# POTATO VARIETY TRIALS, 1968-1970
# MUCK CROP BRANCH
# CELERYVILLE, OHIO



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TABLE 1.--Planting and harvest dates for the 1968 - 1970 growing seasons.

| Year | Planting Date | Harvest Date | Season (Days) |
|---|---|---|---|
| 1968 | May 10 | Oct. 17 | 160 |
| 1969 | May 14 | Oct. 3 | 142 |
| 1970 | May 4 | Sept. 28 | 147 |

Seed pieces were spaced 11 inches within paired rows 32 inches apart on 56 inch centers. Each variety was planted in single plot row 25 feet long and each plot replicated 5 times. Superior and Katahdin were used as varietal checks. See Table 2. for the list of varieties planted in 1968 - 1970.

Fertilizer at the rate of 1000 pounds per acre of 0-20-20 was plowed down before planting. Eptam (4 lbs./A), for weed control, was applied prior to the last cultivation when the potato plants were 12 - 18 inches tall. Dithane M-45 (3 lbs./A) was applied at weekly intervals starting when the plants were 6 - 8 inches tall. Thiodan (0.5 lb./A), Sevin (1 lb./A) and Meta Systox (0.5 lb./A) applications were started at the same time on a weekly alternating basis. Irrigation water was applied as needed. Other cultural practices were similar to those used by commercial growers.

Harvesting of plots commenced about 10 - 14 days after natural vine death. Specific gravity of tubers taken during the 1968 trials was determined by the potato hydrometer method and converted to percent solids using the Maercker-Landwerths conversion chart.

For storage quality tests in 1970, each variety was kept at room temperature for 2 weeks after harvest and then stored for 5 months at 45° F. and 85 - 90% relative humidity. No sprout inhibitors were used in this test.

Results - 1968. See Table 3. for a summary of the results.

1. Yield. Five varieties had a total yield of over 500 cwt./A. They were Lenape, Alamo, Katahdin, Norchip and Platte. Other varieties having relatively high

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TABLE 2.--List of Potato Varieties Planted During the 1968, 1969 and 1970 Seasons.

| Variety | Released By | Year | Year Tested |
|---|---|---|---|
| Alamo | U.S.D.A. - Texas | 1967 | 1968, 1969, 1970 |
| Haig | Nebraska | 1957 | 1968 |
| Iopride | Iowa | 1970 | 1970 |
| Katahdin | U.S.D.A. | 1935 | 1968, 1969, 1970 |
| La Chipper | Louisiana | 1962 | 1968, 1969 |
| [1] Lenape | U.S.D.A. - Pennsylvania | 1967 | 1968, 1969 |
| Monona | U.S.D.A. - Frito Lay | [2] 1964 | 1968, 1969, 1970 |
| MS 709 | Michigan | [2] | 1970 |
| N.Y. 30 | New York | | 1969, 1970 |
| Norchip | North Dakota | 1968 | 1968, 1969, 1970 |
| Ona | U.S.D.A. | 1961 | 1968 |
| Peconic | New York | 1966 | 1968, 1969 |
| Penobscott | U.S.D.A. - Maine | 1962 | 1968 |
| Platte | Nebraska | 1965 | 1968, 1969 |
| Shurchip | Nebraska | 1969 | 1969, 1970 |
| Superior | Wisconsin | 1961 | 1968, 1969, 1970 |
| Wauseon | U.S.D.A. | 1967 | 1970 |

[1] Withdrawn by U.S.D.A. and Pennsylvania Agricultural Experiment Station on February 11, 1970

[2] Not yet released.

yields were Superior, Monona, Penobscott and Peconic. La Chipper was the lowest yielding variety with 248 cwt/A.

2. Total Solids. (Specific Gravity). Lenape, a newly released variety, had the highest specific gravity (1.093). Penobscott also had a fairly high specific gravity (1.084). For chipping, a specific gravity of less than 1.070 (low solids) is usually considered as unsatisfactory because of excess oil absorption by the chips. Varieties having specific gravities below this level were Alamo, Superior, Monona, Haig, Platte and La Chipper. Haig was extremely low in specific gravity (1.056).

3. Chip Color. Subjective potato chip color rating above 7.0 is generally considered to be unacceptable for market. The higher the score above 7.0 the darker the chip. Varieties having slightly darkened chips before storage were Ona and Alamo. Penobscott was borderline in color before and after storage. Lenape, Norchip, Monona

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TABLE 3.--A Summary of the Results for the 1968 Potato Trial on Muck Soil, Celeryville, Ohio.

