

Identifying Economic Gains and Cost Savings with New Varieties

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My Background

- PhD Potato Agronomy (WSU)
- MS Plant Protection/Weed Sci (UI)
- BS Ag Econ (UI)
- BS Crop Production (UI)
- Commercial Farming Experience
- International Research Experience (Cambridge, UK)
- Private Company Experience (Monsanto, Syngenta)
- Born and reared in American Falls, ID

Should we even mess with new variety development?

- Our current varieties are making us money
 - Most of us are making money with them
- New varieties impose risk and confusion
 - Learning how to grow them, storage failure
- Too dang many new varieties
 - Which one do we choose?

Do you want China producing the potatoes you eat?

- Global competitiveness
- As an example
 - Is the technology, trim, MPG of the pickup you drive today going to be acceptable in 10 years?
 - Why should we expect the potatoes you grow today to work in 10 years? 20 years?
- If we don't stay competitive on a global scale, the US potato industry will erode away.

Real Concerns

- Loss of fumigants, tighter regulations
 - Verticillium wilt, nematodes
- New viruses and diseases
 - Zebra chip, BLTVA
- New pest threats
 - Tuber moth
- Acrylamide concerns
 - Cancer causing?
- Dry irrigation wells, drought
- Global Population explosion
 - Every day the world gains the same amount of people as the population of Boise (213,000, net), 148/minute
 - <https://www.cia.gov/library/publications/the-world-factbook/geos/xx.html>

Addressing Real Concerns

- Tri-State Potato Variety Team
 - UI, OSU, WSU, USDA, Commissions, Industry
- Top priorities
 - Disease resistance
 - reduced inputs (water, fert, pesticide, etc)
 - Improved PNW/US competitiveness
 - improved post-harvest
 - reduce production risk
 - high yields and quality
 - human nutrition

The Tri-State Variety Development Team Mission

- Keep the PNW/US industry competitive and profitable
- Provide consumers healthy, high quality inexpensive potatoes
- Contribute to the well being of the environment

History of Common Varieties

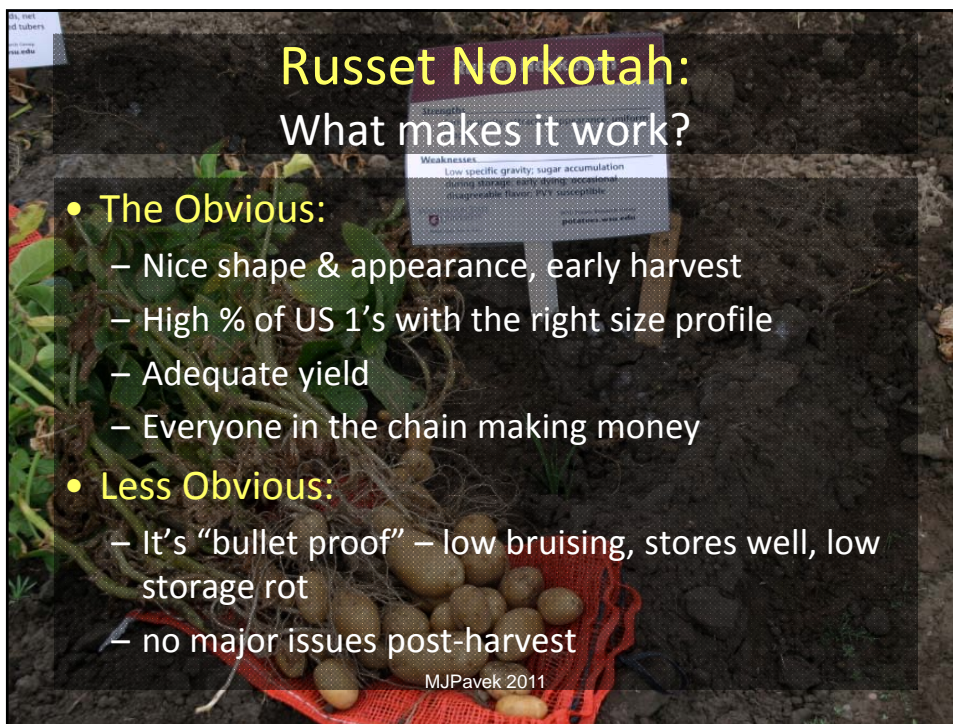
- **Russet Burbank, 1914, Luther Burbank**
 - The original Burbank was a white potato.
 - Russet Burbank (Netted Gem) is a mutation of original Burbank, from Colorado .
- **Shepody, 1980, New Brunswick Canada**
- **Russet Norkotah, 1987, N. Dakota**
- **Ranger Russet, 1991, Tri-State**
- **Umatilla Russet, 1998, Tri-State**

Key to Success for a Variety

- **Obvious** – having all the right characteristics for the market
 - Internal & external quality, good taste
 - Yield, storability
 - Makes money for everyone in the chain
- **Less Obvious**
 - The growers and industry learn how to grow, manage, handle, and store it.

