

## **NEW POTATO VARIETIES**

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### **PROMISING VARIETIES AND ADVANCED SELECTIONS FROM THE ABERDEEN POTATO BREEDING PROGRAM**

#### **ALTURAS (A77182-1 x A75188-3)**

Released in 2002, Alturas was fifth and seventh in acreage in Idaho and the U.S. in 2006, respectively. Alturas is used primarily for processing, with its light russeting limiting its use for fresh-pack; however, it has been rated highly for its culinary quality. It is notable for its high yields and solids, and cold-sweetening resistance. Alturas has resistance to Verticillium wilt and early blight. Weaknesses include short tuber dormancy (see post-harvest and storage section), late maturity in areas with short growing seasons and higher water requirements than Russet Burbank. A release article for Alturas was published in the American Journal of Potato Research in 2003, volume 80, p. 295-301.

#### **Management:**

Optimal plant spacing for Alturas for commercial production in southeast Idaho is 13 to 15 inches in 36-inch wide rows. Metribuzin resistance for Alturas is good at normal application rates. The nitrogen requirement for Alturas is about 60-70% of Russet Burbank. In southeast Idaho, this is equivalent to about 120 to 150 lb N/acre. 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. Planting Alturas the year after alfalfa can delay tuber maturation and can make vine kill more difficult. Irrigation requirements are 15-20% higher than Russet Burbank and significant yield reductions will occur if water deficits occur, particularly late in the growing season.

#### **SUMMIT RUSSET (A77236-6 x TND329-1Russ)**

Released in 2003, Summit Russet is a dual-purpose variety suitable for processing and fresh-pack usage. It has high U.S. No. 1 yields and specific gravity, with tubers having few internal and external defects. Summit Russet also has been rated as having high culinary quality, and has resistance to Verticillium wilt, tuber early blight, and common scab. It is also moderately resistant to dry rot and net necrosis. Summit Russet has a very long dormancy that while beneficial in storage, can result in slow emergence following planting. Warming of seed at 50-60F for 3 weeks prior to planting is recommended to hasten emergence. PVY susceptibility is a notable weakness. A release article for Summit Russet was published in the American Journal of Potato Research in 2005, volume 82, p. 425-432.

#### **Management:**

Summit Russet planted in 36 inch-wide rows performs well with a seed piece spacing of 8 to 12 inches. In three years of nitrogen fertility trials, Summit Russet produced maximum yields in southeast Idaho with about 200 to 210 lb N/acre of residual soil N plus fertilizer N, which was about 10% less than Russet Burbank. The best N use efficiency was achieved when 2/3 of the seasonal N supply was applied pre-plant with the remainder applied during tuber bulking. Petiole nitrate sufficiency ranges for Summit Russet are as follows: from emergence to tuberization, 15,000 to 25,000 ppm; during tuberization, 14,000 to 23,000 ppm; during early tuber bulking,

13,000 to 20,000 ppm; during late tuber bulking, 5,000 to 13,000 ppm; and during tuber maturation, 2,000 to 8,000ppm. Summit Russet has good resistance to internal and external defects caused by water stress but is only moderately resistant to drought with respect to total yield. Therefore, available soil moisture should be maintained between 65 and 80%. Summit Russet has a high level of resistance to blackspot bruise and also has good resistance to metribuzin.

#### **GEMSTAR RUSSET (Gem Russet x A8341-5)**

Released in 2004, GemStar Russet is a dual-purpose variety suitable for processing and fresh-pack usage. It has high U.S. No. 1 yields with very attractive tubers having few external defects and higher concentrations of Vitamin C and protein than other potato cultivars. GemStar Russet is cold-sweetening resistant making it exceptional for use in processing. It is resistant to PVX, common and powdery scab, and soft rot, and has moderate resistance to Verticillium wilt, net necrosis, and corky ringspot. GemStar Russet is notable for its tolerance to water stress. It is very susceptible to PVY and dry rot, and late-season hollow heart can be problematic as well. A release article for GemStar Russet was published in the American Journal of Potato Research in 2006, volume 83, p. 171-180.

