POTATOES, the PMC AND ALASKA

Bowen Introduction and Future Directions

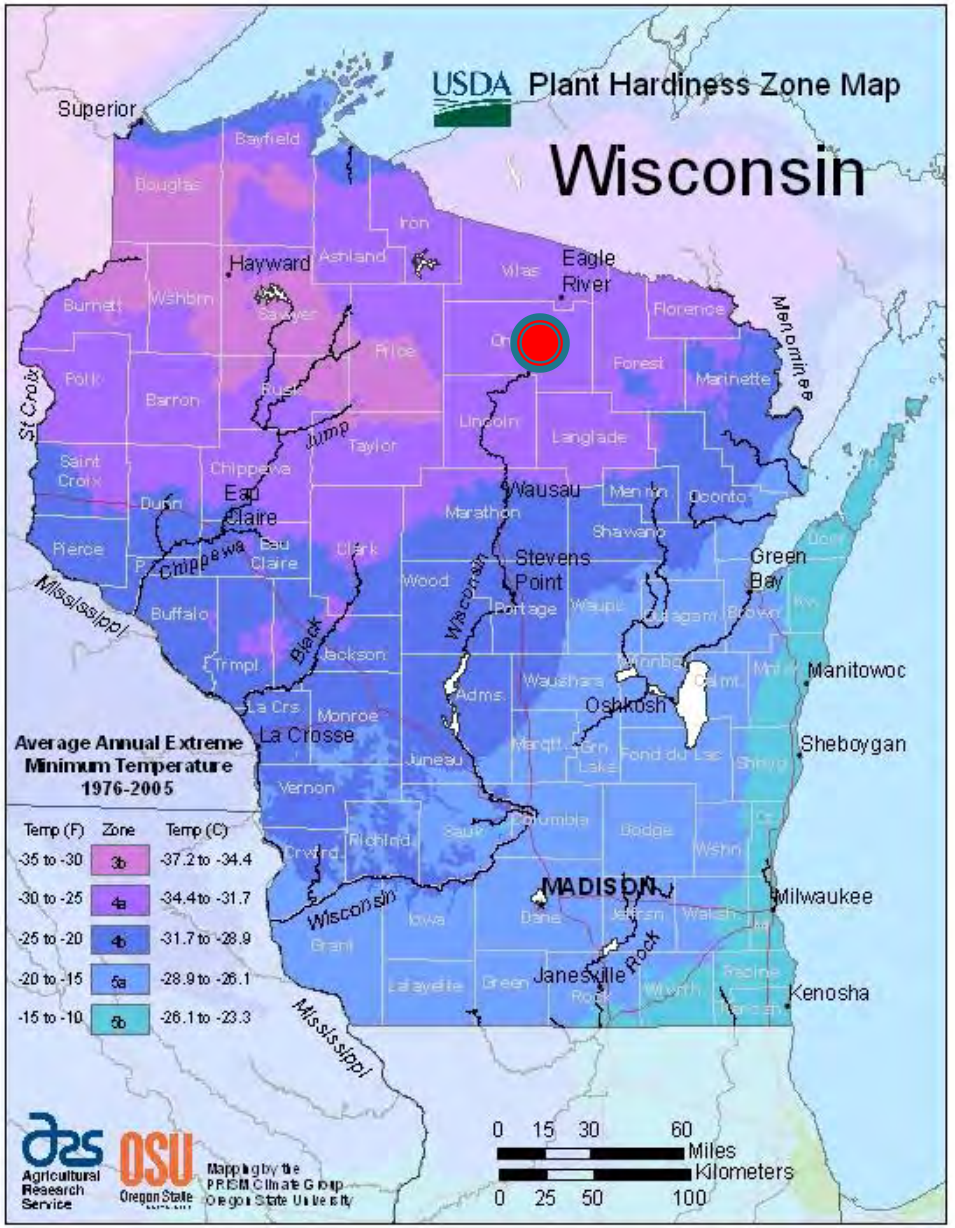
Outline

- Personal background
- Work history
- Snapshot of WI Potato Industry
- AK Priorities and Directions

