

# AG FACTS

## Selecting Potato Varieties for Michigan

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Proper variety selection is essential to a high quality potato crop for commercial production as well as home gardens. The variety must be well adapted to the soil, cultural conditions and acceptable for the chosen market outlet.

Extensive potato variety performance trials are conducted each year at the Montcalm Research Station, and mini-commercial trials are conducted in several counties on cooperating commercial farms. New varieties and seedlings are obtained from several U.S. and Canadian potato breeding programs. These are grown to provide performance data, quality characteristics and adaptability of new varieties for Michigan growers.

Due to the wide diversity of market use of potatoes, both in-state and out-of-state, it is difficult to make specific recommendations. Market use for potatoes is becoming more specific, and many contract agreements specify the variety to be grown. The tables and information in this publication provide observations on several potato varieties tested in Michigan to assist commercial producers and home gardeners in variety selection.

Table 1 provides general information as to the relationship between specific gravity, dry matter, texture and the best use of potatoes within these parameters.

### Varieties Released Since 1976

Table 2 provides tuber type, maturity and general observations on the potato varieties released since 1976. Not all have been tested in Michigan performance trials, thus some data is not available. In some

**Table 1.** The relationship between specific gravity, dry matter, texture and use of potatoes.

Specific Gravity	Percent Total Solids	Texture	Best Use
Below 1.060 (very low)	less than 15.4	very soggy	good pan friers, salads, good for canned processing.
1.061-1.070 (low)	15.6-17.5	soggy	good pan friers, salads, boilers, good for canned processing.
1.071-1.080 (medium)	17.7-19.7	waxy	good boilers, mashers, fair to good for chip processing, fair for canned processing.
1.081-1.090 (high)	19.9-21.8	mealy, dry	good bakers, chippers, French fries. Some varieties tend to slough when boiled.
above 1.090 (very high)	over 22.0	very mealy or dry	good bakers, French fries, chips. Greater tendency for brittle chips and sloughing when boiled.

cases, official variety release information has not been published.

### Yield Performance

Table 3 summarizes the yield results of several varieties included in irrigated, dates-of-harvest studies conducted annually since 1980 at the Montcalm Research Farm. Each variety is replicated four times in each planting and all plantings are made on the same day between May 5 and 10. Plots are 23 feet long and seed spacing is 12 inches in rows 34 inches apart. Uniform fertilizer at planting and subsequent sidedress is applied after planting to all plots at approximately 200 lbs N/A, 50 lbs P<sub>2</sub>O<sub>5</sub>/A and 225 lbs K<sub>2</sub>O/A. Harvests are made in early August, late August and late September (90-95, 110-115 and 130-135 days from planting).

After harvest, the samples are graded into 4 categories: under 2 inches, 2-3¼ inches, over 3¼

inches (10 ounce for long tuber varieties) and pick-outs (tubers with external growth defects such as knobs, growth cracks and misshapen). Samples are also collected to determine specific gravity using the ratio of weight in air vs. weight in water and to evaluate internal defects such as vascular discoloration, hollow heart and internal necrosis.

From the data in Table 3, marketable yield can be determined. By evaluating the change in yield and specific gravity for a given variety between the three harvest dates, the optimum yield time can be determined. Optimum yield is usually not the same as the maximum yield but is important for potato use.

Often, factors other than yield must be considered in determining optimum maturity. For example, the Onaway, has a 55 cwt/A increase in yield of U.S. No. 1 potatoes from early to mid-season

harvest and is still classed as an early variety because it sets tubers and develops size early. If harvest is delayed, even though an additional hundredweight may be added, the tubers become excessively large (over 3¼ inch) and tend to be misshapen and undesirable for a U.S. No. 1 fresh-pack. Similarly, although the Russet Burbank did not add yield between the mid-season and late harvest, it is still considered as late maturing. Under normal, high fertility, commercial management, it usually continues to increase tuber size and yields into late September.

## Seedling Performance

Table 3 contains yield and quality performance of several seedlings and varieties. The seedlings with MS prefixes are from crosses in the MSU potato breeding program made in 1978. Their potential for release has yet to be determined. Following is a brief description of each.

**MS700-79** is a cross between Atlantic and Michibonne. It has smooth round white tubers with medium specific gravity and mid-season maturity. It is being evaluated for fresh market and has exhibited resistance to scab.

**MS700-83** is a cross between Atlantic and Michibonne. It has smooth round white tubers with a bright general appearance. It yields above average, has good fresh market potential, chips out of the field and is suited for short term chip storage at 50°. It has minimal internal defects and moderate resistance to scab.

