



Grapevine Virus Survey, 2013

W. McFadden-Smith
L. Stobbs
K. Hoshkiw & N. Grieg

Ministry of Agriculture
and Food
Ministry of Rural Affairs



Grape Growers
of ONTARIO



Grapevine Leafroll Virus in Canada

- MacKenzie, Johnson & Warner, 1996
 - Dormant canes collected in fall & winter
 - 2.5 plants/ha from all known vineyards and nurseries in BC (131 sites), ON (480), QC (7), NS (19)

1996 Survey Results

Table 3. Percentage of samples from each variety type found to be infected with one or more viruses

| | British Columbia | | | Ontario | | |
|-------------------|------------------|-------|-----------------------|---------|-------|--------------------|
| | Hybrid | Other | <i>Vitis vinifera</i> | Hybrid | Other | <i>V. vinifera</i> |
| ArMV ^a | 0.83% | 0 | 0.27% | 1.44% | 0 | 0.88% |
| | (2) ^b | | (3) | (36) | | (18) |
| GFLV | 0 | 0 | 0.09% | 0.28% | 0 | 1.17% |
| | | | (1) | (7) | | (24) |
| GLRaV-I | 0 | 0 | 1.7% | 0.92% | 0.73% | 5.37% |
| | | | (19) | (23) | (38) | (110) |
| GLRaV-III | 11.6% | 0 | 0.36% | 15.4% | 14.1% | 3.42% |
| | (28) | | (4) | (385) | (736) | (70) |

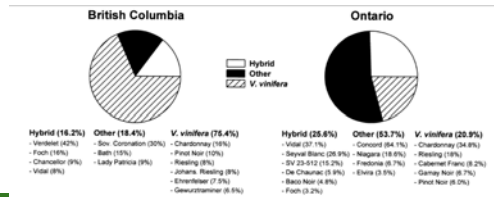


Fig. 1. Variety and type profile of samples collected from British Columbia and Ontario during the course of the national grapevine survey. Varieties were listed by variety type. For varieties, hybrid crosses are either varieties, including those of European origin.

September, 2013





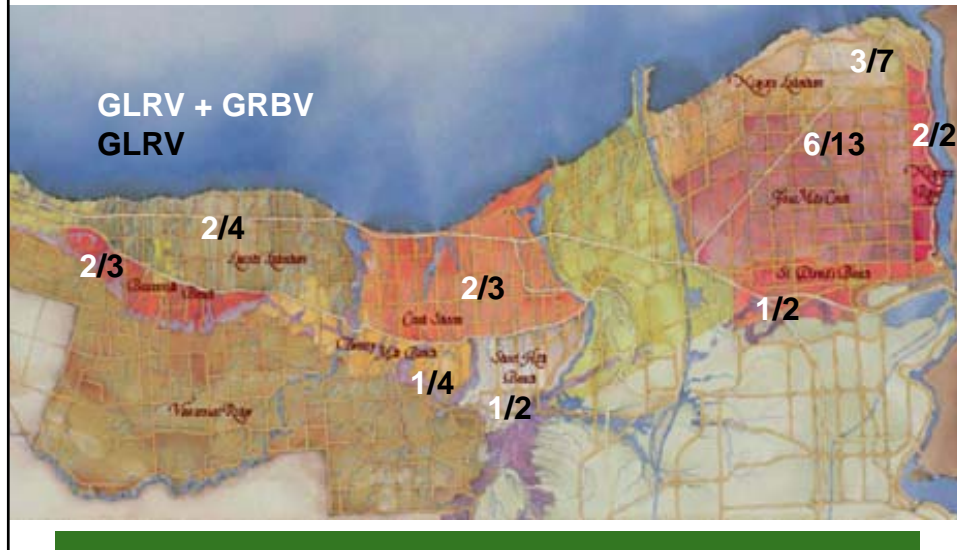
Grapevine Leafroll and Red Blotch

- What is the incidence of leafroll virus and red blotch virus in commercial vineyards of red *V. vinifera*?

