Colorado Potato Cultivar Management

Research Data Summary 2011




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-Comments Welcome-

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MISSION STATEMENT

The mission of the Colorado Potato Cultivar Management and Physiology Program is to develop cultural management guidelines for the successful production of newly released and existing potato cultivars, as well as advanced potato selections that have the potential of being released, through field and laboratory research.

INTRODUCTION

Each potato cultivar has its own unique set of cultural management requirements for maximizing tuber yield of premium size and grade tubers. Therefore, cultural management practices that maximize tuber production and quality of each potato cultivar must be developed.

The best guidelines for fertility practices, irrigation management, plant population management, vine kill management, and other management practices are obtained from field experiments conducted in replicated trials. New cultivars are much more successful when release is accompanied by cultivar specific management guidelines. Information reported in this book reveals management practices that are agronomically sound, economically advantageous, and environmentally responsible, while optimizing potato tuber yield and quality.

When management guidelines are tailored for individual cultivars it leads to the successful, sustainable, and economic production of the cultivar, which results in the optimization of its genetic potential, while minimizing economic inputs and environmental degradation.

In 2011, new potato cultivars were evaluated under Colorado production conditions for their response to nitrogen application management, plant population (in-row seed spacing) management, soil amendments, and preceding green manure and/or cover crops.

MATERIALS AND METHODS

Nitrogen Management Studies

The field studies were laid out as randomized complete block designs. Treatments were replicated four times. Treatments included nitrogen application rates at 60, 120, and 180 lb N/ac. A control treatment was included in all studies, where no nitrogen fertilizer was applied.

Soil samples were taken from each experimental site in the spring of 2011. The soil samples were analyzed for residual soil nitrate nitrogen. Water samples were taken from the irrigation well and analyzed for nitrate nitrogen concentration. The residual soil and irrigation water nitrate nitrogen concentration added up to 29 lb N/ac in the cultivars CO99053-3RU, Purple Majesty, Canela, and AC99329-7PW/Y experimental plots. Residual soil and irrigation water nitrate N added up to 26 lb N/ac in the Russet Norkotah and Premiere Russet experimental plots. Knowledge of the residual soil and irrigation water nitrate nitrogen content is important to help estimate how much nitrogen fertilizer will be needed to apply to the potato crop for optimum tuber yield and quality. Residual soil N + irrigation water N + applied N fertilizer = available nitrogen for the plant.

Sixty lb N/ac was applied pre-plant to all plots except the control. The remainder of each treatment was applied in-season in three equal parts. Urea ammonium nitrate (32-0-0) was used as source of N fertilizer application. In-season N application began just after tuber formation. Subsequent application was done at weekly intervals. Nitrogen Fertilizer application ended on July 26 (about 77 days after planting).

Potato seed piece were cut and suberized for 7 days before planting. CO99053-3RU and Purple Majesty were planted on May 9, 2011, and Canela, AC99329-7PW/Y, Russet Norkotah, and Premiere Russet were planted on May 10, 2011. Vines were killed by mechanical flailing on September 8, 2011, and harvesting was done on September 28 and 29, 2011.

Plant Population Management (In-row seed spacing) Studies

The in-row seed spacing studies were laid out in the field as randomized complete block design. Each treatment was replicated four times. Each plot consisted of 3 rows spaced at 34 inches apart. In-row seed spacing treatments included planting seed at 10, 12, and 14 inches spacing. All potato seed were planted by hand. Seed was cut and suberized for 7 days before planting on May 17, 2011. Vines were killed by mechanical flailing on September 8, 2011, and potatoes harvested on 29 and 30 September, for Canela, AC99329-7PW/Y, and CO99100-1RU. CO99053-3RU and Purple Majesty were harvested on October 4, 2011.

RESULTS AND DISCUSSION

CO99053-3RU

Nitrogen Management of CO99053-3RU

Tuber Yield and Tuber Size Distribution

Optimum tuber yield of CO99053-3RU was obtained at available nitrogen (soil + irrigation water + applied nitrogen) rate of 150-160 lb N/A (fig. 1)

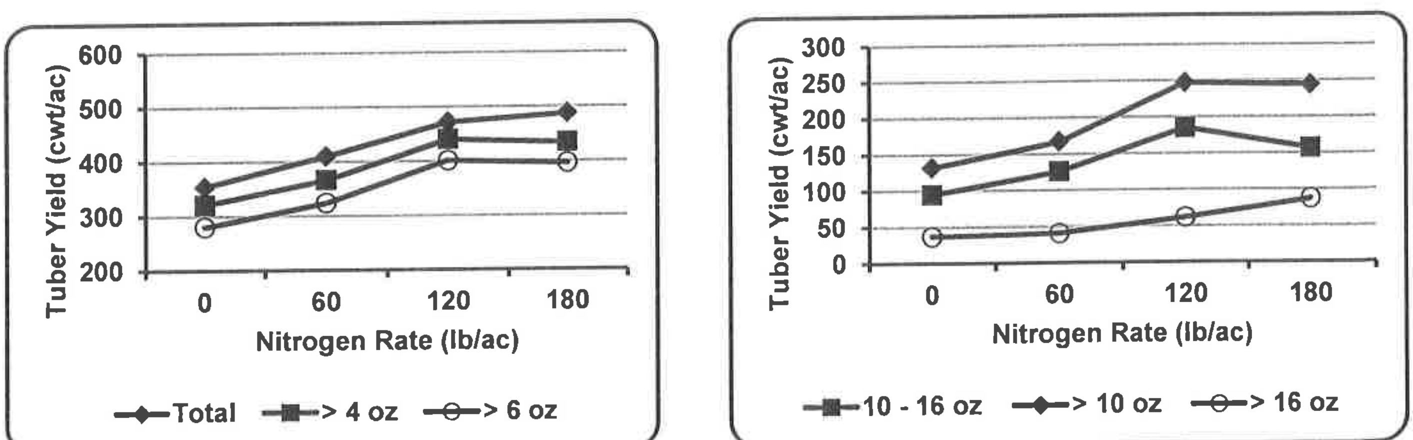


Fig. 1. Response of CO99053-3RU tuber yield and tuber size distribution to nitrogen application rate.

In-season petiole nitrate nitrogen concentration of CO99053-3RU

To obtain optimum tuber yield, petiole nitrate nitrogen concentration of CO99053-3RU should range from 5900 ppm at 70 days after planting to 2000 ppm at 84 days after planting (fig. 2)

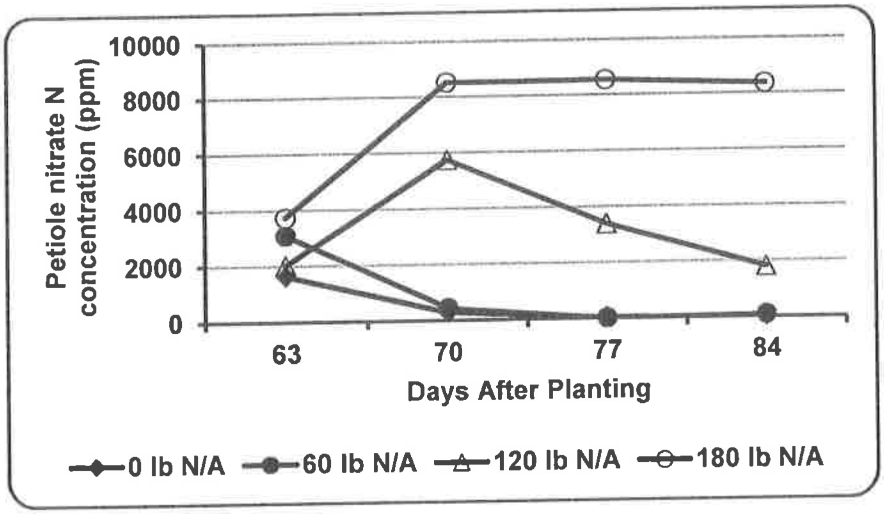


Fig. 2. Effect of nitrogen application rate on petiole nitrate nitrogen concentration of CO99053-3RU

Tuber External and Internal Defects

Tuber external and internal defects were reduced by 1.6% and 6.0%, respectively, when available N rate was 150 lb N/A, compared to the control (fig. 3 a,b).

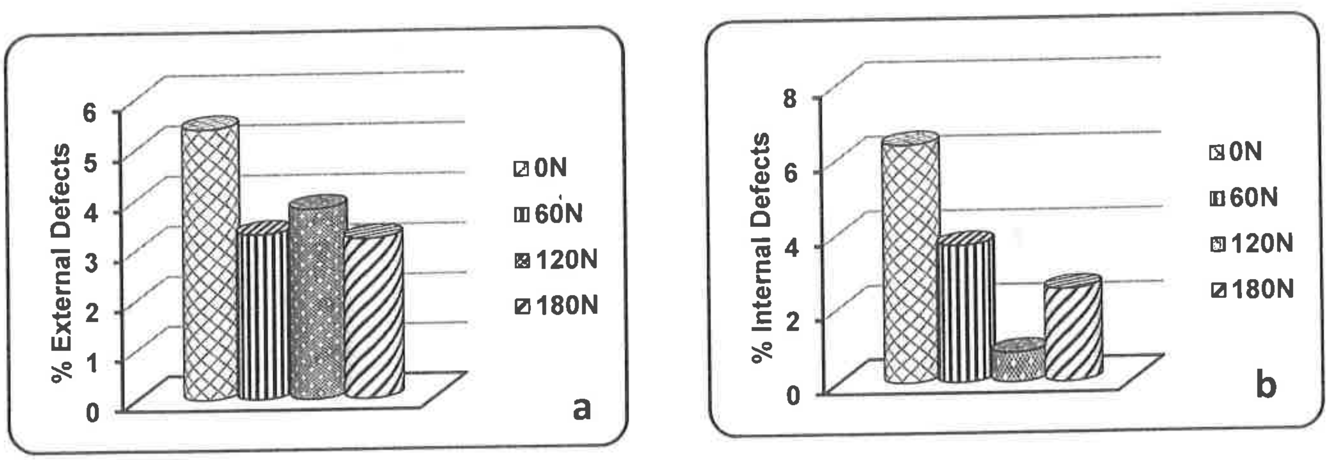


Fig. 3. Effect of nitrogen application rate on a) tuber external and b) internal defects of CO99053-3RU.

External defects include growth cracks, knobs, and misshapes.
Internal defects include hollow heart and brown center

Tuber Specific Gravity

Tuber specific gravity was high (1.095) at available N rate of 150 lb N/ac. Tuber specific gravity dropped to 1.085 when available N rate increased to 209 lb N/ac (fig. 4)

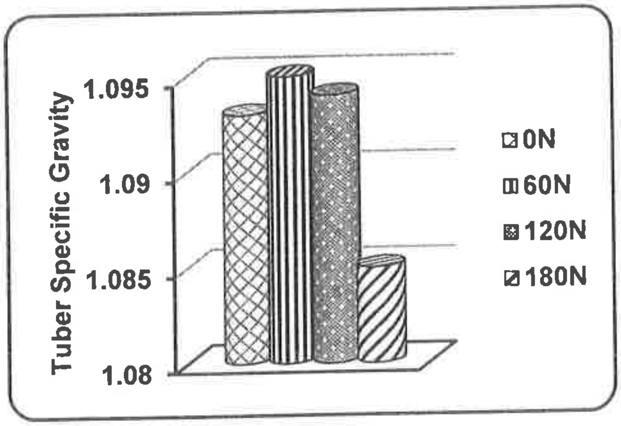


Fig. 4. Effect of nitrogen application rate on tuber specific gravity of CO99053-3RU.

In-Row Seed Spacing Management of CO99053-3RU

Tuber Yield and Tuber Size Distribution

To obtain optimum yield with reduced seed input, CO99053-3RU should be planted at a spacing of 12-13 inches (fig. 5).

