



Breeding Update at Mt. Ashwabay Vineyard & Orchard – Aug. 2011

Mark Hart

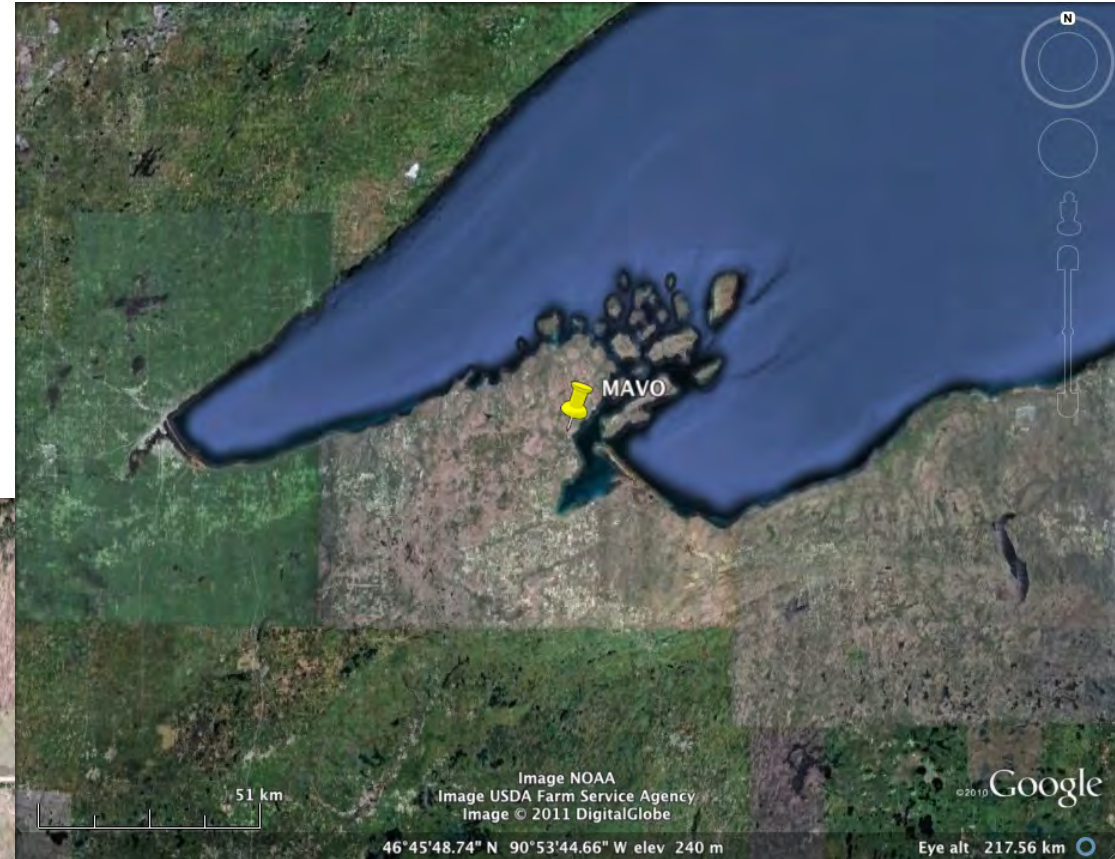
Mt. Ashwabay Vineyard & Orchard
Bayfield, WI USA

Varieties Reflect Place



Location of MAVO Breeding Effort

- Northern Wisconsin, 46.8N.



- Continental climate with a strong 'lake effect' from Lake Superior.

