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Preliminary Maturity Group II Soybean Variety Trials

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PRELIMINARY MATURITY GROUP II SOYBEAN VARIETY TRIAL

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On-farm research with early maturing soybean varieties in Kentucky in both 1993 and 1994 has indicated that Maturity Group (MG) II varieties yield competitively with our traditional MG IV varieties. In those tests, four MG II varieties were compared with a single, high yielding MG IV variety (Asgrow A4715) over a range of planting dates on a total of 27 farms across both years. Asgrow A4715 averaged 43 bu/A, while the best MG II variety (Jack) averaged 39 bu/A. Such on-farm strip tests are valuable for comparing varieties under true production conditions. However, strip tests can effectively compare only a handful of the early maturing varieties available. In contrast, the soybean variety trials conducted by Iowa State University routinely include over 200 MG II varieties. In on-station tests at the UK Ag. Experiment Station during the same 2 years, where 12 MG II varieties were compared in four planting dates each year, the best variety averaged 10 bu/A more than the worst variety. However, since we were only able to compare 12 varieties in the on-station tests, both the on-farm and on-station tests could have easily missed some of the best MG II varieties.

An alternative which would increase the number of varieties being compared, would be to simply pick the best early maturing varieties from yield tests conducted in the northern locations in which MG II varieties are routinely tested. That strategy assumes that varieties which perform well in the north will continue to perform well when they are moved well south of their normal zone of production. Several soybean breeders, both public and private, have indicated that they feel that some varieties might move south better than others. Traits which have been cited as potentially advantageous for such a southerly move include: 1) taller plant height, 2) higher lodging scores in northern locations (indicating good vegetative growth potential), 3) warmer temperature tolerance, and 4) greater tolerance to pests (such as nematodes, insects, diseases, or weeds). The objective of this research was to compare Kentucky yield performance to northern Illinois yield performance of the same group of commercial and public MG II varieties.

Materials and Methods

We planted 3 replications of 27 MG II and 3 MG IV check varieties at Lexington on May 23 and June 14 and at Princeton on May 24 and June 19 in 1995. Wet conditions delayed the first planting at both locations by about 2 weeks from our target date. Those 27 MG II varieties were selected from the list of MG II varieties which had been entered for the first time in the University of Illinois variety trials in their 1994 tests at DeKalb, Dwight, Monmouth, and Urbana. We picked three MG IV check varieties which

varied somewhat in their maturity ratings. The MG IV checks were included in an effort to compare MG II yields with those of the currently most popular MG in Kentucky. The 30 varieties tested in Kentucky are shown in Table 1.

Conventional tillage was used for both planting dates at both locations. For the Lexington tests, imazaquin and alachlor were pre-plant incorporated prior to the first planting date (for both the May and June plantings). For the Princeton tests, flumetsulam and metolachlor were pre-plant incorporated prior to the first planting date. Acifluorfen was applied at Lexington to control vines and quizalofop was applied twice at Princeton to control johnsongrass. Plots were six 20 foot long rows spaced 15 inches apart. The 4 center rows were harvested (except for the MG II's in the May planting at Princeton where 3 center rows were harvested, due to equipment availability) with a small plot combine.

Data recorded included established stands, canopy closure at R1 (beginning flowering) and at R5 (beginning seed fill), mature plant height, lodging (on a 1 to 5 scale, with the larger values indicating more serious lodging), lowest pod height (from the soil surface to the node at which the lowest pod is attached), potential harvest loss at a 4 inch combine cutting height (measured in the laboratory from plants brought in from a 1.0 meter section of one row), and R7 (physiological maturity) dates. All data, except R7 dates, were subjected to the appropriate statistical analysis. R7 dates were recorded for only the first replication for each location by planting date combination, and so could not be analyzed statistically.

Data from the 1995 Illinois tests were obtained from Ralph Esgar and Gary Pepper. We used their individual plot data to analyze yields of the 19 varieties which were in common to all four 1995 Kentucky tests and the four 1995 Illinois tests at Dekalb, Dwight, Monmouth, and Urbana. Varieties were ranked by yield to compare variety performances in both Kentucky and Illinois.

Results

Table 2 shows variety yields for each of the four Kentucky tests and the averages across those 4 tests. The two Lexington tests yielded the highest and the June planted Princeton test yielded the lowest. Moisture availability may have caused much of those differences. The May planting in Princeton produced the greatest spread among MG II variety yields, ranging from a low of 28.9 bu/A to a high of 56.5 bu/A. The other three tests showed smaller differences in MG II yields.

