MASI AGRICOLA

GRUPPO TECNICO MASI TECHNICAL GROUP

Technical Seminar – Vinitaly 2005

NATIVE GRAPES: A LEGACY OF THE VENETIAN TERRITORIES

Research by Masi Technical Group and Milan University

TECHNICAL SEMINAR
Saturday, April 9th, Vinitaly 2005

Data by	Masi Technical Group and Milan University
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Relatori:	Dr. Lanfranco Paronetto – Masi Technical Group
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INTRODUCTION

by Sandro Boscaini

As the market has becomes more and more global, and the focus is on quality, particularly in terms of value-for-money, the two oenological poles of the New World and Old Europe have been forced into increasingly active competition, pitting the strengths of one camp against the other.

There is no doubt that in terms of sheer technical quality the New World has the advantage in resources, with abundant raw materials, lower production costs and cutting edge technology. The Old World, however, can deploy an added value that is broader and deeper, in which technical bravura is supplemented with the associations of a long cultural history and the consequent precise territorial personality that appends to a wine.

This is the competitive edge that must be preserved, enhanced and communicated to our best abilities.

The starting point is the uniquely different biodiversity peculiar to each zone.
Working with biodiversity means studying and using the innumerable native grape varieties that provide the signature and identity of our territorially based products. In the Venetian territories we have a particularly important legacy; and the Masi Technical Group has been studying the best use of this inheritance for decades.

In recent years, after the happy rediscovery of the Oseleta grape, the Masi Technical Group has benefited from the scientific assistance of Milan University. A joint research project is based on a dedicated conservation vineyard, appropriate winery vinifications, and laboratory studies with literally dozens of varieties. The idea is to research the history of these varieties and assess them for potential use. Some of them have more marked characteristics than others, but they all express the regional typicity that is to be found in the Venetian way of producing, tasting and studying wine.

This Seminar is devoted to explaining the concepts that underly this research and to presenting some of the more interesting examples of microvinifications we have carried out on native grapes.

On behalf of Masi I would like to express our profuse thanks to Prof. Attilio Scienza, Prof. Lucio Brancadoro, their colleagues and the members of the Masi Technical Group. I would also like to mention our many colleagues in the wine producing world who are also involved in studies of native grapes.

s.b.05

NATIVE GRAPE VARIETIES: AN IMPORTANT FACTOR IN QUALITY ASSESSMENT

By Lanfranco Paronetto

1 – The quality concept

Quality is a constant concern in commerce. Making products and services better is a fundamental factor in competition between regions, countries and commercial enterprises. But the term quality can mean many things, depending on its context.

In oenology, quality is seen first in a wine's composition, and then in it ability to give pleasure to a consumer. This is only a first impression. Often after this initial tasting, to back up a positive impression one asks what it is that gives the wine quality, what makes one wine better than another. Where does the real or imagined superiority of one wine over another come from?
The reply is usually expressed by listing four classic factors: **Terrain, Climate, Vine, and Man.**

But if sensory perceptions of quality are a fundamental part of the winemaker's work, this does not necessarily include all the qualitative considerations of a wider judgement that uses psychology, anthropology, and the sciences involved in marketing.
Unlike other drinks, the quality of wine is not only judged by its physical composition. Instead, it acquires added value, respect and worth from a complex interaction with the territory in which it is made. However, just lately the two visions of wine quality assessment, consisting of **consolidated tradition** on the one hand and a **more dynamic vision** more closely based on the **logic of competition** on the other are challenging each other in a bid to represent wine quality.
Elements to be taken into consideration beside quality include economic factors, financial factors, and cultural considerations.

2 - International strategies in the representation of wine quality

At a basic level, despite various cultural differences, there are just two different approaches to considerations of wine quality:

- ***The European approach***: characterised as "traditional" or "classical" and based on the highly structured French model. This model sees wine defined by a severe (and rigid) series of codified rules dictated by tradition and emanating from the wine's territory of origin, where it acquires through the medium of certain defined grape types an "obvious tipicity", through the slow evolution of culturally based methods of viticulture and oenology.
- ***The New World approach***: is more free and less allied to tradition; and since it is more liberal it can dedicate itself to intrinsic considerations of the quality of wine assessed in relation to the pleasure of drinking, rather than the cultural history that might go with it.

2.a - The notion of Territory in wine

This began in France as part of the profound social changes that took place at the end of the 19th century and beginning of the 20th. It starts with the vigneron, who is responsible for the quality of his wine, largely derived from the vineyard itself, and finishes with the organisation whose job it is to regulate a collective rapport with the wine and the rules of its production. Before the wine can be presented to the consumer, it has to be approved by the tasting panels of this organisation. Individual producers then become of secondary importance compared to the search for a collective identity, as expressed by the Territory.

