

# A New Disease In Italian Vineyards

Pinot Grigio disease causes grapevine leaf mottling and deformation

By Elisa Angelini, Irene Bazzo, Nadia Bertazzon, Luisa Filippin and Vally Forte

**G**rapevine leaf mottling and deformation are the hallmarks of a new vine disease spreading across grapegrowing regions in northeast Italy and Slovenia. The first warning signs came in 2003-04, when symptoms were observed in the vineyards of Piana Rotaliana and Collio. During the next few years, the disease gradually spread to every grapegrowing area in Trentino Alto Adige and Friuli Venezia Giulia—the two regions where it first developed.

The disease then spread to neighboring regions such as Veneto, Emilia Romagna and Lombardy. In Veneto, where it was first identified in the DOCG Prosecco area in 2013, it has become a constant presence, having been detected in each of the best grapegrowing provinces. In Emilia Romagna, there was a high incidence of infected plants in 2013, whereas in Lombardy the disease wasn't detected until 2014. For the time being, the disease has only a sporadic presence in Emilia Romagna and Lombardy, which each have some hotbeds scattered throughout the region.



Clockwise from top right: The canes of affected vines are stunted with shorter internodes and smaller leaves; the Glera cultivar displays nerve discoloration on its leaves until the end of the season; leaves show symptoms of deformation and discoloration.

**First article from *Il Corriere Vinicolo***

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The disease was detected for the first time in Pinot Gris, which is where the Italian name for the disease comes from (malattia del Pinot Grigio or "Pinot Grigio disease"), though it was later identified in other varieties. The cultivars most affected so far are Pinot Gris, Pinot Blanc, Pinot Noir, Gewürztraminer, Tocai Friulano and Glera (a grape used for Prosecco production), all typical varieties in the regions where the disease is most widespread. No data is currently available on the susceptibility of other varieties common to Italy and other European regions, although Merlot and

Cabernet seem to show few or no symptoms at all.

Fortunately, the incidence of Pinot Grigio disease in the affected areas has remained generally low. In the vineyards observed in Trentino Alto Adige, the average incidence in susceptible varieties was said to be around 0.5% during the past two or three years. In Friuli Venezia Giulia and Veneto, the incidence might be lower. Symptomatic plants are present sporadically and in an isolated manner in most vineyards. However, when the incidence of disease is higher, there is generally a distribution in groups, localized both in the center and at

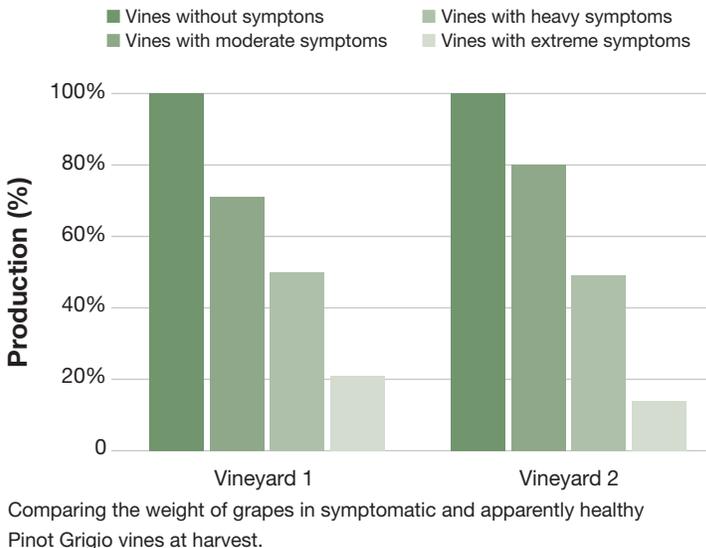
vineyard edges. There are, however, some vineyards where symptomatic plants appear randomly distributed throughout the whole vineyard.

**Symptoms and damage to production**

The symptoms described above for Pinot Gris, Gewürztraminer and

Glera are more evident at the start of the growing season, when they can be confused with damage caused by eriophyid mites and thrips. At bud break, the infected vines show a clear delay compared to healthy plants, with stunted canes with short internodes bearing small, deformed leaves with

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discolored nerves and mottling on the leaf surface, which remains during vegetative growth.

