Viticulture, enology and marketing for cold-hardy grapes

How climate influenced grape maturity in 11 Northern Grape variety trials from South Dakota to Massachusetts

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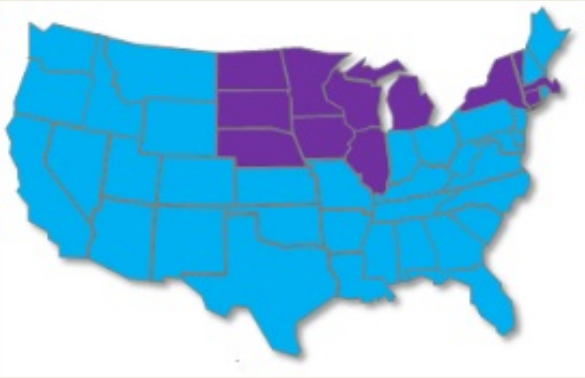


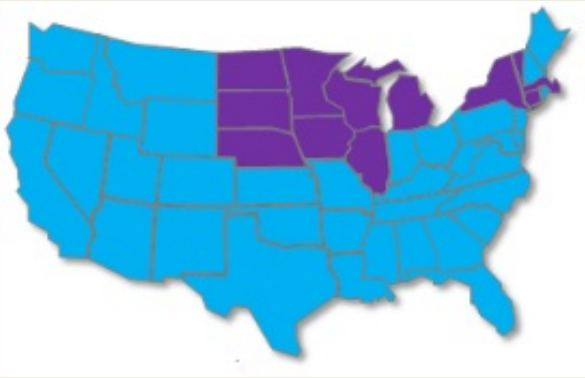
AND – (See next slide)

The Northern Grapes Project is funded by the USDA's Specialty Crops Research Initiative Program of the National Institute for Food and Agriculture, Project #2011-51181-30850

How climate influenced grape maturity in 11 Northern Grape variety trials from South Dakota to Massachusetts

Short Answer:

- *Climate did not influence grape maturity in 2012.*
- *Everything got ripe. Early.*



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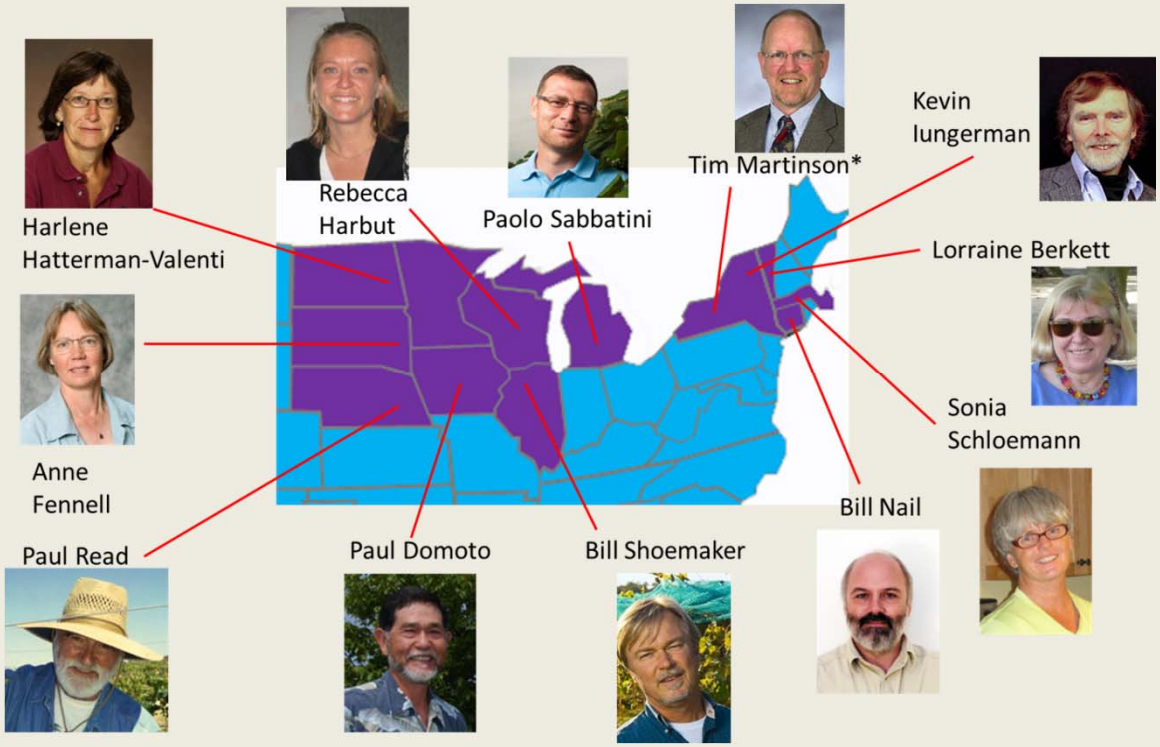
NE-1020 Coordinated Variety Trials

How does environment affect Flavors?

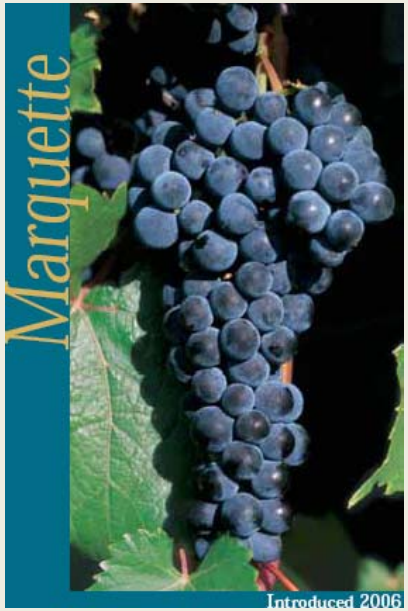
Climate and standard maturity indices

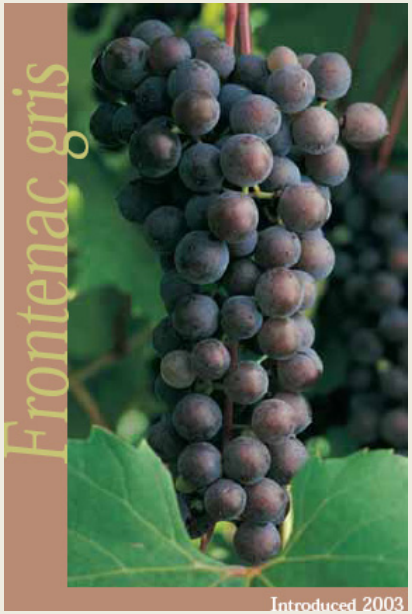


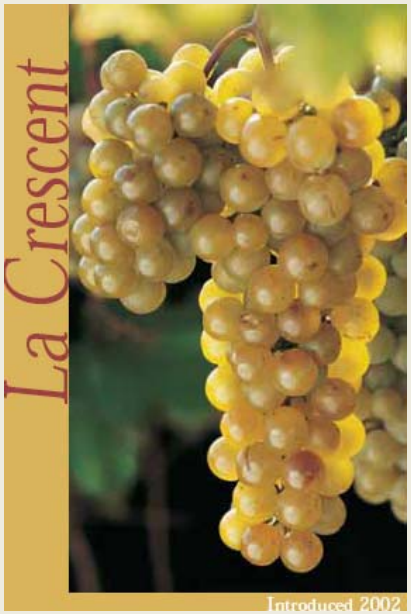
Vine performance and climate

- Eval: Yield and quality vs. climate indices
- Data from 3-9 sites/variety

NORTHERN GRAPES PROJECT







NE-1020 Blocks

With Northern Cultivars

Table 1. List of cold-climate cultivars planted in NE-1020 project *Multi-state Evaluation of Winegrape Cultivars and Clones* **and two additional project blocks in Illinois and New York.**

State	Edel-weiss	Front-enac	Frontenac gris	La Crescent	La-crosse	Mar-quette	MN 1258	MN 1189	MN 1200	MN 1220	MN 1235	Petit Amie	Prairie Star	St. Croix
	Cultivars under Evaluation (No. vines)													
NE 1020 Coordinated Variety Trials														
Connecticut		50	25			50		25	50		25			50
Iowa		50		50		50	50	50	50	50	50	50	50	50
Michigan		25		25										25
Nebraska	18	36	36	36	36	36	36	36	36	36	36		36	36
NY-Geneva				25		25								25
Pennsylvania				25		25		25			25			
South Dakota		36	36	36		36	25	25	25	36	25	25	25	36
North Dakota		24	24	24		24			24	24	24	24	24	24
Vermont		24		24		24							24	24
Massachusetts		24		24		24								24
Additional Cultivar Trials														
NY-Champlain	12	12	12	12	12	12			12			12	12	12
Illinois		24	24	24		24						24	24	24

NE 1020 blocks were planted in 2008; NY Champlain in 2005; and Illinois in 2008

What Can We Learn from Cultivar Evaluations?

Can variety X be grown profitably in environment Y?

- How often can we expect winter injury?
- Is there enough heat to ripen them consistently?
- What fruit composition is typical for region?

Benchmarks:

- ~ 4 T/acre of fruit, 5 yr average.
- Low frequency winter injury
- Budburst and spring frosts
- Acids, sugars and pH in acceptable ranges.