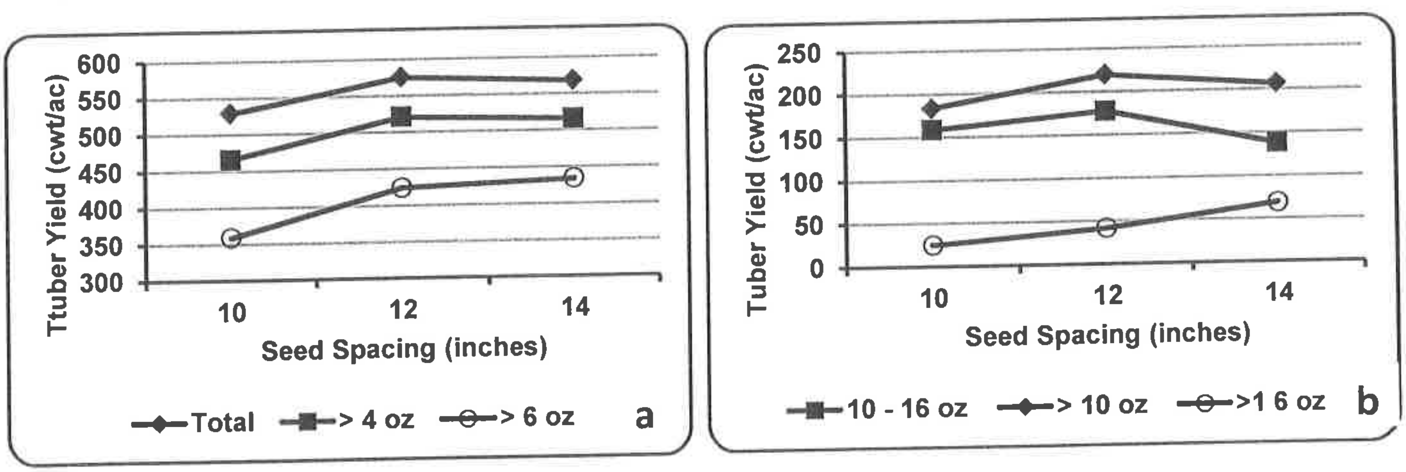


Fig. 5. Yield response of CO99053-3RU to in-row seed spacing.

Effect of In-row Seed Spacing on Tuber External and Internal Defects

Tuber external and internal defects were reduced when CO99053-3RU was planted at within row spacing of 12 inches (fig. 6).

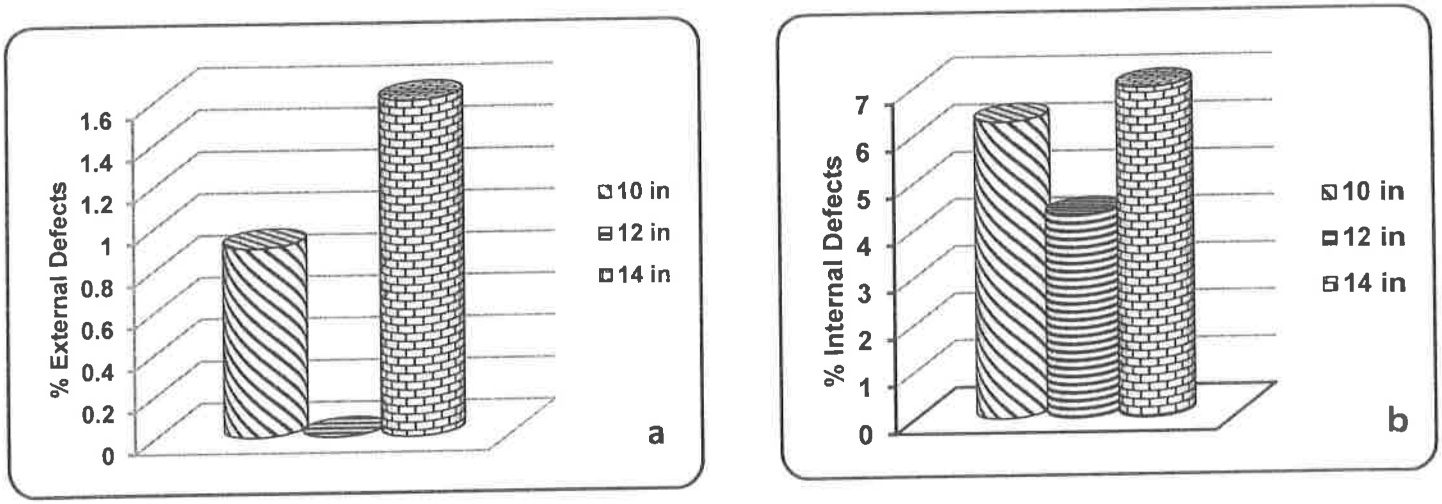


Fig. 6. Effect of in-row seed spacing on tuber a) external and b) internal defects of CO99053-3RU.
External defects include growth cracks, knobs, and misshapes.
Internal defects include hollow heart and brown center

In-row Seed Spacing and Tuber Specific Gravity of CO99053-3RU

Tuber specific gravity was high in this study (1.092). In-row seed spacing did not influence tuber specific gravity in 2011 (fig. 7).

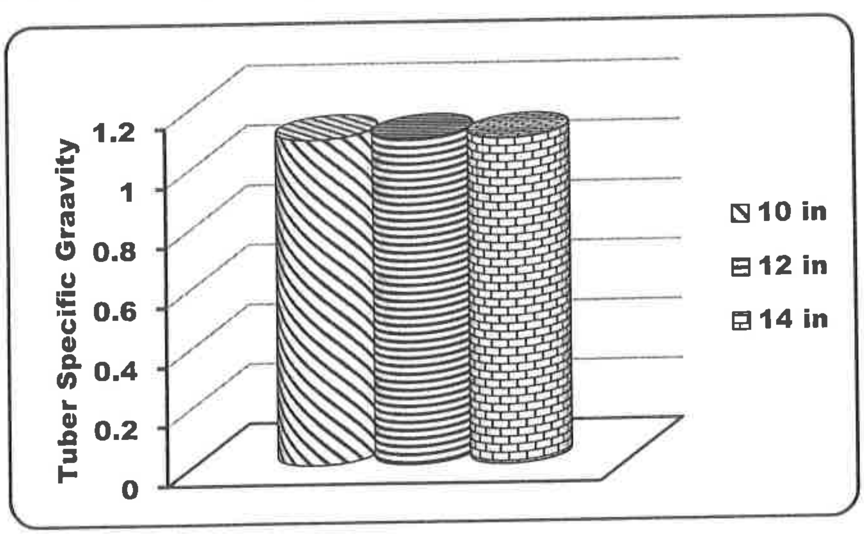


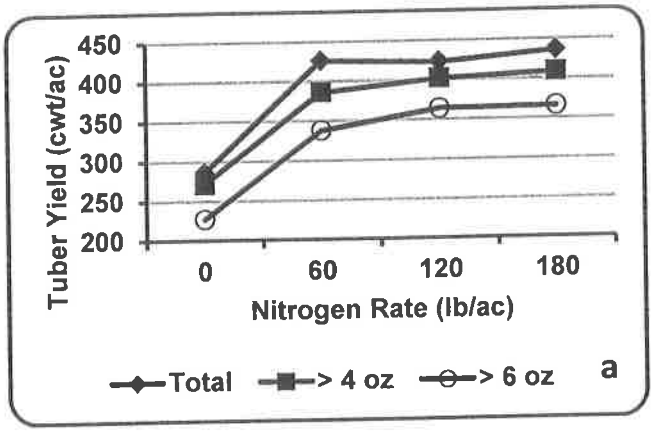
Fig. 7. Effect of in-row seed spacing on tuber specific gravity of CO99053-3RU.

CANELA RUSSET

Nitrogen Management of Canela Russet

Tuber Yield and Tuber Size Distribution

Optimum available N (soil + irrigation water + applied nitrogen) rate for optimum tuber yield of Canela Russet was observed to be between 149-179 lb N/A (fig. 8).



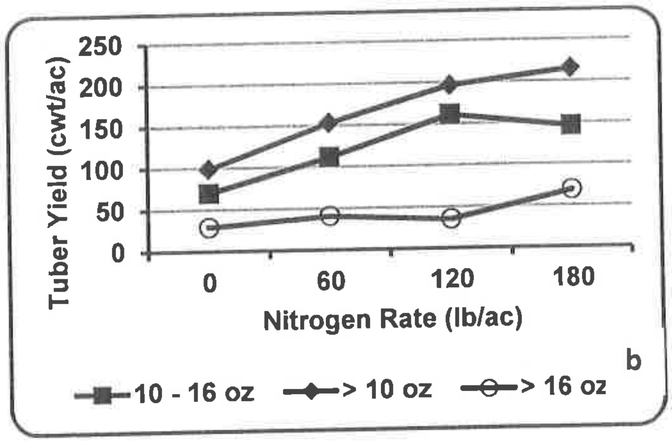


Fig. 8. Effect of nitrogen application rate on tuber yield and tuber size distribution of Canela Russet.

In-season petiole nitrate nitrogen concentration of Canela Russet

For optimum tuber yield of Canela Russet, in-season petiole nitrate nitrogen concentration should range from 10000 ppm at 69 days after planting down to 7500 ppm at 83 days after planting (fig. 9).

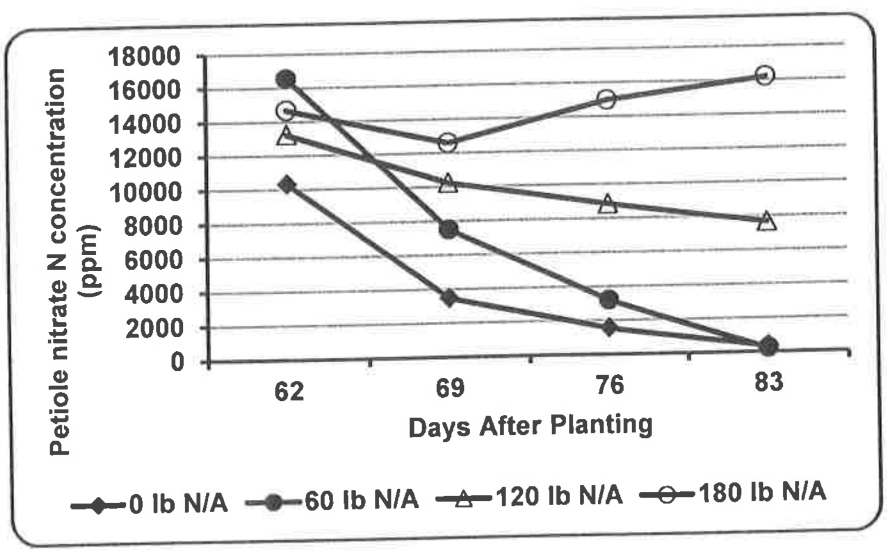


Fig. 9. Effect of nitrogen application rate on petiole nitrate nitrogen concentration of Canela Russet

Nitrogen Rate Effect on Tuber External and Internal Defects of Canela Russet

No tuber external defects were observed at the available N rate of 149-179 lb N/A (fig. 10 a.), and no internal defects were observed in tubers from the available N rate treatment of 149 lb N/A (fig. 10 b).

