NDSU | EXTENSION

2024 Field to Fork

www.ag.ndsu.edu/food EXTENDING KNOWLEDGE ›› CHANGING LIVES

Upcoming Webinars

- **March 20 - Tips For Preserving the Bounty of the Harvest**
  - Barb Ingham, Professor and Extension Food Safety Specialist, University of Wisconsin-Madison

- **March 27 - How to Grow Garlic and Other Alliums**
  - Harlene Hatterman Valenti, Plant Sciences Professor, NDSU

Zoom Webinar

You are viewing Scott Swanson's screen

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- **Please complete the short online survey** that will be emailed to you after today's webinar. It will take just a couple minutes!
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Acknowledgement: This project was supported by the U.S. Department of Agriculture's (USDA) Agricultural Marketing Service through 21SCBPND1069. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA.

March 13

Spuddles, Vader Tots and Small Fries: Let's Talk Potatoes!

Susie Thompson, Plant Sciences Associate Professor, NDSU

Today's Presentation

- Potato and its importance to North Dakota and the Northern Plains
- Nutritional value, market types, and culinary quality
- Potato agronomics

Botany

- Nightshade family, Solanaceae

  Solanum tuberosum, L.
- Relative of tomato, eggplant, pepper, tobacco, petunia, and nightshade
- Grown for underground tubers
- Herbaceous dicot, annual
- Cultivated potato is tetraploid (4x)

History

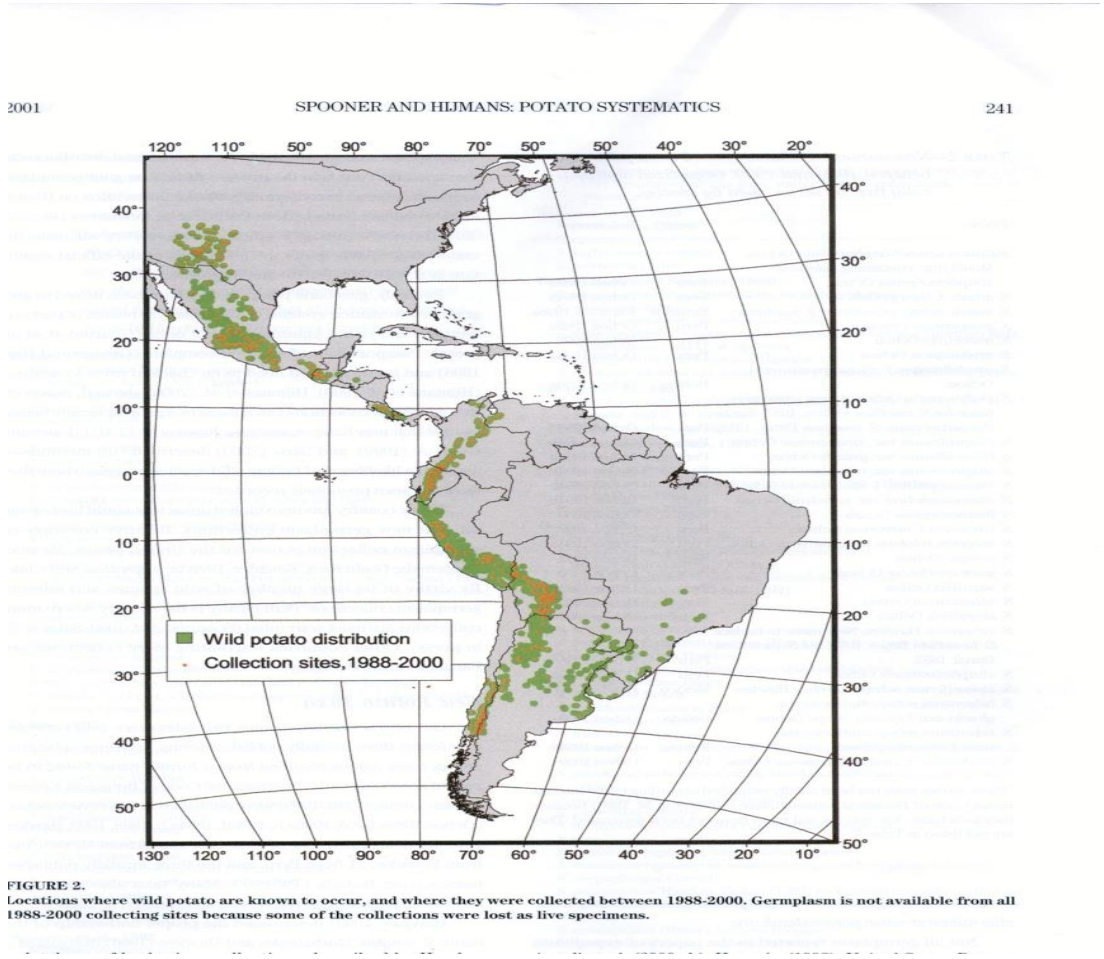
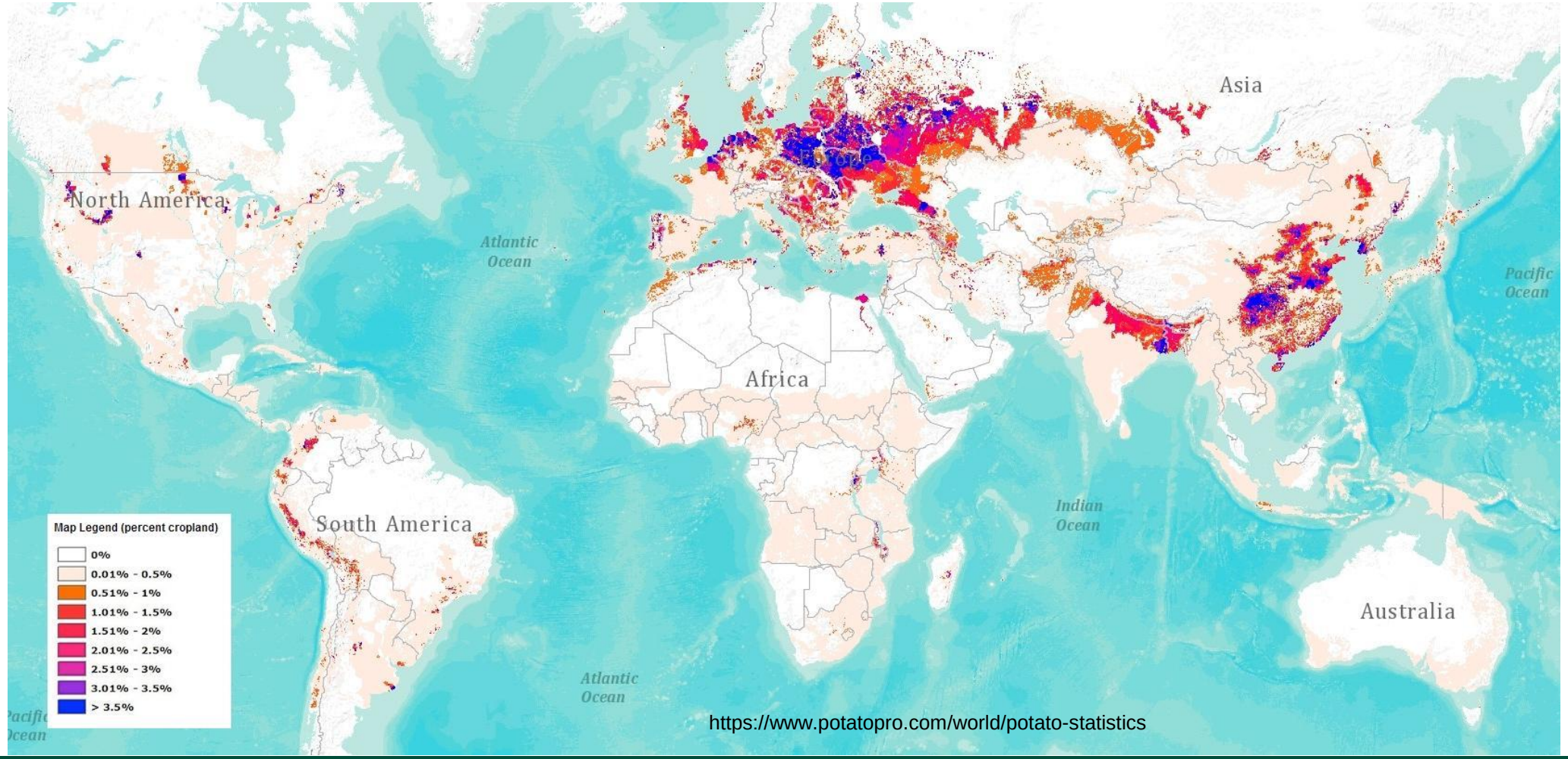