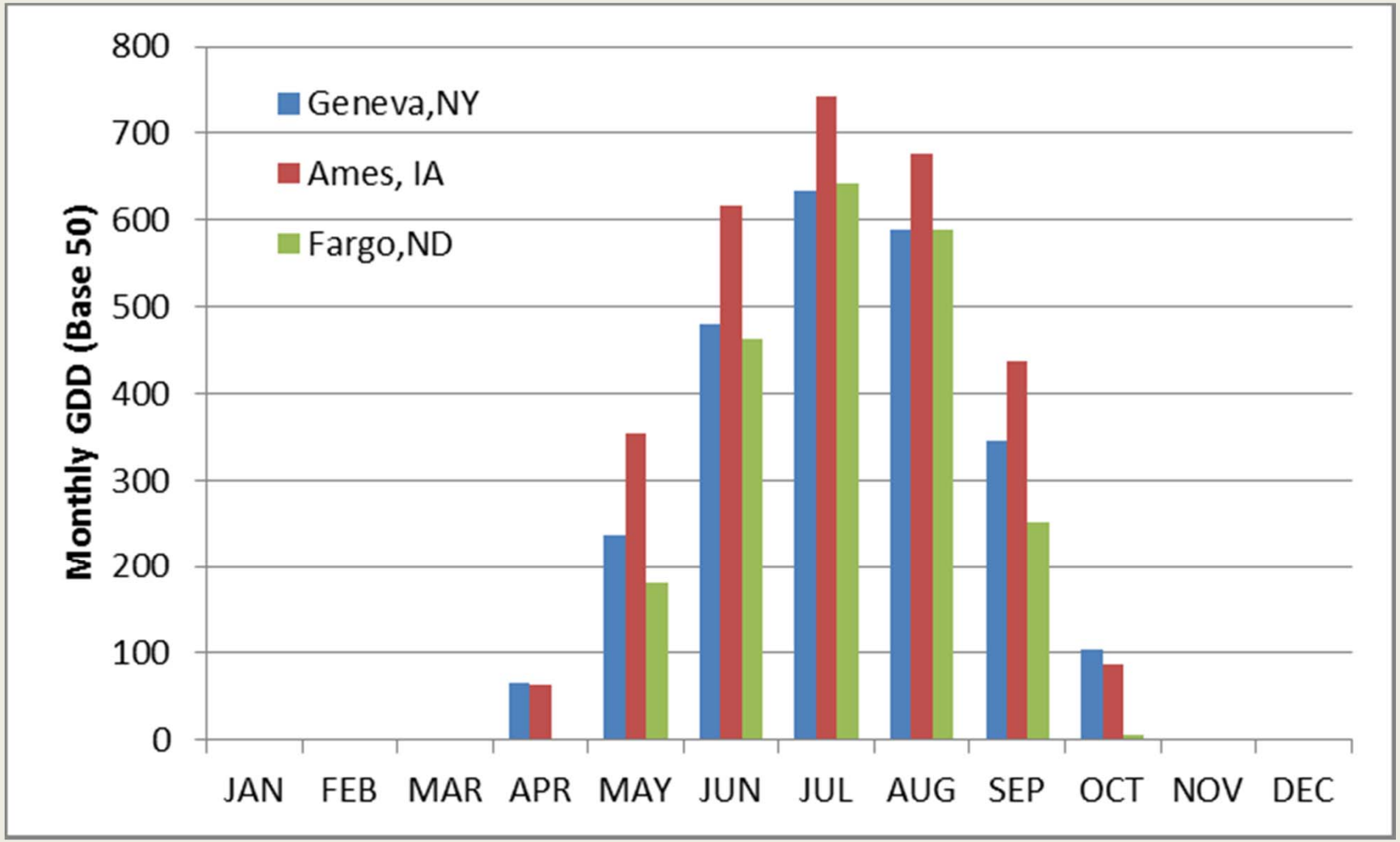
How Many Years of Data?

- One year is not enough.
- Three years ‘bare’ minimum
- Five years is better

- Today: Report on 2012 season only.

Weather and Growing Degree Days

30 year average 1980-2010

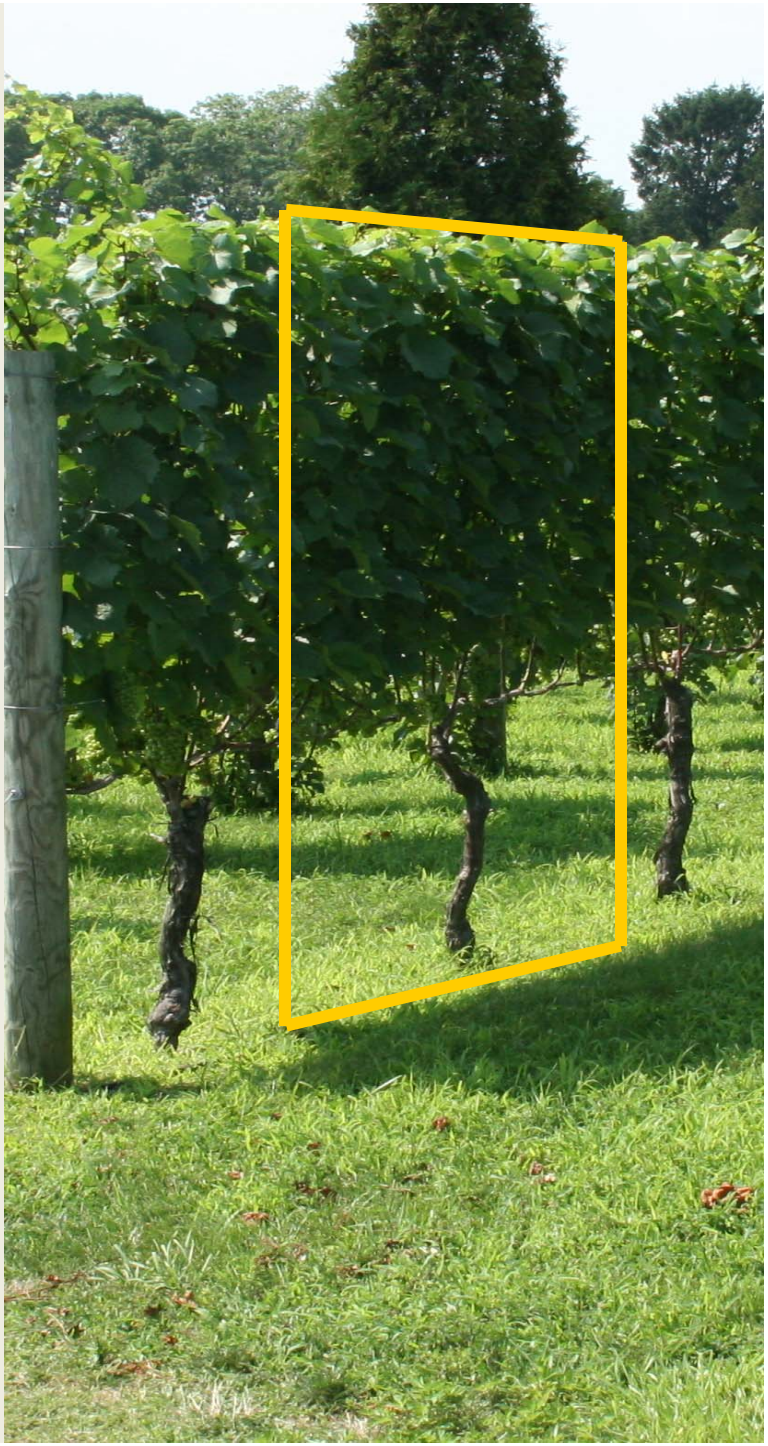


What We Measure

- Phenology
  - Budburst
  - Bloom
  - Veraison
  - Harvest
- Yield/ components
  - Cluster no & Wt
- Fruit composition
  - Brix, pH, TA
  - Tartaric/Malic acids
- Pruning Weight

Derived Values

- Vine spacing varies
  - 10x8 = 544 vines/acre
  - 8x6 = 807 vines/acre
- Yield/growth per unit of canopy.
  - No. Retained Nodes — ‘Count’ buds
  - Shoots per vine — ‘Count’ shoots, ‘noncount’ 2ndary
  - Shoots per retained node — Winter/Spring Frost Metric
  - Shoots per foot (meter) — Canopy density
  - Crop weight per node. — “Bud fruitfulness” Cluster size/no