Case in Point

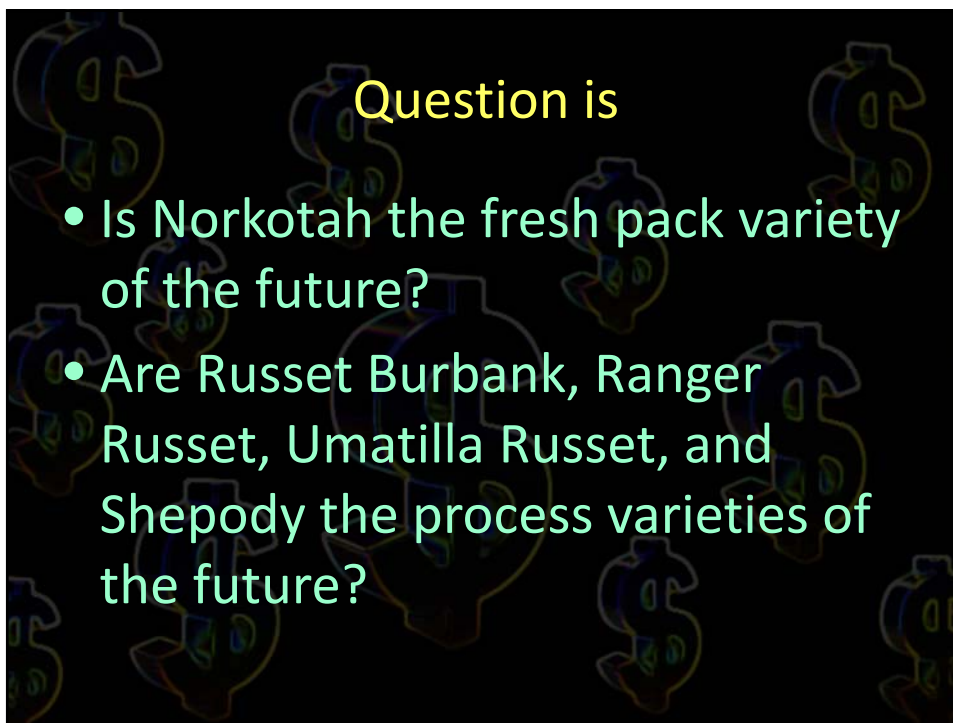
- **Ranger Russet:**
 - Susceptible to blackspot bruise
 - Used to be a serious issue
 - Industry improved harvest/handling practices
- **Umatilla Russet:**
 - Susceptible to dry rot – especially seed
 - Used to be a serious issue
 - Seed producers changed harvest and handling practices



Russet Norkotah: What makes it work?

- **The Obvious:**
 - Nice shape & appearance, early harvest
 - High % of US 1's with the right size profile
 - Adequate yield
 - Everyone in the chain making money
- **Less Obvious:**
 - It's "bullet proof" – low bruising, stores well, low storage rot
 - no major issues post-harvest

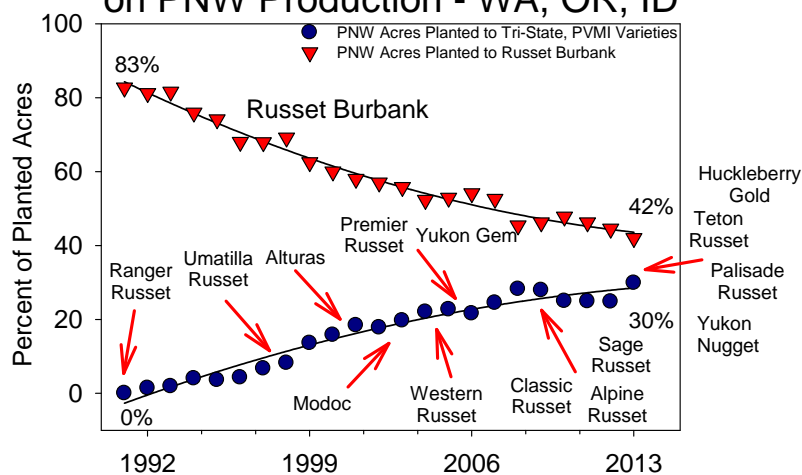
MJ Pavek 2011



Question is

- Is Norkotah the fresh pack variety of the future?
- Are Russet Burbank, Ranger Russet, Umatilla Russet, and Shepody the process varieties of the future?

The Decline of Russet Burbank & Impact of Tri-State Potato Varieties on PNW Production - WA, OR, ID



New variety economics

- Potential Gains
 - Higher payable yield
 - Improved quality, especially out of storage
 - Virus/Disease resistance = less yield drop
 - Able to get your seed certified – less risk
 - Less processing trim loss, higher recovery
 - Remain globally competitive
- Potential Cost Savings
 - Reduced inputs – fert, pesticides, water

Obvious Economic Gain with Many New Varieties:

- Higher Payable Yield

Gauging Economic Potential of New Varieties

- Processing contract
 - Base price
 - 4 oz minimum – usable potatoes
 - Premiums and penalties
 - US Grades, SG, > 6oz or > 10oz clause
- Fresh Pack
 - Carton sizes
 - Actual fresh pack prices – USDA Market News
 - Pack shed fee

