

Acknowledgment and management of vocational units in Chianti Rufina

Mise en évidence et gestion des Unités Vocationnelles dans le Chianti Rufina

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Summary

In Tuscany region the Rufina is a district of Chianti D.O.C.G. positioned in Val di Sieve, 20 km north east from Florence. During the three years period (2002-2004) a study for a viticultural zoning has been carried in order to characterize the productions. By a pedological survey it was possible to characterize Rufina territory in 13 Landscape Units in which the choice of the vineyards was made. The variety mainly used for the study was the autochthonous Sangiovese with 29 vineyards; also some vineyards of Merlot have been characterised in order to assess its suitability to the studied area. Climate study has been realised using the historical data that have been processed by the main climatic indexes to characterize the different environment in relation to grape grown. For each of the 36 vineyards maturation dynamics were assessed in the pre-harvest period and, at harvest, data about quality and production have been collected; moreover microvinifications for each vineyard were made and the obtained wines have been chemically and sensorial analyzed. Data processing showed a lot of differences that made possible to identify and classify the territory of Chianti Rufina in 11 Vocational Units. Publications of a Manual of good practices, allowed to give technical advices, from planting agronomical management of vineyard, of identified Units with the aim to optimize productive activities depending on the oenological target set.

Keywords: Zoning, Rufina, Sangiovese, Vocational unit.

Introduction

In the modern worldwide viticulture we find two opposite schools of thought; one based on territory and the other on grapevine. The first way is followed by the ancient viticultural tradition and recognizes quality of wines as strictly tied to the original territory owing to *terroir*. The second one is typical of the new viticultural world lands which consider grapevine variety the principal maker of quality of wines. However exist a third way which consider the concept of interaction between grapevine and area as creator of wine's quality proposing a series of products obtained by both international and native grapevines and in peculiar geological and climatic environments (Scienza 2000). In this way the illusion whose wants to produce the same wines everywhere only moving grapevine varieties is confirmed, but at the same time relevance of grapevine in definition of final characteristics of product is not disclaimed (Scienza 1992).

In studying quality of wines, although subjective and difficult to define, a "perceived quality" and a "intrinsic quality" of wine can be detected by wine-drinking; about this could be specified a "innate" part (or natural) determined by biological (having reference to grapevine) and environmental and pedological factors (having reference to the natural area of production), and a "acquired quality" determined by technological factors tied to methodology of production and making of grapes (Parodi, 1997; Scienza, 1992). Bearing in mind that in last decades progress of oenological and viticultural methods enhanced "acquired quality" of products, on the innate one we can try to intervene to improve production.

Generally we can say that the product of a genotype is not defined primly, but could have a large variety of expressions, as wider as bigger will be the reaction of that variety, determined by environment influence. Grapevines are more or less reactive to the different geographic and

environmental conditions and to vocationality of an area, as well the variety choice is closely related to this reactivity (Crespy, 2003; Toninato et al., 2005). With this claim we can assert that with the same grapevine grown in different areas we can obtain wines with the same quality level, but different between them, thanks to expressive capacity of a variety in relation to the ecopedological conditions, summarized in the French notion of *terroir* (Morlat, 2001; Vadour, 2003).

However is not enough to estimate the influence of *terroir* on the vegetative and productive expression of a plant to intervene on quality of products, but is necessary to research the ties which doesn't allow the variables of the operation of the system grape-*terroir* to express completely. It is important to break up the whole variability which characterize the productive model in single factors to be able to classify by importance of influence on the final product determining vocationality of particular areas for grapevine varieties and also suggesting strategies and approaches of this interaction.

The instrument which enables this study and this strategy of optimization is the "Zoning" (Bogoni, 1998; Bogoni et al., 1995; Colugnati and Crespan, 2000; Falcetti et al., 2001), matter with multidisciplinary approach which, by applying bioclimatic, geological, pedological and agronomical standards and managing information derived from different studies, is able to create a hierarchy of factors of quality based on the role that each one exercise on production.

