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# Results of Field Experiments with Potatoes in 1953

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## Variety Trials

Nineteen varieties of potatoes were planted at three locations in the state in 1953 - Brookings, Garden City* and Redfield. Two plantings were made at Redfield, one of which was irrigated. Tubers from the same lots were used in all four plantings.

Included in these experiments were a few of the more recently introduced varieties as well as several older standard varieties. It was intended to compare scab reaction, development of foliage diseases, and the influence of these diseases on yield of these newer varieties and the older standard varieties. However, in 1953 disease development in all of the plantings was negligible and yields, therefore, were unaffected by disease.

To facilitate cultivation, tubers were planted in rows spaced 42-inches apart at Brookings, 40-

*The writer wishes to acknowledge the cooperation of W. J. Hartman on whose farm this trial was planted.

inches at Garden City, and 36-inches at Redfield. The differences in row spacings were taken into account in calculating bushel yields per acre. Total solids of the harvested tubers were determined only at Brookings. Higher total solids usually are indicative of superior cooking quality.

The yields from each of the four plantings are shown in Tables 1-4.* The yields were lower at Garden City and on the non-irrigated plot at Redfield than at Brookings, or on the irrigated plot at Redfield. The relative yield spread between varieties was less at Brookings than at the other locations. With few exceptions, the varieties ranked about the same for yield at all four plantings.

As may be seen from Summary Table 5, LaSoda, Chippewa, Cherokee, Kennebec and Columbia Russet were the five top yielding varieties. Osage, White Cloud,

*Note: The expression "least significant difference" in the yield tables means the difference necessary to reliably distinguish between the yields of varieties grown under the same conditions. The "5% (level)" means that a difference comparably as great or greater between two given varieties would occur in 95 of 100 different trials; "1% (level)", 99 of 100 trials.

Yampa, and Stark's Red were not so well adaped to these areas in 1953. Irish Cobbler, Red Pontiac, Sebago, Keswick, and Canso gave acceptable yields.

At Brookings, Columbia Russet was highest in total solids (Table 6); Canso, Cherokee, and Irish Cobbler were above-average; Early Ohio, Waseca, and Red Pontiac were below-average. The remaining varieties, including the high-yielding LaSoda, were average.

Table 1. Yield in bushels per acre of seventeen potato varieties grown at Brookings, 1953. Non-irrigated.

| Variety[1] | Bu./A.[2] |
|---|---|
| LaSoda | 494.8 |
| Cherokee | 469.4 |
| Red Pontiac | 467.6 |
| Keswick | 456.1 |
| Chippewa | 452.8 |
| Bliss Triumph | 429.5 |
| Waseca | 420.4 |
| Columbia Russet | 386.8 |
| Irish Cobbler | 383.2 |
| Sebago | 375.5 |
| Canso | 368.8 |
| Osage | 320.4 |
| Russet Sebago | 298.8 |
| Early Ohio | 283.2 |
| Stark's Red | 272.3 |
| White Cloud | 234.0 |
| Average | 382.1 |

1/ Planting date-May 6: harvest date-September 15.

2/ Least significant difference: 5%-77.8; 1%-103.8.

Table 2. Yield in bushels per acre of nineteen potato varieties grown at Garden City, 1953. Non-irrigated.

| Variety[1] | Bu./A.[2] |
|---|---|
| Kennebec | 197.1 |
| Chippewa | 174.8 |
| Irish Cobbler | 173.2 |
| Columbia Russet | 171.5 |
| Red Pontiac | 162.8 |
| LaSoda | 161.9 |
| Cherokee | 156.6 |
| Sebago | 154.2 |
| Keswick | 144.3 |
| Early Ohio | 142.3 |
| Canso | 139.1 |
| Russet Sebago | 139.0 |
| Yampa | 133.7 |
| Waseca | 128.2 |
| Katahdin | 109.1 |
| Osage | 101.0 |
| Bliss Triumph | 99.9 |
| White Cloud | 82.2 |
| Stark's Red | 67.4 |
| Average | 138.8 |

1/Planting date-May 8; harvest date-September 25.
2/Least significant difference: 5%-30.3; 1%-40.5.

