Chapter 3
Variety Selection and Management

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Introduction

Selecting a potato variety to grow and successfully market has become more complex in recent years, as the number and range of market types and acceptable attributes has greatly increased. Changing consumer preferences have also been a significant driving force behind this change, resulting in a much more colorful market produce section than in the past. Descriptions are provided for some of the major

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J. C. Stark et al. (eds.), *Potato Production Systems*,
https://doi.org/10.1007/978-3-030-39157-7_3

varieties grown in North America, along with their morphological and agronomic characteristics, incentives for production, strengths and weaknesses, and key management considerations. Although variety acceptance in the marketplace is a dynamic process, many of these varieties have remained and will likely remain in commerce for years to come.

The Purpose of Potato Variety Development

To remain competitive, potato production efficiency must improve to offset increasing transportation and finishing costs. Improvement and sustainability of potato production systems depend greatly on the introduction of new varieties, because the dominant varieties, such as Russet Burbank, Russet Norkotah, Red Norland, and Yukon Gold, have significant production and quality limitations and are currently being grown at near peak efficiency.

Variety development offers the most effective approach for addressing issues of food supply, nutrition, and impact of agriculture on the environment. With current or even reduced levels of management, new varieties can offer improved yields, processing quality, and disease and pest resistance, while reducing the demand for fertilizer and water resources.

In recognition of this fact, cooperative potato breeding and cultivar improvement programs have received public support in the U.S. since the late 1920s when, through legislative action, a national potato breeding program was developed. There are many regional and state potato improvement programs currently operating in the U.S. Working together, the United States Department of Agriculture-Agricultural Research Service (USDA-ARS) and state experiment stations focus on potato cultivar improvements needed for specific production areas across the U.S.

Since the introduction of new russet varieties and processing methods in the early 1990s, the historical choice to grow only a select few varieties has begun to change. Markets have been established for many other types of potatoes, and growers can now make the choice to include multiple varieties in their operations.

Specialty potato cultivars with red, yellow, purple, and multi-colored skin and/or flesh combinations occupy a small, but increasingly important, market niche. These potatoes have strong consumer appeal due to their unique combinations of color, shape, culinary quality, and nutrient content.

Many characteristics must be considered when choosing a variety. Market acceptance and economic advantage are still the major factors growers consider when choosing a variety; however, yield, quality, pest resistance, and adaptability to local growing conditions are also key considerations.

If the market will accept a new variety, the opportunity for inclusion in a grower's operation is available, but many additional factors become important to the decision-making process. Each variety has characteristics that present distinct strengths and weaknesses. Factors to be considered include: (1) yield potential in the area of intended production, (2) conformity to market specifications that will

result in price incentives, and (3) resistance to common, as well as region-specific, defects, diseases, pests, and stress-related problems. Defining these characteristics is critical so that an informed decision can be made regarding the cost-effectiveness of producing a variety.

At least three essential criteria must be met in selecting a variety to grow:

- The intended market place exists and will accept the variety. A contract should preferably be in hand until wide acceptance is achieved.
- The variety will perform as intended. It is a wise practice to conduct initial testing on limited acreage in the first few years to avoid costly surprises.
- Sufficient information is available on managing the new variety. The full potential of a new variety may not be realized unless cultivar-specific management practices are implemented.

Potato Market Classes

Potato market classes have little basis in genetics, meaning they have a historical rather than scientific basis. There is no practical reason that a good french fry processing variety cannot have red skin, a good boiling potato cannot have russet skin and long shape, or that the ideal baker cannot be round with white skin.

Table 3.1 Characteristics of some commonly grown potato varieties in North America

Variety	Maturity	Tuber characteristics	Primary usage
Alturas	Very late	Lightly russeted, oblong	Processing
Atlantic	Medium	White (buff), light netting, round	Chips
Blazer Russet	Early-mid	Russet, oblong	Fresh, french fries
Chieftain	Medium	Medium red, oblong-round	Fresh
Clearwater Russet	Medium-late	Russet-oblong	Frozen processing
Dakota Pearl	Medium	White, round	Chips, fresh
Goldrush	Medium	Russet, oblong/blocky	Fresh
Norland	Early	Medium to dark red, round	Fresh
Ranger Russet	Medium-late	Russet, long	Frozen processing
Red LaSoda	Medium	Light red (pink), oblong	Fresh
Russet Burbank	Late	Russet, long	Fresh, frozen processing
Russet Norkotah	Early	Russet, long	Fresh
Shepody	Early-medium	White, long	Frozen processing
Snowden	Medium-late	White, round	Chips
Teton Russet	Early	Russet, oblong-long	Fresh, frozen processing
Umatilla Russet	Late	Russet, long	Frozen processing
Yukon Gem	Medium	Yellow, round-oval	Fresh
Yukon Gold	Medium	Yellow skin and flesh, oval	Fresh

Note: This publication does not provide all available information on the characteristics and management requirements for the varieties. However, it does review practices that are known, unique, and critical to attain successful production of each variety

In North America, historical regional preferences for certain potato varieties, combined with local culinary practices, led to the development of performance expectations based on tuber appearance. The consumer expects red potatoes to be round, first to market, and have good boiling quality. Russet potatoes are expected to have a long shape and make good baked potatoes and french fries. Round, white potatoes are expected to either make good potato chips or to boil well, but not necessarily both.

Long russets, round whites, and reds make up most of the North American potato market, although other specialty potatoes are making significant gains in the fresh potato industry. Current key potato markets and examples of some common varieties sold in those markets (Table 3.1) include the following:

- Russets (dual purpose)—Used for french fries and tablestock. Varieties: Russet Burbank, Blazer Russet, Teton Russet.
- Russets (processing)—Used for french fry processing. Varieties: Russet Burbank, Ranger Russet, Umatilla Russet, Clearwater Russet.
- Russets (fresh market)—Used for tablestock (mostly baking). Varieties: Russet Norkotah, Goldrush.
- Long whites (processing)—Used mostly for french fries and dehydration processing. Varieties: Alturas, Shepody.
- Round whites (chipping)—Used for making potato chips. Varieties: Atlantic, Dakota Pearl, Snowden.
- Reds (fresh market)—Used for tablestock (mostly boiling). Varieties: Red Norland/Dark Red Norland, Chieftain, Red LaSoda.
- Specialty potatoes (fresh market)—Used for home preparation of various products. Varieties: Yukon Gold, Yukon Gem (yellow skin and flesh).

Widely Grown, Commercially Available Varieties

Russet Varieties for Fresh Use or French Fry Processing (Figs. 3.1–3.4)

Blazer Russet

General Information

Parentage: A7816–14 x NorKing Russet.

Developers: Northwest (Tri-State) Variety Development Program.

