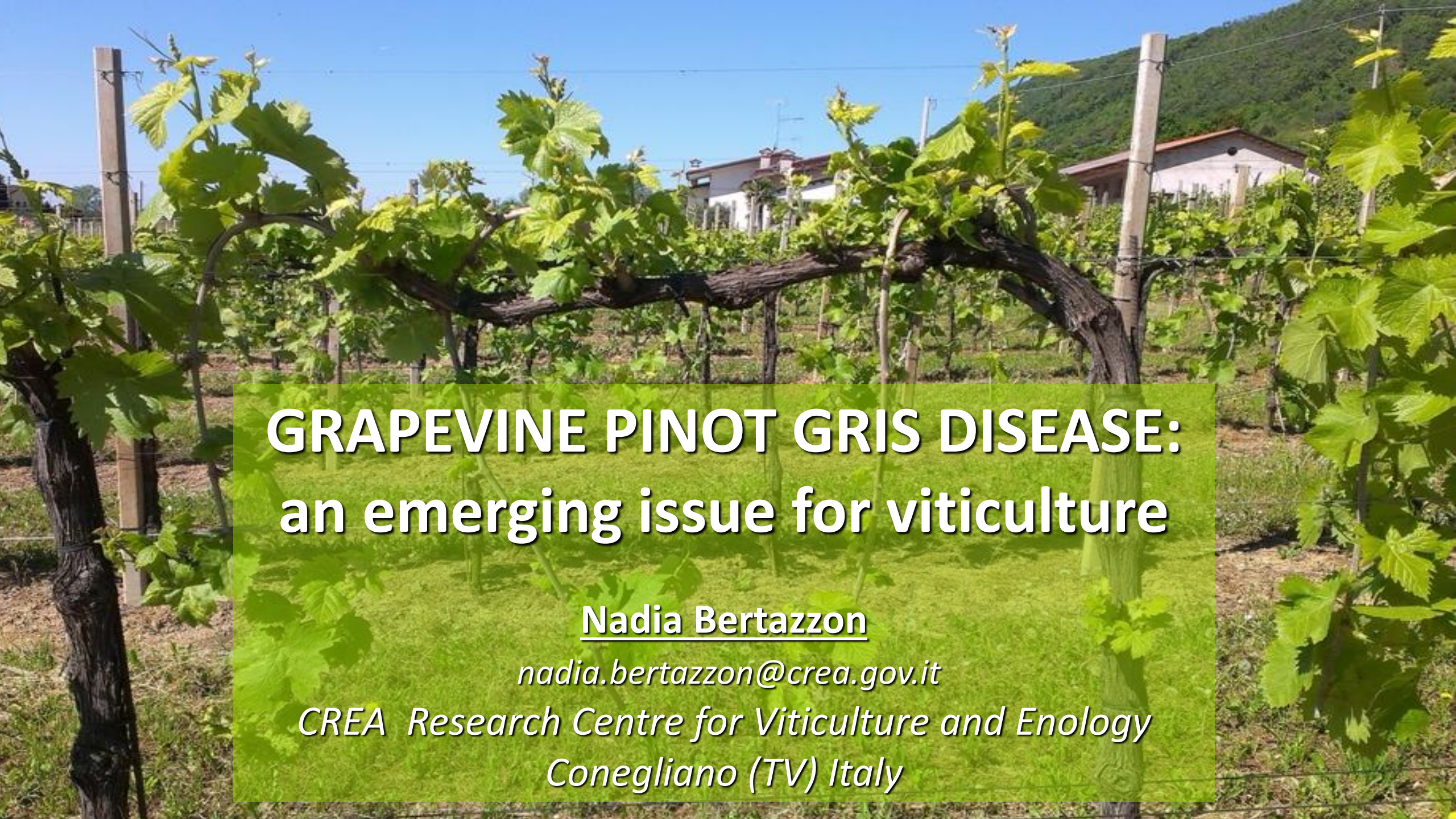


GRAPEVINE PINOT GRIS DISEASE: an emerging issue for viticulture

Nadia Bertazzon

nadia.bertazzon@crea.gov.it

CREA Research Centre for Viticulture and Enology

Conegliano (TV) Italy

Discovery of Pinot gris disease and GPGV in Italy

- 2003, Trentino Alto Adige (Northern Italy)
- Strange symptoms in a few vineyards in cultivar Pinot gris, similar to those caused by thrips or mites

- ELISA and PCR tests excluded the association with known viruses, phytoplasmas, other bacteria and fungi

The disease was called “Pinot gris disease”