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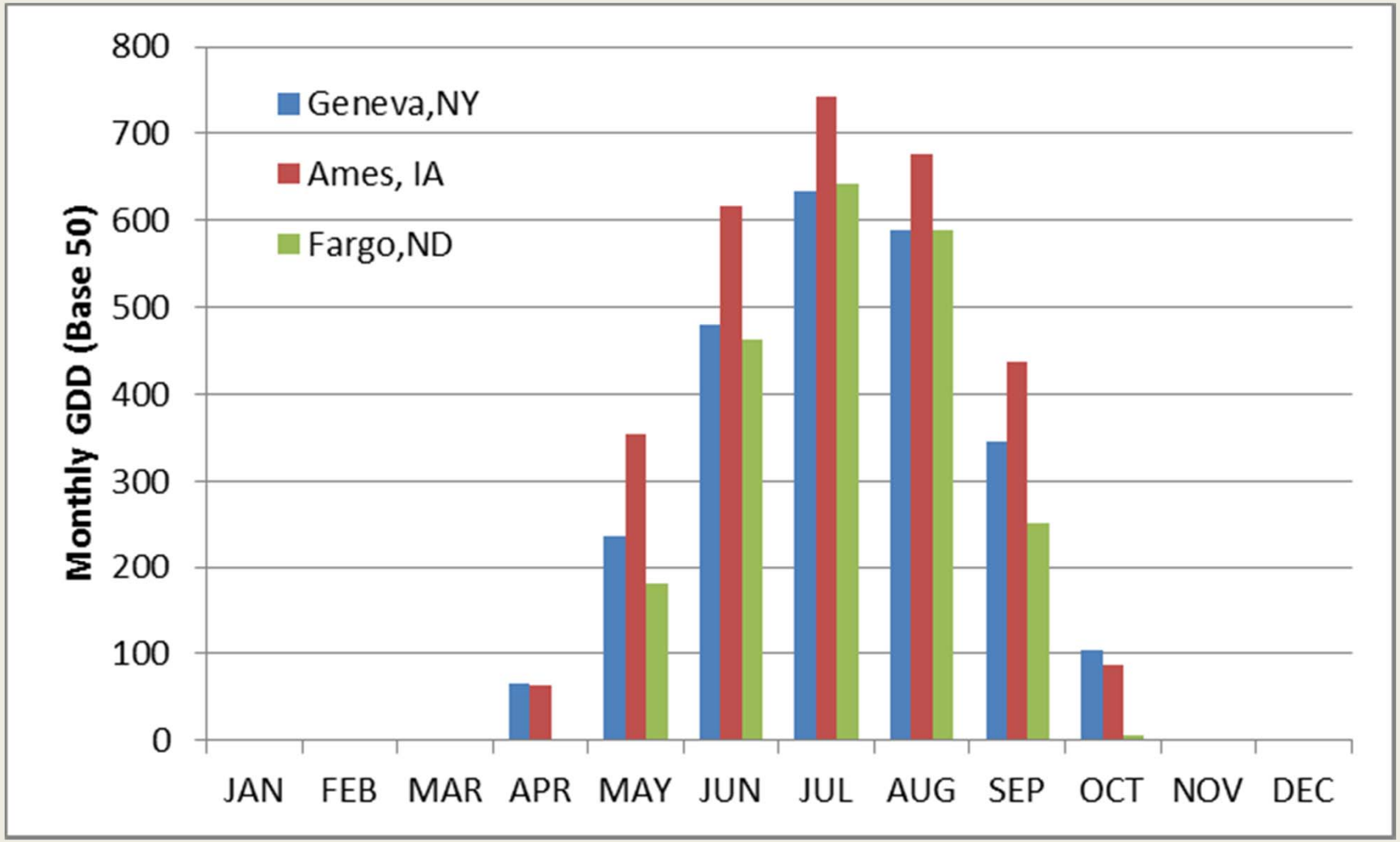
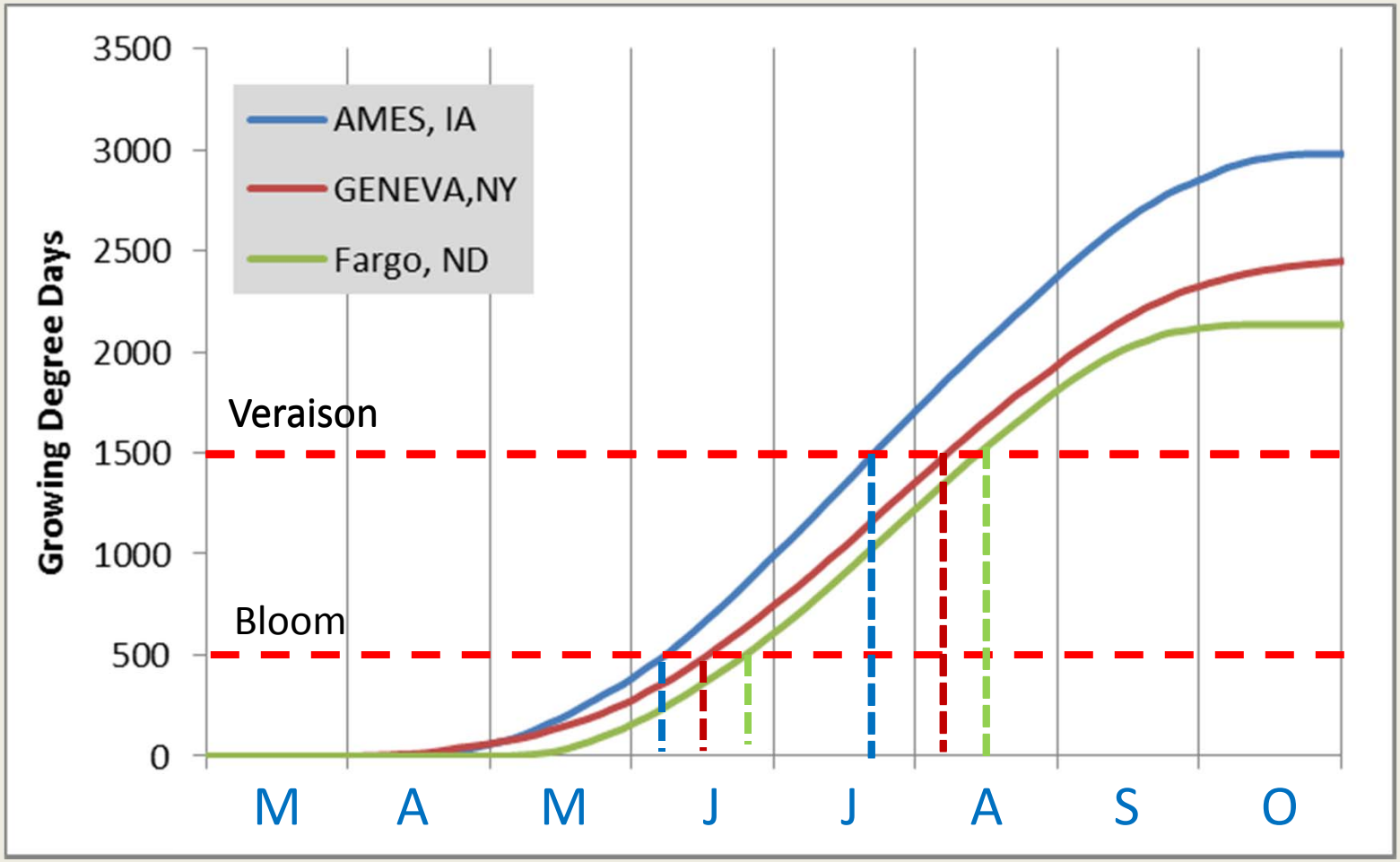