Plant Variety Protection: Northwest Potato Variety Development Program (administered by PVMI).

Morphological Characteristics

Plant: Small to medium-sized, semi-erect vine expressing medium maturity with white flowers.

Tubers: Oblong, with a moderate, tan russet skin and shallow eyes.

Fig. 3.1 Blazer Russet. (Photo credit: Potato Variety Management Institute (PVMI))

Fig. 3.2 Clearwater Russet. (Photo credit: PVMI)

Fig. 3.3 Russet Burbank. (Photo credit: PVMI)

Fig. 3.4 Teton Russet. (Photo credit: PVMI)

Incentives for Production

Blazer Russet is an early to mid-season variety notable for its high U.S. No. 1 yield of medium-russeted tubers and its good processing and culinary qualities. It is very suitable for processing into french fries and other frozen potato products directly from the field or from extended storage, with higher merit than Russet Burbank and Ranger Russet in processing and post-harvest evaluations. Blazer Russet also has high merit for use in the fresh market, with sensory evaluations comparable to those of Russet Burbank.

Agronomic Characteristics

Vine Maturity: Early to mid.

Yield Potential: Typically produces higher total and U.S. No. 1 yields than Russet Norkotah and Shepody for early harvest production. In full-season trials in the western U.S., total yields for Blazer Russet were slightly lower than Ranger Russet and slightly higher than Russet Burbank, but U.S. No. 1 yields were greater than Ranger Russet and Russet Burbank. Blazer Russet also produces a high percentage of U.S. No. 1 tubers, similar to Russet Norkotah.

Specific Gravity: Specific gravities are comparable to Shepody and higher than Russet Norkotah and Russet Burbank, but lower than Ranger Russet.

Culinary Quality: Blazer Russet is suitable for both fresh pack and french fry processing. Fry color was consistently acceptable in comprehensive processing evaluations following long-term storage of tubers obtained from trials conducted in Washington, Idaho, and Oregon. Fry color is light and uniform, with a low incidence of sugar ends. Post-harvest processing ratings for Blazer Russet in the Pacific Northwest have been higher than those for Ranger Russet and Russet Burbank. Blazer Russet has compared favorably to Russet Burbank in both pre- and post-storage sensory evaluations of baked potatoes.

Diseases/Pests/Physiological Disorders: Blazer Russet is resistant to sugar ends, tuber malformations, and most internal and external defects; the exception being its moderate susceptibility to hollow heart. It is resistant to common scab, tuber powdery scab, and potato virus X (PVX), and has moderate resistance to blackspot bruise and tuber late blight infections. It is moderately susceptible to powdery scab root galling, potato virus Y (PVY^{o}), early blight infection of the tuber, Erwinia soft rot, and Fusarium dry rot. Blazer Russet is susceptible to

Verticillium wilt, pink rot, potato leafroll virus (PLRV) net necrosis, corky ringspot, and foliar early and late blight.

Storability: Stores well. Natural tuber dormancy is approximately 40–50 days shorter than for Russet Burbank.

Key Management Considerations

Total seasonal nitrogen (N) requirements for Blazer Russet are about 10% less than Russet Burbank, but a higher proportion should be applied early in the growing season to facilitate earlier tuber development. Nitrogen uptake decreases substantially after August 1, so applications should not be made after that time. Studies in Idaho indicate that petiole nitrate sufficiency levels for Blazer Russet are similar to those for Russet Burbank. Adjust N timing and rate to deplete soil N and allow plant to mature naturally for an early harvest. To reduce shatter bruise, do not overfertilize or over-irrigate late in the season. Allow plants to mature and skins to set for at least 14 days prior to harvest.

Strengths: High early-yield potential, dual-purpose with excellent processing quality and resistance to tuber powdery scab and common scab.

Weaknesses: Verticillium wilt and PLRV susceptibility and moderate hollow heart susceptibility.

Clearwater Russet

General Information

Parentage: Bannock Russet x A89152-4.

Developers: Released in 2008 by the USDA-ARS and the Agricultural Experiment Stations of Idaho, Oregon, and Washington, and represents a variety of the Pacific Northwest Potato Variety (Tri-State) Development Program.

Plant Variety Protection: Pacific Northwest Potato Variety Development Program (administered by PVMI).

Morphological Characteristics

Plant: Medium-sized, semi-erect vine with purple flowers having white tips.

Tubers: Oblong to long, medium russeted, with white flesh and shallow eyes.

Incentives for Production

With high marketable yield and a low incidence of external tuber defects, Clearwater Russet is suitable for fresh or processing use. Cold-sweetening resistant with a low incidence of sugar ends, Clearwater Russet can be stored at 45 °F for up to 250 days and provide acceptable french fries. Clearwater Russet is also notable for its higher tuber protein content.

Agronomic Characteristics

Vine Maturity: Medium-late.

Yield Potential: Total yield comparable to industry standard varieties, with U.S. No. 1 yield being comparable to Ranger Russet and substantially higher than Russet Burbank.

Specific Gravity: Averaging in the mid- to high-80s across western sites.
Culinary Quality: Good sensory ratings for both processed products and for fresh use with sensory ratings of baked potatoes being comparable to Russet Burbank.
Diseases/Pests/Physiological Disorders: Resistant to PVX and tuber late blight infection; moderately resistant to Verticillium wilt and common scab; susceptible to Fusarium dry rot.
Storability: Tuber dormancy is approximately 55–60 days shorter than for Russet Burbank with comparable tuber shrinkage to Russet Burbank. Fresh market storage can be up to 9 months at 42–45 °F in the absence of problematic storage disease development. With its cold-sweetening resistance, Clearwater Russet can be stored at 45–48 °F for optimum processing quality. To minimize dry rot formation in storage, bruising and wounding of tubers should be minimized during harvest and subsequent handling.

Key Management Considerations
With 34–36-in. row spacings, plant seed pieces at 10–11 in. for fresh market potatoes and 12–13 in. for processing potatoes. Smaller tuber size is noted for Clearwater Russet in the Columbia Basin region of the U.S., with the recommendation that 10–12-in. seed spacing be used and the crop be allowed to grow >150 days to ensure adequate tuber size. In Idaho, seasonal N requirements for Clearwater Russet are 25% less than for Russet Burbank, with 1/3–1/2 of the seasonal N recommended to be applied by row closure, and the remainder applied by early August. Tuber skinning and damage during harvest should be minimized as much as feasible to limit the potential for dry rot infection and subsequent development in storage.
Strengths: Attractive tubers and a low incidence of external tuber defects; excellent processing qualities with cold-sweetening resistance and a low incidence of sugar ends.
Weaknesses: Fusarium dry rot susceptibility with internal brown spot being noted as problematic in the southern Columbia Basin.

