Application of a web-based DSS in the Iberian Peninsula for the sustainable management of vineyards

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Background: The transition from conventional to sustainable viticulture requires increased knowledge of the farming system and makes decision-making for crop management complex (Rossi et al., 2012). In Europe, Directive 128/2009/EC on the Sustainable Use of Pesticides makes mandatory the adoption of integrated pest management (IPM). IPM promotes low pesticide control of harmful organisms based on crop monitoring and decision support tools (Art. 14 of the directive). Vite.net® is a Decision Support System (DSS) developed by Horta (www.horta-srl.com), a spin-off company of the Università Cattolica del Sacro Cuore, Italy. The DSS is available for Italian growers since 2013 and it is used by hundreds of farmers. Since 2015, the DSS is available also in Spain and Portugal (González-Dominguez et al., 2019). In this work, we show the results of two pilot runs developed in Spain and Portugal to evaluate the use of vite.net, primarily for the management of downy mildew (DM) in vineyards.

Pilot in Spain

In 2016 and 2017, the DSS was evaluated in the Penedès region (North-East Spain) by the regional service of plant health (SISTEMIO project; Guijarro, 2017). The evaluation was performed in 18 vineyards, by comparing the DSS output concerning primary and secondary infections of DM, fungicide treatments performed by the growers, and disease assessments.

Average number of treatments against DM performed by growers following common practice and recommended by vite.net.

<table>
<thead>
<tr>
<th>Year</th>
<th>Grower</th>
<th>vite.net</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>3.1</td>
<td>1.1</td>
</tr>
<tr>
<td>2017</td>
<td>3.0</td>
<td>1.9</td>
</tr>
</tbody>
</table>

vite.net did advise for controlling DM only when there was risk of infection, saving 49% of the sprays during unfavourable periods for the pathogens.

Cases in which the grower made a treatment or not against DM when vite.net predicted an infection or not.

In 15 cases, the grower did not protect an infection predicted by vite.net; in 14 of them (93%) DM symptoms were observed in vineyards.

In 6 cases, the grower applied fungicides even though there was no risk for DM.

In 2018, the DSS was evaluated in an organic vineyard of Penedès with high pressure of DM, by the regional service of plant health. A subplot was treated based on vite.net advice (Orchard A) and the rest of the vineyard was treated by the grower (Orchard B).

8 treatments were performed in orchard A (first treatment 30/04) and 7 in orchard B (first treatment 4/05), with different timings.

Orchard B showed DM symptoms repeatedly during the season, and was severely affected. Orchard A showed few symptoms only once, because of one predicted infection was not protected timely.

References

