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College of Agriculture

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of
POTATO VARIETIES
IN IDAHO

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Evaluation of Potato Varieties in Idaho

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IN the past—when most Idaho potatoes were sold on the fresh market—the Russet Burbank was the only variety that competed favorably with varieties grown in other states. Because of its high quality and attractive appearance, this potato presently accounts for over 90 percent of Idaho's potato production.

With the vast expansion of the processing industry in the last decade and the increased potato acreage, appreciable production of another variety or varieties is possible. At present over 50 percent of Idaho's total production is being processed. Of this 50 percent, Russet Burbank is the predominant variety. Although the Russet Burbank is a good processing potato, it has some inherent weaknesses of concern to the industry. First, it is a poor yielder compared to other varieties Idaho farmers could grow. Second, it is so susceptible to *Verticillium* wilt—commonly known as “early dying”—that some areas have been forced to limit production. Third, the Russet Burbank is sensitive in its response to environmental conditions and is thus a difficult potato to grow.

Desirable Characteristics of a Potato for Production in Idaho

Listed below are the more important variety characteristics desired by Idaho's potato industry:

- (a) Long, smooth russet type similar to the Russet Burbank.
- (b) Resistance to Verticillium wilt, leafroll virus, Rhizoctonia, eumartii wilt, early blight, and scab.
- (c) Reasonably high dry-matter content.
- (d) High yields in sacks per acre as well as in percentage of No. 1's.
- (e) Narrow range of specific-gravity and size distribution.
- (f) Ability to withstand adverse environmental conditions without producing a large number of malformed tubers.
- (g) Ability to store well for extended periods without sprouting, rotting, or excessive shrinkage.
- (h) Possess small amounts of reducing sugars.
- (i) Ability to withstand reasonable amounts of rough handling.

These qualities are highly desirable both for the fresh market and the processing potato. Although the long russet appearance does not necessarily enhance the processing ability, it is desirable to be able to ship on the more economically feasible market—either fresh or process.

Results of Variety Trials From 1950-1961 at Aberdeen

Many varieties have been tested in the past 10 years for their adaptability to Idaho growing conditions. The number of years in testing and the average performance for the varieties are shown in Table 1. Data on varieties tested less than 3 years may or may not be indicative of performance ability. Numbered varieties with the prefix A are seedlings from the U.S.D.A. Western Regional Potato Breeding Program at Aberdeen. The varieties are arranged in Table 1 from the highest average yield per acre to the lowest.

Yields, Specific Gravity, and Specific-Gravity Distribution

Average yield for Russet Burbank from 1950 to 1961 was 235 hundredweight per acre with 55 percent No. 1's and a specific gravity of 1.0861. This is poor performance in comparison to some of the other varieties. Menominee, tested 7 years, averaged 293

hundredweight per acre with 72 percent No. 1's and a specific gravity of 1.0912. Other varieties tested 3 years or more and which had an overall performance better than Russet Burbank are Green Mountain, CS6330, A175-7, Kennebec, Cayuga, and Mohawk. Although White Rose yielded quite well, it had a low percentage of No. 1's and low specific gravity. A170-9, tested 5 years, had good dry-matter content but it had a tendency to produce rough tubers and a resulting low percentage of No. 1's. Russet Rural tested 1 year had the highest yield and a high specific gravity. Ontario, A183-8, Blanca, A180-26, and Russet Sebago were also tested less than 3 years. Each yielded slightly less than Russet Burbank but produced higher percentages of No. 1's and dry matter.

Figure 1 gives the specific gravity distributions of varieties grown in 1959 and 1960. These ranges were determined by separations in solutions of various salt contents. A narrow distribution range is desirable in processing because uniformity of a processed product depends on uniformity of the raw product. In 1959 the tubers were divided into six classes, whereas, in 1960 five classes were used. From appearance of the histograms, Blanca seems to have a relatively wide range of dry matter. This was true both for 1959 and 1960 seasons. Kennebec had a much wider range of specific gravity in 1959 and 1960. Menominee appears to have one of the more desirable distributions as did seedling A175-7, Russet Burbank's equal. Early Gem had a high percentage of tubers with a specific gravity below 1.075 for both years of the test. Means for each variety are listed at the bottom of the figure. On the whole, the means for 1960 were considerably lower than for 1959. For some unexplained reason, the average specific gravity for Kennebec dropped considerably in 1960.

Table 2 shows performance of varieties at two locations — Parma¹ and Aberdeen. Parma is in western Idaho where the growing season is much longer and summer temperatures average about 7° F. higher than at Aberdeen. Data in Table 2 show that performance varied widely from year to year and according to location. Menominee was consistently the highest yielder regardless of location or season. On the average, higher yields as well as higher specific gravities were obtained at Parma.

Disease Resistance

As stated before, Russet Burbank's susceptibility to Verticillium wilt has caused growers in some areas to limit its production. Average yield was too low principally because of the disease. The predominant symptom is premature dying of foliage. Of varieties tested in Idaho, Menominee had the highest degree of resistance,

¹ Acknowledgement is made of the Parma Branch Experiment Station's cooperation in these tests, and of help given by E. T. Bullard, Roger Sandsted, and R. F. Foley in obtaining valuable data from the Parma plots.

Table 1.—Performance of varieties tested at Aberdeen from 1950 to 1961.

Variety	No. of Years Tested	Ave. Total Yield	Ave. Percent No. 1's	Ave. Specific Gravity
		Sks/A		
Russet Rural	1	311	76	1.0959
Green Mountain	3	309	59	1.0857
ND179-25	1	301	49	1.0714
*A120-5	1	295	29	1.0870
Menominee	7	293	72	1.0912
White Rose	5	287	51	1.0803
CS6330	3	274	80	1.0837
A175-7	4	273	79	1.0834
Progress	3	267	57	1.0809
Kennebec	4	266	68	1.0852
Cayuga	4	260	79	1.0951
**Maine Red	1	254	74	1.0817
Mohawk	3	245	66	1.0920
A180-24	2	238	60	1.0795
A170-9	5	237	51	1.0865
Bliss Triumph	2	236	69	1.0723
A223-21	2	235	69	1.0815
Early Gem	7	235	63	1.0723
Russet Burbank	10	235	55	1.0861
Pontiac	1	229	88	1.0754
A183-8	1	229	79	1.0890
Ontario	2	223	79	1.0868
Blanca	2	221	67	1.0875
A180-26	3	213	79	1.0890
Russet Sebago	1	208	78	1.0904
A177-54	2	202	42	1.0887
Red Warba	1	196	27	1.0790
Yampa	2	189	74	1.0876
Irish Cobbler	1	185	80	1.0845
Navajo	1	184	72	1.0868
Plymouth	1	144	70	1.0851
A183-11	1	143	73	1.0900
Merrimac	1	130	65	1.0868

* Numbers with prefix A indicate seedlings from breeding program at Aberdeen.

**A seedling received from Maine as Maine Red.

with Seedling A175-7 nearly as good. Although accurate data were not kept on all varieties, Russet Rural, Blanca, A170-9, and Cayuga showed moderate resistance. (Table 3)

Most varieties are susceptible to leafroll, although the degree of susceptibility as well as the expression of symptoms may vary. White Rose and Kennebec seem to have some resistance.

Varieties with a moderate to high degree of resistance to scab are Menominee, Cayuga, Early Gem, Russet Burbank, A-175-7, and A170-9. Blanca, Russet Rural, and White Rose have moderate