Russet Burbank

General Information
Parentage: Sport of Burbank Seedling identified in California in 1902. Burbank Seedling was an open pollinated seedling of Early Rose.
Developers: Bred by Luther Burbank in Massachusetts and released in 1876.
Plant Variety Protection: No.

Morphological Characteristics
Plant: Large, spreading vine with sparse white flowers.
Tubers: Long, slightly flattened, with medium russet skin and moderately shallow eyes.

Incentives for Production
Russet Burbank is the industry standard for french fry processing and the russet fresh market. Consequently, it is routinely sold into commodity markets. If man-

aged properly, it produces a high yield of quality potatoes. The tubers store exceptionally well due to long dormancy and moderate resistance to storage rots.

Agronomic Characteristics

Vine Maturity: Late.

Yield Potential: Moderately high.

Specific Gravity: Medium.

Culinary Quality: Excellent for making fried products and baking.

Diseases/Pests/Physiological Disorders: Russet Burbank is very susceptible to net necrosis caused by PLRV, a problem that commonly causes losses in crop value. It is also susceptible to PVX, PVY, Verticillium wilt, foliar late blight, foliar early blight, and Fusarium tuber decay. Russet Burbank is resistant to tuber late blight rot and common scab. This cultivar is susceptible to most tuber quality defects, including hollow heart, blackspot bruise, secondary growth, growth cracks, and sugar ends.

Storability: One of the best attributes of Russet Burbank is its ability to maintain excellent tuber quality for periods of storage up to 11 months. Long dormancy reduces the need for applied sprout inhibitors for tubers stored for packing at relatively cold temperatures.

Key Management Considerations

For 36-in. row spacing, plant seed pieces 11–13 in. apart. Control management-related stresses, such as nutrient or water deficits. Minimize net necrosis by applying an insecticide to control colonizing green peach aphids. Use soil fumigation or incorporation of a green-manure mustard crop in fields with historical problems of early dying or nematodes. Potatoes for processing should be stored at 47–48 °F, and sugars should be monitored for early onset of senescent sweetening.

Strengths: Russet Burbank's most positive attribute is recognition in the marketplace for superior cooking qualities. It also possesses excellent storage characteristics.

Weaknesses: Russet Burbank is a high-input cultivar, making it less economically efficient to produce than many of the newer cultivars. Production requires management of physiological susceptibilities, including environmental stresses that cause tuber defects, such as malformations, hollow heart, brown center, and sugar ends. It is susceptible to net necrosis and early dying and produces a large proportion of undersized tubers.

Teton Russet

General Information

Parentage: Blazer Russet x Classic Russet.

Developers: Released in 2011 by the USDA-ARS and the Agricultural Experiment Stations of Idaho, Oregon, and Washington, and represents a variety of the Pacific Northwest Potato Variety (Tri-State) Development Program.

Plant Variety Protection: Pacific Northwest Potato Variety Development Program (administered by PVMI).

Morphological Characteristics

Plant: Semi-erect, medium-sized vine with white flowers.

Tubers: Oblong-long, with medium russeting of skin, white flesh, and shallow eyes.

Incentives for Production

An early-maturing russet variety with early-harvest marketable yields comparable to or higher than Russet Norkotah. Attractive tubers for fresh pack use and acceptable french fry quality following up to 8 months of storage at 48 °F makes Teton Russet a good dual-purpose variety. Teton Russet is resistant to common scab and Fusarium dry rot and is moderately resistant to tuber net necrosis resulting from PLRV infection. It has higher protein and vitamin C content than most standard varieties.

Agronomic Characteristics

Vine Maturity: Early.

Yield Potential: Medium to high and comparable to Russet Norkotah. Teton Russet produces a high percentage of U.S. No. 1 tubers.

Specific Gravity: In early-harvest trials conducted in the western U.S., specific gravities were in the high 70s, which were comparable to values for Ranger Russet and Russet Burbank; specific gravities tend to be higher for Teton Russet relative to Russet Norkotah.

Culinary Quality: Suitable for both fresh pack and french fry processing from the field and from storage. Fry color is light and uniform, with a low incidence of sugar ends. A formal taste and sensory panel overseen by Washington State University Food Sensory Lab over a 3-year period rated Teton Russet baked potatoes as comparable to Russet Norkotah and Russet Burbank for aroma, flavor, texture, aftertaste, and overall acceptance.

Diseases/Pests/Physiological Disorders: Low incidence of internal and external defects, but growth cracks have been observed when soil moisture levels are allowed to fluctuate and are not uniformly maintained. Resistant to Fusarium dry rot and common scab. Moderately resistant to tuber net necrosis associated with PLRV. Teton Russet is considered susceptible to other potato diseases and shatter bruise.

Storability: Tuber dormancy is approximately 35 days shorter than for Russet Burbank and is comparable to the dormancy of Ranger Russet. For the frozen processing market, it is recommended that Teton Russet tubers be stored at 48 °F to retain the lightest fry color and minimize fry mottling following long-term storage.

Key Management Considerations

Total seasonal N requirements for Teton Russet are approximately 20–30% less than Russet Burbank for the same yield goal. For southern Idaho, About 65% of fertilizer N should be applied by tuber initiation, with the remaining N applied via sprinkler irrigation prior to the last week of July. To promote skin set, N applications should be completed at least 30 days prior to harvest. To reduce shatter bruise, do not over-fertilize or over-irrigate late in the season; reduced irrigation also minimizes lenticel enlargement on tubers. Allow plants to mature and skins to set for at least 10 days prior to harvest.

Strengths: High early-yield potential, dual-purpose with good processing quality and resistance to Fusarium dry rot and common scab. Also good nutritional qualities with higher vitamin C and protein content than standard varieties.

Weaknesses: Growth cracks when wide fluctuations in soil moisture and shatter bruise susceptible.

Russet Varieties for French Fry Processing (Figs. 3.5 & 3.6)

Ranger Russet

General Information

Parentage: Butte x A6395-3.

Developers: Released in 1991 by the USDA-ARS and the Idaho, Oregon, Washington, and Colorado Agricultural Experiment Stations. Experimental designation was A7411-2.

Plant Variety Protection: No.

Morphological Characteristics

Plant: Large, spreading vine with dark lavender flowers.

Tubers: Long, slightly flattened with moderately deep eyes and medium russet skin.

Fig. 3.5 Ranger Russet. (Photo credit: PVMI)

Fig. 3.6 Umatilla Russet. (Photo credit: PVMI)

Incentives for Production

Ranger Russet is a consistent producer of high-quality potatoes that are preferred for french fry production. Yield potential is high for second-early harvest. Ranger Russet is resistant to most physiologically based tuber defect issues that detract from fry quality, including hollow heart, internal brown spot, sugar-ends, and general malformations. Ranger Russet exhibits exceptionally high vitamin C content in comparison to other cultivars.