Grapevine Leafroll and Red Blotch Survey, 2013

- Funding from GGO to sample up to 40 vineyard blocks for GLRV and 20 of those for GRBV as well
- Sampling of sub-appellations divided according to acreage of red vinifera
- Grower numbers randomly selected within sub-appellations
- Blocks randomly sampled from grower
- Minimum size - 20-panel sample

Sites per Sub-Appellation



Grapevine Leafroll and Red Blotch Survey, 2013

- 21 Cabernet franc
- 4 Cabernet sauvignon
- 6 Merlot
- 2 Pinot noir
- 1 Gamay

Leafroll Virus Sampling Pattern

20 samples per vineyard block

| | | | |
|---|----|----|----|
| 1 | 10 | 11 | 20 |
| 2 | 9 | 12 | 19 |
| 3 | 8 | 13 | 18 |
| 3 | 7 | 14 | 17 |
| 5 | 6 | 15 | 16 |

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Grapevine Leafroll and Red Blotch Survey, 2013

- 20 panels sampled per block
- 3 (6) basal, symptomatic leaves from each of 5 vines per panel

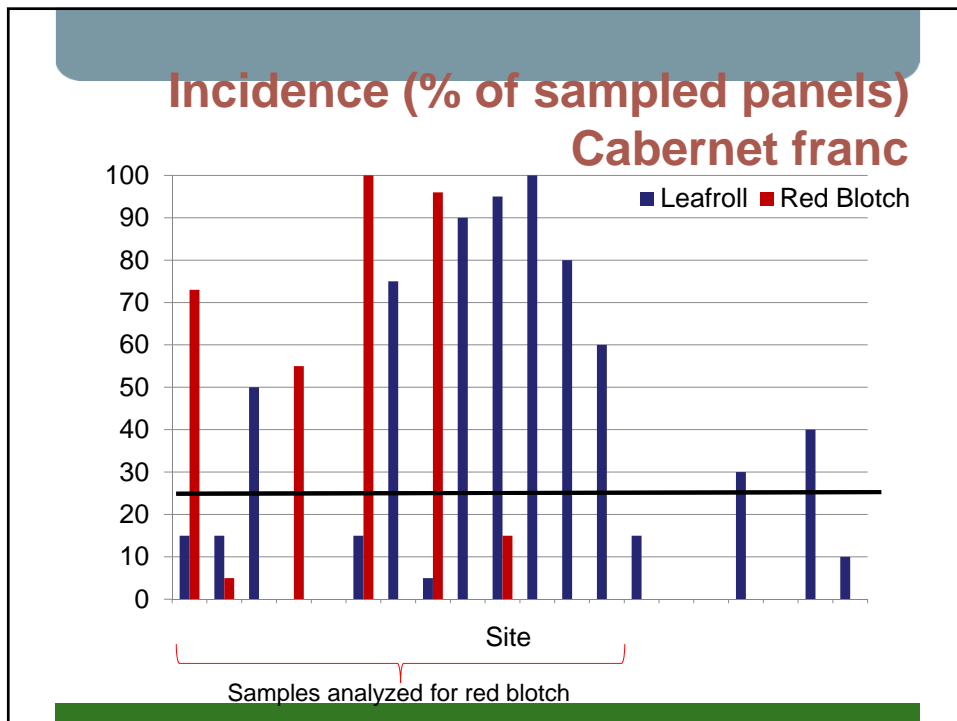
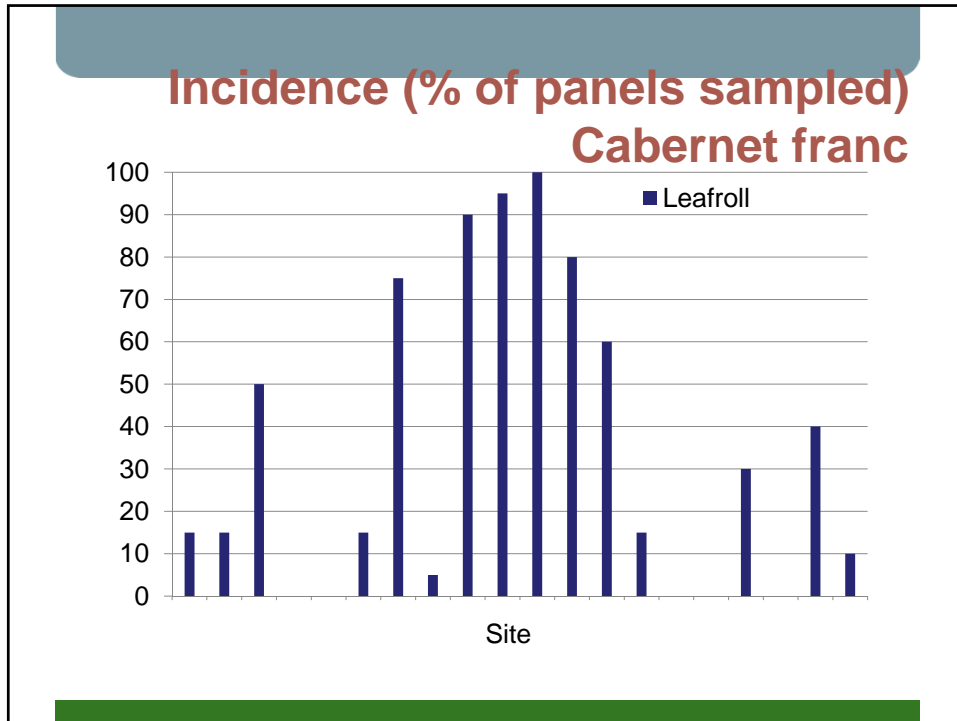
Grapevine Leafroll and Red Blotch Survey, 2013

