NDSU Carrington Research Extension Center
2007
Soybean Seed Quality Evaluation (Accelerated Aging)

Trial Objectives and Background: Assess the influence of a range of 'accelerated aging' scores on soybean emergence and performance. Current guidelines indicate that accelerated aging scores within 20 points of the germination score are considered satisfactory and reflective of seed germination. Growers typically adjust crop seeding rates based on seed germination percentage and seed size. However, soybean are among those crops that often have an 'accelerated aging' test conducted. The 'accelerated aging' test exposes seed to a period of high temperatures and high humidity prior to conducting a germination test. Accelerated aging provides some indication of seedling vigor and germination of a seedlot when exposed to stress conditions (eg., termperature, water, and emergence stress) in the field.

Field Trial Methodology:

Planting Date = May 18 ; Harvest Date = October 11 ; Previous Crop = Spring Wheat; Days to PM: average of 121 = September 16.

** A.A. = Accelerated Aging Score based on North Dakota State Seed Department laboratory analysis.

** Germination % based on North Dakota State Seed Department laboratory analysis.

** All treatments were adjusted for seed size and germination so as to attain the equivalent of 200,000 PLS per acre.

** Early visual stand scores recorded on June 8, numbers reflect the relative stand versus the potential full stand of ~ 4.5 plants ft^{-2}.

** First stand counts recorded on June 11 and second stand counts recorded on June 18.

Observations: Seed Yield.

** The influence of varied accelerating aging scores had variable impact on soybean seed yield. Response varied among soybean varieties.

** However, review of the variety 'RR0069' indicates significant differences in yield among the wide ranging accelerated aging scores.

** These yield differences among accelerated aging scores are not perfectly coorelated, though there is a good trend.

Observations: Stand Establishment.

** Variety A: Some examples of reduced stands with lower AA's, however quite inconsistent response.
~ AA's of 66 and 68 were lower than an AA of 93.

** Variety B: A general trend for a reduced stand with a lower AA,
examples of significantly lower stand with AA of 36, 38 & 44 vs 81.

** Variety C: General trend for a reduced stand with lower AA, example of significantly lower stand with AA of 67 vs 85.

Observations in General:

** As one began taking the physiological maturity (PM) notes it was apparent that the more variable plant establishment of this experiment relative to a soybean performance test resulted in the expression of less uniformity in plant attainment of PM.

** A couple of the seedlots evaluated had A.A.'s of 0%. These seedlots attained moderate seed yield. Early visual scores and stand counts indicated very low stand establishment. However, with no or limited comparison to higher or normal A.A.'s it is difficult to assess the impact of 0% A.A. on seedlot viability.

Trial results represent the first year of evaluation. Further research is needed to validate these trends.