Agronomic Characteristics

Vine Maturity: Late, although early tuber yields are high.

Yield Potential: Moderately high to high.

Specific Gravity: Moderately high.

Culinary Quality: Excellent for french fry production. Baking and boiling quality is good, although Ranger Russet is not commonly used for fresh sales.

Diseases/Pests/Physiological Disorders: Ranger Russet is resistant or highly resistant to Verticillium wilt, Fusarium tuber rot, PVY, PVX, and net necrosis caused by PLRV. It is susceptible to common scab, foliar and tuber late blight, foliar early blight, and root-knot nematode. Resistance to physiological defects, including hollow heart, secondary growth, and growth cracks is high to very high. Tubers are susceptible to blackspot bruise.

Storability: Although Ranger Russet is not commonly produced for long-term storage, tubers retain good quality for several months. Dormancy is medium length, and tubers held for more than 2–3 months will require applications of sprout inhibitors. Tubers are prone to pressure bruising under conditions of low humidity in storage.

Key Management Considerations

Avoid cutting and planting heavily sprouted seed. For 36-in. row spacing, plant seed pieces 8–10 in. apart. Reduce the incidence of blackspot bruise by maintaining green vines up to vine kill, maintaining high soil moisture through vine kill and maturation, and using the best anti-bruise practices during harvest. Many growers utilize green-dig procedures for Ranger Russet tubers going into storage. Utilize full-season late blight control where applicable. Avoid tuber chilling before harvest. Potatoes for processing should be stored at 47–48 °F, and sugars should be monitored for early onset of senescent sweetening.

Strengths: Ranger Russet consistently produces high yields of potatoes with excellent french fry processing qualities. This cultivar is resistant to internal defects, such as hollow heart, brown center, net necrosis, and sugar ends; has a high proportion of large tubers; is resistant to PVY and net necrosis; and is moderately resistant to early dying.

Weaknesses: Ranger Russet is susceptible to blackspot bruise, a problem that requires special considerations during harvesting and delivery. It is also very susceptible to late blight tuber rot and moderately susceptible to stress-induced tuber constrictions.

Umatilla Russet

General Information

Parentage: Butte x A77268-4.

Developers: Released in 1998 by the USDA-ARS and the Agricultural Experiment Stations of Idaho, Oregon, and Washington, and represents a variety of the Pacific Northwest Potato Variety (Tri-State) Development Program.

Plant Variety Protection: Pacific Northwest Potato Variety Development Program (administered by Oregon State University).

Morphological Characteristics

Plant: Medium-sized, semi-erect vine, with blue-violet flowers that tend to purple-violet on inner surface of petals.

Tubers: Long, medium-russeted skin, white flesh, with a tendency for tapering on apical ends.

Incentives for Production

Umatilla Russet produces high U.S. No. 1 (marketable) yields, with tubers having consistent specific gravities and acceptable fry colors from storage temperatures as low as 45 °F.

Agronomic Characteristics

Vine Maturity: Late.

Yield Potential: High.

Specific Gravity: Typically in the low- to mid-80s in western trial sites.

Culinary Quality: Good, especially for french fry production.

Diseases/Pests/Physiological Disorders: Resistant to PVX and common scab; moderately resistant to Verticillium wilt, tuber late blight infection, and net necrosis caused by PLRV. Less susceptible to hollow heart and growth cracks relative to Russet Burbank, but with greater susceptibility to Fusarium dry rot, blackspot, and shatter bruise.

Storability: Tuber dormancy is approximately 30 days shorter than for Russet Burbank. Umatilla Russet can be stored at 45–48 °F for optimum processing quality. To minimize dry rot formation in storage, bruising and wounding of tubers should be minimized during harvest and subsequent handling.

Key Management Considerations

Plant emergence can be slow and non-uniform, but delayed emergence does not impact final yield or market value in regions with longer growing seasons, such as in the Columbia Basin. Minimize tuber wounding during harvest to mitigate the development of Fusarium dry rot in storage. Nutrient and irrigation management are similar to guidelines developed for Russet Burbank.

Strengths: Umatilla Russet produces high yields of marketable tubers with uniform specific gravity and good fry color from as low as 45 °F storage. It is resistant to most internal and external tuber defects, PVX, and common scab, and has moderate resistance to Verticillium wilt, tuber late blight infection, and net necrosis caused by the PLRV.

Weaknesses: Umatilla Russet occasionally exhibits pointed tubers as a result of stress and is susceptible to shatter bruise, which can promote associated dry rot infection of tubers.

Russet Varieties for Fresh Use (Figs. 3.7 & 3.8)

Goldrush

General Information

Parentage: ND450-3Russ x Lemhi Russet.

Developers: The North Dakota Agricultural Experiment Station.

Plant Variety Protection: Goldrush was protected via a plant patent (administered by the North Dakota State University Research Foundation).

Morphological Characteristics

Plant: Semi-erect, medium-large sized vine with light red-purple flowers.

Tubers: Oblong and block, with medium heavy golden russet skin, and well-distributed shallow eyes.

Fig. 3.7 Goldrush. (Photo credit: PVMI)

Fig. 3.8 Russet Norkotah. (Photo credit: PVMI)

Incentives for Production
Attractive fresh market russet and processing variety with early-yield potential, mid-maturity, good culinary quality, and resistance to hollow heart.

Agronomic Characteristics
Vine Maturity: Mid-season.
Yield Potential: Medium to high. Typically produces about 90% U.S. No. 1 tubers.
Specific Gravity: Medium; similar to Russet Norkotah.
Culinary Quality: Suitable for fresh pack and possibly for some early processing from the field. In sensory panels conducted at North Dakota State University, Goldrush rated similarly to Russet Norkotah and Russet Burbank for boiling, baking, and microwave cooking for flavor and mealiness. Tuber glycoalkaloids are low.
Diseases/Pests/Physiological Disorders: Low incidence of internal and external defects; resistant to hollow heart. It is moderately resistant to blackspot bruise. It has good resistance to common scab, and moderate tolerance of Verticillium wilt and silver scurf. Goldrush is susceptible to PVY and bacterial ring rot, showing good symptoms of both. It is also susceptible to early blight, late blight, soft rot, and Fusarium dry rot.
Storability: Stores well. Natural tuber dormancy is shorter than for Russet Burbank.

Key Management Considerations
Under non-irrigated conditions, U.S. No. 1 yields are comparable to Russet Norkotah, but substantially higher than those of Russet Burbank. Under irrigation, U.S. No. 1 yields of Goldrush are comparable to Russet Burbank. It is not well suited for processing into fries, although it can be used for such purposes with early harvest and limited storage.
Strengths: High early-yield potential and high pack-out, very white flesh, and excellent culinary quality, with some potential for processing out of the field. It has resistance to hollow heart and common scab.
Weaknesses: Occasional off-type tubers have been noted (hearts, twins), and a reddish blush on the apical end of the tuber may be observed after storage.