FIGURE 2.
Locations where wild potato are known to occur, and where they were collected between 1988-2000. Germplasm is not available from all 1988-2000 collecting sites because some of the collections were lost as live specimens.

- Indigenous to the Andean Region
- Utilization documented as early as 7000 yrs. ago
  - Incas domesticated and cultivated
- Introduced to Europe
  - 1570 - Spain
  - 1580 - England
- To the New World
  - Early 1700s

World Potato Production



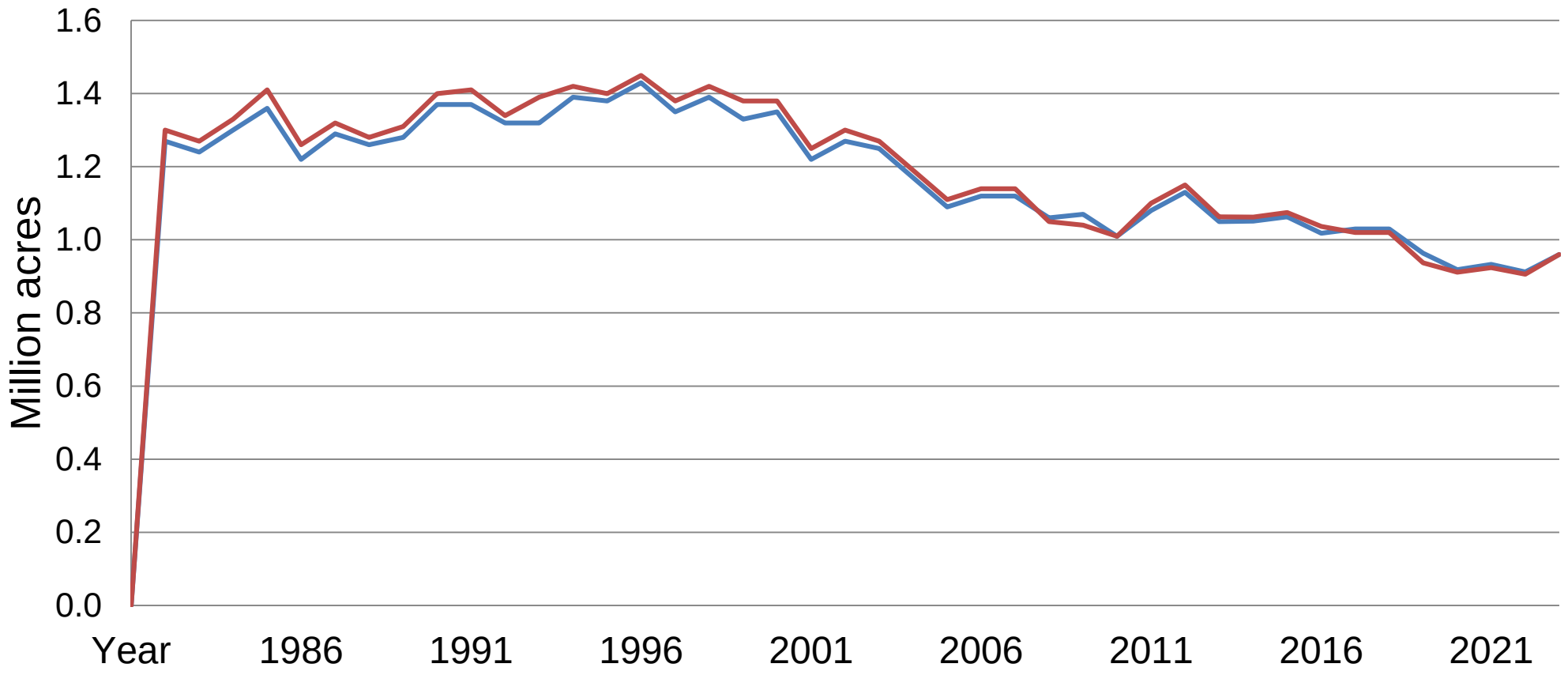
https://www.potatopro.com/world/potato-statistics