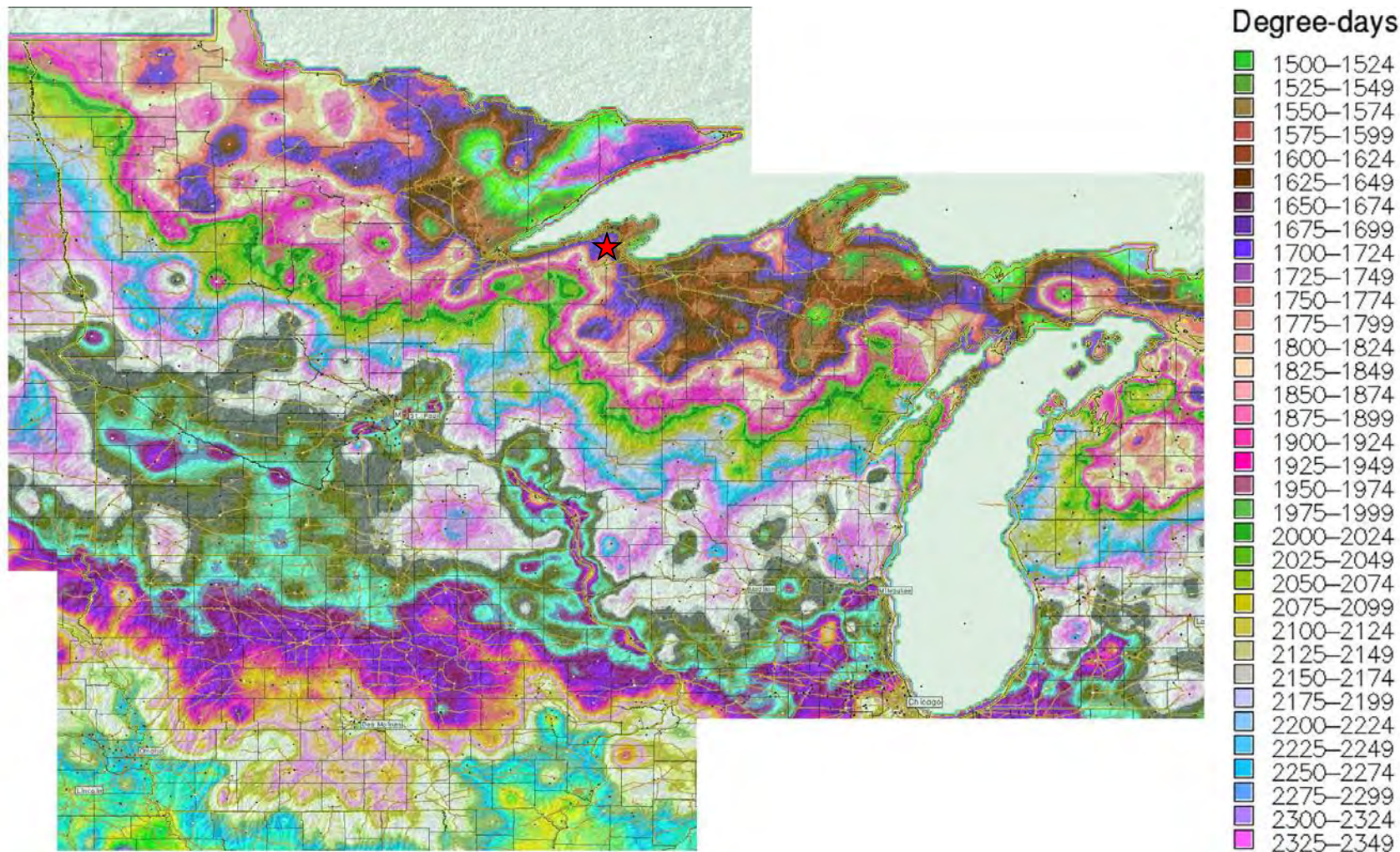
MAVO Vineyard

- 5 acres of vineyard, half seedling vineyards



- Recent expansions of seedling vineyard, & nursery 'tunnel'

Summer Heat - Not Much!



- 1850 GDD 50F (1025 10C), 1600-2300 range
- Ave. last frost 3 May, Ave. first frost 5 Oct = 155 FF
- Sunlight also plays a role, at high latitudes

Anticipated Geographic Range



- MAVO grape suitability map based more on berry maturity objectives than anticipated cold hardiness.
- Also high latitude areas in Europe (Scandinavia, Baltic Region)
- Future releases will probably experience largest demand from areas in new expansion for commercial viticulture.

