



SEED MANAGEMENT

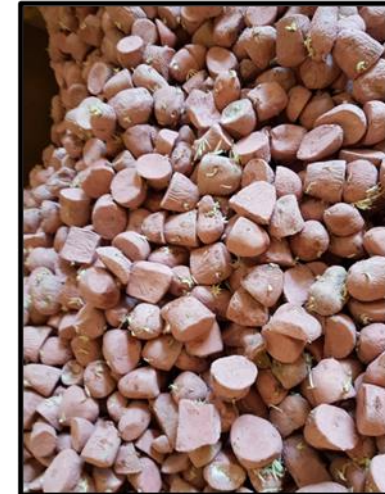
Technical Recommendations & Experiences

AIM LOCAL WORKSHOPS – March 8-9, 2023

Newton Yorinori – Director Ag Research, Breeding & Seed Development

WHY WE SHOULD PRIORITIZE SEED ?

- ✓ Good quality seed has a relevant impact on crop yield potential
 - Influence of biotic + abiotic factors on yield
- ✓ Seed Potatoes are the highest value potatoes on your farm
 - Added costs (Transport + Handling + Cutting + Treatment + Storage)
- ✓ Cut seed is the most delicate potato to handle
 - ↑ Risk : Bruise + Healing + Store
- ✓ Cut seed is the most challenging potato to store
 - Require very specific conditions.
 - Risk of losses (Shrinkage, Rot, Diseases)
- ✓ Cut seed has an expiration date
 - Planting is weather dependent; seed does not care



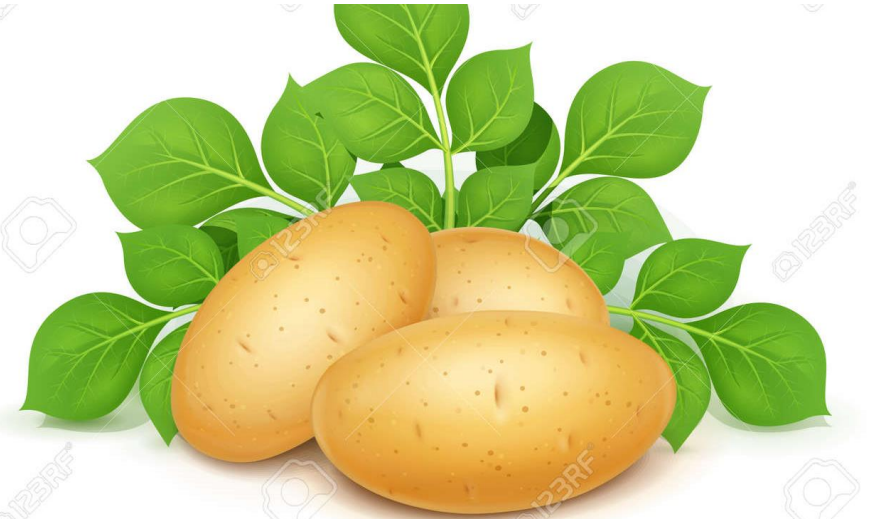
WHAT IS THE IDEAL SEED FOR YOU ?

- Grown in a good field free of diseases
- Long days, cool nights, good nutrition and irrigation
- No variety mixtures
- Approved by official certification system
- Disease free (LB, Virus, BRR, Dry rot)
- Adequate skin set
- Right size profile
- Bruise free
- Stored at 38-39F
- Right physiological age



FACTORS AFFECTING SEED PERFORMANCE

- **Variety (# eyes, dormancy)**
- **How it was grown (rainfall, stress, diseases)**
- **Storage (T, RH, time)**
- **Transport (T, ventilation, time)**
- **Handling (harvest to shipping/planting)**
- **Seed Cutting (cutter, blade, size)**
- **Chemical treatment**
- **Planting (soil moisture, T, texture, depth)**
- **Weather**



POTATO SEED TRANSPORTATION

1. How will seed be shipped?
2. How long will seed be in transit?
3. Nothing good happens during transit.
4. Seed will never come out of a truck in better condition than when it went in.

- ✓ Seed is very fragile
- ✓ Seed at low T is easier to bruise
- ✓ Warm up T during the transportation
- ✓ Provide fresh air
- ✓ Ensure driver is aware of the seed requirement



SEED UNLOADING

- ✓ **Seed is very fragile**
- ✓ **Identify and eliminate possible bruise points**
- ✓ **Provide favorable conditions for tuber wound healing**
 - **Pile seed up to 5' height**
 - **High humidity**
 - **T = 50-55F (10-12C)**
 - **Constant ventilation**
 - **Period**
 - **Min 3 days to prevent soft rot**
 - **14 days to avoid dry rot**
 - **Up to 21 days to get a new periderm**

SEED HANDLING

☑ Temperature (avoid freezing point)

☑ Sanitation

- Clean and disinfect trucks, hoppers, conveyors, cutters, pilers, grading equipment)

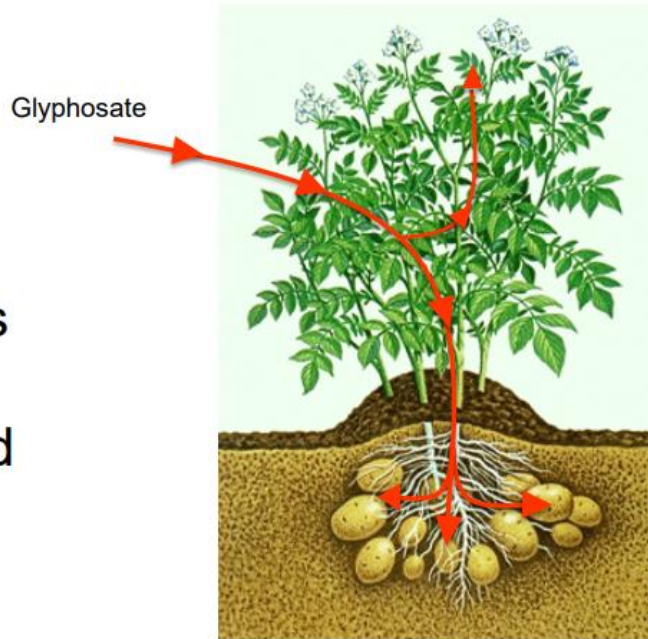
☑ Handling

- Avoid seed bruise and cut
- Reduction of seed decay
- Extra handling increase seed age

HERBICIDE INJURY ON SEED POTATOES

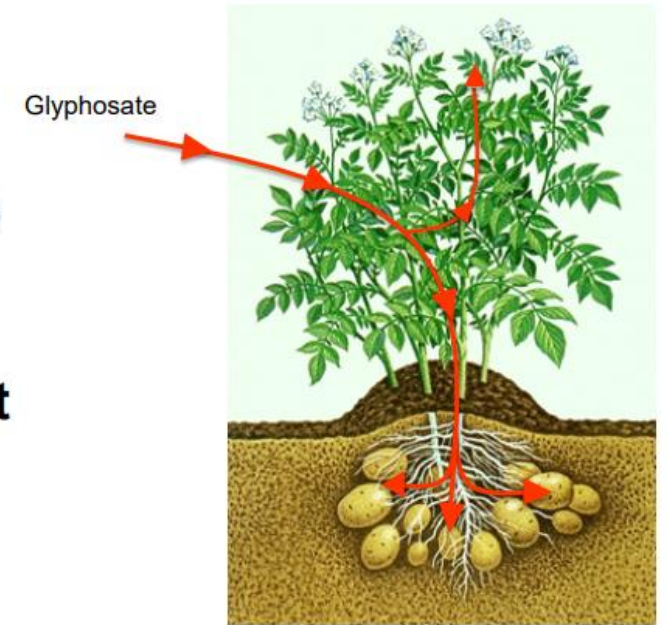
Movement of Glyphosate

- Translocates throughout the potato plant
- Reaches highest concentration levels in potatoes within four days (Smid and Hiller, 1981)



Movement of Glyphosate

- **Glyphosate will move to tubers and residues accumulate in the eyes causing sprouting problems the next year.**

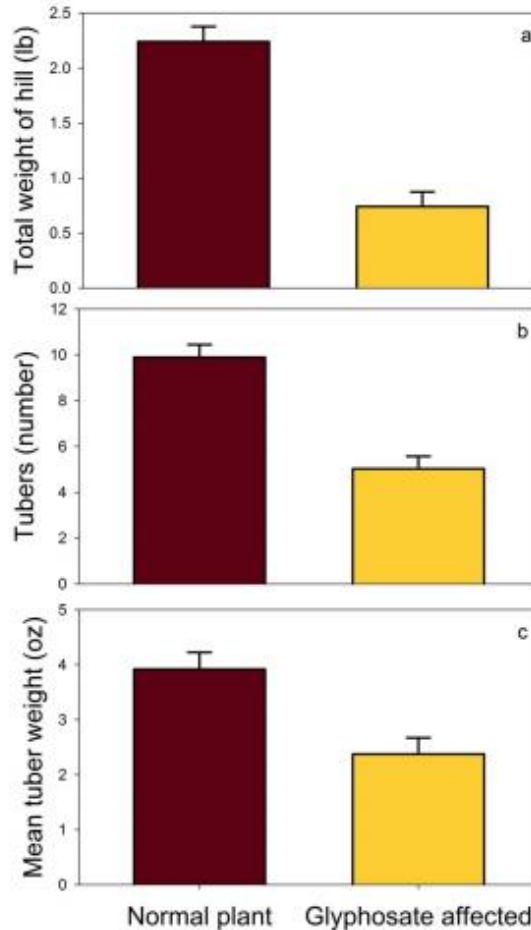


HERBICIDE INJURY ON SEED POTATOES

Glyphosate Residues in Seed Potato

Seed pieces with glyphosate residues had a:

- 67% reduction in total yield (from 2.25 to 0.75 lb/hill)
- 50% reduction in tuber number (10 to 5 tubers/hill)
- 38% reduction in mean tuber weight (3.9 to 2.4 oz/tuber)



Glyphosate Levels

- Amount: 0.007 to 0.036 ppm glyphosate



HERBICIDE INJURY ON SEED POTATOES

Symptoms of Glyphosate Residues in Seed Potatoes

- Erratic and slow emergence pattern
- Bending, twisting, and yellowing of leaves
- Multiple shoots from an eye
- Cauliflower or candelabra formation of shoots
- Enlarged shoots
- Prolific roots or reduced rooting



IF YOU SUSPECT YOUR SEED LOT HAS HERBICIDE INJURED SYMPTOMS

Herbicide Injury Checklist

- ☐ Document potato injury symptoms and patterns.
- ☐ Check pesticide application history.
- ☐ Contact the applicator or chemical representative.
- ☐ Photograph injury symptoms.
- ☐ Send samples to lab for confirmation.
- ☐ Checking growing points to determine plant recovery potential.
- ☐ Count damaged plants to determine the extent of injury.
- ☐ Map areas of the field damaged.
- ☐ Keep records of crop yield losses.



