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SOYBEAN CHOICES FOR
IRON-DEFICIENT SOILS

Merle Witt and William Schapaugh*

Yellow etiolated soybeans with reduced yields caused by a shortage of available iron are increasing problems in Kansas. In the central and western portions of the state, the iron-deficient areas that often are associated with highly calcareous soils are becoming more apparent. In severe cases of iron deficiency, other crop choices should be considered rather than soybeans. However, where soybeans are grown, partial solutions to this crop problem are possible.

Yield losses from iron deficiency often can be minimized in soybeans by:

1. Growing varieties with genetic tolerance to iron chlorosis.
2. Making field applications of livestock manure.

Among those three alternatives, using varieties tolerant of iron-deficient soils is generally the most desirable. Livestock manure applications to a field are often effective, but drawbacks include lack of accessibility to manure, high transportation costs, and frequent presence of weed seed. Foliar iron applications often are not very effective with soybeans, and the materials also tend to be expensive, difficult to maintain in suspension, and abrasive to application equipment.
Procedure
Sixty soybean varieties were studied in 1994 in field plots at the Southwest Research–Extension Center near Garden City, KS for their response to soils with limited available iron. Iron uptake values were recorded as chlorophyll (greenness) measurements using a Minolta SPAD-502 Chlorophyll Meter. Ratings were averaged from three plots for each entry. This soil site contained approximately 5 ppm iron (DPTA test).

Results
The reactions of some public and private soybean varieties are given in Table 1. These data cover released varieties available to the public or experimentals nearing release and of interest to producers.

The first 12 varieties listed rank significantly better than other entries in tolerance to limited available iron. The very poorest tolerance was shown by the variety Ohlde 4040.

Conclusions
Although no soybean varieties are available with complete tolerance to iron chlorosis, some show moderate levels of tolerance. Moderate tolerance allows improved soybean production in all but the most severe problem areas. Thus, variety selection is often the most practical solution to chlorosis caused by iron deficiency.

Table 1. Evaluation of soybean varieties for iron chlorosis tolerance.

<table>
<thead>
<tr>
<th>Brand</th>
<th>Entry</th>
<th>Maturity Group</th>
<th>Iron Uptake Reading</th>
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Brand Entry Maturity Iron Uptake Group Reading
Agripro AP 4510  IV  27.0
Drussel DSS Exp 4358  III  26.7
DeKalb K1235  IV  26.7
Ohlde X3660  III  26.3
Pioneer 9341  III  26.0
Hyperformer HY 351  III  25.7
Midland 8393  III  25.3
Asgrow A3510  III  25.0
Drussel DSS Exp 6353  III  25.0
Golden Harvest H-1388  III  25.0
Ohlde 3272  III  25.0
Ohlde 3750A  III  24.7
Ohlde X3555  III  24.7
Golden Harvest HC89-2170  IV  24.7
Midland Exp 372  III  24.3
Ohlde X816  III  24.0
DeKalb CX411  IV  24.0
Ohlde Renik  III  23.3
Golden Harvest Corsica  IV  23.3
Ohlde Flyer  IV  22.7
Golden Harvest K1262  IV  22.3
Ohlde K1262  IV  22.3
Golden Harvest Kenwood  III  21.7
Golden Harvest KY88-5037  IV  21.7
Hyperformer HY 446  IV  21.7
Agripro AP3800  III  21.0
Pioneer 9381  III  20.3
Pioneer Edison  III  20.0
Ohlde 3870  III  20.0
Hyperformer HSC 398  III  19.3
Golden Harvest A4138  IV  19.0
Asgrow C1832  III  18.7
Hyperformer Sherman  III  18.7
Pioneer 9362  III  17.3
Golden Harvest HY 498  IV  15.7
Deltapine DP 3478  IV  14.3
Stine 3490  IV  14.3
Northrup King 542-60  IV  14.0
Golden Harvest 4040  IV  12.0

Test Average 24.0
L.S.D. (5%) 5.7

\( / \) Highest value is best.
Note: Trade names are used to identify products. No endorsement is intended, nor is any criticism implied of similar products not named.

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Contribution No. 95-450-S from the Kansas Agricultural Experiment Station.