Russet Norkotah

General Information
Parentage: ND9526-4Russ x ND9687-5Russ.
Developers: North Dakota Agricultural Experiment Station.
Plant Variety Protection: Released prior to plant variety protection (PVP). Several line selections have been granted PVP (administered by varying entities).

Morphological Characteristics
Plant: Semi-erect, medium-sized vine with white flowers.
Tubers: Long and blocky, with medium to heavy golden russet skin and shallow eyes.

Incentives for Production
Russet Norkotah is suited for the fresh market. It possesses high-yield potential, produces a high percentage of U.S. No. 1 tubers, and tubers size early.

Agronomic Characteristics
Vine Maturity: Mid-season.
Yield Potential: Medium-high. Russet Norkotah produces a high percentage (>90%) of U.S. No. 1 tubers.
Specific Gravity: Similar to Russet Burbank.
Culinary Quality: Suitable for fresh packing. Formal taste and sensory panels have occasionally noted off-flavor associated with storage conditions. Tuber glycoalkaloids are low.
Diseases/Pests/Physiological Disorders: Low incidence of external and internal defects, though it will occasionally produce protruding eyes, and it is susceptible to hollow heart. Russet Norkotah is susceptible to foliar early blight, Verticillium wilt (line selections tend to be moderately susceptible), and the early dying complex, blackleg, PLRV, PVY (often producing few or very mild symptoms), PVX, bacterial soft rot, late blight, Fusarium dry rot, Pythium leak, pink rot, and silver scurf. It is resistant to tuber net necrosis associated with PLRV and moderately resistant to common scab, tuber early blight, and Rhizoctonia (black) scurf. It is moderately resistant to blackspot bruise. Russet Norkotah may exhibit a physiological symptom related to toxic seed piece decay when the seed piece disappears during hot periods around tuber initiation or shortly thereafter.
Storability: Stores well. Natural tuber dormancy is shorter than for Russet Burbank.

Key Management Considerations
Nitrogen requirements are similar to Russet Burbank unless stressful conditions are common or early dying pressure is present, in which case apply up to 120% of that needed by Russet Burbank. Apply all N preplant or make the last application by the time flowering is completed. Avoid over-irrigation late in the season. For irrigated production, at maximum evapotranspiration (ET) an irrigation interval of about 2.5 days is recommended.
Strengths: High early-yield potential, with a high percentage of U.S. No. 1 tubers.
Weaknesses: Susceptibility to early dying and PVY.

Long White Varieties for Processing (Figs. 3.9 & 3.10)

Alturas

General Information
Parentage: A77182-1 x A75188-3.
Developers: Released in 2002 by the USDA-ARS and the Agricultural Experiment Stations of Idaho, Oregon, and Washington, and represents a variety of the Pacific Northwest Potato Variety (Tri-State) Development Program.
Plant Variety Protection: Pacific Northwest Potato Variety Development Program (administered by PVMI).

Fig. 3.9 Alturas. (Photo credit: PVMI)

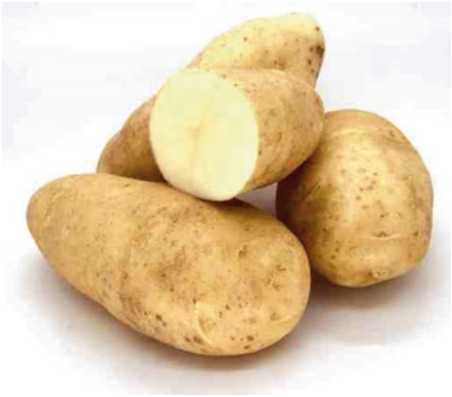

Fig. 3.10 Shepody. (Photo credit: Chelsey Lowder)

Morphological Characteristics

Plant: Large, semi-erect vine, with white flowers.

Tubers: Oblong, lightly russeted, with white flesh and a high set and smaller average size.

Incentives for Production

Alturas has very high yield potential, especially in areas with an extended growing season, and high specific gravity; it is used primarily for processing and dehydrated products. Alturas is resistant to Verticillium wilt and foliar early blight, moderately resistant to net necrosis caused by PLRV, and resistant to most internal and external defects. Alturas also has relatively low production input requirements, especially N, which are approximately 60–70% of the N requirements of Russet Burbank.

Agronomic Characteristics

Vine Maturity: Late to very late.

Yield Potential: High to very high.

Specific Gravity: High, with averages in western trials slightly higher or comparable to Ranger Russet.

Culinary Quality: Alturas has good sensory attributes for fries, as well as fresh-pack use, although fresh-pack use could be limited by the light russeting of tubers.
Diseases/Pests/Physiological Disorders: Resistant to Verticillium wilt and foliar early blight, which both contribute to early die, moderately resistant to net necrosis caused by PLRV, and resistant to most internal and external tuber defects.
Storability: At storage temperatures of 45 °F with no sprout inhibitor application, tuber dormancy averages 45 days less than that of Russet Burbank. Cold-sweetening resistant and can be stored at 42 °F for dehydrated processing and 45–48 °F for frozen processing.

Key Management Considerations
Nitrogen requirement is about 60–70% of Russet Burbank. In short season areas, all N should be applied pre-plant to allow tubers to mature by harvest. In longer season areas, split N applications can be used, but all N should be applied before July 31 to avoid delaying tuber maturity. Irrigation requirements are 15–20% higher than Russet Burbank.
Strengths: High yields and specific gravity; cold-sweetening resistant with the ability to be stored at colder temperatures than Russet Burbank and still provide acceptable processed and dehydrated products.
Weaknesses: Smaller tuber size with light russeting and short dormancy; late maturity, with late season N applications delaying maturing even further; greater water usage requirements than Russet Burbank.

Shepody

General Information
Parentage: Bake King x F58050.
Developers: Released in 1980 by Agriculture Canada in Fredericton, New Brunswick.
Plant Variety Protection: No. Public variety.

Morphological Characteristics
Plant: Medium-sized, spreading vine, light violet flowers with white tips.
Tubers: Long, white-skinned, white fleshed, sometimes with light netting on skin.

Incentives for Production
High early yields of larger tubers have made it useful for early fry processing directly following field harvest or from short-term storage.

Agronomic Characteristics
Vine Maturity: Early.
Yield Potential: High.
Specific Gravity: Low to medium; average of 1.083 in replicated trials conducted over 4 years in three sites in eastern Canada.
Culinary Quality: Good flavor for both processing and fresh use, with boiling and baking quality similar to that of Kennebec.