CIPC RESIDUE ON SEED POTATOES

CIPC RESIDUE RISK

- ❖ Tuber apical eyes more sensitive (rosette sprout growth)
- ❖ Levels of 0.025ppm enough to reduce yield
- ❖ Residues cause a negative impact:
 - Delay emergence 2-3 days
 - Yield reduction (1.5% – 15%)
- ❖ Higher levels found
 - Near the walls
 - Ventilation ducts
- ❖ Disinfection only with steam
- ❖ Hot water is not effective to remove CIPC

Impact on Russet burbank

Intended Rate	Actual Rate	Yield (cwt/ac)	Yield Reduction
0 ppm	0 ppm	537	--
0.025 ppm	0.021 ppm	480	10.6%
0.050 ppm	0.128 ppm	487	9.3%
0.100 ppm	0.143 ppm	464	13.6%
0.200 ppm	0.230 ppm	453	15.6%

Impact on Innovator

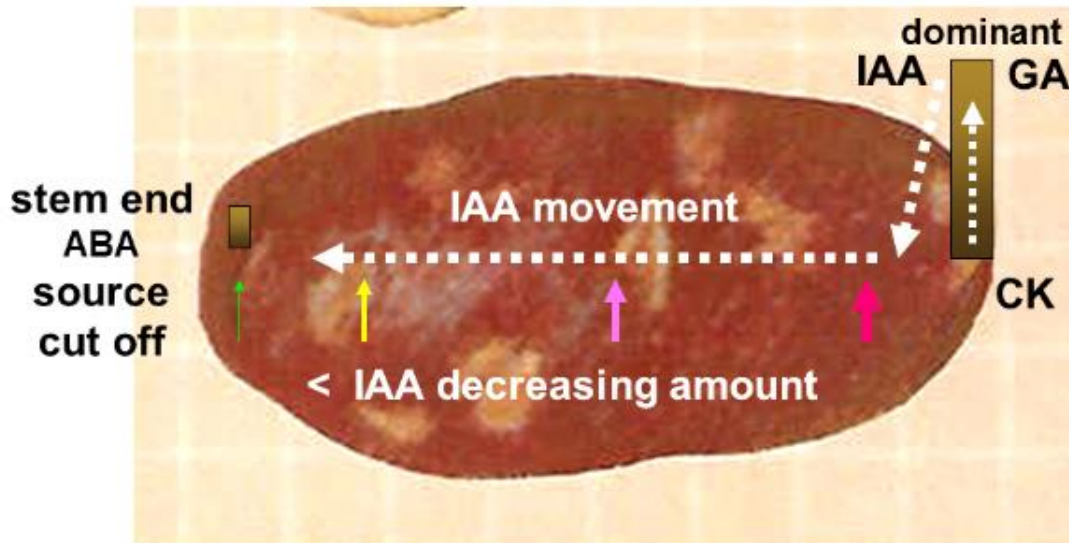
Intended Rate	Actual Rate	Yield (cwt/ac)	Yield Reduction
0 ppm	0.000 ppm	593	--
0.025 ppm	0.062 ppm	584	1.5%
0.050 ppm	0.153 ppm	547	7.8%
0.100 ppm	0.153 ppm	564	4.9%
0.200 ppm	0.303 ppm	524	11.6%



SEED DORMANCY

Figure 1. APICAL DOMINANCE (“young seed”)

< one eye sprouted >

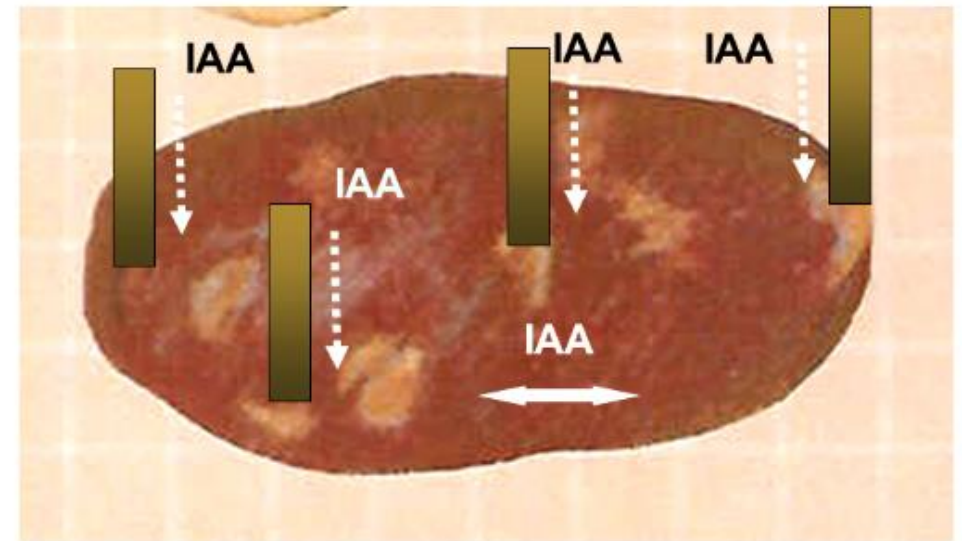


ABA = abscisic acid, IAA = indoleacetic acid, GA = gibberellic acid, CK = cytokinin

GENETIC BASIS :: STORAGE TEMPERATURE INFLUENCE

Figure 2. MULTIPLE SPROUTING (“aged seed”)

< LOST dominance; many eyes sprouted >



IAA = indoleacetic acid

GENETIC BASIS :: TIME & TEMPERATURE INFLUENCE

SEED POTATO DORMANCY

How long it takes to start to
sprout?

Main Processing Varieties

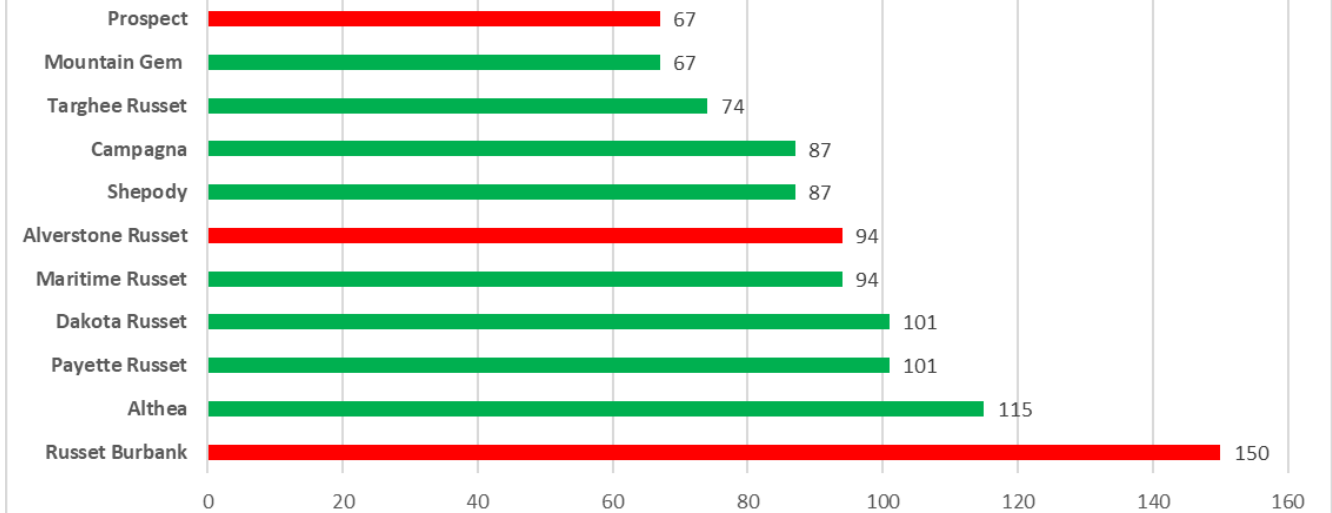
Storage Condition :

Temperature : 50F

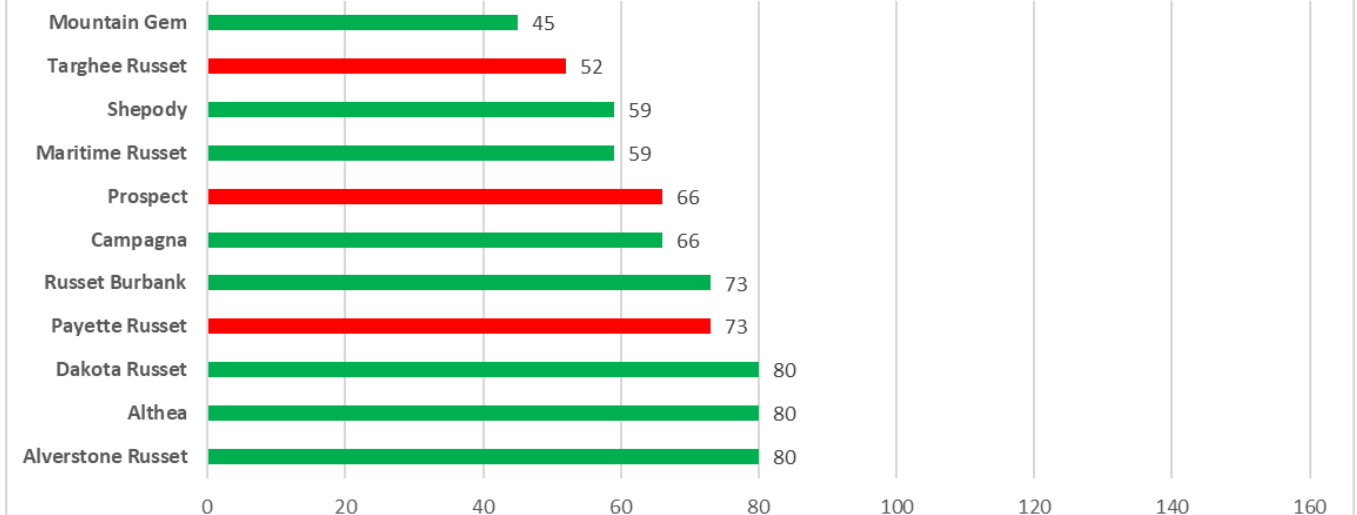
RH : 70-80%



Days from harvest to initial tuber sprouting (2019/2020)



Days from harvest to initial tuber sprouting (2020/2021)



SEED POTATO DORMANCY

How long it takes to start to
sprout?

Main Processing Varieties

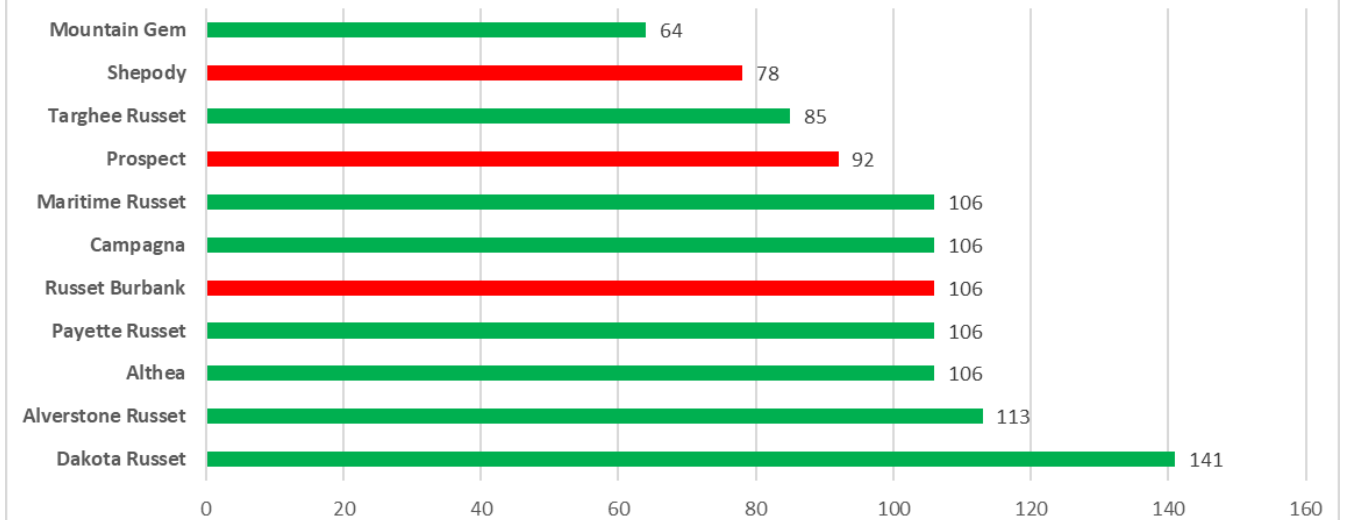
Storage Condition :

