Use of past advisory bulletins to rebuild pest and disease historical annual pressures in French vineyards

Nathalie Smits, Anne Merot, Lionel Delbac, Leslie Daraignes, Marianne Fraysse, Ruben Bellaïche, Marc Fermaud

EUROPEAN SOCIETY FOR AGRONOMY

18th Congress of the
European Society for Agronomy

“Synergies for a resilient future: from knowledge to action”

Scientific program

26 August – 30 August 2024

Rennes, France

The Couvent des Jacobins

Use of past advisory bulletins to rebuild pest and disease historical annual pressures in French vineyards

events.institut-agro.fr/event/1/contributions/304

Nathalie Smits[1], Anne Merot[1], Lionel Delbac[2], Leslie Daraignes[2], Marianne Fraysse[1], Ruben Bellaïche[1], Marc Fermaud[2]
1 INRAE, CIRAD, Institut Agro, UMR ABSys, Montpellier, France
2 INRAE, BSA, ISVV, SAVE, Villenave d'Ornon, France

1 Introduction

As a perennial crop, grapevine life history covers many decades, and the vines are exposed year after year to several biotic and abiotic hazards. The cumulative effect of such exposures influences the present health and productive potential of the vines. It is there important to understand the vine past in order to manage them properly.
The protection of crops against pests and diseases have always been a major concern for growers. To help them, advisory bulletins have been provided to growers under different forms for almost one century by the French service of Plant Protection, part of the Ministry of Agriculture. They constitute an important source of information on the history of biotic threats and crop protection.
The aim of this work was to reconstruct the vines' past exposure to diseases and pests. We build time series of annual indicators of grapevine pests, using agricultural warning bulletins from several French wine-growing regions.

2 Materials and methods

2.1 Material used

The publication in France of warning bulletins, called "Avertissements Agricoles" (AA), began in the 1940s, although some other forms of advisory bulletins existed previously. The AAs were edited in each region for each crop. In 2009, they were replaced by the "Bulletin de Santé du Végétal" (BSV), that came in a uniformed format in all regions.
To rebuild the past exposure to pests and diseases, we collected long time series of these documents (at least 60 years) in three different wine-growing regions covering the whole range of climate variations in France. We collected periodical bulletins published along the seasons, and, as soon as possible, annual syntheses.

2.2 Document analyses

In each studied region, we selected the main grapevine pests and diseases and analyzed the information for each of them. We collected, in the yearly synthesis or periodic bulletins, all the words or parts of sentences describing the observed prevalence, on one hand, and the severity, on the other hand, of the pest. We then translated these textual elements into a severity and a prevalence score, and constructed an aggregated scale of these two scores to obtain a final annual score. Repeating these steps for each year allowed us to build time series of pest or disease level over the studied winegrowing region.

3 Results

We collected and analyzed advisory documents from the three French wine growing regions of Bordeaux, Champagne and South Rhône Valley / Vaucluse. The timespan covered by these corpus differs between regions: in Bordeaux, we succeeded in and calculating pests and diseases indicators from 1940, in Champagne from 1944 and in Vaucluse from 1954, with

fewer gasps in time series after 1960.
The result of this work consisted in time series of annual pest levels. The level was expressed in a semi quantitative score ranging from 0 (absence) to 6 (pest or disease generally present over the region and with high severity). Grades 1 to 3 indicate local attacks, grades 4 to 6 indicate generalized presence of the pest over the region. The figure shows the calculated levels of powdery mildew in the three regions from 1961 on.

4 Discussion

This work allowed us to build and validate a method for translating textual information on past pest and disease levels into semi-quantitative scores, and to validate it in different regions. However we had to develop region-specific decision rules, mainly to account for the prevalence. We will now relate the obtained time series to climatic time series and have engaged collaborations with historians to rebuild the past socio-technical context of grapevine protection against pests and diseases. Apart from the need of local adaptation, the method for analyzing advisory documents can easily be transferred to other cultivated species and other pests and diseases mentioned in these documents.

5 References

https://archive.org/search.php?query=subject%3A%22Collection_Inra_Averstissements-Agricoles%22
Fermaud, M., Smits, N., Merot, A. Roudet, J., Thiery, D., Wery J. and Delbac, L. 2016. New multipest damage indicator to assess protection strategies in grapevine cropping systems. Aust. J. Grape Wine Res. 22: 450-61.
Zwankhuizen, M. J., and Zadoks, J. C. 2002. Phytophthora infestans's 10-Year Truce with Holland: A long-term analysis of potato late-blight epidemics in the Netherlands. Plant Pathol. 51: 413-423.

Key-words : Grapevine, advisory bulletins, pests and diseases, historical rebuilding