Diseases/Pests/Physiological Disorders: Reported as having moderate resistance to Rhizoctonia and Fusarium dry rot, and plant tolerance to heat stress. It is susceptible to common scab and should not be planted on acreage where common scab can be problematic. It displays poor visual symptoms of infection by PVY, making removal of infected plants difficult in seed acreage.

Storability: Limited—typically used for processing directly from the field or from short-term storage at temperatures of 50–55 °F to reduce tuber sugar accumulation.

Key Management Considerations

Applying excessive N rates, especially late in the growing season can produce specific gravities that are too low for processing. Shepody requires approximately 80% of the N required by Russet Burbank. Tuber greening can be an issue with the larger tuber size of Shepody, so careful hilling operations to ensure season-long coverage of tubers is important. Shepody is very sensitive to metribuzin.

Strengths: High early yields of tubers suitable for fry processing, resistance to hollow heart, and plants tolerant of heat stress.

Weaknesses: Common scab and metribuzin susceptible; poor visual symptoms of PVY infection in leaves can make removal of PVY-infected plants difficult for seed growers. Misshapen tubers and too large of size—careful monitoring of tubers during the growing season is required to mitigate.

Round White Varieties for Processing into Chips (Figs. 3.11–3.13)

Atlantic

General Information

Parentage: Wauseon x B5141–6 (Lenape).

Developers: Released in 1978 by the USDA-ARS-Beltsville.

Fig. 3.11 Atlantic. (Photo credit: PVMI)

Fig. 3.12 Dakota Pearl.
(Photo credit: PVMI)

Fig. 3.13 Snowden.
(Photo credit: PVMI)

Plant Variety Protection: No. Public variety.

Morphological Characteristics

Plant: Medium maturing with a medium-large, upright vine, pale lavender flowers.
Tubers: Round to oval, buff-colored with light netting and high specific gravity. May produce a large percentage of oversized tubers.

Incentives for Production

Suitable for processing into potato chips directly from the field and from short-term storage.

Agronomic Characteristics

Vine Maturity: Mid-season.
Yield Potential: Moderately high to high.
Specific Gravity: High.
Culinary Quality: Excellent chip quality when processed directly from the field or from short-term storage.
Diseases/Pests/Physiological Disorders: Susceptible to internal necrosis when grown in sandy soils under hot, dry conditions, as well as hollow heart.

Susceptible to late blight with medium susceptibility to early blight, black leg, and PLRV, as well as most potato viruses. Atlantic has medium susceptibility to soft rot, as well as common scab, dry rot, and pink rot. It is resistant to tuber net necrosis.

Storability: Tuber sugar content in Atlantic tubers readily increases when storage temperatures drop below 50 °F, so it is preferable to process directly from the field or within 3–4 months of harvest.

Key Management Considerations

With a 36-in. row spacing, plant seed pieces 9–11 in. apart. If intended for late harvest, use N application rates and timings that are appropriate for Russet Burbank. If intended for early harvest, use 20% less N and complete seasonal applications 4–5 weeks before the intended harvest date. Use weed control strategies that do not include metribuzin, or if metribuzin is applied, use minimum rates and incorporate with a minimal amount of water (less than 0.5 in.). When feasible, avoid storage by marketing directly from the field.

Strengths: Good yield potential and high specific gravity across environments. Atlantic is tolerant to early dying and is resistant to pinkeye, PVX, race A of the golden nematode, and tuber net necrosis.

Weaknesses: Tubers have short dormancy. Atlantic is susceptible to shatter bruise and associated storage rots, as well as hollow heart/brown center, internal heat necrosis (particularly in sandy soils in warm dry seasons), and is moderately susceptible to common scab and metribuzin herbicide injury.

Dakota Pearl

General Information

Parentage: ND1118–1 x ND944–6.

Developers: The North Dakota Agricultural Experiment Station.

Plant Variety Protection: North Dakota State University and the North Dakota Agricultural Experiment Station (administered by the North Dakota State University Development Foundation).

Morphological Characteristics

Plant: Semi-erect, medium-sized vine with white flowers.

Tubers: Round, bright white skin, and shallow eyes.

Incentives for Production

Good yield of bright white, smooth, uniform, round tubers. Produces light chips from the field and from 42 °F storage.

Agronomic Characteristics

Vine Maturity: Mid-season.

Yield Potential: Medium to high.

Specific Gravity: Medium; lower than for industry standards Atlantic and Snowden.

Culinary Quality: Suitable for both chip processing and tablestock. Chip color is light and uniform, with a low incidence of defects. Dakota Pearl is considered a cold chipping industry standard due to its ability to reliably chip from colder storage temperatures than other cultivars. It may also double as a tablestock cultivar due to attractive tuber appearance and acceptable baked, boiled, and microwaved taste panel ratings. Tuber glycoalkaloids are low.

Diseases/Pests/Physiological Disorders: Low incidence of internal and external defects; hollow heart has occasionally been noted in the northern plains and heat necrosis in production areas such as North Carolina. Dakota Pearl has no notable disease resistances or susceptibilities. It is susceptible to late blight (foliar and tuber), PVY, and bacterial ring rot (expressing typical symptoms for both foliage and tubers).

Storability: Stores well. It develops low levels of glucose. Natural tuber dormancy is shorter than for Snowden. Most chip processors will utilize by the March–April window.

Key Management Considerations

Planting physiologically young seed is important to avoid high tuber sets. It responds best when planted at soil temperatures above 45 °F. Plant spacing should be 12 in. for commercial production and 11 in. for seed. Proper hilling is required to avoid tuber greening. Dakota Pearl requires a rather high rate of N and supplemental foliar feeding during the growing season. It also will perform best with a consistent supply of water.

Strengths: Good yields of bright white skinned, uniformly sized tubers; low sugar accumulation in storage.

Weaknesses: Susceptible to heat necrosis and hollow heart occasionally noted.

Snowden

General Information

Parentage: Lenape (B5141–6) x Wischip.

Developers: University of Wisconsin.

Plant Variety Protection: No.

Morphological Characteristics

Plant: Large, vigorous, and semi-erect vine with white flowers.

Tubers: Round, slightly flattened tubers with a slight net. Eye depth is deeper than for Dakota Pearl, including on both bud and stem ends. Eye distribution is uniform.

Incentives for Production

High yield, produces light chips from the field and from 45 °F storage; long-term storage industry standard.