The "eco-geo-pedological sequence" worked out by Morlat and Asselin is the base notion of the study of *terroirs* and the modern zonings. A viticultural area is considered from these authors as an "association of juxtaposed elementary environments" each defined by three components: geological (lithology, stratigraphy, frame of subsoil) and pedological (chain of deriving soils) that together forms a "geo-pedological sequence" or "pedo-climate", to be more precise the edaphic substrate on which the vine grows; from that issue derives the *landscape* factor linked to topography and to environment which all together determine a typical "mesoclimate". The "eco-geo-pedological sequence" defined in this way is the *Unitè Terroir de Base* (UTB), homogeneous unit of operation of *terroir*-grapevine system.

From these Territorial units zoning can arrive to define the so called "Vocational Units" that summarize information about grapevine behaviour in everyone homogeneous area of the territory, can enable to elaborate "territory maps" that, together with a "good practice manual" of the same territory, provides technical advices for soil management, choice of best vegetal material to plant, about pursuable oenological targets area per area. All this information gets value if applied to management and planning of viticultural and oenological activity of an area.

Starting from these considerations "Consorzio di Tutela dei vini Chianti Rufina e Pomino" from 2002 used this instrument to support viticulture and oenological operators and to promote territory safeguarding the peculiarity of wines and increasing the value of attitudes and vocations of this territory which wines production is mentioned and recognized since 1716 when grand duke Cosimo III De Medici, with the announcement in 24 September "About declaration of land ends of four countries Chianti, Pomino, Carmignano and upper Val d'Arno" "stopped the circumference" edging as one of the four areas of Tuscany in which production and commerce of wine, as precious product, was subject to legislation and control by authority.

Material and methods

Preliminary steps of Zoning study of Chianti Rufina allowed, by climatic, pedological and landscape survey, to identify and map making 13 Landscape Units (LU). LU have been used to detect 29 guide vineyards for Sangiovese (most cultivated variety in the area and base for DOCG) and 7 guide vineyards for Merlot (international variety with good pliability to DOCG climate) these were used as source of all measurements carried out in first three years of survey (2002-2004).

Going on chronologically sampling of grapes have been done, from veraison to harvest, with the aim to monitor by chemical analysis results on sugar content, acidity and pH, trend of maturation. At vintage 50 kg of grapes have been harvested from each guide vineyard and intended to microvinification carried out following a standardized protocol. In this phase also parameters of vegetal and productive status of each plant selected for the study have been recorded. Microvinifications were carried out to obtain data on descriptors on taste and smell of wines through tasting done by trained panel, and allowed to identify different sensorial profile essential for wine characterization of each guide vineyard.

At the same time a climatic survey was done of all area through historical data elaboration and use of bio climatic indexes which allowed to elaborate climatic maps of the area.

Data-gathering which describe trend of maturation of grapes enabled constitution of a database which have been elaborated following Failla method (Failla et al., 2004) which allows to compare data of more years in a more sharp way.

In this way some indexes for each main variable of maturation kinetics can be calculated (NZT = Sugar Index, NAT = Acidity Index and NPT = pH Index) and can be used for statistical elaboration; as variance source has been used a vine model formed of following data: Valley systems (Valley), Landscape Units (LU) (analysed in interaction with Valleys to avoid redundancy), Altitude and Exposure of vineyards.

Results and Discussion

In graphics reported in Figure 1 components expected of variance for studied model for maturation indexes are showed.