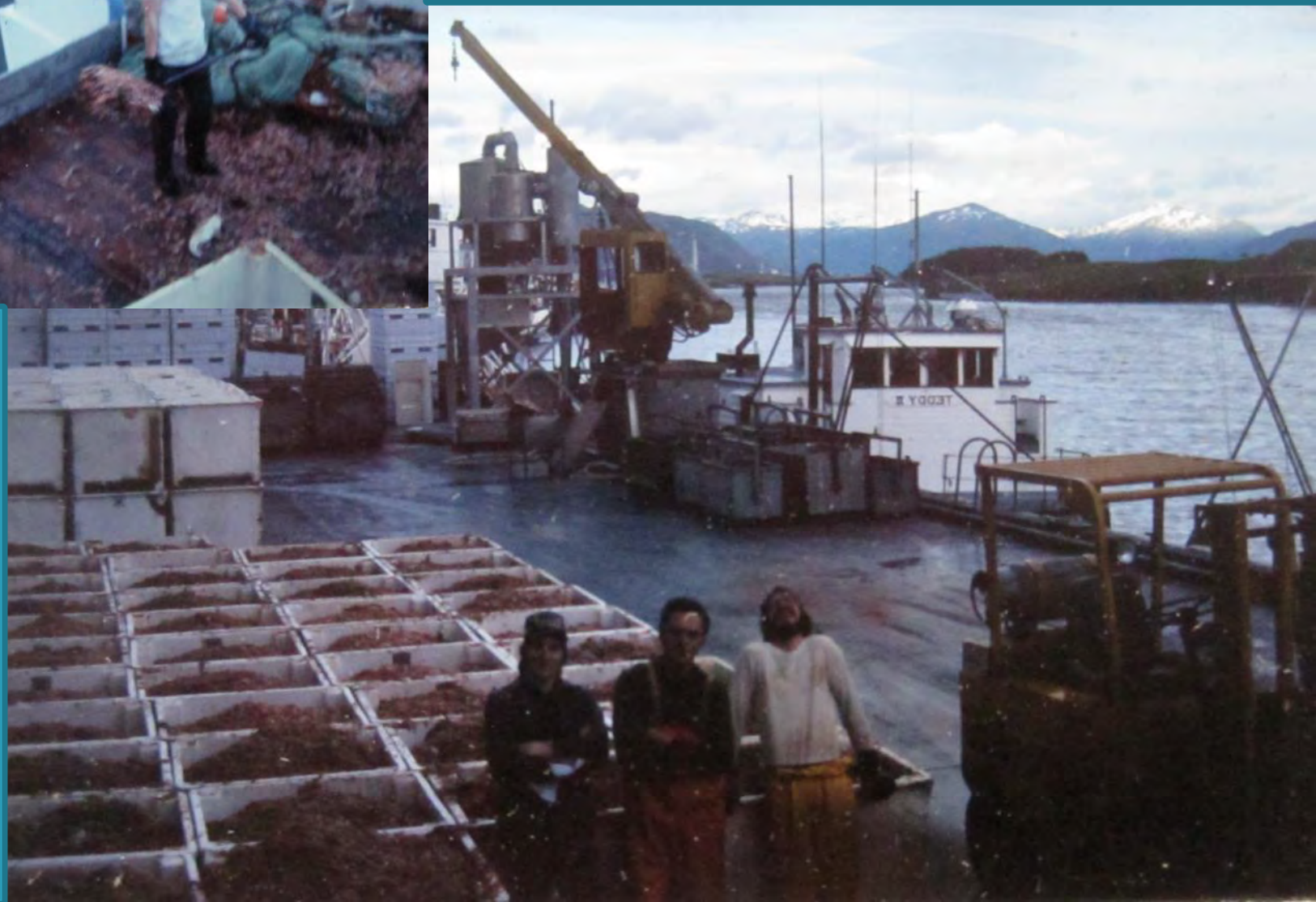
WISCONSIN

1848

Wisconsin
The Badger State



Kodiak, Island 1979



Wecome to Hodag Country !
Rhinelander, WI

Background

- Farm experience with hay production, small-scale livestock, dairy
- Forestry
- 1984: B.S. Soils Science and Agronomy
- 1986: M.S. Soil Science and Groundwater Hydrology
- 1986-1991 UW-Hancock Exp. Station (potato agronomy)
- 1991-2014 UW-Rhinelander Exp. Station (potato breeding)

