

Cornell Potato Breeding Annual Report, December 2023



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Description of Advanced Selections from Cornell Breeding Program
Based on Cornell trials in 2023 and prior years
Last updated: 29 November 2023

Bliss (NY163, L7-2) = E50-8 x E48-2 (2009). Mid-late season chipstock, determinate vines, exceptionally light chip color out of cold storage.

In 2023 we named this clone ‘Bliss’, after the hamlet of Bliss in Western NY, to honor the numerous on-farm yield trials that CSS Farms and predecessor McCormick Farms have hosted in Wyoming County over the years.

- In 17 Tompkins County trials over the past ten years, marketable yields averaged 101% of Atlantic.
- In trials in Wyoming and Steuben counties, yield averaged 84% of Atlantic in 2016, 112% in 2017, 84% in 2018, 88% in 2019, 72% in 2020, and 127% of Atlantic in 2021.
- On Long Island yield was 123% of Reba in 2016.
- Yield in Pennsylvania was 113% of Atlantic in 2017 (1 trial), 97% in 2019 (3 trials), 108% in 2020 (2 trials), 121% in 2021 (3 trials), and 94% of Atlantic in 2022 (3 trials).
- Yield in eight northern SNAC trails averaged 94% of Snowden in 2020, 98% in 2021, and 90% of Snowden in 2022.

Tubers are round to oblong with lightly netted skin. Low levels of growth cracks and knobs have been observed. No hollow heart, brown center or internal necrosis has yet been seen in NY. Sensitivity to metribuzin applied post-emergence was seen in Michigan in 2022. Specific gravity has averaged 0.004 less than Atlantic (30 trials). Chip color from 44F storage in December, January and February (2014 crop season) averaged 3.7 compared to 4.3 for Snowden (lower is better). Chip color averaged 3.2 vs 3.8 for Snowden in 2015, and 2.3 vs 4.3 in 2016. Out of 43F storage color averaged 2.5 vs 4.4 for Snowden in 2017, 3.0 vs 4.8 in 2018, 2.3 vs 4.7 in 2019, 3.0 vs 4.3 in 2020, 2.8 vs 5.0 in 2021 and 2.7 versus 5.0 in 2022. Moderate resistance to common scab. Susceptible to late blight (PA trial, inoculum = US-23, 2022). Total glycolalkaloids have been modest (8.1 mg/100 g FW in 2017, 6.3 in 2018, 6.7 in 2019). Tuber dormancy is about one week longer than Atlantic. Resistant to race Ro1 of the golden nematode.

Walter’s assessment: as an overall package, Bliss has a lot going for it: yield close to (but probably a few percent less than) Atlantic or Snowden, specific gravity high enough to ensure it is above 1.080 on most farms, the lightest fry color of any clone we’ve developed to date, incredibly low frequency of internal defects, a small (but not too small) size profile, and reasonable resistance to common scab. Downsides to date include a report of blistered chips in 2020 in a commercial plant, and breakdown in storage in a 2021 box bin trial in Michigan.

NY165 (M8-5) = NY148 x F48-4 (2010) Mid-season chipstock.

- In 15 Tompkins County trials over the past nine years, marketable yields averaged 112% of Atlantic.
- In trials in Wyoming and Steuben counties, yield averaged 110% of Atlantic in 2017, 120% in 2018, 101% in 2019, 102% in 2020, and 105% of Atlantic in 2021.
- Yield on Long Island was 119% of Reba in 2018 and 122% of Atlantic in 2019.
- Yield in Pennsylvania was 104% of Atlantic in 2019 (3 trials), 98% in 2020 (4 trials), 104% in 2021 (3 trials), and 104% of Atlantic in 2022 (3 trials).
- Yield in eight northern SNAC trails averaged 109% of Snowden in 2021.

Tubers are round to oblong, flattened, with lightly textured skin. Low levels of pickouts (misshapes and knobs) and internal defects (hollow heart and brown center) have been observed. Specific gravity has averaged 0.007 less than Atlantic (26 trials). Chip color from 44F storage in December, January and February (2015 crop season) averaged 3.2 compared to 4.2 for Snowden (lower is better). Chip color averaged 3.5 vs 4.3 for Snowden in 2016. Out of 43F storage chip color averaged 3.0 vs 4.4 for Snowden in 2017, 3.9 vs 4.8 in 2018, 4.0 vs 4.7 in 2019, 3.3 vs 4.3 in 2020, 3.3 vs 5.0 in 2021, and 3.7 versus 5.0 in 2022. Moderately resistant to common scab. Molecular markers suggest NY165 is resistant to potato virus Y. Resistant to late blight (US-23) in a 2022 PA trial. Total glycolalkaloids have been modest (10.7 mg/100 g FW in 2018, 4.7 in 2018, 4.5 in 2019). Tuber dormancy is one to two weeks longer than Atlantic. Resistant to race Ro1 of the golden nematode.

Walter's assessment: NY165 is a chipping clone ideal for environments, like the Northeast, where specific gravity (and attendant blackspot bruise) can get too high. It has excellent marketable yields (better than Snowden), and very good chip color out of cold storage (better than Snowden), as well as mid-season maturity. Scab resistance is better than Snowden. Possible downside: tubers are flatter than I prefer, but we haven't yet received feedback that they are too flat.

NY171 (Q126-1) = Blue Belle x NY115 (2013). Early maturing tablestock, long white tubers with purple color around the eyes.

- In eight Tompkins County trials over five years, marketable yields averaged 100% of Atlantic. In one Tompkins County trial in 2020, yield was 91% of Eva.
- Yield in Wayne County was 92% of Eva in 2019, 95% in 2020, 78% in 2021, and 66% of Eva in 2022.
- Yield in Pennsylvania was 92% of Atlantic in 2022 (3 trials).

Tubers are long with bright white skin and striking purple color around the eyes. Low levels of pickouts (secondary growth and growth cracks) and internal defects (hollow heart) have been observed. Specific gravity has averaged 0.016 less than Atlantic (9 trials). Tubers exhibit some after cooking darkening and slight sloughing when boiled. Intermediate reaction to common scab (not highly resistant, not highly susceptible). Total glycoalkaloids have been low (4.2 mg/100g FW in 2020, 4.1 in 2021). Tuber dormancy is three to four weeks longer than Atlantic. Resistant to race Ro1 of the golden nematode.

