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1-INTRODUCTION

Land degradation is a major challenge, particularly in intensive agriculture areas such as typical vineyards. Soil contamination with heavy metals is a widespread phenomenon in vineyards, due to the intensive use of pesticides, fertilizers, manure and slurry. This study, aims to assess the total heavy metal content in vineyards managed under different management practices: (1) no tillage, (2) integrated production, and (3) conventional farming.

In Portugal, vineyard area represents the fourth largest area in Europe (178770 ha), being one of the most relevant crops. Different approaches, such as, environmental programs and innovative management practices have been adopted over the last years, in order to minimize soil contamination by heavy metals. Vineyard soils have accumulated heavy metals and other trace elements that may be phytotoxic, non-biodegradable and persistent, which represents a long term threat to the crop system and to the food chain.



Vineyards in the central region of Portugal, managed under different management practices: (1) no tillage, (2) integrated production, and (3) conventional farming. The integrated production and the conventional farming in the study sites have been intensively managed for more than 5 years, and more than 30 years in the no tillage vineyard.









Assessment of total heavy metal contents in vineyards managed under different agriculture practices

is an H20202 Europen project that aims to Integrate existing soil quality related information with agricultural management effects provided by long-term field trials. The project aims to integrated soil quality indicators into an easy-to-use interactive soil quality assessment tool (SQAPP) across Europe and China as a new standard for holistic assessment of agricultural soil quality.

2- METHODOLOGY

The study sites, were monitored in 2018, before and after pesticide application (April and July, respectively), through the assessment of the total heavy metals content (Cu, Cd, Cr, Pb, Zn and Ni) that are directly influenced by agricultural management practices. Soil samples were also analyzed for pH and soil organic matter content (SOM).

Fig. 1- Soil quality parameters analyzed after harvesting in 2018 in vineyard farm with no tillage(NT), integrated production (IP), and conventional farming (CV) (n=12). a) Soil organic matters and b) soil pH.



in the project



* Portuguese legislation DL103/2015.

4- CONCLUSION

- sustainable agriculture and reduce land degradation.



Study sites in Portugal





- CV.

Fig. 2- Total heavy metals content no tillage(NT), integrated production (IP), and conventional farming (CV) (n=12). a) Cooper content (mg/Kg) and b) zinc content (mg/Kg), c) cadmium content (mg/Kg), d) nickel content (mg/Kg), e) chromium content (mg/Kg), and f) leader content (mg/Kg).

In conventional and non-tillage vineyards, the wide application of phytochemical products led to concentrations of Cu above the Portuguese soil quality standards. Cu accumulation in vineyard soils should be a major concern.

Information about the impact of distinct management practices on soil quality is critical to guide farmers and policy makers to encourage

Acknowledgements





Study sites under IP management shows higher SOM content than CV and NT. In NT, the lack of any amendment over the last years and the scarce ground cover led to similar SOM than

Similar soil pH were observed in IP and NT.

- Higher Cu content were observed in NT (195) mg/kg) and CV (144 mg/kg) than IP (65 mg/kg)(p<0.5). Copper-based fungicides are one of the major factor Cu accumulation in vineyards agricultural soils worldwide.
- NT and CV (Fig.2a), and IP and NT(Fig.2c) shows values much higher than the maximum admissible established by the Portuguese legislation (DL103/2015).