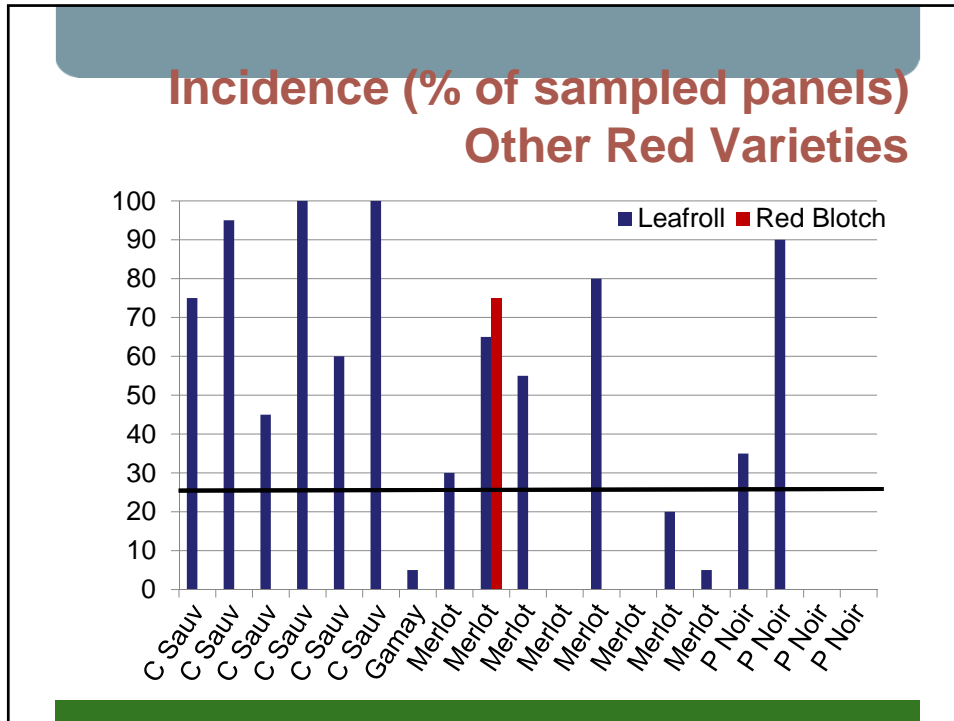
- GLRV testing at AAFC Vineland by Stobbs and Grieg, using ELISA
- GRBV testing at Pest Diagnostic Lab, U of G, using PCR

