Maine Potato Breeding Program

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Caribou Russet (AF3362-1) tubers, flower, and seed plot (center two rows)



University of Maine Potato Breeding Program

Overall Goal:

 Provide marketing opportunities and solve production problems by breeding and developing new potato varieties

Research Effort:

- 50% russets and long-whites, processing and dual-purpose
- 40% round types for chipping and/or fresh use
- 10% reds (and specialty types)
 20





Greenhouse Crossing



2022 crosses produced ~127,638 true potato seed (TPS) from 262 different families

University of Maine Potato Breeding Program

- Top Priority Disease
 Resistance Goals
 - Late blight resistance
 - Scab resistance
 - **PVY resistance**
 - Pink rot resistance
 - Others: Soft rot, VW, Fusarium, GN, PLRV/NN, EBL, etc
- Bruise Tolerance



Resistance Screening Plots, Clockwise from top: late blight, PLRV, PVY

Potato Breeding 101

 Potatoes are vegetatively propagated
 New varieties are generated by cross pollination

 Our potato is a tetraploid crop with a non-uniform genetic background and complex inheritance



Cross Pollination

Female Parent (e.g. Atlantic) Pistol/stigma/style Male Parent (e.g. PVY, LBL res clone) Pollen



X



Fruit with True Seeds (e.g. 5 fruit, 300 seeds, each looks like a small tomato seed) Each seed is a unique combination of traits; each is a potential new variety.



University of Maine Potato Breeding and Variety Development



Disease, pest, and quality screening

University of Maine Potato Breeding Program

- Out with the old
- Greg Porter is retiring effective December 31, 2023 (~one-year from now)
 - After 38 years on the faculty of the University of Maine, Orono
 - Teaching undergraduate and graduate students at Orono
 - Agronomy research on potato and other crops
 - Leadership of the University of Maine Potato Breeding Program since 2007 (16 years)



Photo from 12 years ago. Greg Porter selecting 2nd Year russets at Aroostook Research Farm, Presque Isle, ME

University of Maine Potato Breeding Program

- In with the new
- Dr. Mario Andrade will be joining the University of Maine in February 2023
 - Dr. Andrade joins us from the University of Florida
 - He will take over leadership of the breeding program
 - He has a background in potato breeding, genetics, and agronomy and has also worked on alfalfa
 - He'll be teaching undergraduate and graduate students at Orono and will conduct research on potato breeding and genetics.
 - Approximately one-year overlap with me (Greg Porter) will help assure smooth transition handling plant materials, grants, and working with stakeholders.



Whites & Yellows

Yield and Market Quality

- Chips or Fresh Mkt
- Wide Adaptation When Possible
- Bruise tolerance
- PVY, Scab, Late Blight Resistance
- Other Resistances

Chip selection includes Potatoes USA NCPT, SNAC/SFA, & Next Gen. Chipping Trials Crossing and selection can be designed to meet these needs



AF5280-5

An early fresh market white with good yield and quality

Primary Strengths:

- High yields
- Good tuber appearance
- Good boiled quality
- Low hollow heart, internal and external defects incidence
- Early to mid-season maturity
- Scab, golden nematode, shatter, blackspot, wart resistance/tolerand
- Wide adaptation

Known Weaknesses

- Some off shapes
- Skin sometimes slightly netted



Pedigree: ND7799C-1 x ND860-2, Univ. of Maine selection from NDSU cross. Maturity: Early to Mid-season (rtg=4.1), Tubers: Round to Oblong (rtg=3.1), smooth to slightly netted skin (rtg=6.6). Appearance = Fair to Good (5.6).

AF5280-5, Maine Variety Trials Maine Variety Trial Results, 25 trials, 2013-2022

Variety	Total Cwt/A (% Sup)	US#1 cwt/A (% Sup)	⁰⁄₀ B's	% > 2-1/2"	Spec Grav (vs Sup)	Tuber App. 1 to 9	% Ext Defs	% HH
AF5280-5	309 (109)	260 (116)	4.5	50.2	1.069 (-0.009)	5.6	12.0	2.2
Superior	284	224	4.2	49.0	1.078	4.8	17.3	4.8

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 65 is very good.