This how the **Denominazione di Origine** system began!

From the agronomist's point of view there is no problem in asserting that climatic and geological variations in vineyard sites give an individual wine its own signature and explain the differences between one producer and another. But the human intervention necessary to transform grapes into wine cannot be overlooked.
In the end a wine will be above all the expression of its territory, which makes it unique by definition, with a precise organoleptic identity, and therefore **tipicity.**

This is how the notion of tipicity came about. In ways which are both obvious and mysterious, the characteristics of a wine are indissolubly linked with its origin: a geographic origin, a territorial origin, and a historical origin that is the product of the interaction of cultural evolution and technical evolution.
Thus it is that terroir becomes part of culture, through tradition and history, whence it acquires consistency and authority, reinforcing the unique identity of a wine that would be impossible to replicate in another part of the world.
These ideas have been part of a common European winemaking philosophy for decades. This is a unique legacy from which we can proudly extract values and ideas.

2.b - Varietals and the pleasure principle

The New World (Australia, Argentina, Chile, South Africa, and California) has a different approach to describing the quality of a wine. Lacking history and European traditions they have had to use ideas that are simpler, and in many ways easier for the consumer to understand.

There is no need for any talk about terroir. Grapes cannot be grown just anywhere, but once a region has been identified, cultivation can be run on empirical rounds according to the locations that agronomists identify as being ideal for making the type of wine that the target **market** requires.
From the outset vineyards can also be planted with **mechanisation** in mind for all viticultural procedures, including the harvest, with obvious cost benefits.

On the other hand, the culturally based choice is based on just a few well differentiated vine types promoted for their quality and proposed as being obviously different to each other. Considerations of terroir mean that when talking about "tipicity" the actual **vine type** is of secondary importance. But in the New World "tipicity" is actually based on the vine

type, making the consumer's work of recognition much easier. The consumer is almost never an expert on wine, but likes to understand the choice put before him.

To help the consumer even more, **New World technology** is based on enhancing varietal tipicity, bringing out the aromatic qualities of a wine and its softness on the palate, thus enhancing its "pleasure" factor.
This approach to wine is unencumbered by a necessity to understand the relationship between terroir and cultural values, but instead favours immediate varietal recognition and the pursuit of pleasure.

3 - The role of the vine type in Tipicity

Squeezed between considerations of territory and the variabilities of human intervention, in the European tradition the actual **vine type employed is of secondary importance** when compared to factors relating to terroir and human intervention. The idea of viticultural territory ("terroir") is in fact not only used as a quality benchmark, it is also used in defence of quality; no-one can counterfeit a "terroir", which belongs exclusively to those who inhabit it.

Products that are famous, or that benefit from a strong quality reputation are in danger of counterfeits, to the detriment of their reputation and their commercial standing. Protected by the image of their "terroir" DOC wines are in a privileged position, as their quality is guaranteed and defended institutionally. **The "terroir" is immoveable**, and its authority remains vested in it, **but the vines can be taken elsewhere**. These translocated vines may give excellent results, but they cannot benefit from the tipicity that comes from a "terroir" and from the associated cultural interaction of recorded tradition.

Nevertheless, it is undeniable that the most famous terroirs also have their own particular vine types. In Burgundy, for example, the vines are almost exclusively Pinot Noir and Chardonnay; Bordeaux is the home of Cabernet Sauvignon and Merlot; Nebbiolo comes from Piedmont; Valpolicella is made from Corvina and Rondinella.

Thus it is that when comparing vine types and terroirs, the vine type is of limited importance in one sense and of crucial importance in another.

This importance is most clearly seen in the concepts of novelty and immediacy proposed by producers from the **southern hemisphere**. Here the vine can always achieve its full potential, wherever it is planted, free from the norms of a terroir, the shackles of bureaucracy and preoccupations about identity. The grape varieties involved have only **one important test: does the consumer like them**

For many reasons, not least of all ease of name recognition, the varietal based thinking of the New World has been hugely and unexpectedly successful. Certainly, this was not expected by the advocates of terroir, the invincible fortress of quality.

4 - Native grapes, the legacy of terroir

The castle of terroir, which seemed to be solid and invincible, has been battered by new ideas, revealing some **serious structural defects**. Despite being solidly founded on quality, the terroir system is hampered by rigid regulation and inward-looking thinking. Every stimulus for progress has been ignored, limits have not been tested and new objectives not yet set. Under attack from the simpler and more easily understood forces of the New World, we are forced to re-evaluate the concept of terroir.