University of Wisconsin Madison
College of Agricultural and Life Sciences

- Agricultural Research Stations Dept.
- 11 Stations
- Cranberries and cows to pine trees and potatoes

- http://www.ars.wisc.edu/

WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON


UW – Rhinelander
Agricultural
Research Station
Where new potatoes are always growing . . .
WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON


Research Station

UW- Rhinelander Agricultural Research Station/Breeding Station

Administrative lines

Superintendent

Assist. Breeder

Agricultural Research Stations

Farm operation

Department of Horticulture

Potato Breeding Program

Dr. Jiwan Palta

Wisconsin Potato Breeding Program

Dr. Felix Navarro

Bryan Bowen

Objectives in Breeding New Potato Varieties

1. Agronomic traits: (yield, size, dry matter content)
2. Quality traits: (lack of defects)- hollow, cracks, off-shape, bruising, skin finish
3. Disease resistance: (scab, early and late blight, verticillium wilt)
4. Sensory: taste/flavor, texture


W2717-5


W1874-1R
x
W2275-3R

Stage	Volume		
Parents	500		
Pollinations	17,000		
Seedlings	56,000		
	Potential Varieties		*Hills*
1 H	81,000		1
4 H	2,800		4
8 H	779		8
20 H	191		20
40 H	104		40
Rep.Trial 1	50		120
Rep.Trial 2	30		120
WI State Trials	39		100
SpudPro Plots	18		300
NCRT	4		640
Seed Growers	5		100+ acres
Com. Growers	13		


ZIMMATIC

CHAVDEN
47°
52°

WISCONSIN
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HOME GROWN
WISCONSIN
POTATOES

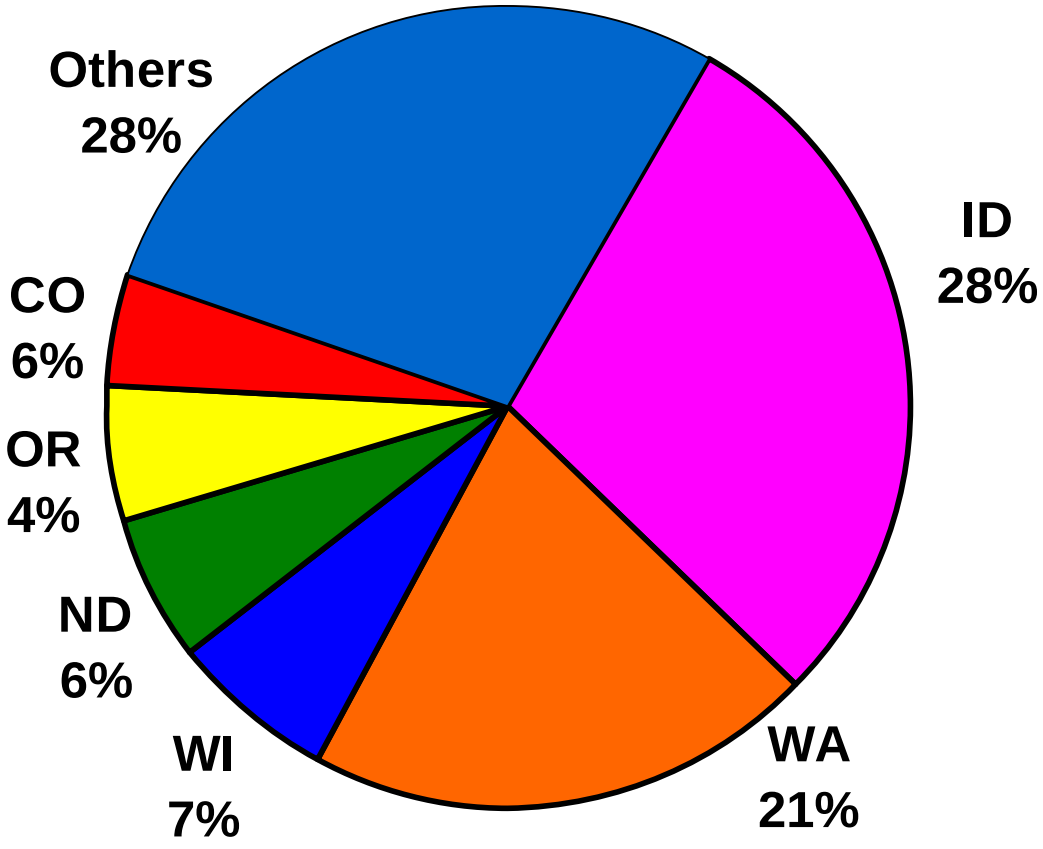
SPUDPRO Candidate and Wisconsin Potato Variety Trials