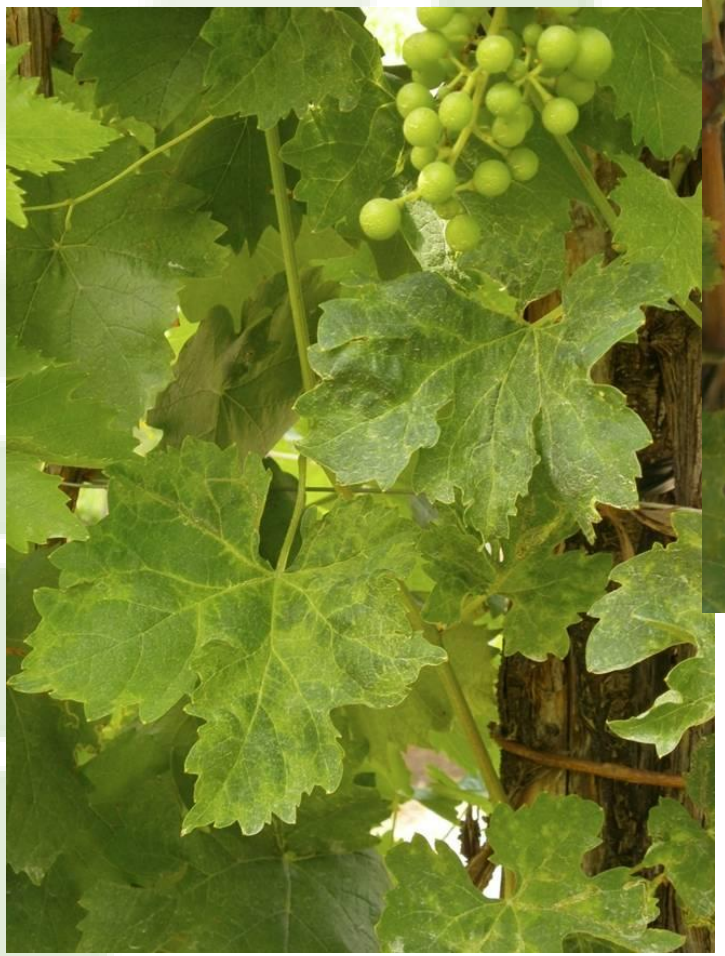
Symptoms

- delayed bud break

- shortened internodes

Symptoms

- chlorotic mottling



- mosaic and deformation of leaves

Symptoms

- desiccation of inflorescences

- uneven fruit set

Symptoms

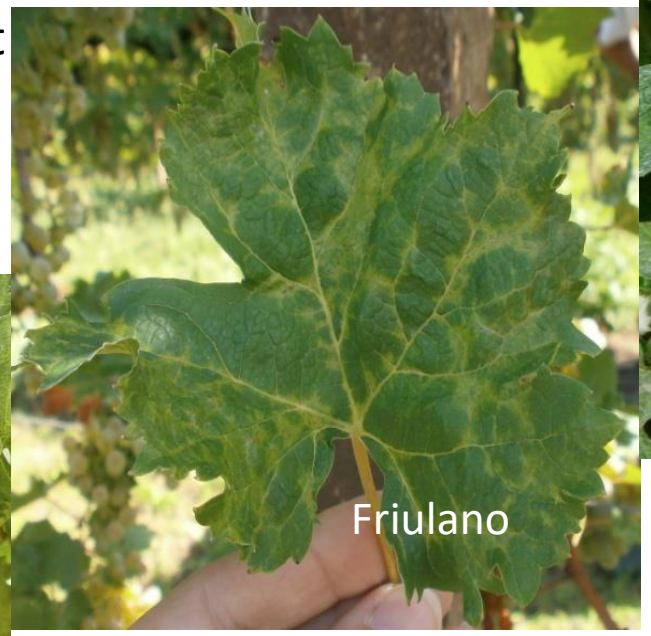
- stunting of the plant:

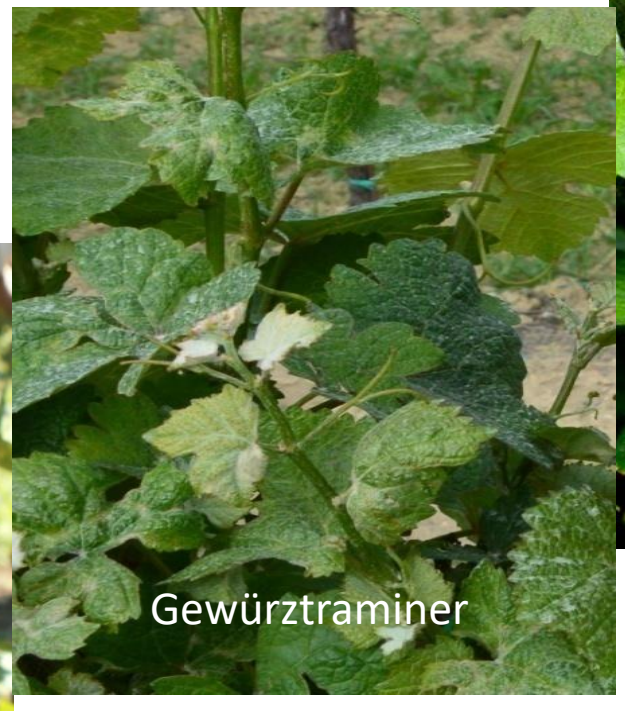
Symptoms are stronger at the beginning of the growth season, while symptomatic plants seem to recover after fruit set; indeed the shoots and leaves growing after June are usually not symptomatic.

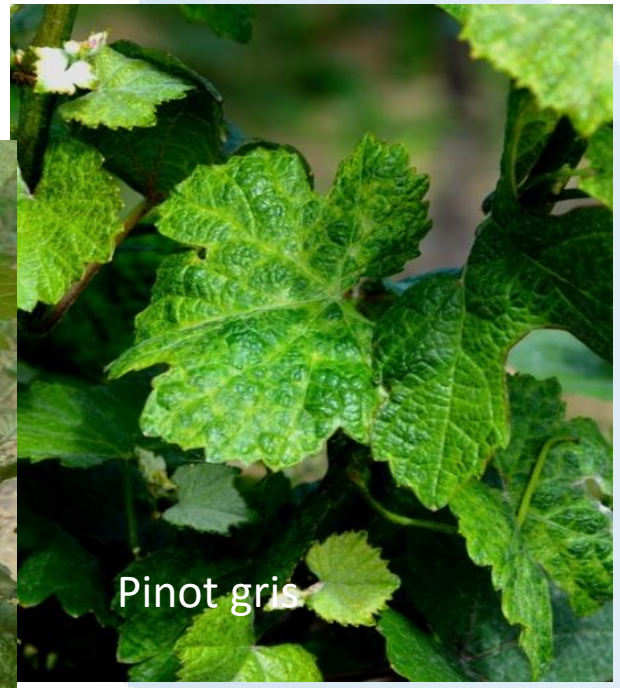
Varietal susceptibility

Diverse susceptibility to the disease and different degree of manifestation of the symptoms among the varieties