Walter's assessment: the NY171 tubers we harvested from the 2019 Wayne County muck trial were the prettiest I've ever seen from our breeding program. Bright white skin, shallow eyes, attractive purple color around the eyes; just gorgeous. The skin has not been as smooth in mineral soil trials, however. NY171 is best suited for niche market growers and home gardeners. We will stop evaluating it but will keep some seed on hand for anyone who would like to test it.

NY173 (Q38-4) = J110-12 x F31-3 (2013) Full season chipstock.

- In six Tompkins County trials over the past six years, marketable yields averaged 120% of Atlantic.
- Yield in Steuben and Wyoming counties averaged 102% of Atlantic in 2020, 134% in 2021, and 95% of Atlantic in 2023.

Tubers are round/compressed with lightly textured skin. Low levels of pickouts (secondary growth and growth cracks) and internal defects (hollow heart) have been observed. Specific gravity has averaged 0.006 less than Atlantic (12 trials). Chip color from 43F storage in December, January and February (2018 crop season) averaged 5.3 compared to 4.8 for Snowden (lower is better), 3.0 vs 4.7 in 2019, 3.7 vs 4.3 in 2020, and 3.8 vs 5.0 in 2021. Moderately resistant to common scab. Molecular markers suggest NY173 is resistant to potato virus Y. Total glycoalkaloids have been modest (7.2 mg/100 g FW in 2018, 4.9 in 2019, 7.5 in 2020). Tuber dormancy is about one week longer than Atlantic. Resistant to race Ro1 of the golden nematode.

Walter's assessment: a reasonable chipping clone, worth continued evaluation. Different pedigree than our other advanced chipping clones, so presents different opportunities/risks. Trials in 2021 and 2023 (e.g., 5% sunburned tubers in Wyoming County trial) suggest that NY173 may be more prone to tuber greening than other clones. Was not tested anywhere in 2022, as we didn't have enough seed. Performed well in 2023 NCPT trials.

NY174 (Q106-13) = NY148 x E48-2 (2013) High yielding, full season chipstock.

- In six Tompkins County trials over the past six years, marketable yields averaged 113% of Atlantic.
- Yield in Steuben and Wyoming counties averaged 135% of Atlantic in 2020 and 129% in 2023. Yield in Wyoming county in 2021 was 141% of Atlantic.
- Marketable yield at 12 locations in nationwide 2023 SNAC trials averaged 106% of Snowden, while specific gravity averaged the same as Snowden.

Tubers are round to oblong with lightly textured skin and a moderately recessed apical eye. Low levels of pickouts (secondary growth and growth cracks) and internal defects (hollow heart, internal necrosis and brown center) have been observed in most trials, although a high level of heat necrosis was observed in the Missouri 2023 SNAC trial. Specific gravity has averaged 0.001 less than Atlantic (11 trials). Chip color from 43F storage in January and February (2018 crop season) averaged 4.0 compared to 4.2 for Snowden (lower is better). Chip color from 43F storage in December, January, and February averaged 3.0 vs 4.7 in 2019, 3.7 vs 4.3 in 2020, 2.7 vs 5.0 in 2021, and 2.7 versus 5.0 in 2022. Intermediate reaction to common scab. Molecular markers suggest NY174 is resistant to potato virus Y. Total glycolalkaloids have been modest (4.3 mg/100 g FW in 2018, 2.1 in 2019, 5.0 in 2020). Tuber dormancy is about three weeks longer than Atlantic. Resistant to race Ro1 of the golden nematode.

Walter's assessment: a reasonable chipping clone, worth continued evaluation. Was not tested anywhere in 2022 because of insufficient seed but was widely tested in 2022. NY174 was the obvious standout in NY on-farm trials in 2023 because of high yield.

NY175 (Q29-2) = Lady Liberty x F31-3 (2013) Mid-late season chipstock.

- In six Tompkins County trials over the past six years, marketable yields averaged 125% of Atlantic.
- Yield in Steuben and Wyoming counties averaged 83% of Atlantic in 2019, 132% in 2021, 114% in 2022, and 102% of Atlantic in 2023.

Tubers are round to oblong with moderately textured skin. Low levels of pickouts (growth cracks) and internal defects (hollow heart, internal necrosis and brown center) have been observed. Specific gravity has averaged equal to Atlantic (14 trials). Chip color from 43F storage in December, January, and February (2019 crop season) averaged 3.7 compared to 4.0 for Snowden (lower is better), 4.3 vs 4.3 in 2020, 4.0 vs 5.0 in 2022, and 3.0 versus 5.0 in 2022. Moderately resistant to common scab. Molecular markers suggest NY175 is resistant to potato virus Y. Total glycolalkaloids have been modest (8.1 mg/100 g FW in 2018, 4.1 in 2019, 7.6 in 2022). Tuber dormancy is about one week longer than Atlantic. Susceptible to race Ro1 of the golden nematode.

Walter's assessment: A decent, but not awesome, clone. Yields have been good, gravity very good, but chip color is "only" comparable to Snowden, and it is susceptible to golden nematode. Performed well in National Chip Processing Trials in 2023 (better than Atlantic, Snowden and Lamoka).

NY177 (R107-6) = NY148 x E48-2 (2014) Mid-late season chipstock with very high specific gravity.

- In four Tompkins County trials over the past five years, marketable yields averaged 116% of Atlantic.
- Yield in Wyoming county in 2021 was 124% of Atlantic. Yield in Steuben and Wyoming counties averaged 125% of Atlantic in 2022 and 89% in 2023.
- Yield in Pennsylvania in averaged 107% of Atlantic in 2022 (2 trials).
- Marketable yield at 12 locations in nationwide 2023 SNAC trials averaged 96% of Snowden, while specific gravity averaged 0.009 *higher* than Snowden. Yield was dragged down by underperformance in southern states; in the eight northern trial sites, yield averaged the same as Snowden.

Tubers are round to oblong with lightly textured skin. Low levels of pickouts (growth cracks) and internal defects (internal necrosis and brown center) have been observed. Specific gravity has averaged 0.006 more than Atlantic (11 trials). Chip color from 43F storage in December, January, and February (2019 crop season) averaged 2.3 compared to 4.7 for Snowden (lower is better), 2.7 vs 4.3 in 2020, 2.8 vs 5.0 in 2021, and 3.0 vs 5.0 in 2022. Moderate resistance to common scab. Molecular markers suggest NY177 is resistant to potato virus Y. Total glycolalkaloids have been modest (6.8 mg/100 g FW in 2020, 7.9 in 2021, 8.6 in 2022). Tuber dormancy is about one week longer than Atlantic. Resistant to race Ro1 of the golden nematode.