To safeguard the traditions of this undoubted viticultural inheritance and give it a future better suited to the modern market, **the concept of terroir must be revisited and re-evaluated. To guarantee a future for terroir we must elaborate a strategy that promotes and regulates its evolution.**

One of the main ideas of this strategy, and one that is particularly relevant to Italy, is the **re-evaluation of native (autochthonous) grape varieties**. This should give new life to some of the DOCs that are based on a particular grape variety. This is the case for Primitivo di Manduria, Aglianico del Vulture, Fiano di Avellino, Montepulciano d'Abruzzo, Refosco del Friuli, Teroldego Trentino, Raboso del Piave and so on right up to the production of the new wave New World style IGT wines that are almost exclusively based on the name of their principal grape component. Examples might be Nero d'Avola, Grillo, Uva di Troia, Negro amaro, Falangina, Ortrugo, Manzoni bianco…etc.
This process is the **rediscovery of particular vine types and their development as the crucial quality ingredient of a wine,** together with a **commercial strategy styled as "novelty that springs from tradition and is still authentic."**

In this case the distinction between the "native grape variety" which enhances originality and tipicity in a wine, and the "international grape variety" which implies a process of homologation and therefore uniformity**,** despite its easy acceptance on the market, needs careful study.

In fact, if well used **the native grape variety can stand in as the "missing link", capable of uniting the legacy of terroir with the need for simpler commercial propositions.**

The second idea concerns the study of viticultural potential in grape varieties using **technology to develop "new" tipicities.**

Technology is now commonplace. There are no secrets anymore in the process of wine production. Originally native grape varieties often fell out of use because of difficulty in their cultivation or because of economic necessity. So **we must learn (or indeed re-learn) to understand their potential, their advantages and their disadvantages, so as to be able to choose the grape varieties most suitable for today's needs, and develop them.**

Scientific research and applied experimentation are therefore the touchstones of understanding the agricultural and oenological aspects of this exploration of our heritage. This gives us the ability to study and select intelligently the "new old" varieties that will link terroir and tipicity with development in quality.

5 - The Veronese concept of terroir: actuality and change

Verona, and Valpolicella particularly, are good examples of a terroir that has developed enormously in the last twenty years. Various seminars have been devoted to the unique qualities of this terroir, but in brief it is:

- **A territory particularly well suited to viticulture** situated between 45° and 46° latitude, in the foothill region north west of Verona and benefiting from the climatic influence of Lake Garda. Various geological strata are involved, particularly the Middle Eocene with the liberal addition of rock from volcanoes active at the time.
- **An extremely rich and completely autochthonous ampelographic heritage**. Very few genetic modifications have been recorded from the possible variations imported from the east.

The use of modern production methods has helped quality development in Valpolicella and made its best wines some of Italy's most famous. If Verona, like all other terroirs, has benefited from the universal progress in technology – the fruit of that same technological research that is available to all wineries alike, wherever they are located in the world – it can on the other hand boast of a **unique connection between viticulture and oenology**, **the legacy of terroir combined with its cultural associations: *appassimento*!**

The *appassimento* process is unique, and a characteristic of the Valpolicella area. It enhances and at the same time transforms the raw materials of vinification, necessitating the use of a technology that is suited to its nature.

Returning to the subject of viticulture, we cannot afford to ignore the potential offered by **new-old grape varieties rescued from oblivion**. They once formed an active part of the Veronese viticultural patrimony, and now can be studied for future use in the enhancement of the quality of Veronese wines today, without losing the link with tradition.

The Veronese territories offer many opportunities for **the creation of new expressions of quality,** following new modern quality criteria with regard to style and personality, as used by the most famous producers. And at the same time the territory itself is open to reinterpretation within the bounds of its rich tradition.

As always, it is desirable to go from theory to practice as soon as possible. This is the way forward for quality and the way to confirm and increase the fame of Veronese wines on the world market.

Masi, the instigator of this research project into various of Verona's native grape varieties, collaborates with Milan University in the delineation of their characteristics. For Vinitaly 2005, Masi offers delegates at the Masi Seminar the chance to taste some experimental wines made from six of the most significant grape varieties involved: **Oseleta, Cabrusina, Forsellina, Pomella**, red-skinned and white-skinned **Bianca Capriana**.

l.p.05

THE ORIGINS OF ANCIENT VINE TYPES IN VERONA: FROM THE WILD TO THE DOMESTICATED

By Attilio Scienza

When considering the complex problem of the origin of the domestic vine contributions are necessary both from cultural anthropology on the one hand and molecular biology on the other.