Bryan Bowen and Mary LeMere

		Total Yield (cwt/A)		A Size (cwt/A)		B Size (cwt/A)	Culls (cwt/A)		Specific Gravity		Tuber Preference		Early Vigor Jun		Late Vigor
		Han	Ant	Han	Ant	Ant	Han	Ant	Han	Ant	Han	Ant	Han	Ant	Han
Short	Atlantic	503	490	476	439	10.8	13.7	34.4	1.087	1.082	6.6	6.3	55.1	83.0	54.5
	Accumulator	574	***625***	542	***602***	12.7	17.4	29.8	1.084	1.078	4.2	4.7	62.5	***91.9***	60.7
Long Storage Chippers	CO95051-7W	408	470	385	408	18.3	11.5	35.3	1.082	1.079	6.0	6.6	44.9	81.6	56.1
	Lamoka	479	481	448	433	16.8	16.2	24.7	1.086	1.079	***7.5***	***7.4***	***71.2***	***91.9***	51.4
	Lelah	446	506	417	451	25.1	14.2	29.4	1.086	1.083	6.9	7.0	***66.8***	***97.8***	32.7
	Nicolet	579	492	552	425	16.3	15.6	45.6	1.083	1.080	***7.7***	6.3	62.5	86.0	56.1
	Tundra	463	459	433	409	14.4	15.8	25.0	1.086	1.084	5.4	5.8	53.7	86.0	51.4
	W5015-12	564	480	524	431	21.0	7.4	22.2	1.087	1.081	6.2	6.0	65.4	***93.3***	56.1
	Snowden	587	495	520	450	13.7	7.4	27.5	***1.095***	1.082	5.9	6.0	53.7	52.1	54.5
Fresh Market Reds	ATTX98453-6R	289	425	257	329	25.2	15.3	57.1	1.062	1.064	5.7	6.1	25.9	50.6	70.0
	W6002-1R	451	***585***	415	***542***	23.0	12.1	35.8	1.061	1.066	7.1	***7.2***	43.5	83.0	93.2
	W8405-1R	***592***	469	***548***	392	37.1	12.1	36.0	1.063	1.069	6.6	6.6	52.2	86.0	***100.0***
	W8890-1R	527	509	477	455	35.4	10.5	23.2	1.065	1.072	***7.4***	7.6	***66.8***	86.0	79.2
	Dark Red Norland	499	478	451	419	26.1	10.3	30.2	1.058	1.064	4.8	6.6	***74.2***	***91.9***	43.4
	Red Norland	476	540	434	472	18.8	18.4	56.1	1.056	1.062	4.4	5.3	***74.2***	***96.3***	40.3
Fresh Market Russets	A03158-2TE	581	511	562	439	23.0	22.4	55.0	1.074	1.075	***8.0***	***6.9***	56.6	80.1	77.6
	AF3362-1	556	520	533	457	***11.1***	22.2	58.2	1.074	1.074	5.3	6.4	52.2	71.2	76.9
	AOTX02136-1RU	370	480	359	399	22.3	19.0	58.0	1.069	1.073	6.6	6.0	37.6	74.2	18.4
	Canela	473	439	444	373	13.8	30.3	45.4	1.078	***1.087***	6.5	***7.2***	30.3	65.4	***80.7***
	CO03276-5RU	462	490	442	417	21.1	23.5	53.8	1.071	1.072	5.7	5.7	46.4	80.1	55.8
	CO99045-1W/Y	581	494	553	424	28.8	25.3	44.5	1.079	1.078	6.3	6.1	***69.8***	***96.3***	69.8
	MN0246ru/Y	529	476	506	386	40.0	23.5	50.4	1.072	1.078	6.0	4.9	56.6	87.4	74.5
	Silverton	478	458	463	382	23.2	18.8	50.4	1.078	1.068	***7.4***	6.3	58.1	78.6	74.5
	W9133-1rus	364	486	357	413	20.6	19.7	54.0	1.065	1.069	6.5	4.8	36.1	69.8	27.8
	Norkotah Sel 8	505	554	486	478	25.9	21.3	63.0	1.072	1.073	6.9	6.3	52.2	80.1	23.1
Processing Russets	AF3001-6	***593***	556	***581***	***524***	11.6	12.0	35.7	1.074	1.077	6.0	6.8	43.5	72.7	***80.1***
	AF4281-3	***598***	498	559	432	14.3	34.6	54.2	1.076	1.079	3.9	4.9	65.4	***90.4***	69.8
	Innovator	524	527	485	414	15.5	47.2	103.1	1.073	1.070	6.3	4.9	59.5	87.4	71.4
	Pallisade	***607***	469	527	351	17.4	68.6	96.3	***1.085***	***1.084***	4.4	4.2	63.9	65.4	***83.8***
	Umatilla	588	507	563	431	26.2	23.1	55.3	1.076	***1.081***	6.9	6.3	65.4	83.0	74.5
	W6234-4rus	569	433	552	365	14.7	16.0	45.1	1.074	1.071	***7.7***	6.3	62.5	86.0	65.2
	W8152-1rus	521	462	502	408	12.1	20.3	38.6	1.074	1.077	6.5	5.7	56.6	86.0	65.2
	Burbank	510	486			19.8	24.2	70.0	1.077	***1.081***	4.8	5.1	***68.3***	***90.4***	***79.2***

