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SOYBEAN VARIETY CHOICES FOR INCREASED RESISTANCE TO PENDIMETHALIN HERBICIDE

D.G. Glover and W.T. Schapaugh, Jr.*

Stem breakage and lodging near the soil line are reoccurring problems for soybean in Kansas. These are among the symptoms of a condition known as brittle bean syndrome, which is associated with use of pendimethalin herbicide (Prowl, Squadron, and Pursuit Plus) and suitable environmental conditions (wet during and following emergence). Stem breakage/lodging is of economic concern and may occur any time during the growing season.

Soybean varieties vary in resistance to pendimethalin. Varieties less adversely affected should be planted when pendimethalin is used. This study was undertaken to identify varieties with increased levels of resistance.

Procedures

One-hundred eleven soybean varieties were studied at the Agronomy Research Farm near Manhattan, KS, and at the East Central Experiment Field near Ottawa, KS for their response to pendimethalin herbicide-induced stem damage (brittle bean syndrome). Varieties were grown on untreated control plots or treated with 1 and 3 lb/per acre rates of pendimethalin and scored near harvest for percent stem breakage (0=no breakage, 100=all plants broken). Soils were a fine sandy loam at Manhattan and a silt loam at Ottawa. Rainfall and temperatures at Manhattan were normal, with

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Kansas State University, Manhattan
Marc A. Johnson, Director

adequate precipitation for timely activation of the herbicide. Rainfall at Ottawa was delayed for 14 days; thus, emergence occurred before activation of the herbicide.

Results

Reactions of the public and private soybean varieties tested are given in Table 1. Results are presented for both location and herbicide rates, because the varieties responded differently in the two environments. These data cover released varieties available to the public or experimental lines nearing release and of interest to producers.

The most susceptible varieties included Essex, KS5292, Stafford, Delsoy 4900, and Hutcheson. Some of the most resistant varieties were Probst, Asgow A4715, Flyer, and Agripro AP 3727.

Conclusions

No soybean variety appeared to have complete resistance to pendimethalin. However, many of the commercial varieties expressed little or no damage to pendimethalin under the environmental conditions of our study. These resistant varieties offer increased plant protection and higher yield potential when grown in a cropping system using pendimethalin herbicide.

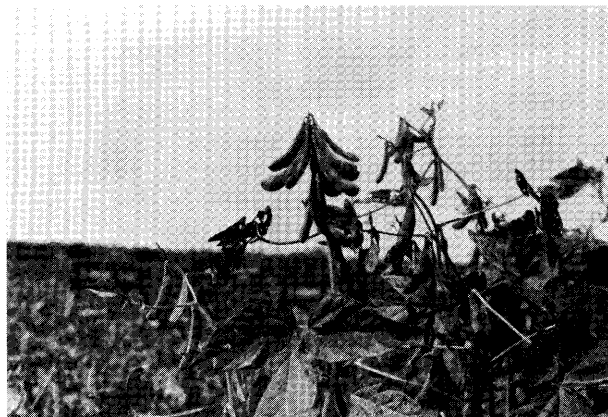


Table 1. Evaluation of soybean varieties grown at two locations and treated with two rates of pendimethalin for percent stem breakage.