Process Market Value – Methods

- Early Process Contract
 - Base Price
 - Harvest date, Ranger or Shepody Contract
 - Reject, Specific Gravity Below 1.074
 - Market Yield > 4oz,
- Late Process Contract
 - Base Price
 - Premiums and Penalties
 - % Market yield above 6 oz
 - Specific Gravity – sweet spot
 - Oversize clause



Fresh Market Economic Methods

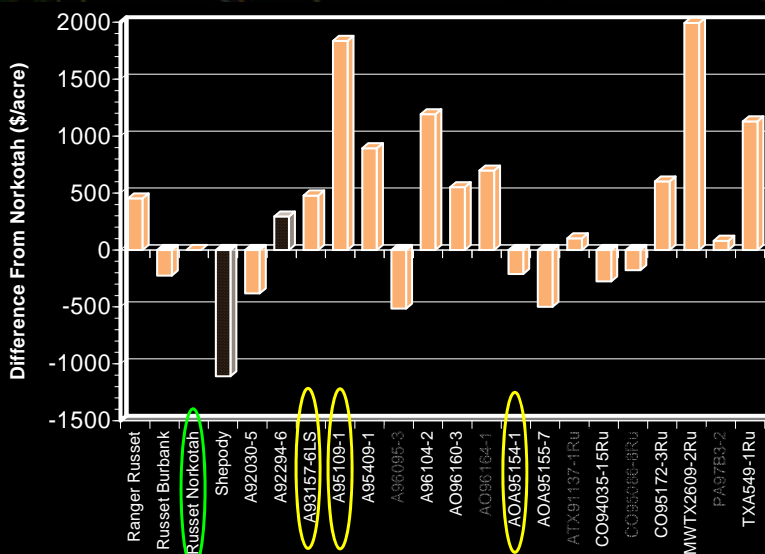
- Electronic sizer
 - Each potato weighed, US grades
- Industry size classes
 - See chart to right
- 4 year average C. Basin prices
 - Early Harvest
 - July to Mid Aug
 - Late Harvest
 - October

*Prices minus pack shed fee

Package	US 1 Size (oz)	Price* (\$/CWT)
Poly bag	4.0 – 7.0	4.57
100 count	7.0 - 8.5	15.44
90 count	8.5 - 9.5	17.26
80 count	9.5 - 10.5	21.64
70 count	10.5 – 12.5	23.56
60 count	12.5 – 14.0	23.59
50 count	14.0 – 18.0	23.26
Burlap bag	>18 oz	5.69
Burlap bag	US 2s >10oz	5.69
Process culls	All other	0.00