Temperature : 50F

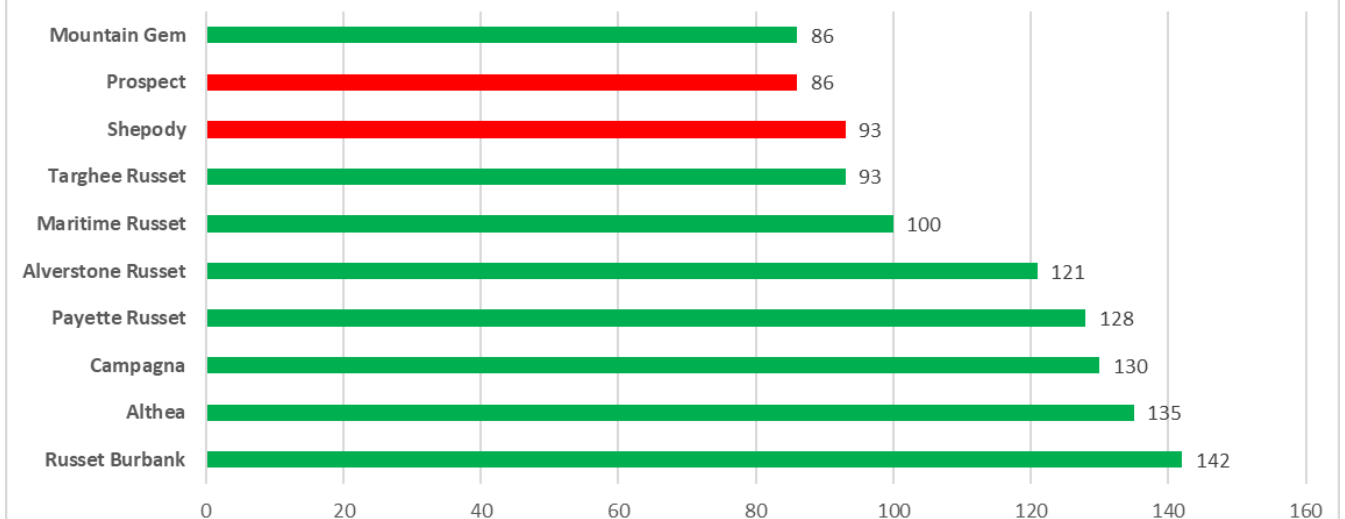
RH : 70-80%



Days from harvest to initial tuber sprouting (2021/2022)



Days from harvest to initial tuber sprouting (2022/2023)



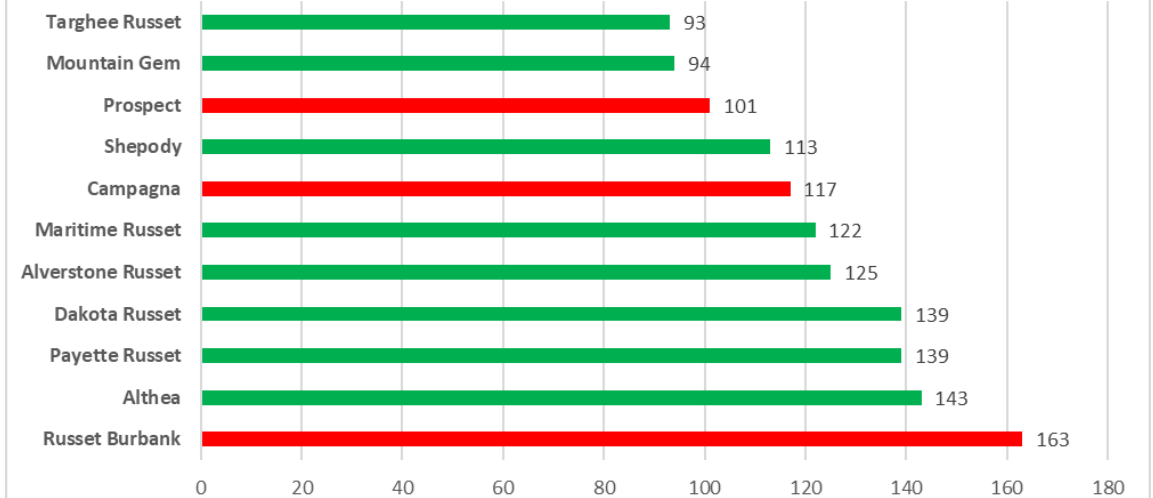
SEED POTATO DORMANCY

When the seed will be ready to
plant?

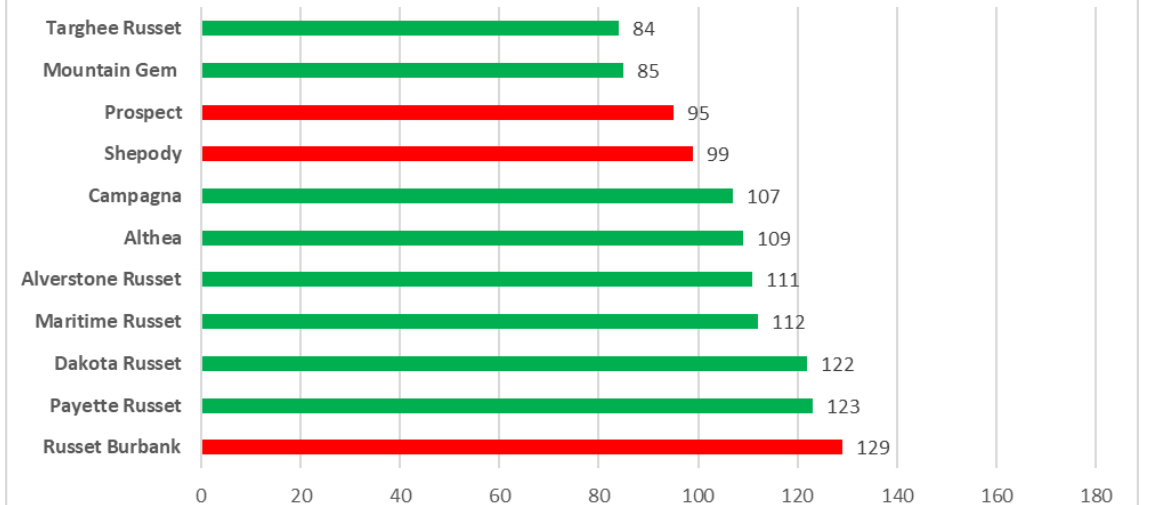
Main Processing Varieties



Days from harvest to 90% of tuber sprouting (2019/2020)



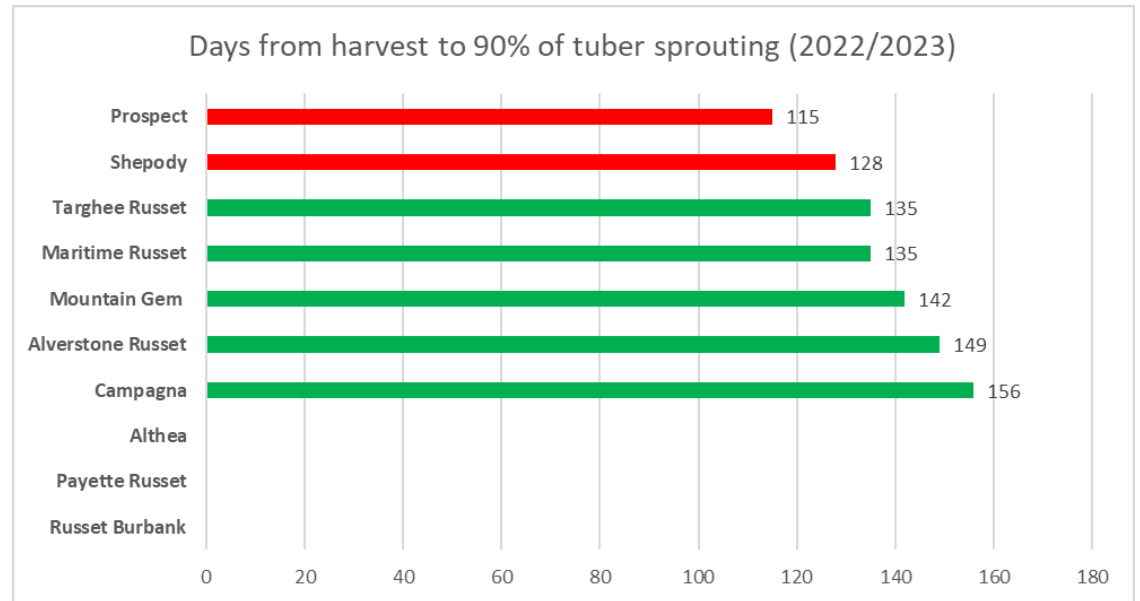
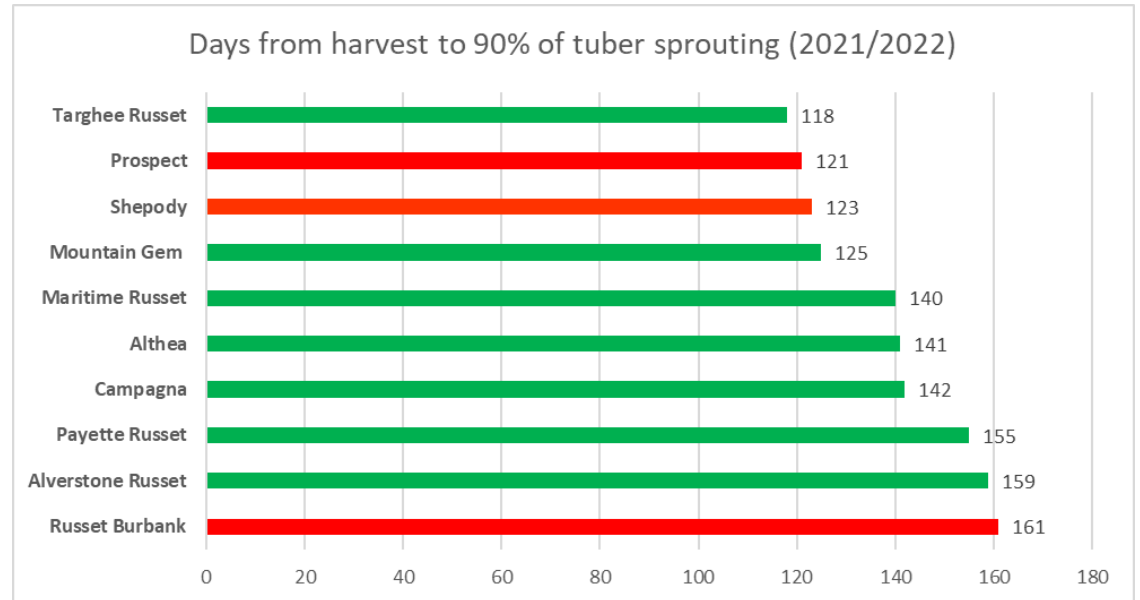
Days from harvest to 90% of tuber sprouting (2020/2021)



SEED POTATO DORMANCY

When the seed will be ready to
plant?