US Production

- Locations
- Seasonal groups
- Irrigated and non-irrigated

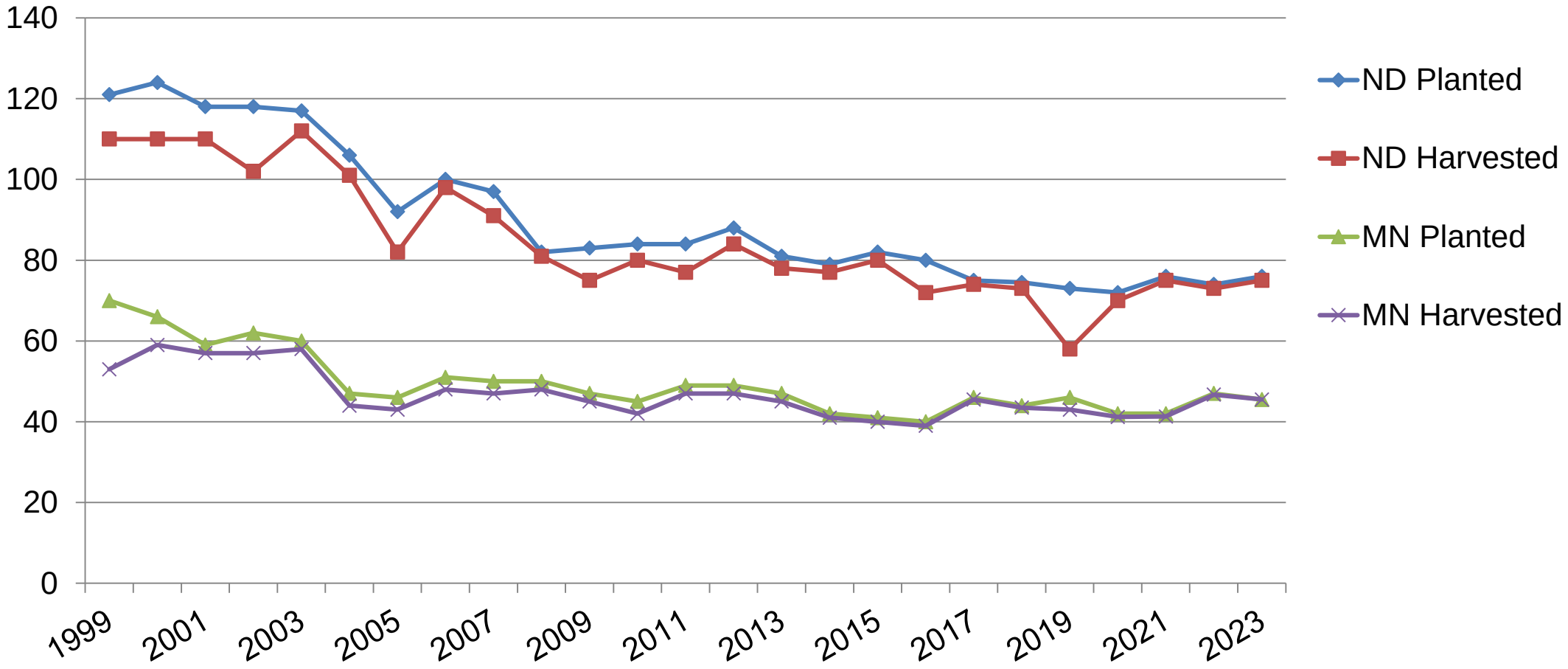
U.S. Total Acreage Planted and Harvested