#### **Management:**

GemStar Russet has relatively few, apically positioned eyes and therefore it is important to avoid using large seed tubers to prevent blind seed pieces. Dry rot potential should be determined on all seed and an effective fungicide should be used when appropriate. Optimal plant spacing is 8-11 inches and seed should be planted at or near optimal soil temperatures to minimize soft rot problems. Maximum yields have been obtained with 180 to 200 lb of total N/acre in southeast Idaho, which is about 75-85% of the amount required for Russet Burbank. About 1/3 of the seasonal N should be applied at or prior to planting with the remainder applied during tuber bulking. Petiole nitrate concentrations are similar to those for Russet Burbank. GemStar Russet is very drought tolerant and produces good yields with 20-25% less water than Russet Burbank. Closer plant spacing and a reduction in water during the last 3-4 weeks of the growing season can help to minimize hollow heart. GemStar Russet is resistant to Metribuzin at normal application rates.

#### **DEFENDER (KSA195-90 x Ranger Russet)**

Released in 2004, Defender is a lightly-russeted variety suitable for processing directly from the field or following short-term storage. The name "Defender" was chosen to highlight this variety's foliar and tuber resistance to late blight. Defender is very high-yielding and tubers have high solids and Vitamin C. While foliage is late maturing, tuber bulking can be rapid making Defender suitable for early harvest as well. In addition to its late blight resistance, Defender also is resistant to tuber early blight, PVX, and net necrosis. It exhibits moderate resistance to early dying, pink rot, corky ringspot, PVY<sup>o</sup> and soft rot. Its disease resistances make Defender a good candidate for use in organic production. Weaknesses include a relatively short tuber dormancy and susceptibility to common scab, blackspot bruise, and tuber greening. A release article for Defender was published in the American Journal of Potato Research in 2006, volume 83, p. 9-18

#### **Management:**

Seed piece spacing trials have shown that the optimal spacing for Defender is 10-12 inches. Seed should be planted 5 to 7 inches deep with 2-3 inches of soil applied at final hilling to minimize tuber greening. Nitrogen requirements for Defender are about 190-210 lb N/acre in southeast

Idaho, which is 80-90% of Russet Burbank. One-third to one-half of the seasonal N requirement should be applied at or near planting with the remainder applied before August 10 to avoid delaying tuber maturation. Soil moisture should be maintained between 65-80% ASM throughout the growing season to avoid drought stress. Vines of Defender remain green and vigorous late in the season and use 10-20% more water than Russet Burbank. Avoid excessive soil drying prior to vine kill to minimize tuber dehydration and blackspot bruise. Defender is resistant to Metribuzin at normal application rates.

#### **WESTERN RUSSET (A68113-4 x BelRus)**

Released in 2004, Western Russet is a dual purpose russet that was 4<sup>th</sup> in acreage in Idaho in 2006. Strengths include a high percent of U.S. No. 1 tubers, and resistance to tuber external and internal defects and common scab. Western Russet is moderately resistant to PVY<sup>o</sup>, early dying, and net necrosis. Weaknesses include susceptibility to tuber early blight and blackspot bruise, and a short dormancy. A release article for Western Russet was published in the American Journal of Potato Research in 2006, volume 83, p. 161-169.

#### **Management:**

Optimal within-row plant spacing for Western Russet grown in 36-inch wide rows in southeast Idaho is 10-12 inches. Planting depth should be about 5-6 inches. Nitrogen requirements for Western Russet in replicated field trials in southeast Idaho have been about 170-200 lb N/acre, which is about 75 to 90% of Russet Burbank. Split N applications should be used in all but the shortest season areas, with up to 50% of the seasonal N requirement applied pre-plant and the remainder applied before August 5. Irrigation requirements are similar to Russet Burbank. Available soil moisture should be maintained above 65% through tuber bulking, but the soil should not be allowed to dry down below 60%ASM prior to harvest to minimize blackspot bruise potential. Over-maturation of the tubers should be avoided by killing vines before natural death and timing the harvest to coincide with the minimum period needed to set skin. Minimization of early blight infection is important if tubers are to be stored. This can be accomplished by treating the vines with effective fungicides, following proper tuber maturation and harvesting procedures, avoiding harvest during wet weather and minimizing tuber damage during handling. Western Russet has shown moderate susceptibility to metribuzin. Lower rates should be used and care should be taken to avoid application during weather conditions that increase injury.