Main Processing Varieties



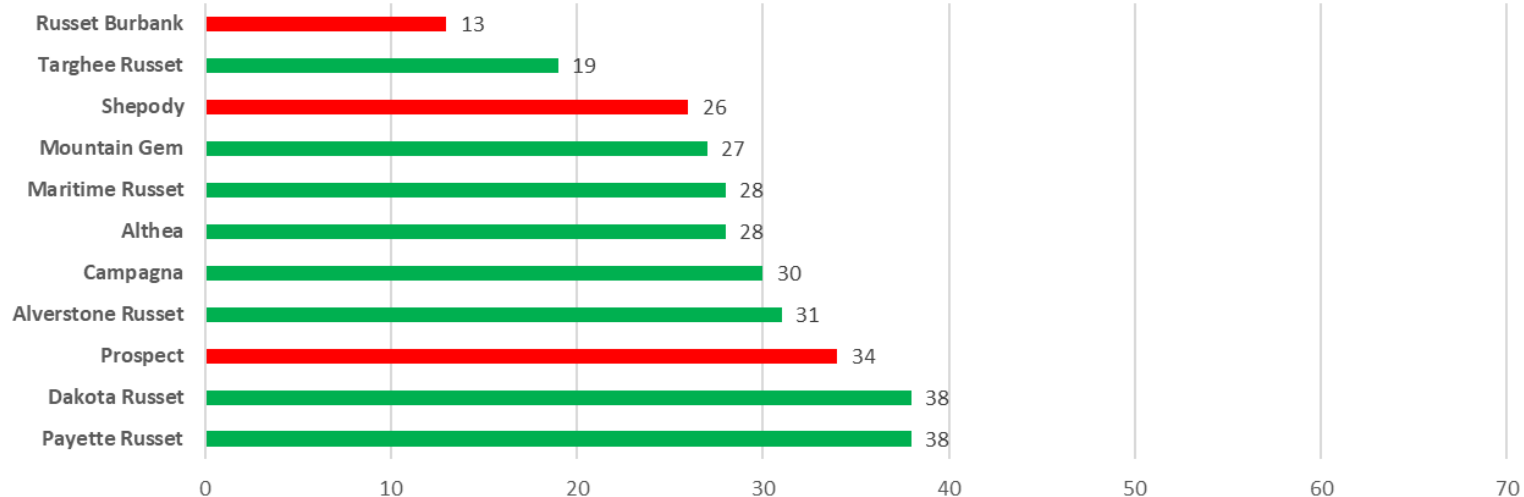
SEED POTATO DORMANCY

Check how long it takes to
get your seed lot sprouted

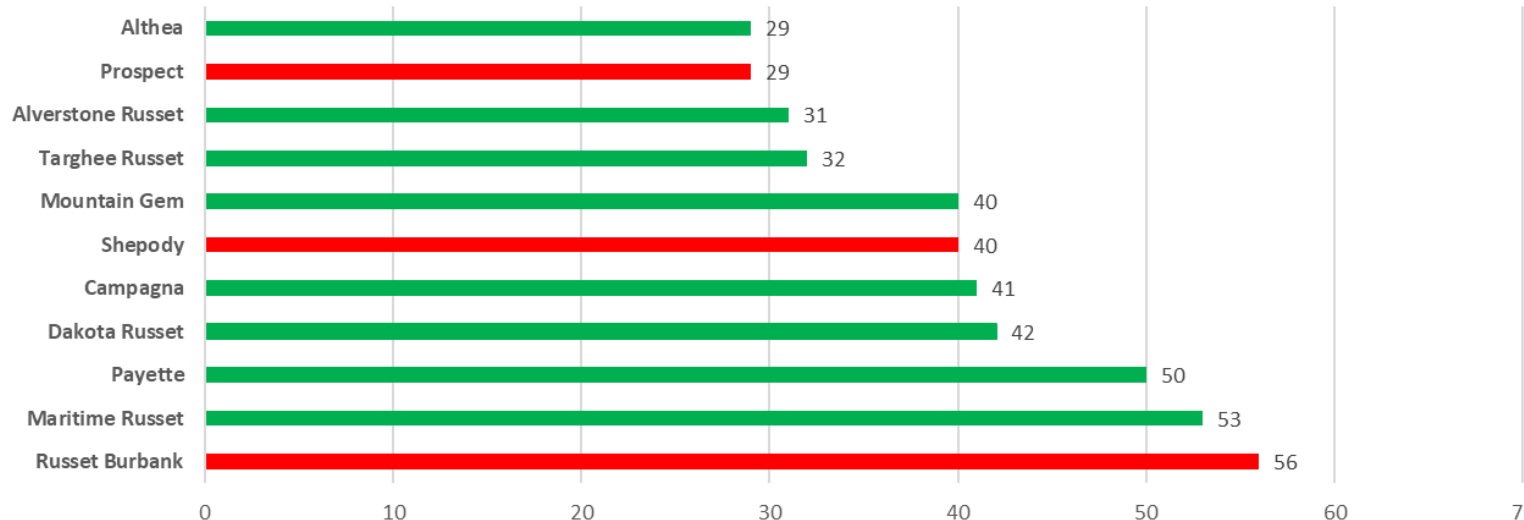
Main Processing Varieties



Days from tuber sprouting to 90% of tubers sprouted (2019/2020)



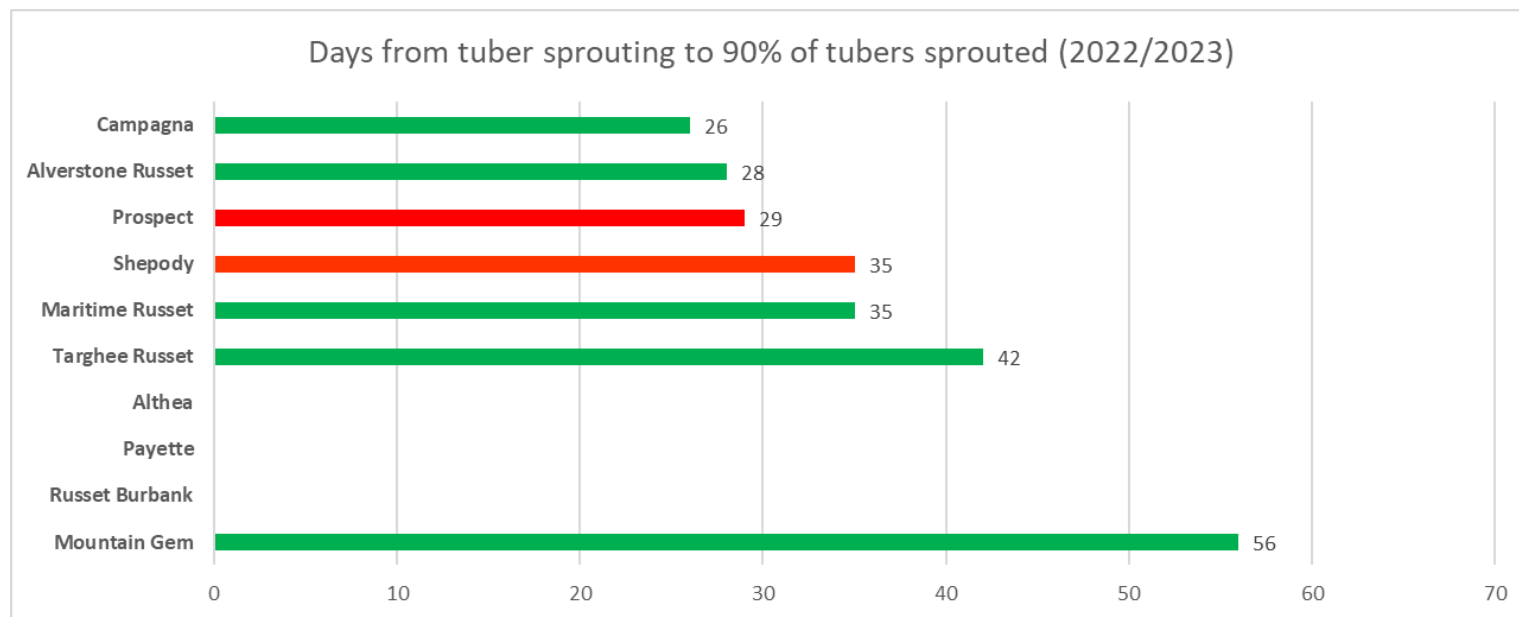
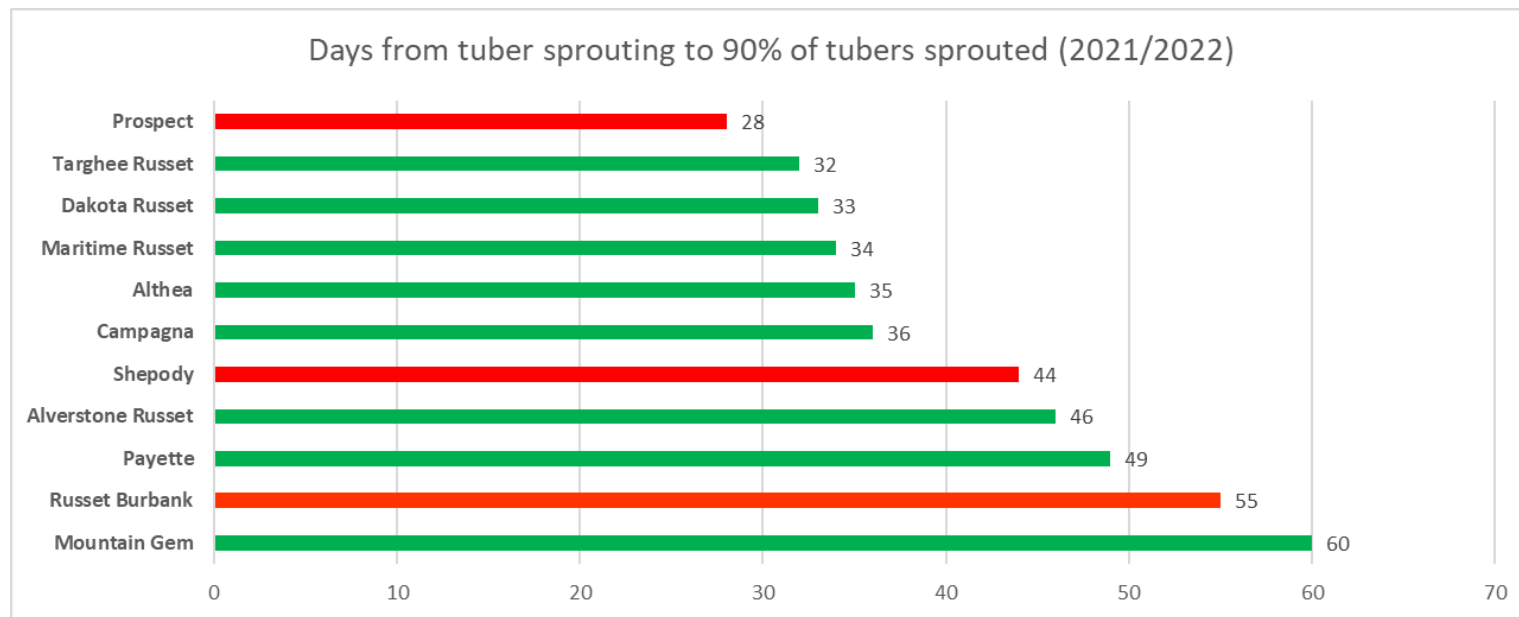
Days from tuber sprouting to 90% of tubers sprouted (2020/2021)