It is probably more important to look at yield responses averaged across all four Kentucky tests. Those data (in the right-hand column of Table 2) show that the top MG II variety was Mohave II (50.3 bu/A). Five other MG II varieties were within the LSD (0.10) of Mohave II (Lewis 283, Lynks 5298, Pioneer 9273, Pioneer 9281, and Stine 2660X). Only 2 of the 3 MG IV varieties (CF-492 and FFR-439) were equal to the top-yielding group.

Table 3 shows measurements, averaged across all four Kentucky locations, of other factors important to producers considering a switch to earlier maturing varieties. While MG II varieties had slightly less canopy closure by R5 (beginning seed fill), they were all in the neighborhood of 90% (apparently plenty to support good yields). Average plant heights of MG II varieties ranged from 19.8 to 30.9 inches (Table 3). Very short MG II varieties set pods close to the soil surface, resulting in excessive harvest losses. However, the tallest MG II varieties were not the best yielding (see Table 2). Also, Jack, the tallest variety, has suffered severe lodging in past Kentucky tests. Thus, it appears that growers interested in growing MG II varieties in Kentucky may want to avoid both the shortest and tallest varieties. Lodging was a non-factor in 1995, even for Jack, the notoriously high lodging MG II entry. Lowest pod heights of MG II varieties

ranged from 1.7 to 3.3 inches; those numbers are small enough to make producers wonder about potential harvest losses. We measured such losses at a 4 inch combine cutting height (from samples collected from each plot before combine harvest). While all 3 MG IV varieties had harvest losses under 1.0%, MG II losses ranged from 3.2 to 14.7%. The 6 best yielding MG II varieties averaged 6.9% losses at a 4 inch combine cutting height. This was clearly less of a problem than the losses suffered by some of the lower yielding MG II varieties. Certainly, a producer would want to look carefully at this characteristic when choosing an early maturing variety to move south. The last two columns of Table 3 show maturity dates, which were not analyzed since they were based on estimates only of one of the three replications at each location. Since the planting dates at the two locations were so similar, and the resulting maturity dates also corresponded closely, we have only shown the maturity dates for the 2 Lexington tests. When planted in mid-May, MG II varieties matured between August 28 and September 6. When planting was delayed until mid June, MG II varieties matured between September 9 and 16. In both cases, the MG II varieties were ready to harvest between 10 and 20 days before the MG IV check varieties. This would make a significant difference in the dates over which harvest could be accomplished. Yields of MG IV check varieties in Kentucky show that the best MG II varieties did as well as the good MG IV varieties used in this test.

Nineteen varieties were grown in all four Kentucky and all four Illinois tests (Table 4). The 19 varieties broke out into four groups. Some varieties did well in both states (e.g., Pioneer 9273 and Pioneer 9281). Some varieties did poorly in both states (e.g., Conrad 94 and Burlison). Some varieties did well in Kentucky, but not as great in Illinois (e.g., Merschman Mohave II and Lewis 283). Finally, some varieties did not do well in Kentucky, but looked better in Illinois (e.g., ICI D-260 and Northrup King S24-92).

PLANS FOR 1996

In 1996, we will repeat the four Kentucky tests, and we plan to obtain Illinois data for the same set of 19 common MG II varieties. Our approach will be to see how well the 1995 data sets predict 1996 performance in Kentucky. The central question will be: "Can Kentucky producers do as well in picking top varieties from northern data as they could if we had our own southern data?" If that turns out to be the case, then we simply need to make sure that Kentucky growers interested in early maturing soybeans have access to current northern data. On the other hand, if our 1995 Kentucky trials are more helpful in choosing the top yielding MG II varieties grown in our 1996 tests, then we should consider establishing a permanent MG II variety trial in our state.

Conclusions

We cannot determine yet whether the Illinois tests or the Kentucky tests more accurately predict yield performance of MG II varieties moved south to Kentucky. We can conclude that some MG II varieties are better than others, and that the best MG II varieties yielded as well as selected MG IV check varieties. Producers wanting to plant some of their 1996 acres to MG II varieties should consider yield first, but should also look at lowest pod heights (and related harvest losses), relative maturity dates, and lodging problems. Based on past experience, it is our preliminary recommendation that growers should use multi-location yield data from their own state to select soybean varieties for planting.