| Direction | Row Entered | Row # | Panel # | Grape leafroll | Red blotch |
|-----------|-------------|-------|---------|----------------|------------|
| South | | 7 | 2 | Neg | Neg |
| | | 7 | 7 | Neg | Neg |
| | | 7 | 12 | Neg | Neg |
| | | 7 | 17 | Neg | Neg |
| North | | 14 | 2 | Neg | Neg |
| | | 14 | 7 | Neg | Neg |
| | | 14 | 12 | Neg | Neg |
| | | 14 | 17 | Neg | Neg |
| South | | 21 | 2 | Neg | Pos |
| | | 21 | 7 | Neg | Neg |
| | | 21 | 12 | Pos | Neg |
| | | 21 | 17 | Neg | Neg |
| North | | 28 | 2 | Neg | Neg |
| | | 28 | 7 | Neg | Neg |
| | | 28 | 12 | Neg | Neg |
| | | 28 | 17 | Neg | Neg |
| South | | 34 | 2 | Neg | Neg |
| | | 34 | 7 | Pos | Neg |
| | | 34 | 12 | Pos | Neg |
| | | 34 | 17 | Neg | Neg |

Sample
 Survey report

Summary: 15 % sampled panels positive for leafroll virus
 5 % of panels positive for red blotch
 0% of panels positive for both leafroll virus and red blotch virus





Summary

of vineyards with different
% infected panels*

| | 0 | 1-10 | 11-20 | 21-50 | 51-90 | 91-100 | Total vineyards |
|-----------------------------|----|------|-------|-------|-------|--------|-----------------|
| GLRV I+III or II | 11 | 3 | 5 | 6 | 10 | 5 | 40 |
| GRBV | 13 | 1 | 1 | 0 | 3 | 2 | 20 |

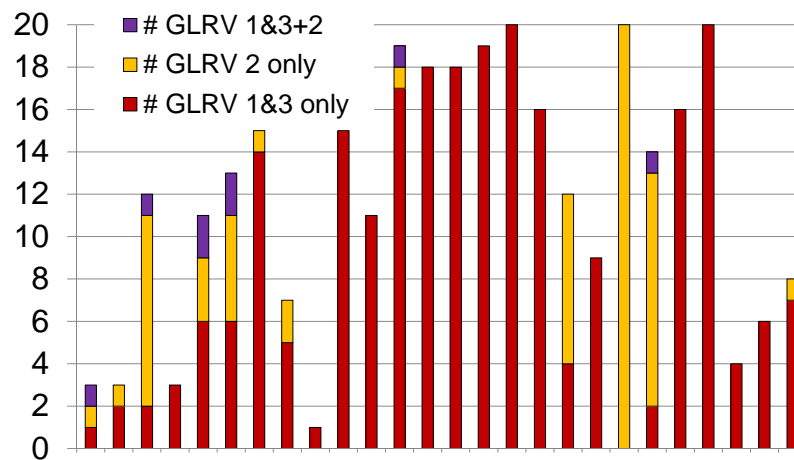
* Based on a sample of 20 panels per vineyard block

Summary

of vineyards with different
% infected panels

| | 0 | 1-10 | 11-20 | 21-50 | 51-90 | 91-100 | Total vineyards |
|-------------------------|----|------|-------|-------|-------|--------|-----------------|
| GLRV I+III or II | 11 | 3 | 5 | 6 | 10 | 5 | 40 |
| I+III | 12 | 6 | 6 | 5 | 8 | 3 | 40 |
| II | 29 | 4 | 1 | 4 | 1 | 1 | 40 |
| GRBV | 13 | 1 | 1 | 0 | 3 | 2 | 20 |