U.S. Potato Production by State

Crop Year 2004 Production Reached 20.4 Million MT



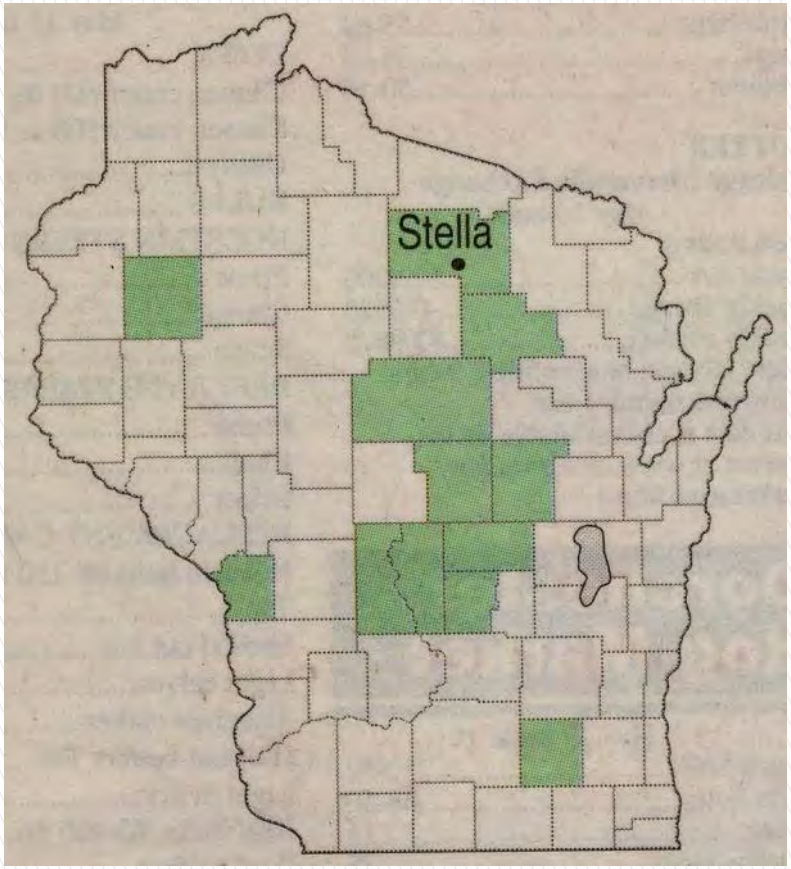
Note: Includes fresh and seed. Crop year is associated with the calendar year in which harvest is accomplished.