Walter's assessment: NY177 possesses an unusually good combination of yield, specific gravity, and fry color. For the stony soils of NY, the specific gravity may be a deal breaker by virtue of making NY177 too susceptible to blackspot bruise. Indeed, a 2023 Maine trial reported much bruise in this clone. NY177 can also be a little small – see, e.g., Steuben County trial data for 2023 (a trial that suffered considerable water stress) – but it wasn't too small in Wyoming County, which received plenty of water. We'll try wider spacing in the future to see if that increases tuber size.

NY178 (R201-3) = Blue Belle x Genesee (2014) White tablestock.

- In one Tompkins County trial in 2019, marketable yield averaged 92% of Atlantic. In four Tompkins County trials from 2020-2022, yield was 102% of Eva. In two Tompkins County trials in 2023, yield averaged 119% of Atlantic.
- Yield in Wayne County was 118% of Eva in 2019, 93% in 2020, 80% in 2021, and 57% of Eva in 2022. Yield was 70% of Atlantic in 2023.
- Yield in Pennsylvania was 76% of Atlantic (1 trial).

Tubers are oblong to long with lightly textured skin. Low levels of pickouts (secondary growth) and internal defects (hollow heart and brown center) have been observed. Intermediate reaction to common scab (not highly resistant, not highly susceptible). Tuber dormancy is one to two weeks longer than Atlantic. Susceptible to race Ro1 of the golden nematode.

Walter's assessment: NY178 is currently the best-looking traditional white tablestock clone we are evaluating. Muck trial yields have been so variable, I struggle to interpret them. On mineral soils I consider Eva to have slightly better appearance than NY178 and unlike NY178, Eva is resistant to golden nematode and potato virus Y. I lean towards dropping this clone.

NY179 (R1-7) = Andover x Lady Liberty (2014) Chipstock.

- In four Tompkins County trials over the past five years, marketable yields averaged 110% of Atlantic.
- Yield in Steuben County in 2021 was 90% of Atlantic. Yield in Steuben and Wyoming Counties averaged 127% of Atlantic in 2022 and 104% in 2023.

Tubers are round to oblong moderately textured skin; overall appearance is good. Low to modest levels of hollow heart have been observed. Specific gravity has averaged 0.006 less than Atlantic (9 trials). Chip color from 43F storage in December, January, and February (2019 crop season) averaged 3.7 compared to 4.7 for Snowden (lower is better), 4.0 vs 4.3 in 2020, 4.2 vs 5.0 in 2021, and 3.7 vs 5.0 in 2022. Moderately susceptible to common scab. Total glycolalkaloids have been low (4.7 mg/100 g FW in 2020, 5.0 in 2021, 8.9 in 2022). Tuber dormancy is one to two weeks longer than Atlantic. Molecular markers suggest NY179 is resistant to potato virus Y. Resistant to race Ro1 of the golden nematode.

Walter's assessment: I have been ambivalent about NY179. I like its pedigree, the overall appearance, think yield is OK but not great, that gravity is good for the Northeast (not too high, not too low), but wish it had better resistance to common scab and better fry color. We nevertheless kept it because it performed well in 2021 and 2022 NCPT trials. 2023 was a different story: NY179 performed worse than Atlantic, Snowden and Lamoka in NCPT Tier 2. I'm inclined to drop it.

NY180 (R107-11) = NY148 x E48-2 (2014) Mid-season chipstock.

- In three Tompkins County trials over the past five years, marketable yields averaged 106% of Atlantic.
- Yield in Steuben and Wyoming Counties averaged 94% of Atlantic in 2023.

Tubers are round to oblong with moderately textured skin and somewhat flattened. Low levels of pickouts (growth cracks, secondary growth) and internal defects (hollow heart) have been observed. Specific gravity has averaged 0.001 greater than Atlantic (5 trials). Chip color from 43F storage in December, January, and February (2019 crop season) averaged 2.7 compared to 4.7 for Snowden (lower is better), 3.3 vs 4.3 in 2020, 2.3 vs 5.0 in 2021, and 2.3 vs 5.0 in 2022. Moderate resistance to common scab. Total glycolalkaloids have been moderate (12.4 mg/100 g FW in 2020, 7.2 in 2021, 18.8 in 2022; over 20 mg/100 g FW is a concern). Tuber dormancy is similar to Atlantic. Molecular markers suggest NY180 is resistant to potato virus Y. Resistant to race Ro1 of the golden nematode.

Walter's assessment: At this point it is clear that NY180 (like siblings NY174 and NY177) has excellent fry color and high specific gravity. Performed reasonably well in 2023 NCPT trials. We haven't had enough seed to meaningfully test yield yet but feel that it merits continued testing based on trial data to date.

NY181 (S18-4) = NY156 x F31-3 (2015) Mid-late season chipstock.

- In three Tompkins County trials over the past four years, marketable yields averaged 112% of Atlantic.
- Yield in Steuben and Wyoming Counties averaged 85% of Atlantic in 2023.

Tubers are round to oblong with textured skin and overall attractive appearance. Low levels of pickouts (growth cracks) and internal defects (hollow heart) have been observed. Specific gravity has averaged 0.004 greater than Atlantic (5 trials). Chip color from 43F storage in December, January, and February (2020 crop season) averaged 3.0 compared to 4.3 for Snowden (lower is better), 3.1 vs 5.0 in 2021, and 2.0 vs 5.0 in 2022. Intermediate reaction to common scab (not highly resistant, not highly susceptible). Total glycolalkaloids have been moderate (12.1 mg/100 g FW vs Snowden at 14.7 in 2021, 12.8 vs 30.4 for Snowden in 2022. Over 20 mg/100 g FW is a concern). Tuber dormancy is about one to two weeks less than Atlantic. Molecular markers suggest NY181 is resistant to potato virus Y. Resistant to race Ro1 of the golden nematode.

