

Monitoring of Pests and Diseases: a Technological Vision

M. Prevostini¹, A. V. Taddeo¹

¹*Dolphin Engineering Sagl, CH-6900 Lugano, Switzerland*

Abstract: The use of technology in agriculture starts from the early eighties, when in the United States the term “precision agriculture” had been coined. Initially, precision agriculture techniques were related to geolocation (Global Positioning System - GPS), with the aim of providing recommendations for an effective use of fertilizers.

Over the years, the use of technology has increased gradually up to an exponential growth, facilitated by the rapid development of the Internet.

The ability of electronic and informatics components to communicate wirelessly, the continuous miniaturization of these components, their low energy consumption and lower costs, especially in the last decade, led to an explosion of wireless devices. The use of sensors for data acquisition, storage, and the availability via Internet has led to new applications in precision agriculture, allowing a high degree of innovation. Such sensors were primarily used to collect information on soil retention in order to find the best irrigation timing. Since then, the use of IT solutions for taking decisions (Decision Support Systems - DSS) greatly expanded.

The distribution of predictive models, which describe the development of pests and diseases, has in recent years led to increasingly sophisticated DSS. And the electronic processing of data collected in the vineyards, allows real-time query about their status in relation to the risk of possible developments of diseases or predicting the development of disease-transmitting insects. This information is very useful to take adequate disease control measures.

By using DSS, wine growers, plant protection services and scouts are able to profit from a continuous dialogue with the agro-ecological system. They can operate in a controlled environment and customize their activities to the state of their vineyards.

The advantages are significant and the winemakers can optimize their resources, e.g. time, staff or the use of plant protection products, finally leading to a higher quality of grapes and wine at a lower cost. Moreover, a better environmental performance can be achieved by means of a more effective use of chemicals.

Although there is a positive trend in the use of technology in agriculture, we noted that there is still a conservative mentality, which considers the adoption of technology as a cost rather than an investment. In this paper we will propose our vision aiming at inverting such a perception. We envision a new futuristic system where wine growers and operators interact each others, sharing information and planning strategies by using proper high-tech tools and platforms with the ultimate goal of including the technologies in everyday best practices.

Key words: pests, diseases, integrated control, technology, wireless networks, DSS, prediction systems