Alongside the evidence that vines arrived from the East, there is an ever increasing body of evidence from Italian and French botanic archaeologists that **the wild vine was domesticated in Neolithic times in many European locations.**

Molecular studies show huge genetic differences between vines far apart in different locations, and it is clear that the phenomenon of transmigration of vines in ancient times was common to the Mediterranean area. On the other hand, vines in Alpine, Continental and Iberian locations are the product of genetic interbreeding. Chardonnay is a classic example: the product of the spontaneous crossing of a vine native to the Rhine basin with a vine introduced from the East.

The study of the origins of a variety, the reclaiming of the places where it has undergone its domestication and subsequent acclimatisation, and the promotion of this varietal through the wines it produces is a sort of re-appropriation of a precious resource by the inhabitants of its birthplace.

The controversy about the origins of vine types is linked to ways of thinking. Identifying the origin of a vine has thus become a symbolic act, unrelated to the actual production process. Theory has become a way of conceptualising the problem, so that it has become the way of expressing tangible reality for certain groups of people.

In fact, theories of the Occidental origins of Indo-European agriculture and theories of the so-called “indigenous-supporters” who claim localised independent origins for European viticulture are by no means mutually exclusive. Both are important factors in the development of European viticulture. **But the birth of many ancient vine types is the result of an extremely lengthy selection process in areas of what came to be called “centres of secondary viability”.**

One of these areas is the **hills of Verona**, where vine types were once much more varied than they are today, and where they are they are the result of seeded plants or of genetic mutations, **typical of the interactive phenomena in mountain areas where climate permits a wider spectrum of mutation than normal.** DNA analysis shows that **within the category of ancient Veronese vine types there is an extremely high family interrelation of type**.

This observation is not true, for example, of vines from the plain. In the end, the most important observation is **that the para-domesticated vines of the hills of Valpolicella and of the glacial depressions of the Adige basin come from a very restricted stock.**

Climatic changes in the XIV century, which coincide with what we call “lesser glaciation” and the socio-economic repercussions of the mid XIX century agricultural crisis caused a **dramatic decrease in the number of vine varieties** grown in the once prolific area of the Veronese hills. Two or three varieties only have survived until present times.

The recovery project initiated by **Masi** together with **DIPROVE of Milan University** will evaluate several lost varieties with the aim of re-introducing them into the viticultural process of the Valpolicella area, especially as complementary grape types in the production both of wines for long ageing (such as Amarone) and wines for immediate drinking (such as Valpolicella). Verona local government administered vineyards in San Floriano have taken up the same theme with parallel studies.

a.s.05

VITICULTURAL DISPOSITION AND OENOLOGICAL EXPERIMENTATION

By Masi Technical Group

Il progetto sperimentale dedicato allo studio e al recupero delle varietà autoctone cosiddette secondarie delle Venezie si svolge presso le **strutture messe a disposizione dall'azienda Masi Agricola** all'interno delle proprie tenute in Gargagnago, Valpolicella Classica.
The entire project benefits from the collaboration of Professor Attilio Scienza's Department for Viticulture and Oenology at **Milan University**, which collaborators and stagists have followed the project together with Masi technicians.

The production phases that follow the viticultural process take place in the other two Masi experimental locations:

a) *viticultural phase:* lead in the **experimental vineyard** planted by Masi inside the Serego Alighieri estate in Gargagnago
b) *wine making phase*: and the **experimental cellars** with ultra-modern technology used for the vinification of native grapes in the Venetian regions.
c) *drying phase (not object of today's experimental wines)*: lead in the **drying loft** equipped with the "Natural Appassimento Super Assisted" **(NASA)** system, an innovative way of controlling the appassimento process developed by Masi;

a) Experimental Vineyard

The first "**Experimental Vineyard for the Conservation and Evaluation of Indigenous Grape Varieties in the Venetian territories**" has been established on one of the most ancient parts of the Conti Serego Alighieri estate. In 2000 no fewer than 48 different varieties of vines were planted and cloned where necessary to enable the microvinification of selected varieties. Dr. Dario Boscaini is in charge of viticulture for the Masi Technical Group, and has managed the creation of the new planting with the collaboration of dr. Ermanno Murari, export of **Vivai Cooperativi Rauscedo**.

The Masi Technical Group has set itself the following targets:

- **to select the best clones for the base wines** in terms of adaptability to the particular production process,
- **to select** which ones can be better suited to appassimento than to immediate vinification as fresh grapes.
- To **re-evaluate old local grape varieties** that had been abandoned because of their low yields, but which might be able to bring out the personalities of Veronese and Venetian wines.
- To identify the native grapes suitable for **improving the traditional grape blends** of the wines.