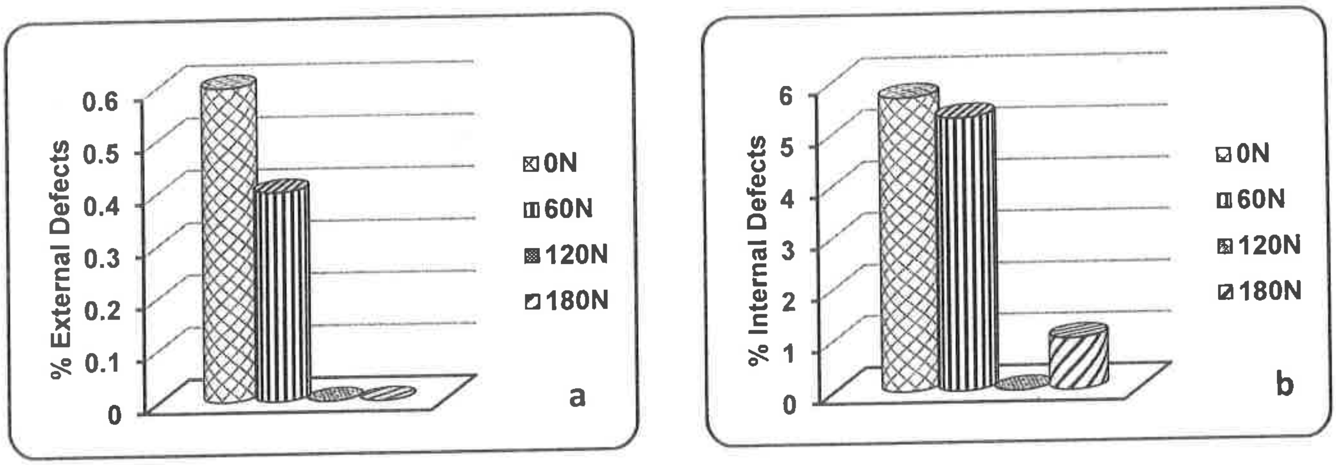


Fig 10. Effect of nitrogen application rate on a) tuber external and b) internal defects of Canela Russet
External defects include growth cracks, knobs, and misshapes.
Internal defects include hollow heart and brown center

Tuber Specific Gravity

Tuber specific gravity was high (1.104) at available N rate of 149 lb N/A (fig. 11). Tuber specific gravity reduced significantly to 0.096 when available N rate increased to 209 lb N/A.

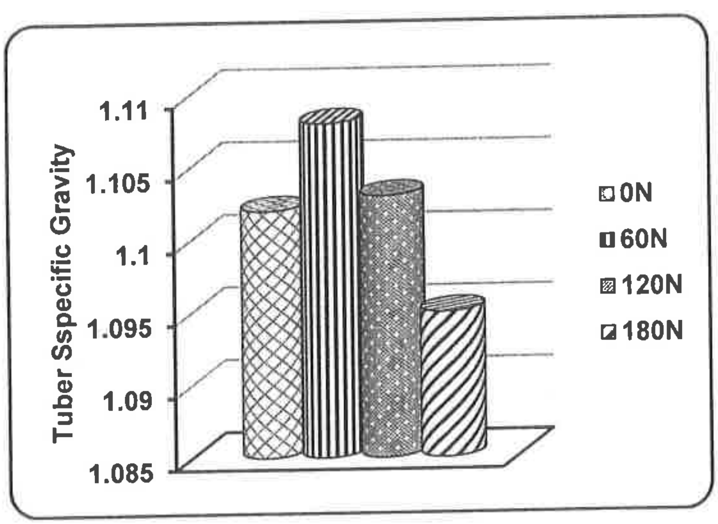
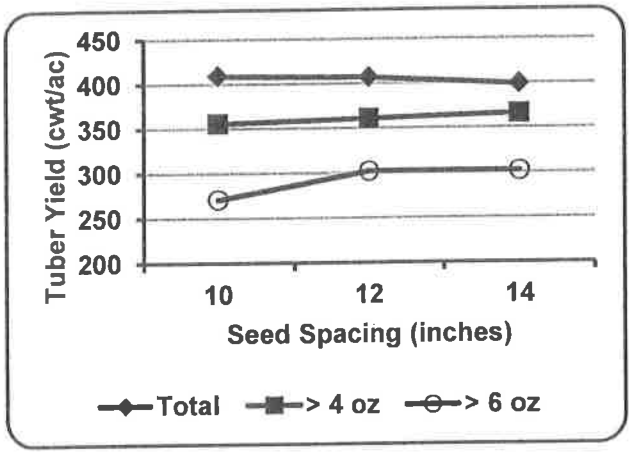


Fig. 11. Effect of nitrogen application rate on tuber specific gravity of Canela Russet.

In-Row Seed Spacing Management of Canela Russet

Tuber Yield and Tuber Size Distribution

Optimum tuber yield of Canela Russet was obtained at in-row seed spacing of between 12-13 inches (fig. 12).



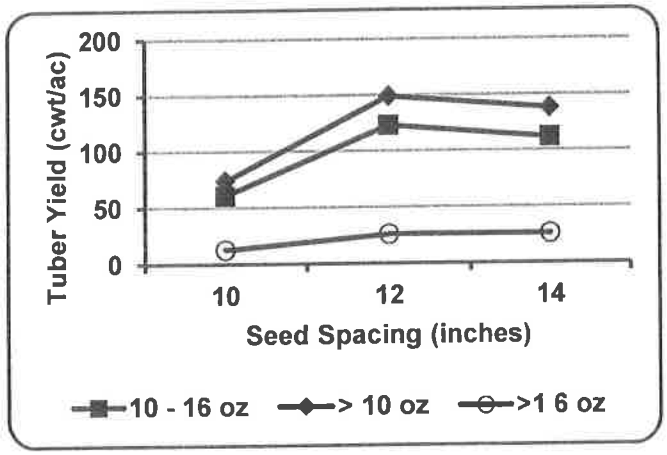


Fig. 12. Effect of in-row seed spacing on tuber yield and tuber size distribution of Canela Russet

Seed Spacing and Tuber External Defects of Canela Russet

Tuber external defects increased by about 0.7% when seed was planted at 12 inches spacing, compared to planting at 14 inches spacing (fig. 13). No internal defects were observed in any of the tubers in this study.

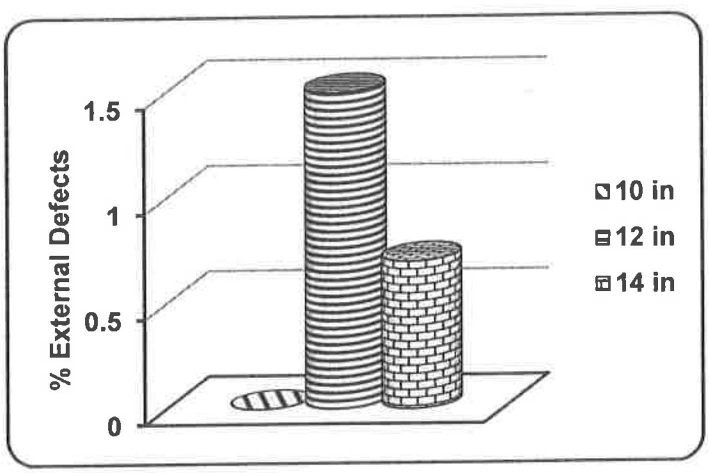


Fig. 13. Effect of in-row seed spacing on tuber external defects of Canela Russet.

External defects include growth cracks, knobs, and misshapes.

Seed Spacing and Tuber Specific Gravity of Canela Russet

Tuber specific gravity was high (1.100) at the 12 inches spacing, compared to the 14 inches spacing (1.098) treatment (fig. 14)

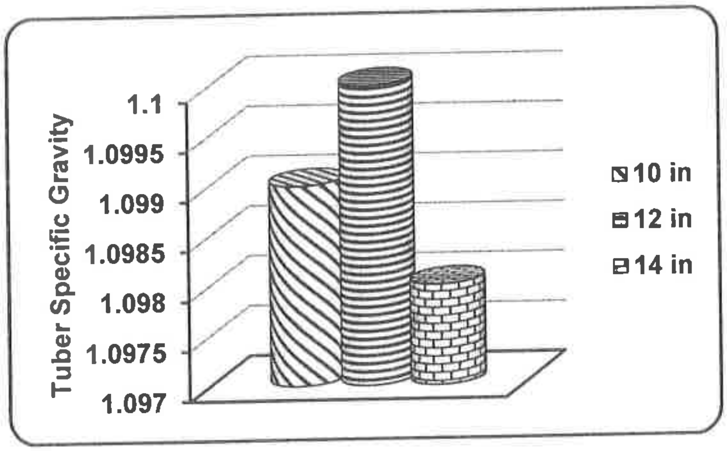


Fig. 14. Effect of in-row seed spacing on tuber specific gravity of Canela Russet.

PREMIER RUSSET

Nitrogen Management of Premier Russet

Tuber Yield and Tuber Size Distribution

Optimum tuber yield was obtained at available N rate of 156 lb N/A (Fig. 15).

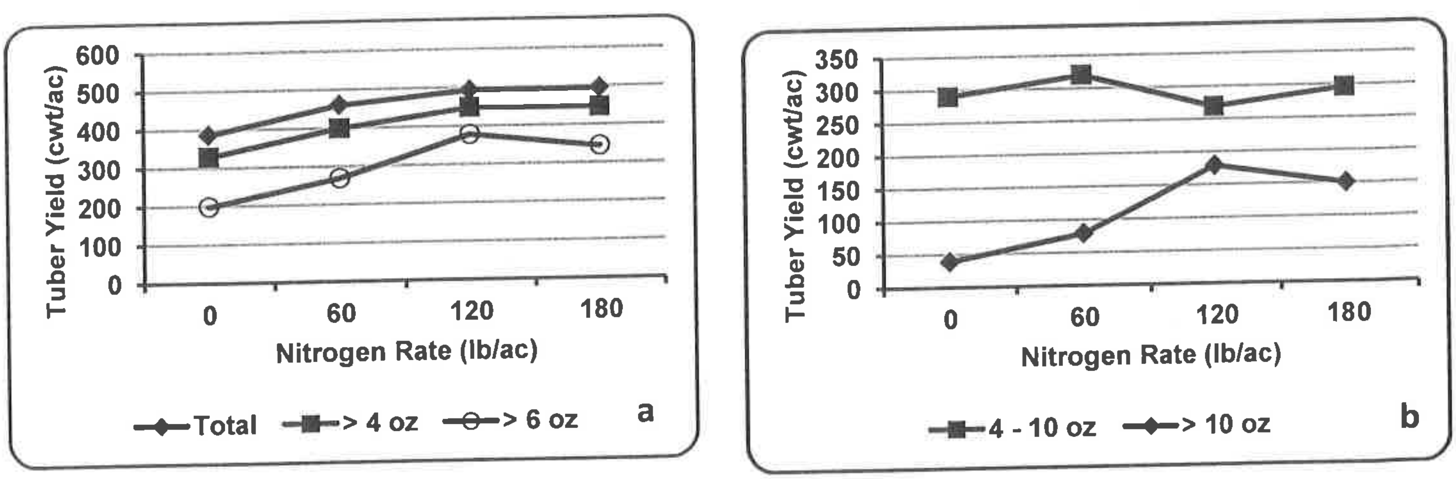


Fig. 15. Effect of nitrogen application rate on tuber yield and tuber size distribution of Premier Russet.