| Brand | Entry | Manhattan | | Ottawa | |
|--------------|----------|--------------|--------------|--------------|--------------|
| | | 1.0 lb/ac | 3.0 lb/at | 1.0 lb/at | 3.0 lb/at |
| | | % | | | |
| AgriPro | AP 3727 | 0 | 3 | 0 | 3 |
| AgriPro | AP 3800 | 0 | 5 | 1 | 1 |
| AgriPro | AP 3990 | 0 | 8 | 1 | 10 |
| AgriPro | AP 4100 | 0 | 8 | 1 | 18 |
| AgriPro | AP 4510 | 0 | 6 | 2 | 8 |
| AgriPro | AP 4880 | 3 | 4 | 0 | 6 |
| Asgrow | A3313 | 1 | 3 | 1 | 8 |
| Asgrow | A3510 | 0 | 5 | 0 | 10 |
| Asgrow | A3935 | 1 | 5 | 2 | 6 |
| Asgrow | A4045 | 0 | 4 | 3 | 11 |
| Asgrow | A4138 | 0 | 9 | 0 | 9 |
| Asgrow | A4341 | 0 | 4 | 1 | 15 |
| Asgrow | A4415 | 1 | 5 | 3 | 18 |
| Asgrow | A4715 | 0 | 1 | 1 | 5 |
| Asgrow | A5112 | 0 | 4 | 5 | 9 |
| Dekalb | CX335 | 1 | 5 | 0 | 10 |
| Dekalb | CX377 | 0 | 5 | 1 | 9 |
| Dekalb | CX404 | 1 | 6 | 3 | 11 |
| Dekalb | CX411 | 1 | 1 | 4 | 6 |
| Dekalb | CX445 | 1 | 4 | 1 | 5 |
| Dekalb | CX458 | 1 | 4 | 1 | 4 |
| Dekalb | CX469c | 1 | 5 | 2 | 11 |
| Delta Pine | DP 3375 | 0 | 1 | 3 | 5 |
| Delta Pine | DP 3456 | 0 | 15 | 0 | 8 |
| Delta Pine | DP 3478 | 0 | 3 | 1 | 10 |
| Delta Pine | DPX 3358 | 1 | 8 | 3 | 13 |
| Delta Pine | DPX 3381 | 1 | 12 | 3 | 9 |
| Delta Pine | DPX 3388 | 3 | 4 | 1 | 8 |
| Delta Pine | DPX 3432 | 0 | 8 | 0 | 14 |
| Delta Pine | DPX 3391 | 1 | 10 | 0 | 8 |
| ICI | D371 | 1 | 5 | 0 | 5 |
| ICI | D396 | 0 | 4 | 1 | 10 |
| ICI | D414 | 0 | 14 | 4 | 10 |
| ICI | D454 | 1 | 10 | 0 | 9 |
| ICI | EX4484 | 4 | 6 | 1 | 9 |
| NC+ | 3A44 | 0 | 4 | 0 | 6 |
| NC+ | 3K84 | 0 | 6 | 1 | 10 |
| NC+ | 4A10 | 0 | 4 | 1 | 10 |
| NC+ | 4A27 | 3 | 9 | 1 | 11 |
| NC+ | 5A15 | 0 | 9 | 4 | 16 |
| NC+ | 5H61 | 3 | 10 | 4 | 25 |
| Northup King | S29-39 | 0 | 5 | 1 | 6 |
| Northup King | S30-06 | 0 | 3 | 1 | 9 |
| Northup King | S35-35 | 1 | 6 | 1 | 10 |
| Northup King | S39-41 | 0 | 4 | 0 | 15 |
| Northup King | S42-50 | 2 | 5 | 0 | 5 |

