

Biodiversity of vineyard environments and wine qualities

Summary

A study of the elements in the landscape around vineyards, their aromatic components and whether they are found in the wines produced in this environment was considered worthwhile.

The uniqueness of a wine is influenced by several factors, including grape variety, terroir, microclimate and the vineyard environment. The variety may be grown by other producers but, as a whole, the microclimate, terrain and environment produce almost unique conditions for each vineyard.

The influence of the environment on the characteristics of wine remains largely unknown. In many wines certain aspects associated with floral notes, forest or aromatic plants can be recognised but so far few links have been established that relate the aromas of the environment to the aromas of the wine. However, such a link has been demonstrated in at least in two cases: vineyards near eucalyptus trees, where there is more eucalyptol in wines; and smoke from fires which increases phenols such as guaiacol and chrysol in grapes and wine.

Objectives

The main objectives of the project were to:

- Identify the main elements of the botanical landscape around specific vineyards and their relationship to the aromas of wine.
- Obtain aromatic profiles of various farmed or spontaneous plants near the vineyards.
- Identify the aromas in wines from the vineyards in the study using sensory and instrumental analysis.
- Improve the concentration of aromas through processing techniques and encouraging the planting of certain plant species.

Description of the actions carried out in the project

1. Identifying the most abundant and aromatic plant species in the areas around the vineyards in the study.
2. Studying the typical aromas of the wines obtained from the vineyards in the study.
3. Associating possible relationships between aromas in the environment and aromas of the wines.
4. Carrying out vinification tests to favour the most characteristic aromas.
5. Providing knowledge of the plants surrounding the vineyards and identifying aromas in wines by winemakers, restaurateurs and consumers.

Final results and practical recommendations

- Incorporate knowledge of spontaneous aromatic plants and their aromas among makers and consumers.
- Strengthen the uniqueness of each winery's wines through this knowledge.
- Incorporate a differential feature of sustainability and authenticity in the products by using plants native to the wine-growing area of each company which are farmed organically.

Conclusions

The study of the plants and crops surrounding the vineyards showed the association between landscape and wine and highlighted aromas related to various aromatic plants present in different Catalan designations of origin.

Some of the factors assessed were nearby crops, the natural environment, elements of the landscape, structures such as margins, fallow land, plant borders, vegetation cover, cropping systems, fertilisation and the influence of nearby elements. The flowering time of different species characteristic of each area in the study was also assessed. Other factors

that we considered important were the benefits or services many plants provide for the agricultural ecosystem, such as nitrogen assimilation by leguminous plants, nutritional species for butterflies, conservation of pollinators and support for bird life, among others.

A total of 168 plants were identified present in or around the vineyards studied. Differences related to the vegetation in each area were found among the vineyards in the study. Each vineyard has a differentiated and almost unique environment, consisting of dozens of plants that make up its visual and aromatic landscape.

A total of 68 aromatic compounds from the 2020 and 2021 wines were analysed with gas chromatography techniques, showing differences in the proportion of these aromatic components. Among the compounds with the highest aroma activity values were the norisoprenoids: Ionone and damascenone, which have floral and fruity aromas such as violet, apple and plum and which are found in aromatic plants. Rosemary, a species found in all the vineyards studied but in different proportions, contains terpenes, which we found in the wines (2).

The main objectives of the project were achieved on schedule:

- Identifying the main elements of the botanical landscape around certain vineyards and their relationship with the aromas of the wine produced from them.
- Identifying the aromas in wines from the vineyards in the study using sensory and instrumental analysis.
- Extracts were obtained from various plants growing near vineyards.
- No improvement in the aromas studied in the wine was obtained with the tested production techniques: maceration in whites and sulphite-free in reds.
- The use of extracts can improve the knowledge and appreciation of the plants surrounding vineyards.

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Subject area(s) of application

- Agricultural production system
- Agricultural practice
- Agricultural equipment and machinery
- Livestock farming and animal welfare
- Vegetable production and horticulture
- Landscape / Territorial management
- Pest and disease control
- Fertilisation and nutrient management
- Soil management

| | |
|-------------------------------------|---|
| <input type="checkbox"/> | Genetic resources |
| <input type="checkbox"/> | Forestry |
| <input type="checkbox"/> | Water management |
| <input type="checkbox"/> | Climate and Climate Change |
| <input type="checkbox"/> | Energy management |
| <input type="checkbox"/> | Waste and by-product management |
| <input checked="" type="checkbox"/> | Biodiversity and environmental management |
| <input type="checkbox"/> | Food quality/processing and nutrition |
| <input checked="" type="checkbox"/> | Supply chain, marketing and consumption |
| <input checked="" type="checkbox"/> | Competitiveness and agricultural and forestry diversification |
| <input type="checkbox"/> | General |

Geographical area(s) of application

| PROVINCE(S) | REGION(S) |
|---------------------------------|-----------|
| Barcelona, Girona and Tarragona | All |

Dissemination of the project (publications, conferences, multimedia, etc.)

News items were generated on the INNOVI.cat website in relation to the progress of the project, which were disseminated on the INNOVI and the cluster partners' social media.

Presentation of the project at the Palau Robert 2022.

[The radio programme, Vilafranca Penedès en Xarxa interviewed Eloi Montcada, from INNOVI, Joan Ignasi Domènech, from Vinyes Domènech, and Enric Bartra and Gemma Urgell, from INCAVI, in relation to the project.](#)

[The Catalunya Ràdio programme El Primer Sector, interviewed an INCAVI expert on the project.](#)

Project website

www.innovi.cat/biodiversitat/

More information on the project

| PROJECT DATES | TOTAL BUDGET |
|---|---------------------------|
| Start date (month-year): July 2020 | Total budget: €148,506.00 |
| Completion date (month-year): August 2022 | DARP funding: €59,253.89 |
| Current status: Completed | EU funding: €44,700.31 |
| | Own funding: €44,551.80 |

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Order ARP/133/2017 of 21 June, approving the regulatory bases for grants for cooperation for innovation by promoting the creation of European Association for Innovation operational groups in the areas of agricultural productivity and sustainability and the execution of innovative pilot projects by those groups, and Resolution ARP/1531/2019, of 28 May, announcing the call for the grant.



Generalitat de Catalunya
**Departament d'Agricultura,
Ramaderia, Pesca i Alimentació**



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