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# On-Farm Testing of Early Maturing Soybeans

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# Agronomy notes

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## ON-FARM TESTING OF EARLY MATURING SOYBEANS

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Maturity Group (MG) II soybean varieties have performed well in University of Kentucky tests over the past several years. Six tests from 1986 to 1989 showed MG II varieities to outyield MG I, III, or IV varieties. During those relatively dry years, MG II may have been able to better utilize limited soil moisture than did later maturing varieties. Across the years 1990 to 1993, four planting date tests showed continued strong performance by MG II varieties, although MG III and IV varieties had slightly higher yield averages during those wetter years. In summary, over the last eight years of UK testing, MG II varieties have produced average yields virtually identical to those of MG III or MG IV varieties. Thus, growers could plant a portion of their soybean acreage to MG II varieties and gain the advantages of earlier harvest, more fall planting options, and perhaps profit from higher early fall cash market prices.

Since many of these studies have been done in central Kentucky at Lexington, western Kentucky growers have not been convinced that this system would work under their conditions. A few farmers who have tried this system on their own have been pleased with their results. In 1992, an Ohio County producer harvested 62 bushels/A from a field of MG II soybeans (var. Burlison). However, since MG II varieties were developed to be planted well north of the Kentucky soybean region, it is possible that they may not be able to withstand the more difficult growing conditions on Kentucky farms. Our temperatures are higher, insect pressure is greater, weeds seem to be more numerous, and soybean cyst nematode (SCN) is a more serious problem. For these reasons, it is important to test MG II varieties over a broad range of on-farm conditions before recommending that Kentucky farmers try this system on their own farms.

The objective of this project, funded by the Kentucky Soybean Promotion Board, was to test the merits of producing early maturing soybean varieties across a wide range of on-farm Kentucky conditions.

### Materials and Methods

Growers were selected with the help of a State Extension Grain Specialist and several county agricultural agents. Each farmer was asked to plant two randomized replications of a strip test which included the following five varieties: 1) Jack, MG II public with SCN resistance; 2) Iowa 2008, MG II public; 3) Pioneer 9273, MG II private, 4) Stine 2250, MG II private, and 5) Asgrow 4715, MG IV private with SCN resistance. These varieties were selected based on

their high yield performance in their normal area of adaptation. Production practices such as planting date, row spacing, seeding rate, and weed control methods were left up to the discretion of individual growers. We provided seed to the growers and visited each field several times during the season to monitor progress of the crop. Data collected by the researchers included: stand establishment, early August canopy closure, lowest pod height, plant height, and potential losses if harvest had occurred at 2, 4, or 6 inch combine cutting heights. Harvest was done by growers with their own equipment and yields were measured in weigh wagons.

Results and Discussion

Fourteen tests were completed. Individual farm yields averaged across all five varieties are presented in Table 1. Full season tests generally ranked higher than did double crop tests. The two lowest yielding full season tests (Rhodes and Foster) suffered severe mid-to-late-season drought stress. The wide range in average farm yields helps test MG II performance across a spectrum of growing conditions.

The best MG II variety (Pioneer 9273) was not significantly lower in yield than the MG IV check variety Asgrow 4715 (Table 2). Stine 2250 and Jack yielded somewhat less than the top two varieties, while Iowa 2008 performed poorly. Iowa 2008 shattered severely whenever its harvest was delayed. This variety also appeared to be more attractive to insects, particularly Japanese beetles. Clearly, the best MG II varieties can compete with the best MG IV varieties. However, careful MG II variety selection is essential for the success of this cropping system.

When Pioneer 9273 and Asgrow 4715 were compared "head-to-head" at each of the tests, growers' results showed a significant yield advantage for each variety once, and a statistical "draw" the other 12 times (Table 3). On a Nelson County farm, Asgrow 4715 had a 10 bushel/A advantage. On a Hancock County farm, Pioneer 9273 had a 7 bushel/A advantage. When growers' data were split into full-season and double-crop trials, Pioneer 9273 and Asgrow 4715 yielded comparably in each cropping system. In nine full-season tests, Pioneer 9273 yielded 44 bushels/A compared to 45 bushels/A for Asgrow 4715. In five double-crop tests, Pioneer 9273 produced 33 bushels/A compared to 34 bushels/A for Asgrow 4715. Thus, the best MG II variety (Pioneer 9273) was able to compete with the MG IV check (Asgrow 4715) whether the farmers were growing full-season or double-crop soybean.