Most sensitive varieties so far:
- Pinot gris, Pinot blanc, Pinot
- Gewürztraminer
- Friulano
- Glera







It is known by biological indexing that infected Cabernet franc do not show symptoms

Possible confusions

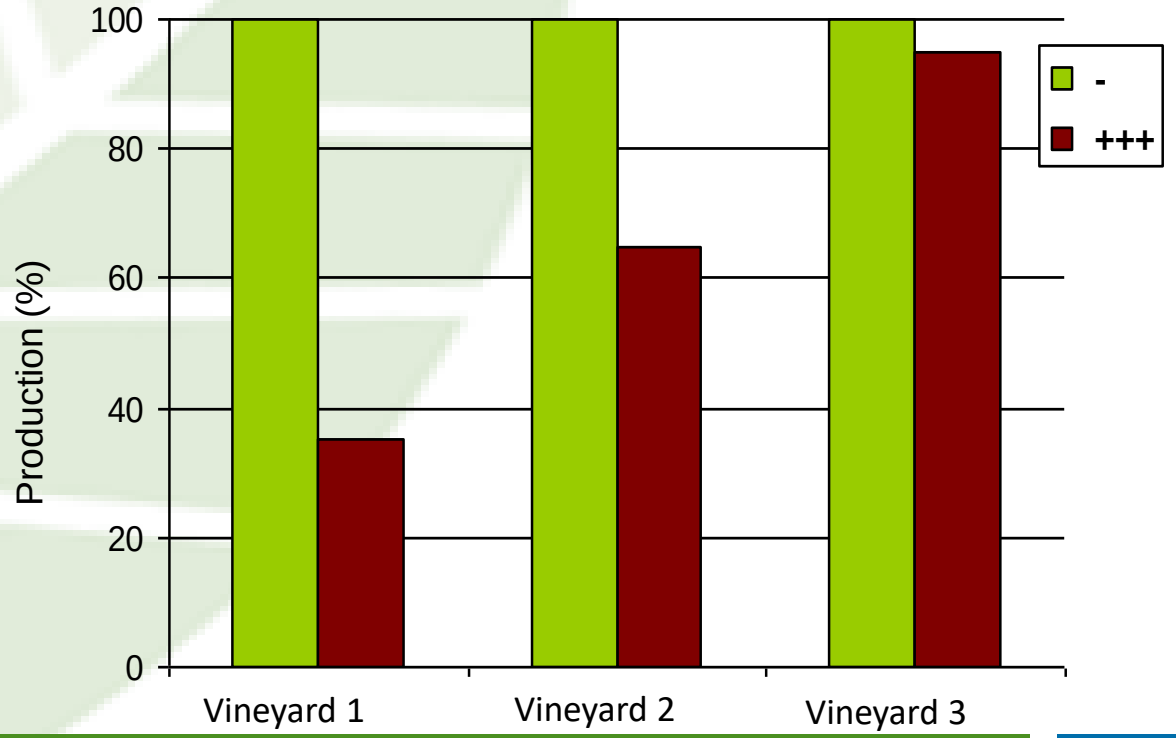
Symptoms can be confused with:

- Damages due to punctures by eriophyid mites (*Calepitrimerus vitis*)
- Damages due to punctures by thrips
- Herbicide treatment
- Fanleaf
- Mineral deficiency (Boron)

Effects on grapevine performance

Glera (very vigorous variety) in Veneto:

- reduction of yield up to 65% in the most damaged vineyard (1)
- no reduction in another vineyard, where the plants remains vigorous despite the presence of strong symptoms in the leaves (3)

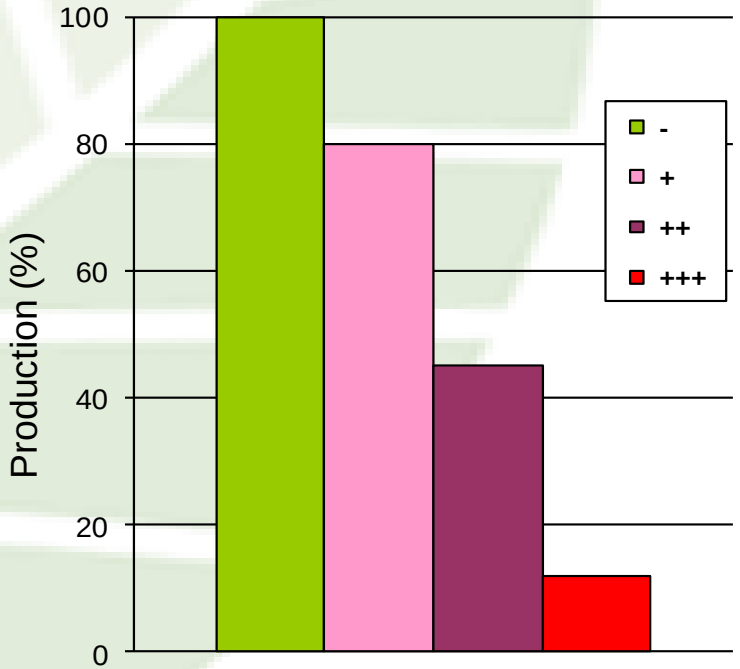


- lower number of clusters and reduced cluster weight
- uneven ripening
- higher acidity and less sugar in the must

Effects on grapevine performance

Damage at the productive level, **both on quantity and quality**

- Trentino Alto Adige: reduction in yield of about 50% in Pinot gris and Gewürztraminer, due to the lower number and weight of bunches
- Veneto: reduction of the production up to 80% in Pinot gris