Walter's assessment: Reasonable so far, with outstanding fry color and specific gravity. Along with NY179, tied for first in NCPT Tier 2 in 2022. NY181 also performed very well in NCPT Tier 2 in 2023. My primary concern is that tuber size profile may be too small.

NY182 (R213-2) = Daisy Gold x F11-1 (2014) Attractive tubers with pink eyes and yellow flesh

- In six Tompkins County trials over the past five years, marketable yields averaged 104% of Atlantic.
- Marketable yield in Wayne County was 112% of Eva in 2019, 119% of Eva in 2020, 75% of Eva in 2021, 83% of Eva in 2022 and 102% of Atlantic in 2023.

Attractive small to mid-sized oblong tubers with smooth skin, pink eyes and yellow flesh. Low levels of pickouts (knobs, secondary growth) and internal defects (hollow heart) have been observed. Specific gravity has averaged 0.016 less than Atlantic (6 trials). Moderately susceptible to common scab. Total glycolalkaloids have been moderate (6.4 mg/100 g FW in 2021, 9.9 in 2022). Tuber dormancy is similar to Atlantic. Resistant to race Ro1 of the golden nematode.

Walter's assessment: for several years Matt Falise (program field manager) and I have differed on whether NY178 or NY182 is our most promising candidate tablestock variety. I've come to the view that Matt, who favored NY182, was correct. Tubers are smaller than conventional (American) tablestock, but easily acceptable by European standards.

The link for anyone interested in NCPT and SNAC trial data: <https://potatoesusa.medius.re/>

This and prior Show&Tell reports are available as pdf files at:
<https://blogs.cornell.edu/varietytrials/potato-breeding-trials/>

Whatever happened to ...? Brief updates on clones with paragraph descriptions in our 2021 report, but not in 2022.

NY168. Chipping clone, dropped because of erratic performance in 2022 national SNAC trials and susceptibility to common scab.

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2023 Summary of Yield Trials

Marketable yield larger than 1 7/8" (including green tubers).
Performance given as % of check variety.

	Ellis Hollow		Freeville		County			
	Tablestock Trial	Tablestock Trial	Tablestock Trial	Tablestock Trial	Cayuga Cato	Steuben Arkport	Wyoming Gainesville	
Atlantic	100	100	100	100	100	100	100	100
NY171	134	99						
NY173						79	111	
NY174						114	145	
NY175						91	114	
NY177						76	102	
NY178	116	122		70				
NY179						84	125	
NY180						79	108	
NY181						71	99	
NY182 (R213-2)	101	112		103				

2022 Summary of Specific Gravities

Entries show differences (in units of 0.001) from Atlantic

	Ellis Hollow	County	
	Observation	Steuben	Wyoming
	Plot	Arkport	Pike
Atlantic	1.085	1.074	1.093
Snowden	-6		-8
Lamoka	-10		
NY163	0		
NY168	-9	+1	-4
NY174	-6		
NY175	+2	+2	-2
NY177	+5	+8	+2
NY179	-6	-5	-8
NY180	+5		
NY181	+3		

2023 First Stage Chipping Clone Yield Trial, Ellis Hollow

Plots 2 rows x 15', hills spaced at 8.2"

3 Replicates (unless indicated otherwise in parentheses)

Planted April 28, harvested September 21. Vine kill applied September 7.

	cwt/acre		%	pickout		% internal defects			appear. score	specific gravity
	>1 7/8"	>2 1/2"	>2 1/2"	cwt/A	type	HHT	IN	BC		
Atlantic	366	226	62	35	gc	40	10	0	3.4	1.084
Lady Liberty	571	348	61	0	-	23	0	0	3.3	1.075
Snowden	505	327	65	2	gc	23	3	3	3.0	1.079
V4-2	325	208	64	10	gc	23	3	0	3.4	1.078
V6-11	634	519	82	4	gc, k	47	0	0	3.1	1.079
V8-1	450	180	40	4	k, 2g	0	0	0	3.4	1.077
V12-1	349	250	72	5	gc	40	0	3	3.1	1.076
V12-2	355	236	67	21	gc	20	0	0	3.4	1.084
V14-6	180	19	10	35	gc	7	0	0	3.3	1.069
V26-1	356	229	64	8	gc	50	0	0	3.3	1.078
V29-2	296	185	62	5	gc, mis	20	0	0	3.0	1.084
V30-11	229	33	14	5	k	0	0	3	3.1	1.087
V111-4	581	413	71	4	k, 2g	0	3	0	3.4	1.084
V113-11	437	277	63	6	k, 2g	13	7	3	3.3	1.087
V118-3	339	169	50	4	gc	3	0	0	3.5	1.071
V118-29	574	326	57	1	k	10	7	3	3.1	1.083
V119-1	570	373	66	0	-	17	0	3	3.2	1.080
V119-5	451	265	59	0	-	13	0	0	3.0	1.080
V119-7	311	80	26	0	-	0	0	0	3.3	1.079
V119-10	414	213	51	1	2g	7	0	17	3.1	1.084
V119-12	424	184	43	1	gc	17	3	0	3.2	1.075
V119-16	349	147	42	2	gc	0	0	0	3.5	1.080
V119-17	453	250	55	1	mis	0	0	0	3.0	1.086
V119-18	336	234	70	8	gc, k	17	0	0	3.5	1.078
V119-20	263	67	25	3	gc	0	3	0	3.7	1.085
V122-1	398	166	42	1	k	0	0	0	3.4	1.075
V123-1	416	180	43	1	mis	0	0	0	3.5	1.076
V125-1	453	232	51	17	gc	3	3	0	3.2	1.085

2023 Tablestock Trial, Ellis Hollow

Plots 2 rows x 15', hills spaced at 8.2"

3 replicates (unless indicated otherwise in parentheses)

Planted April 28, harvested September 21. Vine kill applied September 7.

	cwt/acre		% >2 1/2"	pickout		% internal defects			appear. score	specific gravity
	>1 7/8"	>2 1/2"		cwt/A	type	HHT	IN	BC		
Atlantic	414	257	62	25	gc	13	3	3	3.5	1.082
Chieftain	336	229	68	46	gc	0	3	10	3.5	1.063
Eva	445	353	79	14	k, gc	7	0	0	3.6	1.071
Genesee	475	362	76	12	gc	0	0	0	3.3	1.063
Nordonna	402	212	53	7	mis, gc	0	0	0	3.4	1.065
Norland	221	40	18	37	gc	0	0	0	3.5	1.059
Yukon Gold	245	215	88	65	gc	27	0	3	3.0	1.072
NY171 (2)	553	332	60	3	mis	5	0	0	3.5	1.066
NY178	480	307	64	22	gc, 2g	10	10	0	3.5	1.059
R15-4	668	478	72	31	gc, k	13	3	0	3.1	1.085
R213-2	417	166	40	5	2g, k	3	0	0	3.7	1.067
V101-1	298	203	68	36	mis	23	0	3	2.8	1.056
V103-1*	449	84	19	4	mis	10	0	0	3.5	1.079
V107-2	215	80	37	31	gc	0	43	0	3.5	1.055

*V103-1 is a small red, and also produced an additional 156 cwt/acre of potatoes less than 1.875" in diameter

First Year Chip Clone Yield Trial, Freeville NY, 2023. Page 1 of 2.

