Highland Russet Management Recommendations - Idaho

Highland Russet is a late-season potato variety with light russet skin notable for its high yield of uniform U.S. No. 1 tubers, and good processing and culinary qualities. It resulted from a 1990 cross between Ranger Russet and Russet Legend and has been evaluated for over 15 years in public and industry trials throughout the western U.S. Highland Russet was released in 2006 by the USDA-ARS and the Agricultural Experiment Stations of Idaho, Oregon and Washington and is a product of the Northwest Potato Variety (Tri-State) Development Program. It is suitable for processing into French fries and other frozen potato products with excellent fry recovery directly from the field or from extended storage and fry color and processing ratings similar to Ranger Russet.

A limited number of studies on the management of Highland Russet have been conducted in southern Idaho. Results of these studies may provide growers in these and other production regions with the basis for developing appropriate management guidelines for their locale.

Seed and Pest Management

Optimal seed size for Highland Russet is about 2.5 oz. Seed should be planted near optimal temperatures (about 50-55^{o}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. A narrower spacing should be used if excessive tuber size is a concern. Adequate soil needs to be applied to the surface of the hill at final hilling to minimize tuber greening.

Highland Russet has exhibited good resistance to metribuzin when applied at labeled rates. It has an erect, medium sized vine that matures late in the growing season and competes reasonably well with weeds after row closure during early to mid-tuber bulking. Highland Russet is moderately resistant to Verticillium wilt and powdery scab root galling, as well as to tuber infections of late blight. It is also moderately resistant to common strains of potato virus Y (PVY^{O}) but is susceptible to PVY^{NTN}. It is moderately susceptible to pink rot, common scab, powdery scab of the tuber and early blight of the tuber, as well as to *Pectobacterium* soft rot and *Fusarium* dry rot. Highland Russet is susceptible to foliar late blight, PLRV, Root-knot nematode and corky ringspot and is moderately susceptible to PLRV net necrosis.

Soils infested with Root-knot nematodes or a history of severe early die problems should be fumigated. Routine fungicide applications should also be made to prevent serious early blight infections. Early blight control for tubers in fields scheduled for storage can be facilitated by minimizing tuber skinning and bruising during harvest and subsequent handling and avoiding harvesting in wet weather conditions.

Nutrient Management

Total seasonal nitrogen requirements for Highland Russet are similar to Russet Burbank.

Typically, 1/3 to 1/2 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, total soil plus fertilizer N recommendations are 240 lb N/acre in areas with a 400 cwt/acre yield potential, 280 lb N/acre in areas with a 500 cwt/acre yield potential and 320 lb N/acre in areas with a 600 cwt/acre yield potential. Nitrogen uptake decreases significantly after August 10-14 so N applications should not be made after that time. Nitrogen response studies conducted for two years at Aberdeen, Idaho indicate that petiole nitrate levels for Highland Russet tend to run about 3,000 to 5000 ppm higher than Russet Burbank during tuber bulking.

Phosphorus, potassium and micronutrient requirements have not been established for Highland Russet. Therefore, it is recommended that growers follow local nutrient management recommendations for Russet Burbank until new guidelines for Highland Russet become available.

Irrigation Management

Seasonal irrigation requirements for Highland Russet are similar to those for Russet Burbank, although Highland 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 and enlarged lenticels. Bruise susceptibility is similar to Russet Burbank. Therefore, low soil moisture (<60%ASM) conditions should be avoided during tuber maturation and harvest to minimize tuber dehydration. The incidence of hollow heart in Highland Russet is low, similar to that of Ranger Russet and lower than Russet Burbank, while its blackspot bruise reaction is similar to Russet Burbank.

Storage Management

Tuber dormancy for Highland Russet is about 70 days shorter than Russet Burbank at 45^{o}F and 60 days at 48^{o}F. Consequently, sprout inhibition will normally be required after 2 to 3 months when tubers are stored at this temperature range. In the absence of dry rot problems, Highland Russet can be stored for up to 9 months for processing with proper management.

Glucose concentrations for Highland Russet during two years of storage research ranged from 0.07 to 0.10% (fresh wt basis) at both 45^{o}F and 48^{o}F from about 30 days after harvest throughout nine months of storage. USDA fry color scores from non-stressed tubers also remained acceptable ($\leq$2.0) during nine months of storage. At 45^{o}F, glucose peaked at about 180-190 days after harvest, but at 48^{o}F, glucose peaked at about 80-110 days in storage and then gradually decreased with time. Research indicates that in growing seasons with normal temperatures, a storage temperature of 45-47^{o}F is appropriate for processing. However, in years with significant periods of high temperature stress, a higher storage temperature (48^{o}F) may be necessary to maintain optimum processing quality.