From: Bertazzon et al. 2015

Reduction depends upon the seriousness of the symptomatology

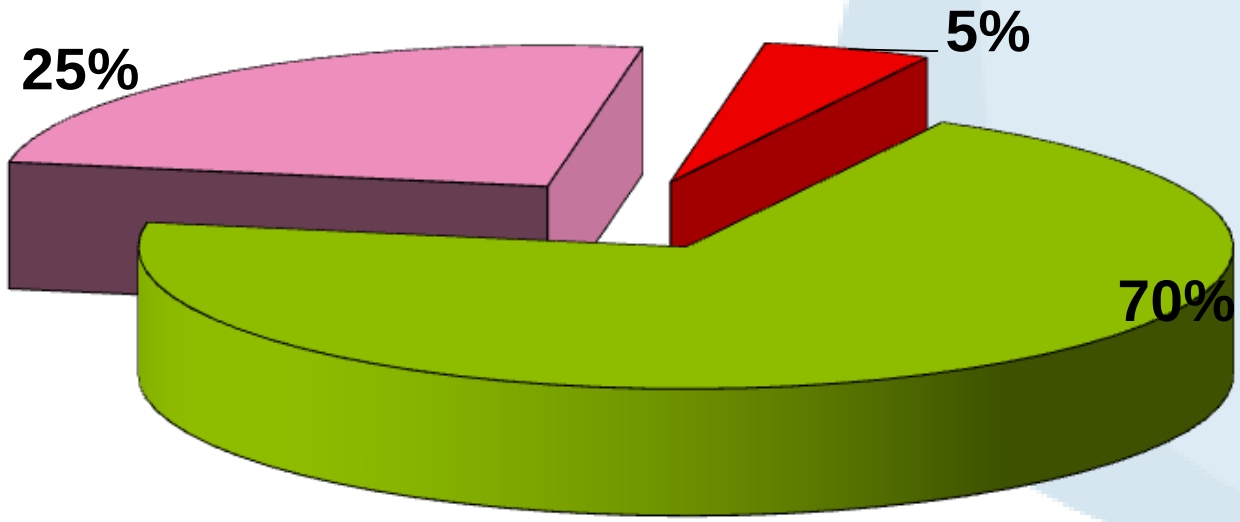
- : asymptomatic plants

+, ++, +++ : symptomatic plants with different degree of symptom extension (few canes, half of the canopy, more than half of the plant)

Current situation in Italy – the disease

Results of a survey performed in 2014-2016 on **250** vineyards in Veneto:

163 out of 250 vineyards
had at least one symptomatic plant

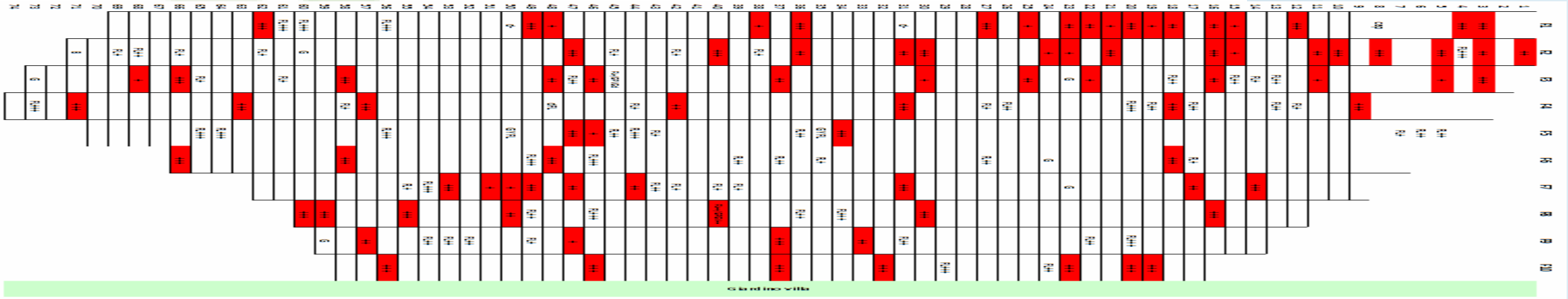


Current situation in Italy – the disease

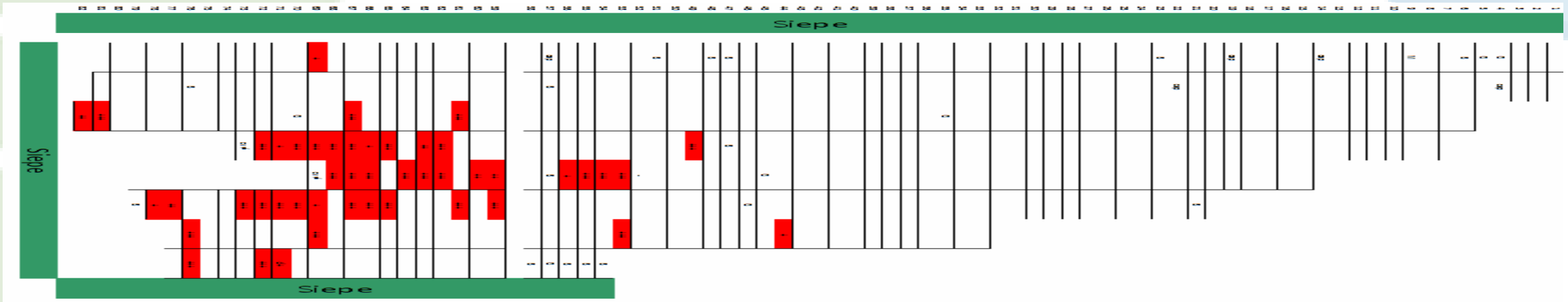
Occurrence and distribution of symptomatic grapevines (yellow pins) in a few surveyed vineyard (delimited in red)