Heat Unit Accumulations

30 Yr Average Growing Degree Days



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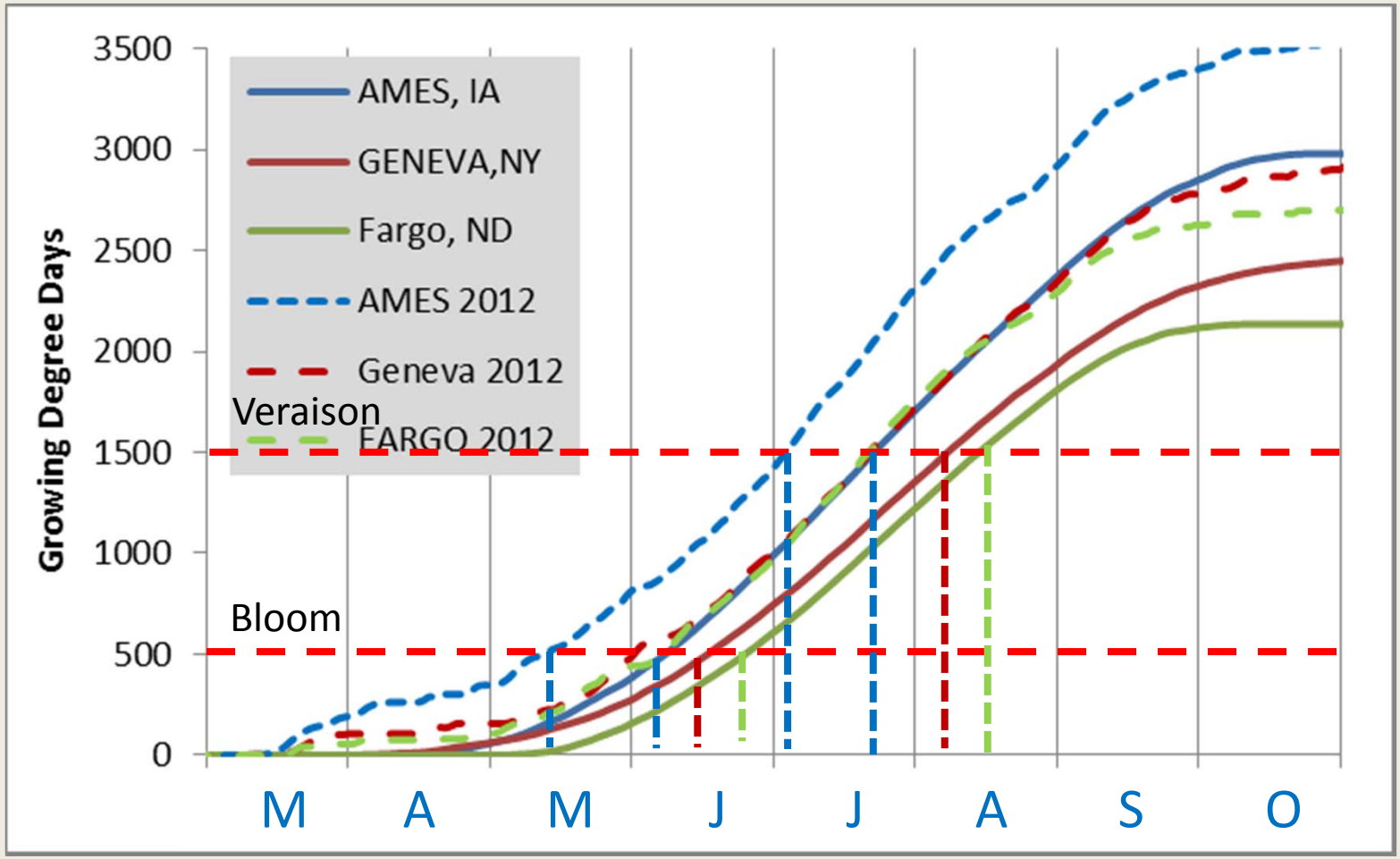
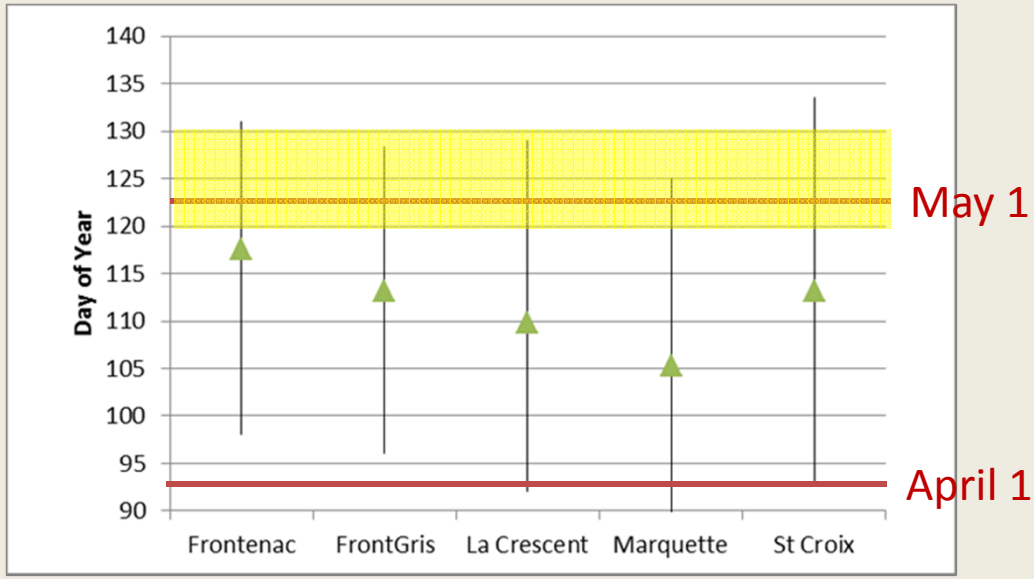
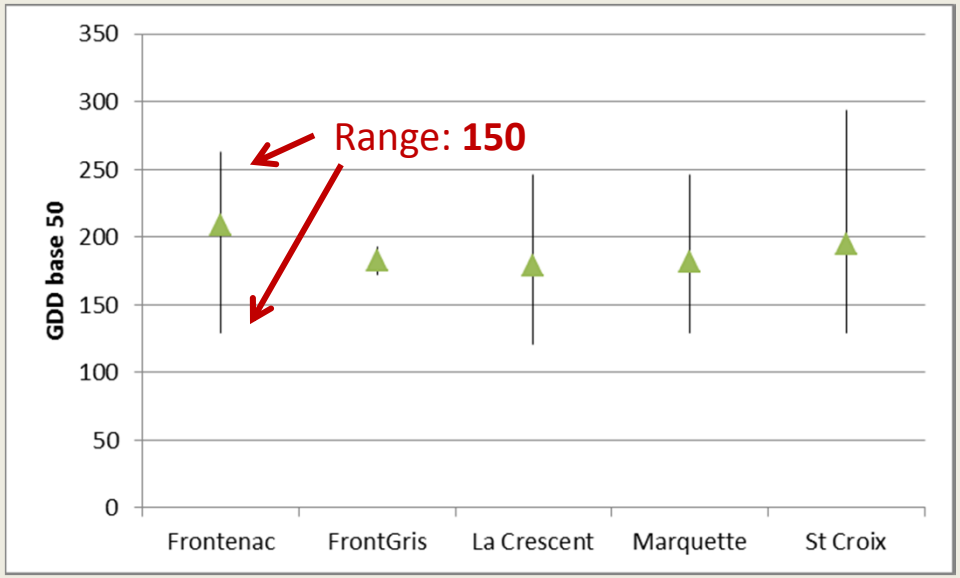


Budburst

DATE



Growing Degree Days



Bloom

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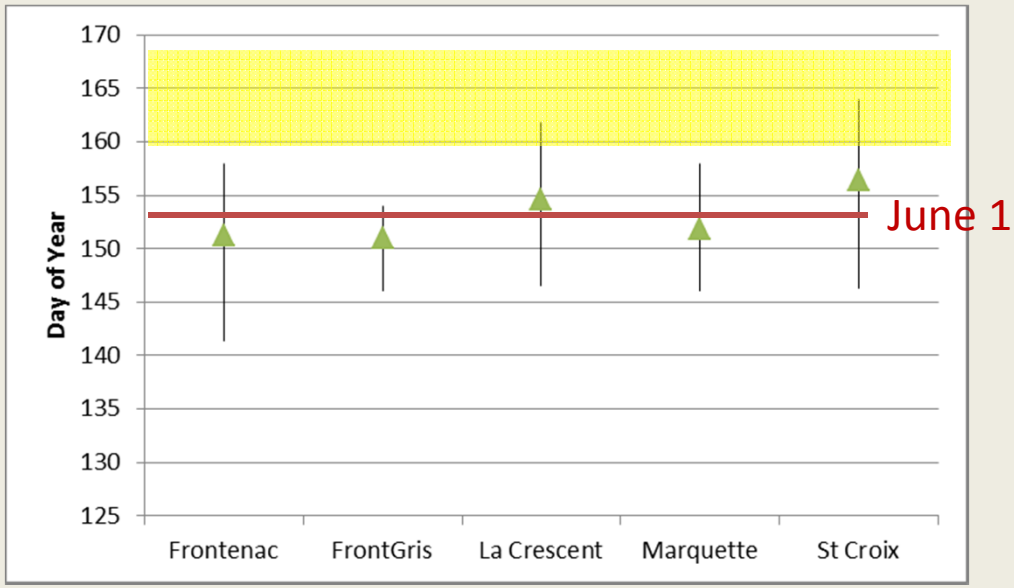
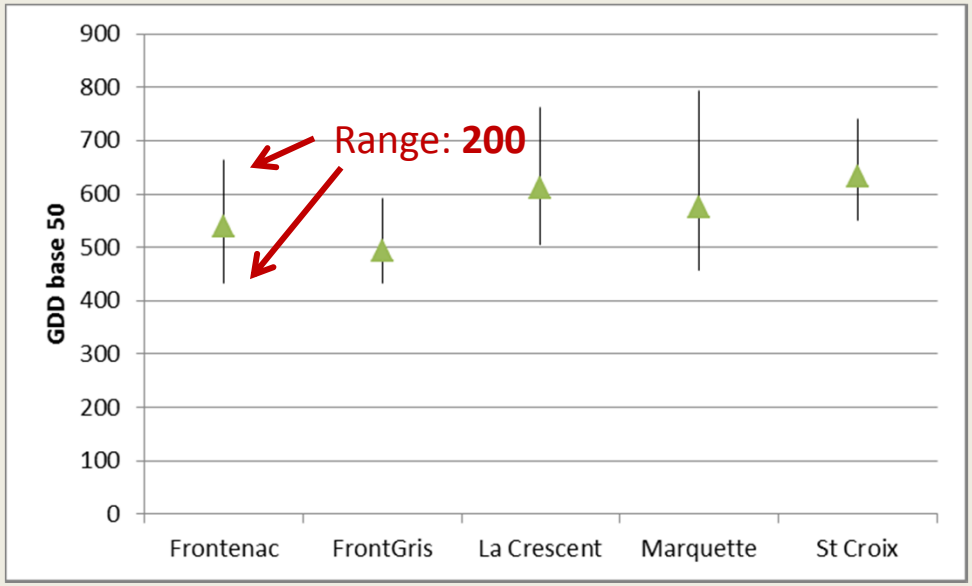
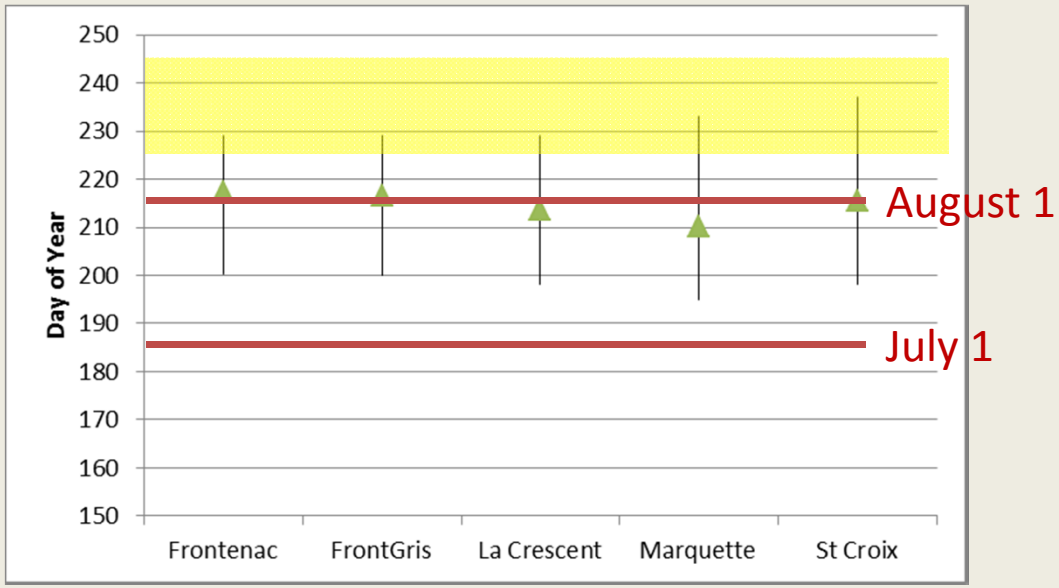