Agronomic Characteristics
Vine Maturity: Full season.
Yield Potential: High, similar to Atlantic.
Specific Gravity: High, similar, but slightly lower, than for Atlantic.
Culinary Quality: Excellent chip processing quality from long-term storage. Total tuber glycoalkaloids are acceptable—perhaps on the high side—and some note a slight aftertaste.
Diseases/Pests/Physiological Disorders: Snowden is less susceptible to soft rot, Fusarium dry rot, and bruising than Atlantic. It is susceptible to common scab, early blight, late blight, pink rot, and *Phytophthora nicotianae*. Snowden is resistant to Pythium leak.
Storability: Stores well. Dormancy is medium.

Key Management Considerations
Susceptible to metribuzin. Due to heavy set of tubers and long stolons, a 12-in. within-row spacing is recommended. Irrigation about every 2.5 days is recommended at maximum ET. Excessive late season irrigation may increase late-season hollow heart and has also been linked to internal brown spot. Proper mid-season irrigation minimizes common scab on tubers.
Strengths: Snowden is high yielding, with excellent chip processing quality; particularly from long-term storage and colder (45 °F) storage than many industry standard cultivars.
Weaknesses: Sets high so tubers are often undersized, some question about glycoalkaloid levels (on the high end of acceptable).

Specialty Varieties for the Fresh Market (Red Flesh) (Figs. 3.14–3.16)

Chieftain

General Information
Parentage: La 1354 x Ia 1027-18.
Developers: Released in 1966 by the Iowa Agriculture and Home Economics Experiment Station and the USDA-ARS.
Plant Variety Protection: No. Public variety.

Morphological Characteristics
Plant: Medium sized, spreading vine and light violet flowers.
Tubers: Oblong to round with medium-red skin and white flesh.

Incentives for Production
A higher yielding variety, Chieftain does well in differing production environments and is a good variety for fresh-pack.

Fig. 3.14 Chieftain (Photo credit: Chelsey Lowder)

Fig. 3.15 Norland (Photo: Chelsey Lowder)

Fig. 3.16 Red LaSoda (Photo credit: Chelsey Lowder)

Agronomic Characteristics

Vine Maturity: Medium.

Yield Potential: High.

Specific Gravity: Low—similar to other red-skinned varieties.

Culinary Quality: Good quality for fresh use with less after-cooking browning reported relative to Norland following boiling.

Diseases/Pests/Physiological Disorders: Resistant to stem end browning and net necrosis from infection of tuber by PLRV; moderate resistance to common scab.
Storability: Noted as having medium tuber dormancy.

Key Management Considerations
Chieftain is susceptible to metribuzin, so application should be applied prior to plant emergence. With a tendency to skin, it is recommended that tubers not be harvested directly from the field without prior vine kill to promote skin set.
Strengths: Chieftain is adapted to a wide range of environments. It is high yielding, has moderate resistance to common scab, and resistance to stem end browning and net necrosis from infection of tuber by PLRV.
Weaknesses: Tubers tend to skin during harvest and handling, with some susceptibility to growth cracks. Eyes can tend to be deep, depending on environment.

Norland

General Information
Parentage: Redkote x ND626.
Developers: North Dakota State University and the North Dakota Agricultural Experiment Station.
Plant Variety Protection: No.

Morphological Characteristics
Plant: Medium and spreading vine with a determinate growth habit and red-purple flowers.
Tubers: Oblong, slightly flattened, and smooth with red skin. Several darker-red skinned strains of Norland have been selected since Norland was released in 1957. Eye depth is shallow to medium and uniformly distributed.

Incentives for Production
Widely adapted, early maturing, several strains with darker-red skin color, high proportion of marketable tubers.

Agronomic Characteristics
Vine Maturity: Early.
Yield Potential: Medium with a high proportion of marketable tubers.
Specific Gravity: Low to medium.
Culinary Quality: Fresh market standard, suitable for boiling, mashing, potato salads, and soups particularly. Total tuber glycoalkaloids are low.
Diseases/Pests/Physiological Disorders: Norland has a low incidence of internal and external defects. It is moderately resistant to pink rot caused by *Phytophthora erythroseptica* and has a moderate response to common scab (less susceptible than Red LaSoda) and net necrosis associated with PLRV. Norland is susceptible to early dying including Verticillium wilt, PVY, PVX, PLRV, black leg, silver scurf, early blight, late blight, Fusarium dry rot, *Phytophthora nicotianae*, and Pythium leak.

Storability: Stores well, though dormancy is short, and it can be susceptible to pressure bruise if not properly hydrated. Skin color also fades in storage or may become brownish in color by silver scurf and/or black dot.

Key Management Considerations

Susceptible to metribuzin. Sensitive to moisture stress resulting from drought and excess moisture. If producing Norland under irrigation, it is recommended every 2.5 days at maximum ET. Avoid excessive irrigation as plants are senescing.

Strengths: Norland is widely adapted, produces early yields of uniform tubers, and has versatile cooking quality.

Weaknesses: Low specific gravity and low to medium yields if compared to late season cultivars, such as Red LaSoda and Red Pontiac. Susceptibility to silver scurf and black dot often results in brown tubers in storage. Red skin color fades in storage.

Red LaSoda

General Information

Parentage: Red LaSoda is a selected red-skinned mutant of LaSoda. Parentage of LaSoda is Triumph x Katahdin.

Developers: Released in 1953 by the USDA and Louisiana State University.

Plant Variety Protection: No.

Morphological Characteristics

Plant: Upright to spreading, medium-sized vine with light pink to lavender flowers.

Tubers: Round to oval, medium-light red skin, with deep eyes.

Incentives for Production

Red LaSoda is considered the standard for red potato varieties in many regions of the U.S. and is a recognized entity in the marketplace. It is a widely adapted cultivar that produces early high yields of attractive tubers. It is also adapted to winter production conditions. Vines hold up well in the heat, and production is good under stressful conditions. Good flavor and waxy texture make it a choice cultivar for boiling and salads.

Agronomic Characteristics

Vine Maturity: Medium-late, although tubers size early.

Yield Potential: High.

Specific Gravity: Moderately low, but higher than most modern red cultivars.

Culinary Quality: Good for boiling, making salads, and canning. Red LaSoda can be used for baking.

Diseases/Pests/Physiological Disorders: Red LaSoda is susceptible to PLRV, PVX, and PVY. Response to PVY is extreme, causing plant collapse and ultimately death. It is also susceptible to late blight, Fusarium dry rot, and common scab. Resistance to Verticillium wilt and early blight is moderate. Red LaSoda is less prone to swollen lenticels in wet soils than most red cultivars. It is susceptible to

hollow heart, growth cracks, and general tuber malformation. Deep eyes become a quality issue in large tubers.

Storability: It is not typically produced as a storage potato. Tuber dormancy is medium to short, and tubers retain quality in storage if sprouting is controlled.