Plots 2 rows x 15', hills spaced at 8.2"

3 Replicates

Planted May 9, harvested September 25. Vine kill applied August 30.

Genotype Variety or Clone	Total Yield		Mkt. Yield		Size Distribution ¹ (% of total yield)					Size Distrib. (%)		Spec. Grav.
	Cwt/A	Std.	Cwt/A	Std.	1	2	3	4	5	1-7/8" to 4"	2-1/2" to 4"	
Atlantic	400	100	330	100	4	30	56	9	0	96	66	1.089
Andover (2)	295	80	265	80	8	53	40	0	0	92	40	1.082
Lady Liberty	611	166	546	166	7	44	49	1	0	93	49	1.085
Lamoka	330	85	281	85	7	48	45	0	0	93	45	1.077
Snowden	426	116	381	116	7	47	46	0	0	93	46	1.087
Waneta	335	89	295	89	5	33	60	2	0	95	62	1.076
V6-11	549	143	471	143	2	22	69	7	0	98	76	1.086
V8-1	514	122	402	122	14	54	32	1	0	86	32	1.087
V12-1	320	90	297	90	5	38	56	1	0	95	58	1.084
V12-2	385	100	329	100	8	39	49	3	0	92	52	1.093
V14-6	249	50	167	50	26	71	4	0	0	74	4	1.075
V26-1	400	101	334	101	7	45	48	0	0	93	48	1.087
V29-2	510	141	467	141	3	36	55	5	0	97	61	1.096
V30-11	319	76	250	76	18	69	13	0	0	82	13	1.097
V111-4	496	137	452	137	3	35	59	3	0	97	62	1.097
V113-11	482	132	435	132	7	58	35	0	0	93	35	1.102
V118-3	375	92	303	92	11	56	33	0	0	89	33	1.077
V118-29	511	133	439	133	7	32	57	4	0	93	61	1.090
V119-1	618	171	564	171	2	31	65	1	0	98	67	1.090
V119-5	465	128	423	128	6	57	35	1	0	94	36	1.093
V119-7	483	122	404	122	12	58	30	0	0	88	30	1.093
V119-10	478	131	431	131	6	47	47	0	0	94	47	1.093
V119-12	534	147	484	147	7	57	36	0	0	93	36	1.091
V119-16	488	132	436	132	8	51	40	0	0	92	40	1.087
V119-17	483	130	429	130	6	48	45	1	0	94	46	1.100
V119-18	378	98	322	98	6	42	51	0	0	94	52	1.082
V119-20	338	82	271	82	17	65	18	0	0	83	18	1.086
V122-1	469	125	413	125	10	63	27	0	0	90	27	1.083
V123-1	426	114	376	114	8	60	32	0	0	92	32	1.087
V125-1	403	101	332	101	15	67	18	0	0	85	18	1.088

¹ = under 1.875 inches diameter, 2 = 1.875 to 2.5, 3 = 2.5 to 3.25, 4 = 3.25 to 4, 5 = over 4 inches diameter

Tuber size classes:

First Year Chip Clone Yield Trial, Freeville NY, 2023. Page 2 of 2.

Genotype	Tuber Attributes			External Tuber Defects (%)					Int. Tuber Defects (%)				
	Tuber Shape	Skin Text.	Tuber Appear.	Total Defects	Green	Mis-shapen	Growth Cracks	Rot	Holl. Heart	Brn. Center	Vasc. Disc.	Int. Nec.	
Atlantic	3.0	5.0	7.0	14	6	3	5	0	37	0	0	17	
Andover (2)	3.0	5.0	8.0	3	2	0	1	0	5	0	0	0	
Lady Liberty	3.0	5.0	7.0	4	4	0	0	0	0	0	0	0	
Lanoka	3.7	6.0	6.7	8	4	0	4	0	0	0	10	0	
Snowden	1.3	5.0	5.0	3	3	0	0	0	7	0	0	0	
Waneta	4.0	5.7	7.0	8	6	0	1	0	0	0	0	0	
V6-11	3.0	5.3	6.3	12	12	0	0	0	7	0	0	10	
V8-1	2.7	5.0	7.3	9	9	0	0	0	0	0	3	0	
V12-1	2.0	6.0	6.0	3	3	0	0	0	13	3	3	0	
V12-2	3.0	5.0	6.0	7	6	0	0	0	23	0	3	0	
V14-6	3.0	6.0	6.7	10	1	0	9	0	0	3	0	0	
V26-1	3.0	5.7	6.3	10	5	0	5	0	63	0	0	0	
V29-2	2.0	5.7	5.7	6	4	0	1	1	33	0	0	0	
V30-11	3.3	7.0	7.0	4	3	1	0	0	0	0	0	0	
V111-4	3.0	4.7	7.0	6	5	0	0	0	0	0	0	0	
V113-11	2.7	5.3	7.0	3	2	0	0	1	0	0	0	0	
V118-3	2.7	5.7	6.3	10	9	0	1	0	0	0	0	0	
V118-29	2.0	5.7	6.3	8	6	0	1	0	0	0	0	0	
V119-1	2.7	5.7	6.3	7	6	0	0	0	10	0	0	0	
V119-5	2.0	5.0	5.0	2	1	0	1	0	10	0	3	0	
V119-7	2.7	6.0	6.0	5	5	0	0	0	0	0	3	0	
V119-10	3.0	6.0	6.0	4	4	0	0	0	3	3	0	0	
V119-12	2.7	5.0	7.0	3	3	0	0	0	0	0	0	0	
V119-16	2.0	6.0	6.0	3	2	0	0	0	0	3	0	0	
V119-17	3.0	6.0	6.0	6	5	0	0	0	0	0	0	0	
V119-18	3.0	6.0	6.0	10	8	0	1	0	3	0	0	0	
V119-20	3.0	5.0	6.7	4	3	0	1	0	0	0	0	0	
V122-1	2.0	6.3	7.7	2	1	0	0	0	0	0	0	0	
V123-1	3.0	6.0	6.7	5	4	0	0	0	0	0	0	7	
V125-1	1.0	5.0	7.0	4	1	0	3	0	0	0	0	0	