AF5280-5, Eastern Regional Variety Trials Florida to Maine and Eastern Canada, 44 trials, 2013-2021

Variety	Total	US#1	%	⁰∕₀ >	Spec	Tuber	%	%	%
~	Cwt/A	cwt/A	B's	2-1/2"	Grav	App.	Ext	HH	Int.
	(% Sup)	(% Sup)			(vs Sup)	1 to 9	Defs		Heat Necr osis
AF5280-5	343	288	15.0	53.0	1.064	6.0	12.9	3.5	4.1
	(111)	(111)			(-0.007)				
Superior	309	260	14.0	54.0	1.071	5.0	14.0	9.6	7.3

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 65 is very good.

AF5819-2

An early fresh market white with good yield and quality

Primary Strengths:

- Very high yields
- Good tuber appearance
- Low hollow heart, internal and external defects incidence
- Early to mid-season maturity
- Scab, shatter, fusarium, and softrot resistance/tolerance
- Wide adaptation

Known Weaknesses

- Eye depth?
- PVY expression TBD.



Pedigree: Dakota Crisp x AF4552-5, Univ. of Maine cross. Maturity: Early to Mid-season (rtg=4.8), Tubers: Mostly Round (rtg=2.4), mostly smooth skin (rtg=7.0). Appearance = Good (6.3)

AF5819-2, Maine Variety Trials Maine Variety Trial Results, 8 trials, 2017-2022

Variety	Total	US#1	%	º⁄_0 >	Spec	Tuber	%	%
5	Cwt/A	cwt/A	B's	2-1/2"	Grav	App.	Ext	HH
	(% Sup)	(% Sup)			(vs Sup)	1 to 9	Defs	
AE5010 2	2/2	279	7.0	/2 1	1 001	6.3	10.7	0.2
AF 3019-2	343	410	7.0	43.1	1.001	0.3	10.7	0.5
	(138)	(161)			(-0.001)			
Superior	248	173	9.5	40.0	1.082	5.0	20.4	1.6

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 65 is very good.

Many fresh market whites and yellows coming



Example fresh market clones: AF6194-4 (scab and PVY resistant white, left); WAF14096-5 (high yielding yellow, pink splash); NDAF14188-5 (high yielding round-white, possible dual use); AF6566-1 (high yielding yellow).

MSAFB635-15

A high yielding, midseason chipper with high gravity

Primary Strengths:

- High yields (EAST: 103% ATL, 107% SNO)
- High gravity (EAST: 1.089 vs 1.086 ATL, 1.083 SNO)
- Good chip color from field; FG from storage.
- Low internal and external defects
- Verticillium, softrot, pink rot, leak, Nicotia, shatter resistance/tolerance
- Scab reaction (intermediate)
- Wide adaptation
- Relatively small size profile

Known Weaknesses

- Blackspot?
- Not early enough in some SE trials versus Atlantic



Pedigree: NYH15-5 x MSS297-3, Univ. of Maine selection from MSU cross.

Maturity: Med-late (rtg=6.1), Tubers: Mostly round (rtg=2.0), netted skin (rtg=5.1). Appearance: Fair (5.0).

MSAFB635-15, Maine Variety Trials Presque Isle and Exeter, 9 trials, 2017-2022

Variety	Total	US#1	%	º⁄_0 >	Spec	Tuber	%	%	Chip
2	Cwt/A	cwt/A	B's	2-1/2"	Grav	App.	Ext	HH	Col.
	(% Atl)	(% Atl)			(vs Atl)	1 to 9	Defs		50F
									Dec
MSAF	330	261	10.0	39.1	1.094	5.0	10.8	0.6	67.3
B635-15	(106)	(106)			(+0.001)				
Atlantic	310	247	4.1	58.3	1.093	5.0	15.6	9.2	64.4
Snowden	298	231	8.0	45.3	1.090	4.7	14.6	0.4	67.7

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 65 is very good.