(million acres) NASS, USDA 2023



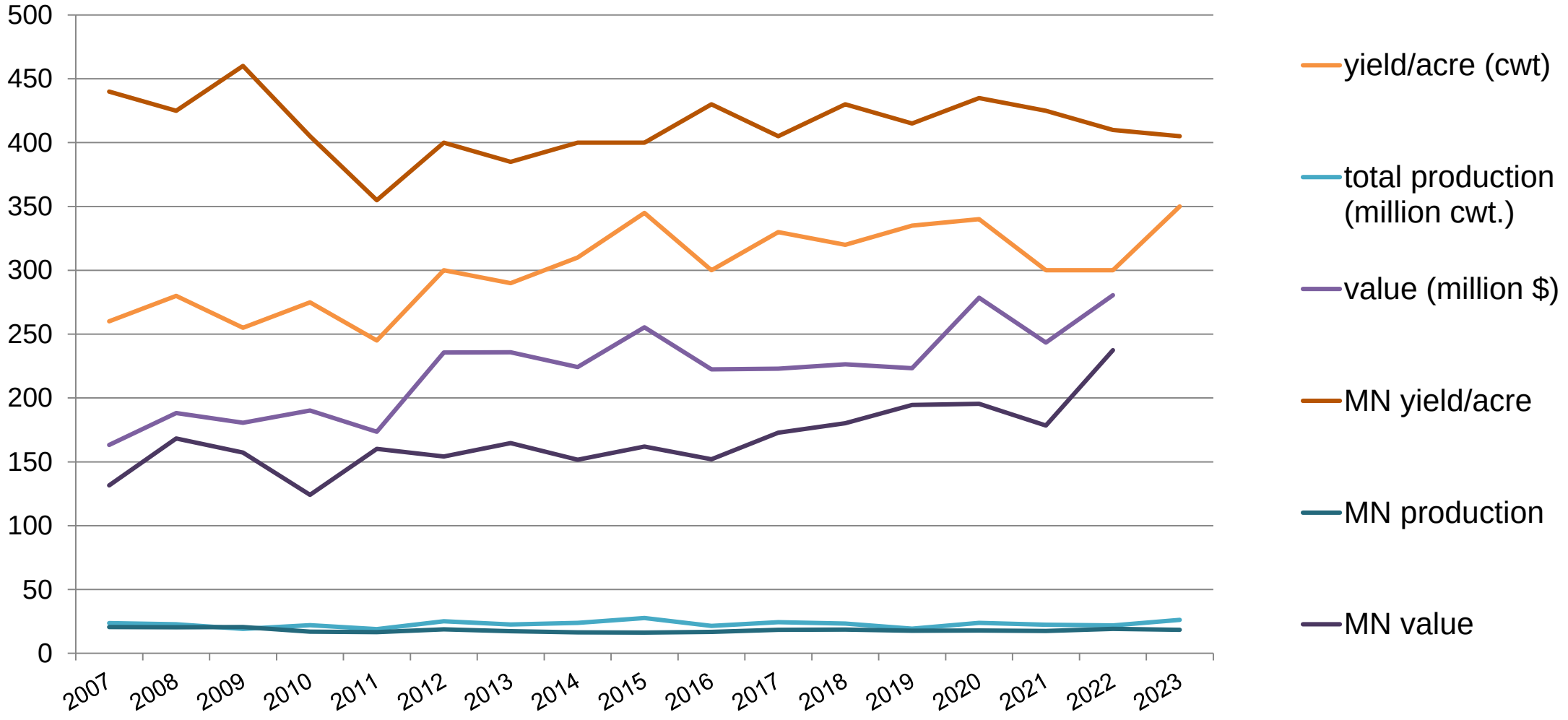
Total Acreage Planted and Harvested ND & MN

(thousand acres) NASS, USDA, 2024



ND & MN Yield, Total Production, and Value - 2023

USDA, NASS, 2024



Market Classes

- Round whites for chipping
- Long russets and whites for processing & tablestock
- Reds for tablestock
- Heirloom/specialty

Utilization

About 88% is used for human consumption

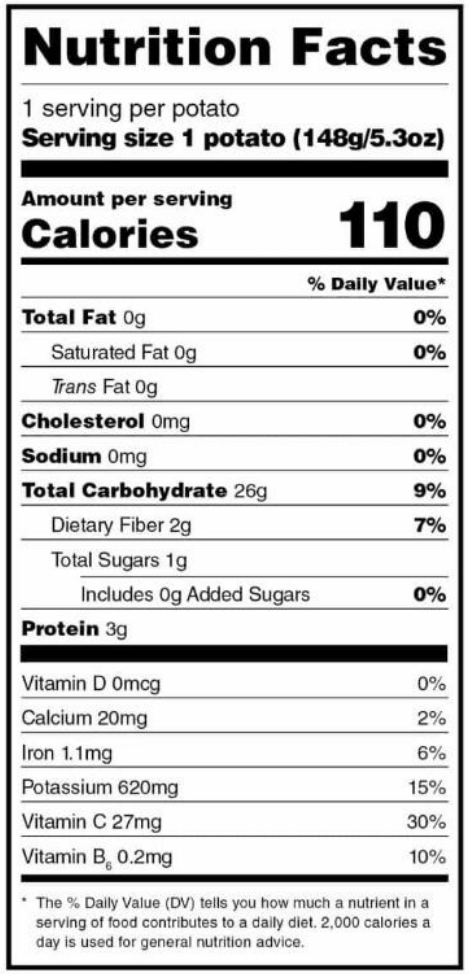
- 39% Frozen
- 26% Fresh
- 22% Chips
- 7% Dehydrated
- 4% Refrigerated
- 2% Other

Potato Statistical Yearbook 2023

Quality

- Related to
  - Visual appeal
  - Size, shape, appearance, absence of disease & defects, flavor, texture, sloughing, nutritional value, enzymatic browning, after cooking darkening…
  - Culinary preference of the consumer
  - Market specifications
  - Glycoalkaloid content
- Important characteristics
  - Starch content
  - Sugar content

Nutritional information



Nutrition Facts

1 serving per potato
Serving size 1 potato (148g/5.3oz)

Amount per serving	
Calories	**110**
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 0mg	**0%**
Total Carbohydrate 26g	**9%**
Dietary Fiber 2g	**7%**
Total Sugars 1g	
Includes 0g Added Sugars	**0%**
Protein 3g	
Vitamin D 0mcg	0%
Calcium 20mg	2%
Iron 1.1mg	6%
Potassium 620mg	15%
Vitamin C 27mg	30%
Vitamin B_6 0.2mg	10%

