

GRAPE CROWN GALL IN NOVA SCOTIA

COLIN BELL

WINDERMERE HILLS FARM & VINEYARD



Windermere Hills Farm & Vineyard

OVERVIEW

A. Crash course on Crown Gall (CG).

B. The Survey:

A. How the data was collected.

B. Calculations performed.

C. The Results:

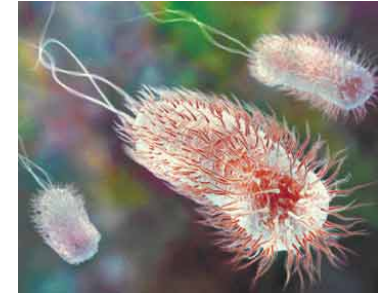
A. Infection across vineyards

B. Infection within grape cultivars

D. The Value of the Data

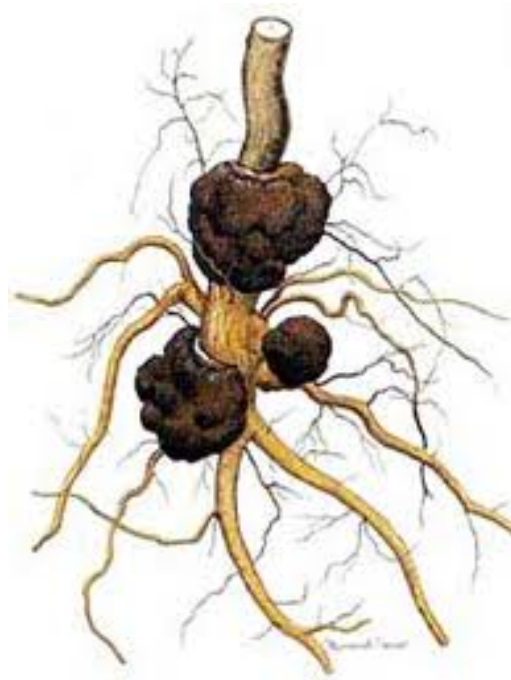


CROWN GALL IS A PLANT CANCER



Agrobacterium tumefaciens

The plant must be wounded for the cancer to begin.



CROWN GALL PRESENTATION IN GRAPE



INFORMATION ON THE DATA:

- 16 VINEYARDS REPORTED OUT OF 89 (18%)
- REPRESENTED 151 ACRES OUT OF 613 (25%)

THE CALCULATIONS PERFORMED:

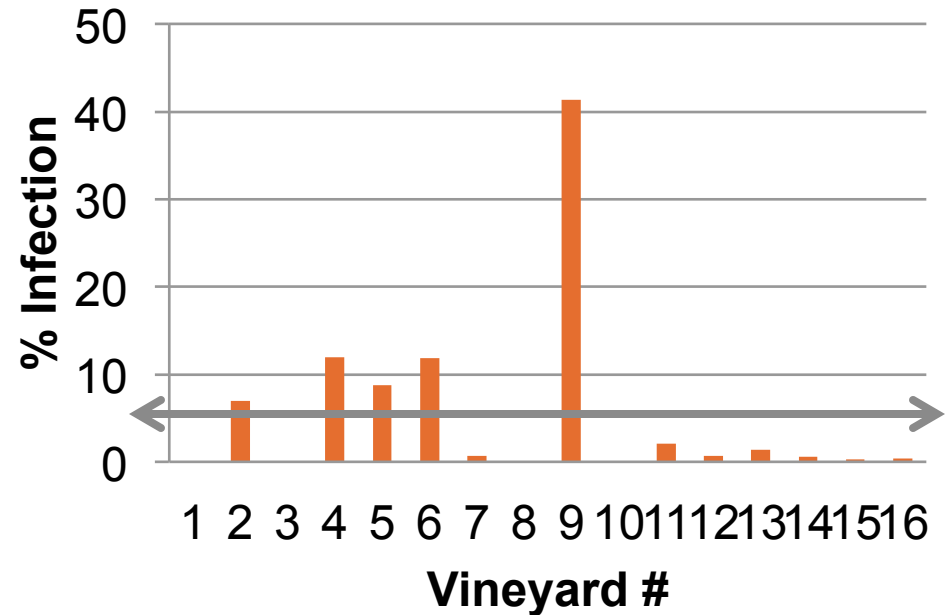
PERCENT INFECTION WAS THE KEY PARAMETER

1. % infection across the entire vineyard - $(\text{No. vines with CG} / \text{Total vines in vineyard}) \times 100$
2. % infection in specific grape cultivars – $(\text{No. cultivar vines with CG} / \text{No. vines of that cultivar}) \times 100$
3. Effect of vineyard variables determined in Excel by sorting and comparing means and SDs