The symptoms often diminish as the growing season progresses, giving the impression that the plants are recovering. In fact, the new canes and leaves that develop after fruit set appear normal. The following year, however, the symptoms go through the same stages as described above, proving recovery is only illusory and temporary. In more serious cases—especially for Gewürztraminer—cane development remains limited throughout the

growing season to the extent that no cane is able to lignify.

As for production, in some cases there is a desiccation of the inflorescence and bunch shatter. Bunches of symptomatic plants are generally smaller at harvest, with millerandage and delayed ripening—especially on the worse-affected plants. The depressive effects of the disease on production parameters seem more serious for Pinot Gris, where the weight of grapes at harvest may be reduced up to 80% on symptomatic plants (see “Harvest 2014”).

The Glera grape, on the other hand, shows less serious production losses, with an average of about 35%, according to data gathered in 2014. From the point of view of quality, symptomatic vines are prone to higher acidity, while the concentration of sugars does not seem to vary significantly between symptomatic and non-symptomatic vines.

**Incidence of the disease in Veneto**

In 2014, a voluntary territorial-monitoring network was set up in Veneto by research bodies (CRA-VIT and the University of Padua), the Regional Plant Health Service, producers’ associations, wineries and grapegrowers including both consultants and sellers. A single monitoring sheet and online database have been adopted by the Plant Health Service and distributed to technicians working in the Veneto region to collect data.

About 290 vineyards were monitored—especially the cultivars Glera and Pinot Gris—and the symptoms were observed for each individual vine (about 500-1,000 vines per vineyard). Only 29% of the vineyards observed had no symptomatic plants. Of the total vineyards with symptoms, most currently show a very low incidence of the disease (less than 1%). In about 10% of the vineyards, the presence of symptomatic vines ranges from 1% to 10%. In nine vineyards (3% of the total), the incidence of symptomatic plants is higher than 10%, reaching peaks of 40% (see “Presence of Symptomatic Vines”).

Processing data collected through the monitoring sheet has shown no correlation between vineyard age and the presence of symptomatic vines. High levels of the disease

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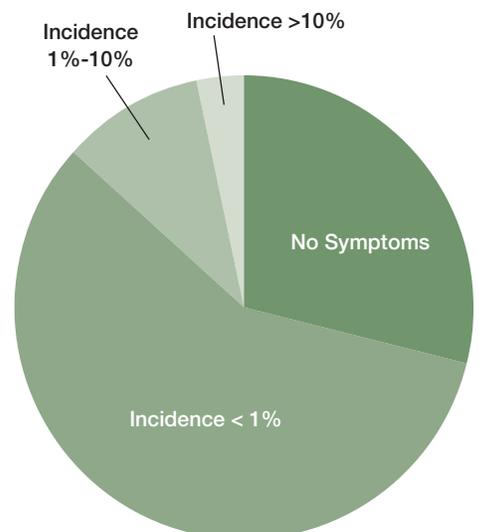
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**PRESENCE OF SYMPTOMATIC VINES**



The presence of symptomatic vines in the vineyards monitored in Veneto in 2014. The data have been organized into four classes of incidence.

## KEY POINTS

Researchers from the CRA-VIT (Viticulture Research Center) in northeast Italy found that 71% of the 290 vineyards studied in the Veneto wine region are affected by Pinot Grigio disease.

The disease is associated with a virus and affects Gewurztraminer, Pinot Blanc, Tocai Friuliano and other grapes—in addition to Pinot Gris/Grigio—in various parts of northeast Italy.

Vine growth, flowering and yields are all adversely affected by the disease, for which there is no known vector at this time.

were found both in young vineyards (just two years old) and vineyards planted more than 40 years ago. From the observations carried out, it seems that at the moment the disease is more widespread in the hilly areas of the Veneto region, where it was detected in 84% of the vineyards observed, compared to the plains, where symptoms were identified in 49% of vineyards.