#### **BLAZER RUSSET (A7816-14 x NorKing Russet)**

Released in 2005, Blazer Russet is an early-maturing, dual-purpose variety that has found a niche with the processing industry as a replacement for Shepody. Blazer Russet is resistant to tuber external defects, sugar ends, common and powdery scab, and PVX. It is moderately resistant to blackspot bruise, tuber late blight, and net necrosis. Blazer Russet has moderate susceptibility to hollow heart.

#### **Management:**

Blazer Russet has an intermediate number of eyes that are uniformly distributed and seed piece should range from about 2.0 to 3.0 oz. Seed should be planted at near optimal temperatures (50° F) to minimize the potential for soft rot decay. Dry rot potential of seed lots should also be determined and seed should be treated with an effective fungicide when needed. Optimal seed piece spacing for 36 inch wide rows is 9 to 11 inches with a 5 to 6 inch planting depth. Adequate soil needs to be applied to the surface of the hill at final hilling to minimize tuber greening. Total seasonal nitrogen requirements for Blazer Russet are about 90 to 100% of Russet Burbank but a higher proportion should be applied early in the growing season to facilitate the earlier tuber development. Typically, 1/2 to 2/3 of the seasonal N requirement should be applied by row

closure, with subsequent in-season applications being based on petiole nitrate concentrations. For southern Idaho, the combined total of soil plus fertilizer N for Blazer Russet should range from about 200 lb N/ha in areas with a 400 cwt/a yield potential to 280 lb N/ha in areas with a 600 cwt/a yield potential. Nitrogen uptake decreases substantially after August 1 so applications should not be made after that time. Nitrogen response studies conducted for two years at Aberdeen, Idaho indicate that petiole nitrate sufficiency levels for Blazer Russet are similar to those for Russet Burbank. Seasonal irrigation requirements for Blazer Russet are also similar to those for Russet Burbank, although Blazer Russet is significantly more resistant to water stress-related tuber defects. Therefore, available soil moisture (ASM) should be maintained within the range of 65 to 80% for optimal yield and quality. Plant water uptake decreases appreciably in late August, so irrigation application rates need to be adjusted according to soil moisture measurements to avoid developing excessively wet soil conditions that promote disease. Bruise susceptibility is similar to Russet Burbank. Consequently, low soil moisture (<60% ASM) conditions should be avoided during tuber maturation and harvest to minimize tuber dehydration. Blazer Russet has exhibited good resistance to metribuzin when applied at labeled rates.

**A9045-7: (Ranger Russet x Russet Legend)**

Released in 2006, this lightly-russeted variety is used by the processing industry. Strengths of A9045-7 include a high yield of tubers with an excellent size profile and uniformity, and few external or internal defects. Fry recovery from the field and storage has been high and it shows good potential for the processing market. A9045-7 has good resistance to Verticillium wilt and PVX and is moderately resistant to PVY<sup>o</sup>, common scab, and early and late tuber blight. A weakness is a greater susceptibility to powdery scab infections of the tuber relative to Russet Burbank and a relatively light skin, which may limit its use for fresh pack.

**Management:**

Optimal within-row plant spacing for A9045-7 in southeast Idaho is 10-12 inches for 36-inch wide rows, although a narrower spacing should be used in areas where excessive size has been a problem. Planting depth should be 5-6 inches. Nitrogen requirements for A9045-7 in replicated field trials in southeast Idaho have been about 110-120% of Russet Burbank (270 to 290 lb N/acre). Petiole nitrate sufficiency levels for A9045-7 usually run about 3,000 to 5,000 ppm higher than Russet Burbank through tuber bulking. A9045-7 has good drought tolerance but available soil moisture should still be maintained between 65 and 80% ASM for maximum yield and quality. A9045-7 has demonstrated greater resistance to growth cracks, secondary growth, shatter bruise, and hollow heart than Russet Burbank, particularly under high stress conditions. Blackspot bruise susceptibility of A9045-7 is similar to Russet Burbank and care should be taken to avoid drying soil below 60% ASM during tuber maturation. Metribuzin resistance for A9045-7 is good at normal application rates.