Current situation in Italy – the disease

- Random distribution of symptomatic plants



- Clustering of symptomatic plants

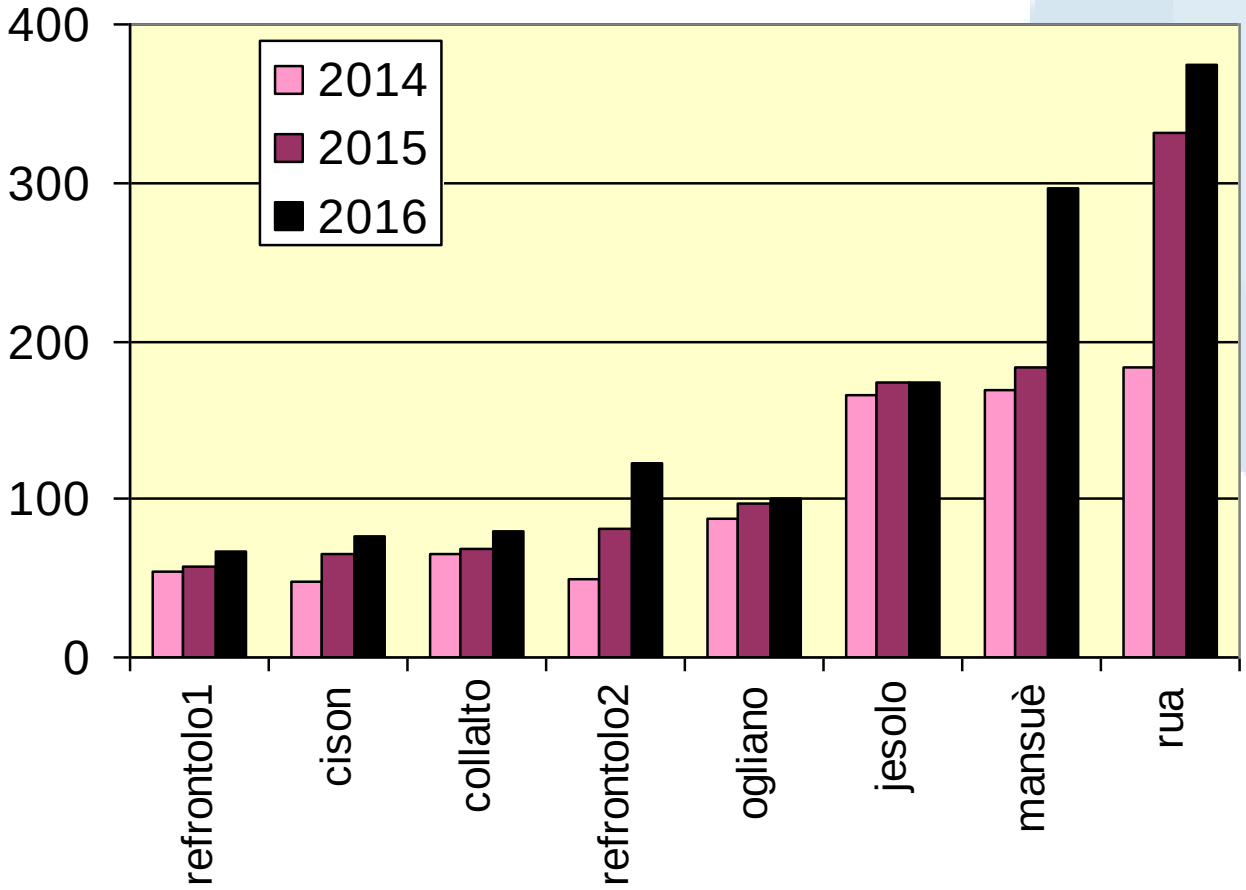


Current situation in Italy – the disease

- Monitoring symptoms in field in 8 seriously diseased vineyards in Veneto region, 4 to 50 year old

- Annual increasing varies between 3% and 80%

- Average + 25% per year!



Discovery of Grapevine Pinot gris Virus (GPGV)

