

Mountain Gem Russet Cultural Management Recommendations for the Columbia Basin of WA and OR

March 2018 MJ Pavek, ZJ Holden and Alejandro Cruz - WSU

Disclaimer: This may change slightly in near future as research and grower feedback increases.

Columbia Basin of WA and OR: Mountain Gem Russet (MGR) typically produces a medium to large tuber size profile, similar to Ranger Russet and slightly larger than Russet Burbank and Russet Norkotah. Mountain Gem Russet tends to produce slightly more tubers per plant (~0.6 to 1.0) than the same three varieties listed above. Recommended seed-piece depth is 7-8 inches from top of hill to top of seed piece, after all post-planting tillage is finished. Similar to most varieties grown in the Columbia Basin, MGR will produce up to 6% more net revenue when planted into 32-inch rows versus 34-inch rows.

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 11-12 inches apart in-row. Total seasonal N applications should be 250-280 lbs/A, including pre-plant and residual inorganic soil N (NO₃-N plus NH₄-N). See also “Nitrogen Management” section and figures below.

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 10-11 inches apart in-row (see figures). Total seasonal N applications should be 285-310 lbs/A for fresh-market and 330-350 lbs/A for process market, including pre-plant and residual inorganic soil N (NO₃-N plus NH₄-N). See also “Nitrogen Management” section and figures below.

Nitrogen Management

We recommend applying pre-plant or at-planting nitrogen so there is 125- to 150-lbs/A of available N (soil residual N + applied) in the root zone at emergence. Petiole and soils during the growing season should be used as a guide, however, growers should strive to hit the season total N targets (Table 1).

Petiole values alone should not drive in-season nutrient applications. Petiole and soil samples should be collected prior to row closure and continue through the season until late bulking (once every 2 weeks is adequate). Soil N should be at or below 50 lbs/A by mid-July and plants kept healthy via “spoon-feeding” of nitrogen. With low soil N and the cessation of N applications prior to mid-August, plants will be able to adequately mature during August and September. Full season rates do not account for N applications to aid in crop residue breakdown.

Table 1. Full-season nitrogen rates and associated petioles values for Mountain Gem Russet. These rates and values were those that maximized grower return for each variety following three years of research. Growers should strive to hit the full-season target rates.

Mountain Gem Russet	Full-Season Nitrogen Target Rate*	Petiole Nitrate Target Concentrations			
		June 15	June 30	July 15	July 30
	lbs/A	-----% NO ₃ -N-----			
Process Market	340	2.6	2.3	2.0	1.8
Fresh Market	300	2.6	2.1	1.8	1.6

(*Soil residual N + applied fertilizer)

Nutrients other than Nitrogen:

Management guidelines for nutrients other than N have not been established for Mountain Gem Russet, however, preliminary research results indicate Mountain Gem Russet responds well to 250 lbs P₂O₅. Soil pH and phosphorus tie-up can alter results. For additional info, growers should follow local nutrient management recommendations for Russet Burbank (Lang et al. 1999) until new guidelines for Mountain Gem Russet become available. (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.)

Irrigation Management:

Available soil moisture (ASM) should be maintained at 75% to 85% from full emergence until late bulking, avoid excessive irrigation. As vines senesce, ASM should be reduced to 60% to 65%. Avoid excessive soil moisture from mid to late bulking to prevent disease, rot, and shatter bruising at harvest.

Harvesting and Handling Mountain Gem Russet

Mountain Gem Russet is susceptible to shatter and blackspot bruising at harvest. Shatter, mechanical cracking, thumbnail cracks, and air checks are terms that refer to hairline fractures in the tuber that typically result when turgid tubers collide with a solid surface. Susceptibility to shatter is often variety specific and heavily influenced by a variety's genetics. Genetic potential plus the environmental conditions conducive for shatter can be devastating to a grower's pocket book. Shatter can reduce marketability and lead to excessive rot in storage. Turgid tubers (firm, well hydrated, high fluid content) are more susceptible to shatter bruise than flaccid tubers.

