2.1
TXL076210-005	44.53	58	30.7	4	3.7	2.2
Tx049429-036	55.71	118	32.1	5	3.7	2.4
TXL076211-008	37.94	26	33.6	6	3.6	2.1
Tx049429-032	33.58	14	33.7	7	3.1	2
TXL076208-013	45.92	63	34.9	8	3.2	1.8
TXL076203-029	44.51	57	36.8	10	3.8	2.1
TXL076206-018	37.4	24	36.8	9	3.2	1.9
Tx049420-050	36.87	23	36.9	11	3.3	1.9
TXL076204-017	35.17	18	37.5	12	3	1.7
TXL076208-006	30.68	6	37.8	13	3.4	2
TXL076209-007	27.45	1	39.1	14	2.8	2.1
Tx049429-093	32.22	10	39.5	15	3.3	1.9
TXL076216-002	31.89	8	39.6	16	3.2	1.8
TXL076211-002	56.15	120	39.7	17	3.5	1.9
NC7	41.26	41	39.9	18	3.2	2
Tx049429-013	46.52	68	40.6	19	3.9	2.3
TXL076212-019	46.39	66	40.8	20	3.6	1.8
TXL076209-006	37.97	27	41.8	22	2.9	2.1
TXL076208-004	31.71	7	41.8	21	3.1	1.9
Tx049420-001	46.84	72	42.1	23	3.4	2.1
TXL076206-016	33.57	13	42.2	24	3.4	2
TXL076207-002	46.56	69	42.7	25	3.3	2
Tx049420-012	47.25	74	42.8	28	3.2	2.1
TXL076212-020	41.16	40	42.8	27	3.3	1.9
TXL076208-011	29.73	4	42.8	26	2.9	1.7
TXL076216-007	37.68	25	42.9	29	3.6	1.8
Tx049429-064	41.01	39	43.1	30	3.4	2.1
TXL076212-016	32.17	9	43.6	31	3.5	1.9
Tx049426-007b	43.31	50	43.8	32	3	1.9
Tx049426-005b	56.8	122	44.3	33	3.5	2.1
TXL076203-012	56.84	123	44.5	34	4.2	2.3
Tx049429-034	53.09	111	44.7	35	3.5	2
TXL076216-003	51.24	98	44.8	36	3.3	1.8
TXL076208-017	46.22	65	45.3	38	3.1	2
TXL076207-001	41.97	44	45.3	37	3.4	2
Tx049432-042	43.67	53	46	39	2.6	1.6
TXL076203-004	55.39	117	46.3	40	3.6	2.1
Tx049432-010	40.06	33	46.6	42	3.4	2
TamrunOL01	49.62	89	46.6	41	3.3	1.9
TXL076204-025	49.84	90	46.8	43	3.4	1.9
TXL076203-007	34.94	15	47.1	44	3	1.8
TXL076204-006	47.92	78	47.5	45	3.2	1.9
TXL076204-005	39.2	29	48.1	47	3.3	2.1
TXL076203-031	50.12	92	48.1	46	3.1	1.8
TamrunOL02	50.53	95	48.2	48	3.2	1.9
Tx049423-006	48.77	83	48.3	50	3.1	1.9
TXL076207-003	39.44	31	48.3	49	3.2	1.9