Source: National Agricultural Statistics Service, USDA

Wisconsin Potato Industry

 # 3 in the nation (60,000 acres)

- Seed and ware production
- Irrigation
- High yielding (130 days)
- High insect and disease pressure = spraying
- Fresh and Process



Category Fit in Breeding New Potato Varieties

- Wisconsin market
  - Russets (56%) fresh/ff-process
  - Round whites (33%) fresh/chip-process
  - Reds (10%) fresh
  - Specialties (1%) fresh

Alaska – Impressions

- Geographically isolated
  - Opportunity for minimizing diseases
  - Raises cost of production ($/cwt – double)
- High latitude
  - Short season
  - Long days (rapid bulking)
- Dry spring, wet fall
- Irrigation –use is limited
- Lower N-requirement, higher-P

Alaska – Impressions (cont.)

- Fresh market, (almost exclusively)
- Locally oriented
- Diversified – 116 var. in Certification
  - A few larger producers: (5var on 6 ac)
  - Many small producers: (21var. On 0.5ac)
  - Home use gardeners/growers?

Alaska – Impressions (cont.)

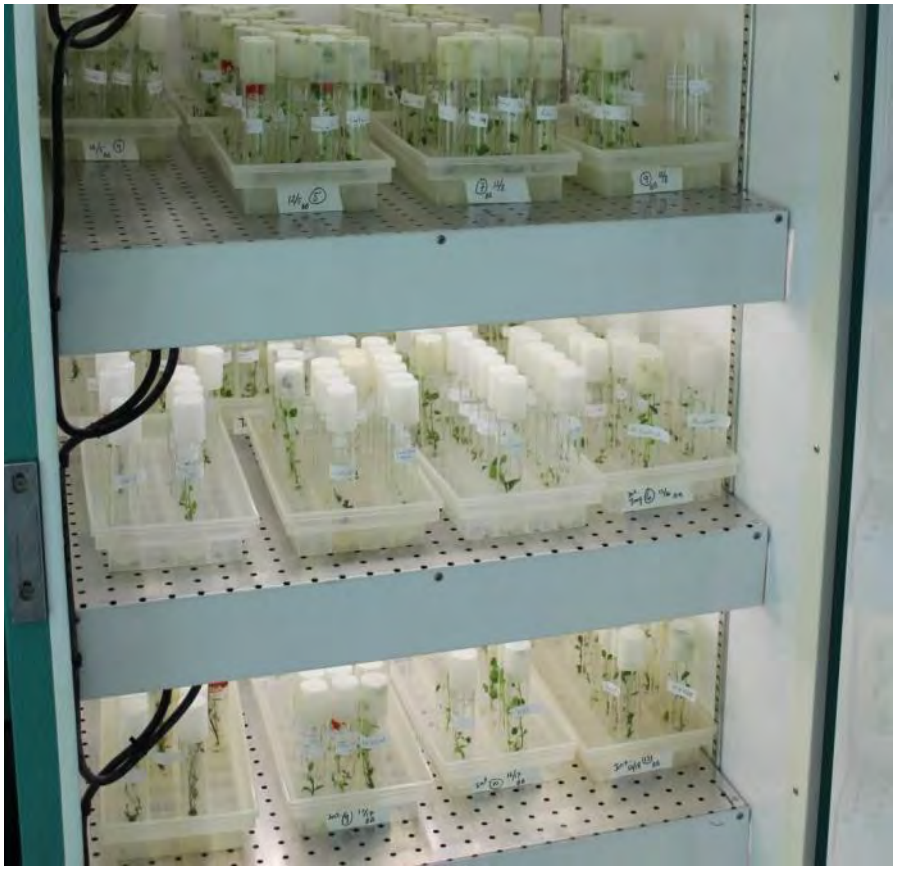
- Emphasis on specialty and heirloom types

- "Alaska Grown", successful message
- Still wondering how pristine AK wants to be or "should be" with regard to disease pressure?