| Vineyard # | Percent Infection in Entire Vineyard |
|------------|--------------------------------------|
| 1 | 0 |
| 2 | 7 |
| 3 | 0 |
| 4 | 11.9 |
| 5 | 8.8 |
| 6 | 11.8 |
| 7 | 0.7 |
| 8 | 0 |
| 9 | 41.4 |
| 10 | 0 |
| 11 | 2.1 |
| 12 | 0.7 |
| 13 | 1.4 |
| 14 | 0.6 |
| 15 | 0.3 |
| 16 | 0.4 |
| Average | 5.4 |
| SD | 10.5 |
| Max | 41.4 |
| Min | 0 |

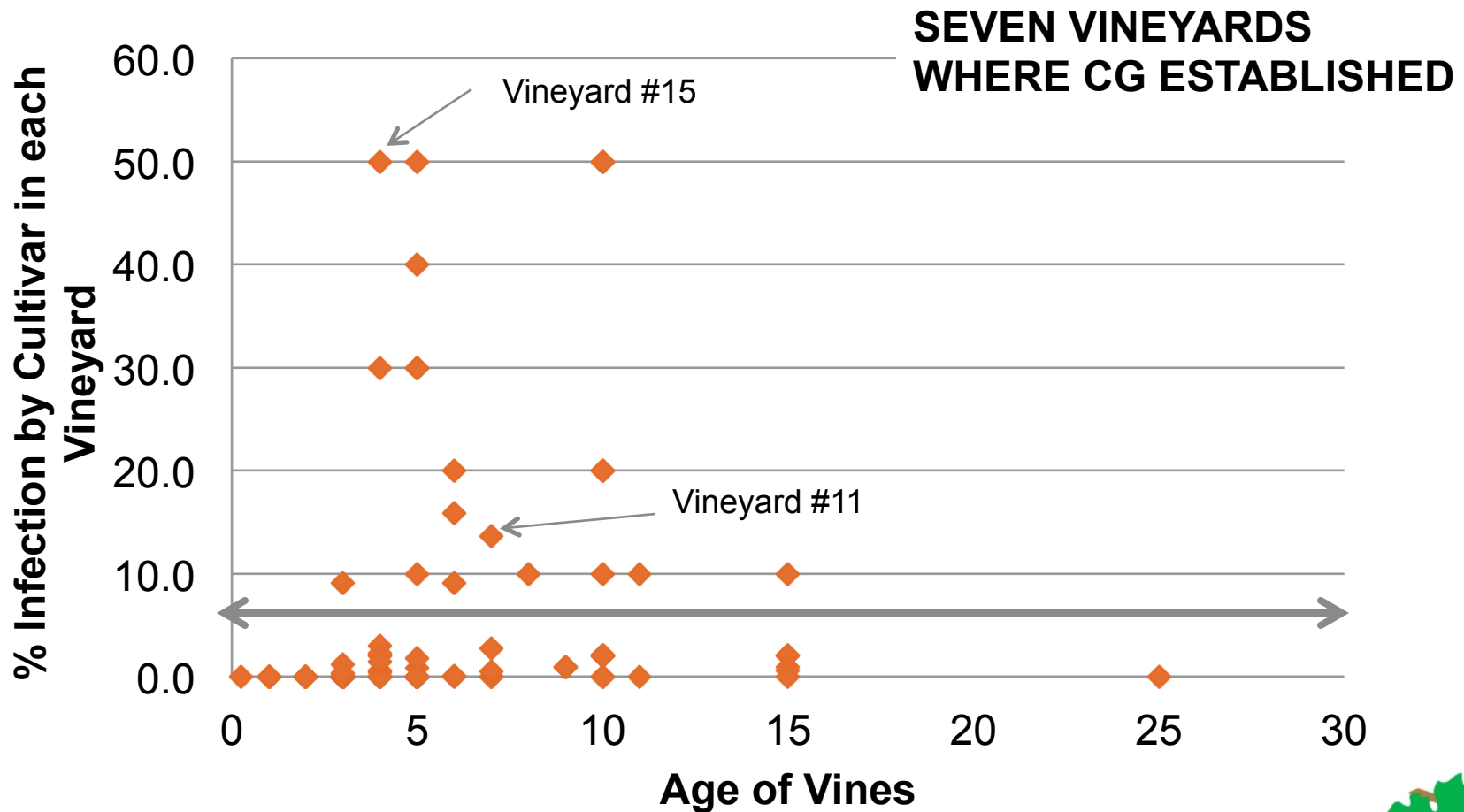
PERCENT INFECTION IN EACH VINEYARD



FIVE VINEYARDS WHERE CG IS WELL ESTABLISHED



PERCENT INFECTION BY CULTIVAR



GRAPE CULTIVARS NEVER INFECTED

| CULTIVAR | No. VINEYARDS GROWING CULTIVAR | AGE RANGE OF VINES (YRS) | TOTAL VINES OF CULTIVAR | ACRES ¹ OF CULTIVAR | ROOTS | CUTTINGS NS or SP ² | No. VINES INFECTED | AVERAGE % INFECTION ³ | PERCENT INFECTION RANGE | EFFECT ON YIELD (Y) |
|----------------------------------|--------------------------------|--------------------------|-------------------------|--------------------------------|------------|--------------------------------|--------------------|----------------------------------|-------------------------|---------------------|
| Cayuga | 1 | 1 | 550 | 0.5 | Own roots | SP | 0 | 0.0 | 0 | N/A |
| Chardonay | 1 | 3 | 325 | 0.3 | 3309 & SO4 | All NS | 0 | 0.0 | 0 | N/A |
| De Chaunac | 1 | 4 | 100 | 0.1 | Own roots | SP | 0 | 0.0 | 0 | N/A |
| Marquette | 2 | 4-5 | 3,410 | 3.1 | Own roots | Both NS | 0 | 0.0 | 0 | N/A |
| Minnesota Muscat | 1 | 2 | 1,100 | 1 | Own roots | SP | 0 | 0.0 | 0 | N/A |
| Seyval Blanc | 2 | 11-15 | 3,300 | 3 | Own roots | All SP | 0 | 0.0 | 0 | N/A |
| Swenson Somerset Seedless | 1 | 5+ | 550 | 0.5 | Own roots | SP | 0 | 0.0 | 0 | N/A |