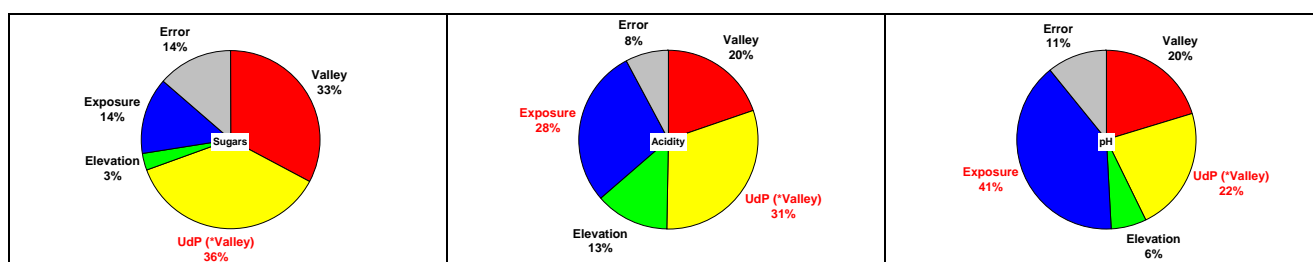


Figure 1 Graphic representation of expected variance components for model under investigation (in red significant factors)

We can observe how Landscape Unit results always significant in explaining observed differences and also exposure has influence in explaining trend of acidic component of must, these behaviours are evident in Figure 2. In Figure 2a which shows trend of average sugar gain in years in operation of Landscape Unit we can observe that LU Sieci terrazzo basso shows a greater precocity together with a higher gaining capacity; LU Pelago shows instead a good precocity of sugar synthesis which does not maintain a high gradient during maturation period; opposite behaviour is showed by LU Fornello which although seems to be the most posthumous in the first phases at the end shows a good build-up curve.

Concerning trend of pH in operation with exposure (Fig. 2.b) it's evident that the most regular, homogeneous and with best results is the one determined by slopes exposed to West; also curve obtained in vineyards which are exposed to East is homogeneous and regular but with values firmly inferior to mean.

Concerning other combinations it is interesting to show trends recorded for exposures top SE and SW which present a regular rise of pH till half of maturation period and after a descend noticeably at harvest period. Good and regular are kinetics of other combinations.

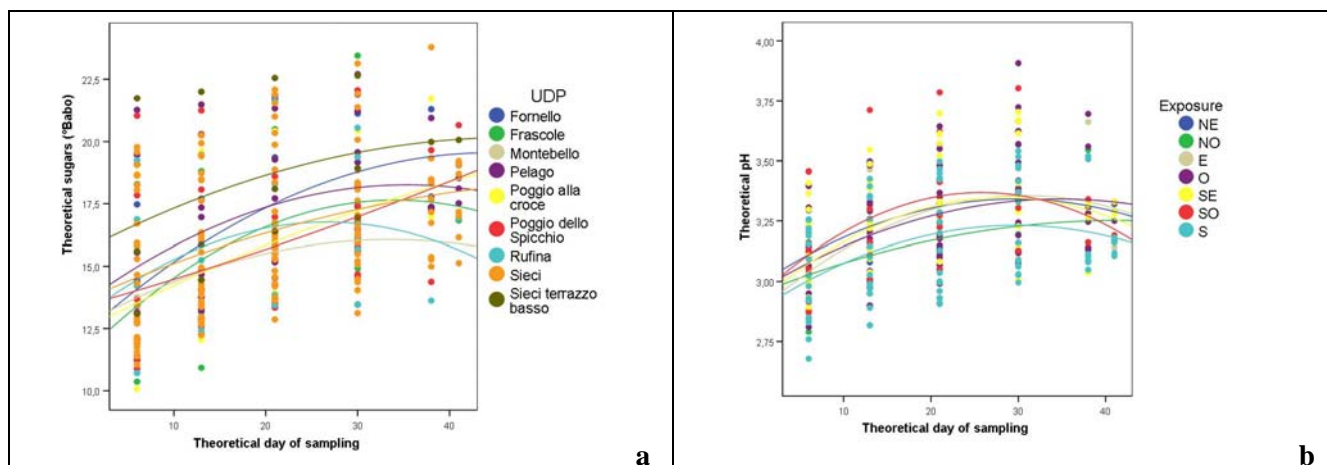


Figure 2 Trends of maturation for factors significant at variance analysis

Using the same model proposed for maturation curves also data recorded in vintage phase have been analysed statistically. Table 1 shows significance levels which measures constituent vine model present in variability of qualitative parameters sugar, pH and acidity.