Table 3. Yield in bushels per acre of nineteen potato varieties grown at Redfield, 1953. Non-irrigated.

| Variety[1] | Bu./A.[2] |
|---|---|
| Kennebec | 307.1 |
| Cherokee | 285.8 |
| Irish Cobbler | 282.2 |
| LaSoda | 279.9 |
| Sebago | 267.4 |
| Columbia Russet | 260.3 |
| Chippewa | 246.0 |
| Keswick | 234.7 |
| Canso | 230.1 |
| Early Ohio | 226.4 |
| Katahdin | 222.2 |
| Red Pontiac | 214.5 |
| Russet Sebago | 211.0 |
| Yampa | 191.8 |
| Waseca | 189.4 |
| Bliss Triumph | 140.0 |
| Osage | 114.7 |
| White Cloud | 108.1 |
| Stark's Red | 94.9 |
| Average | 216.1 |

1/Planting date-May 18; harvest date-September 30.

2/Least significant difference: 5%-73.6; 1%-97.0.

Table 4. Yield in bushels per acre of nineteen potato varieties grown at Redfield, 1953. Irrigated.

| Variety[1] | Bu./A.[2] |
|---|---|
| LaSoda | 445.3 |
| Kennebec | 423.1 |
| Chippewa | 406.6 |
| Columbia Russet | 391.0 |
| Sebago | 359.5 |
| Early Ohio | 358.0 |
| Canso | 347.5 |
| Irish Cobbler | 344.6 |
| Katahdin | 338.9 |
| Cherokee | 330.9 |
| Yampa | 318.1 |
| Red Pontiac | 314.1 |
| Russet Sebago | 301.5 |
| Keswick | 277.3 |
| Waseca | 243.7 |
| Bliss Triumph | 236.4 |
| Stark's Red | 208.4 |
| Osage | 203.5 |
| White Cloud | 122.0 |
| Average | 314.2 |

[1] Planting date-May 18; harvest date-September 30.

[2] Least significant difference: 5%-152.3; 1%-202.8.

Table 5. Average yield of nineteen potato varieties grown at Brookings, Garden City, and on irrigated and non-irrigated plots at Redfield in 1953.[1]

| Variety[1] | Bu./A.[2] |
|---|---|
| LaSoda | 345.5 |
| Chippewa | 320.0 |
| Cherokee | 310.7 |
| Kennebec | 309.1 |
| Columbia Russet | 302.4 |
| Irish Cobbler | 295.8 |
| Red Pontiac | 289.8 |
| Sebago | 289.2 |
| Keswick | 278.1 |
| Canso | 271.4 |
| Early Ohio | 252.5 |
| Waseca | 245.4 |
| Russet Sebago | 237.6 |
| Bliss Triumph | 226.5 |
| Katahdin | 223.4 |
| Yampa | 214.5 |
| Osage | 184.9 |
| Stark's Red | 160.8 |
| White Cloud | 136.6 |

[1] Irrigated trial only at Redfield with non-irrigated trials at all three locations.

[2] Least significant difference: 5%-70.5; 1%-94.1.

Table 6. Per cent total solids of seventeen potato varieties grown at Brookings, 1953.

| Variety | Per cent total solids |
|---|---|
| Columbia Russet | 24.0 |
| Canso | 21.7 |
| Cherokee | 20.9 |
| Keswick | 20.2 |
| Chippewa | 19.2 |
| Sebago | 19.0 |
| White Cloud | 18.8 |
| Osage | 18.4 |
| Irish Cobbler | 18.2 |
| Russet Sebago | 17.9 |
| Bliss Triumph | 17.7 |
| LaSoda | 17.2 |
| Stark's Red | 17.2 |
| Early Ohio | 16.9 |
| Waseca | 16.2 |
| Red Pontiac | 15.5 |

## Control of Common Scab

Common scab is an ever-present problem for most potato growers. While there are varieties available which are quite resistant, these are sometimes not adapted to the climate or soil or may not be favorably accepted by the producer or buyer. Therefore, other means of avoiding scab are sometimes necessary.

The occurrence of this disease has been shown to be directly associated with soil pH (the measure of acid or alkaline reaction). Scab is usually most severe when the pH is not distinctly acid or alkaline, but nearly neutral. Treatments to lower the pH of soil (make it more acid) are known to lessen the severity of scab, and sulfur has been used for this purpose successfully in many areas.

