Clearwater Russet Management Recommendations for Idaho

A limited number of studies for developing management practices optimal for the production of Clearwater Russet were conducted in southern Idaho. Results of these studies may provide growers in these and other production regions with a basis for developing appropriate management guidelines for their locale.

Seed and Pest Management

Optimal seed size for Clearwater Russet is about 2 to 3 oz. Seed should be planted near optimal soil temperatures 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. Planting depth should be 6 to 8 inches from the top of the seed piece to the top of the hill. Seed piece spacing for 36 inch wide rows should be 10 to 12 inches for fresh market use, but spacing may be increased to13 inches for processing if a larger size profile is desired.

Clearwater Russet has exhibited good resistance to metribuzin when applied at labeled rates. It has an erect, medium sized vine with medium-late maturity but competes reasonably well with weeds after row closure during early to mid-tuber bulking. 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 Clearwater Russet are about 25% less than Russet Burbank for a given amount of yield produced. 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 range from about 180 lb N/acre in areas with a 400 cwt/acre yield potential, 210 lb N/acre in areas with a 500 cwt/acre yield potential and 240 lb N/acre in areas with a 600 cwt/acre yield potential. Nitrogen uptake decreases significantly after mid August so N applications should not be made after that time.

Nitrogen response studies conducted for two years at Aberdeen, Idaho indicate that optimal petiole nitrate concentrations for Clearwater Russet should be about 18,000 to 22,000 ppm at the end of tuber initiation, and about 15 to 18,000 ppm during mid-bulking. During late bulking, petiole nitrate concentrations should be allowed to decrease to 7,000 to 10,000 ppm.

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

Irrigation Management:

Seasonal irrigation requirements for Clearwater Russet are similar to those for Russet Burbank, although Clearwater Russet is significantly more resistant to water stress-related tuber defects. Therefore, available soil moisture (ASM) should be maintained within the range of 70 to 85% 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. Low soil moisture (<60%ASM) conditions should be avoided during tuber maturation and harvest to minimize tuber dehydration and blackspot bruise.

Harvest Management:

Irrigation rates should be gradually reduced during the remaining few weeks prior to vine kill to avoid excessive soil moisture and allow tuber hydration to decrease to a moderate level during skin set. Standard practices for minimizing tuber impact damage during harvest and transfer to storage should be followed to reduce the potential for shatter and blackspot bruise. Tuber damage should also be minimized to limit the potential for dry rot development.

Storage:

Over a three year period, tubers of Clearwater Russet and Russet Burbank were evaluated for response to *Fusarium* dry rot. The results indicate that Clearwater Russet has equal to higher susceptibility to *F. sambucinum* than Russet Burbank. Clearwater Russet is only moderately susceptible to dry rot caused by *F. solani* var. *coeruleum*. On the basis of these results, additional care during harvest and handling is recommended for Clearwater to mitigate wounding that allows for entry and infection of tubers by *Fusarium*.

Tuber dormancy length of Clearwater Russet is approximately 58 days shorter than Russet Burbank when held at storage temperatures ranging from 42^{o}F to 48^{o}F. Treatment for sprout inhibition with chlorpropham should be made within the first 2 months of storage if storing at relatively warmer temperatures of 45^{o} F to 48^{o} F. Shrinkage or percent weight loss throughout the storage season is similar to that of Russet Burbank. Storage temperature range recommendation for fresh market use of Clearwater Russet is 42^{o} to 45^{o}F. Clearwater Russet can be successfully stored for this purpose up to 9 months in the absence of problematic disease development within the storage.

Clearwater Russet has excellent processing qualities. Percent glucose (fresh wt basis) is below 0.08% at 42^{o} F and below 0.05% at 45^{o} F and 48^{o}F throughout 9 months storage at

these temperatures. Percent sucrose concentration is similar to Russet Burbank at harvest and throughout the 9 month storage duration. Fry color is lightest (USDA 1 or lighter) at 45^{o} F and 48^{o} F storage temperatures with the 48 ^{o} F temperature ameliorating seasonal variability in sugar content and fry color. Mottling, a dark, uneven coloration which can occur in fried products is occasionally observed in tubers held at 42^{o}F and seldom observed at 45 ^{o} F and 48^{o} F storage temperatures. For the frozen processing market, it is recommended to store Clearwater Russet at 45^{o} F to 48^{o} F for optimum processing quality unless a known stress occurred during the growing season that may warrant consideration of slighter higher temperatures.