| Brand | Entry | Manhattan | | Ottawa | |
|--------------|----------------|--------------|--------------|--------------|--------------|
| | | 1.0 lb/at | 3.0 lb/ac | 1.0 lb/at | 3.0 lb/at |
| | | % | | | |
| Northup King | S42-60 | 3 | 6 | 1 | 15 |
| Northup King | S46-44 | 1 | 19 | 3 | 19 |
| Northup King | S52-25 | 1 | 12 | 4 | 7 |
| Pioneer | 9341 | 1 | 1 | 0 | 9 |
| Pioneer | 9362 | 1 | 6 | 1 | 3 |
| Pioneer | 9381 | 0 | 5 | 0 | 7 |
| Pioneer | 9391 | 3 | 9 | 1 | 14 |
| Pioneer | 9393 | 0 | 4 | 0 | 11 |
| Pioneer | 9394 | 3 | 8 | 3 | 6 |
| Pioneer | 9411 | 1 | 14 | 0 | 13 |
| Pioneer | 9491 | 5 | 10 | 4 | 28 |
| Pioneer | 9521 | 0 | 8 | 3 | 15 |
| Stine | 3260 | 0 | 6 | 0 | 8 |
| Stine | 3470 | 0 | 5 | 8 | 5 |
| Stine | 3490 | 0 | 5 | 0 | 9 |
| Stine | 3510 | 0 | 3 | 3 | 11 |
| Stine | 3630 | 4 | 6 | 0 | 6 |
| Stine | 3660 | 0 | 8 | 1 | 9 |
| Stine | 3680 | 3 | 9 | 1 | 14 |
| Stine | 4340 | 1 | 13 | 1 | 10 |
| Stine | 4350 | 1 | 4 | 3 | 13 |
| Stine | 4680 | 0 | 13 | 3 | 6 |
| Stine | 4390 | 0 | 8 | 1 | 10 |
| Stine | 4322CN | 0 | 8 | 1 | 6 |
| | Avery | 3 | 19 | 8 | 11 |
| | Corsica | 0 | 5 | 0 | 9 |
| | Crawford | 0 | 3 | 1 | 6 |
| | Delsoy 4210 | 3 | 8 | 4 | 8 |
| | Delsoy 4500 | 3 | 5 | 3 | 13 |
| | Delsoy 4710 | 0 | 5 | 3 | 11 |
| | Delsoy 4900 | 0 | 14 | 6 | 38 |
| | Edison | 0 | 5 | 0 | 13 |
| | Essex | 1 | 31 | 8 | 51 |
| | Fayette | 1 | 9 | 1 | 10 |
| | Flyer | 0 | 5 | 1 | 4 |
| | Forrest | 0 | 3 | 2 | 6 |
| | Hamilton | 0 | 6 | 0 | 6 |
| | Hartwig | 0 | 5 | 0 | 5 |
| | Holladay | 0 | 12 | 4 | 8 |
| | Hutcheson | 0 | 19 | 5 | 31 |
| | K1213 | 2 | 6 | 0 | 12 |
| | K1218 | 0 | 5 | 1 | 9 |
| | K1231 | 0 | 10 | 3 | 9 |
| | K1235 | 3 | 9 | 0 | 6 |
| | K1261 | 0 | 3 | 1 | 5 |
| | K1262 | 2 | 5 | 1 | 3 |
| | K87-7-95 EXP. | 10 | 41 | 9 | 15 |
| | K88-22-42 EXP. | 13 | 24 | 4 | 41 |
| | Kenwood | 1 | 6 | 1 | 11 |
| | KS3494 | 1 | 5 | 5 | 4 |
| | KS4390 | 0 | 10 | 3 | 26 |

| Brand | Entry | Manhattan | | Ottawa | |
|----------|-------------|--------------|--------------|--------------|--------------|
| | | 1.0 lb/at | 3.0 lb/at | 1.0 lb/at | 3.0 lb/at |
| | | % | | | |
| | KS4694 | 0 | 3 | 3 | 9 |
| | KS4895 | 1 | 3 | 1 | 8 |
| | KS5292 | 1 | 10 | 8 | 49 |
| | KY88-5037 | 0 | 4 | 4 | 9 |
| | Kunitz | 1 | 6 | 3 | 5 |
| | Linford | 3 | 10 | 1 | 10 |
| | Manokin | 1 | 5 | 0 | 14 |
| | Probst | 0 | 0 | 0 | 5 |
| | Resnik | 0 | 6 | 1 | 8 |
| | Sherman | 0 | 6 | 3 | 8 |
| | Sparks | 6 | 13 | 3 | 11 |
| | Stafford | 1 | 25 | 6 | 33 |
| | Stressland | 0 | 13 | 3 | 5 |
| | Williams 82 | 1 | 1 | 3 | 6 |
| LSD (5%) | | 3 | 10 | 4 | 13 |

Note: Trade names are used to identify products; no endorsement is intended, nor is any criticism implied of similar products not mentioned.

*Graduate student and professor, respectively, Department of Agronomy, Throckmorton Plant Sciences Center, Kansas State University, Manhattan, KS 66502-5501. Glover E-mail: Donnie@ksuvm.ksu.edu.

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**Agricultural Experiment Station
Kansas State University
Manhattan 66506-4008**

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