

Mountain Gem Russet

MANAGEMENT GUIDELINES

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

Southern Idaho

Optimal seed size for Mountain Gem Russet is approximately 2-3 oz. Recommended final planting depth is 20 cm from the top of the hill to the top of the planted seed piece.

Seed should be treated and planted in soil with optimal temperature (45-55°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.

Mountain Gem 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 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. Effective fungicide application programs should be used to prevent serious early blight infections.

Early Harvest Production

For early harvest production, seed piece spacing with rows spaced 36 inches apart should be 9-10 inches for fresh market use, with seed spacing increased to 10 to 11 inches for processing.

The total seasonal nitrogen requirements for Mountain Gem Russet are about 10-20% less than Russet Burbank per unit of yield produced, depending on the length of the growing season. For early harvest production in southern Idaho, total soil plus fertilizer N recommendations should range from about 160-180 lb N/acre in areas with a 400 cwt/acre yield potential, to 190-210 lb

N/acre with a 500 cwt/acre yield potential, and 220-240 lb N/acre in areas with a 600 cwt/acre yield potential. About 100-120 lb N/acre (soil plus applied N) should be available at tuber initiation, with the remaining N applied via sprinkler irrigation prior to the last week of July. Nitrogen response studies conducted for two years at Aberdeen, Idaho indicate that petiole nitrate levels for Mountain Gem Russet grown for early fresh market should be about 18,000 ppm at the end of tuber initiation and decrease to 12,000 ppm during mid-bulking and about 8,000 ppm during late bulking.

Late Harvest (Full Season) Production

For late harvest production, seed spacing of 9 to 10 inches with rows spaced 36 inches apart is also recommended for either fresh market or processing. Seasonal soil plus fertilizer N rates should be increased to 180-200 lb N/acre for a 400 cwt/acre yield potential, 210-230 lb N/acre with a 500 cwt/acre yield potential, and 240-260 lb N/acre in areas with a 600 cwt/acre yield potential. Petiole nitrate levels for Mountain Gem Russet grown for late harvest production should be about 20,000 ppm at the end of tuber initiation and decrease to 14,000 to 16,000 ppm during mid-bulking decreasing to 10,000 ppm during late bulking.

Phosphorus, potassium and micronutrient requirements have not been established for Mountain Gem Russet. Therefore, it is recommended that growers follow local nutrient management recommendations for Russet Burbank (Stark et. al., 2004) until new guidelines for Mountain Gem Russet become available.

Irrigation Management:

Seasonal 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 as vines senesce, so irrigation application rates need to be adjusted to maintain ASM at about 60% to 70% to avoid developing excessively wet soil conditions that promote disease and enlarged lenticels. Low soil moisture conditions appreciably below 60% ASM should be avoided during tuber maturation and harvest to minimize tuber dehydration and blackspot bruise. However,

because of its susceptibility to shatter bruise, Mountain Gem Russet should be harvested with a moderate tuber hydration level.

Harvest Management:

Mountain Gem Russet is susceptible to shatter bruise and therefore should be handled as gently as possible to minimize bruising. Irrigation rates should be gradually reduced during the last two weeks prior to vine kill to allow tuber hydration to decrease to an intermediate level during skin set. Standard practices for minimizing tuber impact damage should be followed to reduce the potential for shatter bruise. 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.

Columbia Basin of Washington

When grown in the Columbia Basin of Washington, Mountain Gem Russet typically produces a medium to large tuber size profile, similar to Ranger Russet and slightly larger than Russet Burbank and Russet Norkotah. Five years of in-field testing in Othello, WA revealed that Mountain Gem Russet tends to produce about 0.6 to 1.0 more tubers per plant than the same three varieties listed above. Agronomists should note that across the five years of evaluation in WA, hollow heart tended to be more serious when Mountain Gem Russet was planted early, before the middle of April, when compared with later planting dates. Due to tuber size profile similarities with Ranger Russet, we recommend Mountain Gem Russet seed pieces be planted in a spatial arrangement similar to that of Ranger Russet (recommendations shown below), regardless of market choice (fresh or process). Seed piece size should range from 1 ½ to 3 oz., planted into rows spaced 34 inches apart. Recommended final planting depth is 8 inches from the top of the hill to the top of the planted seed piece.