Tuber shape 1 = round, 2 = mostly round, 3 = round to oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong to long, 7 = long

Skin texture 5 = netted, 6 = slight net, 7 = medium smooth, 8 = smooth, 9 = very smooth

Tuber appearance 5 = fair, 6 = OK, 7 = good, 8 = nice

Table Clone Yield Trial, Freeville NY, 2023. Page 1 of 2.

Plots 2 rows x 15', hills spaced at 8.2"

3 Replicates (unless indicated otherwise in parentheses)

Planted May 9, harvested September 26. Vine kill applied August 30.

Genotype Variety or Clone	Total Yield		Mkt. Yield		Size Distribution ¹ (% of total yield)					Size Distrib. (%)		Spec. Grav.
	Cwt/A	% of Std.	Cwt/A	% of Std.	1	2	3	4	5	1-7/8" to 4"	2-1/2" to 4"	
Atlantic	446	100	375	100	7	35	54	4	0	93	58	1.090
Genesee	511	113	424	113	6	31	61	2	0	94	63	1.068
Nordonna	491	115	431	115	7	44	49	0	0	93	49	1.066
Norland	375	84	314	84	12	60	28	0	0	88	28	1.064
Salem	353	80	299	80	9	38	53	0	0	91	53	1.061
NY171	446	100	375	100	8	47	45	1	0	92	45	1.070
NY178	532	119	447	119	8	37	53	1	0	92	54	1.062
R213-2	502	117	437	117	11	58	31	0	0	89	31	1.068
T59-1	382	81	306	81	15	66	19	0	0	85	19	1.063
V101-1	357	83	310	83	6	31	62	1	0	94	63	1.058
V103-1	487	85	317	85	34	54	12	0	0	66	12	1.087
V107-2	290	47	177	47	9	54	36	0	0	91	36	1.057

Tuber size classes: 1 = under 1.875 inches diameter, 2 = 1.875 to 2.5, 3 = 2.5 to 3.25, 4 = 3.25 to 4, 5 = over 4 inches diameter

Table Clone Yield Trial, Freeville NY, 2023. Page 2 of 2.

Genotype Variety or Clone	Tuber Attributes				External Tuber Defects (%)					Int. Tuber Defects (%)			
	Tuber Shape	Skin Text.	Tuber Appear.	Total Defects	Green	Mis- shapen	Growth Cracks	Rot	Holl. Heart	Bm. Center	Vasc. Disc.	Int. Nec.	
Atlantic	3.0	5.0	6.7	10.6	6.0	0.5	2.3	1.8	10	3	0	10	
Genesee	4.0	5.0	7.0	12.0	10.3	0.8	0.0	0.8	3	0	7	0	
Nordonna	3.0	7.0	6.0	6.1	1.6	2.7	1.0	0.7	0	0	0	0	
Norland	3.0	6.0	6.7	4.9	0.9	0.1	3.4	0.5	0	0	0	0	
Salem	4.0	6.0	7.0	7.0	2.1	2.1	2.6	0.2	0	0	0	0	
NY171	5.0	7.0	7.0	8.8	5.5	2.5	0.4	0.4	7	0	0	0	
NY178	5.0	6.3	7.3	8.5	8.5	0.0	0.0	0.0	3	3	0	0	
R213-2	4.0	6.3	8.0	2.1	2.0	0.2	0.0	0.0	0	0	0	0	
T59-1	4.0	7.0	7.0	6.1	0.3	0.6	0.7	4.5	3	0	0	0	
V101-1	3.0	7.0	5.0	7.5	0.4	5.5	1.2	0.4	23	0	0	0	
V103-1	1.0	5.0	6.0	1.9	1.4	0.2	0.2	0.2	0	0	0	0	
V107-2	3.0	7.0	7.0	33.0	0.8	1.0	31.2	0.0	0	0	0	0	

Tuber shape 1 = round, 2 = mostly round, 3 = round to oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong to long, 7 = long

Skin texture 5 = netted, 6 = slight net, 7 = medium smooth, 8 = smooth, 9 = very smooth

Tuber appearance 5 = fair, 6 = OK, 7 = good, 8 = nice

2022 Crop Season Chip Color Scores - University Trials

43F Storage

Unlike prior years, just one location (Ellis Hollow)

	VISUAL SCORES				Average
	DEC	JAN	FEB	3 MONTHS	
SNOWDEN	5.0	5.0	5.0	5.0	
LAMOKA	4.0	4.0	4.0	4.0	
NY163	3.0	3.0	2.0	2.7	
NY165	4.0	3.0	4.0	3.7	
NY173	ND	ND	ND	ND	
NY174	3.0	3.0	2.0	2.7	
NY175	ND	3.0	3.0	3.0	
NY177	3.0	3.0	3.0	3.0	
NY179	5.0	3.0	3.0	3.7	
NY180	2.0	2.0	3.0	2.3	
NY181	2.0	2.0	2.0	2.0	

VISUAL CHIP SCALE: 1 - 10

1 = best

4 = marginal

5 and over = not acceptable

ND = no data

Samples were not reconditioned before chipping

Average Chip Color over Four Years - University Trials

Out of 43F storage: 2019 - 2022 crop seasons.