List of Varieties Planted, according to their disposition on the vineyard, maximum two varieties per row:

(west side of the vineyard, direction S. Ambrogio)

Row 1 MOLINARA	**SEREGO ALIGHIERI**
Row 2 REFOSCO DAL PED. ROSSO	
Row 3 OSELETA	
Row 4 CABRUSINA	**TEROLDEGO**
Row 5 FORSELLINA	**CARMENERE**
Row 6 DINDARELLA POGGI	**POMELLA**
Row 7 DINDARELLA PULE	**SCHIAVA**
Row 8 MOLINARA CL. 87	**ENANTIO**
Row 9 MOLINARA CL. 100	**CASETTA**
Row 10 MOLINARA CL. 3	**ROSSIGNOLA CL. 5**
Row 11 MOLINARA NERA	**ROSSIGNOLA CL. 3**
Row 12 RONDINELLA CL. 76	**ROSETTA DI MONTAGNA**
Row 13 RONDINELLA CL. 73	**QUAIARA**
Row 14 RONDINELLA CL 1	**RABOSO VERONESE**
Row 15 CORVINONE 3	**CROATINA**
Row 16 CORVINONE PED. ROSSO	**PINOT GRIGIO**
Row 17 CORVINONE CL. 8	**BIGOLONA**
Row 18 CORVINONE CL. 7	**DENELLA**
Row 19 CORVINA CL. 48 K5BB	**BIANCA CAPRIANA**
Row 20 CORVINA CL. 48 420A	**DURELLA**
Row 21 CORVINA CL. 48 41B	**TREBBIANO DI SOAVE**
Row 22 CORVINA CL. 48 SO4	**NOSIOLA**
Row 23 CORVINA CL. 13 SO4	**PROSECCO**
Row 24 CORVINA CL. 6 SO4	**SAUVIGNON BIANCO**
Row 25 CORVINA CL. 7 SO4	**GARGANEGA CL. 4**
Row 26 CORVINA GENTILE	**GARGANEGA CL 84**

(east side of the vineyard, direction S. Pietro in Cariano)

The soil is alluvial and moderately stony.
The training system is Guyot and the planting density is 2·9*1. The vine rows are orientated North-South.
The number of buds left on the vine after manual pruning is from eight to ten. Leaf development is regulated by green pruning. Bunch thinning varies from 20% - 40% according to the quantity found on the vine. Each phase is monitored by the technicians, who decide on the quantities to be produced.
The lanes between the vines are stripped of vegetation and the general viticultural procedures are as follows:

- Organic fertilisation with manure but without mineral additives; earthing up and unearthing.
- No irrigation.

b) The Experimental Cellars

The project and the necessary technological backup to carry it out have been certified by M.U.R.S.T. (Ministery of Instruction, Universities and Research) with Decree 07.11.2002 and assisted by the Fund for Research.
Although this project has a wider oenological value it is specifically orientated here towards the native grapes of the Tre Venezie area, both in their fresh and semi-dried forms.

The project has particular reference to:

a) The use of biotechnology
b) The different uses of technology

The cellars occupy a 350 square metre space on the ground floor of a building at the company's headquarters to the north of Corte Monteleone in Gargagnago. It is air-conditioned throughout, equipped with modern systems of production and transportation of nitrogen and oxygen, and if needed refrigeration and heating systems. The cellar is divided into 5 sections:

A – grape processing
B – vinification
C – fermentation in barrel and malolactic fermentation
D – lab and sample collection
E - maturation barrel cellar

The cellars are directly connected to the NASA technology appassimento plant above them, and the dried grapes can be transported from the appassimento plant to the extensive barrel maturation area by gravity alone.

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AMPELOGRAPHIC AND SENSORY PROFILE OF THE MICROVINIFICATIONS PRESENTED FOR THE TASTING

By Masi Technical Group and Milan University

In the attachment you'll find the fact sheets of the five most significant microvinifications made by the technicians and offered to the tasting:

sample n.1 BIANCA CAPRIANA

sample n.2 POMELLA

sample n.3 FORSELLINA

sample n.4 CABRUSINA

sample n.5 OSELETA

MASI TECHNICAL GROUP

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References:

for geology	Lino Sartor
for climate	Marco Olivetti
for history and civilization	Giuseppe Brugnoli

We like to thank the collaborators of this specific project:
Viticolture and Oenology Department at Milan University, director professor Attilio Scienza, collaborators professor Lucio Brancadoro, dr. Giulia Tamai, dr Adam Boaz and other collaborators and students among which we thank Alberto Zanini.

