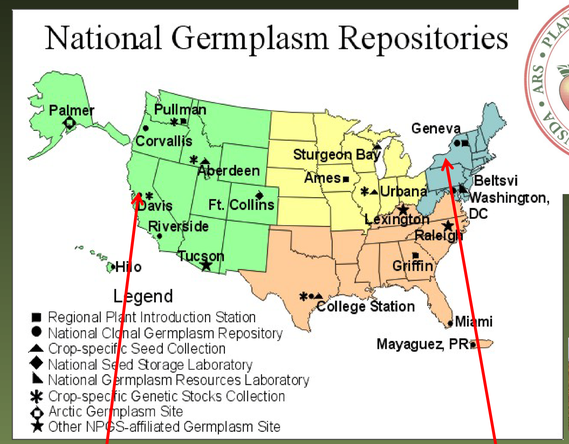
Cold-hardy Grape Germplasm Collection, Geneva, NY

Acquire Maintain Conserve Characterize Evaluate Distribute *Vitis* Genetic Diversity



Tenturier cultivar

Leaf senescence

Davis, CA
cold tender grapes
~ 3000 accessions
~ half are *Vitis vinifera*
- 45 species

Geneva, NY
cold hardy grapes
~ 1371 accessions
On own roots
~ 68% are *Vitis* hybrid
~20 species

Vitis aestivalis	29
Vitis amurensis	19
Vitis cinerea	47
Vitis coignetiae	11
Vitis hybrid	929
Vitis labrusca	45
Vitis monticola	2
Vitis mustangensis	1
Vitis palmata	7
Vitis piasezkii	3
Vitis pseudoreticulata	2
Vitis riparia	80
Vitis romaneti	4
Vitis rupestris	36
Vitis spp.	24
Vitis vinifera	84
Vitis tilifolia	1
Vitis thunbergii	1
Vitis vulpina	16
Vitis X champinii	4
Vitis X doaniana	2
Vitis X novae-angliae	1
Vitis yenshanensis	2
Ampelopsis aconitifolia var glabra	1
Ampelopsis brevipedunculata	4
Cissus sp.	1
Total	1371

Acquire

Developed selections from breeders

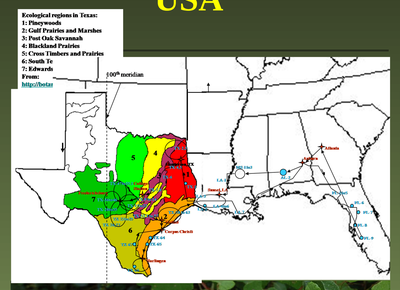
Elmer Swenson 1913-2004

pioneering grape breeder who revolutionized grape growing in cold and short-seasoned regions

Mexico

Wild accessions through exploration

USA



Vitis mustangensis, Alabama
(new, disjunct population)

Kazakhstan

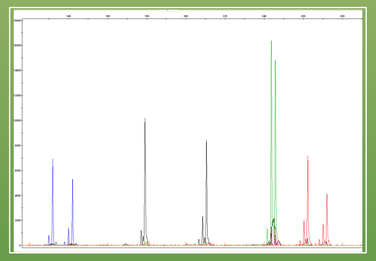
Vitis sylvestris

Characterize and Evaluate

PI 157518

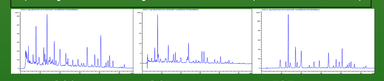
Characterizations

DESCRIPTOR	No. of accessions
Berry length	1026
Berry shape	980
Berry size	975
Berry weight	979
Berry width	1026
Berry flavor	973
Bloom date	1078
Brix	979
Budburst date	~1350
Cluster length	1023
Cluster weight	981
Cluster width	980
Digital images	~1800
Flesh color	979
Peduncle length	980
Seedlessness	951
Sex of flower	1245
Skin color	1031



Molecular:
SSR fingerprint of every vine

Collaborative evaluations
1) Berry resveratrol concentration
2) Leaf resveratrol content
3) Crown gall susceptibility
4) Genome size in base pairs
5) Genome size in pico grams
In progress
6) Phomopsis resistance (Dr. Wilcox, CU)
7) Powdery mildes resistance (Dr. Reisch, CU)
8) Genetics of grape-pathogen interactions (Dr. Cadle-Davidson, GGRU)
9) Key Secondary Metabolites (Dr. Chen, CU)

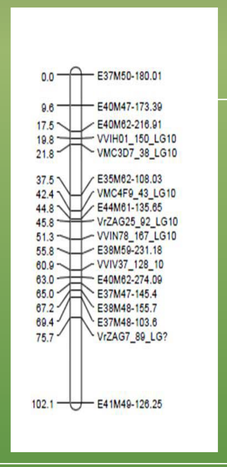

280nm 365nm 525nm

10) Virus Indexing and Therapy (Dr. Fuchs, CU)

Photo documentation

Plus Passport Data
All information available at:
http://www.ars-grin.gov

Research and Collaborations

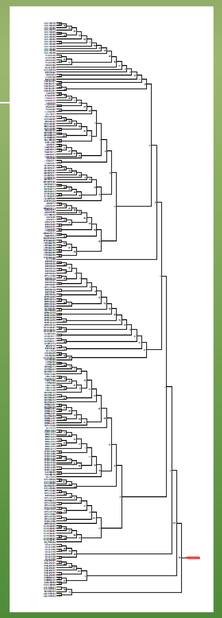


Functional Marker Development

- Collaboration
- Horizon x Ill547-1
- Numerous disease response/ viticultural traits
- Germplasm characterization
- Marker assisted selection

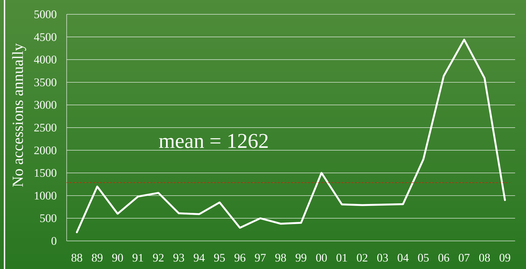
Phylogenomic Analysis of Grapes

- Resequencing
- 27 EST-derived markers
- 11,400 aligned base pairs
- 304 accessions (North America, China, Europe)
- Phylogeographic analysis
- Evolutionary history
- Assess genetic diversity
- develop tools/markers for
- Germplasm conservation/use



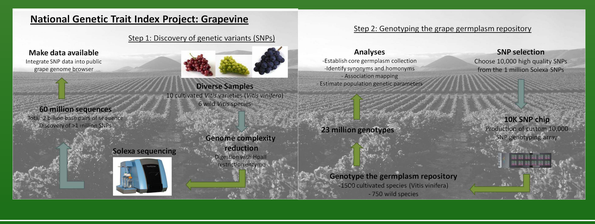
Distribute

Annual distribution of grape germplasm 1988-2009



Grape total accessions distributed = 27,766 Grape total orders = 1413
Grape orders per year mean = 64 range 14 - 145

Dormant Cuttings, Seeds, Pollen, Flowers, Fruit, Leaves

Vitis9KSNP Array

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