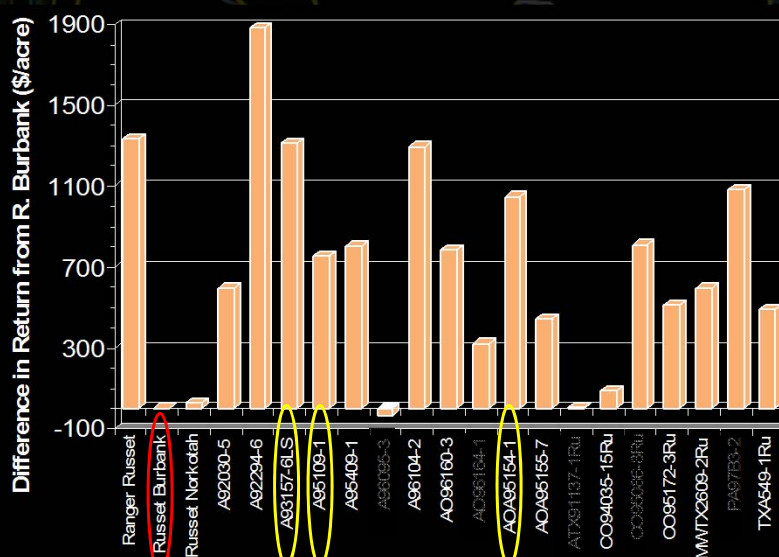
2005 Early Fresh Market

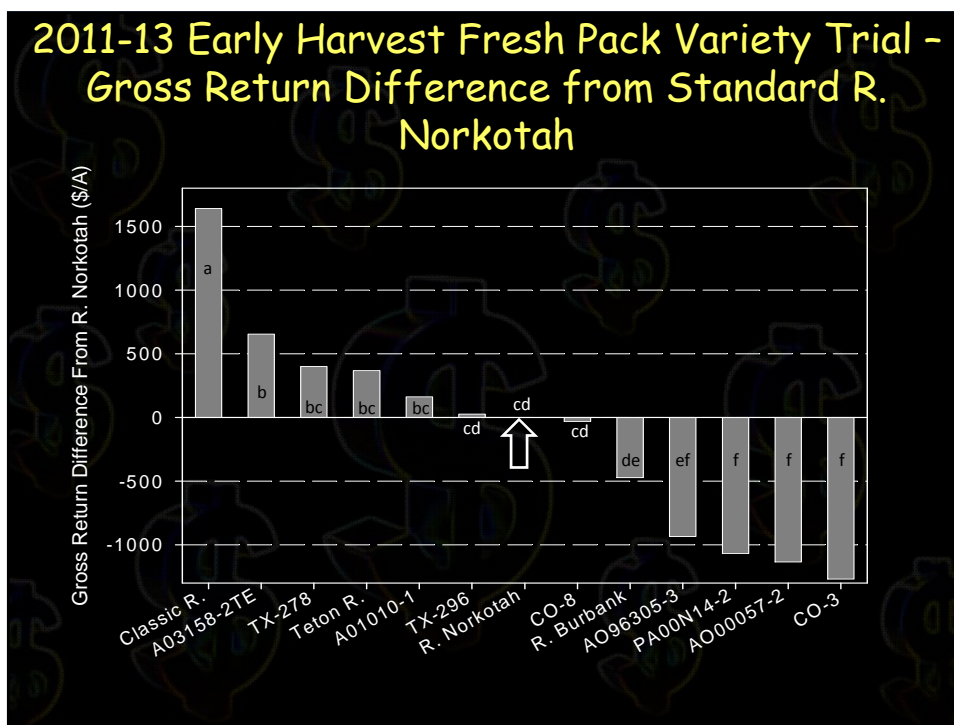
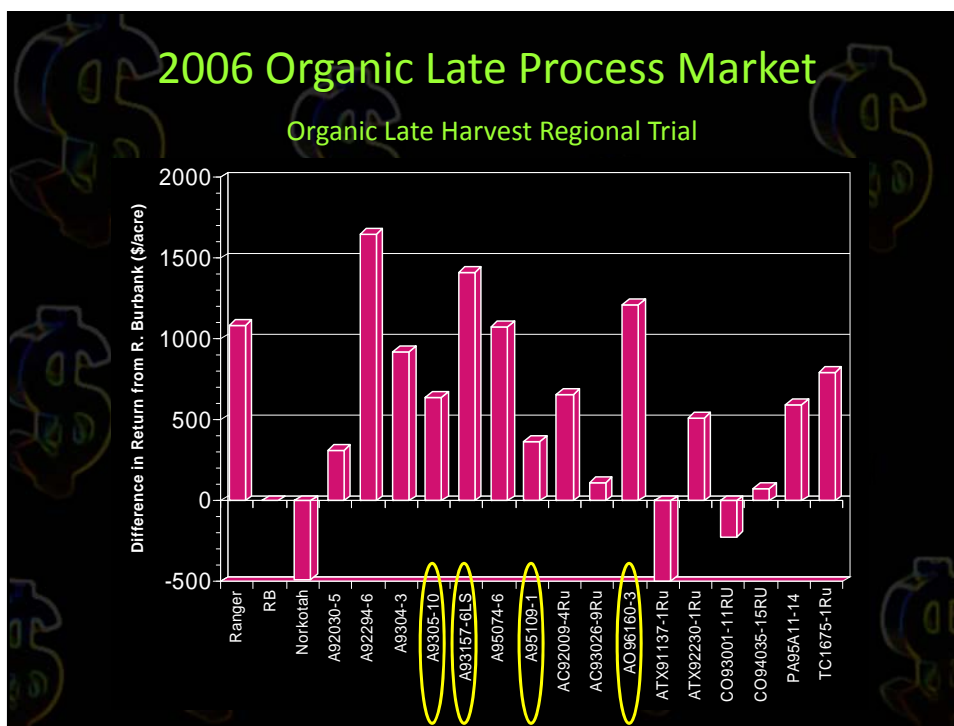
Early Harvest Regional Trial



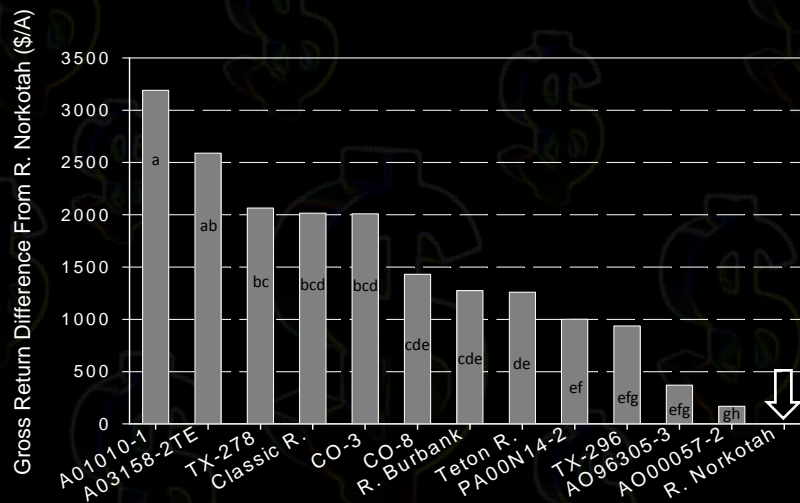
2005 Late Process Market

Late Harvest Regional Trial





2011-13 Late Harvest Fresh Pack Variety Trial – Gross Return Difference from Standard R. Norkotah