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ATTACHMENT

Technical Seminar - Vinitaly 2005
Native grapes: a legacy of the Venetian territories
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AMPELOGRAPHIC AND SENSORY PROFILE OF THE MICROVINIFICATIONS PRESENTED FOR THE TASTING

sample n.1 BIANCA CAPRIANA

sample n.2 POMELLA

sample n.3 FORSELLINA

sample n.4 CABRUSINA

sample n.5 OSELETA

Analysis data by
MASI TECHNICAL GROUP
AND DEPARTMENT FOR VITICULTURE AND OENOLOGY AT MILAN UNIVERSITY
Harvest 2004

Bianca Capriana



Synonyms None

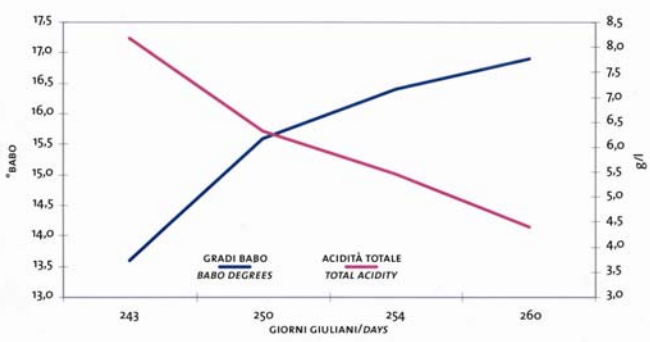
Incorrect names None

Ampelography
Leaf: medium-sized, pentagonal, tri-lobed; tight, V-shaped petiolar sinus; upper surface light green; irregular, short teeth.

Development stages
Budbreak: normal
Flowering: normal
Veraison: early-normal
Ripening: early-normal

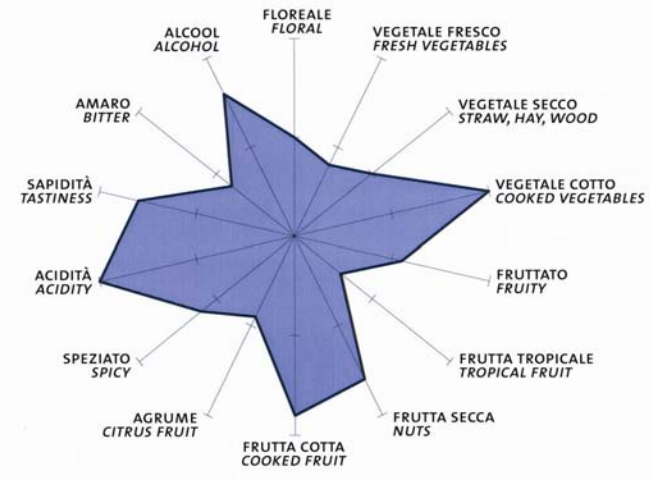
Agronomic & growth characteristics
Vigour: normal
Average bunch weight: 130g-150g
Average berry weight: 1.8g-2.0g

Environmental & cultivation requirements
Well adapted to cool, averagely-fertile soils. Average susceptibility to the main cryptogamic diseases.



Pre-harvest rate of sugar accumulation and acid loss.

Stages of technological ripeness
Grape ripening is even, culminating in a good sugar-acid balance. Technological ripeness is attained early.



Sensory profile of the wine

Organoleptic characteristics
The wine obtained from the variety is a straw-yellow colour. The nose gives cooked fruit, dried fruit, and straw and dried leaves.
The acid level is medium and there is a good level of alcohol, resulting in a balanced palate.

Wine styles
Can be used blended with other indigenous cultivars as it gives a fresh, savoury character to wines and adds complexity.

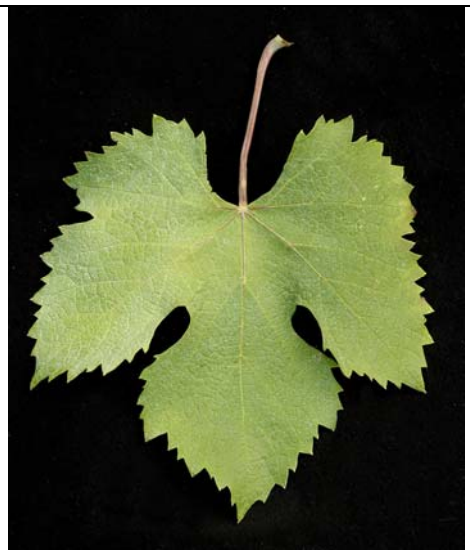
Chemical characteristics of the wine:

Alcohol (%vol.)	Fixed acidity (g/l)	Non-reducing extract (g/l)	Malic Acid (g/l)	pH
11,8	7,16	19,9	0,97	3,40

Molecular analysis
Nuclear DNA analysis expressed in length (no. bases)

Microsatellite	VVS2	VVMD27	ZAG62	ZAG79	VVMD5	VVMD7	VVMD28	VVMD21	VVMD24	VVMD25
Allele 1	131	181	187	240	222	237	237	247	206	253
Allele 2	144	187	193	244	230	241	239	247	206	253