In-Season Petiole Nitrate Nitrogen Concentration of Premier Russet

For optimum tuber yield of Premier Russet, petiole nitrate nitrogen concentration should range from 4000 ppm at 69 days after planting to 3000 ppm at 83 days after planting (fig. 16)

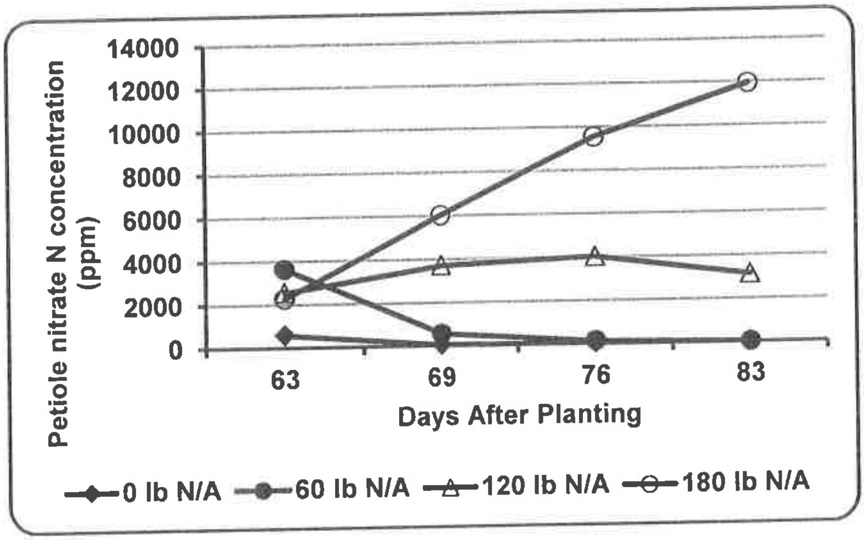


Fig. 16. Effect of nitrogen application rate on petiole nitrate nitrogen concentration of Premier Russet

Nitrogen Application Effect on Tuber External and Internal Defects of Premier Russet

With the exception of the 86 lb available N rate per acre treatment where no external defects were observed in the tubers (fig. 17 a), no difference was observed among the treatments in tuber external (fig. 17 a) and internal (fig. 17 b) defects.

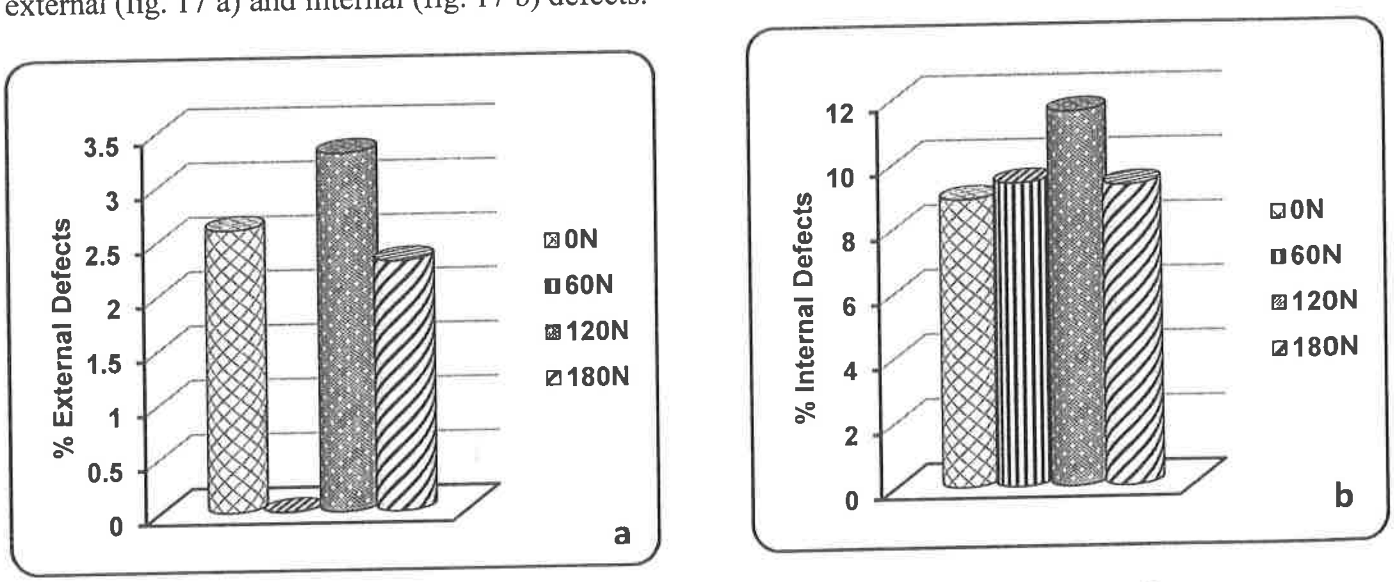


Fig 17. Effect of N application rate on tuber (a) external and (b) internal defects of Premier Russet
External defects include growth cracks, knobs, and misshapes.
Internal defects include hollow heart and brown center

Nitrogen Application and Tuber Specific Gravity of Premier Russet

No significant difference was observed in tuber specific gravity for the 26-146 lb available N rate/A treatments (fig 18). However, there was a significant reduction in tuber specific gravity when available N rate increased to 206 lb N/A.

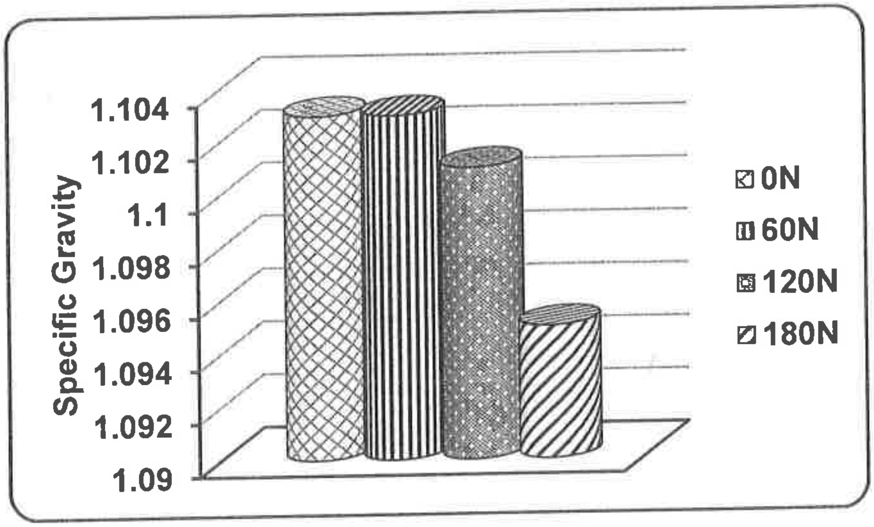


Fig. 18. Effect of nitrogen application rate on tuber specific gravity of Premier Russet.

RUSSET NORKOTAH (S8)

Nitrogen Management of Russet Norkotah (S8)

Tuber Yield and Tuber Size Distribution

Optimum available N rate for optimum tuber yield of Russet Norkotah (S8) was observed to be between 150-180 lb N/A (fig. 19).

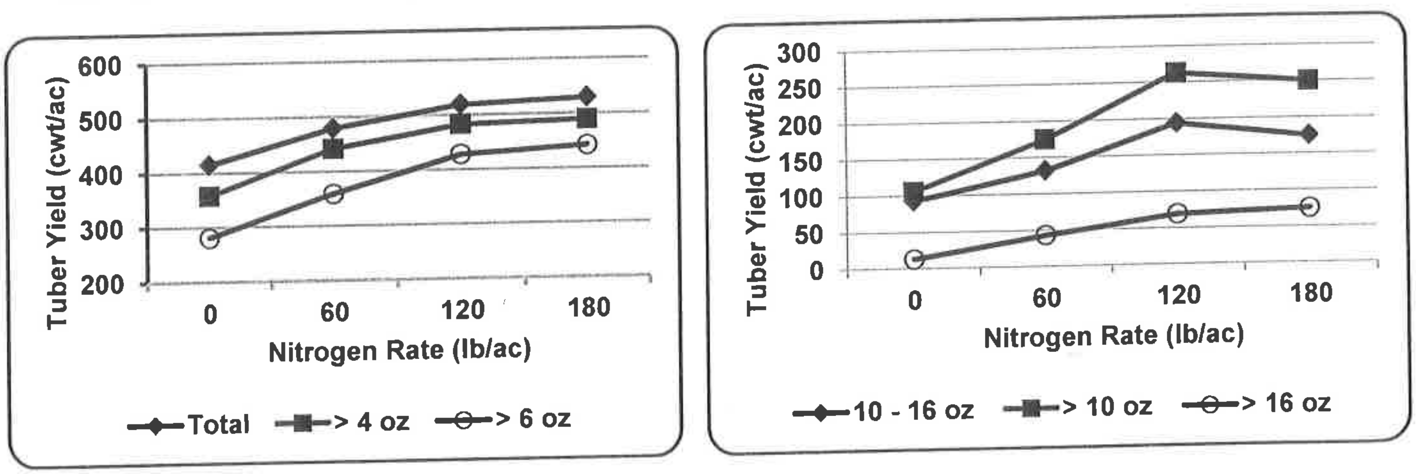


Fig. 19. Effect of N application rate on tuber yield and tuber size distribution of Russet Norkotah (S8)

In-season Petiole Nitrate Nitrogen Concentration of Russet Norkotah (S8)

For optimum tuber yield, in-season petiole nitrate N concentration should range from 9000 ppm at 69 days after planting to 5000 ppm at 83 days after planting (fig. 20) for Russet Norkotah (S8)

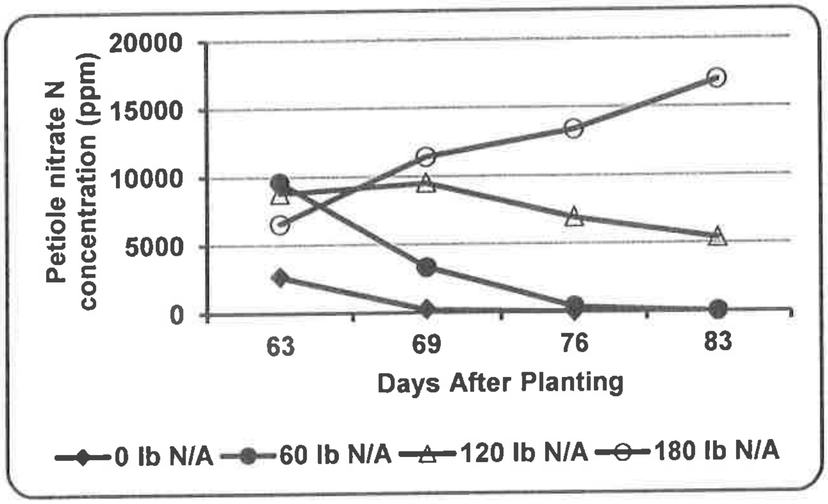
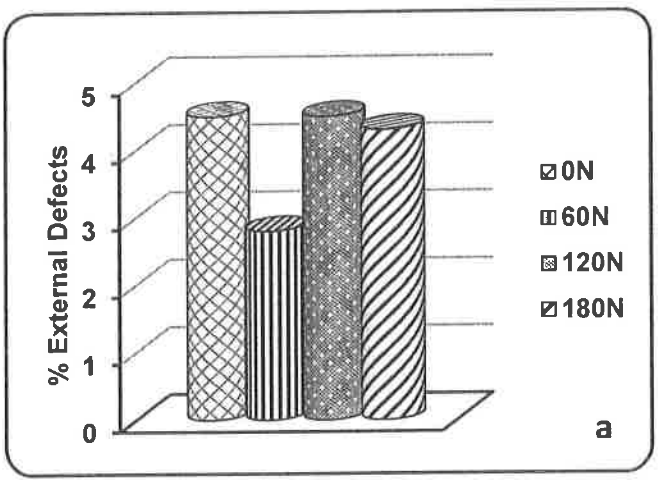


Fig. 20. Effect of N application rate on in-season petiole nitrate nitrogen concentration of Russet Norkotah (S8).

Nitrogen Application and Tuber External and Internal Defects of Russet Norkotah (S8)

Field conditions in 2011 caused unusual tuber external and internal defects in Russet Norkotah (S8). Tubers produced the lowest external defects (3%) when available N rate was 89 lb N/A. All other treatments produced almost 4.5% external defects (fig. 21a). Tuber internal defects were high (14%) in the control (0 N) treatment, and lowest when applied N was equal to 180 lb N/A (fig. 21 b).