Many more UMAINE and regional chippers doing well in national trials



AF6206-5

AF6568-5

AF6601-2

Example promising chipping clones: AF6206-5 (storage chipper; resistance to blackspot, shatter, and golden nematode); AF6568-5 (storage chipper; resistance to late blight, soft rot, and PVY); AF6601-2 (storage chipper; cold sweetening resistance; resistance to late blight, fusarium, blackspot, shatter, golden nematode, and PVY).

Reds & Specialties

Market Quality

- Appearance
- Yield and Wide Adaptation When Possible
- Bruise and Skinning tolerance
- PVY, Scab, Late Blight Resistance
- Other Resistances

- Crossing and selection can be designed to meet these needs
- Increased use of Dark Red Norland and early varieties



NDAF113484B-1

A mid-season fresh market red with good appearance and quality

Primary Strengths:

- Very good tuber appearance and skin color
- Good boiled quality
- Low hollow heart, internal and external defects incidence
- Mid-season maturity
- Moderate scab, softrot, shatter tolerance
- Wide adaptation

Known Weaknesses

- Internal heat necrosis in a few southern trials.
- Smaller vine, yields similar to Dark
 Red Norland
 Dedicrost ND0



Pedigree: ND060570B-1R x ND8555-8R, Univ. of Maine selection from NDSU cross. Maturity: Mid-season (rtg=4.9), Tubers: round to oblong (rtg=2.9), smooth skin (rtg=7.0), off-white flesh, good appearance (rtg=6.4).

NDAF113484B-1, Maine Variety Trials Aroostook Research Farm, Presque Isle, 15 trials, 2016-2022

Variety	Total	US#1	%	⁰∕₀ >	Spec	Tuber	%	⁰∕₀
č	Cwt/A	cwt/A	B's	2-1/2"	Grav	App.	Ext	HH
	(%	(%			(vs DRN)	1 to 9	Defs	
	DRN)	DRN)						
NDAF	289	240	6.5	42.7	1.072	6.4	9.8	0.5
113484B-1	(99)	(100)			(+0.002)			
Dark Red	300	245	6.4	45.6	1.070	5.2	11.2	1.3
Norland								

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 65 is very good.

NDAF113484B-1, Eastern Regional Variety Trials Florida to Maine and Eastern Canada, 19 trials, 2016-2021

Variety	Total	US#1	%	º⁄_0 >	Spec	Tuber	%	%	%
	Cwt/A	cwt/A	B's	2-1/2"	Grav	App.	Ext	HH	Int.
	(%	(%			(vs DRN)	1 to 9	Defs		Heat
	DRN)	DRN)							Necr osis
NDAF	286	237	22.0	33.0	1.064	6.0	6.8	0.1	10.1
113484B-1	(99)	(103)			(+0.002)				
Dark Red	289	231	22.0	36.0	1.062	5.0	12.3	1.4	1.7
Norland									

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 65 is very good.

Many more promising UMAINE reds in local and regional trials



AAF11546-3

NDAF12238Y-2

NDAF141Y-3

Example promising red-skinned, white-fleshed clones: AAF11546-3 (high yields, widely adapted, smooth skin, holds color well in south, resistance to blackspot and scab); NDAF12238Y-2 (smooth skin, bright color in north, resistance to blackspot, shatter, and scab); NDAF141Y-3 (smooth skin, bright color in north, resistance to scab and PVY).