Experiments at Trent* in 1953 were designed to determine the influence upon scab of sulfur applied at various rates soon after planting. The results of these experiments are presented in Table 7. It

*The writer wishes to acknowledge the cooperation of Ed. H. Lacey on whose farm these experiments were conducted.

should be noted that as the rate of sulfur application increases, there was a distinct decrease in the percentage of tubers with visible scab. Also, as the sulfur application rate was increased, the percentage of tubers with pitted lesions decreased. The percentage of salable tubers was increased with each increase in rate of application.

On the basis of these results, it appears that sulfur might be useful in some areas of the state as a measure for controlling potato scab. However, no recommendations can be made on the basis of a single seasons results.

Table 7. Effects of sulfur applied at various broadcast rates on the incidence of common scab of potatoes. Trent, South Dakota.

| Pounds of sulfur per acre | Percent[1] Tubers Exhibiting | | | | % Salable Tubers[2] |
|---|---|---|---|---|---|
| | No Scab | Surface Scab | Raised Lesions | Pitted Lesions | |
| 0 | 28 | 6 | 1 | 69 | 55 |
| 600 | 33 | 6 | 1 | 64 | 61 |
| 1200 | 46 | 14 | 0 | 43 | 71 |
| 1800 | 49 | 9 | 1 | 43 | 71 |
| 2400 | 39 | 25 | 0 | 38 | 74 |
| 3000 | 50 | 5 | 0 | 39 | 77 |

[1] Figures based on five 25-tuber samples (125 tubers).
[2] Less than 15% surface scab or three raised or pitted lesions.

## Influence of Nitrogen Side Dressing and Soil Fertilization of Potato Yield

An experiment at Garden City* in 1953 was designed to compare the effect of nitrogen applied at early midseason as a side dressing with various fertilizers broadcast before planting. The abundant rainfall in late midseason should have made the differences in yield quite noticeable if nitrogen side dressing applications are of value.

Broadcast applications of 390#/acre of an 18-11-0 fertilizer and 390#/acre of an 18-11-10 fertilizer each gave a significant increase in yield (Table 8). However, the only treatment which was found to greatly increase yield was a broadcast application of 390#/acre of an 18-11-10 fertilizer followed by a nitrogen (ammonium nitrate) side dressing of 120#/acre.

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*The writer wishes to acknowledge the cooperation of V. J. Hartman on whose farm this experiment was conducted. This experiment was designed and completed with the cooperation and assistance of Gene Gresham, Agronomy Department, S.D.S.C.

Table 8. Effects of various broadcast and side dressed fertilizer applications on yield of Bliss Triumph potatoes. Garden City, S. D.

| Fertilizer Treatment | | Pounds/A. | Total Yield |
|---|---|---|---|
| Broadcast Applied April 5, 1953 | Side Dressing Applied July 3, 1953 | Nutrient Added[1] | Bu./A.[2] Sept. 23, 1953 |
| none | none | 0-0-0 | 268.3 |
| none | Ammonium nitrate (120#/A.) | 40-0-0 | 273.0 |
| Ammonium nitrate (180#/A.) | none | 60-0-0 | 289.9 |
| Ammonium nitrate (180#/A.) | Ammonium nitrate (120#/A.) | 100-0-0 | 268.3 |
| Treble super phosphate (110#/A.) | none | 0-50-0 | 296.4 |
| Treble super phosphate (110#/A.) | Ammonium nitrate (120#/A.) | 40-50-0 | 291.5 |
| Ammonium nitrate (180#/A.) and treble super phosphate (110#/A.) | none | 60-50-0 | 307.8 |

| | | | |
|---|---|---|---|
| Ammonium nitrate (180 #/A.) and treble super phosphate (110#/A.) | Ammonium nitrate (120#/A.) | 100-50-0 | 296.8 |
| Ammonium nitrate (180#/A.) and treble super phosphate (110 #/A.) and muriate of potash (100#/A.) | none | 60-50-60 | 310.4 |
| Ammonium nitrate (180#/A.) and treble super phosphate (110#/A.) and muriate of potash (100#/A.) | Ammonium nitrate 120#/A.) | 100-50-60 | 343.2 |

1/ N, $P_2O_5$, $K_2$ in pounds / acre, respectively.
2/ L.S.D.: 5%-37.5: 1%-50.7.