| Factor | Variable | Sign. |
|---------------|---------------------|-------|
| Valley | Sugars (°Babo) | *** |
| | Total acidity (g/l) | *** |
| | pH | *** |
| UdP (*Valley) | Sugars (°Babo) | *** |
| | Total acidity (g/l) | *** |
| | pH | *** |
| Elevation | Sugars (°Babo) | n.s. |
| | Total acidity (g/l) | *** |
| | pH | *** |
| Exposure | Sugars (°Babo) | * |
| | Total acidity (g/l) | *** |
| | pH | *** |

Table 1 GLM carried out on vine model studied (Sign.: * if $p < 0,001$ (99,9%); ** if $0,001 < p < 0,01$ (99%); * if $0,01 < p < 0,05$ (95%); n.s. if $p > 0,05$)**

Using factors which form vine model resulted significant to variance analysis it's clear that (data not reported) concerning sugar parameter, the LU Fornello and Sieci terrazzo basso have showed a higher content in comparison to other Landscape Units instead LU Montebello have recorded lower results in the years. Analysing behaviour of qualitative variable acidity in relation with changing of altitude of vineyards, allow to observe, also from a statistical point of view, that sites placed at altitudes superior to 200 m on level of sea show an acidity content of grapes at harvest superior to sites placed at lower altitudes.

For each guide vineyard and for each year a separate micro-vinification has been carried out; products have been tasted and data recorded have been elaborated statistically using a standardization for year, judge, and date of wine tasting (session) in the way to clean data from further subjective influences. Table 2 shows how, between model components, all have a certain influence in determining, for some descriptors, difference statistically significant; the one who seems to have effect on several descriptors of taste and smell is the Landscape Unit.

| Sensation | Valley | Udp (*Valley) | Elevation | Exposure |
|---------------------|--------|---------------|-----------|----------|
| Floreal | n.s. | ** | * | n.s. |
| Stewed fruit | n.s. | *** | n.s. | n.s. |
| Dried fruit | * | * | n.s. | ** |
| Spicy | n.s. | n.s. | n.s. | ** |
| Herb | n.s. | ** | n.s. | n.s. |
| Acidity | n.s. | * | n.s. | n.s. |
| Alcool | n.s. | * | n.s. | n.s. |
| Astringent | * | n.s. | * | n.s. |

Table 2 GLM carried out on vine model studied (Sign.: *** if $p < 0,001$ (99,9%); ** if $0,001 < p < 0,01$ (99%); * if $0,01 < p < 0,05$ (95%); n.s. if $p > 0,05$)

Data processing, described in results of Sangiovese chapter, enabled to hypothesize a partition of Chianti Rufina area in 11 Vocational Units (Fig. 3). This partition characterizes in a statistically significant way different Vocational Units for most part of studied variables both during maturation process and on vines and on descriptors of wine tasting.