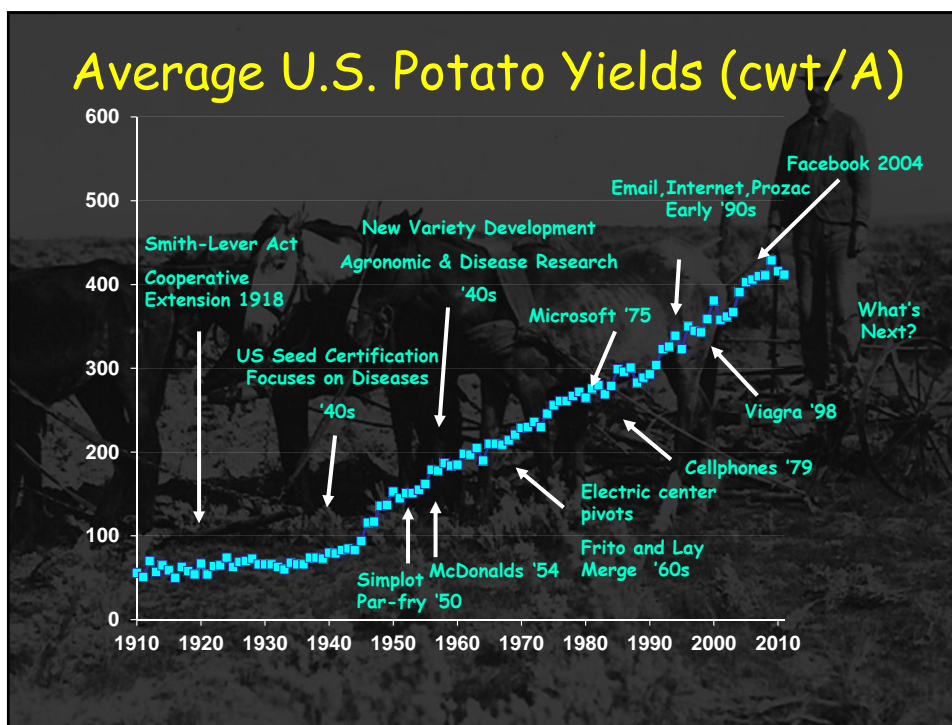


Cost Savings with Many New Varieties:

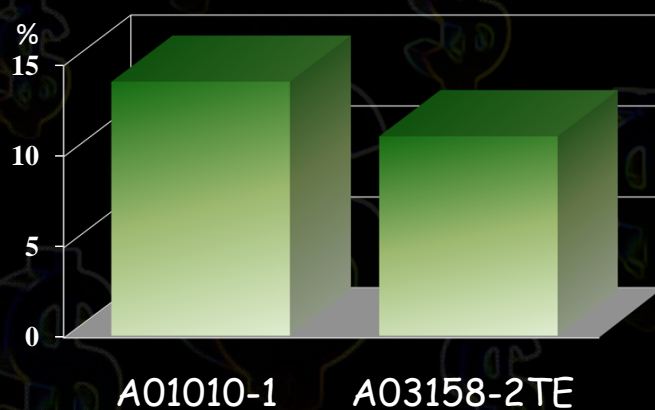
- Improved efficiency with inputs
- Reduced Input use

Higher Yields

- 'Dirty' word combination in DC
- Funding grants rarely given to proposals
 - Seeking to only improve yield
- Higher yielding varieties
 - Efficient with inputs, land, water, fert, pesticides