SEED POTATO DORMANCY

Check how long it takes to
get your seed lot sprouted

Main Processing Varieties



SEED DORMANCY

Short Dormancy

Mountain Gem Russet
Prospect
Shepody
Targhee Russet

Medium Dormancy

Alverstone Russet
Campagna
Maritime Russet

Long Dormancy

Althea
Dakota Russet
Payette Russet
Russet Burbank

FIELD EMERGENCE UNIFORMITY

Less Uniform

Mountain Gem Russet
Payette Russet
Russet Burbank

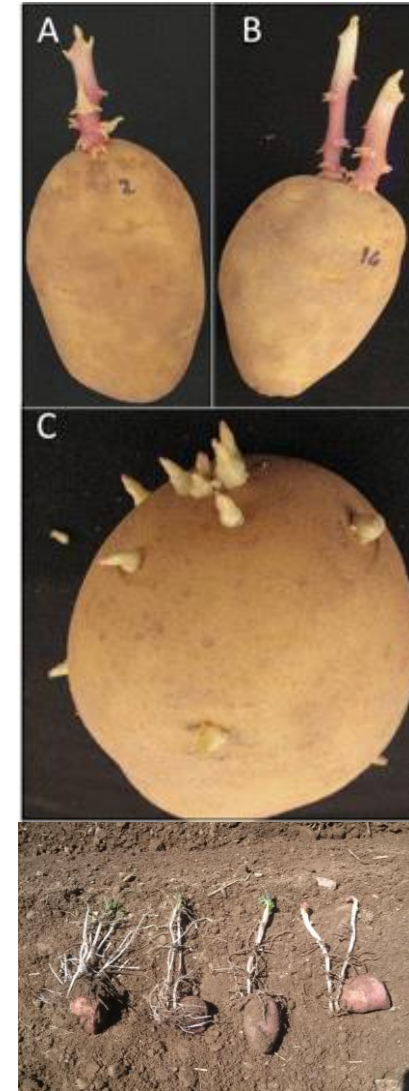
More Uniform

Althea
Prospect
Targhee Russet
Shepody

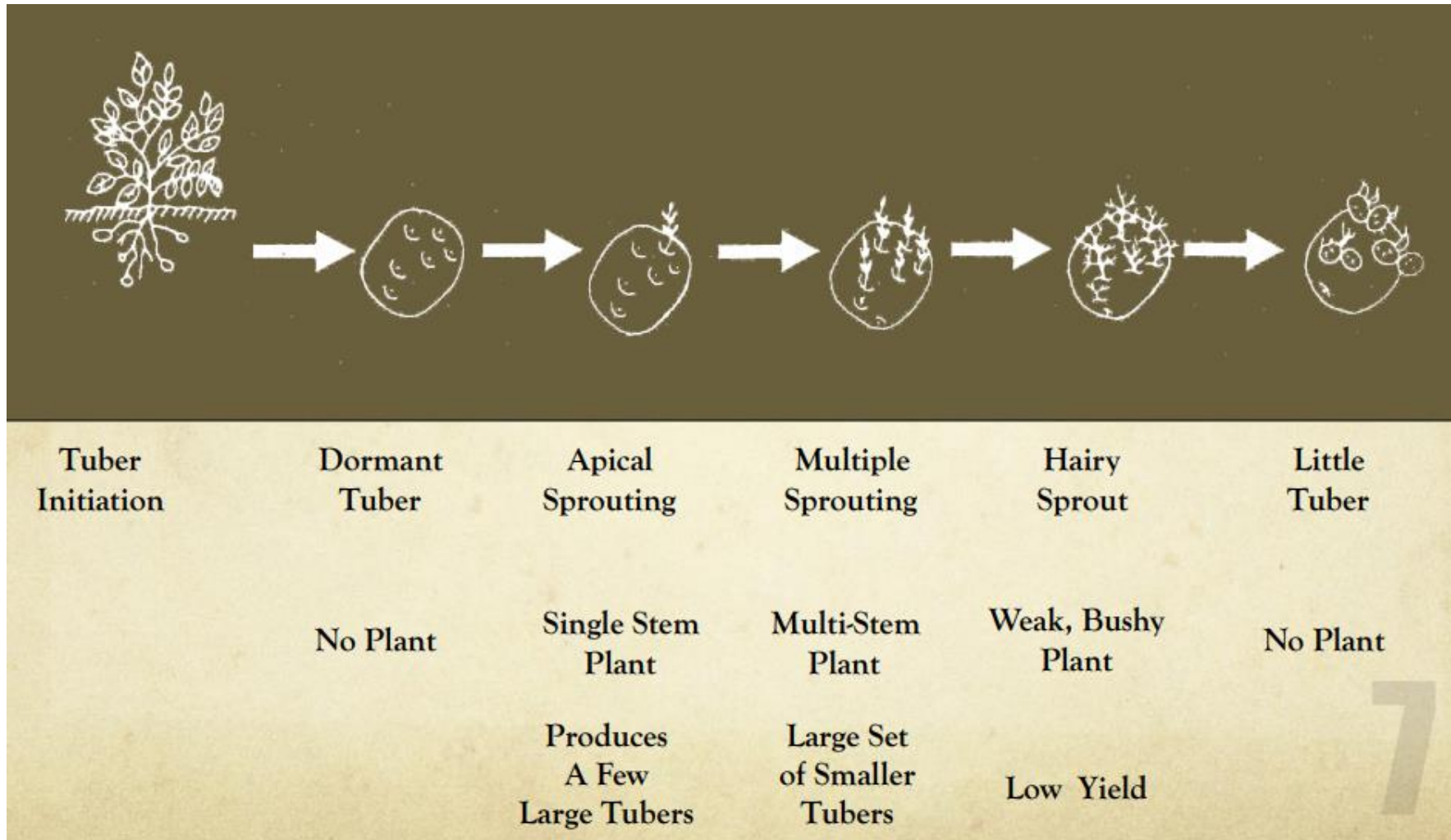
PHYSIOLOGICAL AGE

INFLUENCED BY MANY FACTORS

- ☑ Growing conditions of the seed crop
 - Temperature, Soil moisture, fertility, diseases, frost (Stress)
- ☑ Bruise of seed tubers
 - Accelerates respiration rate
- ☑ Seed Storage conditions
 - Temperature, RH
- ☑ Genetics
- ☑ Cutting operation
 - Accelerates respiration rate



PHYSIOLOGICAL AGE



Seed Physiological Aging Trial Results

General Information

- ✓ **Planting : May 20th, 2022**
- ✓ **Harvest : Sep 30th, 2022**
- ✓ **Experimental Design : RBD with 4 reps**
- ✓ **Chemical control :**
 - Quadris + Actara in furrow + Foliar sprays (Seed crop)
- ✓ **Fertilization :**
 - Planter : 1,250 lbs/acre of 8.8-14-16
 - Top-dressing :
 - Dakota Russet / Prospect 30 lbs/ac N
 - Payette Russet 40 lbs/ac N
- ✓ **Samples processed @ Central Grading + SIMMAC**

- ✓ **Treatments :**
 - No Pre-sprouting + No GA3 (Check)
 - No Pre-sprouting + 13 ppm GA3
 - Pre-sprouting + No GA3
 - Pre-sprouting + 13ppm GA3
- ✓ **Varieties :**
 - Dakota Russet (10")
 - Prospect (10")
 - Payette Russet (10")

SEED PHYSIOLOGICAL AGE

Variety Dakota Russet

TREATMENT	Stem/ Plant	TUBER SET	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Payout (\$/ac)
1 - No pre-sprouting/ No GA3 (check)	2.79	7.40	20.2%	1.6%	258	205	\$ 3,228
2- No pre-sprouting/ GA3	3.29	8.54	39.6%	0.0%	232	141	\$ 2,254
3- Pre-sprouting/ No GA3	2.18	5.67	13.2%	5.4%	233	203	\$ 3,098
4- Pre-sprouting + GA3	3.68	10.11	55.3%	0.0%	226	101	\$ 1,603

C.V.	10.48	12.01	28.42	77.90	10.73	18.86	17.82
LSD 0.05 :	0.43	1.32	12.6%	1.9%	35.30	42.43	628.69

TREATMENT	# TUBERS < 2oz	# TUBERS 2-4oz	# TUBERS 4-6oz	# TUBERS 6-8oz	# TUBERS > 8oz	Number of Tubers ↑ + 9% +30%
1 - No pre-sprouting/ No GA3 (check)	15%	37%	35%	10%	2%	
2- No pre-sprouting/ GA3	27%	48%	18%	5%	1%	
3- Pre-sprouting/ No GA3	12%	28%	33%	20%	8%	
4- Pre-sprouting + GA3	42%	42%	12%	3%	0%	

SEED PHYSIOLOGICAL AGE

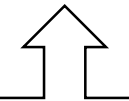
Variety Prospect

TREATMENT	Stem/ Plant	TUBER SET	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Payout (\$/ac)
1 - No pre-sprouting/ No GA3 (check)	2.96	6.68	3.9%	30.4%	354	325	\$ 4,864
2- No pre-sprouting/ GA3	4.30	7.97	9.1%	15.9%	311	265	\$ 4,073
3- Pre-sprouting/ No GA3	2.79	6.36	3.3%	37.0%	362	315	\$ 4,715
4- Pre-sprouting + GA3	4.16	8.07	9.2%	14.0%	323	278	\$ 4,234

C.V.	11.39	7.12	28.40	19.51	10.84	13.28	12.62
LSD 0.05 :	0.56	0.72	2.5%	6.6%	50.65	54.45	781.95

TREATMENT	# TUBERS < 2oz	# TUBERS 2-4oz	# TUBERS 4-6oz	# TUBERS 6-8oz	# TUBERS > 8oz
1 - No pre-sprouting/ No GA3 (check)	10%	20%	19%	20%	31%
2- No pre-sprouting/ GA3	18%	31%	23%	14%	14%
3- Pre-sprouting/ No GA3	13%	18%	21%	19%	29%
4- Pre-sprouting + GA3	21%	28%	25%	12%	14%

Number of Tubers



+21%

+29%



SEED PHYSIOLOGICAL AGE

Variety Payette Russet

TREATMENT	Stem/ Plant	TUBER SET	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Payout (\$/ac)
1 - No pre-sprouting/ No GA3 (check)	3.46	6.40	6.4%	44.9%	258	237	\$ 3,790
2- No pre-sprouting/ GA3	4.72	9.18	17.2%	16.6%	232	188	\$ 3,040
3- Pre-sprouting/ No GA3	3.65	6.97	8.3%	38.3%	233	211	\$ 3,420
4- Pre-sprouting + GA3	4.65	10.20	21.4%	8.8%	226	174	\$ 2,809

C.V.	11.64	13.03	31.92	34.63	10.73	14.24	14.51
LSD 0.05 :	0.66	1.48	5.9%	13.0%	35.30	39.99	656.37

TREATMENT	# TUBERS < 2oz	# TUBERS 2-4oz	# TUBERS 4-6oz	# TUBERS 6-8oz	# TUBERS > 8oz	Number of Tubers
1 - No pre-sprouting/ No GA3 (check)	13%	20%	23%	18%	26%	
2- No pre-sprouting/ GA3	20%	35%	23%	13%	9%	+45%
3- Pre-sprouting/ No GA3	13%	19%	26%	20%	23%	
4- Pre-sprouting + GA3	20%	36%	31%	9%	5%	+70%





SEED SIZE



Seed Size & Seed Cut Trial Results

General Information

- ✓ **Planting : May 15th, 2021 / May 20th, 2022**
- ✓ **Harvest : Oct 1st, 2021 / Sep 29th, 2022**
- ✓ **Experimental Design : RBD with 4 reps**
- ✓ **Chemical control :**
 - Quadris + Actara in furrow + Foliar sprays (Seed crop)
- ✓ **Fertilization :**
 - Planter : 1,250 lbs/acre of 8.8-14-16
 - Top-dressing :
 - Dakota Russet / Prospect 30 lbs/ac N
 - Mountain Gem / Targhee Russet / Althea / Alverstone Russet 40 lbs/ac N
 - Russet Burbank 70 lbs/ac
- ✓ **Samples processed @ Central Grading + SIMMAC**

- ✓ **Treatments :**
 - 1.5 oz Whole seed
 - 1.5 oz Cut
 - 1.5 barrel Cut
 - 2.5 oz Whole seed
 - 2.5 oz Cut
 - 2.5 barrel Cut
 - 3.5 oz Whole seed
 - 3.5 oz Cut
 - 3.5 barrel Cut

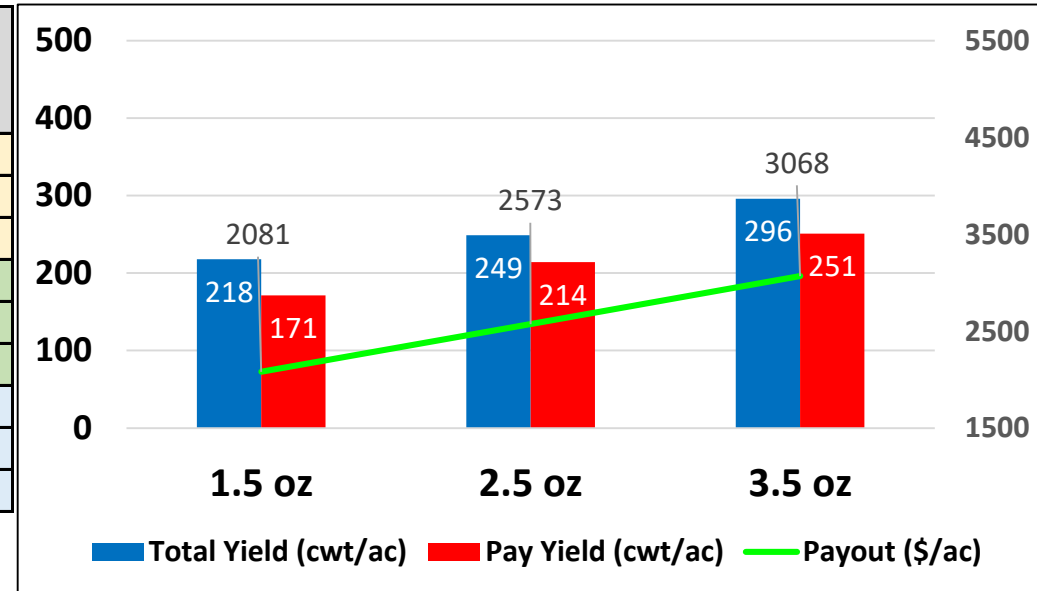
All seeds were pre-cut 1 week before planting