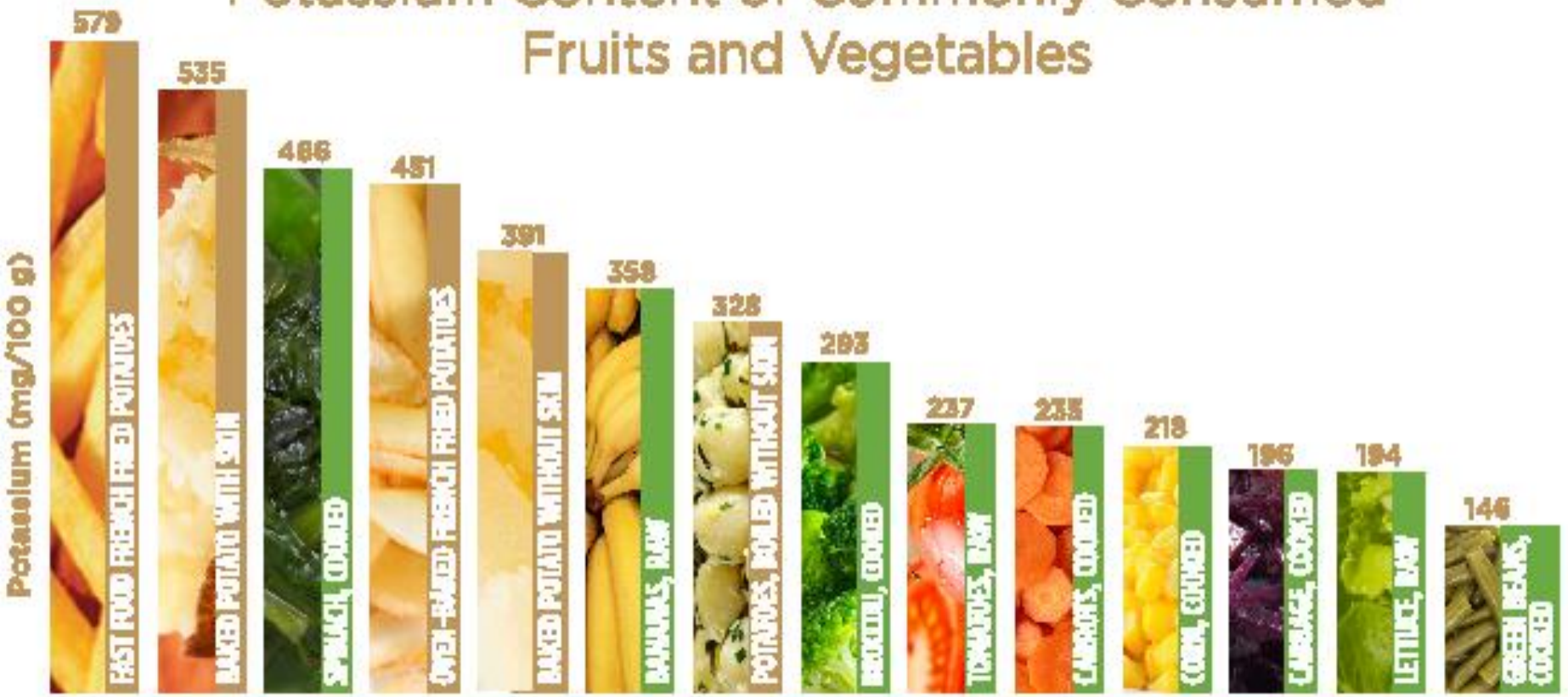
* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Potato Nutrients

- Saturated Fat 0 grams 0% DV
- Trans Fat 0 grams 0% DV
- Cholesterol 0 milligrams 0% DV
- Sodium 0 milligrams 0% DV
- Total Carbohydrate 26 grams 9% DV
- Dietary Fiber 2 grams 7% DV
- Total Sugars 1 gram
- Protein 3 grams
- Vitamin D 0mcg 0% DV
- Calcium 20mg 2% DV
- Iron 1.1mg 6% DV
- Potassium 620mg 15% DV
- Vitamin C 27mg 30% DV
- Vitamin B6 0.2MG 10% DV

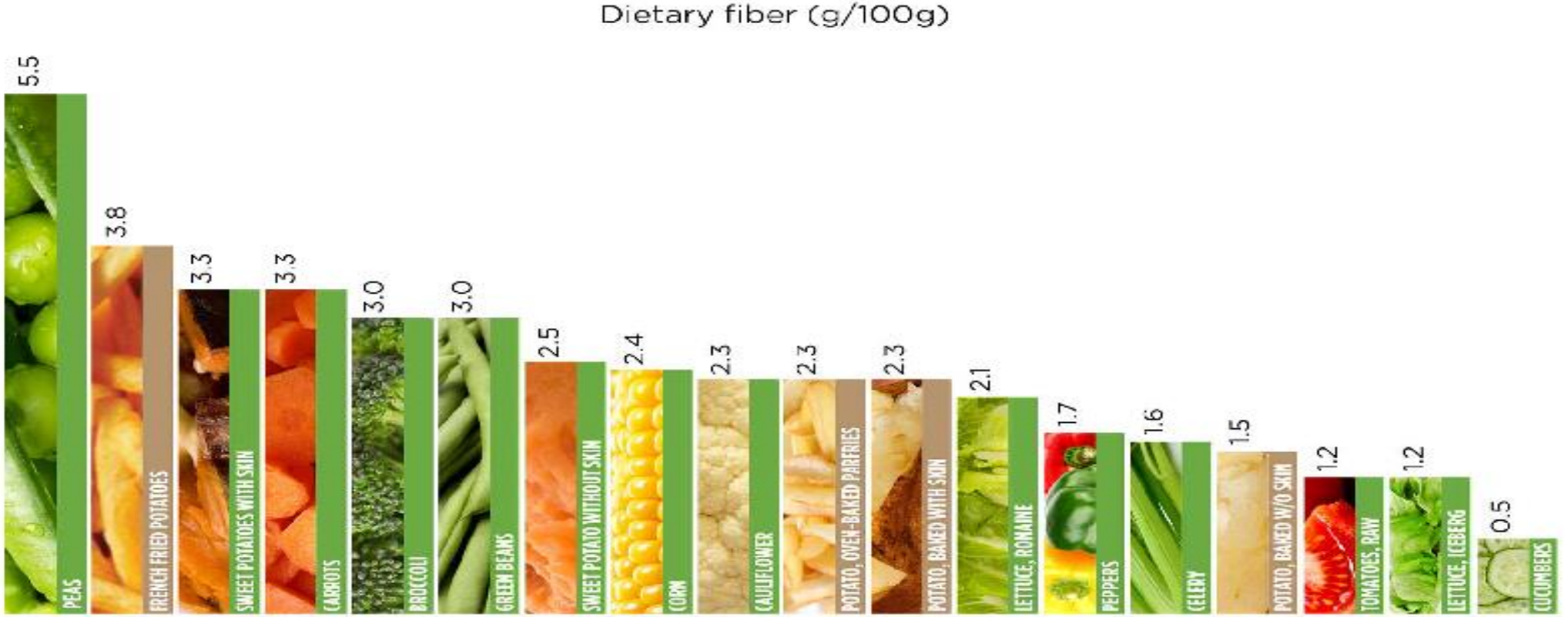
Potato Nutrition Facts | Nutrients, Calories, Benefits of a Potato (potatogoodness.com)