Reds, Purples, Specialties

- Reds
- **Purples**
- Fingerlings
- Roasters
- Colored Flesh
 - More to come



AF5414-1, red to pink flesh



Pinto Gold (AF4659-12), small tubers, YF, "roaster"



AF5412-3, purple flesh







Clockwise above: AF6286-1 purple flesh, WAF14096-5, NDAF1489-4, AF6575-6

Russets and Long Types

Yield and Market Quality

- Fries or Fresh Mkt
 - Yield and Fry quality are priorities
- Wide Adaptation When Possible
- Bruise tolerance
- PVY, Scab, Late Blight Resistance
- Other Resistances

 Crossing and selection can be designed to meet these needs





- Other (scab, lbl, etc)
- PVY & LBL res (scab, etc)
- PVY res (scab, etc)

AF5071-2

A high yielding, high gravity processing russet

Primary Strengths:

- High yields, long tubers, large tuber size profile
- Better type than R. Burbank
- Good fry color and fry color uniformity
- Specific gravity higher than Russet Burbank
- Moderate bruise and fusarium resistance

Known Weaknesses

- Hollow heart incidence similar to Russet Burbank
- PVY, common scab, and pink rot susceptibility.



Pedigree: AF3011-29 x AF3051-2, Univ.of Maine. Maturity: Med-Late (rtg=5.9); Tubers: Long (rtg=7.0) with lightly russeted skin (rtg=3.6); Appearance Fair (5.0).

AF5071-2, Maine Variety Trials Presque Isle and St. Agatha, 15 trials, 2013-2022

Variety	Total	US#1	⁰⁄₀ <	⁰∕₀ >	Spec	Tuber	%	%	Chip
·	Cwt/A	cwt/A	4 oz	8 oz	Grav	App.	Ext	HH	Col.
	(% RB)	(% RB)			(vs RB)	1 to 9	Defs		50F
									Dec
AF5071-2	359	294	13.6	40.6	1.092	5.0	12.4	11.9	54.4
	(115)	(146)			(+0.010)				
R. Burbank	330	244	17.9	39.8	1.082	4.2	24.4	10.9	43.4
R. Norkotah	275	236	19.9	33.3	1.076	6.2	9.4	13.8	41.6
Shepody	315	198	13.9	46.3	1.081	4.0	32.5	15.0	47.3

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 50 is very good for a fry variety.

AF5406-7

A high yielding, late blight resistant russet

Primary Strengths:

- High yields, long tubers, large tuber size profile
- Better type than R. Burbank
- Fair to good fry color
- Specific gravity similar to Russet Burbank
- Late blight, early blight, scab, and powdery scab resistance

Known Weaknesses

- Hollow heart incidence similar to Russet Burbank
- PVY susceptibility (symptom expression variable, generally OK).
- Fry color and quality consistency.



Pedigree: AF3317-15 x Silverton Russet, Univ.of Maine.

Maturity: Late (rtg=6.5); Tubers: Long (rtg=6.9) with lightly russeted skin (rtg=3.9); Appearance F-G (5.3), good when size is controlled.

AF5406-7, Maine Variety Trials Presque Isle and St. Agatha, 18 trials, 2014-2022

Variety	Total	US#1	⁰⁄₀ <	⁰∕₀ >	Spec	Tuber	%	%	Chip
·	Cwt/A	cwt/A	4 oz	8 oz	Grav	App.	Ext	HH	Col.
	(% RB)	(% RB)			(vs RB)	1 to 9	Defs		50F
									Dec
AF5406-7	311	268	11.9	46.4	1.083	5.2	10.1	7.2	48.0
	(113)	(145)			(+0.001)				
R. Burbank	297	223	22.5	33.7	1.082	4.1	22.7	(8.1	45.8
R. Norkotah	237	206	26.4	31.4	1.076	6.2	8.7	9.3	43.4
Shepody	280	184	18.6	42.1	1.082	4.0	28.4	11.5	51.3

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 50 is very good for a fry variety.

AF5521-1

A high yielding, dual-use, early blight resistant russet

Primary Strengths:

- High yields, blocky tubers, large tuber size profile
- Better type than R. Burbank
- Outstanding fry color and fry color uniformity. Cold sweetening resistance.
- Specific gravity higher than Russet Burbank
- Moderate early blight and bruise resistance. GN resistance.
- Dual use potential, widely adapted, southeast to west.

Known Weaknesses

- Hollow heart incidence similar to Russet Burbank
- PVY, common scab, and pink rot susceptibility. Crinkled leaf texture.