**MS702-80** is a cross between Atlantic and Wischip. It has round white tubers with medium deep eyes, average yields, good resistance to scab and is a good chipper.

**MS702-91** is a cross between Atlantic and Wischip. Its tubers

are oblong and sometimes have a tendency to be pear shaped. It also has above average yield, some scab tolerance and medium specific gravity. Its greatest potential is for chips.

**MS704-10(y)** is a yellow fleshed seedling derived from a cross between Atlantic and Wischip. The tubers are round to blocky, somewhat flattened and have a light netting. Because it tends to set many tubers, the production of tubers over 3¼ inch is minimal. It has uniform yellow flesh color and good potential for fresh market and chips. It has a medium-high specific gravity.

**MS716-15** is a cross between MS3-22 and Atlantic. It has very smooth round white tubers with shallow eyes, high specific gravity and a very attractive general appearance.

## Characteristics of the Commonly Grown Varieties

Table 4 summarizes the culinary quality of the more common potato varieties grown in Michigan. The most popular varieties are Russet Burbank, Onaway, Monona, Norchip, Superior, Atlantic, Sebago, Katahdin and Ontario. Most are produced in the Michigan seed potato certification program and are available as tagged Certified seed for commercial and home garden use. The ones most suitable for home gardeners are Katahdin, Norland, Onaway, Sebago and Superior. Other garden varieties commonly grown are Red Pontiac and Kennebec. Russet Burbank is also grown, but should be grown only on soils which are well drained sandy loams or loamy sands. If the soil is allowed to become too dry, or fine textured and poorly drained, it will produce a high percentage of knobby and off-type tubers. Thus

**Table 2.** Potato variety releases (1976-85) and their characteristics observed in Michigan trials.

Variety	Year Released	Agency	Tuber Type <sup>1</sup> shape-skin	Maturity	DM	Disease <sup>2</sup> Resistance/Susceptibility	Best Market Use	Remarks <sup>2</sup>
Acadia Russet	1981	Ag. Canada-NB	obl-lgt rus	late	med-low	Mod. res. to Fusarium solani. Some res. to Phoma. Susc. to VW, CS, LB, PVLR, PVY, PVX, PVS.	Fresh	Some HH noted. Limited studies. Susc. to CS.
Alasclear	1981	USDA-Alaska	obl-wh	late	med	Res. to CS.	Fresh	Early blight has occurred on tubers in storage. Tuber shape is not uniform. Res. to
Allagash Russet	1980	Maine	rd-rus	med-early	low	Mod. res. to CS, NN. Susc. to PVX, GN, VW, EB, LB.	Fresh	Yields have been low with inadequate tuber sizing.
Atlant	1978	USDA-Beltsville	rd-wh	med-late		Res. to bacterial pink eye, LB, GN, VW. Immune to PVX, NN.	Chips	Has range of market maturity; susc. to HH, heat necrosis. Susc. to bruising and CS. Sensitive to metrabuzin.
Belchip	1979	USDA-Beltsville	rd-wh	late	med	Immune to PVA, PVX, NN. Res. to LB.	Chips	Tubers somewhat flattened.
BelRus	1978	USDA-Beltsville	lg-rus	med-early	med	Immune to PVA, NN. Res. to Northern root rot nematode and bacterial pink eye.	Fresh	Tubers very susc. to EB. Below average yields. High percentage U.S. No. 1's.
Campbell 14	1985	Maine and Campbell Institute	rd-wh	med-late	med	Res. to VW, NN.	Fresh	Not evaluated in MI.
Carlton	1982	Ag. Canada-Manitoba	oval-wh	late	low	None reported.	Fresh	Susc. to CS.
Chipbelle	1981	USDA-Beltsville	obl-wh	late	v. high	Res. to PVX, NN, LB, GN.	Chips	Sensitive to metrabuzin. Susc. to bruising and CS.
Conestoga	1982	Ag. Canada-Ontario	rd-wh	early	med	Mod. res. to PVLR, NN, EB, CS. Mod. susc. to mild and rugose mosaic.	Fresh and chips from field.	Deep eyes and susc. to CS.
Crystal	1980	North Dakota	rd-wh	med-late	med	Res. to PVX. Susc. to bacterial pink eye.	Fresh and chips.	Susc. to CS. Bright tuber appearance but thin skin and may be vulnerable to storage breakdown.
Dakchip	1980	North Dakota	rd-wh	med	med-low	Mod. res. to LB.	Chips	Sev. vascular discoloration.
Denali	1978	USDA-Alaska	rd-wh	late	v. high	Tolerance to frost and heat.	Chips	Susc. to CS and bruising.
Elba	1985	New York	rd-wh	v. late	med	Res. to GN, foliar LB, EB, VW.	Fresh	Not evaluated in MI.
Erik	1983	Minnesota	bl-red	med	low	Res. to CS, LB, VW.	Fresh	Not evaluated in MI.
GoldRus	1984	USDA-Beltsville	obl-rus	med	med	Not reported.	Fresh	Low yields.
Hampton	1985	New York	rd-wh	v. late	med	Res. to GN, VW. Susc. to CS, LB.	Fresh	Not evaluated in MI.
Highlat Russet	1980	USDA-Alaska	obl-rus	late	med	Not reported.	Fresh	Not evaluated in MI.
Islander	1984	Maine	obl-wh	med-late	high	Res. to GN, NN. Mod. res. to CS, EB.	Fresh and chips from field.	Below average yields and some scab tolerance.
Jemseg	1978	Ag. Canada-NB	rd-wh	early	med	Immune to PVX. High res. to PVY, PVS. Mod. res. to CS.	Fresh and chips from field.	Sets light, but sizes tubers early.
Krantz	1985	Minnesota-Texas	lg-rus	late	med	High res. to CS, LB. Susc. to EB, PVX, PVS.	Fresh and frozen processing.	Not evaluated in MI.
Langlade	1985	Wisconsin	rd-wh	late	low	Res. to CS.	Fresh	HH in large tubers.
Lemhi Russet	1980	USDA-Idaho	lg-rus	med-late	med-high	Res. to CS, NN.	Fresh and frozen processing.	Tubers very susc. to HH, black-spot and bruising. Res. to CS.
Maverick	1985	Maine	obl-lgt rus	med-late	low	Immune to PVX, LB, NN.	Fresh	Tubers susc. to HH, growth crack and knobs.
NemaRus	1985	USDA-Beltsville	lg-rus	med-early	med	Res. to GN, PVX, LB. High tol. to CS.	Fresh	Low yields and res. to CS.
NorKing Russet	1985	North Dakota	lg-rus	med-late	med-high	None reported.	Fresh and frozen processing.	Good tuber type, high percent No. 1's.