Potassium Content of Commonly Consumed Fruits and Vegetables



Data are from USDA, Agricultural Research Service, National Nutrient Database for Standard Reference, Release 25. July 2013.

Dietary Fiber of Commonly Consumed Vegetables



Data are from USDA Agricultural Research Service, National Nutrient Database for Standard Reference, Release 26. Values are for frozen vegetables — peas, carrots, broccoli, green beans, corn, and cauliflower — that have been boiled; raw vegetables are Romaine and iceberg lettuce, peppers, celery, tomatoes and cucumber with peel.

Conversion table for specific gravity, percent dry matter and starch content

SG	% DM	% Starch
1.050	14.2	7.9
1.065	17.4	10.8
1.080	20.7	13.8
1.095	24.0	16.8
1.110	27.3	19.8

Stark and Love, 2003

Effect of cooking on monomeric anthocyanins

Genotype	Flesh Color	Monomeric anthocyanin (mg/gDW)					
		2008 (LSDs 0.18, 0.09)			2009 (LSDs 0.28, 0.14)		
		Uncooked	Steamed	Microwave	Uncooked	Steamed	Microwave
ND5858	Red	1.82	2.73	2.73	3.71	2.13	2.43
COND04082-1RR	Red	1.88	1.97	2.32	3.36	2.08	2.05
All Red	Red	0.61	0.85	0.95	1.11	0.89	0.99
ND7834-2P	Purple	0.60	0.77	0.87	0.85	0.57	0.64
2126	Purple	0.78	0.84	1.03	1.87	0.96	091
All Blue	Purple	0.74	0.99	1.13	2.28	1.07	1.16
ND028742-12PEY	Yellow	0.03	0.13	0.14	0.02	0.11	0.11
Dakota Dawn	Yellow	0.02	0.15	0.15	0.03	0.12	0.13
Yukon Gold	Yellow	0.05	0.15	0.14	0.02	0.10	0.11
ND860-2	White	0.04	0.14	0.14	0.01	0.10	0.12
ND8304-2	White	0.02	0.15	0.15	0.00	0.11	0.12
Dakota Diamond	White	0.03	0.14	0.13	0.02	0.10	0.12

Effect of cooking on antioxidant activity

Genotype	Flesh Color	Antioxidant Activity (uM $FeSO_4$ equiv.)					
		2008 (LSDs 0.40, 0.20)			2009 (LSDs 0.29, 0.14)		
		Uncooked	Steamed	Microwave	Uncooked	Steamed	Microwave
ND5858	Red	1.48	2.49	2.46	2.49	1.68	1.87
COND04082-1RR	Red	2.04	2.72	2.98	2.53	2.20	2.57
All Red	Red	1.60	1.87	2.12	1.70	1.34	1.49
ND7834-2P	Purple	1.98	1.43	1.59	1.32	0.96	1.08
2126	Purple	2.07	1.73	2.09	2.42	1.71	1.63
All Blue	Purple	1.78	1.89	2.30	2.78	1.59	1.66
ND028742-12PEY	Yellow	0.65	0.71	0.68	0.70	0.46	0.45
Dakota Dawn	Yellow	0.73	0.67	0.79	0.60	0.51	0.52
Yukon Gold	Yellow	0.37	0.39	0.42	0.53	0.37	0.38
ND860-2	White	0.66	0.72	0.92	0.62	0.4	0.45
ND8304-2	White	0.61	0.71	0.80	0.52	0.41	0.48
Dakota Diamond	White	0.41	0.41	0.51	0.52	0.41	0.48