In addition to the poor performance of one of the MG II varieties (Iowa 2008), two other potential problems were identified. In the Donaldson test in Hopkins County, Eastern black nightshade produced large numbers of berries in all MG II variety strips, but no berries in the MG IV variety check strips. This may have been because the nightshade took advantage of the early leaf drop of the MG II varieties. This problem might be reduced by planting MG II varieties in 15 inch rows instead of the 30 inch rows used on the Donaldson farm. Another concern was about harvest losses in the stubble. Average lowest pod heights of the four MG II varieties ranged from 4.0 to 4.8 inches, while lowest pod height of Asgrow 4715 averaged 6.8 inches. When we cut plants at 4 inches, stubble harvest losses ran about 3% higher for MG II varieties than for the MG IV check variety. Based on our experience, most growers can cut the

stubble low enough to avoid serious stubble losses for MG II varieties.

Conclusions

The best MG II variety was strongly competitive with the high-yielding MG IV check variety. However, other MG II varieties did not perform as well, indicating that careful variety selection will be essential for the success of this system in Kentucky growers' fields. Further work needs to be done regarding pest susceptibility of MG II varieties in Kentucky. When using MG II varieties, producers should be prepared to reduce their combine cutting height in order to avoid stubble harvest losses.

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Table 1. Average yields of four MG II and one MG IV varieties from 14 on-farm tests in Kentucky in 1993.

| Farmer | County | Cropping System | Yield (bu/A) |
|---|---|---|---|
| Sprague | Union | FS[a] | 53 |
| Hardesty | Union | FS | 49 |
| Donaldson | Hopkins | FS | 49 |
| Luttrell | Ohio | FS | 41 |
| Peterson | Nelson | FS | 39 |
| Hardesty | Union | DC | 38 |
| Hagman | Hancock | DC | 37 |
| Hagman | Hancock | FS | 36 |
| Ashby | Hopkins | FS | 33 |
| Mattingly | Henderson | DC | 33 |
| Rhodes | Breckinridge | FS | 28 |
| Foster | Daviess | FS | 26 |
| Sprague | Union | DC | 24 |
| Karn | Ohio | DC | 23 |
| | | LSD(0.05) | 4 |

[a]FS, Full Season; DC, Double Crop (behind wheat).

Table 2. Average variety yields from 14 Kentucky on-farm tests in 1993.

| Variety | Maturity Group | Yield (bu/A) |
|---|---|---|
| Asgrow 4715 | IV | 41 |
| Pioneer 9273 | II | 40 |
| Stine 2250 | II | 37 |
| Jack | II | 36 |
| Iowa 2008 | II | 27 |
| | LSD(0.05) | 2 |

Table 3. Yield comparison between the top MG II variety and the MG IV check variety.

| County/Farmer/Cropping System | MG IV Check (Asgrow 4715) | Top MG II (Pioneer 9273) |
|---|---|---|
| | bu/A | |
| Union-Sprague-FS | 58 | 60[a] |
| Union-Hardesty-FS | 53 | 51 |
| Hopkins-Donaldson-FS | 53 | 51 |
| Ohio-Luttrell-FS | 40 | 45 |
| Nelson-Peterson-FS | 51 | 41 |
| Union-Hardesty-DC | 44 | 41 |
| Hancock-Hagman-DC | 32 | 39 |
| Hancock-Hagman-FS | 39 | 41 |
| Hopkins-Ashby-FS | 40 | 38 |
| Henderson-Mattingly-DC | 36 | 34 |
| Breckinridge-Rhodes-FS | 33 | 36 |
| Daviess-Foster-FS | 34 | 31 |
| Union-Sprague-DC | 30 | 26 |
| Ohio-Karn-DC | 30 | 25 |

[a]LSD(0.05) to compare varieties within a farm was 6 bu/A.