% Higher Yield than R. Burbank with Same Agronomic Inputs



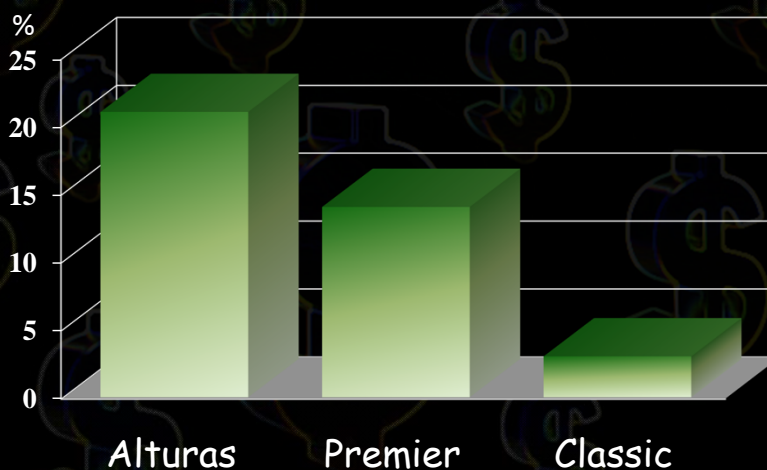
Nitrogen Use Efficiency

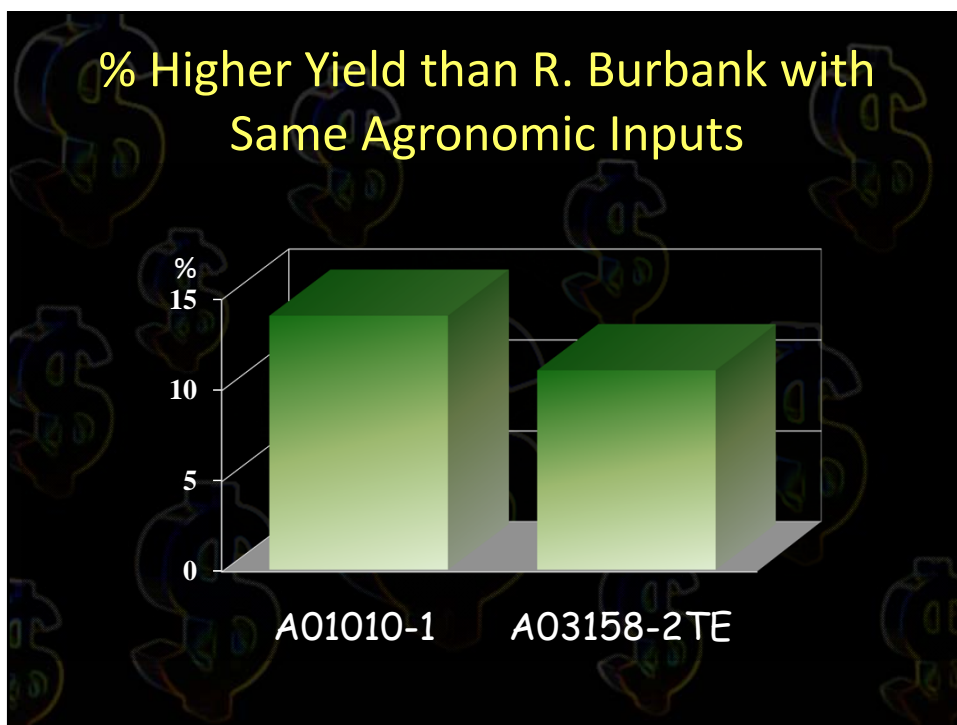
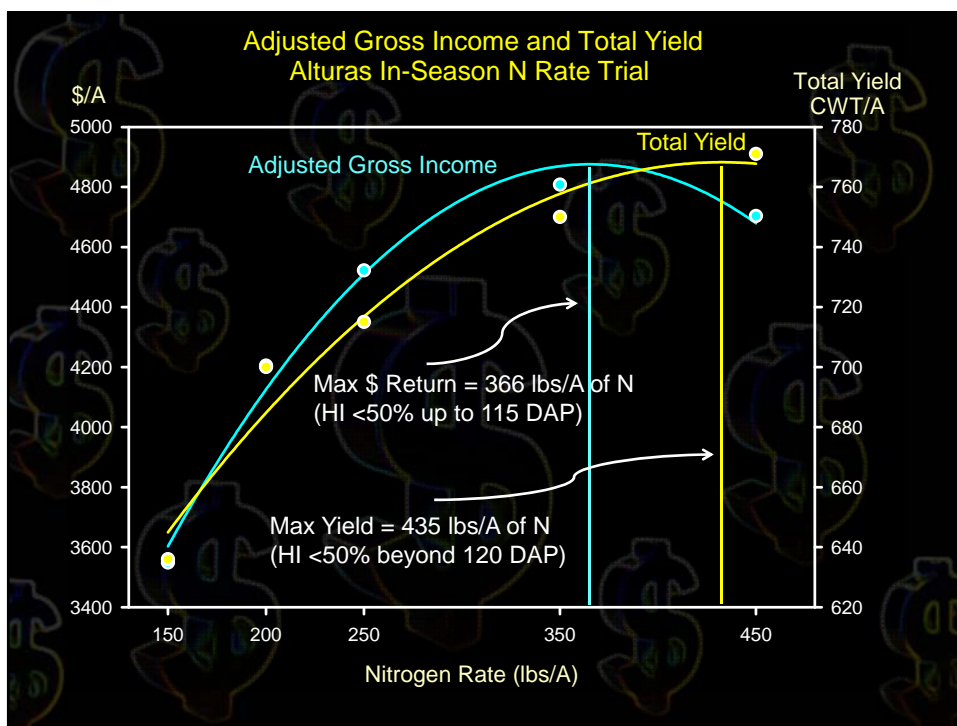
- 2010-12, Using same agronomic inputs
 - A01010-1 = 814 CWT/A
 - A03158-2TE = 794 CWT/A
 - RB = 714 CWT/A
- On average, these clones were 13% more efficient in their utilization of N than RB.

Nitrogen Use Efficiency (cont.)

- Ranger, R. Burbank, Sage, Teton, Umatilla, Alpine, Classic, and Owyhee
 - 2.4-, 2.3-, 2.4-, 2.1-, 2.6-, 2.7-, 2.3-, and 2.4-CWT/lb N, respectively
- Ranger, Umatilla, Alpine, and Owyhee were 2.6%, 10%, 14%, and 2% more efficient than R. Burbank, respectively
- Alpine Russet was the most N efficient variety using only 250 lbs N/A to produce yields higher than the industry standard, R. Burbank, grown with 450 lbs N/A.