NDSU Cultivar Releases

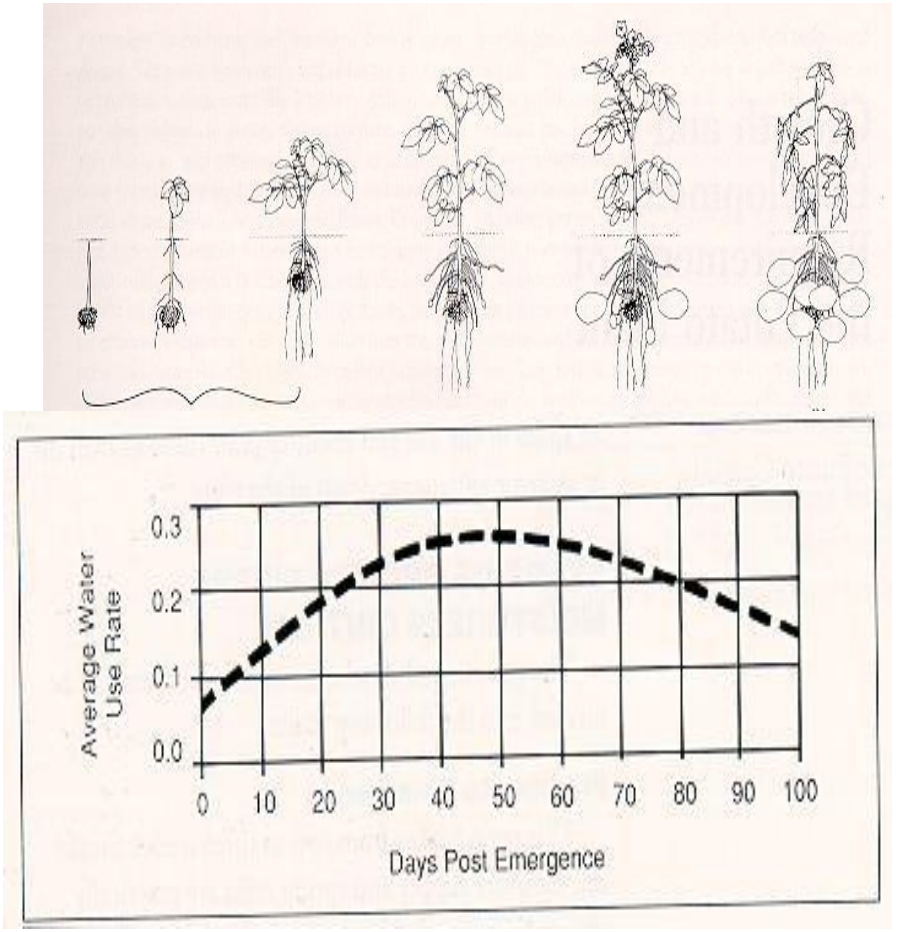
- Nordak
- Norgleam
- Norland
- Snowflake
- Viking
- Norgold Russet
- Norchip
- Norchief
- Bison
- Dakchip
- Crystal
- Redsen
- Norking Russet
- Russet Norkotah
- Goldrush
- Norqueen Russet
- NorDonna
- NorValley
- Dakota Pearl
- Dakota Rose
- Dakota Jewel
- Dakota Crisp
- Dakota Diamond
- Dakota Trailblazer
- Dakota Russet
- Dakota Ruby
- Dakota Dawn

Propagation

- Asexual reproduction
  - Tubers/plantlets
  - Clonal propagation
- Sexual reproduction
  - True Potato Seed (TPS)

Planting

- Cool season crop
  - optimum temperature
  - high temperature
- High water requirement
  - Shallow root system
- Well drained soil
- Plant about 4 inches deep
- Rows 30-36 inches apart
- Within-rows 8-12 inches