To prevent shatter:

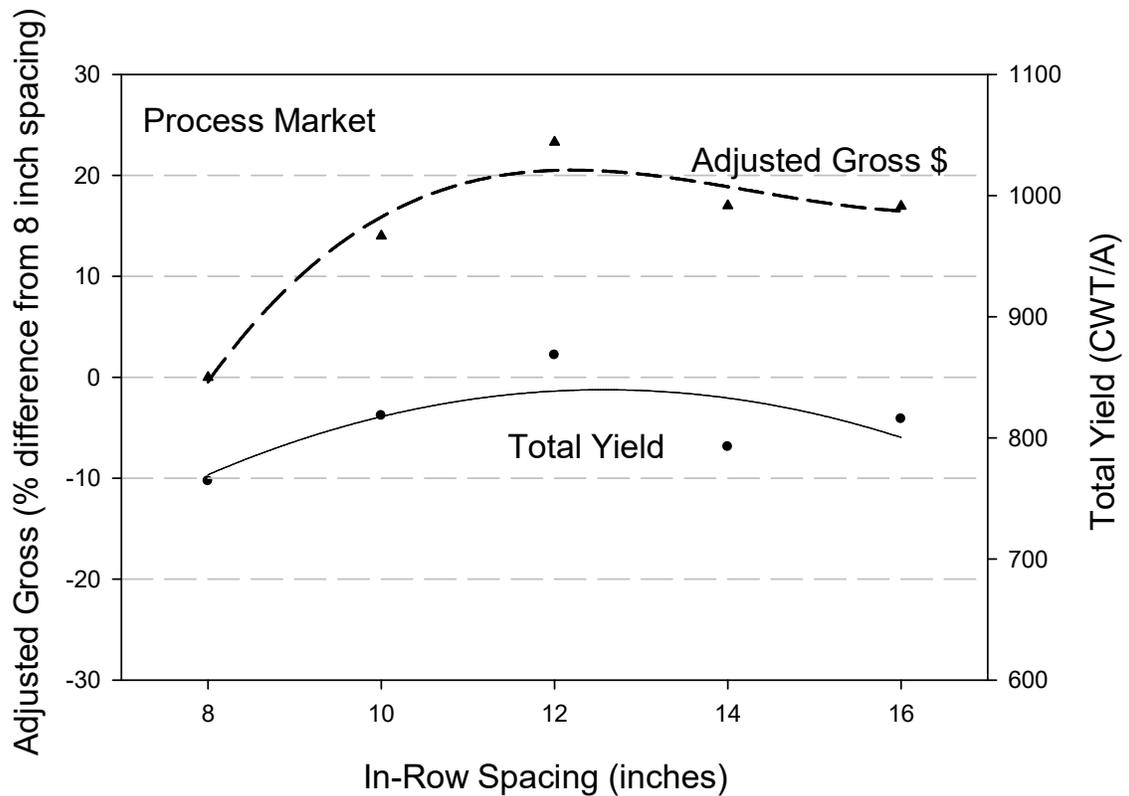
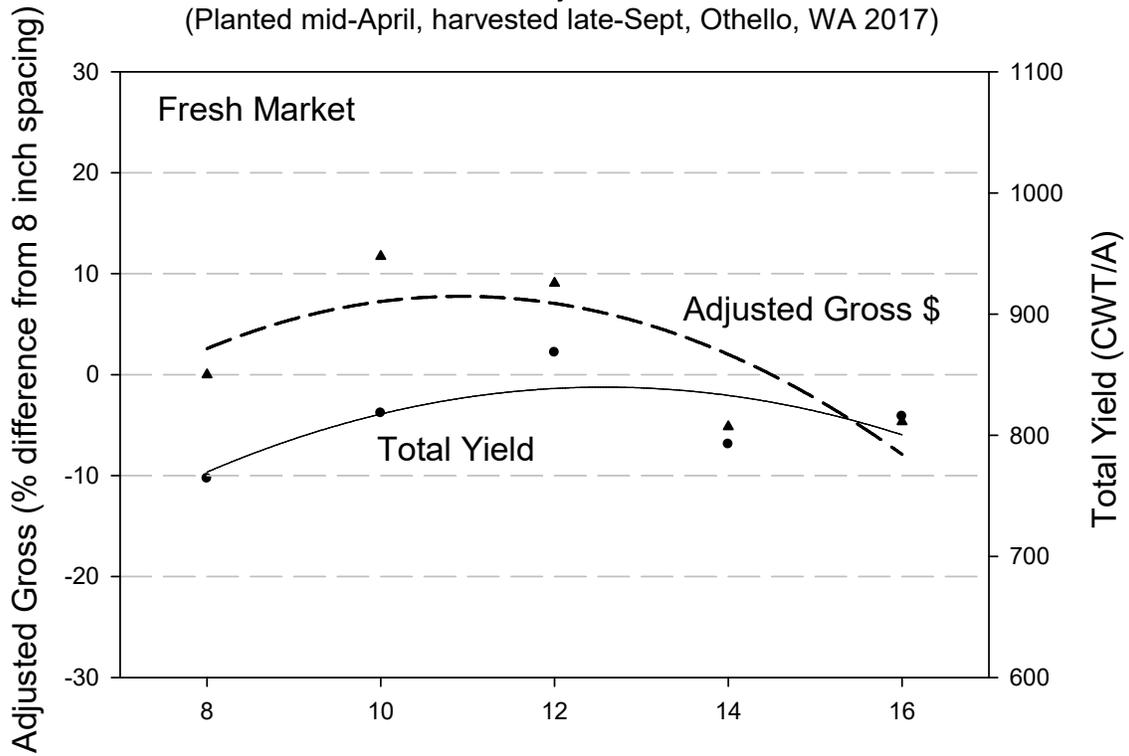
- 1) Your goal should be to dehydrate (reduce turgor) the tubers to a level that will minimize shatter
- 2) Warm temperatures and dry soils facilitate dehydrating tubers
- 3) Best to harvest tubers when it is warm (pulp temp as warm as possible ~ 65F might be ideal)
- 4) Allow 14-21 days after vine kill
- 5) If possible, irrigate just prior to harvest to reduce bruising from clods, etc.
- 6) Follow steps outlined in the "Preventing Potato Bruise Damage" by Mike Thornton & Bill Bohl located at: www.cals.uidaho.edu/edcomm/pdf/BUL/BUL0725.pdf
- 7) Review also: "Thumbnail Cracks of Potato Tubers" By Bill Bohl & Mike Thornton, located at: www.cals.uidaho.edu/edcomm/pdf/CIS/CIS1129.pdf

