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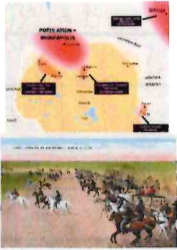
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### Mission-Specialty Crops



- Higher farm returns to compete with development and preserve high quality ag. land
- WARC mission is to use research and outreach to support these farmers and processors

Predicted population growth in Greater Yellowstone Ecosystem by 2050

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### High Start-Up Costs-Slow Return on Investment

- >\$15,000/ac
- Fencing: \$2,500
- Bird Protection: \$1,800-3,500
- Weed Control, Irrigation, Etc.: \$1,000
- Plants: \$4,000+
- Trellis: \$1,500-2,500
- Does not include labor (2-3x)
- **Slow Return-3+ years to harvest**
- **Growers need to plant the right varieties and how to grow them to profit on this investment**



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### Research and Education to Support MT Food Systems

- Farmer/Producer need to plant the right varieties and manage them well to succeed
- Multifaceted:
  - Adaptation
  - Yield
  - Flavor
  - Storage
  - Labor
  - Other qualities-processing and health benefits
  - Plant Genetic and Physiology
- Includes: Berries, Apples, Pears, Grapes, Vegetables.



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### Brief history of cold-hardy grapes

- Relatively new- most developed in the last 30 years by breeders at University of Minnesota and others in the upper Midwest.
- Traditional Wine grapes (*Vitis vinifera*) do not survive mid-winter temperatures near Zero F.
- Crossed with native grapes in N. America to gain tolerance to -25 to -35 F.
- New varieties coming out every year.

The diagram shows two clusters of grapes at the top. The left one is labeled 'Traditional Wine Grapes' and the right one is labeled 'Cold-hardy, Native Grapes'. Two blue arrows point downwards from each cluster towards a single cluster of grapes at the bottom labeled 'Cold-Hardy, Hybrid Grapes'.

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### Opportunities for MT Wine

6<sup>th</sup> fastest growing state (2022)  
8-12 Million tourists per year  
Spending 3 to 4 billion per year

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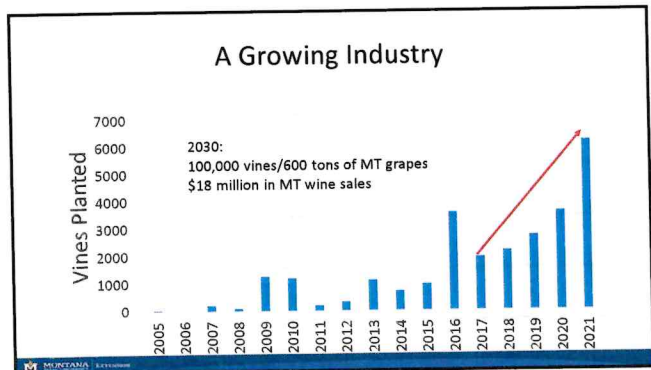
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### Priorities for Research and Education

- Big picture goals:
  - Vineyards: profitable, produce enough quality fruit to support wineries
  - Wineries: profitable, popular wines



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### Priorities for Research and Education

- Vineyards: profitable, produce enough quality fruit to support wineries:
  - Mostly Small (median ~1/2 acre)
  - Labor Limited
  - Relatively New to Growing Grapes
- Consistent, quality harvests
  - Variety selection
  - Management



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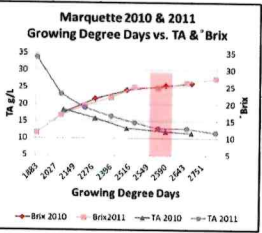
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### Optimal Climate for Hybrid Grapes

Group	Cultivar	Start of Fruit	Harvest
V. vinifera	Chardonnay	2/23/02	9/13/02
	Merlot	2/13/02	9/13/02
	Pinot	2/28/02	9/13/02
	Pinot Noir	2/28/02	9/13/02
New Cultivars	Harvesta-Funk	2/14/00	9/13/00
	St. Peter	2/14/00	9/13/00
	St. Peter	2/14/00	9/13/00
	St. Peter	2/14/00	9/13/00
V. rotundifolia	Lyons	2/14/00	9/13/00
	Lyons	2/14/00	9/13/00
	Lyons	2/14/00	9/13/00
	Lyons	2/14/00	9/13/00