**A93157-6LS: (A87149-4 x A88108-7)**

Released in 2006, this dual-purpose variety is most notable for its resistance to the accumulation of reducing sugars following long-term storage at temperatures as low as 42 F. A93157-6LS is high yielding and has tubers with high specific gravity and few external defects. It is resistant to PVY<sup>o</sup>, common and powdery scab, early dying, and is tolerant of water stress. It is also moderately resistant to tuber early blight and soft rot. Weaknesses include susceptibility to blackspot bruise, Fusarium dry rot, and early season hollow heart. A93157-6LS also has short tuber dormancy, but its ability to store at 42 F can help to prolong dormancy.

**Management:**

Optimal plant spacing for A93157-6LS in 36-inch wide rows in southeast Idaho is 9-11 inches. Seed should be checked for dry rot potential and treated with an effective fungicide if needed. The nitrogen requirement has been about 90% of Russet Burbank in replicated field trials. Most of the N should be applied during tuber bulking. Petiole nitrate sufficiency levels run about 3,000 to 5,000 ppm higher than Russet Burbank early in the season, about the same as Russet Burbank during mid-season and about 2,000-4,000 ppm lower late in the season. Phosphorus requirements for A93157-6LS are 10-20% higher than Russet Burbank. A93157-6LS has good drought tolerance but soil moisture should be maintained above 65% ASM for optimal yield and quality. To minimize hollow heart susceptibility in southeast Idaho, use a 8-9 inch seed piece spacing, reduce early-season N applications, avoid excessive early season soil moisture and plant later if possible. Metribuzin resistance is good at normal application rates.

#### **NDA5507-3Y: (BRODICK X YUKON GOLD)**

Released in 2006, this round-oblong, yellow-fleshed variety is very similar to its parent, Yukon Gold. However, NDA5507-3Y is higher-yielding (12% higher in Idaho) than Yukon Gold and is resistant to PVY<sup>o</sup>, common scab, tuber blight (early and late), net necrosis, blackspot and shatter bruise. It is moderately resistant to dry rot and foliar late blight. Its resistances make it a good candidate for organic production. It also chips acceptably, but its lower specific gravity may limit its use for this purpose.

#### **Management:**

Plant spacing and N response trials are currently underway for NDA5507-3Y, although it has performed well with a plant spacing of 10 to 11 inches, a planting depth of 5-6 inches and N fertilization rates equal to that for Russet Burbank. It also has good resistance to stress-related tuber defects such as growth cracks, second growth and hollow heart.

#### **A95109-1 (Blazer Russet x Summit Russet)**

An advanced breeding clone, A95109-1 has had high fresh merit in Tri-State and Western Regional Potato Variety Trials. A95109-1 is an early-maturing, russeted clone that produces a high percentage of U.S. No. 1 tubers. Its attractive tubers make it very suitable for use by the fresh-pack industry and could also be used as an early processor. It is resistant to external and internal tuber defects and is resistant to common scab. A95109-1 also has moderate resistance to dry rot. Some shatter bruise was noted in this breeding clone in the 2005 and 2006 Western Regional Potato Variety Trial. A decision to release A95109-1 as a variety will be made later this year.

#### **Management:**

Management trials are also underway for A95109-1 to establish optimal plant spacing, nitrogen and irrigation requirements. It has performed well with a 10 to 11 inch plant spacing and N rates similar to Russet Burbank.

#### **A91814-5 (NDA2031-2 x Ivory Crisp)**

A breeding clone bred for use by the chipping industry, A91814-5 completed three years of evaluations in the Western Regional Chip Trial in 2005. In 2007, it will complete its third and final year in the USPB/SFA trials. This breeding clone is notable for its very high yields and specific gravity. Tubers are cold-sweetening resistant and display little or no hollow heart. A91814-5 also has moderate resistance to early dying and corky ringspot. Weaknesses of A91814-5 include susceptibility to PVY<sup>o</sup>, common scab and tuber late blight infection. A decision to release A91814-5 as a variety will be made in 2008.