A WEB-BASED DECISION SUPPORT SYSTEM FOR THE MANAGEMENT OF INTEGRATED VINEYARDS

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The transition from conventional to integrated pest management and, more in general, to integrated production requires an increase of knowledge about the vineyard system and includes also an increase of limits and fulfilments. The vineyard manager needs to be more and more informed and has to take several decisions for the proper management of the vineyard. Therefore, a web-based Decision Support System (DSS) was developed for guiding decision about tactical management of the integrated vineyard. The DSS is provided by Horta srl, a spin-off company of the University of Piacenza (www.horta-srl.com), and is available for registered users via the internet in an interactive way. It is composed by: (i) a network of weather stations that send real time data, (ii) a server repository that stores the weather data; (iii) an user interface that makes it possible to readily input vineyard-specific information and obtain supports for informed decision-making; (iv) a set of mathematical models that use weather data and vineyard-specific information to predict the epidemiology of the main grapevine fungal diseases and the plant development. Output provides information on: (i) current weather conditions and 3-day forecasts; (ii) the growth stage of the plants; (iii) information and decision supports for primary and secondary infections of *Plasmopara viticola* and *Erysiphe necator*, causal agent of grapevine downy and powdery mildew, respectively. In particular, two weather-driven, mechanistic, dynamic models are used to provide the following information for *P. viticola*: dynamic of the oospore population; occurrence of the main events for primary infections (oospores germination, zoospores release and dispersal, infection establishment and appearance of downy mildew lesions); infection severity and epidemic pressure of primary infections; fitness of the sporulating lesions and availability of the secondary inoculum; relative severity and epidemic pressure of secondary infections. Similar models provides information for primary and secondary infection of *E. necator*: the dynamic of chasmothecia population, the release and dispersal of ascospores, the infection establishment and the symptoms onset, as well as the production of secondary inoculum and its efficacy in causing new infections.

Within the FP7-KBBE project "Pesticide Use-and-risk Reduction in European farming systems with Integrated Pest Management" (PURE) 16 commercial vineyards across Italy were managed so as to compare the management according to the DSS, the usual grower's practice and an untreated control. Results collected during the first season confirmed the advantages due to the use of the DSS, in terms of rationalisation of fungicide schedule with a reduction of the number of treatments till to 36%. Other commercial vineyards will be managed according to the DSS in the following grapevine-growing seasons to further validate the DSS and demonstrate t he benefits rising from its use.