

The Observatory - OSCAR - is the national organisation for collecting and sharing information on the first full-scale deployments of downy and powdery mildew resistant grape varieties in French vineyards. The challenge? Combine the use of resistant grape varieties with agronomic practices that protect their durability.

This stage involving genuine full-scale experiments places the wine-growers at the heart of the system.



The main challenge facing the Observatory is to assess **resistance durability**, i.e. to monitor the powdery and downy mildew populations that could make resistances less effective. OSCAR will also be used to acquire or consolidate **agricultural data** on these new grape varieties in production conditions. Based on the initiatives of wine-growers and regional structures that plant the resistant grape varieties, it will provide knowledge for joint construction of cultivation systems that for the first time combine varietal resistance and additional control methods: fungicide treatments, prophylaxis and biocontrol. The Observatory will thus **pool individual experiences** and **encourage the transfer of knowledge** between the players.

Why resistant grape varieties?

Cultivated grape varieties are all highly sensitive to the airborne diseases

powdery mildew (*Erysiphe necator*) and **downy mildew** (*Plasmopara viticola*). An average of five to ten fungicide treatments are currently required during the season to protect against powdery and downy mildew. The **Ecophyto plan** set quantitative goals for reducing plant protection products and in this context, the use of new resistant grape varieties, that are natural sources of resistance described in American or Asian *Vitis* species, would be one of the most promising levers. The first experiments in France in recent years show that using these grape varieties can reduce the treatment frequency index (TFI) by more than 80%.

The Observatory, a multi-purpose tool

The Observatory is geared for three uses: **research**, **monitoring**, **demonstration** and **sharing experiences**. Its size and ambition make it unique in:

- **compiling** data on **changes in populations** of pathogens targeted by the resistance genes through regular collection of downy mildew isolates and laboratory testing of the virulence and aggression of populations;
- **monitoring** on large plots the behaviour of resistant grape varieties faced with the various pathogens in varied agroclimatic situations;
- **detecting** any appearance of new **health problems**;
- **capitalising on** feedback on managing these varieties **in production conditions**: agronomic behaviour, mechanisation potential, ease of management.

Setting up a national network



- Plots in different production areas
- For all the grape varieties deployed
- Varied agroclimatic situations

- Plots under production (> 0.2 ha)
- Regional partners

Why monitor the changes in resistances?

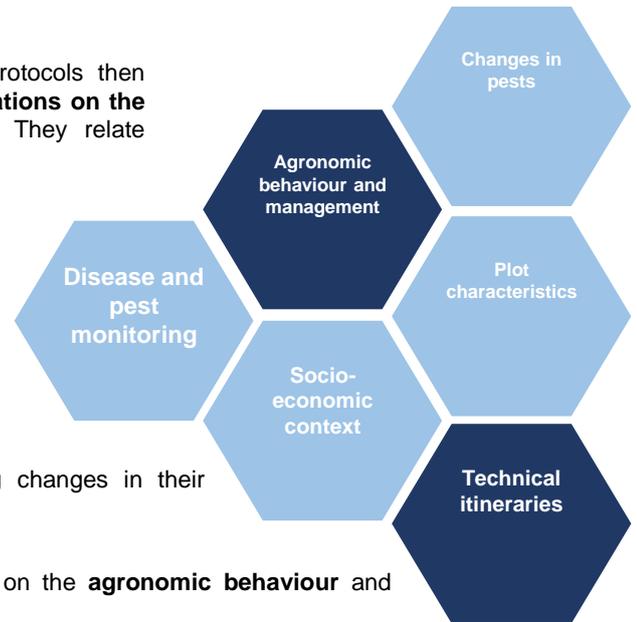
We have few data today to **predict the potential for change** of pathogens faced with the deployment of the resistance. And yet, despite very restricted distribution, changes in aggression of downy mildew populations have already been reported. This adaptation results in reduced effectiveness of the resistance known as **erosion**. A first breakdown was described in 2010 on the Bianca variety in Europe and oidium was seen to have infected plants in North America, despite them bearing a resistance gene.

Observe to build up durable systems jointly



All the data are collected via standardised protocols then centralised nationally. They come from **observations on the plot and interviews** with the wine-growers. They relate mainly to:

- **The technical itinerary:** strategic and tactical elements (pruning methods, green operations, etc.) in managing the vine;
- Monitoring **epidemic dynamics** and pests during the season;
- Collecting **pathogen isolates** for assessing changes in their aggression in the laboratory;
- Quantitative (yield) and qualitative elements on the **agronomic behaviour** and **feedback** on the management.



What is the status of varietal breeding in vines?

INRA has been conducting **genetic improvement** programmes since the 1970s. The research teams produce an inventory of resistance traits to incorporate the most interesting in the cultivated gene pool through **crossing**. Initiated at the beginning of the 2000s, the **INRA-ResDur** programme, based on **pyramiding of several** powdery- and downy mildew-resistant **genes**, has reduced the risk of breakdown of resistances by the pathogens. It is planned to register grape varieties in the official listing in 2018. Our **European neighbours** have also produced a certain number of grape varieties through varietal breeding; these are registered in Germany, Italy and Switzerland. Certain grape varieties are currently included in the **wine-growing classification** in France. This classification, which is definitive or temporary depending on individual cases, will allow the planting of significant areas.

Running and organising a network of players

The Observatory is the result of a partnership between **INRA** and **IFV** (French vine and wine institute). It is run by **SAVE UMR** (INRA Bordeaux), with a Steering Committee in charge of validating the protocols, incorporating new sites and communicating around and within the Observatory network. The Observatory relies on local partnerships with **regional bodies**. The first data have been collected in 2017.



Towards a re-emergence of secondary pests?

The current use of fungicides has tended to overlook the presence of certain secondary diseases in our vineyards. Once fungicide use has dropped dramatically, their presence may become recurrent and even cause significant damage. Thus, **black rot** can cause considerable harvest losses in plots where the grape varieties are sensitive to this disease and without a suitable strategy. Infrequent diseases such as **anthracnose** resurface. As the resistances are sometimes only partial, it is also important to note that **powdery or downy mildew** symptoms can appear. Phylloxera scabs are also seen frequently.

Further information: oscar@inra.fr

observatoire-cepages-resistants.fr