Pedigree: AF4320-7 x AF2291-10, Univ of Maine. Maturity: Med-Late (rtg=6.1); Tubers: blocky and long (rtg=6.7) with russeted skin (rtg=3.3); Appearance is good (6.0).

AF5521-1, Maine Variety Trials Presque Isle and St. Agatha, 12 trials, 2015-2022

Variety	Total	US#1	⁰⁄₀ <	⁰∕₀ >	Spec	Tuber	%	%	Chip
·	Cwt/A	cwt/A	4 oz	8 oz	Grav	App.	Ext	HH	Col.
	(% RB)	(% RB)			(vs RB)	1 to 9	Defs		50F
									Dec
AF5521-1	307	266	6.8	60.8	1.093	6.0	11.3	10.2	58.0
	(108)	(154)			(+0.011)				
R. Burbank	302	213	17.0	39.0	1.082	4.3	26.9	(7.5	46.5
R. Norkotah	252	212	19.5	35.1	1.076	6.3	10.7	10.5	43.2
Shepody	300	194	12.7	50.1	1.083	3.9	30.7	17.6	50.3

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 50 is very good for a fry variety.

AF5736-16

A dual-use, late blight and verticillium resistant russet

Primary Strengths:

- High yields, attractive, long tubers, large tuber size profile
- Better type than R. Burbank
- Outstanding fry color and fry color uniformity. Cold sweetening resistance.
- Specific gravity higher than Russet Burbank
- Low hollow heart incidence.
- Verticillium resistance. Moderate late blight, softrot, blackspot, and scab resistance.
- Dual use potential. Outstanding in National Fry Processing Trials.

Known Weaknesses

- Late maturity
- Some growth cracks
- **PVY** and pink rot susceptibility.



Pedigree: AF3317-15 x D. Trailblazer, Univ.of Maine.

Maturity: Late (rtg=6.9); Tubers: long (rtg=6.8) with lightly russeted skin (rtg=4.0); Appearance is good (5.8).

AF5736-16, Maine Variety Trials Aroostook Research Farm, Presque Isle, 8 trials, 2017-2022

Variety	Total	US#1	⁰∕₀ <	⁰∕₀ >	Spec	Tuber	%	%	Chip
· ·	Cwt/A	cwt/A	4 oz	8 oz	Grav	App.	Ext	HH	Col.
	(% RB)	(% RB)			(vs RB)	1 to 9	Defs		50F
									Dec
AF5736-16	288	238	14.4	49.1	1.095	5.8	12.4	2.1	59.9
	(99)	(142)			(+0.013)				
R. Burbank	302	189	17.7	40.9	1.081	3.9	34.3	5.8	47.1
R. Norkotah	248	199	23.0	32.0	1.075	6.1	13.6	9.4	44.7
Shepody	270	157	14.5	45.2	1.084	4.0	35.3	4.9	54.4

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 50 is very good for a fry variety.

AF5762-8

A dual-use, verticillium and early blight resistant russet

Primary Strengths:

- High yields, attractive, long tubers, moderate tuber size profile
- Better type than R. Burbank
- Outstanding fry color and fry color uniformity. Cold sweetening resistance.
- Specific gravity higher than Russet **Burbank**
- Low hollow heart incidence.
- Moderate early blight and verticillium resistance.
- Dual use potential. Widely adapted.

Known Weaknesses

- Size profile TBD
- MS to blackspot (like RB std)
- PVY and pink rot susceptibility.

Pedigree: AF4320-17 x D. Trailblazer, Univ.of Maine. Maturity: Med-Late (rtg=6.5); Tubers: long (rtg=6.8) with russeted skin (rtg=3.0); Appearance is good (6.1).