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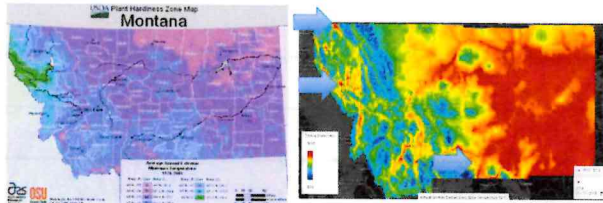
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### Optimal Climate and Locations for Hybrid Grapes



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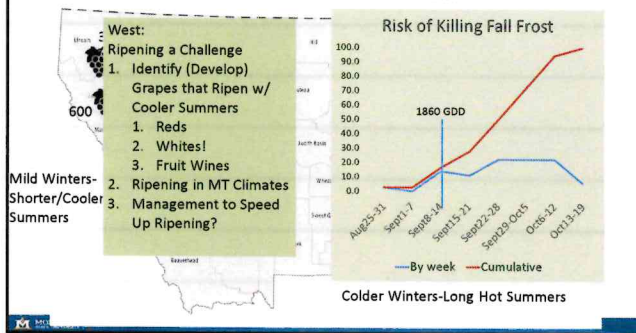
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### Different Varieties Fit Different Climates



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### Screening New Grapes



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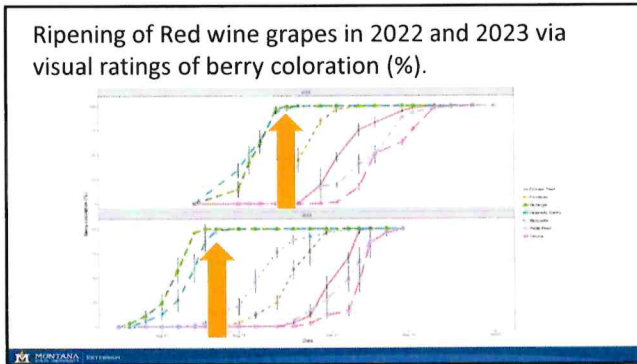
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Red Wine Grapes with Early Ripening Potential

- **Harbinger** (syn. AP.Early/ AP.1)
  - Seedling vine found on a Corvallis, MT fenceline by local grape grower.
  - Patent applied for in 2023.
  - Pedigree unknown.
  - Characteristics: cassis, cherry, blackberry, leather, elderberry, and tobacco.
- **Hasansky Sladky** (syn. Baltica, Kazan Early, Varajane Sinine)
  - Ukrainian cultivar developed by A.K. Bous in 1960
  - Pedigree given as Dalnevostochnyi Tikhonova x *V. amurensis*
  - Characteristics: gamey, foxy, blackberry, aged meat, leather

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Vineyard Management

- Irrigation:
  - MT is unique in irrigated hybrid grapes. Midwest vineyards mostly get enough rain and don't irrigate.
- Weed Management: more important in dry climates
- Bird Management: labor (and sanity) saving netting techniques
- Fertility Management: working with vineyards to test leaf nutrients, design fertilizer programs.

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### Wine Making Research

- Working with wineries and cideries to improve the quality and profitability of MT-made wines and ciders
- What varieties? How to extract juice or ferment on pulp/crushed fruit? What yeast to use? How much fruit to use? Making trash into treasure.



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### Priorities for Research and Education

- MT has potential for wine/cider industry.
- MSU is here to help.
- Big picture goals:
  - Vineyards: profitable, produce enough quality fruit to support wineries
  - Wineries: profitable, popular wines
- Questions



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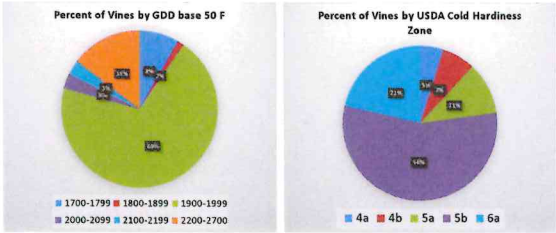
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### Most (81%) vines and vineyards (75%) are in good sites (mild winter (5a+) and >1900 GDD)



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