| Variety | Yield - CWT/A U.S. No. 1 Size A | Size B | Culls | Total Yield | % Total Solids | Sp. Grav. | Chip Score (1) Before Storage | 1 Day Out | 10 Days Out | Rank (2) |
|---|---|---|---|---|---|---|---|---|---|---|
| Alamo | 469 | 38 | 69 | 576 | 15.4 | 1.060 | 7.6 | 8.8 | 8.0 | 9 |
| Haig | 308 | 36 | 30 | 375 | 14.5 | 1.056 | 6.5 | 7.6 | 6.8 | 8 |
| Katahdin | 448 | 20 | 73 | 540 | 17.7 | 1.071 | 6.9 | 7.0 | 7.2 | 5 |
| La Chipper | 204 | 21 | 24 | 248 | 16.0 | 1.063 | 6.8 | 6.4 | 7.4 | 7 |
| Lenape | 561 | 20 | 44 | 625 | 22.4 | 1.093 | 6.5 | 6.6 | 6.6 | 1 |
| Monona | 328 | 25 | 35 | 388 | 16.0 | 1.063 | 6.6 | 6.0 | 5.8 | 3 |
| Norchip | 412 | 30 | 53 | 503 | 18.2 | 1.073 | 6.8 | 6.6 | 6.6 | 4 |
| Ona | 259 | 31 | 41 | 331 | 18.2 | 1.073 | 7.6 | 7.5 | 7.7 | 10 |
| Peconic | 323 | 25 | 46 | 394 | 18.2 | 1.073 | 6.3 | 6.1 | 6.8 | 4 |
| Penobscott | 443 | 19 | 36 | 498 | 20.5 | 1.084 | 7.1 | 7.2 | 7.3 | 2 |
| Platte | 410 | 40 | 59 | 510 | 17.1 | 1.068 | 6.9 | 6.6 | 6.8 | 6 |
| Superior | 355 | 23 | 50 | 428 | 16.9 | 1.067 | 6.5 | 7.8 | 7.0 | 6 |

(1) The Authors gratefully acknowledge the cooperation and assistance of Dr. Wilbur A. Gould in providing this data.

(2) Ranking included yield, total solids and chip score. A rank of 1 is the highest. A chip score of below 7.0 is generally considered to represent a potato chip of acceptable color for market.

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Peconic and Platte had good chip color before storage as well as 1 and 10 days out of storage.

Results - 1969. See Table 4. for a summary of the of the results.

1. Yield. Yield was the only factor studied in 1969. The yields of all varieties was very low compared with the 1968 trials. Norchip which was fifth in total yield in 1968 was first in total yield in 1969. Only six varieties had a total yield of over 200 CWT/A. These low yields, when compared to the 1968 trial could have been due to the heavy rains in July which apparently slowed down foliar and tuber growth.

Results - 1970. See Table 5. for summary of the results.

1. Yield. Two varieties, Katahdin and Alamo and on line, N.Y. 30, had total yields exceeding 300 CWT/A. Monona and one breeding line, MS 709, had total yields less than 200 CWT/A. Monona also yielded poorly in 1968 and 1969, finishing ninth and eleventh, respectively.

2. Cull Distribution. Cull tubers were divided into three major types, sun-greened, mis-shapen or second growth and growth cracks. Alamo had the highest percentage of cull tubers (11%) and the highest incidence of sun greened tubers (89%). Katahdin, Shurchip, Iopride, N.Y. 30, Monona and Wauseon also had high incidence of sun greened tubers. Superior had a very high incidence (65%) of mis-shapened tubers. Surchip and Wauseon were also high in mis-shapen tubers. MS 709 had the highest incidence (43%) of growth cracks and Superior the lowest (0%).

3. Tuber Size. Tuber size was determined for U.S. #1, size A tubers. MS 709, which was very late in maturity, had the smallest tubers. Shurchip also had small tubers which is unlike its response on mineral soils where it produces relatively large tubers. A new variety, Iopride, and Monona produced the largest A-size tubers.

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TABLE 4.--A Summary of the Results for the 1969 Potato Trial on Muck Soil, Celeryville, Ohio.

| Variety | Yield - CWT/A. U.S. # 1 Size A | Size B | Culls | Total | % U.S. #1 | Rank(1) |
|---|---|---|---|---|---|---|
| Alamo | 118 | 30 | 20 | 168 | 88 | 9 |
| Katahdin | 173 | 23 | 32 | 228 | 86 | 5 |
| La Chipper | 132 | 25 | 17 | 174 | 90 | 6 |
| Lenape | 154 | 16 | 20 | 190 | 89 | 4 |
| Monona | 100 | 8 | 14 | 122 | 89 | 8 |
| Norchip | 221 | 20 | 18 | 259 | 93 | 1 |
| N.Y. 30 | 173 | 31 | 27 | 231 | 88 | 4 |
| Peconic | 163 | 29 | 30 | 222 | 86 | 7 |
| Platte | 168 | 33 | 17 | 218 | 92 | 3 |
| Shurchip | 168 | 24 | 16 | 208 | 92 | 2 |
| Superior | 128 | 18 | 17 | 163 | 90 | 6 |

(1) Ranking was based on all yield factors in this table. A rank of 1 is the highest.