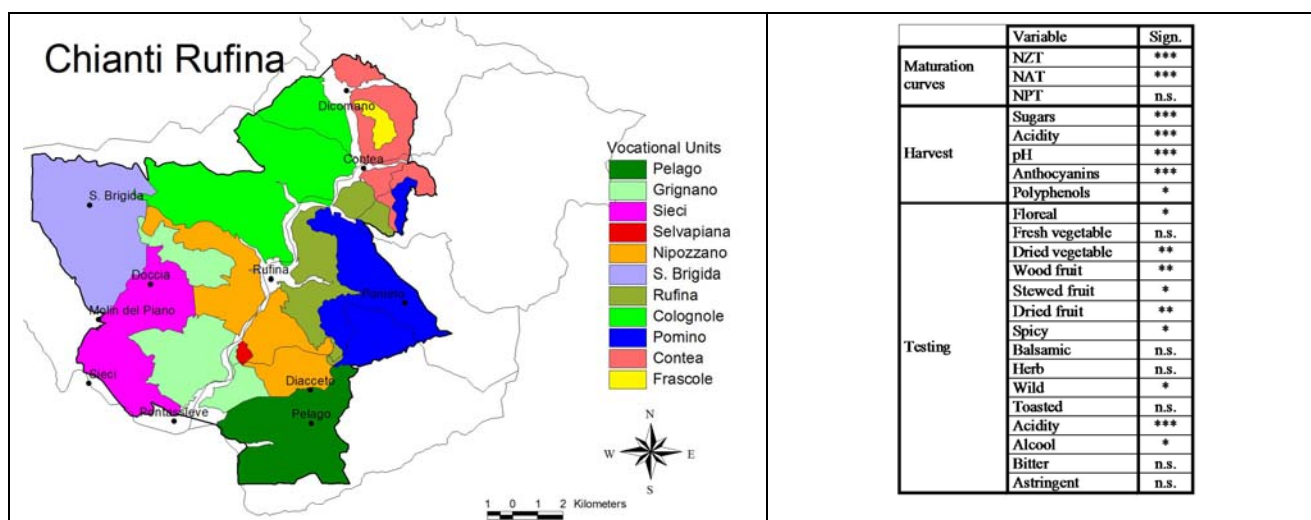


Figure 3 Vocational Unit Map of Sangiovese area in Chianti Rufina DOCG area and significance of variables considered on base of VU proposed

For example in Figure 4 some notes for each Vocational Unit are showed for principal descriptors of Sangiovese; in this case is clear how for flowering descriptor Colognole, Frascole, Pomino, S. Brigida and Selvapiana are the VU more provided; for wood fruit descriptor Frascole is the VU which more allows to perceive this smell which is less present in VU Sieci, Contea and Colognole; spice fragrance are more perceived in wines produced in VU Contea and less in wines produced in Frascole and Sieci. Concerning tasting parameters products of Colognole, Frascole and Sieci seems to be less acid on the contrary of Rufina and Grignano while wines of Frascole, Selvapiana and Sieci are more alcoholic in comparison to those obtained from VU Rufina and Grignano.

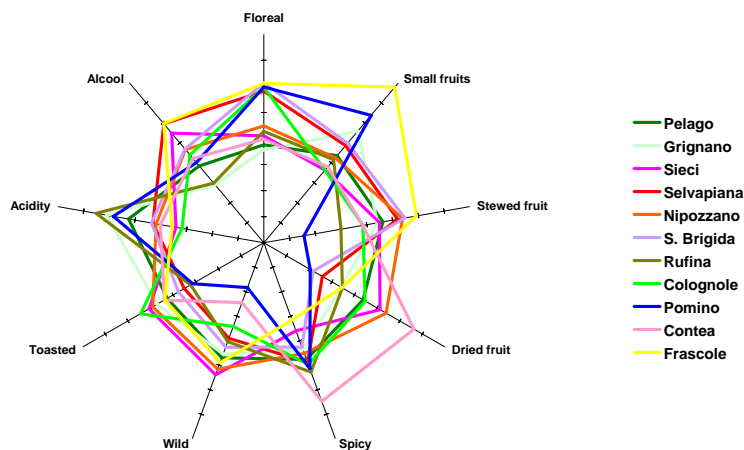


Figure 4 Mean sensorial profiles of Sangiovese wines in different VU

Conclusion

Characterization and cartographic delimitation of territory of each Vocational Unit allowed to elaborate a 'Territory Handbook' which wants to provide advises for the most important choices and decisions to take at planting time and in all phases of vineyard management.

In this publication, in printing phase, are foreseen sheets for an easy consultation concerning environmental description, vocational characteristics, genetic choices at planting time (variety, rootstock) and management choices (fertilization, irrigation, soil management). All information reported, although considered as a pattern due to a necessary simplification caused by study scale, represent not only a ending point of one experimentation but also a starting point for further experiences and for a correct and rational future development of Denomination of Chianti Rufina considering that zoning is not considered a static instrument but can be used as a motivating force for other experiences, scientific, applicative and communicative of specialties of territories.

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