Pomella

Synonyms None

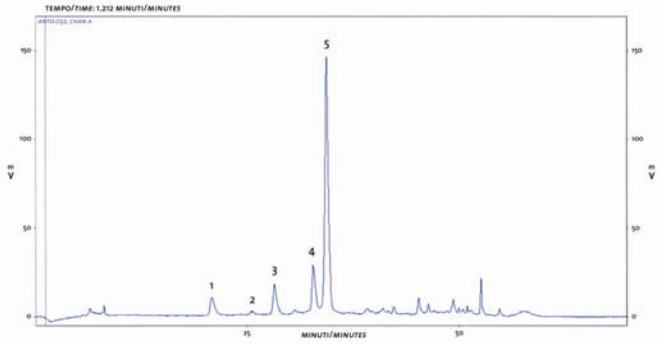
Incorrect names None

Ampelography
Leaf: medium-size, tri-lobed; open, U-shaped petiolar sinus; upper surface light green, pronounced lateral teeth.
Bunch: small, cylindrical, averagely compact; broad, herbaceous stalk.

Development stages
Budbreak: normal
Flowering: normal
Veraison: normal
Ripening: normal

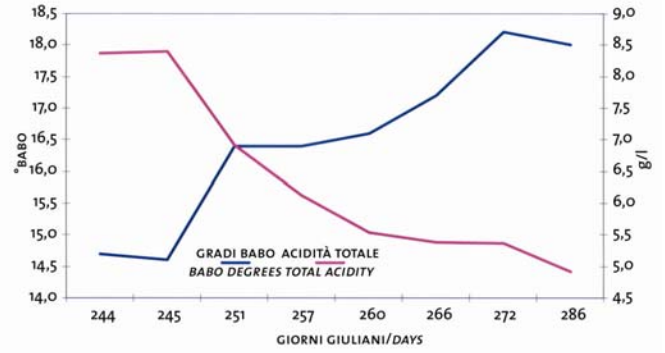
Agronomic & growth characteristics
Average bunch weight: 100g-120g
Average berry weight: 1.1g-1.3g

Environmental & cultivation requirements
Well suited to well-aspected sites in not-overly humid areas with soils of medium fertility Low resistance to the main cryptogamic diseases.



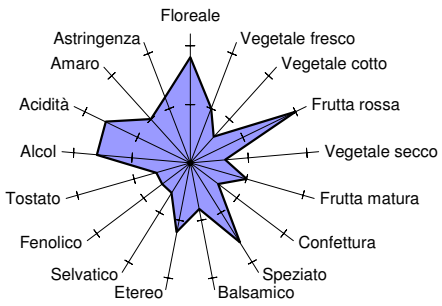
Anthocyanin profile of the wine:
1 = Delphinidin-3-monoglucoside
2 = Cyanidin-3-monoglucoside
3 = Petunidin-3-monoglucoside
4 = Peonidin-3-monoglucside
5 = Malvidin-3-monoglucoside

Chemotaxonomical characteristics of the variety
This variety has been placed in group 1B (Mattivi, 1989), which is characterized by preferential synthesis of tri-substituted anthocyanins. The main pigment is malvidin.
NOTE: quantification is made from the spike area, this is then expressed in relationship to the relative quantity of malvidin.



Pre-harvest rate of sugar accumulation and acid loss.

Stages of technological ripeness
Acid loss and sugar accumulation are even and continuous, facilitating the determination of technological ripeness. However it is important to recognise the right moment for harvest.



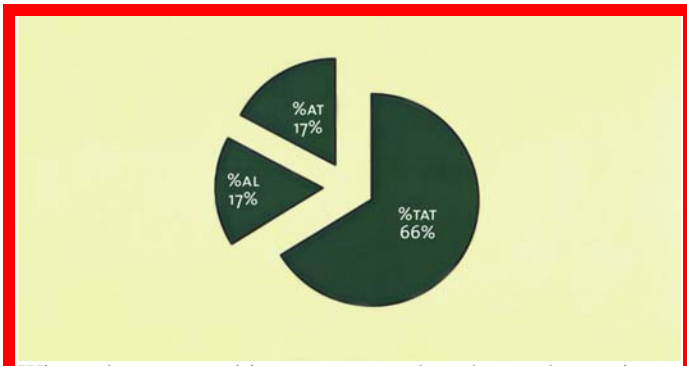
Sensory profile of the wine

Organoleptic characteristics
The wine from this variety is a not very deep red colour. Marked scents of red berry fruits, flowers and spice dominate the nose. The palate has good acid-alcohol balance.