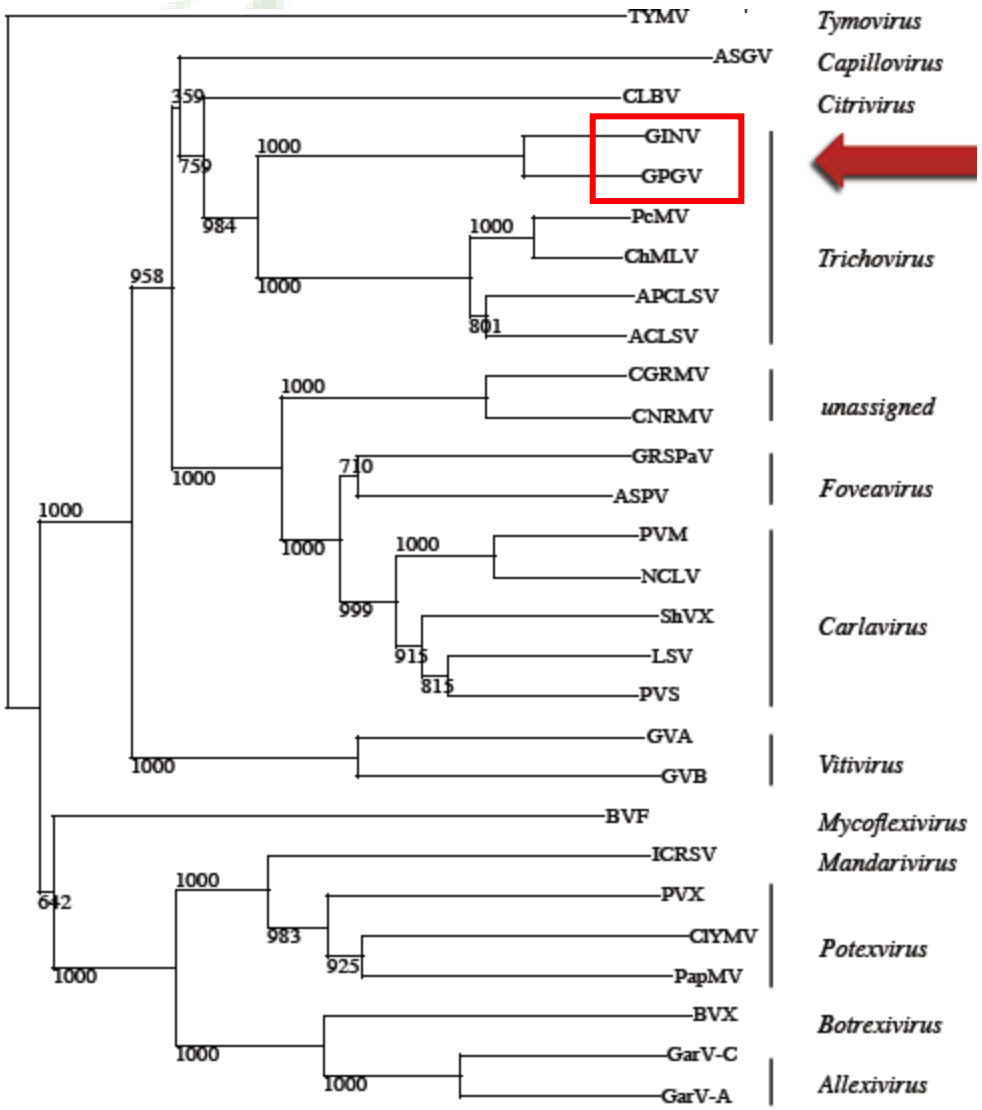
- 2012: a new virus, called ***Grapevine Pinot gris Virus*** **(GPGV)**, was found in the symptomatic plants by NGS technology

- Family: *Trichovirus*

GPGV genome: RdRpol, polymerase; MP, movement protein; CP, coat protein

From Giampietruzzi et al, 2012

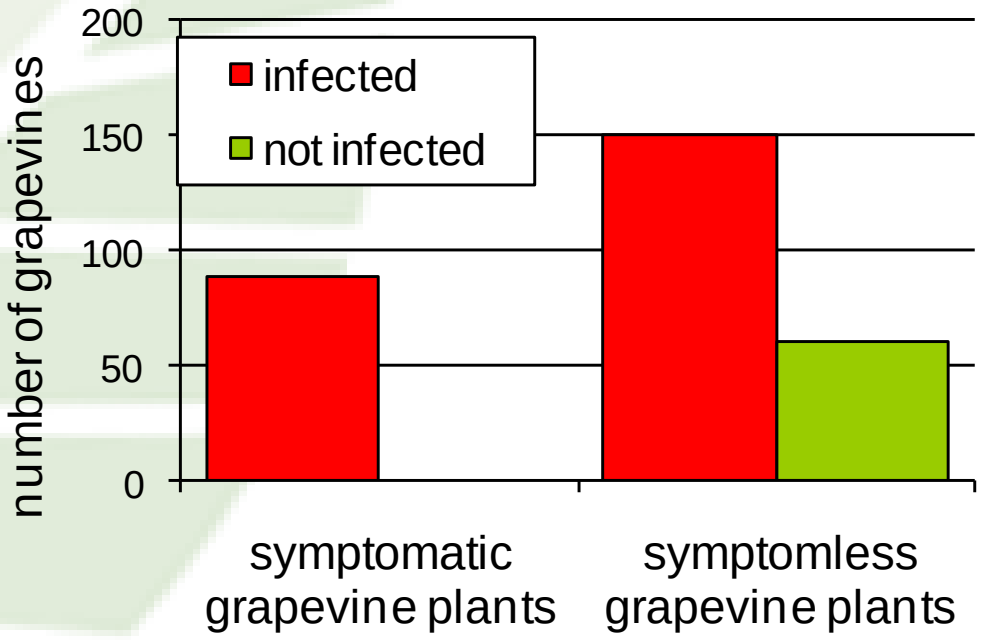
Discovery of Grapevine Pinot gris Virus (GPGV)



New Trichovirus, genetically similar to the japanese virus *Grapevine berry inner necrosis virus* (GINV)