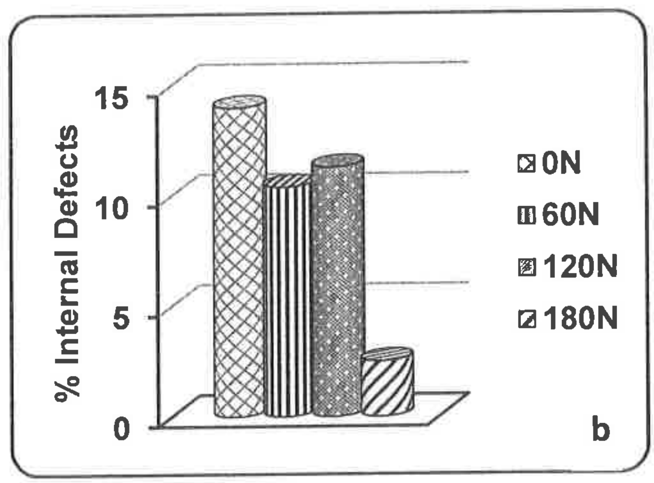


Fig. 21. Effect of N application rate on tuber (a) external and (b) internal defects of Russet Norkotah (S8).
External defects include growth cracks, knobs, and misshapes.
Internal defects include hollow heart and brown center

Nitrogen Application and Tuber Specific Gravity of Russet Norkotah (S8)

As it is usually observed in most potato cultivars, tuber specific gravity of Russet Norkotah (S8) decreased with increased N application rate (fig. 22).

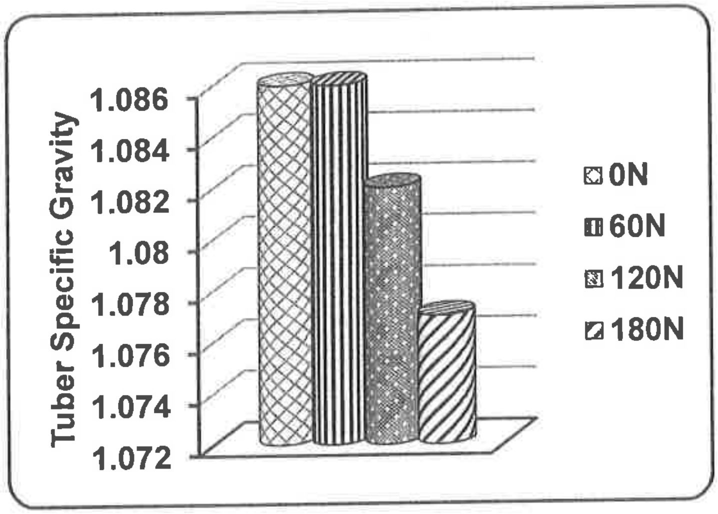


Fig. 22. Effect of nitrogen application rate on tuber specific gravity of Russet Norkotah (S8).

Table 1. Interactive effect of compost tea, fungicide application, and nitrogen application rate on yield and tuber size distribution of Russet Norkotah (sel.8), 2011

Treatment	Total	< 4 oz	> 4 oz	> 6 oz	4 – 16 oz	4 – 10 oz	10 – 16 oz	> 10 oz	6 – 16 oz	> 16 oz
	Yield (cwt/ac)									
80N[1]	331	41	290(88)[2]	228(69)	278	204(62)	74	86	216	12
120N	402	35	367(91)	310(77)	342	223(56)	119	144	285	25
80N – CT	354	43	311(88)	253(72)	302	202(57)	100	109	244	9
120N –CT	356	37	319(90)	255(72)	314	219(62)	95	100	250	5
80N – F	351	49	302(86)	260(74)	289	216(62)	73	86	247	13
120N - F	366	47	319(87)	255(70)	293	175(80)	118	144	229	26

[1] N = Nitrogen Rate (lb N/ac) CT = Compost Tea Applied F = Fungicide Applied.
[2] Figures in brackets indicate % of total.

Table 2. Interactive effect of compost tea, fungicide application, and nitrogen application rate on tuber quality of Russet Norkotah (sel. 8), 2011

Treatment	% Growth Cracks	% Knobs	% Misshapes	% External[2] Defects	% Hollow Heart	% Brown Center	% Internal[3] Defects	Specific Gravity
80N[1]	0	1.0	3.6	4.6	2.1	0	2.1	1.081
120N	0	0.3	4.3	4.6	0	0	0	1.075
80N – CT	0	0.6	2.3	2.9	2.4	0	2.4	1.083
120N – CT	0	1.5	3.5	5.0	0	0	0	1.077
80N – F	0	0.2	1.8	2.0	4.7	0	4.7	1.082
120N - F	0	2.3	3.3	5.6	2.3	0	2.3	1.077

[1] N = Nitrogen Rate (lb N/ac) CT = Compost Tea Applied F = Fungicide Applied.
[2] Includes growth cracks, knobs and misshapes.
[3] Includes hollow heart and brown center.

Table 3. Interactive effect of compost tea, fungicide application, and nitrogen application rate on yield and tuber size distribution of Russet Norkotah sel.8, (two year average).

Treatment	Total	< 4 oz	> 4 oz	> 6 oz	4 – 16 oz	4 – 10 oz	10 – 16 oz	> 10 oz	6 – 16 oz	> 16 oz
						Yield (cwt/ac)				
80N[1]	489	38	451(92)[2]	380(78)	413	243(50)	170	208	342	38
120N	483	34	449(93)	391(81)	404	227(47)	177	222	346	45
80N – CT	470	43	427(91)	360(77)	389	235(50)	154	192	322	38
120N –CT	442	41	401(91)	337(76)	359	231(52)	128	170	295	42
80N – F	477	43	434(91)	385(81)	381	229(48)	152	205	332	53
120N - F	480	42	438(91)	371(77)	378	214(45)	164	224	311	60

[1] N = Nitrogen Rate (lb N/ac) CT = Compost Tea Applied F = Fungicide Applied.

[2] Figures in brackets indicate % of total.

Table 4. Interactive effect of compost tea, fungicide application, and nitrogen application rate on tuber quality of Russet Norkotah sel. 8, (two year average).

Treatment	% Growth Cracks	% Knobs	% Misshapes	% External[2] Defects	% Hollow Heart	% Brown Center	% Internal[3] Defects	Specific Gravity
80N[1]	0.1	0.5	2.5	3.1	1.5	0	1.5	1.081
120N	0	0.2	2.7	2.9	0.7	0	0.7	1.076
80N – CT	0	0.8	1.5	2.3	1.2	0	1.2	1.083
120N – CT	0	0.9	2.2	3.1	0.8	0	0.8	1.077
80N – F	0	0.8	1.1	1.9	3.3	0	3.3	1.084
120N - F	0	1.4	2.0	3.4	1.5	0	1.5	1.078

[1] N = Nitrogen Rate (lb N/ac) CT = Compost Tea Applied F = Fungicide Applied.

[2] Includes growth cracks, knobs and misshapes.

[3] Includes hollow heart and brown center.

AC99329-7PW/Y

Nitrogen Management of AC99329-7PW/Y

Tuber Yield and Tuber Size Distribution

AC99329-7PW/Y responded to high rates of N application. Maximum tuber yield was obtained when available N rate was 209 lb N/A. (fig. 23).

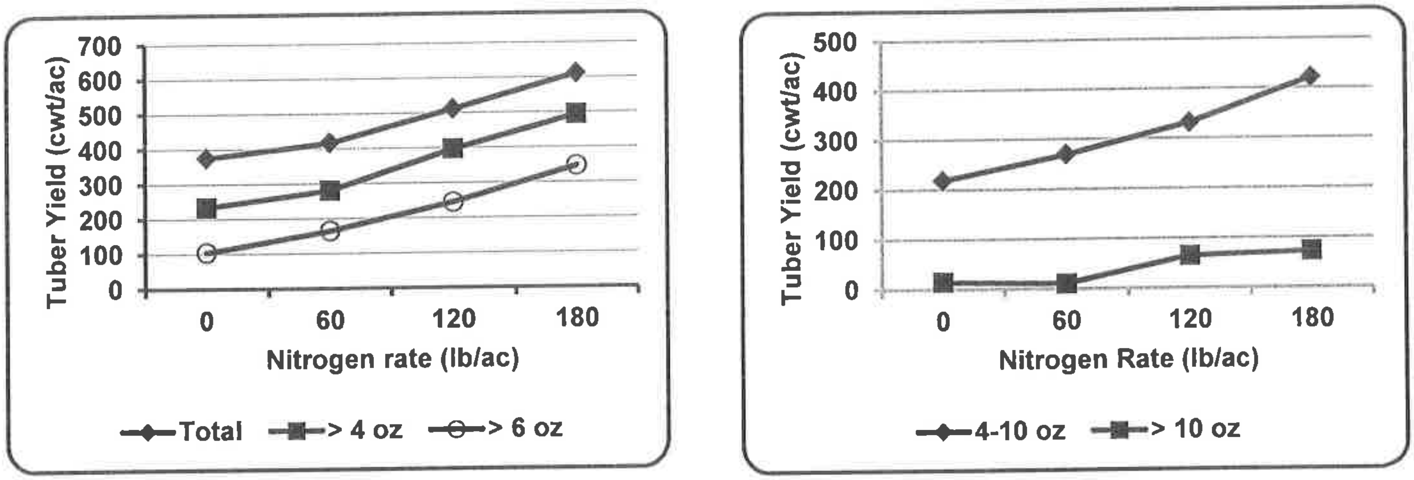


Fig. 23. Effect of nitrogen application rate on tuber yield and tuber size distribution of AC99329-7PW/Y.

In-season Petiole Nitrate N Concentration of AC99329-7PW/Y

For optimum tuber yield, in-season petiole nitrate N concentration of AC99329-7PW/Y should range from 7000 ppm at 69 days after planting to 10000 ppm at 83 days after planting (fig. 24).

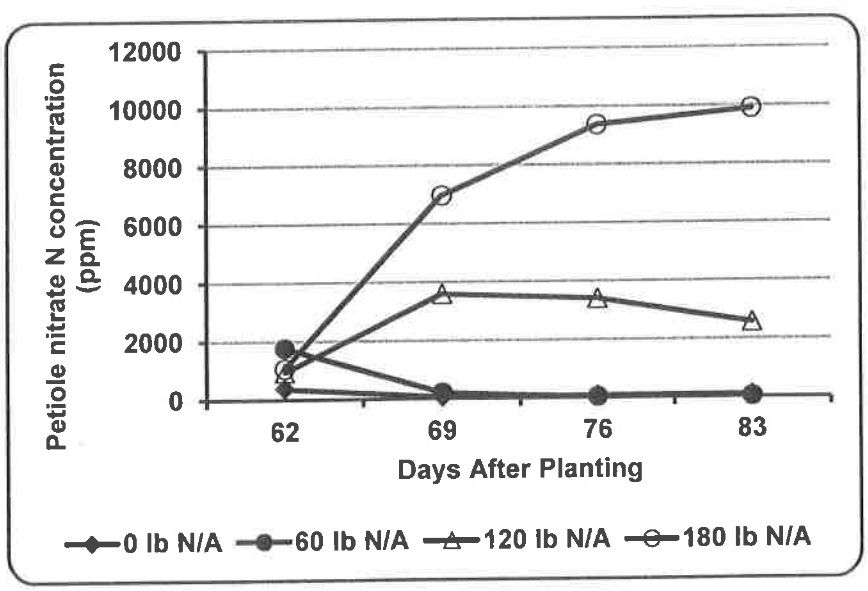


Fig. 24. Effect of nitrogen application rate on in-seasn petiole nitrate N concentration of AC99329-7PW/Y.

Effect of Nitrogen Rate on Tuber External and Internal Defects of AC99329-7PW/Y

Tuber external defects were minimal in this cultivar for all nitrogen rate treatments. Tuber external defects ranged from 0-0.7% (fig. 25). No internal defects were observed in any of the tubers in the 2011 study.