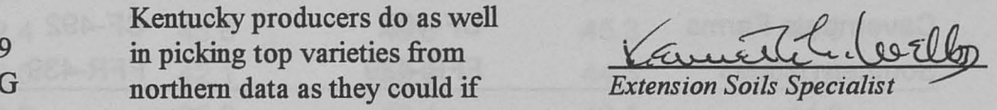

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Table 1. 27 MG II and 3 MG IV varieties tested in Kentucky in 1995.

Seed Company	Variety	Identification Used	Maturity Group
Asgrow Seed Co.	A 2704	As. A 2704	II
Ciba Seeds	3253	Ciba 3253	II
Dairyland Seed Co.	DSR-277	DSR-277	II
DEKALB Genetics Corp.	CX 267	DK CX 267	II
DeRaedt Seed Co.	2221	DeR 2221	II
Henkel Seeds	SS 5238	SS 5238	II
ICI Seeds	D-260	ICI D-260	II
Kaltenberg Seed Farms	KB 274	KB 274	II
Lewis Hybrids	283	Lewis 283	II
L.G.Seeds	LG 6244	LG 6244	II
Lynks Seeds	5298	Lynk. 5298	II
Merschman Seeds	Mohave II	Mohave II	II
Northrup King Co.	S24-92	NK S24-92	II
Pioneer Hi-Bred Intern.	9273	Pion. 9273	II
Pioneer Hi-Bred Intern.	9281	Pion. 9281	II
Public Variety	Burlison	Burlison	II
Public Variety	Conrad 94	Conrad 94	II
Public Variety	Jack	Jack	II
Public Variety	Kenwood 94	Kenw. 94	II
Stine Seed Co.	2660 X	St. 2660 X	II
Sun-Ag Seed	ST-2220	ST-2220	II
Terra International	TS 253	TI TS 253	II
Tri-County Stockdale	Mustang	Mustang	II
Tri-County Stockdale	Pinto	TC Pinto	II
Trisler Seed Farms	Trisoy 2812	Tris. 2812	II
UAP Seed	Dynagro 3256	Dyn. 3256	II
Wilken Seed Grains	2544	Wilk. 2544	II
Asgrow Seed Co.	A 4715	As. A 4715	IV
Caverndale Farms	CF-492	CF-492	IV
Southern States	FFR-439	FFR-439	IV

Table 2. Yields of 4 Kentucky tests and the averages across all 4 tests in 1995.

Variety	Princeton May 24	Princeton June 19	Lexington May 23	Lexington June 14	Kentucky average
	----------bushels/A----------				
As. A 2704	34.9	29.3	53.3	47.7	41.3
Ciba 3253	36.6	33.3	49.2	51.5	42.6
DSR-277	42.8	36.4	55.5	48.7	45.8
DK CX 267	43.0	38.4	48.9	55.0	46.3
DeR 2221	28.9	30.4	42.5	46.9	37.2
SS 5238	40.6	28.5	45.3	47.2	40.4
ICI D-260	35.6	33.8	40.1	49.9	39.9
KB 274	42.8	34.2	50.8	49.7	44.4
Lewis 283	54.1	39.0	53.6	51.8	49.6
LG 6244	38.9	30.7	42.0	47.7	39.8
Lynk. 5298	51.3	38.2	51.3	52.3	48.3
Mohave II	56.5	37.8	57.2	49.6	50.3
NK S24-92	33.7	29.0	45.1	53.2	40.2
Pion. 9273	50.5	37.6	49.9	52.7	47.7
Pion. 9281	49.0	37.7	51.1	52.1	47.5
Burlison	36.4	38.9	47.4	46.3	42.2
Conrad 94	35.0	27.0	44.9	47.3	38.5
Jack	34.6	30.8	51.1	48.1	41.1
Kenw. 94	44.1	33.5	49.4	48.7	43.9
St. 2660 X	50.7	36.6	51.5	50.0	47.2
T-2220	39.6	36.7	52.3	48.3	44.2
TI TS 253	47.8	34.5	47.8	50.2	45.1
Mustang	46.7	31.3	48.2	52.4	44.6
TC Pinto	48.3	33.4	51.4	49.2	45.6
Tris. 2812	42.4	36.6	55.6	45.4	45.0
Dyn. 3256	46.6	32.8	45.8	50.6	44.0
Wilk. 2544	45.9	44.1	43.7	48.8	45.6
As. A 4715	40.4	36.4	51.5	42.9	42.8
CF-492	52.4	45.6	48.8	45.3	48.0
FFR-439	58.0	42.1	55.6	44.3	50.0
Test average	43.6	35.2	49.4	49.1	44.3

The LSD(0.10) for comparing varieties within a single test was 6.8.