Early Harvest Production – Fresh and Process Markets:

Although Mountain Gem Russet is not an early-maturing variety, it could be grown in the Columbia Basin for an early-to mid-season harvest, especially if the vines were removed prior to

natural maturity. For an early-to mid-season harvest between mid-July and mid-August, (100-120 days after planting (DAP)), seed pieces should be spaced approximately 12 inches apart in-row; beyond 120 DAP, space 10 inches apart. Total seasonal N applications should be 160 to 220 lb N/acre, including pre-plant and residual inorganic soil N ($\text{NO}_3\text{-N}$ plus $\text{NH}_4\text{-N}$). A total of 125 to 150 lb N/acre (residual soil N plus fertilizer N) should be available in the root zone at emergence. The remaining N should be applied via overhead irrigation during tuber bulking. Adequate N should be applied to maintain petiole $\text{NO}_3\text{-N}$ concentrations at the end of tuber initiation (about 60 DAP) above 18,000 ppm and total inorganic soil N above 50 lb N/acre. During early bulking (about 80-90 DAP), petiole $\text{NO}_3\text{-N}$ concentrations should be about 15,000 ppm and soil inorganic N should be below 50 lb N/acre. Petiole $\text{NO}_3\text{-N}$ should be allowed to decrease to <12,000 ppm at mid- to late-bulking (approximately 100-110 DAP).

Late Harvest (Full Season) Production – Fresh and Process Markets:

For full season growth with a harvest between mid-August and October (>130 DAP), seed should be spaced 10 inches apart in-row. Nitrogen fertilizer management should be similar to the recommendations for early harvest-fresh market, with the exception that for harvest later than mid-September, growers should strive to keep their petiole $\text{NO}_3\text{-N}$ concentrations at the end of tuber initiation (about 60 DAP) above 22,000 ppm and total inorganic soil N above 90 lb N/acre, between 18,000 to 22,000 ppm at early bulking (80-90 DAP) and between 8,000 to 13,000 ppm during late bulking (approximately 125 DAP).

Management guidelines for nutrients other than N have not been established for Mountain Gem Russet. Therefore, it is recommended that growers follow local nutrient management recommendations for Russet Burbank (Lang et. al, 1999) until new guidelines for Mountain Gem Russet become available.

Irrigation Management:

Available soil moisture (ASM) should be maintained at 75% to 85% from full emergence until late bulking. As vines senesce, ASM should be reduced to 60% to 65%. Avoid excessive soil

moisture from mid to late bulking to minimize lenticel swelling. See Idaho recommendations above for additional irrigation and harvest management suggestions.

Storage Management

Mountain Gem Russet was tested in the UI Kimberly Potato Storage Trial during the 2013-14 storage seasons. Dormancy length of Mountain Gem Russet tubers was short to moderate. Dormancy length across a range of storage temperatures was 120 days at 42°F, 90 days at 45°F, and 70 days at 48°F. By comparison, dormancy length in Russet Burbank for the same years was 190 days at 42°F, 165 days at 45°F, and 140 days at 48°F.

Percent glucose in Mountain Gem Russet tubers was similar to Russet Burbank at 42°F storage. At 45°F and 48°F, percent glucose was lower than 0.10% fresh weight and generally lower than Russet Burbank. Fry color values in Mountain Gem Russet tubers remained ≤USDA 2 at 48°F throughout the 9-month storage period. At 45°F fry color in Mountain Gem Russet ranged from USDA 2 - 3. At 45°F, average fry color in Mountain Gem Russet was USDA 4. By comparison, fry color in Russet Burbank tubers was ≥USDA 4 at 42 and 45°F, and a ≥USDA 3 at 48°F during the same storage time. Mottling, which is thin, thread-like areas of dark coloration found in the cortex of the fried potato tissue was mild to moderate in Mountain Gem Russet and similar to that of Russet Burbank. The mean percent weight loss over 9 months of storage at three temperatures was 10% in Mountain Gem Russet, which was not significantly different than Russet Burbank (8%).

References

Lang, N.S., R.G. Stevens, R.E. Thornton, W.L. Pan, and S. Victory. 1999. Nutrient Management Guide: Central Washington Irrigated Potatoes. Washington State University Experiment Station Extension Bulletin EB1882.

Stark J, D Westermann, and B Hopkins. 2004. Nutrient management guidelines for Russet Burbank potatoes. University of Idaho Extension Bulletin No. 840, 12 p.