Reducing chemical use in vineyards. Evidence from the analysis of a national demonstration Network

Authors: FOUILLET Esther[1], RAPIDEL Bruno[1], MEROT Anne[*1]

[1] ABSys, Univ Montpellier, CIHEAM-IAMM, CIRAD, INRAE, Institut Agro, Montpellier, France

*Corresponding author:*anne.merot@inrae.fr*

Abstract:

Context and purpose of the study - High quantities of chemicals are applied in the vineyard for pest and disease control. Transition towards low pesticide viticulture is a key issue to improve sustainability. Winegrowers have to gradually change their practices to engage in this transition. This work aims at analysing the pesticide use evolution during transition towards low pesticide vineyards and identify some management options mobilized by winegrowers. To understand the diversity of pathways taken towards agroecological transition, we characterized different types of pesticide use evolution.

Material and methods - We analysed the data from 244 vineyards engaged in a network of French demonstration farms, DEPHY-Farm network, created to promote and assess the implementation of practices to reduce the chemicals in vineyard. The network provides data over a 10-year period across 12 winegrowing regions. To characterize the diversity of pathways taken towards chemicals reduction, the Treatment Frequency Index (TFI) was used. . We described the TFI evolution of each vineyard using six indicators: the initial TFI at the engagement in the network and final TFI, the intensity of the TFI decrease, two indicators of potential rupture and the slope. A Principal Component Analysis followed by an Ascendant Hierarchical Clustering were performed to build a typology of chemical reduction. In addition, we performed a survey to identify, for each type of evolution, the levers implemented by winegrowers.

Results – Our results showed that vineyards experienced a chemical reduction of 33% on average related to the decrease of fungicide use. Three types of TFIevolution were identified : the first type represents farms with a high initial TFI and an important reduction of TFI. The second type corresponds to farms with a low TFI when entering the network and that reduced it progressively. The last type represents farms with low initial TFI and without significant chemical evolution.

Depending on the type of TFI evolution, the intensity and the type of changes in fungicides applications and biocontrol used were different. From the surveys, 64 levers implemented by the winegrowers were recorded. The main levers implemented are related to the dose reduction, choice of the product, cessation of herbicides and optimisation of spraying. Cluster 2 Farms mostly redesigned their cropping system while Cluster 3 Farms mostly implemented levers based on a gain in Efficiency.

Keywords: Grapevine, innovation, pesticide reduction, agroecology, survey, database, trajectory