No reconditioning

	VISUAL SCORES				AVG
	DEC	JAN	FEB		
Snowden	5.0	4.6	4.6	4.7	
Lamoka	3.4	3.4	3.4	3.4	
NY163	2.6	2.8	2.6	2.7	
NY165	3.8	3.4	3.6	3.6	
NY173 (2019-2021 only)	3.7	3.3	3.5	3.5	
NY174	3.2	3.2	2.8	3.1	
NY175	4.2	3.8	3.6	3.9	
NY177	2.8	2.8	2.6	2.7	
NY179	3.9	4.0	3.8	3.9	
NY180	2.2	3.0	3.0	2.7	
NY181 (2020-2022 only)	2.9	2.8	2.5	2.7	

VISUAL CHIP SCALE: 1 - 10

1 = best

4 = marginal

5 and over = not acceptable

Scab Score Summary

Tubers evaluated at harvest from scab-infested plots in Ellis Hollow (EH) and Varna (V)
 0 = free of scab, 5 = very susceptible

LOCATION:	2023	2021	2019	2018	2017	2015	2014	2013	2012	2011	2010	2009	2009
	EH	EH	EH	EH	EH	EH	EH	EH	V	EH	EH	V	EH
Bliss	1.7	2.0	2.0	2.0	3.0	2.0	2.8	4.5			4.7	2.7	3.3
Brodie							4.7	4.5			4.7	2.7	3.3
Chieftain	4.7	3.7		2.7	3.3	3.0	3.5	4.0		3.3	5.0	1.0	3.0
Chippewa					5.0	5.0	4.7	4.5	3.0		5.0	4.3	5.0
Katahdin	4.3	3.0	2.3	3.7	4.4	4.7	4.7	4.0	2.3	4.0	4.8	3.7	4.3
Lamoka	2.3	2.3	1.3		2.7		2.8				2.3	1.3	2.7
Lady Liberty				2.0		2.3	2.2	2.0	2.0	2.8			
Nordonna					3.3	2.3	3.7						
Pike	2.3		1.2	2.0	3.3	2.7	2.4		2.7		1.7	1.3	1.7
Superior	2.7			2.3	3.0	3.0	3.5	2.5	2.3	2.8	2.3	2.0	2.7
Upstate Abundance						2.7	3.0	3.0	2.5	3.7	2.3		
Waneta											2.3	2.0	1.0
NY165 (chip)				1.7	1.0	2.0	2.3	2.0					
NY171 (white/purp)				3.3	2.7	1.3	2.3						
NY173 (chip)				3.0	1.3	1.0	2.7						
NY174 (chip)				2.3	2.0	2.3	2.7						
NY175 (chip)				2.0	1.7	1.7	2.0						
NY177 (chip)				2.3	2.7	1.6							
NY178 (white)				3.3	2.3	1.7							
NY179 (chip)				1.7	1.7	1.0							
NY180 (chip)				2.0	2.3	2.0							
NY181 (chip)				3.0	2.7								
NY182 (yellow)				3.5	3.3	2.0							

Scab pressure was low in 2019 and 2021. No scab trial in 2020. Scab trial failed in 2022.
 Scab pressure was high in 2023.

Tuber Dormancy Relative to Atlantic

Replicate 10 tuber samples from each clone were stored in the dark at room temperature.
 The number of weeks that each clone sprouted earlier (-) or later (+) than Atlantic is shown.
 Atlantic typically breaks dormancy in late October to mid November

Dormancy is considered broken when half or more of the sample has 1/4" long sprouts.

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Round whites:											
Andover						0		1		3	3
Algonquin							4	0	4	3	2
Atlantic		0	0	0	0	0	0	0	0	0	0
Bliss	-2	0	0	2	1	2	1				
Brodie			0					4	5	7	6
Eva				8		5		6		7	8
Lady Liberty			0	3		4	5	2	4	3	5
Lamoka			0	3	1	1		0		3	0
Reba			2		3	2		2		4	
Snowden			0	2	2	2	0	0		2	2
Upstate Abundance						0	3	3	3	2	2
Waneta			4	8		7	9	6		10	7
Yukon Gold				2	1	1	2				0
NY165	0	2	0	3	2	1					
NY171	5	3	2	4							
NY173	1	1	0	2							
NY174	6		2	2							
NY175	2	2	0	0							
NY177	0	1									
NY178	2	1									
NY179	1	2									
NY180	0	-1									
NY181	-3	0									
R15-4	1	1									
R213-2	2	-1									

Note: no dormancy data collected in 2022

Upstate New York Grower Table 1. Yield, marketable yield, percentage of yield by grade size distribution, mean tuber number per foot and weight, percentage of defects, and specific gravity for Cayuga County white-skinned variety trial grown near Cato, New York - 2023.

Variety or Clone	Total Yield Cwt/A	Mkt. Yield Cwt/A	Yield % of Std.	Size Distribution ¹ (% of total yield)				Mean Tuber #/ft wt(oz)	Percent External Tuber Defects				Percent Internal Tuber Defects				Spec. Grav.	
				1	2	3	4		SUN	KNB	GC	ROT	HH	BC	VD	NEC		
Atlantic	362	289	100	12	42	46	0	9.5	4.0	5	0	4	0	33	0	0	0	1.083
Agata	382	222	77	36	61	3	0	15.2	2.6	9	0	0	0	7	0	0	0	1.055
NY178	277	184	64	20	49	31	0	8.2	3.5	16	0	0	1	3	7	0	0	1.056
R213-2	425	298	103	27	56	18	0	16.3	2.7	5	0	0	0	7	0	0	0	1.064
Average:	362	248	86	24	52	24	0	12	3	9	0	1	0	13	2	0	0	1.065
Maximum:	425	298	103	36	61	46	0	16	4	16	0	4	1	33	7	0	0	1.083
Minimum:	277	184	64	12	42	3	0	8	3	5	0	0	0	3	0	0	0	1.055

¹Tuber size classes:

1 = under 1.875" dia., 2 = 1.875" to 2.5" dia., 3 = 2.5" to 3.25" dia., and 4 = over 3.25" dia.

Plant Date: June 6

Harvest Date: October 5

Each clone was evaluated in 3 replicate plots

Upstate New York Grower Table 2. Yield, marketable yield, percentage of yield by grade size distribution, mean tuber number per foot and weight, percentage of defects, and specific gravity for Cayuga County red-skinned variety trial grown near Cato, New York - 2023.