- ✓ **Varieties :**
 - Dakota Russet (10")
 - Mountain Gem Russet (12")
 - Prospect (10")
 - Russet Burbank (14")
 - Targhee Russet (12")
 - Althea (12")
 - Alverstone Russet (12")

Seed Size Trial Results – var. Dakota Russet

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Payout (\$/ac)
1.5oz Whole	1.6	5.9	19.7%	6.3%	215	166	\$ 2,011.34
1.5oz Cut	1.3	5.6	14.3%	11.4%	223	184	\$ 2,167.47
1.5oz Barrel Cut	1.3	5.0	11.2%	14.2%	215	163	\$ 2,065.00
2.5oz Whole	2.0	6.6	15.4%	12.9%	270	236	\$ 2,823.06
2.5oz Cut	1.7	6.3	13.1%	8.3%	240	207	\$ 2,499.57
2.5oz Barrel Cut	1.3	6.4	9.2%	11.1%	239	201	\$ 2,398.13
3.5oz Whole	3.2	6.3	11.6%	16.4%	341	290	\$ 3,624.04
3.5oz Cut	1.9	5.1	10.5%	22.7%	267	221	\$ 2,743.23
3.5oz Barrel Cut	1.6	5.0	8.8%	13.1%	280	242	\$ 2,839.21
C.V.	8.08	12.76	24.04	35.48	8.55	11.25	11.67
LSD 0.05 :	0.20	1.03	4.21	6.36	30.15	33.08	416.45





104 1.5oz
Whole Seed
1.5oz Whole Seed

105 1.5oz
Single Cut
1.5oz Single Cut

106 1.5oz
Barnet Cut
1.5oz Barnet Cut

107 2.5oz
Whole Seed
2.5oz Whole Seed

108 2.5oz
Single Cut
2.5oz Single Cut

109 2.5oz
Barnet Cut
2.5oz Barnet Cut

110 3.5oz
Whole Seed
3.5oz Whole Seed

111 3.5oz
Single Cut
3.5oz Single Cut

112 3.5oz
Barnet Cut
3.5oz Barnet Cut

113 1.5oz
Whole Seed
1.5oz Whole Seed

1.5 oz Seed piece

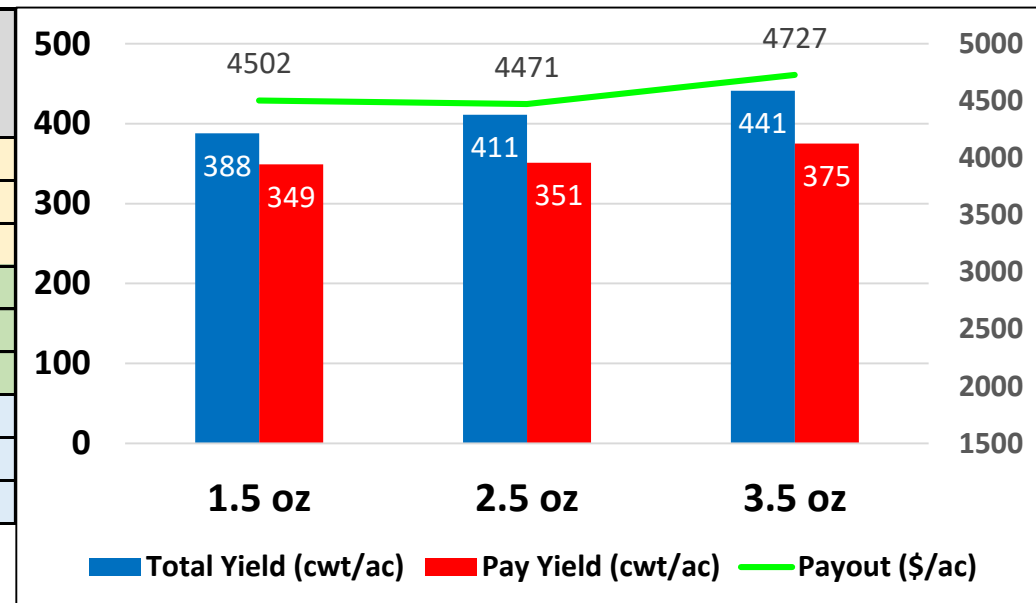
2.5 oz Seed piece

3.5 oz Seed piece

Seed Size Trial Results – var. Mountain Gem Russet

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Payout (\$/ac)
1.5oz Whole	2.7	9.6	7.1%	30.8%	377	346	\$ 4,385.66
1.5oz Cut	2.5	8.2	6.5%	38.0%	420	372	\$ 4,867.26
1.5oz Barrel Cut	2.2	8.4	5.4%	37.3%	366	329	\$ 4,253.62
2.5oz Whole	3.7	9.4	8.2%	31.8%	418	353	\$ 4,635.93
2.5oz Cut	3.1	10.3	7.2%	34.6%	406	357	\$ 4,442.23
2.5oz Barrel Cut	2.8	9.6	7.1%	41.9%	410	343	\$ 4,333.43
3.5oz Whole	4.6	10.5	9.0%	34.1%	425	377	\$ 4,626.45
3.5oz Cut	3.6	9.4	7.0%	39.0%	450	350	\$ 4,320.49
3.5oz Barrel Cut	3.7	8.6	5.6%	38.5%	447	398	\$ 5,235.05
C.V.	7.80	10.57	14.63	16.57	5.49	5.63	5.69
LSD 0.05 :	0.35	1.37	1.42	8.31	31.46	27.98	359.91





1.5 oz Seed piece

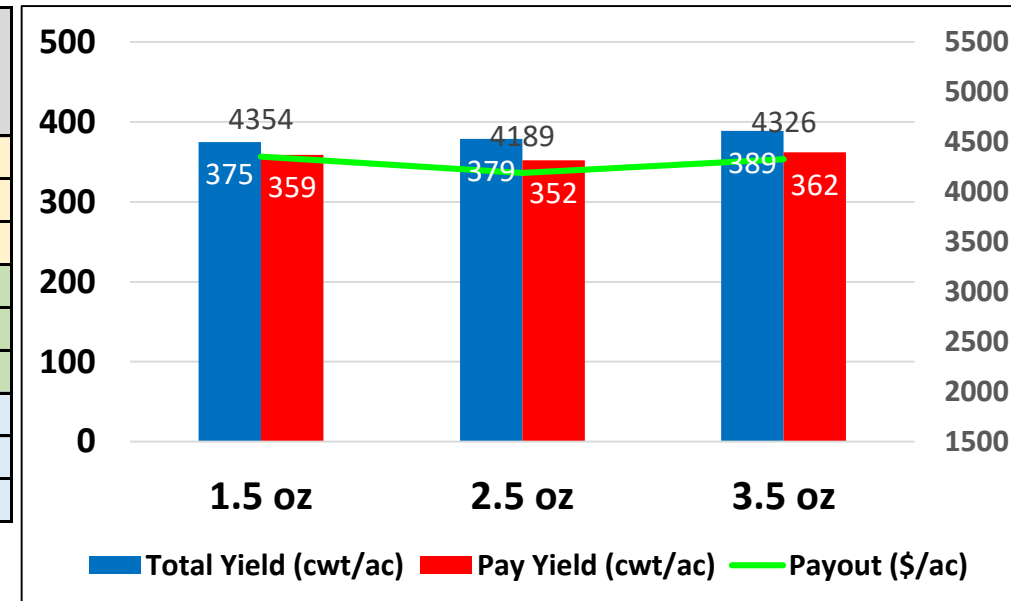
2.5 oz Seed piece

3.5 oz Seed piece

Seed Size Trial Results – var. Prospect

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Payout (\$/ac)
1.5oz Whole	1.7	6.4	3.4%	40.0%	359	332	\$ 4,020.11
1.5oz Cut	1.4	5.5	4.9%	38.8%	399	401	\$ 4,870.01
1.5oz Barrel Cut	1.4	5.8	2.4%	53.7%	368	344	\$ 4,171.98
2.5oz Whole	2.0	6.4	4.8%	38.3%	370	353	\$ 4,256.57
2.5oz Cut	1.5	6.5	1.9%	49.1%	392	356	\$ 4,142.63
2.5oz Barrel Cut	1.5	5.7	2.6%	51.2%	374	346	\$ 4,168.89
3.5oz Whole	2.5	6.2	4.9%	46.0%	403	379	\$ 4,525.04
3.5oz Cut	2.1	5.8	3.7%	43.7%	396	368	\$ 4,383.49
3.5oz Barrel Cut	1.8	6.0	3.4%	50.9%	369	339	\$ 4,069.58
C.V.	10.24	10.53	26.99	9.97	8.36	9.62	9.46
LSD 0.05 :	0.25	0.88	1.33	6.32	44.15	47.66	562.32





1.5 oz Seed piece

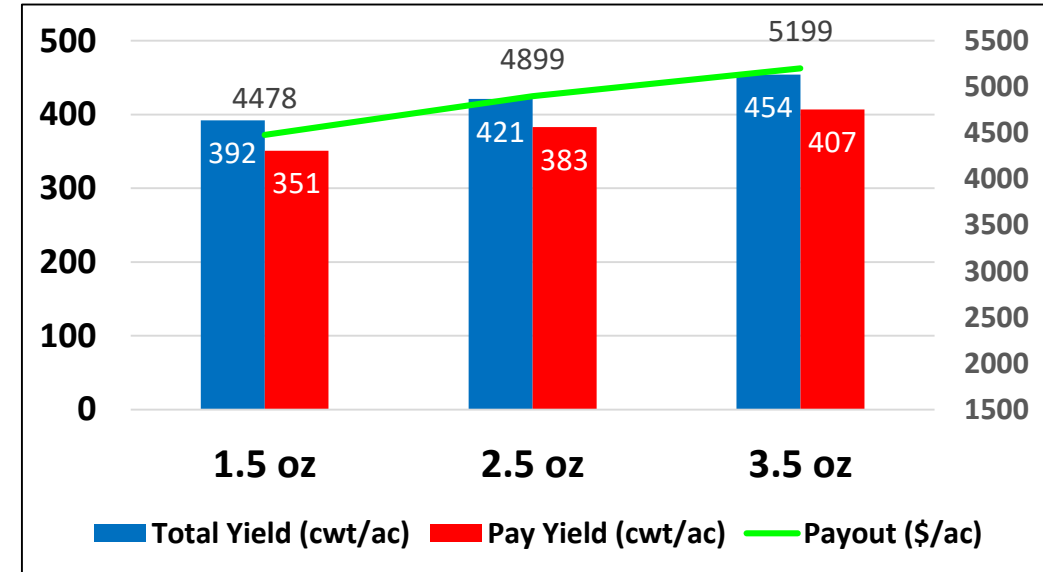
2.5 oz Seed piece

3.5 oz Seed piece

Seed Size Trial Results – var. Russet Burbank

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Payout (\$/ac)
1.5oz Whole	2.8	9.9	8.2%	41.0%	385	335	\$ 4,242.52
1.5oz Cut	2.4	8.9	6.9%	51.8%	397	359	\$ 4,608.97
1.5oz Barrel Cut	2.3	8.1	6.7%	41.6%	394	359	\$ 4,582.15
2.5oz Whole	3.8	11.3	8.0%	37.1%	419	372	\$ 4,782.21
2.5oz Cut	2.6	9.6	6.5%	42.3%	410	370	\$ 4,633.19
2.5oz Barrel Cut	2.8	11.2	5.8%	42.1%	434	408	\$ 5,280.63
3.5oz Whole	4.2	10.0	10.2%	31.3%	441	381	\$ 4,869.64
3.5oz Cut	3.4	10.2	6.6%	43.8%	443	404	\$ 5,111.98
3.5oz Barrel Cut	3.7	9.5	5.5%	37.2%	477	436	\$ 5,616.38
C.V.	10.96	11.71	24.80	13.43	6.75	7.64	7.54
LSD 0.05 :	0.47	1.60	2.46	7.62	39.47	40.27	507.89