% Higher Yield than R. Burbank with 50% less Nitrogen





Water Use Efficiency

- Seasonal water use
 - 2.95 inches/100 CWT
 - A01010-1, A03158-2TE
 - 3.35 inches/100 CWT
 - Russet Burbank
- On Average, these varieties are 14% more efficient with water than RB

Phosphorous Efficiency

- Russet Burbank
 - 6.7 CWT/A tuber yield per lb of soil P
- Alturas, Alpine Russet, Chieftain, Ranger R., Sage R., and Umatilla R.
 - all produced 7.2-8.8 CWT/A per lb of soil P
- Alturas was 30% more P efficient than RB
- Alpine, Chieftain, Ranger, Sage, and Umatilla were 19%, 14%, 12%, 8% and 6% more efficient than R. Burbank, respectively
- P efficiency across WA could be improved 6-19% simply by replacing R. Burbank with Alpine, Chieftain, Ranger, Sage, or Umatilla.

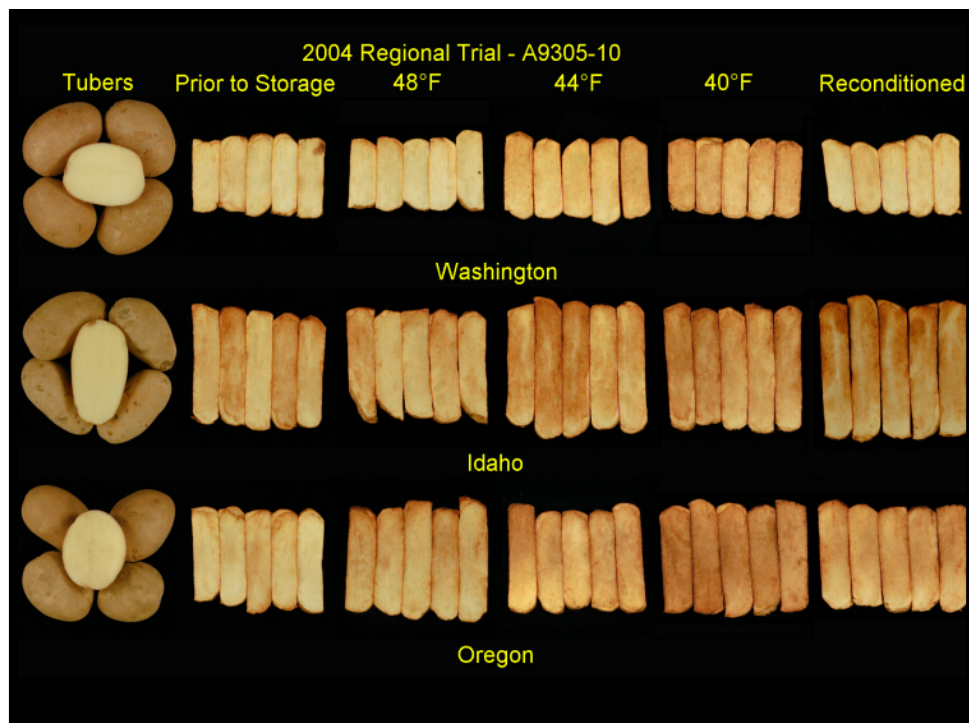
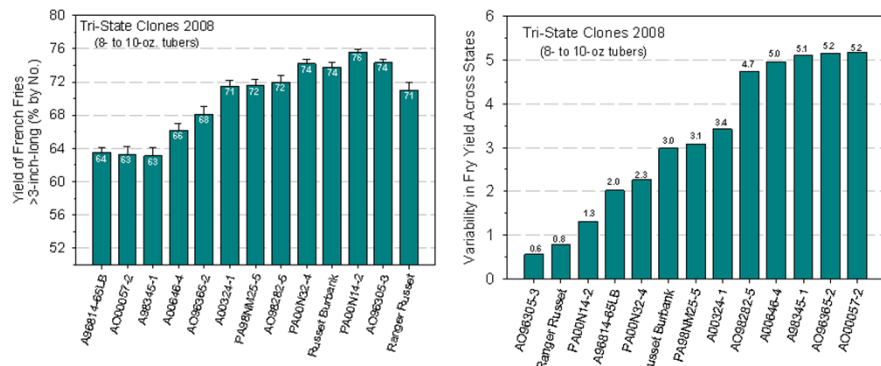
Industry Wide Cost Saving and Impact