Oceania	1981	USDA-Beltsville	rd-wh	early	low	Not reported.	Fresh	Average yields.
Pennrose	1981	Pennsylvania	rd-red	—	—	Not reported.	Fresh	Not evaluated in MI.
Reddale	1984	Minnesota	rd-red	med	low	Res. to CS, LB.	Fresh	Not evaluated in MI.
Redsen	1984	North Dakota	rd-red	med-early	med-low	Res. to LB. Mod. res. to silver scurf, CS.	Fresh	Not evaluated in MI.
Rideau	1979	Ag. Canada-Ontario	rd-red	late	med	Res. to VW. Mod. res. to CS.	Fresh	Good yields and good red color. Slow early growth.
Rhinered	1981	Wisconsin	rd-red	—	—	Not reported.	Fresh	Not evaluated in MI.
Rosa	1980	New York	rd-wh	v. late	med-high	Res. to GN, EB. Some field res. to LB.	Chips	Tubers have red blotches on white skin. Late maturity could produce tubers subject to storage decay. Sets heavy and susc. to CS.
Russette	1981	USDA-Beltsville	obl-rus	late	med	Immune to PVA, NN. Highly res. to VW, bacterial pink eye.	Fresh	Susc. to HH, CS, growth crack.
Sangre	1982	Colorado and USDA	oval-red	med	low	Res. to NN. Susc. to EB, LB, VW.	Fresh	Not evaluated in MI.
Shepody	1980	Ag. Canada-NB	lg-wh	med-late	med	Mod. res. to Rhizoctonia, Fusarium, Phoma. Susc. to PVLR, PVX, PVY, LB.	Fresh and frozen processing.	Makes excellent French fries. Susc. to CS.
Simcoe	1981	Ag. Canada-Ontario	rd-wh	med-early	med-high	Res. to mild mosaic, LB, NN.	Fresh and chips.	Good chip color and susc. to CS.
Sunrise	1985	Maine and Campbell Institute	obl-wh	early	med	Res. to GN, PVX, NN.	Fresh	Not evaluated in MI.
Tolaas	1984	Minnesota	lg-wh	med	med	Res. to CS.	Fresh and frozen processing.	Not evaluated in MI.
Yankee Chipper	1983	Maine	obl-wh	med-late	med-high	Res. to GN, PVX, NN.	Fresh and chips.	Average yields and susc. to CS.
Yankee Supreme	1983	Maine	obl-wh	med-late		Res. to PVX, NN	Fresh	Susc. to CS. Tubers have light netting.
Yukon Gold	1980	Ag. Canada-Ontario	obl-golden flesh	med-early	med	Res. to mild mosaic. Susc. to PVY, PVLR.	Fresh	Tubers have yellow flesh and pinkish eyes. Susc. to CS.