Key Management Considerations

For 36-in. row spacing, plant seed pieces 5–8 in. apart as a means to control size. Apply N fertilizers primarily preplant or early in the season to encourage a late-season N deficit that will improve tuber skin set. Avoid high levels of soil moisture late in the season to minimize swollen lenticels and enhance tuber color. Applications of low rates of 2,4-D herbicide are sometimes used to improve color. Kill vines when tuber size profile is optimal. Allow a 2–3 week maturation period after vine-kill for tubers to set skins.

Strengths: Red LaSoda is adapted to a wide range of production conditions. It produces high yields of tubers with good culinary quality when baked, canned, or used in salads. Variety recognition in the marketplace creates good early-season sales appeal.

Weaknesses: Tubers of Red LaSoda are susceptible to several defect problems, including deep eyes, general malformations, and growth cracks. Red color of the tubers tends to fade with time.

Specialty Varieties for the Fresh Market (Yellow Flesh) (Figs. 3.17 & 3.18)

Yukon Gem

General Information

Parentage: Brodick x Yukon Gold.

Developers: Northwest Potato Variety Development Program, including the USDA-ARS and the Agricultural Experiment Stations of Idaho, Washington, and Oregon.

Plant Variety Protection: Northwest Potato Variety Development Program.

Morphological Characteristics

Plant: Medium-sized, erect vine with medium red-purple flowers. Flowers tend to abort, and pollen production is limited.

Tubers: Round to oval; light yellow skin with a pink splash around the eyes. Eyes are intermediate in depth and number and are evenly distributed. Tuber set is low to medium, setting approximately two tubers more per plant than Yukon Gold. Tubers are medium in size, slightly smaller than Yukon Gold, on average.

Incentives for Production

Higher yield potential than Yukon Gold, with improved resistance to several diseases and physiological disorders. Additionally, it chips acceptably and has similar culinary quality when compared to Yukon Gold. The tuber size profile is slightly

Fig. 3.17 Yellow Gem (Photo credit: PVMI)

Fig. 3.18 Yukon Gold (Photo credit: PVMI)

smaller, and Yukon Gem produces more tubers per plant than Yukon Gold. Yukon Gem has potential for the organic market.

Agronomic Characteristics

Vine Maturity: Mid-season.

Yield Potential: Higher yield potential than Yukon Gold, with a smaller size profile.

Specific Gravity: Moderately low, averaging 1.075, compared to 1.085 for Yukon Gold.

Culinary Quality: Excellent baked, boiled, and microwaved. Tubers exhibit little or no after-cooking darkening. Yukon Gem produces acceptable potato chips; however, the low specific gravity may limit its use for processing. Total tuber glycoalkaloids are low.

Diseases/Pests/Physiological Disorders: Yukon Gem is notable for its PVY^{o} and tuber early and tuber late blight resistances. Additionally, it is resistant to PLRV net necrosis. It is moderately resistant to Fusarium dry rot and moderately susceptible to moderately resistant to foliar late blight. It is moderately susceptible to common scab and Pectobacterium soft rot. Yukon Gem is rated as susceptible

to Verticillium wilt, foliar early blight, PVX, and PLRV (foliar infection). It has resistance to internal and external defects, including growth cracks, secondary growth, and hollow heart.

Storability: Stores well. Dormancy is medium.

Key Management Considerations

Optimal seed piece spacing for 36-in. wide rows is 9–11 in., while an 11–13 in. seed piece spacing should be used if an increased proportion of large tubers is desired. Adequate soil needs to be applied to the surface of the hill at final hilling to minimize the potential for tuber greening. Total seasonal N requirements for Yukon Gem are about 85–90% of Russet Burbank per cwt of yield produced. Typically, 50% of the seasonal N requirement should be applied by row closure, with subsequent in-season applications based on petiole nitrate concentrations. Vines should be killed 2–3 weeks before harvest to allow for proper skin maturation.

Strengths: Yukon Gem is a high yielding, round to oval yellow-fleshed cultivar with attractive appearance, good culinary quality, and chip potential. Yukon Gem has PVY^{o} resistance and is resistant to early and late tuber blight.

Weaknesses: Low specific gravity.

Yukon Gold

General Information

Parentage: W5279-4 x Norgleam.

Developers: Agriculture Canada and the University of Guelph.

Plant Variety Protection: No.

Morphological Characteristics

Plant: Medium-early maturing, erect, and medium-large to large-sized vine, with some tendency to spread at senescence. Yukon Gold has a determinate growth habit and light red-purple flowers.

Tubers: Slightly oval and flattened, smooth tubers with yellow skin, and shallow pink eyes. Eyes are few and not uniformly distributed.

Incentives for Production

Yukon Gold is widely adapted, with medium-early maturity, attractive appearance, yellow flesh color, and excellent culinary quality.

Agronomic Characteristics

Vine Maturity: Medium early.

Yield Potential: Medium with a high proportion of marketable tubers.

Specific Gravity: Medium (about 1.085 across most northern tier states).

Culinary Quality: Fresh market standard, suitable for baking, boiling, mashing, potato salads, soups and stews; can be used for specialty fries out of the field. Total tuber glycoalkaloids are low.

Diseases/Pests/Physiological Disorders: Yukon Gold is moderately resistant to PLRV. It is susceptible to PVY, common scab, early blight, late blight, silver

scurf, black scurf, Fusarium dry rot, and soft rot, and reportedly is tolerant of PVX. It is resistant to net necrosis associated with PLRV infections. Yukon Gold is susceptible to air pollution (ozone), hollow heart, and internal heat necrosis.

Storability: Stores well, with medium to long dormancy. Care should be taken at harvest to minimize bruising, as Fusarium dry rot may be problematic. Storage should be monitored for soft rot development, as Yukon Gold has fairly large-sized lenticels and may be predisposed to swelling if excessive late season irrigation or rainfall at harvest time.

Key Management Considerations

Tubers have few eyes that are not uniformly distributed; thus, using whole (single-drop) seed is often recommended (as well as warming to aid in dormancy break) for better stands. Additionally, due to low eye numbers, using whole seed will increase stem numbers resulting in more tubers per plant and minimizing oversizing, which often results in increased occurrence of hollow heart. Good hill conformation is also important to minimize greening, as tubers are often set high in the hill. Irrigation approximately every 2–3 days is recommended at maximum ET. Excessive late season irrigation may increase soft rot in storage due to enlarged lenticels, or tubers may appear to have freckles, minimizing their attractiveness for fresh marketing. Producers should monitor tuber size to minimize oversized tubers and associated hollow heart.

Strengths: Yukon Gold has high early yields of attractive round to oval, yellow-fleshed tubers. Culinary quality is excellent.

Weaknesses: Sets high in the hill so tuber greening may be an issue. Due to low tuber numbers per stem and rapid tuber bulking, oversized tubers may result if not monitored. Hollow heart has been associated predominantly with oversized tubers.