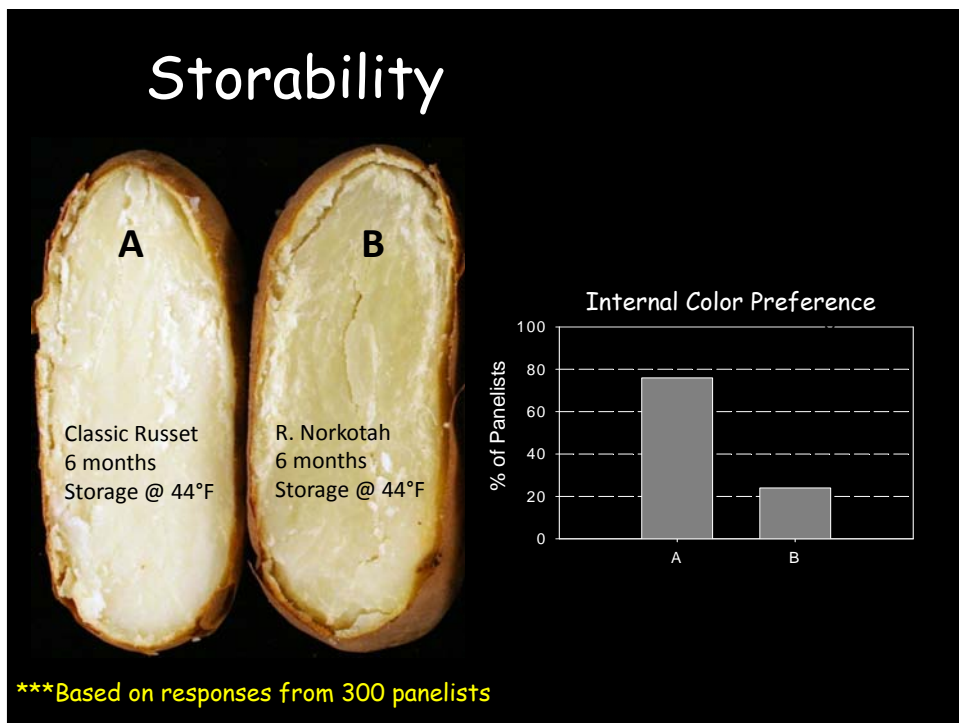
- Alturas, released by the Tri-State program in 2002
- Yields > than most commonly grown var. Russet Burbank
 - with 50% less nitrogen
- Production of Alturas in ID, OR, and WA was over 18,000 acres in 2010
- Potentially reduced amount of N applied to soil
 - 2.7 million lbs
 - compared with the same acreage planted to the old standard R. Burbank.
- The reduced use of nitrogen = less nitrate-contaminated ground water.
- Potential savings to NW growers was over \$1.1 million or \$60/acre
- Nearly all potato varieties released by the Tri-State program over the past 8 years require 10-50% less nitrogen fertilizer to produce yields similar to Russet Burbank

Potato Shape



French Fry Output



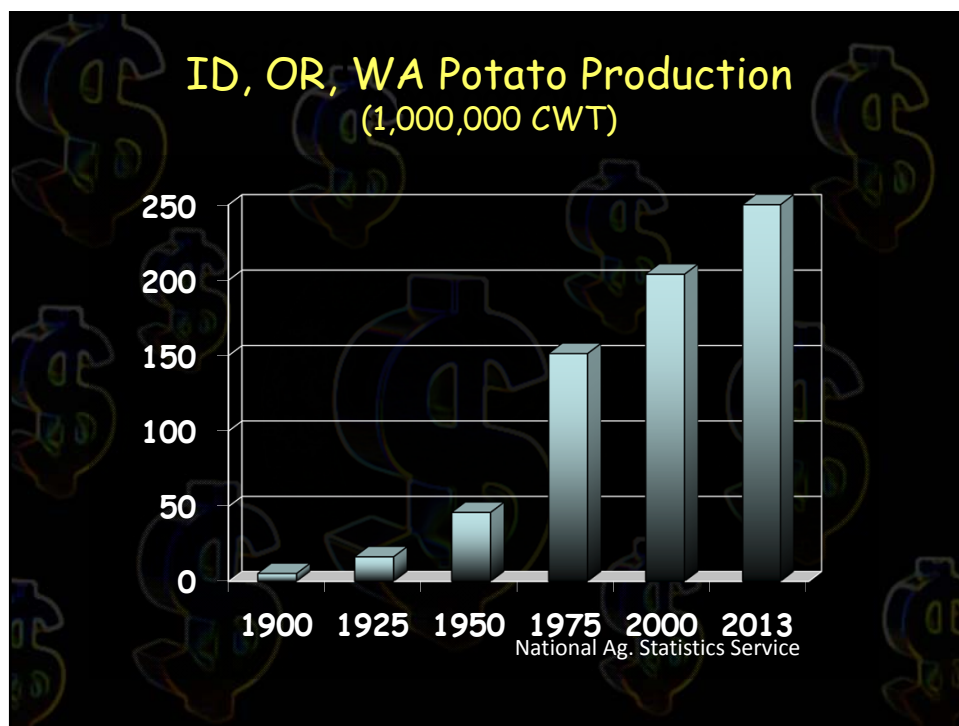


Moderate to High Resistance

- PVY: Clearwater R., Palisade R.
- Vert: Alpine R., Alturas, Clearwater, Gemstar, Palisade, Ranger
- Late Blight: A02057-2LB, Palisade, Defender
- Net Necrosis: Palisade, Alturas, GemStar, Teton
- Sugar ends: Alpine R.
- Common Scab: Alpine, Alturas, Blazer, Classic, Teton, GemStar, Owyhee, Clearwater
- ETC

Less Obvious Economic Gain with Many New Varieties:

- The ability to stay in business
 - Global competitiveness
 - Maintain profitability long term by utilizing latest technology, products, varieties



In Summary

- If you want to remain competitive
 - Adopting new varieties is not a choice – it is a necessity
 - You must take a risk, minimize the risk
- New varieties continue to improve
 - Higher payable yields
 - Improve input efficiency
 - Disease and virus resistance
 - Keeping processors and pack-sheds interested
- Stay ahead of the curve
 - Follow variety development, provide input