<sup>1</sup>obl = oblong; rd = round; lg = long; bl = blocky; lgt = light; rus = russet; wh = white.

<sup>2</sup>mod. res. = moderate resistance; susc. = susceptible; VW = verticillium wilt; CS = common scab; EB = early blight; LB = late blight; PVLR = potato virus leaf roll; PVA = potato virus A; PVX = potato virus X; PVS = potato virus S; PVY = potato virus Y; NN = net necrosis; GN = golden nematode; HH = hollow heart.

**Table 3.** The average yields and specific gravity of several varieties grown in the Dates-of-Harvest Study<sup>1</sup> at the Montcalm Research Farm (1980-85).

Variety	Years Tested	Early Harvest (90-95 days)				Mid Season Harvest (110-115 days)				Late Harvest (130-135 days)			
		cwt/A		% No. 1	Specific Gravity	cwt/A		% No. 1	Specific Gravity	cwt/A		% No. 1	Specific Gravity
		Total	No. 1			Total	No. 1			Total	No. 1		
Allagash Russet	2	272	218	80	1.066	282	238	84	1.064	294	247	84	1.064
Atlantic	6	366	265	72	1.089	463	416	89	1.090	473	431	91	1.090
Belchip	2	326	298	91	1.078	423	392	92	1.077	449	409	91	1.080
Chipbelle	4	345	297	86	1.093	427	384	89	1.095	464	414	89	1.096
Conestoga	2	286	238	83	1.077	314	264	84	1.075	297	253	85	1.075
Crystal	3	449	386	85	1.072	538	481	89	1.073	532	476	89	1.075
Dakchip	2	370	317	85	1.074	408	371	90	1.072	412	353	85	1.068
Denali	2	330	290	87	1.088	435	399	91	1.090	486	441	90	1.090
GoldRus	2	297	208	70	1.077	290	204	70	1.078	285	181	63	1.078
Islander	2	305	240	78	1.079	416	345	82	1.081	384	322	83	1.083
Jemseg	3	307	280	91	1.073	336	313	93	1.072	318	288	90	1.072
Lemhi Russet	3	401	349	87	1.082	520	453	87	1.085	561	495	88	1.082
Monona	4	321	281	87	1.069	368	339	92	1.069	390	358	91	1.069
Onaway	6	440	404	91	1.067	493	459	93	1.067	490	460	93	1.066
Pioneer (red)	2	424	371	87	1.074	465	427	91	1.072	503	458	91	1.072
Rideau (red)	3	341	314	92	1.074	460	440	95	1.077	456	429	94	1.078
Rosa	1	500	446	89	1.081	619	557	89	1.083	590	524	88	1.079
Russet Burbank	6	300	205	68	1.076	456	324	71	1.081	458	303	66	1.080
Russette	2	317	287	90	1.077	344	324	94	1.077	422	391	92	1.076
Shepody	4	286	239	83	1.079	468	386	82	1.083	479	372	77	1.082
Simcoe	2	260	236	90	1.082	343	313	91	1.086	335	317	94	1.081
Superior	3	303	268	88	1.073	329	303	92	1.071	342	304	88	1.073
Yankee Chipper	2	355	280	78	1.081	434	352	81	1.083	405	336	83	1.081
Yankee Supreme	2	369	326	88	1.084	384	338	88	1.080	386	346	89	1.079
Yukon Gold (y)	5	339	303	89	1.078	383	354	92	1.079	395	364	92	1.077
MS700-79	3	261	231	88	1.083	366	340	92	1.084	347	323	93	1.082
MS700-83	3	341	284	83	1.077	488	429	87	1.079	468	419	89	1.078
MS702-80	3	268	214	79	1.076	379	337	88	1.076	357	319	89	1.076
MS702-91	3	337	279	82	1.078	448	403	89	1.080	525	484	92	1.079
MS704-10 (y)	3	333	265	79	1.086	431	376	87	1.085	409	356	87	1.083
MS716-15	3	280	225	80	1.090	366	317	86	1.090	394	346	87	1.088

<sup>1</sup>Replicated plots are planted in early May and blocks are harvested on 3 different dates to determine marketable maturity. U.S. No. 1 (cwt/A and percent) do not include tubers under 2" diameter or pick-outs with external growth defects.

it requires a constant supply, but not a surplus, of adequate soil moisture.