Growing Degree Days

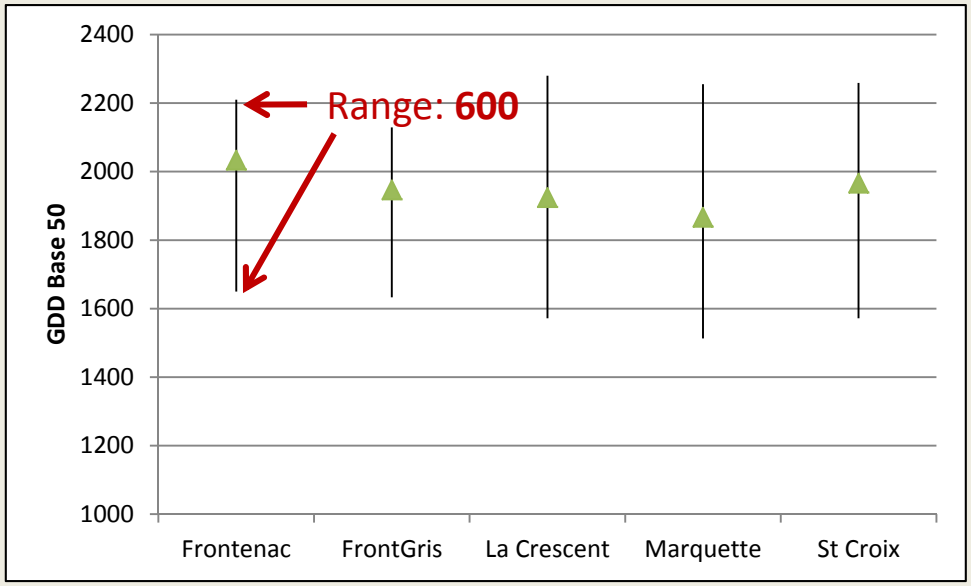


Veraison

DATE

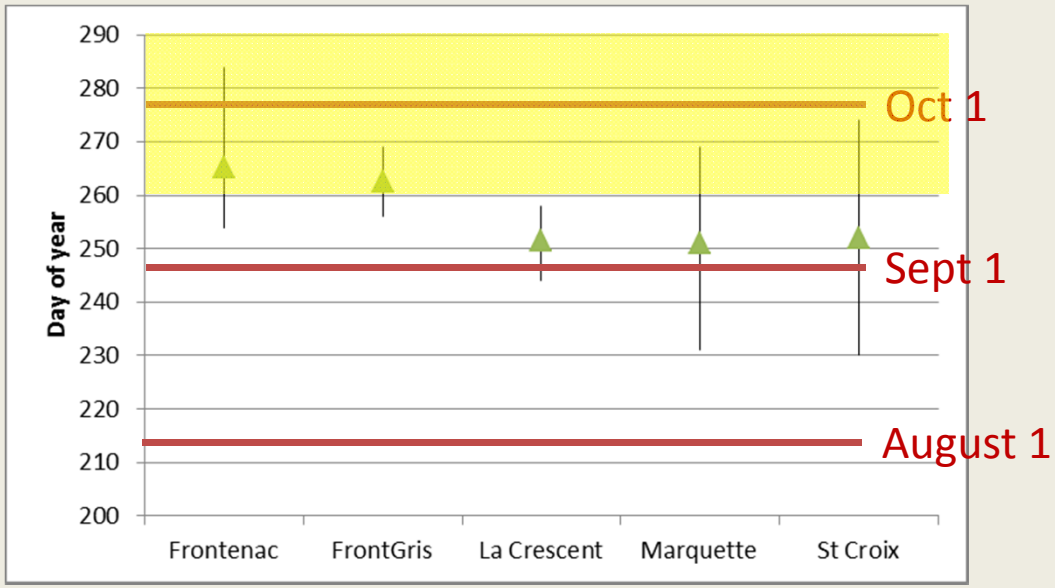


Growing Degree Days

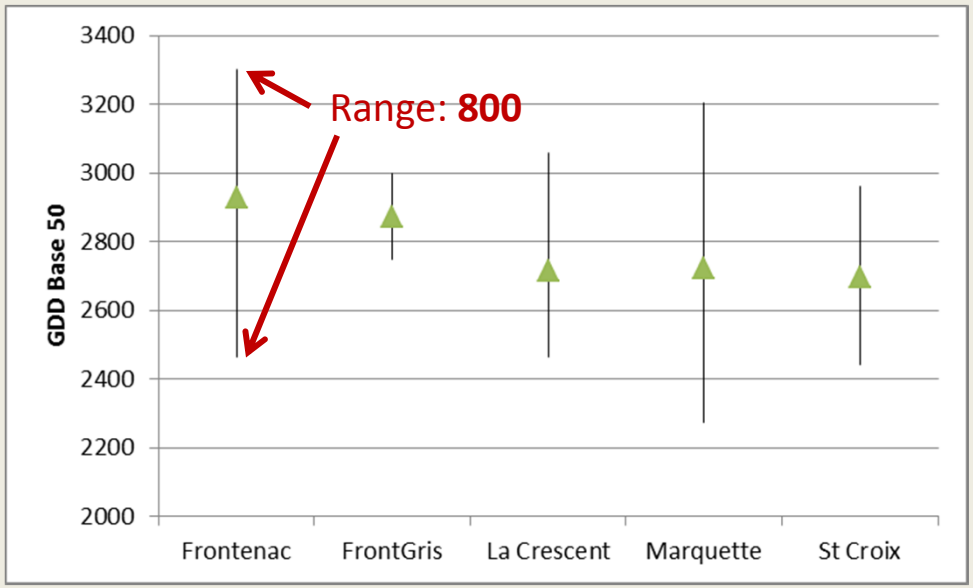


Harvest

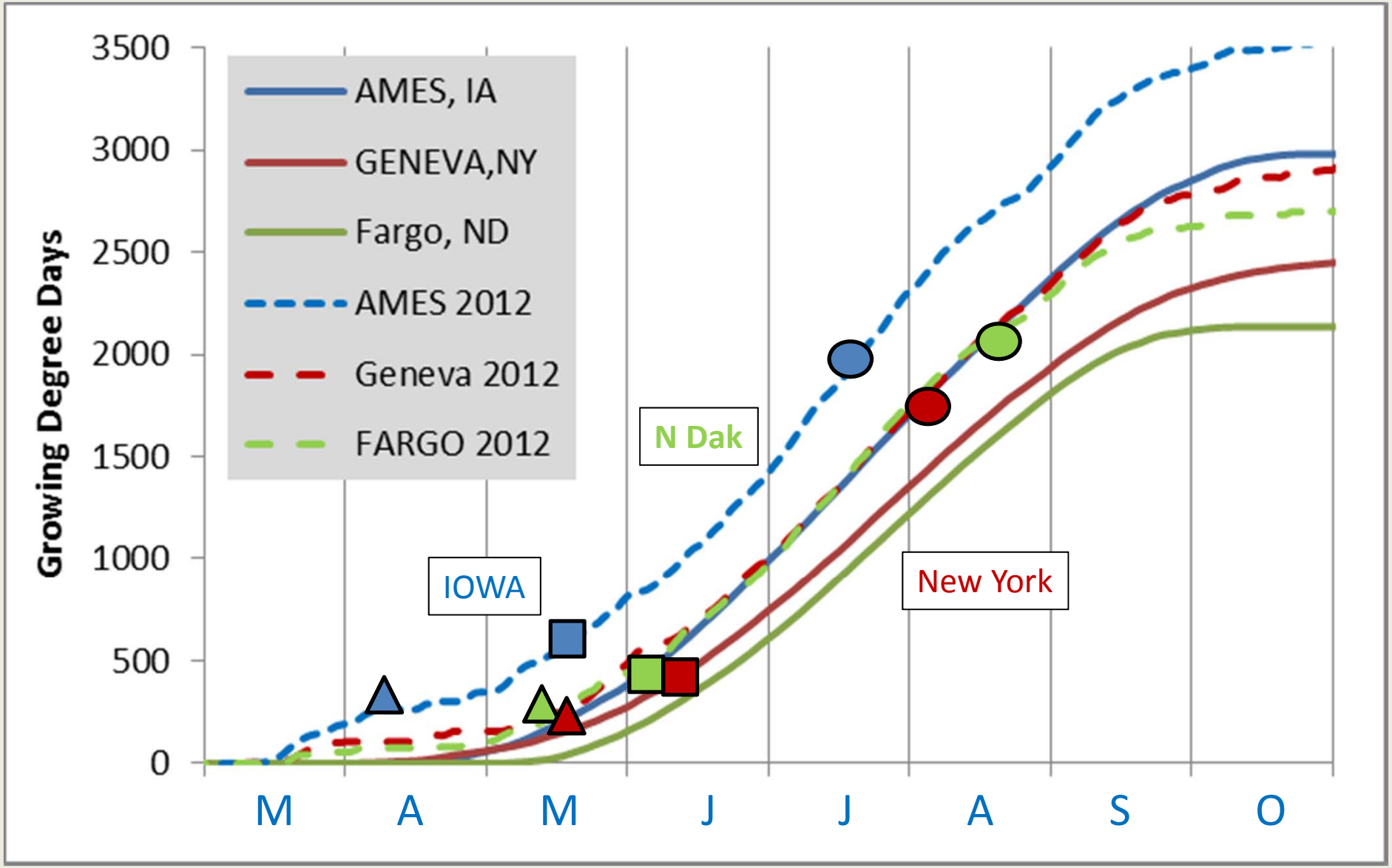
DATE