Genotype	% Disease cov	Rank cov	%Disease	Rank	Length ^a	Width ^b
TXL076208-018	42.87	47	48.4	51	3	1.7
Tx049429-002b	35.27	19	48.5	52	3	1.9
F458	45.01	59	48.5	53	3.1	2
TXL076208-015	45.32	60	48.6	54	3.2	1.9
NC7	43.92	55	48.7	55	3.6	2
TXL076207-009	42.96	48	48.8	56	3.1	2
TXL076204-007	49.34	86	48.8	57	3.3	2
NC7	51.97	103	49.3	58	3.3	2.1
TXL076206-002	43.79	54	49.4	59	2.9	1.7
Tx049429-099	40.43	35	49.5	60	2.8	1.7
Tx049429-092	51.68	99	49.7	62	3.5	2
TXL076212-007	41.88	43	49.7	61	3.2	1.8
Tx049420-013	48.14	80	50.1	63	3.3	2
Florunner	52.9	109	50.1	64	3.6	2.2
Tx049423-003	47.8	77	50.4	65	3.2	2.2
Tx049429-012	47.3	75	50.7	68	3	2
Tx049432-049b	36.15	20	50.7	66	3	1.9
Tx049429-056	42.65	46	50.7	67	2.9	1.9
TXL076203-002	54.27	116	50.8	69	3.1	2.1
Tx049426-005	40.51	37	50.9	70	2.9	1.7
Tamspan90	32.65	11	51.2	71	2.9	1.9
TXL076209-013	47.61	76	51.4	72	2.7	2.1
Tx049432-049	52.74	107	51.8	73	3.1	2
Tx049420-025	40.22	34	52.3	75	3.1	2
Tamspan90	48.35	81	52.3	74	3.4	1.8
Tx049429-044	44.13	56	52.6	76	3	1.9
TxL017746	42	45	53	77	2.8	1.7
Tx049420-041	56.33	121	53.3	79	3.1	1.8
TXL076203-020	49.55	88	53.3	78	3.3	1.7
TXL076212-008	39.3	30	53.5	80	2.9	1.6
TXL076209-014	45.66	62	53.5	81	2.6	2.1
Tamspan90	36.68	22	53.6	82	2.9	1.8
TXL076212-015	51.84	102	53.8	83	3	1.7
TXL076212-011	40.44	36	53.9	84	3	1.8
TamrunOL07	30.03	5	54	85	3	1.9
Tx049420-013b	49.55	87	54.6	86	3.2	2
Tx049420-016	28.27	3	54.8	88	3.2	1.8
Langley	46.86	73	54.8	87	2.7	1.7
Tx049429-002	52.59	106	55	90	3.3	2.1
TXL076203-003	57.32	124	55	89	3.3	2
TXL076214-003	48.82	84	55.1	91	2.8	1.8
TXL076214-005	41.84	42	55.5	92	3	2
TXL076208-009	43.46	51	55.6	93	2.6	1.6
TXL076203-018	48.13	79	55.7	94	2.9	1.8
TXL076212-002	46.48	67	55.9	95	2.8	1.4
Lub275	35.06	17	56.1	96	2.7	1.5
Tx049429-068	51.8	101	56.4	97	2.9	1.9
Tx049432-008	53.95	114	56.7	98	3.1	1.9
TXL076204-020	50.17	93	56.7	99	3.2	2
TXL076204-001	46.75	71	56.9	100	3.2	1.9
TXL076201-003	49.07	85	57.3	101	2.6	1.6
TXL076213-007	39.85	32	58	102	3.2	1.7

Genotype	% Disease cov	Rank cov	%Disease	Rank	Length ^a	Width ^b
TXL076205-002	50.33	94	58.1	103	2.9	1.7
Tx049432-044	58.81	128	58.4	104	3.2	1.8
TXL076203-006	48.53	82	58.5	105	3	1.8
Tx049429-067	43.15	49	58.7	106	2.6	1.7
Tx049420-042	49.86	91	58.8	107	2.9	1.9
Tx049429-008	60.74	131	58.8	108	3	1.9
Tx049429-092b	38.73	28	58.9	109	2.8	1.6
TXL076203-014	52.94	110	59.3	110	3.5	1.9
TXL076209-015	36.15	21	59.3	111	2.6	1.9
Tx049420-014	51.04	97	59.7	112	3.1	2
TXL076207-004	52.19	105	59.8	113	3.1	1.7
TXL076204-021	52.04	104	60.2	114	3.1	1.8
TXL076204-022	40.54	38	60.6	115	2.9	1.9
Tx049423-043	70.57	135	60.7	116	3.2	1.9
TXL076204-012	46.7	70	61.2	117	2.7	1.7
TXL076212-027	60.67	130	61.4	118	2.8	1.7
Flavorrunner458	52.81	108	61.4	119	2.8	1.8
TXL076203-030	58.73	126	61.5	120	3.3	1.8
TXL076203-021	61.74	132	61.5	121	3.2	1.9
TXL076201-004	55.86	119	61.7	122	3	2
TXL076203-024	45.42	61	62.1	123	2.6	1.6
TamrunOL02	43.58	52	62.8	124	2.6	1.7
TXL076214-006	58.75	127	62.9	125	3	1.9
Tx049420-016b	53.33	113	64.5	126	2.7	1.7
Tx049426-015	46.05	64	65.1	127	3.5	1.9
TXL076212-025	53.15	112	65.5	128	3	1.7
TXL076205-006	51.71	100	65.6	129	2.7	1.8
TXL076204-008	50.83	96	66.2	130	2.3	1.7
TamrunOL02	54.19	115	67.8	131	2.9	1.8
TXL076204-003	65.63	133	68	132	3.2	1.9
TXL076203-026	58.47	125	68.7	133	2.7	1.8
Tx049432-044b	60.46	129	69.8	134	2.7	1.6
TXL076205-001	68.97	134	71.1	135	3.1	1.8

^aLength is the average length (cm) of the four leaflets for that genotype, averaged over four replications.

^bWidth is the average width (cm) of the four leaflets for that genotype, averaged over four replications.