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EVALUATION OF FORECASTING MODELS FOR GRAPEVINE INFECTION: A METROLOGICAL APPROACH

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Abstract

Meteorological data have many applications in planning, programming and addressing the human activities, and in the prevention of natural adversities of climate origin.

This study is focused in vineyard advertises, such as Grapevine Downy Mildew (*Plasmopara viticola*), one of the most important disease affecting viticulture. The infection is strictly depending by temperature, humidity and rain and is currently controlled with the use of fungicides, which has considerable economic costs, negative effects on environment, human health and wine quality.

For a correct defense against pathogen attacks, it is necessary to know the incubation period in order to identify high risk of infection, fungicides treatment period and act promptly. The forecasting models of downy mildew infection are useful tools which may assist in agricultural management risks. This requires an accurate knowledge of meteorological variable such as temperature, humidity and precipitation, but to date, the models used don't take into account the measurement uncertainties, which inclusions in input data could significantly improve the forecasting models.

In situ calibrations of weather stations are usually performed by comparison, where the standard sensors are left for a short period close to the station under calibration. This procedure for weather stations installed in agricultural sites was metrologically evaluated and showed relevant weak points. Standard sensors are not always made to operate in open air; it is not possible to cover the whole range for the quantities, thus it is not possible to evaluate linearity and uncertainties for several sensors over the whole range and the evaluation of the mutual influences between parameters is not achievable. A calibration procedure for automatic weather stations for agrometeorological scope is proposed.

The aims of this study, part of the European MeteoMet project, are the improvement of the meteorological observations in field by disseminating the calibration methods, the implementation of traceability in agrometeorological measurements, and the improvement of the forecasting models by inclusion of traceable data and uncertainty components in the input values. The final goal is towards a general reduction of the use of chemicals in viticulture.

Keywords: Metrology, meteorology, downy mildew, forecasting models, weather station