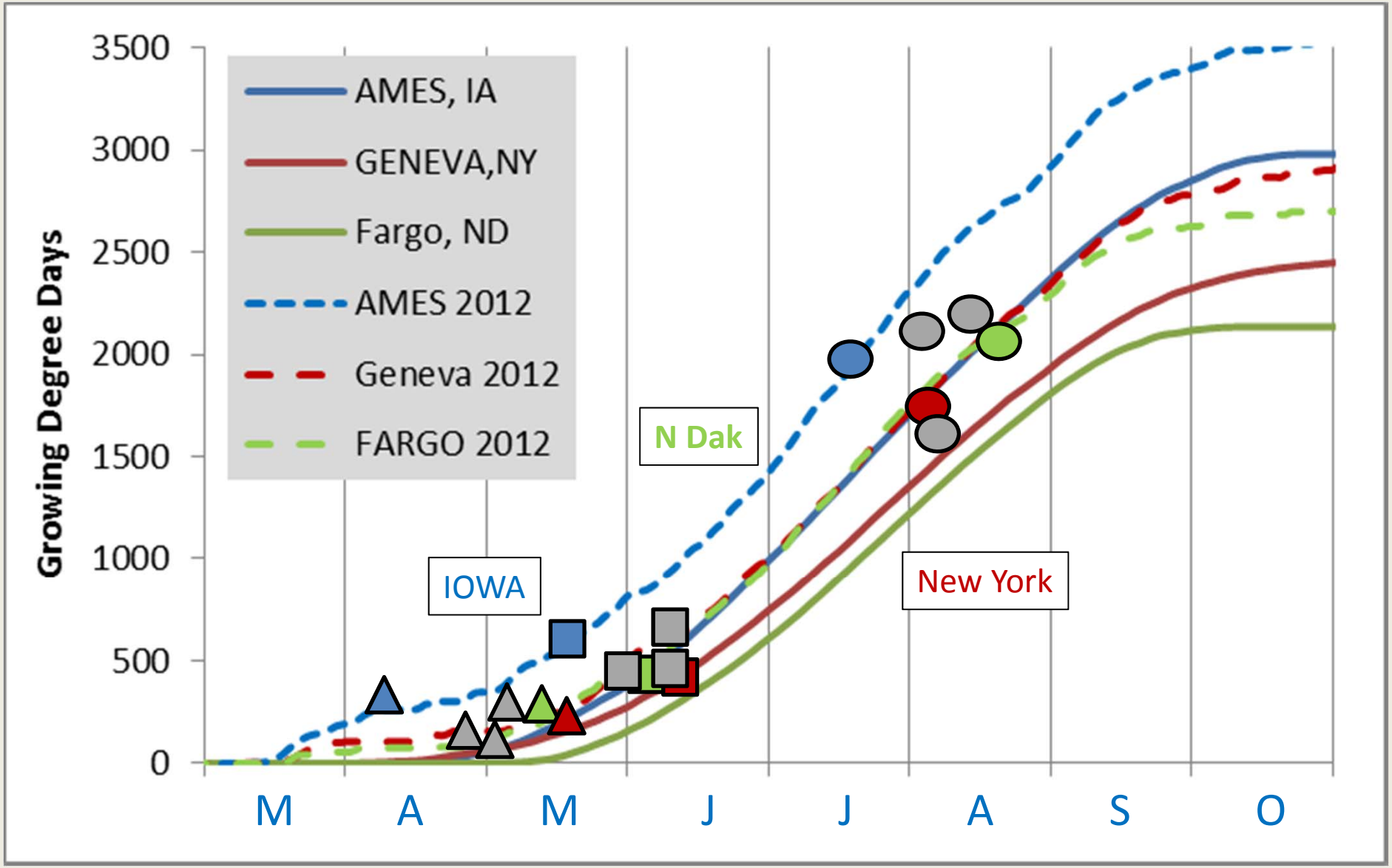
Growing Degree Days



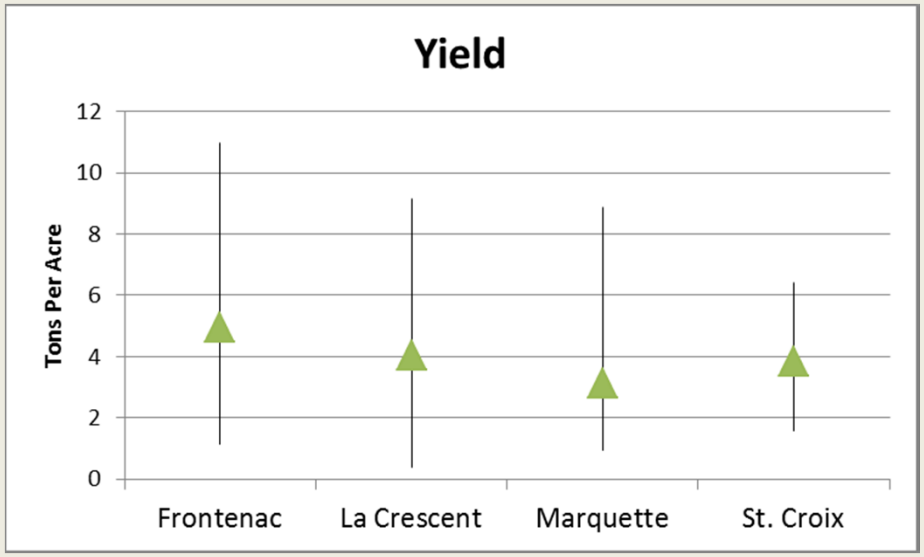
Frontenac Phenology Dates 2012

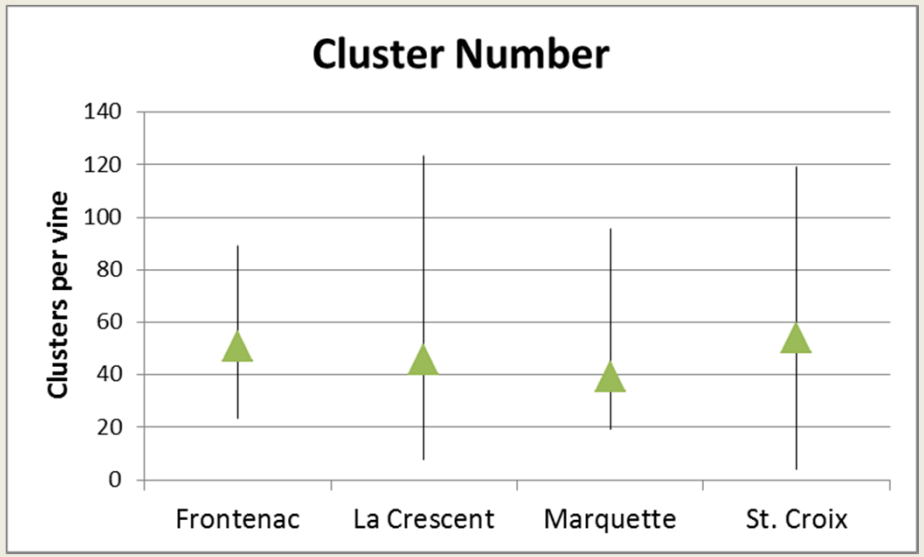


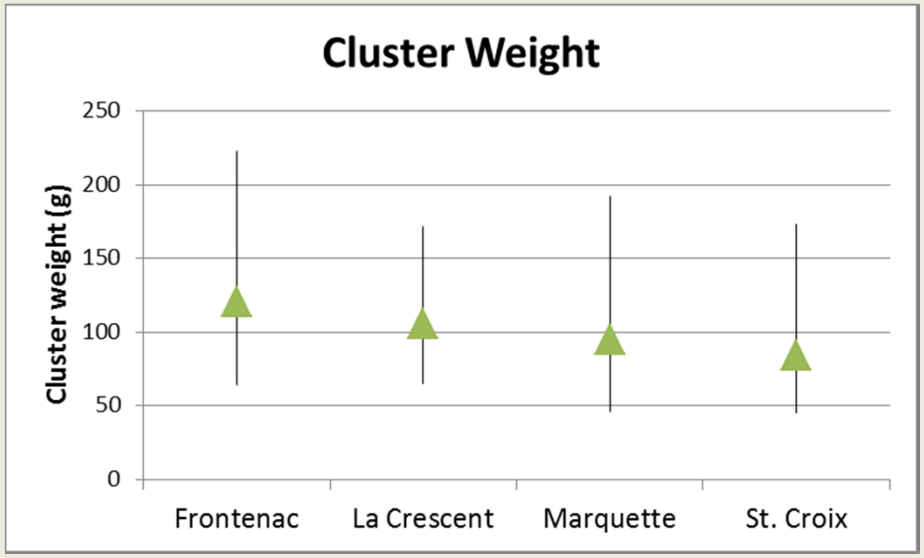
Frontenac Phenology Dates 2012