An interesting relationship has emerged, comparing the nature of the soil and the incidence of symptoms in the vineyards being monitored. Most of the vineyards with a high incidence of symptoms are found on clay soil, while most vineyards cultivated on loose soils do not present visible symptoms. However, these are preliminary data that need more in-depth study.

### The etiologic agent

Although the exact etiology (cause or causes) of the disease is still unknown, in 2012 the presence of a new virus called grapevine Pinot Gris virus (GPGV) was observed in symptomatic plants from Trentino Alto Adige. Following this finding, the virus was identified in the Italian regions affected by the disease as well as other European states (Slovenia, the Czech Republic, Slovakia, France and Greece), though some of these have never reported any presence of the disease. Recent data from the analysis of vine samples collected in several vine-growing countries show that the virus is more widespread than first believed, since it has also been found in Croatia, Serbia, Montenegro, Bosnia, Macedonia, Ukraine, Romania, Spain and Portugal.

However, the presence of this virus is not directly correlated to the presence of symptoms: GPGV is present in all the symptomatic vines but also in a large number of susceptible vines without any symptoms of the disease. In particular, recent studies carried out in the Triveneto region (Trentino-Alto Adige, Veneto, Friuli Venezia Giulia) show that the virus is present in about 70%-80% of apparently healthy vines. There are, however, new data

that highlight the presence of several strains of the virus, which are probably associated with a different pathogenicity in the field.

These results lead us to believe that the relationship between the virus and the disease is still unclear, and there is probably interaction with the environment, cultivation methods and agronomic practices that can influence the expression of symptoms. Only more in-depth studies will be able to clarify the situation.

### How the disease is transmitted

By now it seems clear that the spread of this disease is increasing in this territory, but we still don't know how it spreads. Observations carried out in the different Italian regions suggest it is spread by an animal vector. It also seems that the infection increases slowly in the individual vineyards, though there are cases of sudden outbreaks. This trend seems common in the three most-monitored regions so far (i.e., Trentino Alto Adige, Friuli Venezia Giulia and Veneto).

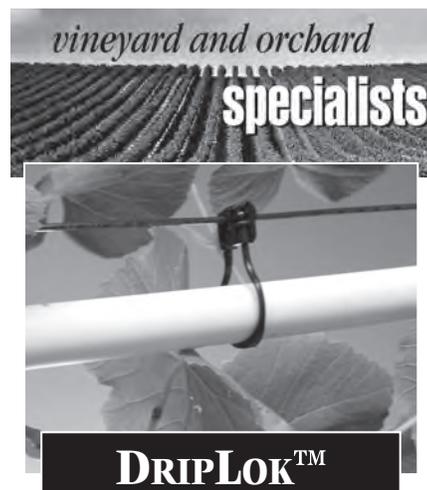
Given the lack of scientific data, at the moment there are no strategies for fighting the disease other than monitoring symptomatic vines in the field and potentially uprooting stunted plants.

### Conclusions

Several Italian and European research bodies are studying this disease and the GPGV virus. Researchers are looking into the association between the disease and the virus: how it is transmitted, laboratory diagnostics, recovery of symptomatic vines and the possible effects of nutritional deficiencies. It is also important to understand if agronomical or environmental factors cause the disease, and therefore if co-existence with this problem is possible, given the large number of vines that are infected by the virus but do not show symptoms.

Knowledge of this disease is still very limited, mainly because it has only recently been discovered. In order to deal with increasing concern and find prompt solutions, it is essential to continue doing research, join forces and share results both between research bodies and technicians and those operating in the grapegrowing and nursery sector. 🍷

The authors of the article work for CRA-VIT (Viticulture Research Center), located in northeast Italy. Since 1923, CRA-VIT has studied issues related to the grapevine including ampelography, genetic improvement, breeding, biology, physiology, protection, propagation, ecology, agronomic (and more recently metabolomic and transcriptomic) techniques. The grapevine pathology group, led by Dr. Elisa Angelini, carries out research mainly focused on diseases associated with viruses, phytoplasmas, bacteria and their vectors. The research looks into etiology, epidemiology, diagnosis and control of grapevine diseases, molecular characterization of pathogens and grapevine defense mechanisms.



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