Decision Support Systems

Bottlenecks and conditions for adoption in different European grapevine-growing regions

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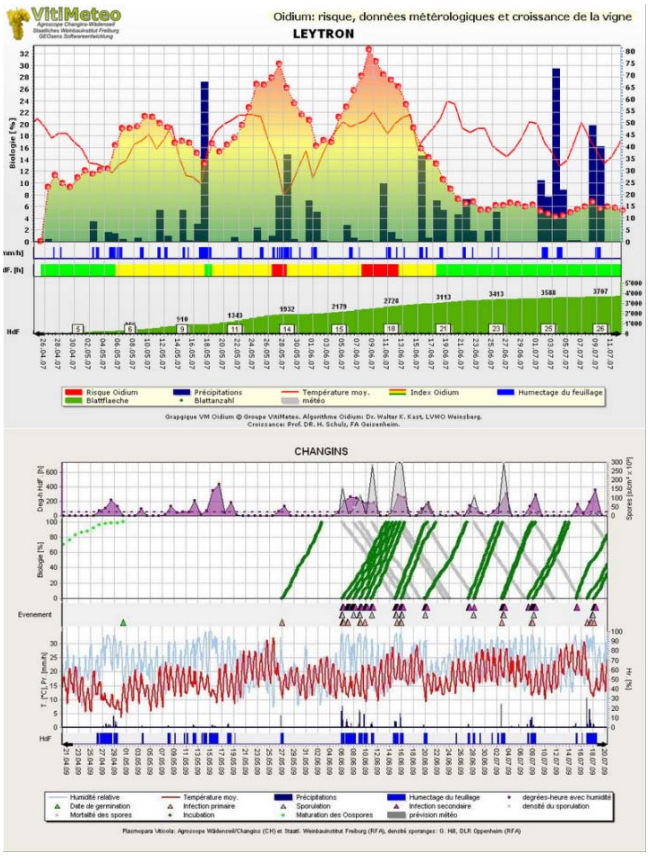

Photo left: Olivier Viret, Agroscope ACW, Switzerland. Images above: Agrometeo, Switzerland.

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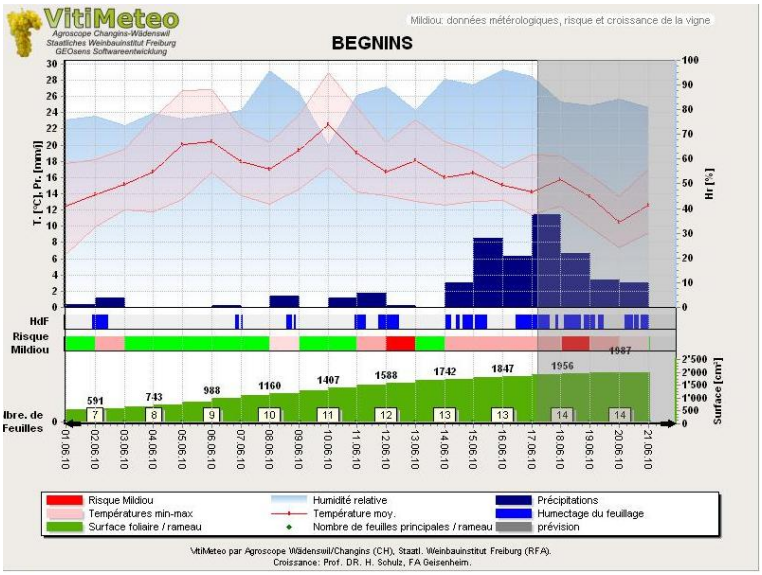
Decision Support Systems

The vast majority of vineyards worldwide are planted with *Vitis vinifera* cultivars, all of which are susceptible to the main fungal diseases affecting grapevine. Therefore, the use of fungicides is indispensable in order to produce high quality wines, even for organic viticulture. As public concern about use of pesticides and residues in wine is growing, Decision Support Systems (DSS) are a key element to help growers restrain pesticide applications to the minimum needed to ensure qualitative production.

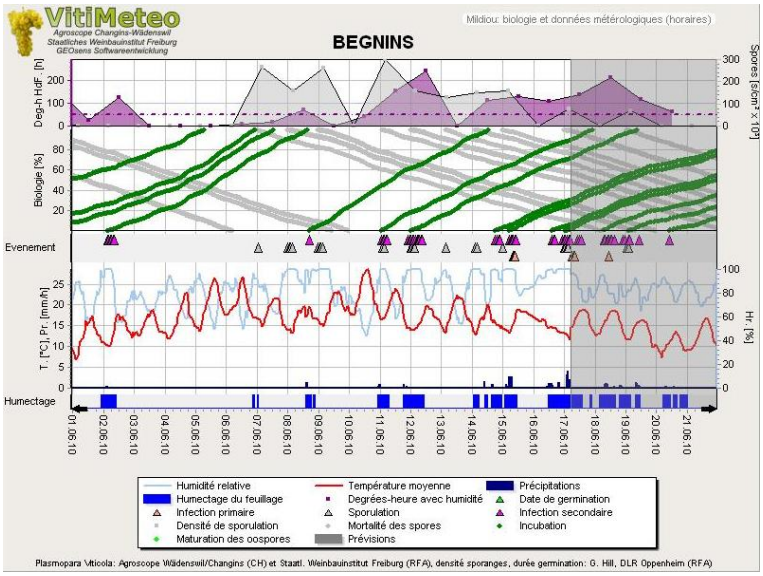
DSS offer much potential to reduce the pesticide input in integrated control strategies against the most important fungal diseases of grapevine. The principle of applying a pesticide only if needed is a basic element of Integrated Pest Management.