The LSD(0.10) for comparing variety averages across all Kentucky tests was 3.4.

Table 3. Measurements averaged across all four Kentucky tests in 1995.

Variety	Canopy Closure R5 (%)	Mature Plant Ht. (inches)	Lodging Scale (1-5)	Lowest Pod Ht. (inches)	Potential Harvest Loss (%)	Lexington Maturity Date May 23	Lexington Maturity Date June14
As. A 2704	88	27.0	1.3	2.7	5.7	9-03	9-14
Ciba 3253	90	22.9	1.2	2.0	9.1	8-31	9-13
DSR-277	91	26.1	1.3	2.9	4.1	9-06	9-15
DK CX 267	88	27.4	1.8	2.3	5.3	8-31	9-14
DeR 2221	90	19.8	1.2	1.9	14.7	8-29	9-10
SS 5238	88	23.8	1.1	2.4	7.9	9-01	9-14
ICI D-260	90	21.7	1.1	2.1	11.3	8-31	9-12
KB 274	91	22.1	1.1	2.8	7.0	9-01	9-14
Lewis 283	95	26.3	1.3	2.3	5.7	9-06	9-15
LG 6244	88	22.1	1.2	1.7	11.6	8-31	9-14
Lynk. 5298	92	26.7	1.3	1.8	7.9	9-04	9-16
Mohave II	89	25.6	1.4	2.4	7.0	9-05	9-16
NK S 24-92	90	22.9	1.2	2.2	9.1	8-29	9-10
Pion. 9273	93	23.4	1.2	2.4	6.7	8-30	9-13
Pion. 9281	92	22.9	1.2	2.6	7.1	9-02	9-14
Burlison	93	25.3	1.2	2.8	5.7	9-02	9-15
Conrad 94	86	23.6	1.3	1.9	10.1	8-30	9-13
Jack	89	30.6	2.3	2.3	5.7	9-06	9-16
Kenw. 94	90	25.0	1.5	2.6	6.5	8-30	9-10
St. 2660 X	91	24.6	1.4	2.6	7.1	9-04	9-16
T-2220	90	23.6	1.2	2.2	7.8	9-06	9-16
TI TS 253	93	23.3	1.2	2.1	9.3	8-31	9-14
Mustang	91	25.5	1.4	3.1	5.6	8-31	9-11
TC Pinto	90	25.0	1.2	2.4	7.3	9-02	9-14
Tris. 2812	90	29.9	1.5	3.3	3.2	9-06	9-15
Dyn. 3256	90	21.9	1.2	2.1	11.0	8-31	9-13
Wilk. 2544	89	24.4	1.3	2.4	8.0	8-29	9-11
As. A 4715	97	34.4	1.4	5.3	0.6	9-23	10-3
CF-492	97	26.9	1.2	4.8	0.4	9-24	10-4
FFR-439	96	37.2	1.5	5.5	0.5	9-15	9-26
LSD(0.10)	1	1.1	0.1	0.3	1.6	not analyzed	

Table 4. Yields and rankings of the 19 varieties common to 4 Kentucky tests and 4 Illinois tests.

Variety	Kentucky Yield (bu/A)	Kentucky Ranking	Illinois Yield (bu/A)	Illinois Ranking
Mohave II	50.3	1	54.4	8
Lewis 283	49.6	2	53.7	11
Pion. 9273	47.7	3	55.7	3
Pion. 9281	47.5	4	56.0	2
DK CX 267	46.3	5	53.2	13
DSR-277	45.8	6	54.2	10
Wilk. 2544	45.7	7	56.3	1
TC Pinto	45.6	8	53.2	14
TI TS 253	45.1	9	55.3	5
Mustang	44.6	10	54.8	7
KB 274	44.4	11	55.6	4
Dyn. 3256	44.0	12	51.9	15
Kenw. 94	43.9	13	51.5	16
Ciba 3253	42.6	14	53.5	12
Burlison	42.2	15	49.5	19
Jack	41.1	16	51.3	17
NK S 24-92	40.2	17	54.3	9
ICI D-260	39.9	18	55.1	6
Conrad 94	38.5	19	49.9	18
LSD(0.10)	3.4		2.1	

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