Directions for PMC Potato Program

1. **Tissue Culture Bank**

Maintain and review current genetic stock during 2015



Approx. 150 varieties and experimental's

Directions for PMC Potato Program

Sterile Tissue Culture

Directions for PMC Potato Program

2. Generation 0 seed program

- Production according to grower orders
- Encourage the use of lower generation seed
- Upgrades to PMC greenhouse facilities
  - Ventilation
  - Insect exclusion
  - Review irrigation
  - Storage

Directions for PMC Potato Program

3. **Extension:** Availability for grower questions and consultation

4. **New genetics:** Two pronged approach

   A. Variety trialing: Bring in material from out of state
   B. Initiate a small scale breeding program based at the PMC

Directions for PMC Potato Program

A. Variety evaluation project

- 2015- establish 1 or 2 loc. trial based on current popular varieties in AK

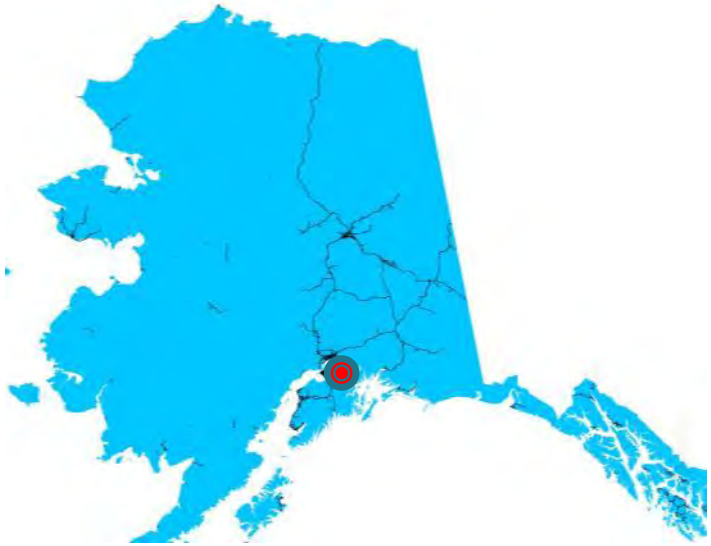
Cal white	Cherry Red	Cal Rus	Iditared
Russet Nork	German Butter.	Daisy Gold	All Blue
Yukon Gold	Lemhi Rus.	Goldrush	Atlantic
Chieftain	Pike	Krantz	D.R. Norland
Sangre Sel-11	Delta Reds	Magic Molly	Red LaSoda

- Long term - Bring in material from Universities and private companies, not previously tested in AK

Directions for PMC Potato Program

A. Variety evaluation project

- 2015 Replicated Field Trial at PMC
- 2015 grow Minitubers for 2016 seed
- 2 -3 yr trial (2016-19)
- **Multiple locations?**
  - Mat-Su valley (replicated)
  - North of range (replicated)?
  - South and east (single rep, observation)?



Directions for PMC Potato Program
(under consideration)

B. Small scale breeding –selection project

- Source seedling tubers from other US-programs
- 10-15,000 (2-3 acres)
- Possibly greenhouse crossing (March-May)
- 4yr selection scheme
  - Fy1: 1 hill
  - Fy2: 12 hills
  - Fy3: 1-Loc., Replic trial
  - Fy4: Multi. Loc. Replic. Trials – decisions by industry

Directions for PMC Potato Program

Proposed infrastructure initiatives

- **Establish line of potato plot equipment**
  - Tractor for 36” row spacing
  - Purchase 2-row planter
  - Hilling, spraying, digging, (to be determined)

- **Upgrade greenhouses for Gen 0 production**
- **Establish storage and handling for Gen 0 tubers**
- **Identify additional future storage for field grown seed**

Questions?


Thank You…