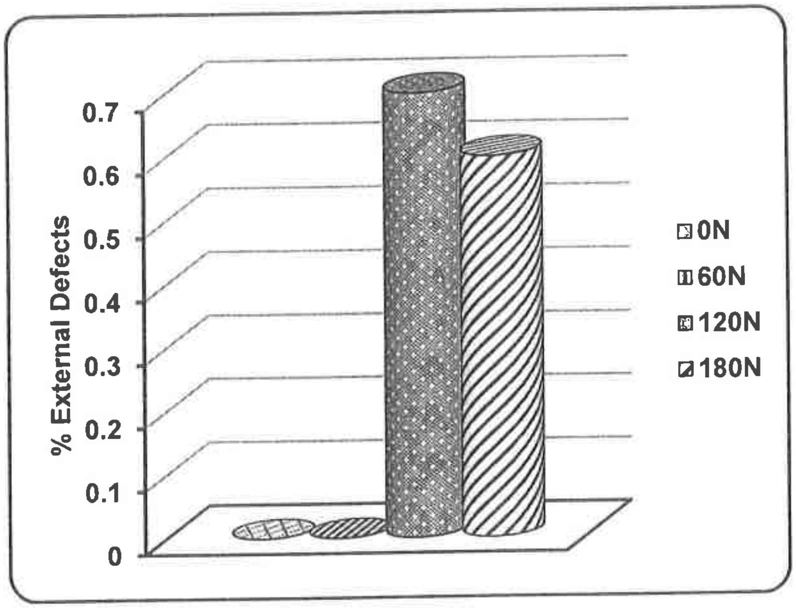


Fig. 25. Effect of nitrogen application rate on tuber external defects of AC99329-7PW/Y.

Tuber external defects include growth cracks, knobs, and misshapes

Nitrogen Rate and Tuber Specific Gravity of AC99329-7PW/Y

Tuber specific gravity was low at the high available N rate of 209 lb N/A (fig. 26). This observed response is typical of most potato cultivars. Tuber specific gravity reduced when nitrogen application rate was increased.

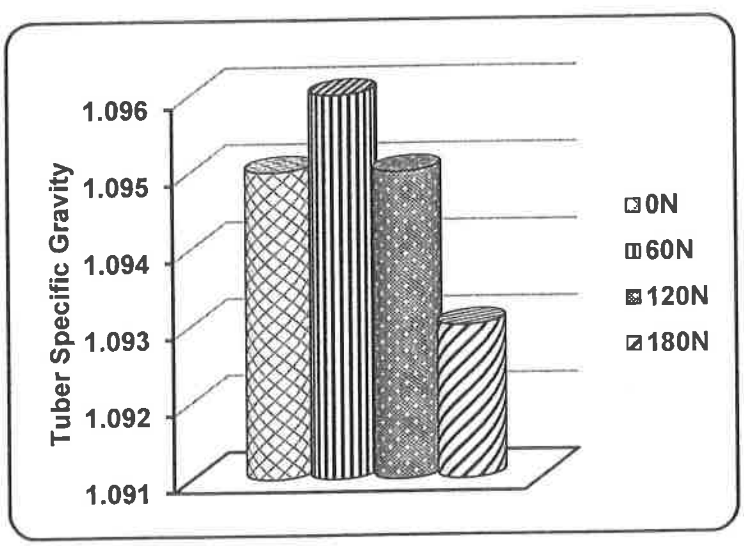


Fig. 26. Effect of nitrogen application rate on tuber specific gravity of AC99329-7PW/Y.

In-Row Seed Spacing Management of AC99329-7PW/Y

Tuber Yield and Tuber Size Distribution

The 2011 data indicated no significant response of AC99329-7PW/Y to in-row seed spacing. It is therefore suggested that for optimum tuber yield with reduced seed input cost, AC99329-7PW/Y could be planted at in-row spacing of 14 inches (fig. 27).

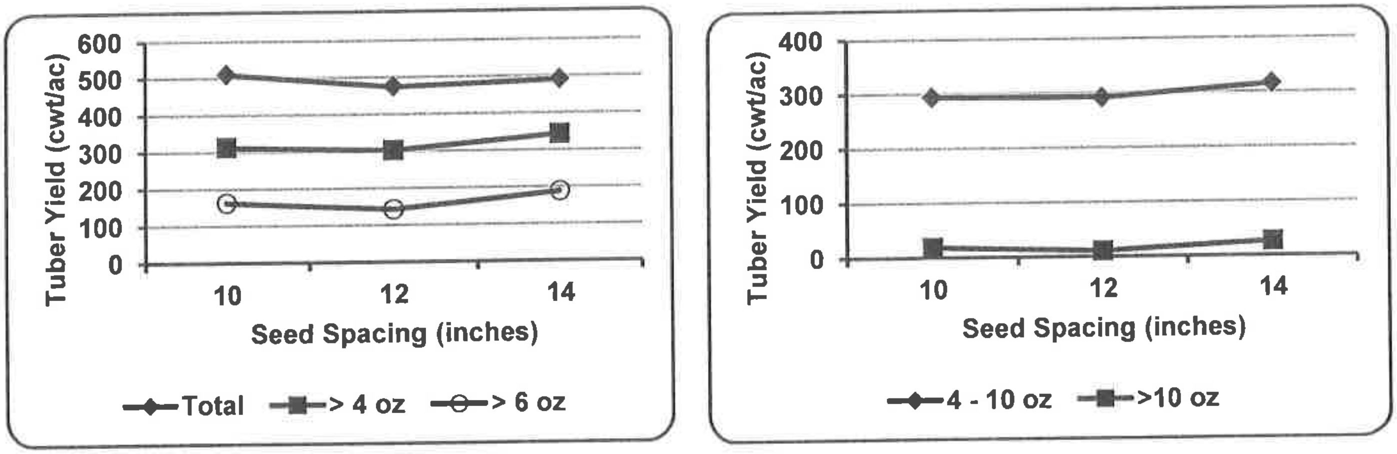


Fig. 27. Effect of in-row seed spacing on tuber yield and tuber size distribution of AC99329-7PW/Y

In-Row Seed Spacing Effect on Tuber External and Internal Defects of AC99329-7PW/Y

No external or internal defects were observed in tubers from the seed spacing study.

In-Row Seed Spacing and Tuber Specific Gravity of AC99329-7PW/Y

Tuber specific gravity was low (1.087) at the 14 inches spacing, compared to the gravities (1.091–1.093) measured for the10 and 12 inches spacing treatments, respectively (fig. 28).

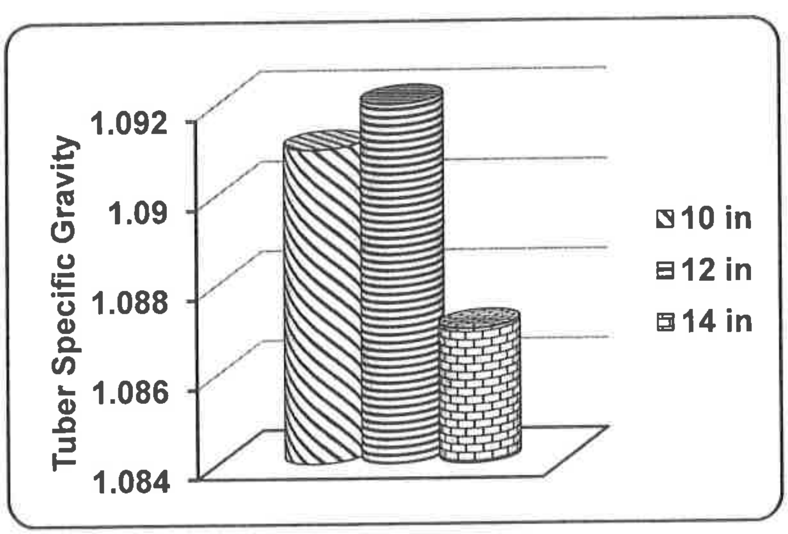


Fig. 28. Effect of in-row seed spacing on tuber specific gravity of AC99329-7PW/Y.

PURPLE MAJESTY

Nitrogen Management of Purple Majesty

Tuber Yield and Tuber Size Distribution

In this study, Purple Majesty responded to high nitrogen application rate. The available N rate for optimum tuber yield of purple majesty was observed to be 209 lb N/A (fig. 29).

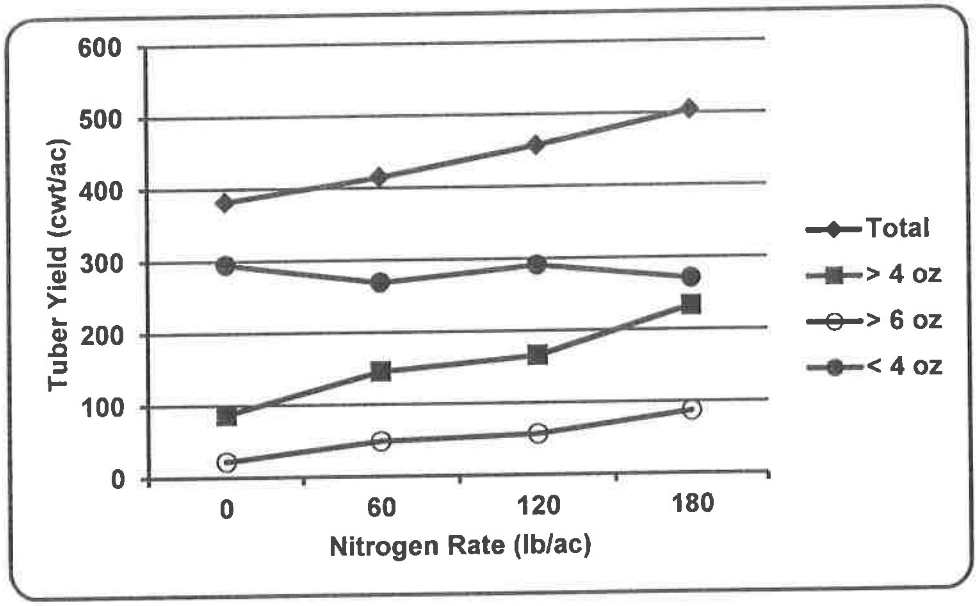


Fig. 29. Effect on nitrogen application rate on tuber yield and tuber size distribution of Purple Majesty.

In-Season Petiole Nitrate Nitrogen Concentration of Purple Majesty

For optimum tuber yield of purple majesty, petiole nitrate nitrogen concentration should range from 9000 ppm at 70 days after planting to 12500 ppm at 84 days after planting (fig. 30).

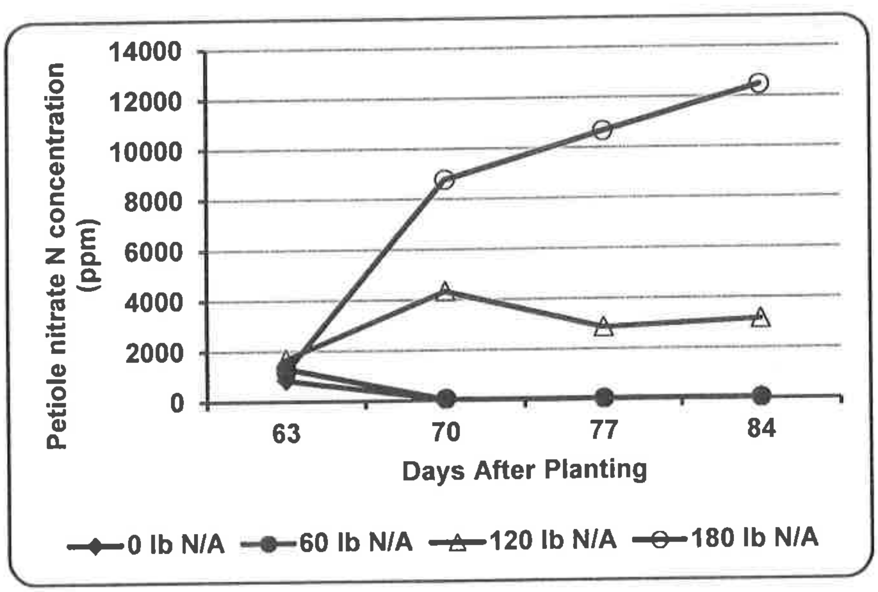


Fig. 30. Effect of nitrogen application rate on petiole nitrate nitrogen concentration of Purple Majesty

Nitrogen Rate Effect on Tuber External and Internal Defects of Purple Majesty

The highest percent of external defects (1.4%) were observed in potatoes that received high rates of available N (209 lb N/A). All other treatments either showed no external defects or showed less than 1% external defects (fig. 31 a). However, tuber internal defects were relatively low (0.5%) when available N rate was 209 lb N/A (fig. 31 b).