1.5 oz Seed piece

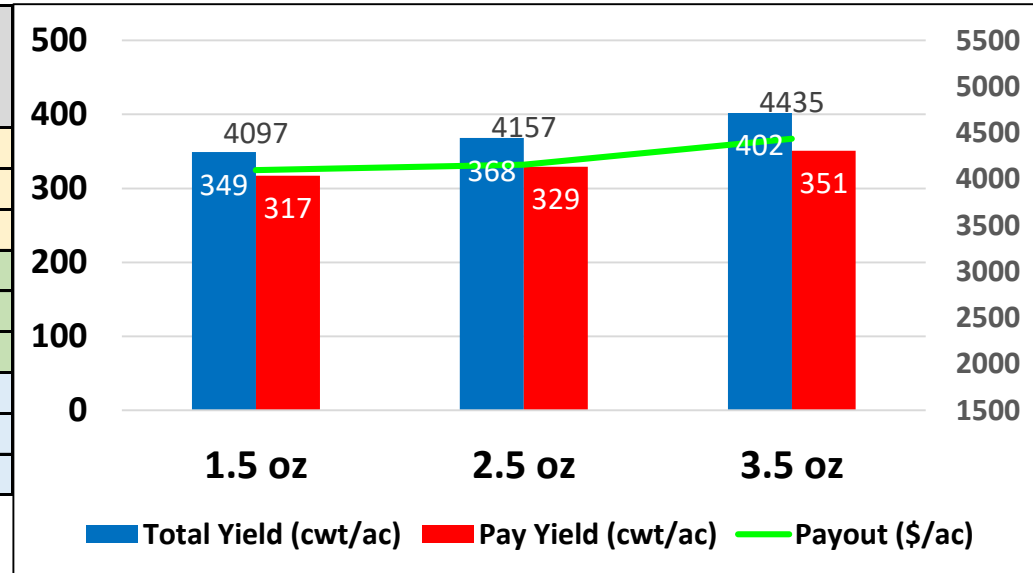
2.5 oz Seed piece

3.5 oz Seed piece

Seed Size Trial Results – var. Targhee Russet

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Payout (\$/ac)
1.5oz Whole	3.0	10.0	8.0%	17.1%	343	312	\$ 4,005.34
1.5oz Cut	3.0	9.8	10.1%	23.1%	346	312	\$ 4,092.06
1.5oz Barrel Cut	2.9	9.1	8.6%	19.9%	358	328	\$ 4,193.95
2.5oz Whole	4.3	10.4	10.7%	22.7%	356	323	\$ 4,187.74
2.5oz Cut	4.2	10.5	11.7%	15.4%	382	340	\$ 4,179.09
2.5oz Barrel Cut	3.4	10.2	9.3%	21.9%	366	323	\$ 4,104.32
3.5oz Whole	5.5	10.8	14.7%	15.1%	395	336	\$ 4,250.41
3.5oz Cut	4.8	10.8	11.8%	21.0%	406	357	\$ 4,480.25
3.5oz Barrel Cut	4.4	10.0	12.3%	16.6%	403	360	\$ 4,573.38
C.V.	6.76	11.55	23.83	22.12	5.05	6.34	6.62
LSD 0.05 :	0.37	1.63	3.57	5.88	26.08	29.20	388.15





3.0oz
Wheat Cut

3.0oz
Wheat Seed

3.0oz
Single Cut

3.0oz
Wheat Cut

3.0oz
Wheat Seed

3.0oz
Single Cut

3.0oz
Single Cut

3.0oz
Wheat Seed

3.0oz
Single Cut

3.0oz
Single Cut

3.0oz
Wheat Seed

3.0oz
Single Cut

1.5 oz Seed piece

2.5 oz Seed piece

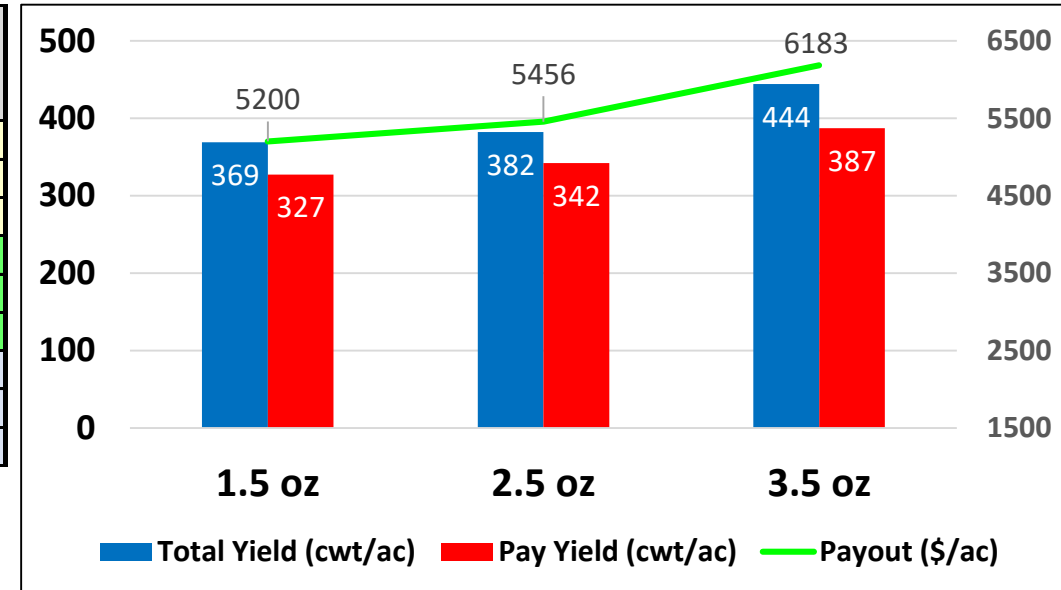
3.5 oz Seed piece

Seed Size Trial Results – var. Alverstone Russet

2022

TREATMENT	Stem/ Plant	Tubers / Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Payout (\$/ac)
1.5 OZ WHOLE SEED	3.72	10.62	6.5%	21.6%	410	370	\$ 5,872
1.5 OZ SINGLE CUT	3.20	9.64	7.4%	21.4%	378	337	\$ 5,355
1.5 OZ BARREL CUT	2.61	8.22	8.6%	26.5%	319	274	\$ 4,373
2.5 OZ WHOLE SEED	3.95	11.62	8.7%	17.7%	420	383	\$ 6,082
2.5 OZ SINGLE CUT	3.88	10.12	8.8%	19.8%	371	331	\$ 5,284
2.5 OZ BARREL CUT	3.71	10.14	10.0%	21.6%	357	312	\$ 5,003
3.5 OZ WHOLE SEED	5.80	14.98	12.1%	14.5%	476	415	\$ 6,644
3.5 OZ SINGLE CUT	4.89	12.98	10.3%	15.6%	425	373	\$ 5,954
3.5 OZ BARREL CUT	4.73	13.12	11.2%	12.9%	430	373	\$ 5,953

C.V.	8.83	9.91	22.27	25.28	8.85	9.18	9.28
LSD 0.05 :	0.50	1.55	2.9%	6.7%	48.87	44.76	721.92

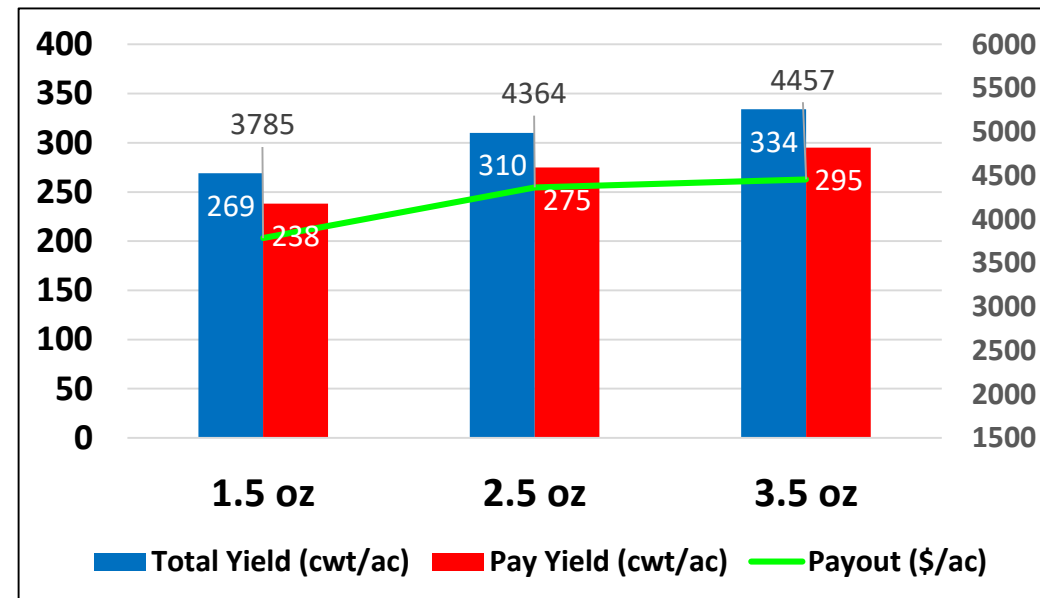


Seed Size Trial Results – var. Althea

2022

TREATMENT	Stem/ Plant	TUBER SET	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
1.5 OZ WHOLE SEED	4.21	10.62	12.4%	7.0%	286	248	\$ 3,945
1.5 OZ SINGLE CUT	3.56	9.64	10.4%	6.5%	270	241	\$ 3,832
1.5 OZ BARREL CUT	2.81	8.22	8.2%	16.1%	251	226	\$ 3,577
2.5 OZ WHOLE SEED	5.11	11.62	10.7%	8.0%	343	307	\$ 4,869
2.5 OZ SINGLE CUT	4.41	10.12	9.6%	9.2%	314	280	\$ 4,442
2.5 OZ BARREL CUT	4.11	10.14	12.1%	8.9%	273	239	\$ 3,782
3.5 OZ WHOLE SEED	5.24	14.98	16.5%	5.8%	354	294	\$ 4,580
3.5 OZ SINGLE CUT	5.36	12.98	13.7%	1.9%	345	295	\$ 4,728
3.5 OZ BARREL CUT	5.02	13.12	16.6%	7.5%	303	255	\$ 4,063

C.V.	8.64	9.91	35.93	54.76	8.32	11.25	10.68
LSD 0.05 :	0.53	1.55	6.1%	6.0%	35.07	41.34	621.85



SEED SIZE vs. SEED COST vs. BENEFIT

Seed Size target : 1.5 oz

In row spacing (inches)	For Elite 2 Seed Crop 30"		For Elite 3 Seed Crop 36"		For Commercial Crop 36"	
	Plant population (Plant/ac)	Seed usage (cwt/ac)	Plant population (Plant/ac)	Seed usage (cwt/ac)	Plant population (Plant/ac)	Seed usage (cwt/ac)
6	34849	32.7	29041	27.2	29041	27.2
6.5	32168	30.2	26807	25.1	26807	25.1
7	29870	28.0	24892	23.3	24892	23.3
7.5	27879	26.1	23232	21.8	23232	21.8
8	26137	24.5	21780	20.4	21780	20.4
8.5	24599	23.1	20499	19.2	20499	19.2
9	23232	21.8	19360	18.2	19360	18.2
9.5	22010	20.6	18341	17.2	18341	17.2
10	20909	19.6	17424	16.3	17424	16.3
10.5	19914	18.7	16595	15.6	16595	15.6
11	19008	17.8	15840	14.9	15840	14.9
11.5	18182	17.0	15152	14.2	15152	14.2
12	17424	16.3	14520	13.6	14520	13.6

Seed Size target : 2.5 oz

In row spacing (inches)	For Elite 2 Seed Crop 30"		For Elite 3 Seed Crop 36"		For Commercial Crop 36"	
	Plant population (Plant/ac)	Seed usage (cwt/ac)	Plant population (Plant/ac)	Seed usage (cwt/ac)	Plant population (Plant/ac)	Seed usage (cwt/ac)
6	34849	54.5	29041	45.4	29041	45.4
6.5	32168	50.3	26807	41.9	26807	41.9
7	29870	46.7	24892	38.9	24892	38.9
7.5	27879	43.6	23232	36.3	23232	36.3
8	26137	40.8	21780	34.0	21780	34.0
8.5	24599	38.4	20499	32.0	20499	32.0
9	23232	36.3	19360	30.3	19360	30.3
9.5	22010	34.4	18341	28.7	18341	28.7
10	20909	32.7	17424	27.2	17424	27.2
10.5	19914	31.1	16595	25.9	16595	25.9
11	19008	29.7	15840	24.8	15840	24.8
11.5	18182	28.4	15152	23.7	15152	23.7
12	17424	27.2	14520	22.7	14520	22.7