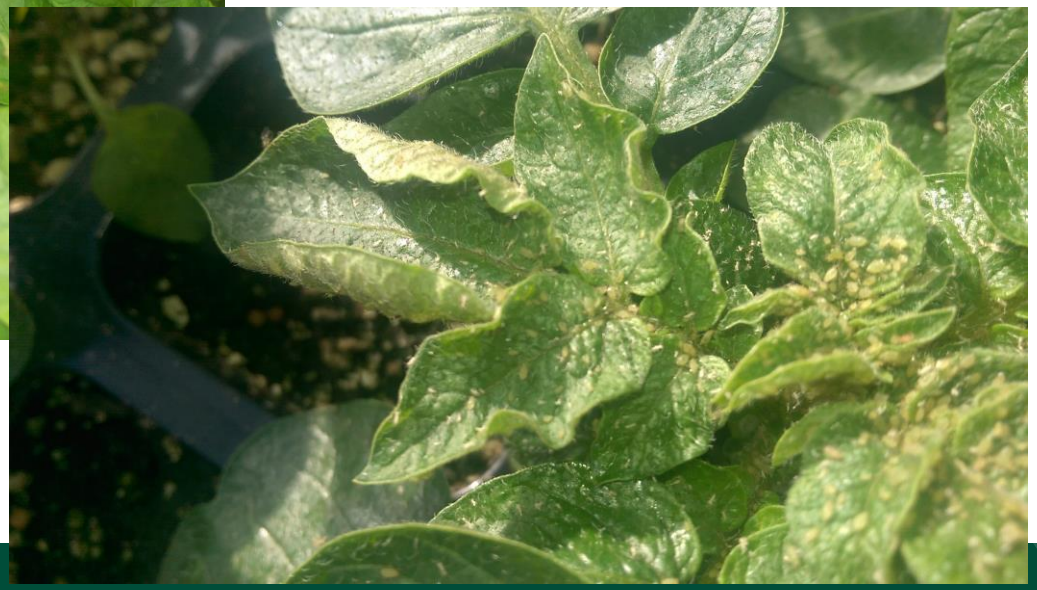
In-Season

- Hilling
- Fertility management
- Watering
- Pest management

Weed Control

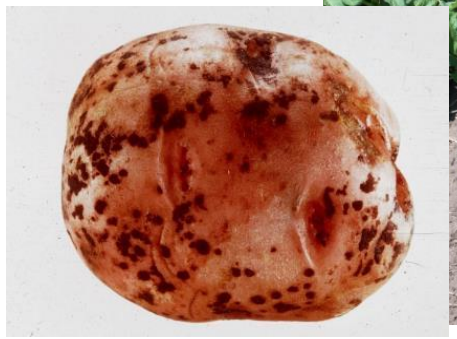
Insect pests

- Colorado Potato Beetle
- Aphids
- Others



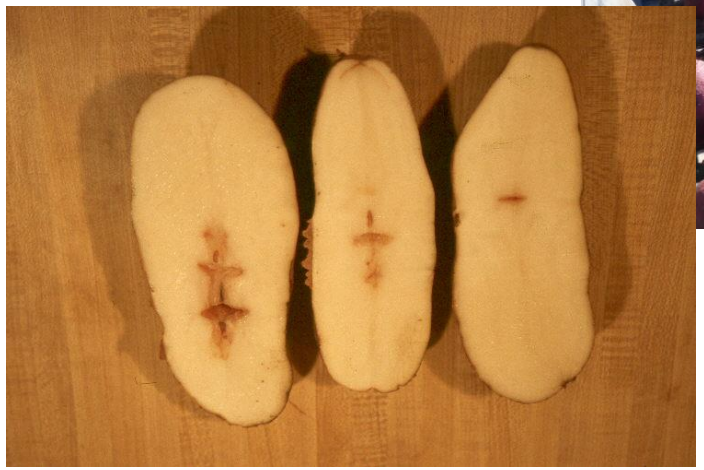
Diseases

- Late Blight
- Verticillium Wilt
- Potato Virus Y
- Common Scab
- Silver Scurf
- Black Scurf



Physiological Disorders

- Growth cracks
- Secondary growth
- Hollow heart and brown center
- Misshapen tubers
- Bruising



Harvest and Storage

- Skinning and bruising
- Curing
  - 90-95% humidity
  - 50-60F
- Storage
  - Tablestock 38-40F
  - Processing 45-48F
- Light

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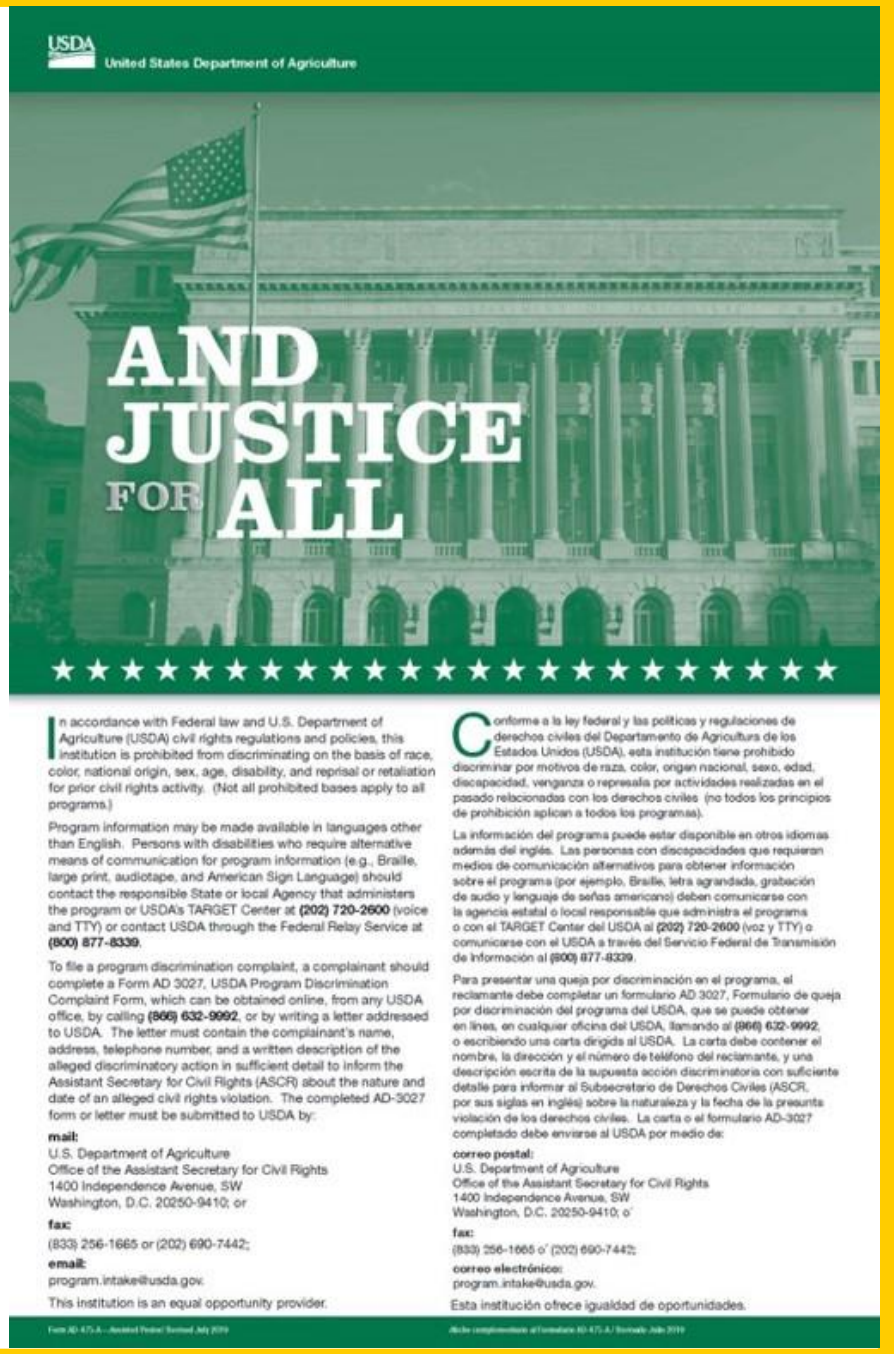


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