GLRV Strains in Positive Vineyards

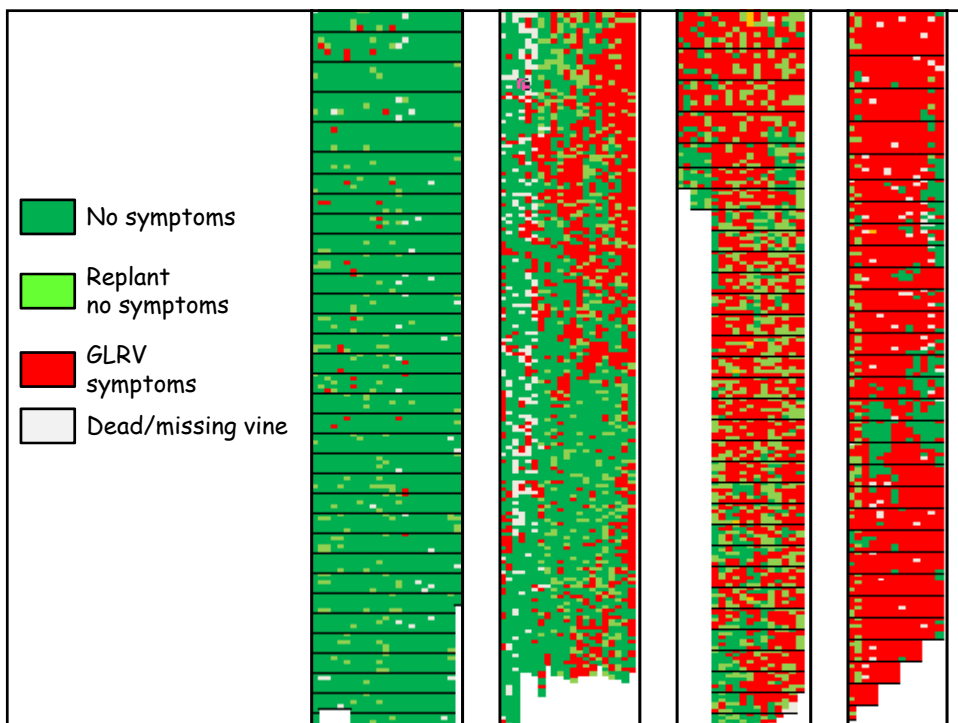
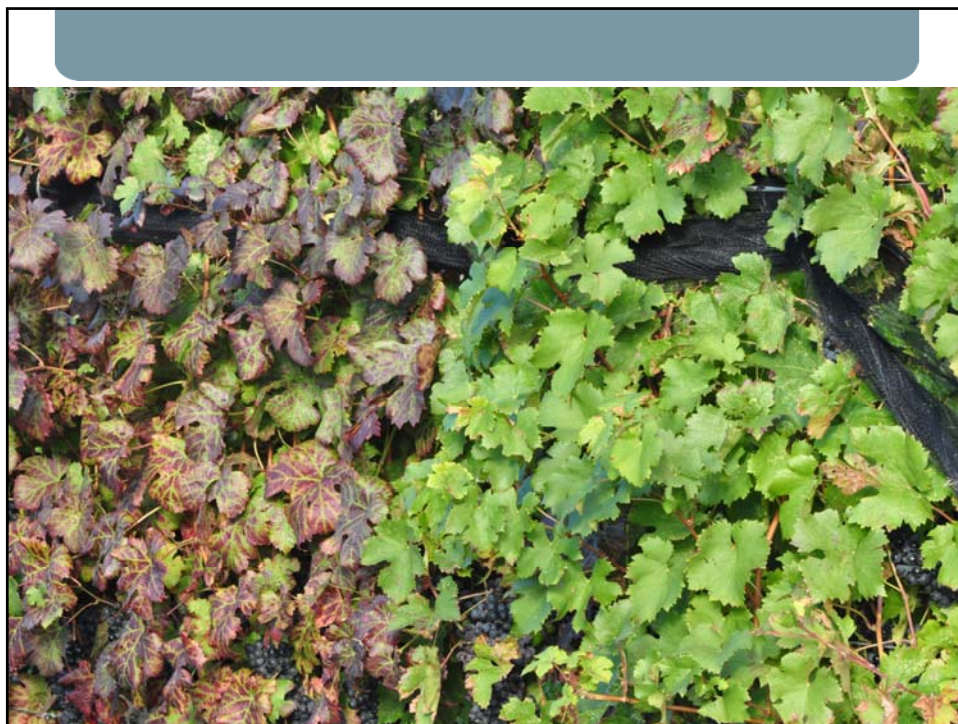