Symptoms and GPGV

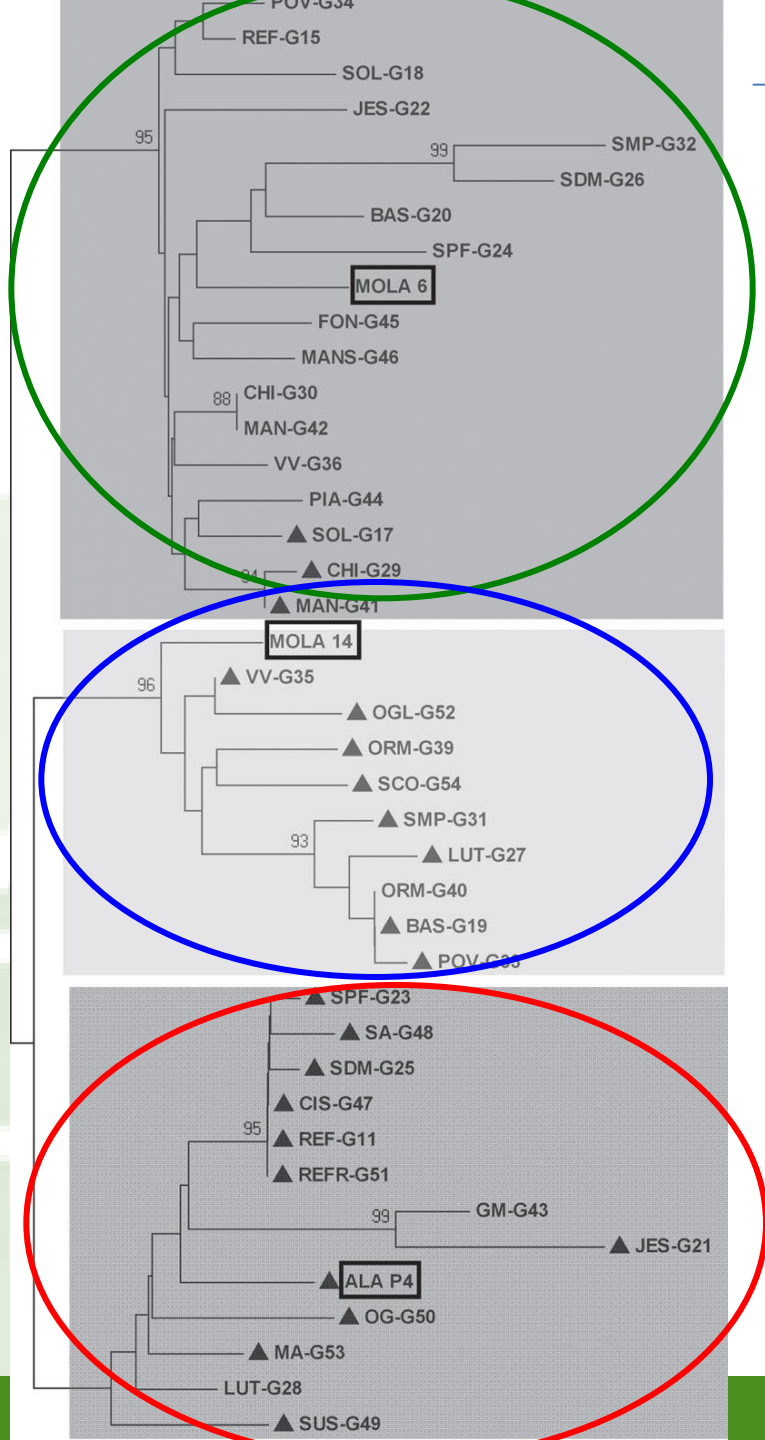
The association between the symptomatology and the virus was not clear: GPGV was found in most symptomatic plants, but also in a high number of asymptomatic grapevines



Graph: molecular data from a survey in Veneto region, carried out in 2013-2015 by CREA

- In the North Eastern Italian regions GPGV is present in roughly 80% of the grapevine plants from commercial vineyards

Symptoms vs GPGV variants



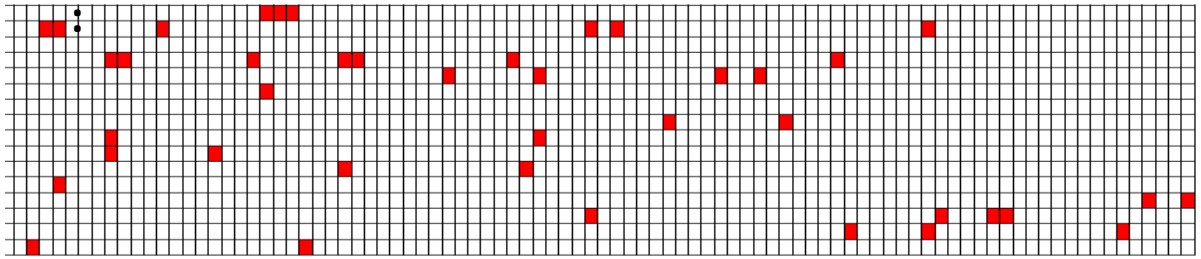
Latent variants:

often (~ 90%) associated to absence of symptoms

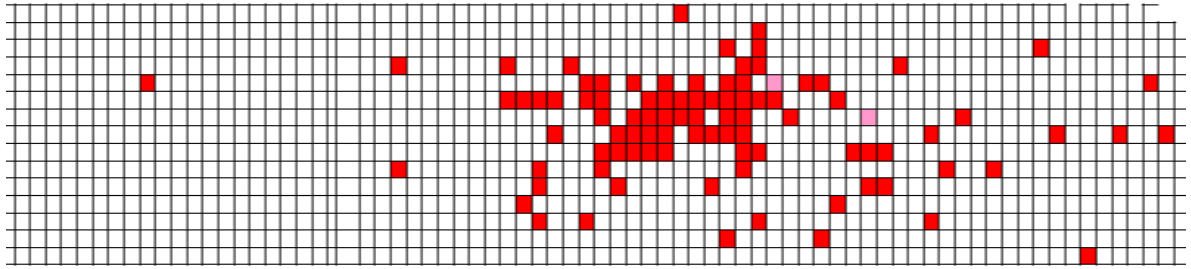
Symptomatic variants:

often (~ 80%) associated to symptoms

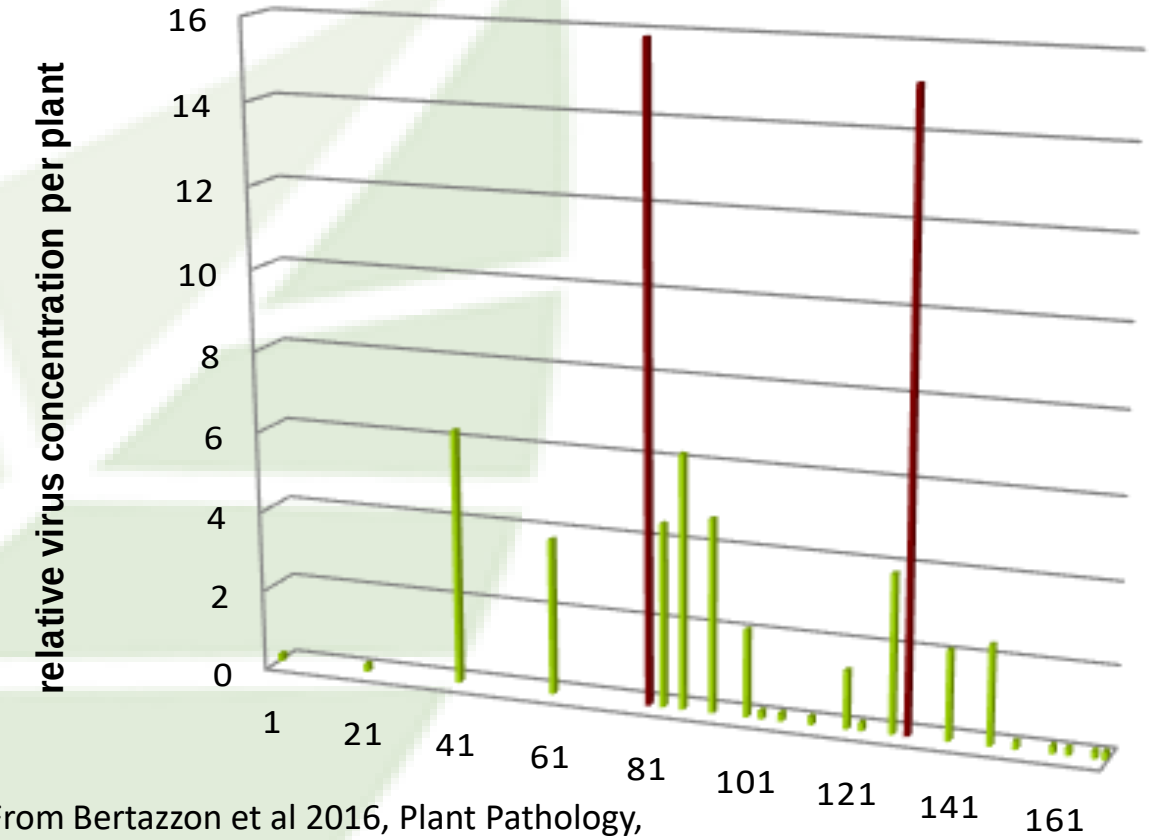
a) not epidemic



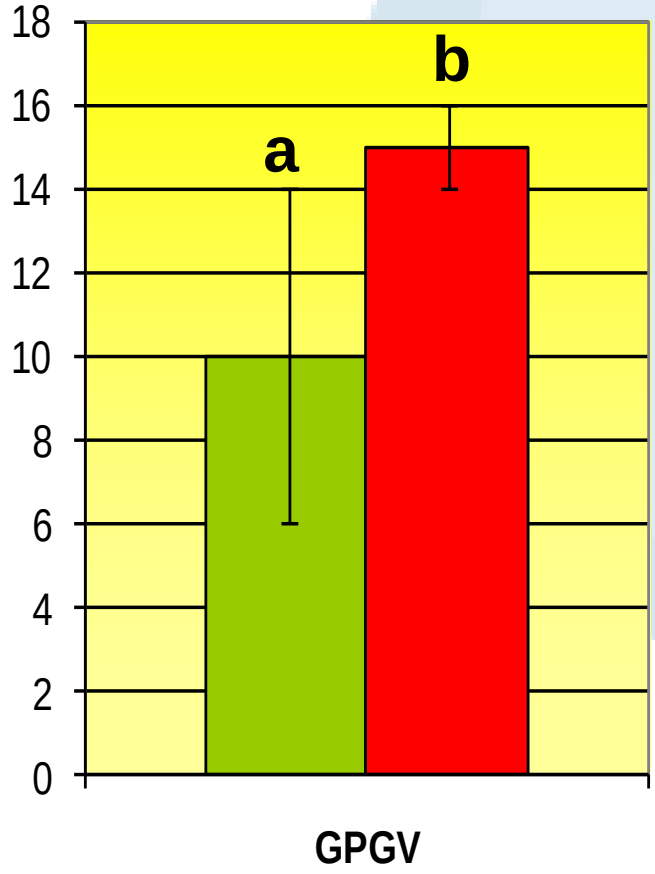
b) epidemic



Symptoms vs GPGV title



From Bertazzon et al 2016, Plant Pathology,
Doi: 10.1111/ppa.12639



Asymptomatic plant

Symptomatic plant

Symptoms vs title and isolates of GPGV

sensitive cultivar ✕ high viral title ✕ symptomatic isolate

✕ enviromental condition?

Epidemiology: vectors

Experimental trials in lab conditions (2013-2015):

Colomerus vitis, the mite causing erinosis, identified as a vector

Epidemiology: host range

GPGV was detected in herbaceous plants collected in the vineyard, which showed symptoms of chlorotic mottling of the leaves

Chenopodium album L.

Silene latifolia subsp. *alba* (Mill.)

Transmission of GPGV via direct contact between grapevine and herbaceous roots should be taken into account

Epidemiology: transmission by grafting

- GPGV is easily transmitted to *Vitis* spp. by grafting

- The susceptibility of grapevine cultivars is variable and unexplored to date

CURRENT PROBLEM
Certification schemes: include GPGV or not?

In any case, better to avoid exporting infected material in the few countries where the virus is not present

crea
Consiglio per la ricerca in agricoltura
e l'analisi dell'economia agraria