Home gardeners should purchase and use new Certified seed each year. Saving tubers from year to year will eventually result in lower yields and small tubers due to seed borne virus diseases. Do not use potatoes sold for table use as seed because they are often treated with a sprout inhibitor.

Following are brief descriptions of popular varieties grown in Michigan:

**Katahdin** — Released in 1932 by the USDA. It is late maturing, round white tuber for the fresh market and is susceptible to scab.

**Monona** — Released in 1964 by Frito-Lay and USDA. It is used primarily for potato chips. It is a late maturing round white variety with medium deep eyes and is susceptible to blackleg.

**Norchip** — Released in 1968 by North Dakota. It is a medium-late, round white variety used

primarily for chip processing. It sets a high number of tubers per plant so it is usually planted at a wider spacing. It has some scab resistance.

**Norgold Russet** — Released in 1964 by North Dakota. It has oblong, russet tubers, medium maturity and some scab resistance. It is used for fresh market and count packs. It is susceptible to hollow heart and blackleg and has lower specific gravity than Russet Burbank.

**Table 4.** The culinary quality of several of the more commonly grown potato varieties in Michigan.

Variety	Type Tuber	Culinary Use					Total Solids
		Baked	Boiled	Mashed	French Fry	Chips	
Atlantic	Round White	excellent	good	good	fair	excellent	high
Chipbelle	Oblong White	excellent	good	good	fair	excellent	very high
Denali	Oblong White	excellent	good	good	fair	excellent	very high
Katahdin	Round White	good	good	good	fair	good	medium
Monona	Round White	fair	very good	very good	fair	excellent	low
Norchip	Round White	very good	good	good	good	excellent	med-high
Norgold Russet	Long Russet	good	very good	very good	fair	poor	medium
Norland	Round Red	fair	excellent	excellent	fair	poor	low
Onaway	Round White	fair	very good	very good	fair	poor	low
Ontario	Round White	good	good	good	fair	poor	medium
Rideau	Round Red	very good	excellent	excellent	fair	fair	medium
Russet Burbank	Long Russet	excellent	good	good	excellent	fair	med-high
Sebago	Round White	very good	excellent	excellent	good	good	medium
Shepody	Long White	excellent	very good	very good	excellent	fair	med-high
Superior	Round White	very good	very good	very good	good	good	medium
Yukon Gold	Oblong-Golden Flesh	excellent	excellent	excellent	good	fair	med-high

**Norland** — Released in 1957 by North Dakota. Norland has a smooth, early maturing tuber with shallow eyes and a red skin. It tends to lose its bright red color after maturity. It has some scab tolerance.

**Onaway** — Released in 1961 by Michigan and USDA. It is an early maturing, round white with medium deep eyes. Its best use is for fresh market out-of-the-field, and is not recommended for storage since the tubers are very susceptible to early blight. It has some scab resistance.

**Ontario** — Released in 1946 by USDA and New York. Ontario is a very late maturing, round white variety which produces a high percentage of U.S. No. 1 potatoes. It is best used for fresh market out of early storage

because it has some tendency to after-cooking-darkening with extended storage. It may develop heat sprouts in some seasons. It is scab resistant.

**Russet Burbank** — Released approximately 1890, it is the most popular variety grown in the U.S. and in Michigan. It is a late maturing, long russet tuber used primarily for fresh market, count-packs, frozen and dehydrated processing. It has some scab resistance, but is susceptible to most other diseases. It requires a uniform supply of soil moisture to avoid knobby and misshapen tubers.

**Red Pontiac** — Released in 1949 by North Dakota and Minnesota. It is not grown commercially in Michigan but is used in home

gardens. It produces oblong, red skin tubers with deep eyes and is susceptible to scab. It produces high yields with many large tubers.

**Sebago** — Released in 1938 by USDA. Sebago is a very late maturing variety used for fresh market out of storage. The tubers are smooth, oblong and have a white skin with shallow eyes.

**Superior** — Released in 1961 by Wisconsin. It is an early maturing, round white variety. The tubers have a netting, are well shaped, attractive and have a high percentage of the U.S. No. 1 grade. Superior is used primarily for fresh market with some use for chips from the field. It has scab resistance.

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