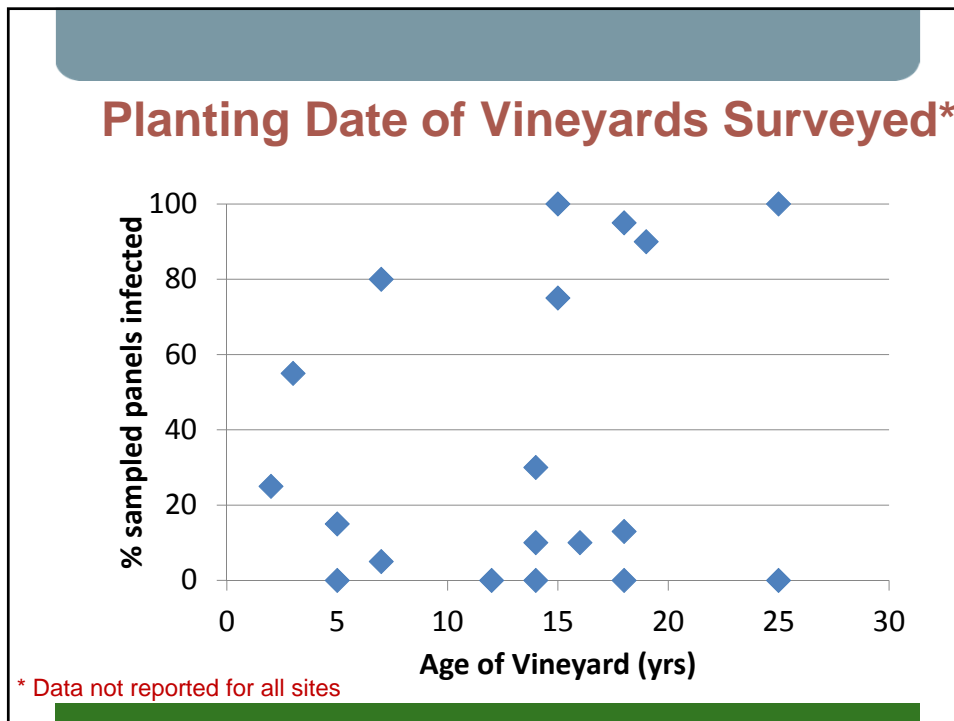
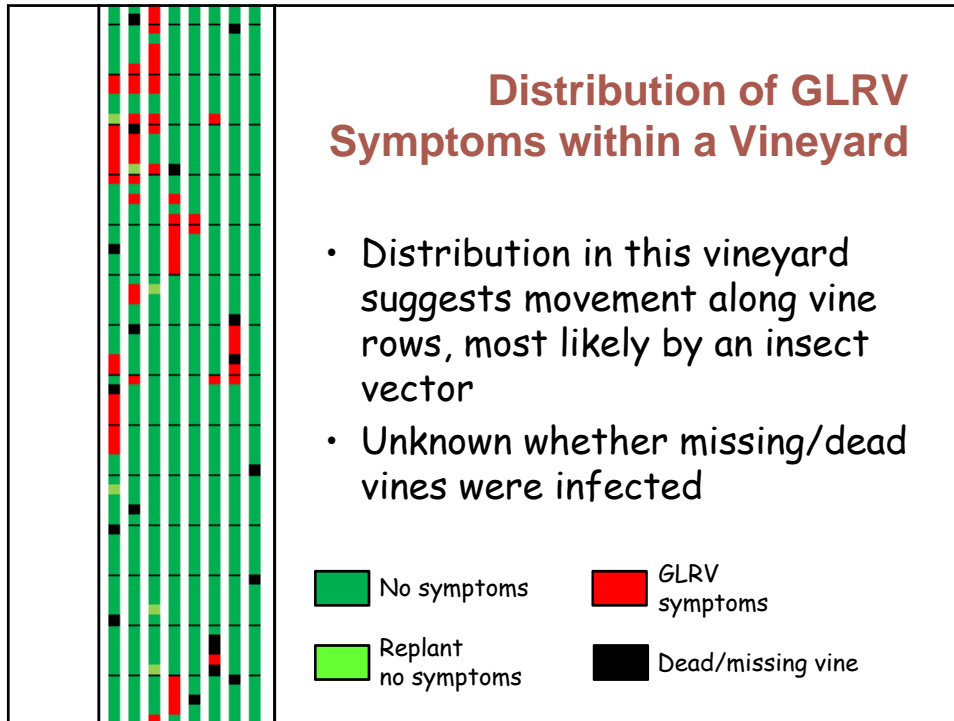
Grapevine Leafroll