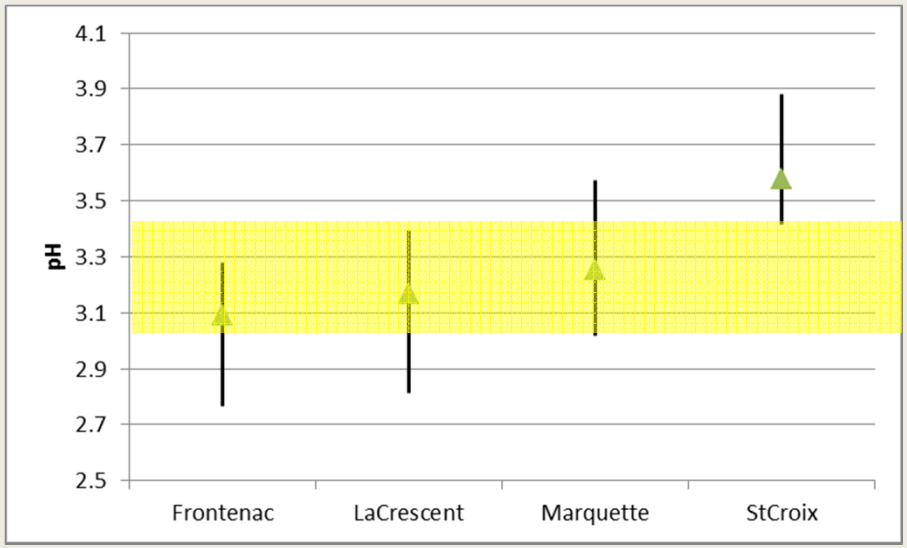
Yield Components

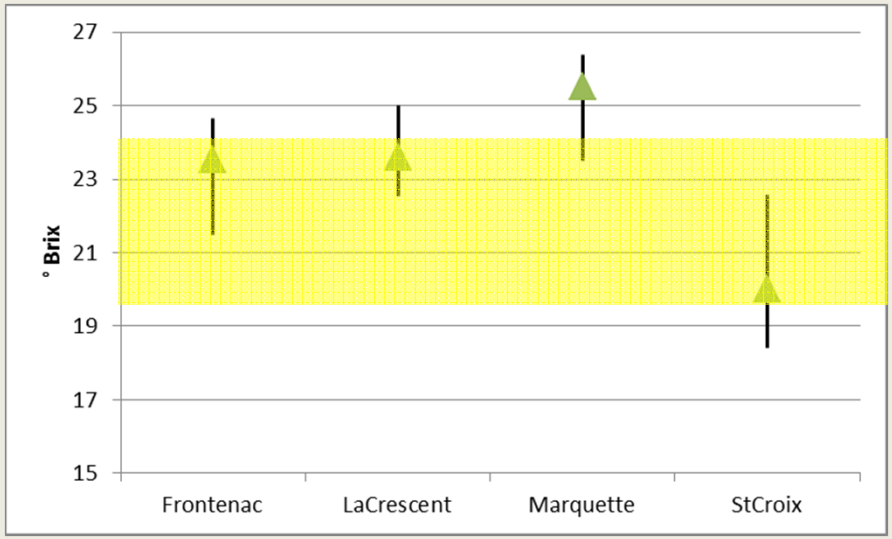


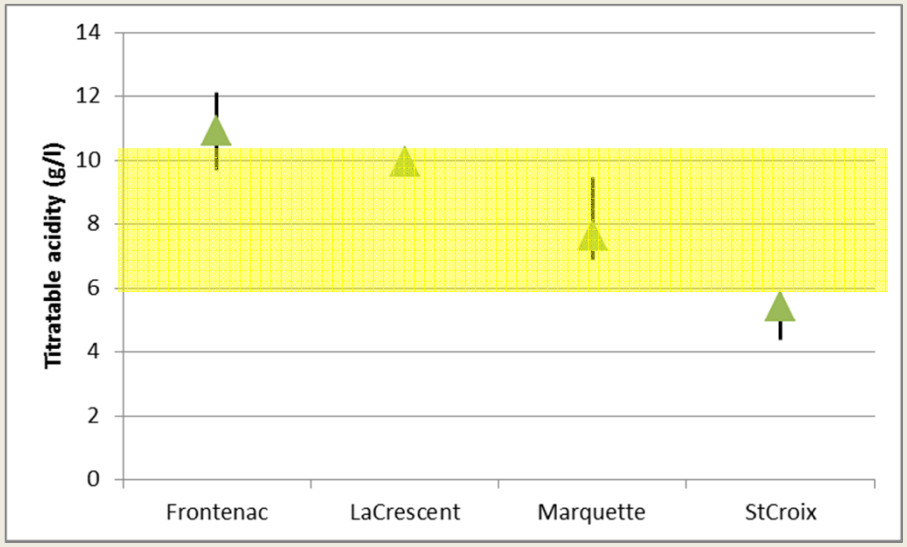




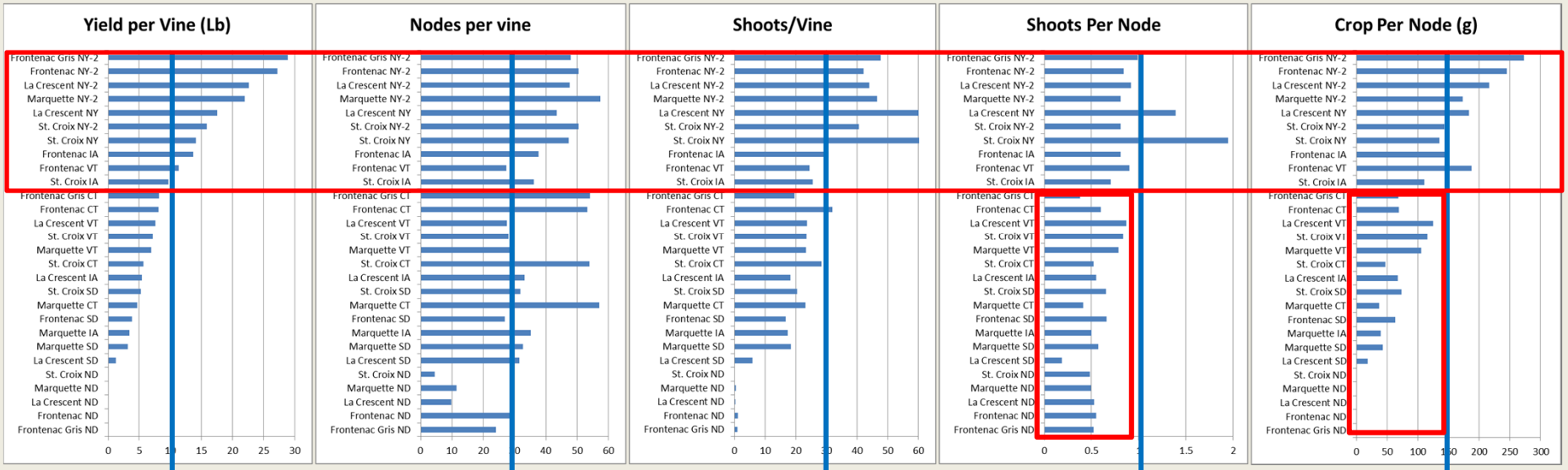
Fruit Composition at Harvest (Brix, pH, TA)