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TABLE 5.--A Summary of the Results for the 1970 Potato Trial on Muck Soil, Celeryville, Ohio

| | Yield - CWT/A | | | | | Cull Distribution - % (1) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | U.S. # 1 | | | | % | | | | Ave. | |
| Variety | Size A | Size B | Culls | Total | U.S. # 1 | Sun Green | Mis-Shapen | Growth Crack | A-Size Tuber (Lb.) | Rank (2) |
| Alamo | 250 | 19 | 33 | 302 | 89 | 89 | 6 | 12 | 0.40 | 8 |
| Iopride | 253 | 15 | 21 | 289 | 93 | 80 | 18 | 13 | 0.44 | 3 |
| Katahdin | 326 | 17 | 25 | 368 | 93 | 82 | 1 | 12 | 0.40 | 2 |
| MS 709 | 87 | 21 | 10 | 118 | 91 | 36 | 8 | 43 | 0.27 | 9 |
| Monona | 171 | 8 | 12 | 191 | 94 | 59 | 0 | 31 | 0.43 | 2 |
| N.Y. 30 | 290 | 37 | 25 | 352 | 93 | 63 | 17 | 12 | 0.37 | 6 |
| Norchip | 217 | 23 | 16 | 256 | 94 | 46 | 14 | 29 | 0.35 | 7 |
| Shurchip | 239 | 15 | 20 | 274 | 93 | 77 | 27 | 9 | 0.30 | 5 |
| Superior | 264 | 12 | 14 | 290 | 95 | 37 | 65 | 0 | 0.36 | 1 |
| Wauseon | 236 | 16 | 16 | 268 | 94 | 54 | 36 | 16 | 0.35 | 4 |

(1) Percentage may not add up to 100% since some tubers may have more than one defect. Where the percentage is less than 100%, tubers were culled for other reasons than the above.

(2) Ranking was based on all of the above observations. A rank of 1 is the highest.

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4. Storage Quality (Table 6). All varieties increased considerably in specific gravity after harvest. This increase occurred primarily during low temperature storage. Tuber weight loss during the 5 month period was least in Alamo (3.9%). and Katahdin (2.7%). Norchip had the most weight loss (8.0%). Norchip also had a very high incidence of internal sprouting (35.7%). None of the other varieties or breeding lines exhibited this defect. Internal sprouting in Norchip has also been observed on upland soil. External sprout development was least in Alamo and considerable in Norchip, Katahdin and Shurchip. N.Y. 30 showed considerable internal breakdown (12.0%). This defect in N.Y. 30 has also been observed when it has been grown on upland soil.

On the basis of the storage factors observed, Alamo was the best storing variety and Norchip was the worst.

Summary. Of these varieties or breeding lines grown for two or three seasons during 1968 - 1970 the following ranking, from highest to lowest was established: Lenape, Shurchip, Katahdin, Norchip, Superior, Monona, Platte, N.Y. 30, Peconic, La chipper and Alamo.

Lenape was a promising new variety from the standpoint of yield potential, very high specific gravity and acceptable chip color when grown on muck and mineral soils. Unfortunately, it had to be withdrawn from production because of the very high glycoalkaloid content in the tubers.

Surchip and N.Y. 30 look promising from the standpoint of yield potential on muck soil. However, Shurchip has a very short tuber dormancy which needs to be controlled and N. Y. 30 might be withdrawn because of internal defects.

Iopride, which was grown only in 1970, appears to be a promising new variety for muck soil, as well as mineral soil, from the viewpoint of yield potential and tuber quality. Further testing of this variety is underway.

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TABLE 6.--Varietal Quality After Five Months Storage at 45° F and 85-90% Relative Humidity. Varieties were harvested on September 28, kept at room temperature for 2 weeks and then put into storage on October 12.

| Variety | Sp. Gr. 9/29 | Sp. Gr. 3/12 | % Wt. Loss | Sprout Wt. Per Tuber (mgms) | % Intern. Break | % Intern. Sprout |
|---|---|---|---|---|---|---|
| Alamo | 1.057 | 1.065 | 3.9 | 125 | 0.0 | 0.0 |
| Iopride | 1.060 | 1.069 | 5.9 | 792 | 0.0 | 0.0 |
| Katahdin | 1.061 | 1.067 | 2.7 | 1.909 | 4.5 | 0.0 |
| MS 709 | 1.056 | 1.065 | 6.9 | 423 | 0.0 | 0.0 |
| Monona | 1.060 | 1.067 | 6.5 | 1.583 | 0.0 | 0.0 |
| N.Y. 30 | 1.061 | 1.069 | 6.8 | 920 | 12.0 | 0.0 |
| Norchip | 1.061 | 1.070 | 8.0 | 1,964 | 0.0 | 35.7 |
| Shurchip | 1.059 | 1.067 | 6.1 | 1,920 | 4.0 | 0.0 |
| Superior | 1.066 | 1.074 | 5.4 | 1,360 | 4.0 | 0.0 |
| Wauseon | 1.064 | 1.070 | 5.3 | 833 | 4.2 | 0.0 |

Monona, while it chipped well off of muck soil, produced very poor yields in all three trial years. MS 709, tested only in 1970, was very late, producing a very low yield with small U.S. #1, A-Size tibers and many B-Size tubers. This new line is probably too late and too low in yield for suitable production in muck soil.

In the 1970 Storage Test, Norchip had a 35.7% incidence of internal sprouting. This defect is serious and if it can not be controlled then Norchip should be dropped from commercial production where storage is necessary.

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