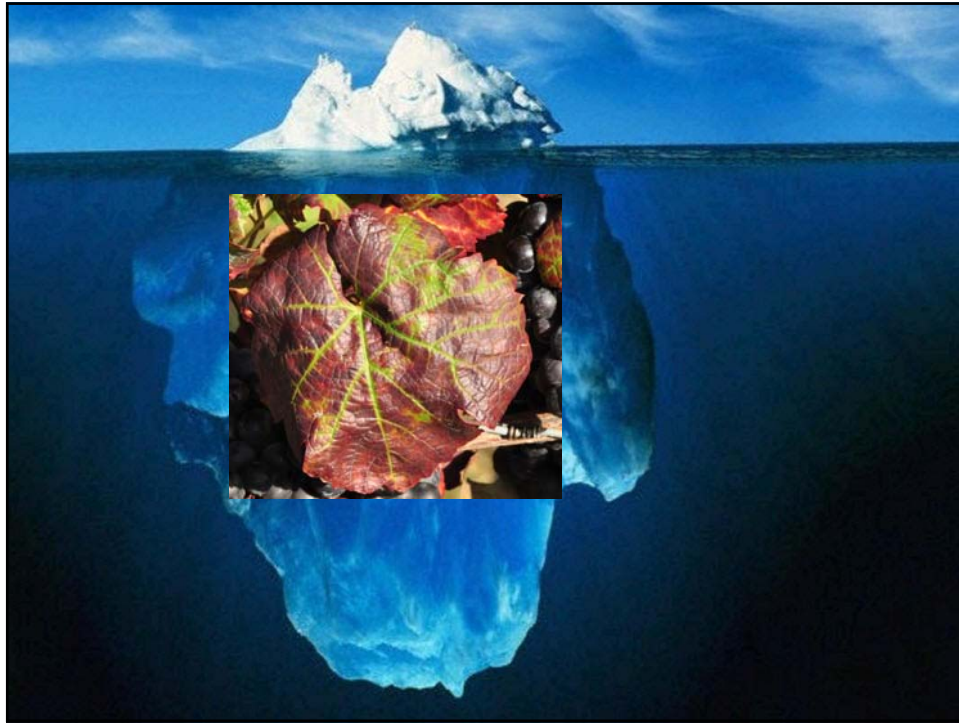
- What is the incidence of leafroll virus and red blotch virus in commercial vineyards of red *V. vinifera*
- Is the infestation and manifestation of symptoms the result of planting infected vines or spread by insect vectors?

Survey of symptomatic vines

- 6 commercial blocks (red varieties)
- Each vine rated for presence/absence of symptoms







Future Research (Just the beginning)

- Expand survey of red varieties (other regions, more sites, include hybrids)
- Extent of GLRV and GRBV in white varieties (vinifera and hybrid)
- Identify insect vectors present and insecticide treatments to manage them
- Impact of infection on winter hardiness
- Vineyard practices to reduce impact on fruit maturation, uniformity and quality
- Rapid, accurate field testing for GLRV and GRBV