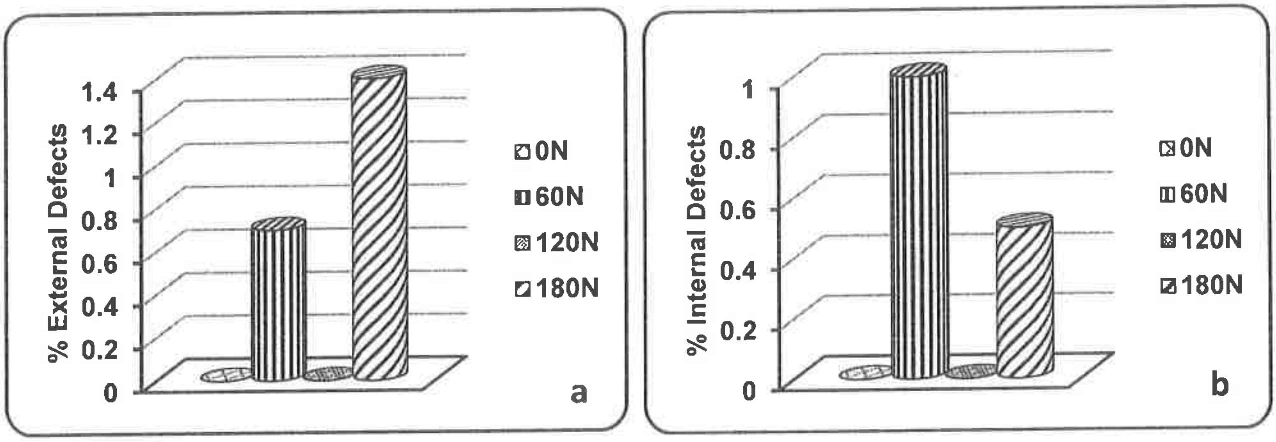


Fig. 31. Effect of nitrogen application rate on tuber a) external and b) internal defects of Purple Majesty.

Tuber external defects include growth cracks, knobs, and misshapes
Tuber internal defects include hollow heart and brown center

Nitrogen Rate and Tuber Specific Gravity of Purple Majesty

Tuber specific gravity decreased with increased nitrogen application rate (fig. 32).

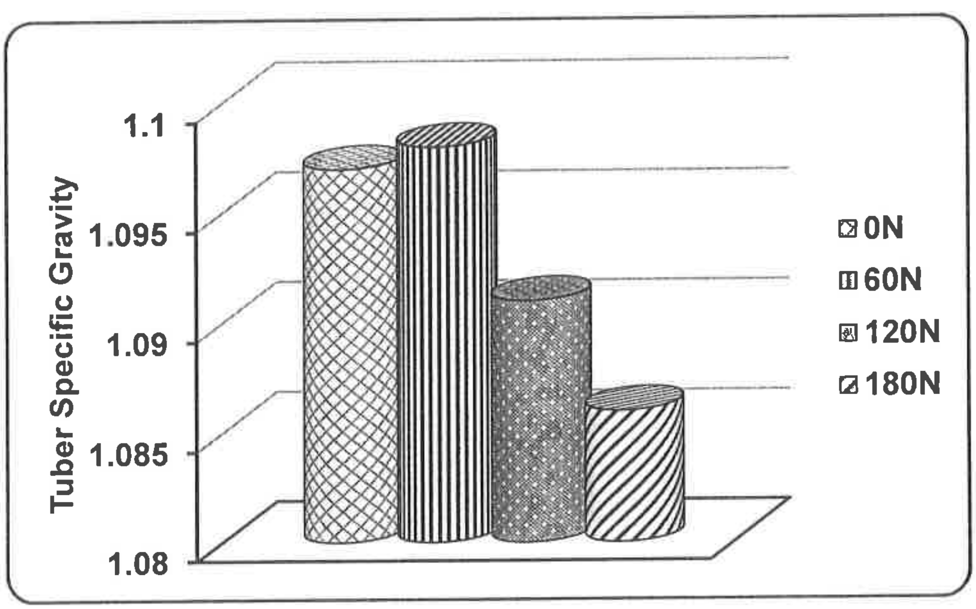


Fig. 32. Effect of nitrogen application rate on tuber specific gravity of Purple Majesty.

In-Row Seed Spacing Management of Purple Majesty

Tuber Yield and Tuber Size Distribution of Purple Majesty

For optimum tuber yield, Purple Majesty can be planted at a spacing of 13 inches (fig. 33).

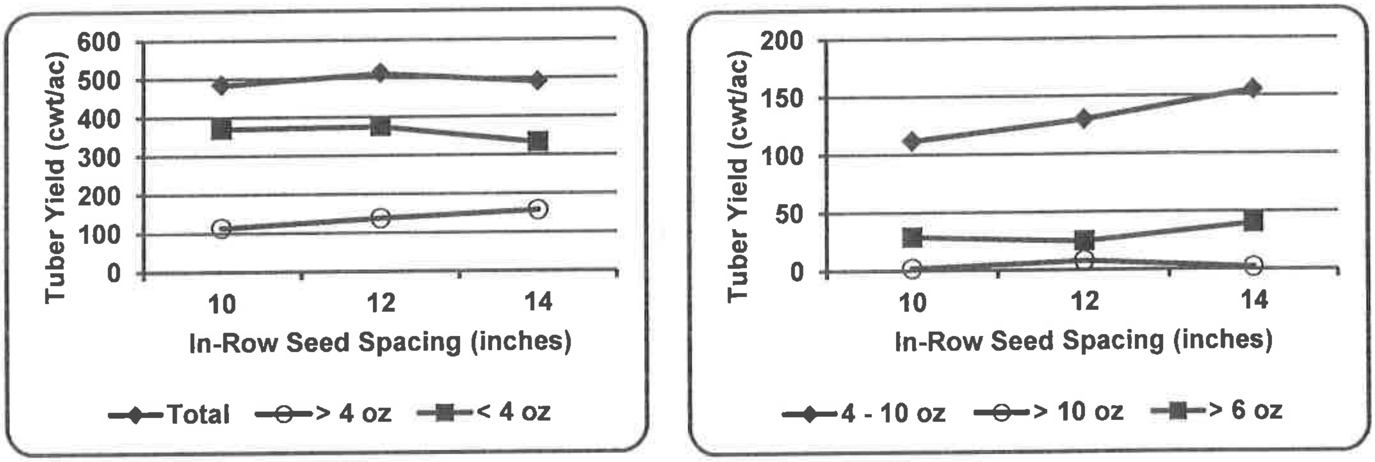


Fig. 33. Effect of in-row seed spacing on tuber yield and tuber size distribution of Purple Majesty.

Effect of In-Row Seed Spacing on Tuber External and Internal Defects of Purple Majesty

Tuber external defects ranged from 0 to 0.6% in this study. Relatively more tuber external defects (0.6%) were observed in the 12 inches spacing treatment (Fig. 34).
No internal defects were observed in tubers from the seed spacing study.

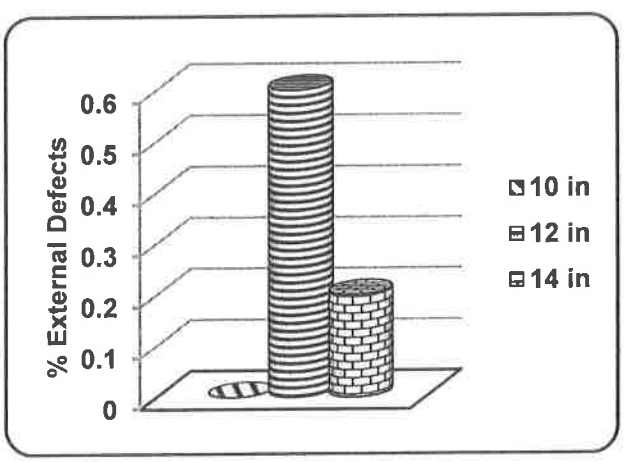


Fig. 34. Effect of in-row seed spacing on tuber external defects of Purple Majesty

Tuber external defects include growth cracks, knobs, and misshapes

In-Row Seed Spacing and Tuber Specific Gravity of Purple Majesty

Tuber specific gravity ranged from 1.084 to 1.086 (fig. 35). No significant difference was observed in tuber specific gravity among the three seed spacing treatments.

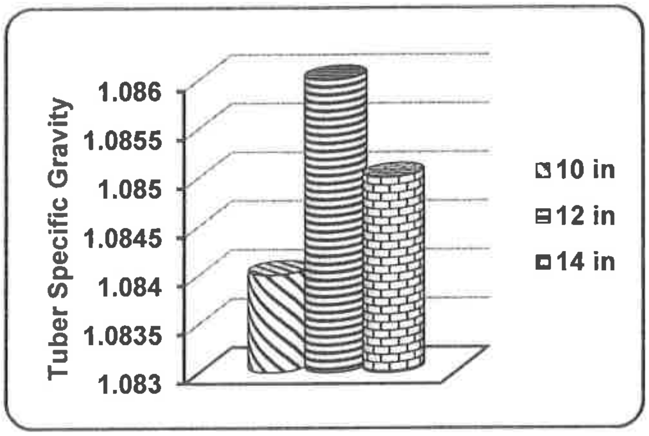


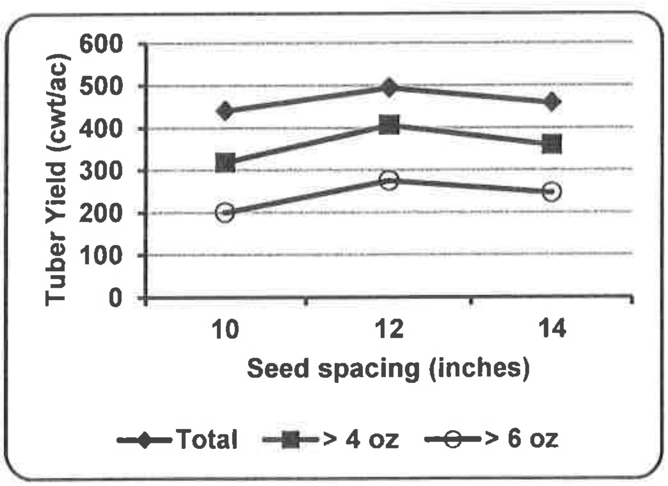
Fig. 35. Effect of in-row seed spacing on tuber specific gravity of Purple Majesty.

CO99100-1RU

In-Row Seed Spacing Management of CO99100-1RU

Tuber Yield and Tuber Size Distribution

For optimum tuber yield, CO99100-1RU should be planted at in-row spacing of 12-13 inches with a row spacing of 34 inches (fig. 36).