Variety or Clone	Total Yield		Size Distribution ¹ (% of total yield)				Mean Tuber		Percent External Tuber Defects				Percent Internal Tuber Defects				Spec. Grav.	
	Cwt/A	Mkt. Yield Cwt/A	1	2	3	4	#/ft	wt(oz)	SUN	KNB	GC	ROT	HH	BC	VD	NEC		
Chieftain	442	195	100	14	47	40	0	10.7	4.3	1	1	47	1	3	0	0	0	1.064
V101-1	180	121	62	17	45	38	0	5.9	3.2	0	15	4	0	23	0	0	0	1.055
V103-1	504	298	153	39	54	7	0	24.8	2.1	1	0	1	0	7	0	0	3	1.077
V107-2	154	58	30	38	46	16	3	7.3	2.1	1	2	33	0	3	0	0	3	1.057
Average:	320	168	86	27	48	25	1	12	3	1	5	21	1	9	0	0	2	1.063
Maximum:	504	298	153	39	54	40	3	25	4	1	15	47	1	23	0	0	3	1.077
Minimum:	154	58	30	14	45	7	0	6	2	0	0	1	0	3	0	0	0	1.055

¹Tuber size classes:

1 = under 1.875" dia., 2 = 1.875" to 2.5" dia., 3 = 2.5" to 3.25" dia., and 4 = over 3.25" dia.

Plant Date: June 6

Harvest Date: October 5

Each clone was evaluated in 3 replicate plots

Upstate New York Grower Table 3. Yield, marketable yield, percentage of yield by grade size distribution, mean tuber number per foot and weight, percentage of defects, and specific gravity for Steuben County chipping variety trial grown near Arkport, New York - 2023.

Variety or Clone	Total Yield Cwt/A	Mkt. Yield % of Std.	Size Distribution ¹ (% of total yield)				Mean Tuber		Percent External Tuber Defects			Percent Internal Tuber Defects			Spec. Grav.			
			1	2	3	4	#/ft	wt(oz)	SUN	KNB	GC	ROT	HH	BC		VD	NEC	
Atlantic	241	206	100	10	71	18	0	6.0	4.2	4	0	0	0	3	13	3	0	1.093
NY173	232	165	80	25	70	5	0	8.6	2.9	3	0	0	0	0	0	0	7	1.085
NY174	270	239	116	10	83	7	0	7.5	3.7	2	0	0	0	0	0	7	3	1.096
NY175	246	188	91	20	79	0	0	8.4	3.1	3	0	0	0	0	0	0	0	1.098
NY177	215	160	78	23	75	2	0	7.7	2.9	2	0	0	0	0	0	0	0	1.096
NY179	232	172	83	21	77	2	0	8.0	3.0	4	1	0	0	0	0	0	0	1.090
NY180	225	165	80	25	73	2	0	8.4	2.8	2	0	0	0	0	0	0	0	1.097
NY181	223	148	72	30	68	2	0	8.8	2.7	3	0	0	0	0	0	0	0	1.097
Average:	236	180	88	21	75	5	0	8	3	3	0	0	0	0	2	1	1	1.094
Maximum:	270	239	116	30	83	18	0	9	4	4	1	0	0	3	13	7	7	1.098
Minimum:	215	148	72	10	68	0	0	6	3	2	0	0	0	0	0	0	0	1.085

¹Tuber size classes:

1 = under 2" dia., 2 = 2" to 3" dia., 3 = 3" to 4" dia., and 4 = over 4" dia.

Plant Date: June 5

Vinekill dates: September 2 and September 6

Harvest Date: October 12

Fertilizer: 136N-272P-136K-5S-5Zn lbs/acre at planting

Each clone was evaluated in 3 replicate plots.

Other: 7 oz Quadris and 2.67 oz Platinum/acre

Spacing: 36 inch bed width by 8 inch within row spacing.

Upstate New York Grower Table 4. Yield, marketable yield, percentage of yield by grade size distribution, mean tuber number per foot and weight, percentage of defects, and specific gravity for Wyoming County chipping variety trial grown near Gainesville, New York - 2023.

Variety or Clone	Total Yield		Mkt. Yield		Size Distribution ¹ (% of total yield)				Mean Tuber		Percent External Tuber Defects				Percent Internal Tuber Defects				Spec. Grav.
	Cwt/A	% of Std.	Cwt/A	% of Std.	1	2	3	4	#/ft	wt(oz)	SUN	KNB	GC	ROT	HH	BC	VD	NEC	
Atlantic (2)	392		345	100	7	64	28	1	8.3	4.9	1	1	2	0	20	0	0	0	1.096
NY173 (3)	456		369	107	13	75	12	0	13.4	3.5	5	1	0	0	3	0	0	0	1.097
NY174 (3)	537		504	146	5	67	28	0	11.6	4.8	0	0	0	0	0	0	0	0	1.098
NY175 (3)	474		386	112	15	80	5	0	14.8	3.3	3	0	0	0	0	0	0	0	1.097
NY177 (2)	401		354	103	11	82	8	0	11.6	3.6	0	0	0	0	5	0	0	0	1.105
NY179 (2)	477		427	124	8	83	9	0	12.2	4.1	2	0	0	0	15	0	0	0	1.091
NY180 (3)	427		372	108	12	82	6	0	12.9	3.4	1	0	0	0	0	0	0	0	1.099
NY181 (2)	421		335	97	17	80	3	0	14.1	3.1	3	0	0	0	5	0	0	0	1.105
Average:	448		386	112	11	77	12	0	12	4	2	0	0	0	6	0	0	0	1.098
Maximum:	537		504	146	17	83	28	1	15	5	5	1	2	0	20	0	0	0	1.105
Minimum:	392		335	97	5	64	3	0	8	3	0	0	0	0	0	0	0	0	1.091

¹Tuber size classes:

1 = under 2" dia., 2 = 2" to 3" dia., 3 = 3" to 4" dia., and 4 = over 4" dia.

Plant Date: May 22

Vinekill Dates: September 12 and September 20

Harvest Date: October 10

Fertilizer: 210N-102P-115K-6.7Mg-37.5Ca lbs/acre at planting

Vinekill: 1 pt/acre Reglone and surfactant (2x)

Other: 7.2 oz Elatus in furrow/acre

Spacing: 34 inch bed width by 8 inch within row spacing.

Water: 9.65" rain fall plus 6.15" supplemental irrigation

Each clone was evaluated in 2 or 3 replicate plots (number of replicates shown in parentheses).

Planting 2023 on-farm muck trial near Cato (Williams Farms). Photo credit: Pia Spychalla

