Introduction

To increase and improve spraying quality requires a thorough knowledge of the existing relationship amongst operating parameters (working pressure, forward speed, spraying pattern quality) and plant morphology and structure. One of the aspects on which these parameters have more influence than any other is over the establishment of the adequate spraying volume for each treatment. Latest trends in recommendations for volume and dose rate have been widely discussed by researchers. Parameters such as row width, tree height, canopy volume (Tree Row Volume or TRV), leaf area index (LAI) and leaf area density (LAD) have been proposed to characterize trees and vines and their relation with the deposition values obtained in field trials (Koch, 2007).

Methodology

DOSAVIÑA is a Decision Support System developed to determine the optimal volume rate for vineyard spraying. This decision tool, arranged over a Microsoft Excel sheet®, is based on multiple data obtained after several years in real working conditions using different types of sprayers in vineyards, and includes a complete data base about crop characteristics (structure, crop stage, leaf area, leaf area index, leaf area density, etc). The computer program has been developed with the objective to generate an easy-to-use and useful tool and is able to determine the optimal volume rate to apply in vineyards, based on different calibration procedures. DOSAVIÑA also quantifies, in terms of losses of liquid, the effect of all parameters involved during the application process.

DOSAVIÑA has been continuously used to determine the optimal volume rate in spray applications in vineyard since 2006. Different wine farms in USA and Spain make their applications according DOSAVIÑA proposals in a wide variety of canopy conditions. From Vitis labrusca varieties characterized by its great canopy volume to local and traditional vinifera varieties as Cabernet Sauvignon, Riesling or Merlot. From early stages up to full canopy development, DOSAVIÑA has been used as a unique tool to determine the applied volume rate. In most cases, the interest of this tool has been quantified not also by the volume reduction but also by the correspondent pesticide reduction. And in all cases, biological efficacy has been measured.
Results

The obtained results after five years of use in real conditions in the field show the interest of DOSAVIÑA. Average reduction about 39% in volume rates has been obtained and, consequently, the same reduction has been achieved in terms of plant protection products. This factor links directly with the main objective of the European Directive of Sustainable Use of Pesticides.

![Figure 1 Variation of applied volume rate in all field tests and for all crop stages.](image)

The resulting reduction in pesticide use did not present any difference in disease control for all the selected varieties (Landers and Gil, 2009). Methodologies based on coverage and leaf area, as prescribed by DOSAVIÑA, seems to be an interesting alternative method to determine the most adequate volume rate according to canopy structure, with the consequent diminution of pesticide use and the increase of environmentally-friendly practices.

References