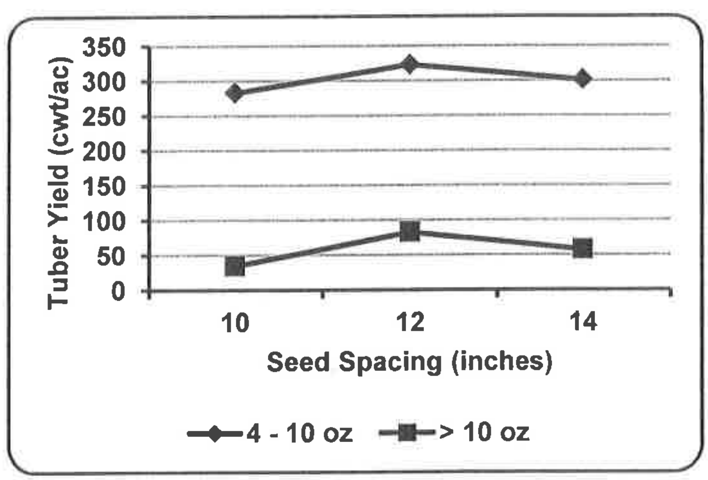
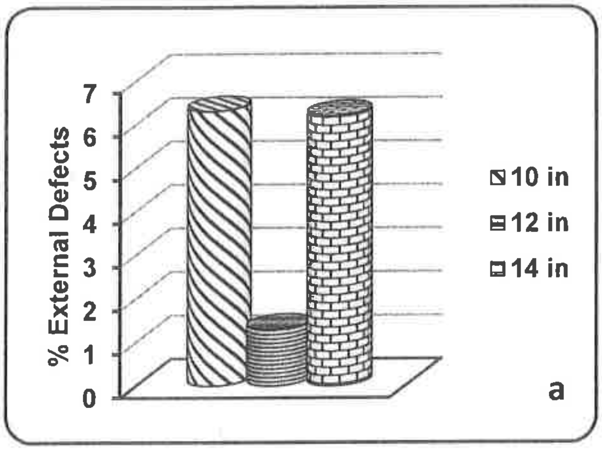


Fig. 36. Effect of in-row seed spacing on tuber yield and tuber size distribution of CO99100-1RU.

Effect of In-Row Seed Spacing on Tuber External and Internal Defects of CO99100-1RU

Tubers showed minimum external defects (1.3%) when seed was planted at in-row spacing of 12 inches (fig. 37 a). However, tuber internal defects were relatively high (4.2%) when seed was planted at 12 inches spacing (fig. 37 b).



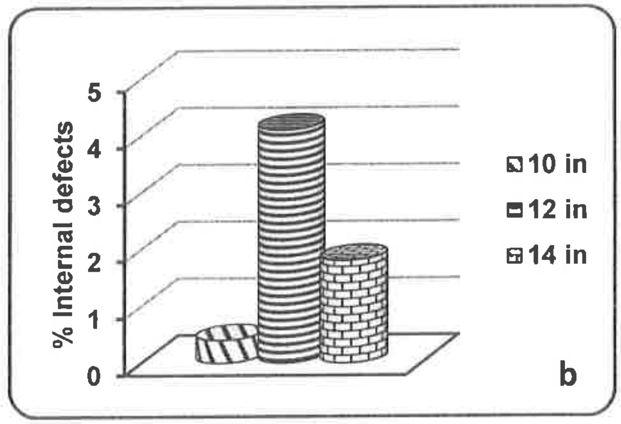


Fig. 37. Effect of in-row seed spacing on tuber a) external and b) internal defects of CO99100-1RU.

Tuber external defects include growth cracks, knobs, and misshapes
Tuber internal defects include hollow heart and brown center

In-Row Seed Spacing and Tuber Specific Gravity of CO99100-1RU

Tuber specific gravity was high (1.092 and 1.094) when seed was planted at in-row spacing of 12 and 14 inches, respectively (fig. 38). Tubers produced relatively low specific gravity (1.089) when seed was planted at 10 inches spacing.

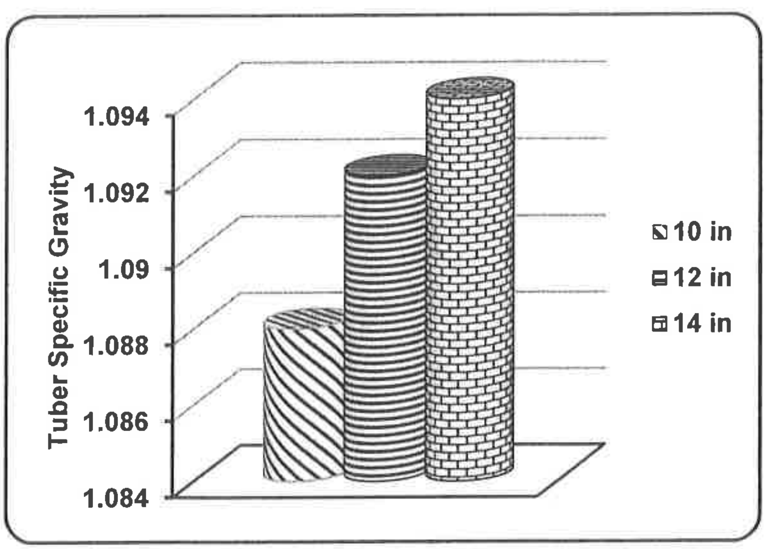


Fig. 38. Effect of in-row seed spacing on tuber specific gravity of CO99100-1RU.

Table 5. Interactive effect of compost tea, fungicide application, and nitrogen application rate on yield and tuber size distribution of Rio Grande Russet, 2011.

Treatment	Total	< 4 oz	> 4 oz	> 6 oz	4 – 16 oz	4 – 10 oz	10 – 16 oz	> 10 oz	6 – 16 oz	> 16 oz
	Yield (cwt/ac)									
80N[1]	438	112	326(74)[2]	202(46)	318	266(61)	52	60	194	8
120N	459	91	368(80)	244(53)	368	333(73)	35	35	244	0
80N – CT	401	111	290(72)	191(48)	290	243(61)	47	47	191	0
120N – CT	435	88	347(80)	253(58)	347	246(57)	101	101	253	0
80N – F	406	89	317(78)	225(55)	317	252(62)	65	65	225	0
120N - F	492	86	406(83)	272(55)	394	329(67)	65	77	260	12

[1] N = Nitrogen Rate (lb N/ac) CT = Compost Tea Applied F = Fungicide Applied.

[2] Figures in brackets indicate % of total.

Table 6. Interactive effect of compost tea, fungicide application, and nitrogen application rate on tuber quality of Rio Grande Russet, 2011

Treatment	% Growth Cracks	% Knobs	% Misshapes	% External[2] Defects	% Hollow Heart	% Brown Center	% Internal[3] Defects	Specific Gravity
80N[1]	0.4	0	0.4	0.8	0	0	0	1.093
120N	0	0	0	0	0	0	0	1.086
80N – CT	0	0	0.5	0.5	0	0	0	1.094
120N – CT	0	0	0.3	0.3	0	0	0	1.088
80N – F	0.3	0	1.6	1.9	0.7	0	0.7	1.096
120N - F	0	0	0	0	0	0	0	1.088

[1] N = Nitrogen Rate (lb N/ac) CT = Compost Tea Applied F = Fungicide Applied.

[2] Includes growth cracks, knobs and misshapes.

[3] Includes hollow heart and brown center.

Table 7. Interactive effect of compost tea, fungicide application, and nitrogen application rate on yield and tuber size distribution of Rio Grande Russet, (two year average).

Treatment	Total	< 4 oz	> 4 oz	> 6 oz	4 – 16 oz	4 – 10 oz	10 – 16 oz	> 10 oz	6 – 16 oz	> 16 oz
	Yield (cwt/ac)									
80N[1]	496	97	399(80)[2]	283(57)	390	311(63)	79	88	274	9
120N	490	78	412(84)	304(62)	405	308(63)	97	104	297	7
80N – CT	484	94	390(81)	289(60)	383	270(56)	113	120	282	7
120N –CT	509	82	427(84)	333(65)	423	291(57)	132	136	329	4
80N – F	482	80	402(83)	308(64)	391	274(57)	117	128	297	11
120N - F	531	71	460(87)	341(64)	447	346(65)	101	114	328	13

[1] N = Nitrogen Rate (lb N/ac) CT = Compost Tea Applied F = Fungicide Applied.

[2] Figures in brackets indicate % of total.

Table 8. Interactive effect of compost tea, fungicide application, and nitrogen application rate on tuber quality of Rio Grande Russet, (two year average).

Treatment	% Growth Cracks	% Knobs	% Misshapes	% External[2] Defects	% Hollow Heart	% Brown Center	% Internal[3] Defects	Specific Gravity
80N[1]	0.6	0	0.2	0.8	0.6	0	0.6	1.091
120N	1.2	0	0.2	1.4	1.3	0	1.3	1.086
80N – CT	0.3	0	0.5	0.8	1.0	0	1.0	1.094
120N – CT	1.2	0	0.3	1.5	0.5	0	0.5	1.090
80N – F	0.9	0	1.3	2.2	1.2	0	1.2	1.093
120N - F	0.8	0	0.2	1.0	0.5	0	0.5	1.091

[1] N = Nitrogen Rate (lb N/ac) CT = Compost Tea Applied F = Fungicide Applied.

[2] Includes growth cracks, knobs and misshapes.

[3] Includes hollow heart and brown center.

Table 9. Effect of Preceding cover crop on potato yield and tuber size distribution of Rio Grande Russet, 2011

Cover Crops	Total	< 4 oz	> 4 oz	> 6 oz	4 – 16 oz	4 – 10 oz	10 – 16 oz	> 10 oz	6 – 16 oz	> 16 oz
	Yield (cwt/ac)									
Barley	500	51	449(90)[1]	339(68)	423	308(62)	115	141	313	26
Sudan Grass (2)	487	43	444(91)	383(79)	419	262(54)	157	182	358	25
Wet Fallow	464	42	422(91)	330(71)	394	294(63)	100	128	302	28
Canola	469	70	399(85)	281(60)	368	274(58)	94	125	250	31
Sudan Grass (5)	450	51	399(89)	317(70)	363	231(51)	132	168	281	36
Camellina	476	83	393(83)	268(56)	389	321(67)	68	72	264	4
Canola + Compost	470	99	371(79)	254(54)	344	282(60)	62	89	227	27
Canola + manure	490	80	410(84)	270(55)	393	314(64)	79	96	253	17
Mustard	482	60	422(88)	319(66)	409	276(57)	133	146	306	13
Radish	479	62	417(87)	310(65)	395	282(59)	113	135	288	22
Sudan grass mixture	541	35	506(94)	394(73)	459	308(57)	151	198	347	47

[1] Figures in brackets indicate % of total.

Table 10. Effect of preceding cover crop on potato tuber quality of Rio Grande Russet, 2011

Cover Crops	% Growth Cracks	% Knobs	% Misshapes	% External[1] Defects	% Hollow Heart	% Brown Center	% Internal[2] Defects	Specific Gravity
Barley	0	0	2.0	2.0	0	0	0	1.085
Sudan Grass (2)	0.2	0	0.8	1.0	1.4	0	1.4	1.087
Wet Fallow	1.1	0	1.7	2.8	0	0	0	1.090
Canola	1.6	0	1.6	3.2	1.0	0	1.0	1.082
Sudan Grass (5)	2.6	0	3.7	6.3	0	0	0	1.084
Camellina	1.6	0	1.6	3.2	0	0	0	1.085
Canola + Compost	0.2	0	0.9	1.1	0	0	0	1.086
Canola + manure	1.9	0	2.4	4.3	0	0	0	1.082
Mustard	1.6	0	2.1	3.7	0	0	0	1.084
Radish	1.1	0	1.1	2.2	0	0	0	1.083
Sudan grass mixture	3.0	0	5.6	8.6	1.1	0	1.1	1.084

[1] Includes growth cracks, knobs and misshapes.
[2] Includes hollow heart and brown center.