DSS use weather data in order to identify periods when the threat of infection is critical. Disease development models are now available for most of the main fungal pathogens of grapevine. However, there is intensive ongoing research to develop and validate disease forecasting which gives more accurate results and enables winegrowers to optimise their spray schedules.

Attempts to integrate both downy and powdery mildew are being conducted by researchers and, if successful, will provide excellent tools for growers to decide when to spray. In most Western European countries, extension organisations and private advisers already make wide use of DSS to write their spraying recommendations. However, practical and organisational limitations still often result in preventive spraying following a regular pre-defined schedule.



Online services such as www.agrometeo.ch seen here offer free information to growers. The VitiMeteo-Plasmopara model simulates the main development step of *Plasmopara viticola* using weather observations from across the country. Above you can see the results for the Begnins area, showing meteorological information, vine growth and downy mildew risk. Below it presents detailed information on downy mildew biology and meteorological statistics. © Agrometeo, Switzerland.



Summary of the major advantages in using DSS

The use of DSS is a central tool to improve the efficacy of plant protection by determining the right timing for fungicide sprays. It can also lead to a reduced number of sprays by avoiding unnecessary

treatment with fungicides, particularly at the beginning of the season or during periods of low disease pressure.

On-site prerequisites for the application of DSS

> Qualitative weather data must be available at a local scale.

> Continuous validation by experts with field data (for example, symptoms, epidemiology and phenology).

> Skilled and trained growers and extension advisers (field observation, understanding of DSS outputs and implementation of adapted protection strategies).

> Precise dosage systems, such as those adapted to the leaf area to be sprayed.

> The quality of application is essential.

Local weather data is an essential pre-requisite for DSS. © Olivier Viret, Agroscope ACW, Switzerland.

Biotic and abiotic factors affecting the efficacy of DSS

> Good quality spraying equipment is essential for precision viticulture.

> All organisational and structural factors which enable applications to be made on time and to react quickly to DSS recommendations (for example, availability of equipment and labour force, farm size, and cover cropping to increase trafficability).

> Extreme climatic conditions can lead to inaccurate modelling.

Factors influencing the decision of growers to use DSS

> Adjustment of forecasting parameters to regional conditions; local validation and adjustment of models and DSS by experts (to account for the effects of local microclimates, varieties).

> Economic information should be provided together with technical information (farmers want to know the possible benefits and potential losses).

> The training and technical level of the growers.

Bottlenecks for DSS use in different European countries

> Availability of precise epidemiological knowledge for some diseases or specific steps in the patho-gen development cycle.

> Availability and cost of either weather data or a weather station network for a specific region.

> Continuous validation by experts and field observations are essential to support DSS use.

> Training and support must be available for the grower to understand and implement strategies linked to the DSS outputs.

> Availability of accurate models that integrate both downy and powdery mildew in order to help the grower in defining a global protection strategy.

Decision Support Systems

How to promote the dissemination of DSS in Europe

> Support the availability of weather data and develop weather station network(s) at local scales.

> Validation and follow up of the DSS.

> Support the development of new and 'user friendly' DSS, and the validation and comparison of existing DSS and models to increase the trust from farmers.

> Training of extension services, advisers and farmers about DSS use and strategies (for example, how to make decisions from information provided by models, how to integrate the information in the global farm management).

> Support the establishment of networks of farmers.

> Set up easy communication tools (new technologies) to deliver the DSS outputs extensively and free of charge for the growers.

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About ENDURE

ENDURE is the European Network for the Durable Exploitation of Crop Protection Strategies. ENDURE is a Network of Excellence (NoE) with two key objectives: restructuring European research and development on the use of plant protection products, and establishing ENDURE as a world leader in the development and implementation of sustainable pest control strategies through:

> Building a lasting crop protection research community

> Providing end-users with a broader range of short-term solutions

> Developing a holistic approach to sustainable pest management

> Taking stock of and informing plant protection policy changes.

Eighteen organisations in 10 European countries are committed to ENDURE for four years (2007-2010), with financial support from the European Commission's Sixth Framework Programme, priority 5: Food Quality and Security.

Website and ENDURE Information Centre:

www.endure-network.eu

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