| Traminette | 1 | 3 | 1,650 | 1.5 | Own roots | NS | 0 | 0.0 | 0 | N/A |
| Triomphe d'Alsace | 1 | 5 | 2,200 | 2 | Own roots | SP | 0 | 0.0 | 0 | N/A |



GRAPE CULTIVARS ALWAYS INFECTED

| CULTIVAR | No. VINEYARDS GROWING CULTIVAR | AGE RANGE OF VINES (YRS) | TOTAL VINES OF CULTIVAR | ACRES ¹ OF CULTIVAR | ROOTS | CUTTINGS NS or SP ² | No. VINES INFECTED | AVERAGE % INFECTION ³ | PERCENT INFECTION RANGE | EFFECT ON YIELD (Y) |
|-----------------|--------------------------------|--------------------------|-------------------------|--------------------------------|-----------|--------------------------------|--------------------|----------------------------------|-------------------------|---------------------|
| Castell | 1 | 4 | 60 | 0.1 | Own roots | SP | 30 | 50.0 | 50 | Low Y |
| Baco Noir | 6 | 4-10+ | 9,120 | 8.3 | One 3309 | Two NS | 3,314 | 36.0 | 0.4-50.0 | Three low Y |
| Cabernet Foch | 4 | 3-7 | 5,225 | 4.8 | Own roots | One NS | 1,643 | 31.0 | 1.2-50.0 | Two low Y |
| Riesling | 1 | 6 | 880 | 0.8 | Own roots | SP | 176 | 20.0 | 20 | Low Y |
| Vidal Blanc | 1 | 10 | 1,650 | 1.5 | Own roots | SP | 330 | 20.0 | 20 | Low Y |
| Marechal Joffre | 2 | 5+ | 3,575 | 3.3 | Own roots | One NS | 350 | 9.8 | 0.8-30.0 | Both low Y |
| Perle | 1 | 3 | 220 | 0.2 | Own roots | SP | 20 | 9.1 | 9.1 | Low Y |



SIGNIFICANCE OF THIS DATA

- 1. CG established in 7 of 16 vineyards (121 acres = 20% of vineyards planted in N.S.).**
- 2. Seven cultivars always infected – grow with due diligence.**
- 3. Nine cultivars showing no infection – so far!**
- 4. Well aged vines (25 yr old) can be kept CG-free.**