Breeding Objectives

- Early Ripening (Marquette or earlier)
- Reliably hardy to -30F (-34C)
- No more the 2 'real' sprays in moderate Eastern disease pressure.
- Non-labrusca flavored wines
- Clusters >60g (100g target)
- Yield > 4 tons/acre
- Table grapes: seedless



Breeding History

- First crosses (5), 1993, west-central Minnesota.
- In 1995 & 1996, dug up vineyard (≈ 800 vines), moved to virgin site in N. Wisconsin.
- No crosses in 1996 & 1997.
- 1998 - 2004, 20-30 crosses/year, ≈ 1400 seeds
- 2005 step up effort and added table grape breeding
- 120-150 crosses, 3700 -6200 seeds



The title 'MAVO Breeding Process' is centered at the top of the slide in a white, bold, sans-serif font. The background of the slide is a photograph of green grape leaves and clusters of light-colored grapes. A blue square is located in the top-left corner, and a yellow vertical bar runs down the left side of the slide.

MAVO Breeding Process

- Bloom: Riparia 10 June; Frontenac 20 June; vinifera 1st week of July
- Generally 1 bag/cross, repeat good crosses
- Pollen: fresh, stored, shipped
- Seeds stored clean & dry at 0F in tea bags (stapled label)
- 24 hour H₂O₂ & GA (500 ppm) treatments, pre-stratification
- Stratification early January in bags layered in moist sphagnum moss in fridge.
- Late Feb/early March Germination
- Blotter versus plug tray
- Get emergent seedling from 55-60% seeds (↑variability)

MAVO Breeding Process

- Seedlings to plant band or Cone-tainer
- Dormant vines from nursery planted in late May
- Potted seedlings in containers until after crosses, mid-July
- 1st Year Vines: Nursery vs. Tray vs. Seedling Vineyard
- No sprays first year, lose about 40%
- Seedling vineyard vines are 18" oc x 8 ft
- Seedling training is simple high wire head



Magnitude of Effort

- 120-150 Crosses per year
- Most are 1 bag/cross, \approx 35-40 seeds/cross.
- 4000-6000 seeds/year
- \approx 2100 Seedlings
- \approx 1500 Seedlings to vineyard
- 2-4 Second test selections/year
- 35% table grape effort last 5 years



Parents – Non-Fruit Quality

- Bulk of hardy parents are U of MN or Swenson
- Swenson's focus was table grapes
- Use various riparia, 3-6 crosses per year
- Frontenac (all colors)
- Lacrescent (↓ DM, ↑Quality)
- Marquette (↓ DR)
- MN 1045
- MN 1094
- MN 1095
- MN 1200
- ES 6-8-25
- ES 5-8-17
- ES 5-8-10
- ES 8-2-24
- St. Pepin
- MAVO 01.20.01
- MAVO 00.22.02
- MAVO 00.33.01



Parents – Fruit Quality

- Mostly tender material
- MAVO tender block = 450 varieties
- External pollen: repositories, other breeders (global)
- Seyval
- Solaris
- Siegerrebe
- Ravat Noir
- Regent
- Rondo
- Zweigelt
- Titan/Turan
- Perlette
- Flame Sdls
- Beauty Sdls
- Underutilized: NYSAES & French Hybrids

Challenges & Deadends

- Riparia: small clusters linked to early ripening
- Very early ripening vs. embryo maturity
- Non-riparia Vitis
 - Amurensis: table grapes
 - Acerifolia (longii)
 - Aestivalis (bicolor)
- Loss of crosses: mice & birds
- Pests
 - Climbing cutworms & grasshoppers
 - Roesellaria
 - Vertebrate: birds, coons, bears, fishers
- Rootstock breeding
- Irrigation
- Municipal water: chlorine



Future of MAVO Breeding

- Where are the releases? 2012?
 - Offsite testing essential
- Marker Assisted Selection (MAS)
 - incorporating identified resistance sources
 - identify new resistance QTL's (riparia) - mapping populations & phenotyping
- Sustainability of effort?
 - Need to be at about 3500-4000 seeds/year





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