Yield and Retained Nodes



10 lb/vine

30 nodes/vine

30 shoots/vine

1 shoot/node

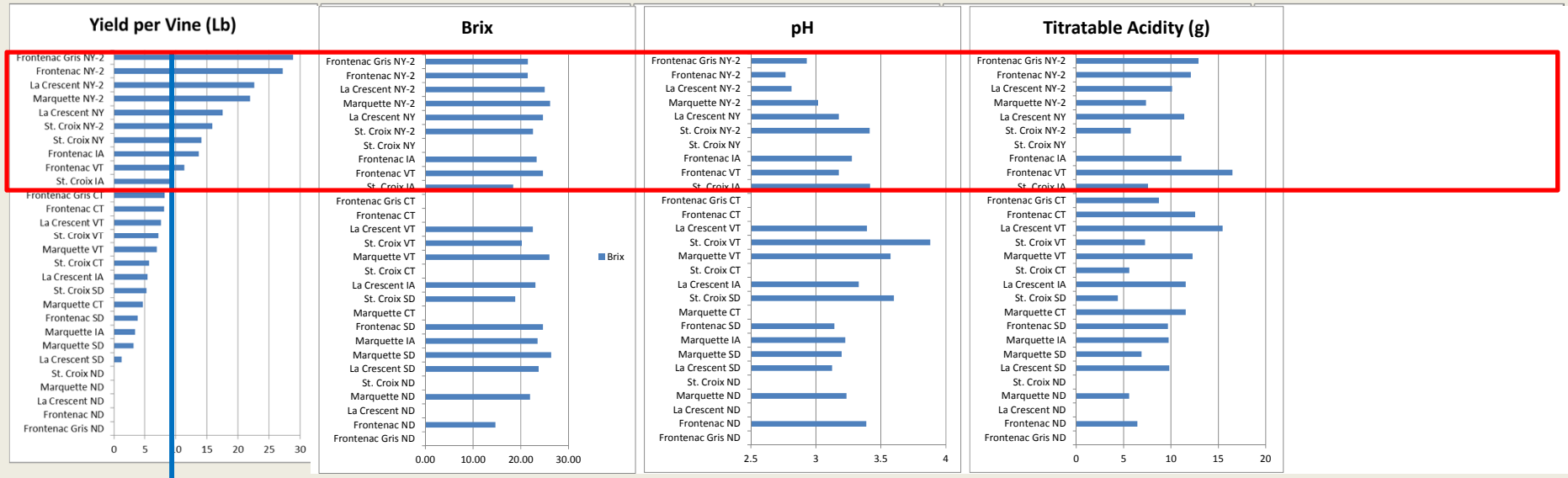
150 g/node

= 4 T/acre
6ft x 9ft
spacing

= 5 per Ft
at 6 Ft
In-row
spacing

= 4.5 KG/vine
= 9.9lb/vine
30 shoots/vine

Yield and Retained Nodes

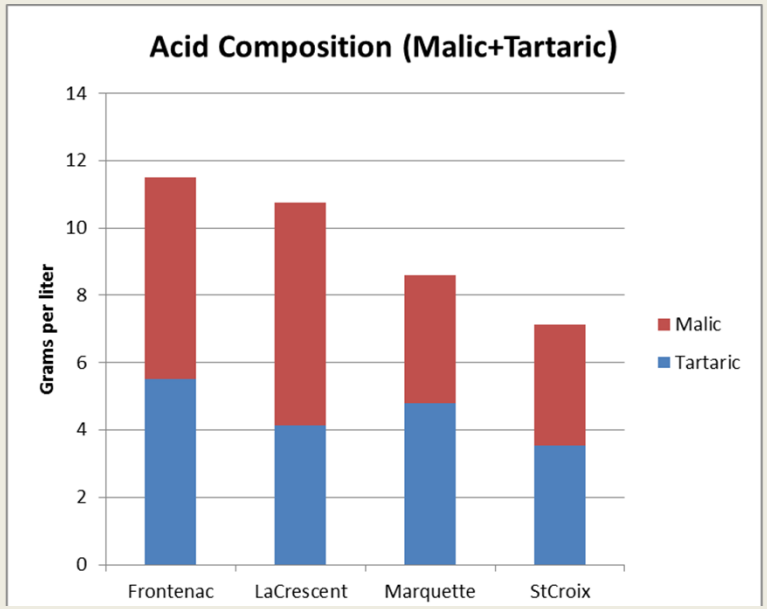


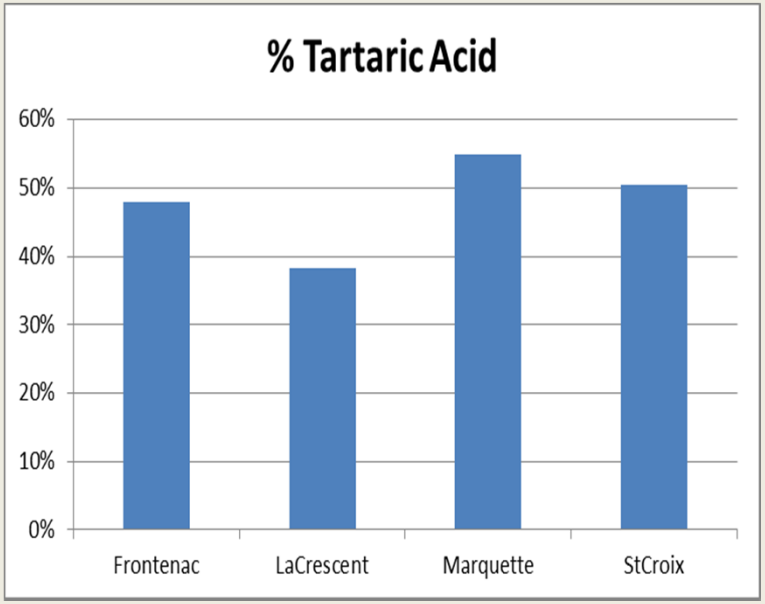
10 lb/vine

= 4 T/acre
6ft x 9ft
spacing

Acid Composition

Murli Dharmadhikari
Iowa State University





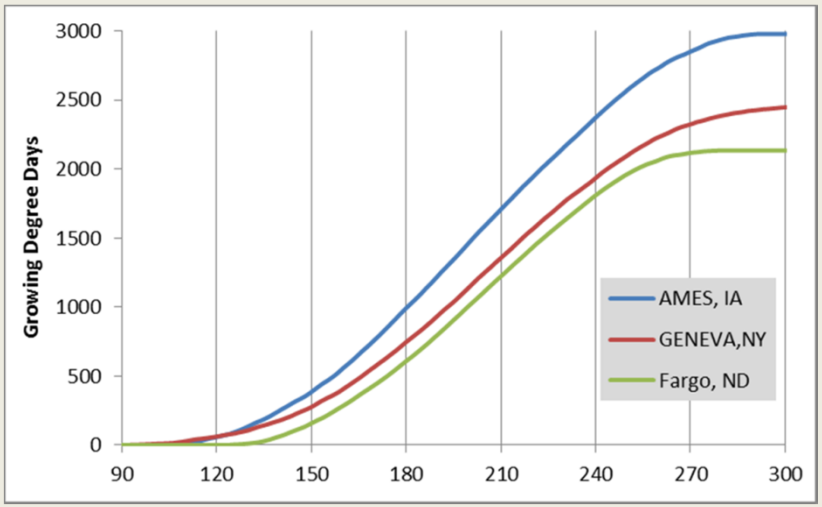
Summary

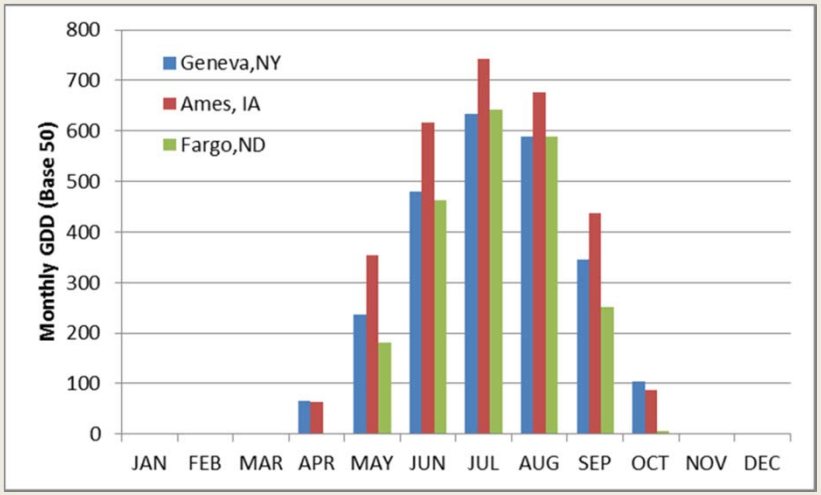
- Vine development advanced by 1 month in 2012
- Frosts after budburst reduced shoot counts.
- Shoots per ‘retained node’ at 0.5 at some sites.
- Yield per shoot was low (<<150 g/retained node) in some blocks, possibly due to smaller clusters arising from 2ndary buds.
- Only about 40% of blocks tested had > 10 lb/vine fruit.
- Brix, TA, pH (maturity indices) not limited by yields of up to 25 lb/vine.

Management Implications

In 2012…

- No 'overcropping' effects on fruit maturity
- Up to 25 lb/vine (= 7.5 T/acre @ 8x9 spacing)
- These cultivars will support higher yields, bud counts
- ? Need for shoot, cluster thin
- 2012 didn't test 'limits'.
- Cooler years: more quality-related fruit composition differences?





Final Note

One season's data is not enough

- Acknowledgements:
  - Harlene Hatterman-Valenti (ND)
  - Anne Fennell (SD)
  - Paul Domoto and Murli Dharmadhikari (IA)
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