AF5762-8, Maine Variety Trials Aroostook Research Farm, Presque Isle, 8 trials, 2017-2022

Variety	Total	US#1	⁰⁄₀ <	⁰∕₀ >	Spec	Tuber	%	%	Chip
· ·	Cwt/A	cwt/A	4 oz	8 oz	Grav	App.	Ext	HH	Col.
	(% RB)	(% RB)			(vs RB)	1 to 9	Defs		50F
									Dec
AF5762-8	279	240	14.2	37.4	1.094	6.1	8.6	2.8	59.4
	(98)	(148)			(+0.012)				
R. Burbank	305	187	16.7	43.2	1.081	3.9	35.3	6.6	47.3
R. Norkotah	245	195	21.0	35.0	1.074	6.3	13.8	9.8	44.7
Shepody	272	165	14.0	46.3	1.084	4.0	33.4	6.5	53.9

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 50 is very good for a fry variety.

AF6075-8

A high yielding, PVY resistant, processing russet

Primary Strengths:

- High yields, long tubers, large tuber size profile
- Better type than R. Burbank
- Fair to good fry color and fry color uniformity
- Specific gravity slightly higher than Russet Burbank
- Low hollow heart incidence.
- Moderate bruise and softrot resistance. PVY resistance.

Known Weaknesses

- Pink rot susceptibility.
- Poor tuber type in Pacific Northwest trials.

Pedigree: AF4124-4 x A93575-4, Univ of Maine. Maturity: Medium to Med-Late (rtg=5.5); Tubers: Long (rtg=6.9) with lightly russeted skin (rtg=3.9); Appearance Fair (5.3).

AF6075-8, Maine Variety Trials Aroostook Research Farm, Presque Isle, 8 trials, 2018-2022

Variety	Total	US#1	⁰∕₀ <	⁰∕₀ >	Spec	Tuber	%	%	Chip
· ·	Cwt/A	cwt/A	4 oz	8 oz	Grav	App.	Ext	HH	Col.
	(% RB)	(% RB)			(vs RB)	1 to 9	Defs		50F
									Dec
AF6075-8	379	305	13.5	43.4	1.085	5.3	14.9	0.6	55.4
	(131)	(193)			(+0.004)				
R. Burbank	304	195	15.6	39.1	1.081	3.9	32.3	15.7	49.6
R. Norkotah	242	197	20.1	38.7	1.076	6.3	12.3	14.7	46.5
Shepody	290	185	12.4	49.6	1.083	3.9	32.8	8.8	54.7

Tuber appearance: 1 to 9, where 3=poor; 4=fair to poor; 5=fair; 6=fair to good; 7=very good. Hollow incidence determined on large tubers only. Chip color is Agtron M35 reflectance form crushed chips, higher number indicates lighter color, \geq 50 is very good for a fry variety.

Think Long-term: New Varieties Can Make a Difference!

 New varieties can provide marketing opportunities, solve production problems, increase yields.

- Long-term investment! It takes 10-12 years to breed, select, test, and commercially introduce a new variety
- A successful new potato variety can provide many millions of dollars in benefits to the industry!



Caribou Russet, St. Agatha, 2018

PVY Strains

• PVY⁰

- Common strain
- Mosaic symptoms
- Subgroups exist
- $\blacksquare PVY^N$
 - Causes veinal necrosis in tobacco

PVY^{NTN}

- Often weak foliar symptoms
- Causes PTNRSD in some potato varieties

PVY^{N:O} and PVY^{N-Wi}

- Recombinant strains
- Often weak foliar symptoms
- Cause PTNRSD in some potato varieties

PTNRSD tuber photo courtesy of Dr. Steven B. Johnson, UM Extension





Clockwise: Foliar PVY in AF4985-1 and Russet Norkotah; PTNRSD, tuber necrotic ringspot disease



PVY Control

PVY Control is Not Just for Seed Growers.

- PVY is a Community Disease
 - Field to field, farm to farm, region to region travel
- Plant Certified Seed with Low Virus Content
- Eliminate Volunteers and Cull Piles
- Aphid Control

Resistant Varieties

- Partial Resistance
 - Slower spread
- Immunity
 - Genetic sources: Ry_{adg}, Ry_{sto}, Ry_{chc}



Northern Maine Potato Production System, photo courtesy of Paul Cyr



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Greg selecting new russets, 2010