Seed Size target : 3.5 oz

In row spacing (inches)	For Elite 2 Seed Crop 30"		For Elite 3 Seed Crop 36"		For Commercial Crop 36"	
	Plant population (Plant/ac)	Seed usage (cwt/ac)	Plant population (Plant/ac)	Seed usage (cwt/ac)	Plant population (Plant/ac)	Seed usage (cwt/ac)
6	34849	76.2	29041	63.5	29041	63.5
6.5	32168	70.4	26807	58.6	26807	58.6
7	29870	65.3	24892	54.5	24892	54.5
7.5	27879	61.0	23232	50.8	23232	50.8
8	26137	57.2	21780	47.6	21780	47.6
8.5	24599	53.8	20499	44.8	20499	44.8
9	23232	50.8	19360	42.4	19360	42.4
9.5	22010	48.1	18341	40.1	18341	40.1
10	20909	45.7	17424	38.1	17424	38.1
10.5	19914	43.6	16595	36.3	16595	36.3
11	19008	41.6	15840	34.7	15840	34.7
11.5	18182	39.8	15152	33.1	15152	33.1
12	17424	38.1	14520	31.8	14520	31.8



SEED CUTTING PROCESS

- ✓ Clean and disinfect cutting equipment between seed lots
- ✓ Use water impermeable seed cutters. Closed cell sponge rollers are recommended
- ✓ Keep the blades sharp and adjusted to deliver the desired average seed piece weight
- ✓ Enforce sanitation practices for workers

SEED PRE-CUT

- ❖ Do not cut seed that is already sprouted (apical?)
- ❖ Warm up seed to 7C (45F) to avoid shatter bruise
- ❖ After cut, keep stored @ 10-11C (50-52F)
- ❖ Provide good air circulation (minimum air movement across the pile 0.5cfm)
- ❖ Do not pile more than 5-6 feet
- ❖ RH 80% (no free moisture) to promote healing in 7-10 days

SEED CUT TREATMENT

LIQUID PRODUCTS

ADVANTAGES

- ❖ More precise application
- ❖ Seed coverage : 75-85%

WATCH OUT

- ❖ Adds moisture to a cut surface (bacteria)
- ❖ Avoid extreme temperature variation (condensation)
- ❖ Equipment capable to apply fine mist (MAFEX spray, atomizers)
- ❖ Recommended volume : 0.5 gal/MT seed
- ❖ Lots of ventilation required
- ❖ Do not pile more than 5' height

DRY PRODUCTS

ADVANTAGES

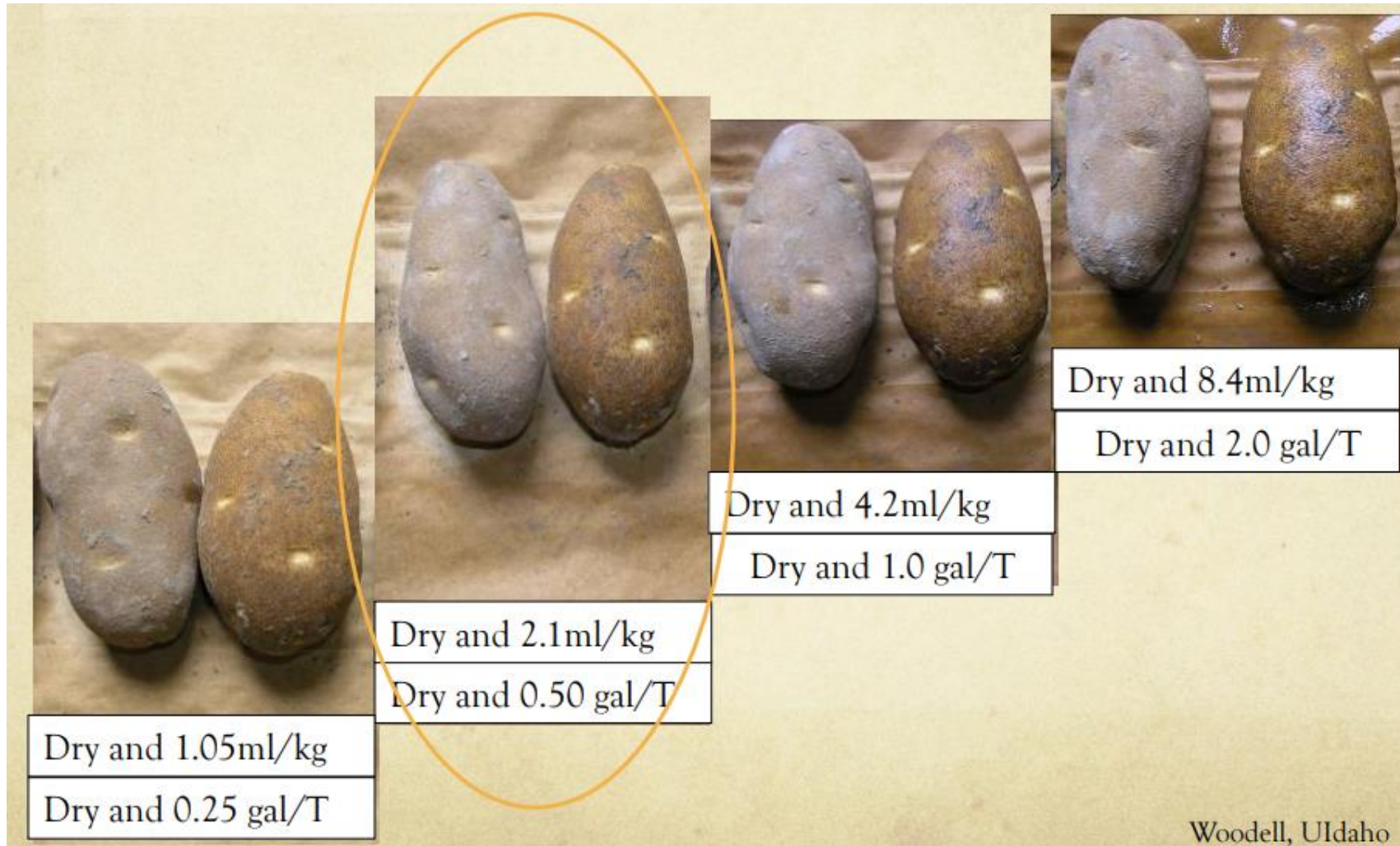
- ❖ No addition of moisture
- ❖ Higher seed coverage

WATCH OUT

- ❖ Coverage is not uniform
- ❖ Dust application may create a hazard situation in closed sites (worker safety)
- ❖ Products like Mancozeb can absorb moisture and make soft rot an issue

Once seed is cut and treated, keep at 10-11C (50-52F) under constant ventilation (min 0.5 cfm)

SEED CUT TREATMENT



Pre-Cut Seed x Fresh Cut Seed Trial

PRE-CUT X FRESH CUT TRIAL

- ✓ **Treatments :**
 - ✓ Pre-Cut seed 2 weeks before planting kept @ 10C
 - ✓ Fresh Cut seed the day of planting
- ✓ **Varieties :**
 - Dakota Russet (10")
 - Mountain Gem Russet (12")
 - Prospect (10")
 - Russet Burbank (14")
 - Targhee Russet (12")
- ✓ **Planting : May 14th, 2021 / May 20th, 2022**
- ✓ **Harvest : Sep 30th, 2021 / Sep 29th, 2022**
- ✓ **Experimental Design : RBD with 4 reps**
- ✓ **Fertilization :**
 - Planter : 1,250 lbs/acre of 8.8-14-16
 - Top-dressing :
 - Dakota Russet / Prospect / Shepody => + 30 lbs/ac N
 - Targhee Russet => + 40 lbs/ac N
 - Russet Burbank => +70 lbs/ac N
- ✓ **Samples processed @ Central Grading**



SEED CUTTING - TIMING

Variety Mountain Gem Russet

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
Fresh Cut	2.69	8.51	7.3%	32.7%	372	333	\$ 4,415
Pre-Cut	3.27	9.93	8.3%	29.2%	424	400	\$ 5,294

C.V.	10.99	3.88	19.07	6.25	2.68	4.70	4.66
LSD 0.05 :	0.49	0.54	2.24	2.92	16.06	25.97	340.87

2022

TREATMENT	Stem/ Plant	Tuber / Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
Pre-Cut	3.75	7.46	10.1%	16.7%	465	416	\$ 6,629
Fresh Cut	3.85	7.53	8.0%	19.0%	414	377	\$ 5,990

C.V.	8.21	6.97	46.78	51.91	3.73	3.01	2.74
LSD 0.05 :	0.43	0.72	5.9%	12.8%	22.73	16.51	239.40

Variety Targhee Russet

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
Fresh Cut	4.40	10.11	9.5%	12.7%	354	329	\$ 4,203
Pre-Cut	3.62	9.84	10.6%	16.7%	372	346	\$ 4,456

C.V.	8.38	8.49	12.21	6.25	6.61	5.25	5.30
LSD 0.05 :	0.51	1.28	1.85	1.39	36.14	26.69	345.91

2022

VARIETY	Stem/ Plant	Tuber / Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
Pre-Cut	4.38	11.32	7.1%	35.9%	352	324	\$ 5,087
Fresh Cut	4.15	10.15	6.7%	39.4%	339	291	\$ 4,434

C.V.	4.28	4.68	34.22	12.38	10.06	16.68	16.99
LSD 0.05 :	0.25	0.70	3.3%	6.5%	48.20	71.11	1120.87



SEED CUTTING - TIMING

Variety Dakota Russet

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
Fresh Cut	1.83	5.30	13.3%	19.0%	240	213	\$ 2,714
Pre-Cut	1.74	6.06	15.1%	7.4%	240	209	\$ 2,535

C.V.	9.02	10.15	18.12	65.71	14.06	16.31	18.06
LSD 0.05 :	0.24	0.87	3.87	13.05	50.89	51.89	714.51

Variety Prospect

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
Fresh Cut	1.91	5.94	3.2%	42.7%	365	333	\$ 4,065
Pre-Cut	1.67	6.54	4.0%	40.8%	379	338	\$ 4,115

C.V.	2.07	10.44	9.92	9.72	4.34	3.30	3.67
LSD 0.05 :	0.06	0.98	0.53	6.12	24.32	16.67	226.42

Variety Russet Burbank

2021

TREATMENT	Stem/ Plant	Tuber/ Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
Fresh Cut	3.41	9.79	7.2%	35.3%	370	338	\$ 4,468
Pre-Cut	2.87	8.77	5.8%	31.9%	344	322	\$ 4,270

C.V.	8.60	7.90	22.63	25.11	9.53	8.06	8.50
LSD 0.05 :	0.41	1.10	2.23	12.72	51.30	40.10	559.58



SEED CUTTING - TIMING

Variety Alverstone Russet

2022

VARIETY	Stem/ Plant	Tuber / Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
Pre-Cut	4.33	13.62	8.7%	12.1%	428	387	\$ 6,121
Fresh Cut	3.88	11.60	8.5%	13.2%	390	355	\$ 5,613

C.V.	17.26	18.09	19.74	29.60	6.30	7.78	7.32
LSD 0.05 :	0.98	3.16	2.4%	5.2%	35.75	39.98	595.14

Variety Althea

2022

VARIETY	Stem/ Plant	Tuber / Plant	Smalls (%)	> 10 oz (%)	Total Yield (cwt/ac)	Pay Yield (cwt/ac)	Total Payout (\$/ac)
Pre-Cut	4.76	8.69	11.3%	8.9%	368	326	\$ 4,962
Fresh Cut	3.92	7.44	14.0%	8.8%	285	243	\$ 3,881

C.V.	1.14	5.79	36.76	59.97	15.40	19.61	18.01
LSD 0.05 :	0.07	0.65	6.4%	7.3%	69.68	77.24	1103.31

QUESTIONS ?