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Trmt. ID	Variety	Germ	A.A.	Seeds per Lb	Seed Rate	Early Visual Stand	First Plant Stand	Second Plant Stand	Plant Lodge	Pod Height	Plant Height	Days to PM	Seeds/ pound	Seed Oil	Seed Protein	Test Weight	Seed Yield	
		%			lbs ac^{-1}	%	plants ft^{-2}	plants ft^{-2}	0 to 9	cm	inch			%	%	lb/bu	bu/ac	
1	A	66	24	3146	96	1.8	0.69	1.00	0.5	7.0	29.5	125.8	2970	32.0	17.3	55.3	34.9	g
2	A	93	55	2830	76	7.0	1.38	1.46	0.6	7.2	33.9	124.0	3026	32.1	17.7	55.1	52.7	abc
3	A	87	66	3264	70	1.5	1.56	0.76	1.8	6.5	33.1	124.8	2974	32.4	17.1	54.3	39.2	efg
4	A	88	68	2935	77	2.3	0.42	0.59	2.3	6.5	32.1	125.8	2999	32.2	17.3	54.3	36.6	fg
5	A	93	70	3043	71	3.8	1.00	1.30	0.8	6.5	34.6	125.0	2997	32.3	17.4	54.5	44.5	cdef
6	A	88	71	3206	71	10.3	1.08	1.61	0.5	7.8	36.8	121.3	3320	33.1	17.1	55.1	58.9	a
7	A	90	81	2958	75	2.3	0.55	0.90	1.3	8.0	31.9	124.3	3116	32.4	17.3	54.9	46.2	cde
8	A	95	90	3003	70	3.3	0.73	1.11	0.5	9.5	36.2	125.5	3062	32.6	17.2	54.9	51.4	abcd
9	A	94	92	2578	83	4.8	0.86	1.38	0.3	7.0	33.3	122.3	3054	32.8	17.4	54.9	55.1	ab
10	A	99	93	2597	78	6.8	1.13	1.45	1.0	8.5	36.2	125.0	3058	32.8	17.4	53.8	58.9	a
11	B	93	36	3299	65	8.5	1.62	1.79	0.3	7.5	34.0	117.8	3578	32.2	17.9	54.8	59.2	ab
12	B	79	38	4434	57	3.8	1.05	1.22	0.0	5.0	33.3	118.3	3451	32.1	18.0	54.8	51.6	b
13	B	90	39	3346	66	16.0	1.81	1.98	1.2	7.6	35.7	118.6	3545	32.1	18.1	55.1	66.2	a
14	B	88	44	3316	69	8.3	1.43	1.67	0.5	6.5	32.1	116.0	3601	31.1	18.3	55.4	60.3	ab
15	B	97	55	3348	62	21.0	2.05	2.24	0.2	5.2	31.6	116.0	3614	31.2	18.5	54.9	64.4	a
16	B	94	64	3910	54	18.8	1.71	1.80	0.8	6.5	34.4	116.8	3630	31.4	18.1	55.6	60.5	a
17	B	95	70	3414	62	19.3	1.86	2.06	1.3	6.5	36.0	117.8	3530	32.0	18.2	55.2	64.0	a
18	B	95	81	3492	60	16.5	2.24	2.55	1.3	6.0	34.6	116.5	3563	31.7	18.2	55.3	64.7	a
19	C	95	58	3907	54	5.0	1.16	1.30	0.5	7.0	32.1	118.0	3956	33.4	17.6	55.4	53.4	a
20	C	96	67	3894	54	6.8	0.94	0.96	0.8	5.5	32.5	119.0	3959	33.7	17.7	54.4	52.4	a
21	C	92	75	4083	53	7.0	1.59	1.69	1.0	5.5	36.6	117.0	4116	32.8	17.7	55.3	59.4	a
22	C	99	85	4535	45	8.8	1.77	1.98	0.5	5.3	33.5	117.5	3992	33.8	17.6	55.3	58.3	a
23	D	75	0	2895	92	1.0	1.09	1.15	0.0	6.0	33.9	127.0	3139	34.0	17.0	54.0	57.1	
24	E	95	18	4856	43	4.4	1.08	1.06	1.4	4.4	32.8	118.4	4041	32.8	17.9	55.7	47.9	
25	F	67	0	3737	80	0.0	0.18	0.39	2.0	10.0	35.4	121.0	3552	32.9	17.6	54.6	42.8	
26	G	89	6	3589	63	1.3	0.56	0.82	3.0	6.8	34.8	122.0	3602	32.9	17.5	55.0	40.9	
	MEAN					8.0	1.22	1.44	0.90	6.70	33.80	120.5	3448	17.7	32.4	55	53.4	
	C.V.%					68.4	40.8	36.7	124	30.1	9.8	1.5	3.4	1.9	2.0	1.7	11.6	
	LSD.05					7.7	0.70	0.75	NS	NS	NS	2.6	166	0.5	0.9	NS	8.7	
	LSD.01					10.2	0.93	0.99	NS	NS	NS	3.4	221	0.6	1.2	NS	11.6	
	# REPS					4	4	4	4	4	4	4	4	4	4	4	4	

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