Unfortunately, some of the things, like warmer temperatures and tuber turgidity, that help to prevent shatter bruising can exacerbate blackspot bruising and vice versa. Do your best to handle all tubers gently and minimize conveyor drop heights.

IMPORTANT PRODUCTION CONCERNS:

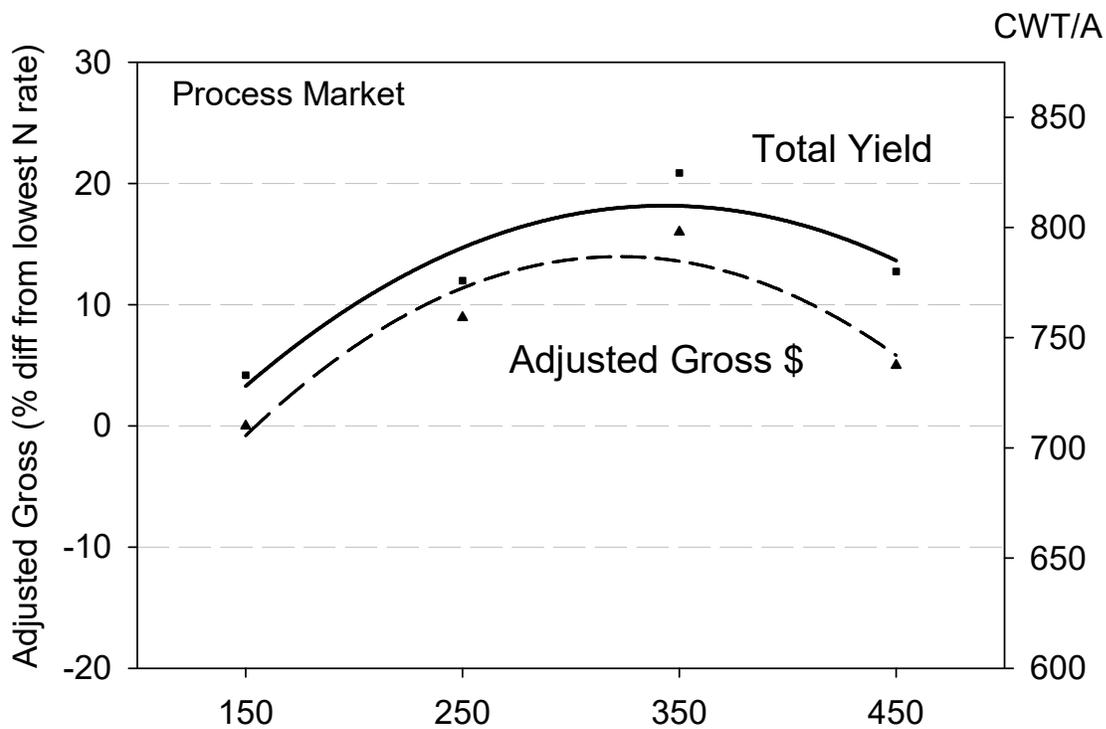
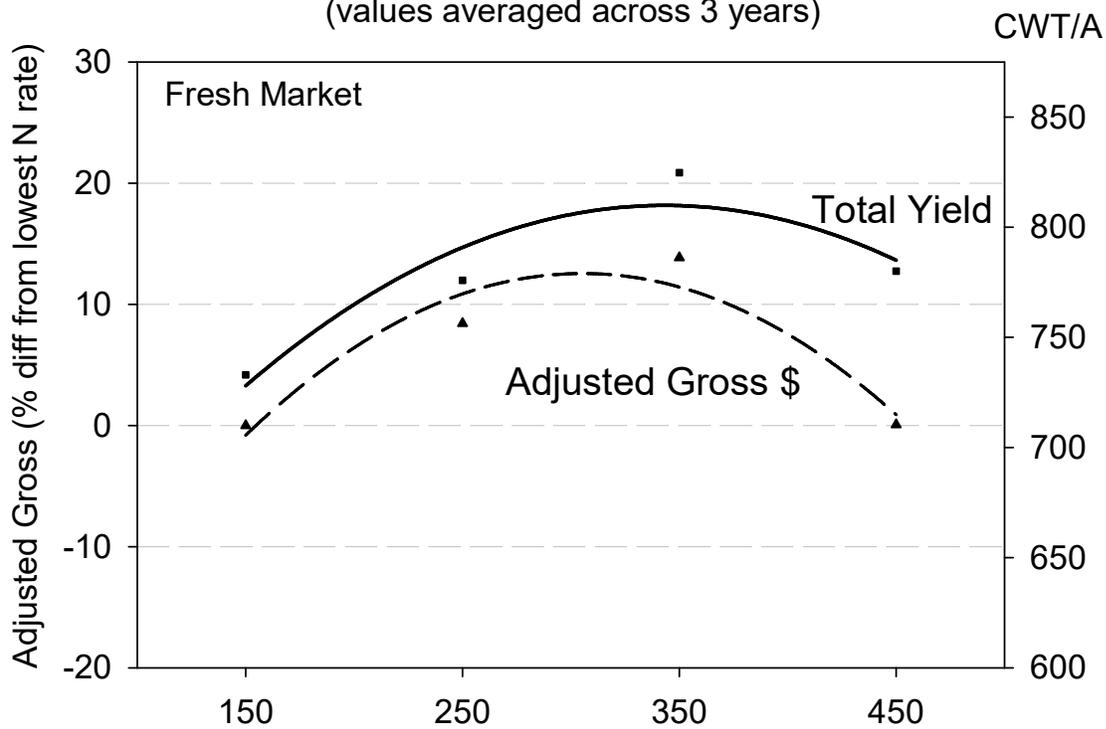
- Mountain Gem Russet is susceptible to hollow heart. When MGR is grown near Othello, WA hollow heart tends to be more serious when planted early, before the middle of April, than later planting dates.
- Mountain Gem Russet is more susceptible to shatter and blackspot bruising than Russet Norkotah, handle gently.
- In cold storage some Mountain Gem Russet tubers may develop a slight, purple hue within the skin. This is normal, due to genetics, and safe to consume; however, consumers may be concerned. The longer the storage, the greater the chances of purpling.

Mountain Gem Russet, Late-Harvest In-Row Spacing Trial
 Fresh Market, Seed-Cost Adjusted Gross, and Total Yield
 (Planted mid-April, harvested late-Sept, Othello, WA 2017)



Mountain Gem Russet Full Season Nitrogen Rate Trial

Fert-Cost-Adjusted Income and Total Yield
(values averaged across 3 years)



Nitrogen Rate (lbs/A)
(soil residual + applied, 1/3 pre-plant, 2/3 fertigated)
(does not account for N needed to break down rotation crop residue)