Wine styles
When vinified as a monovarietal the wine has good structure but lacks colour. Blending with other local cultivars can remedy this. Both monovarietal and blended versions give wines for drinking young or mid-term ageing.

Chemical characteristics of the wine:

Alcohol (%vol.)	Fixed acidity (g/l)	Non-reducing extract (g/l)	Malic Acid (g/l)	pH	Total polyphenols (mg catechin /l)	Total anthocyanins (mg malvidin /l)	Total flavonoids (mg catechin /l)	Non-anthocyanin flavonoids (mg catechin /l)	*Colour intensity*	Tonality
12,45	4,66	20,26	1,19	3,35	882	104,5	752,3	589,9	0,496	-0,455



Wine colour composition percentages based on anthocyanin fractions
FA=free anthocyanins (monomers)
TA=mono-condensed anthocyanins, subject to SO_2 decolouration
TAT=poly-condensed anthocyanins, not subject to SO_2 decolouration

Quality of colouring matter
A variety with a medium-low content of polyphenols and anthocyanins. Nevertheless, fractionation of the anthocyanin pigments confirms the stability of the colour, with more than 50% of its composition coming from poly-condensed pigments.

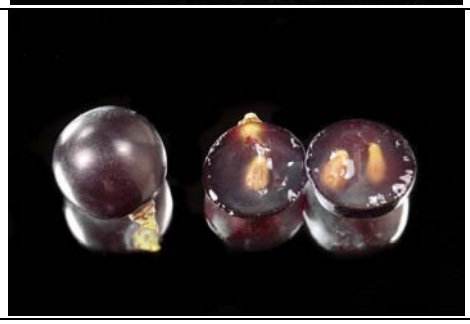
Molecular analysis

Nuclear DNA analysis expressed in length (no. bases)

Microsatellite	***VVS2***	***VVMD27***	**ZAG62**	**ZAG79**	**VVMD5**	**VVMD7**	**VVMD28**	**VVMD21**	**VVMD24**	**VVMD25**
Allele 1	149	183	193	248	230	237	247	241	206	255
Allele 2	153	187	203	248	232	245	259	247	214	261

Forsellina



Synonyms *Forselina or Forcelina, Forsellana or Forsella, Pignola*

Incorrect names *Pignola della Valpolicella*

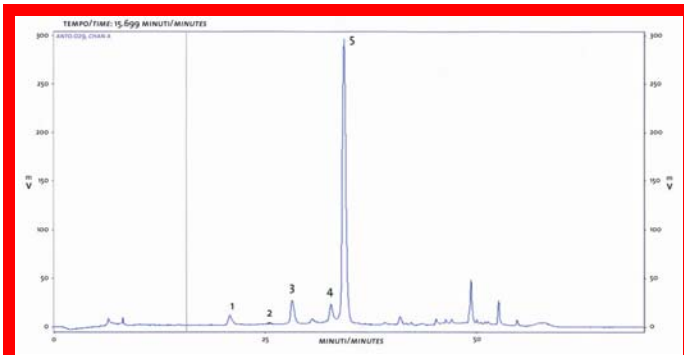
Origins & historical notes Found in the past throughout the area straddling Valpantena and the eastern border of the province of Verona. The name appears to be derived from the frequent presence of forked shoots, also described as “fasciati” (“bound”) shoots.

Ampelography
Growing tip: medium-long, white with pink patches along edges, woolly.
Flower cluster: pyramidal, 20-25 cm long
Leaf: medium-small, pentagonal, 5-lobed; open, W-shaped petiolar sinus; upper surface dark green and smooth, lower surface light green and slightly cobweb-like; pronounced, even lateral teeth.
Bunch: medium-sized, compact, cylindrical, without wings or single-winged; long, slim stalk.

Development stages
Budbreak: normal
Flowering: normal
Veraison: normal
Ripening: normal

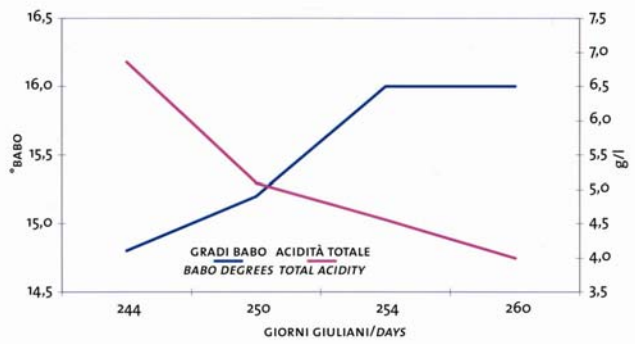
Agronomic & growth characteristics
Growth habit: erect
Vigour: good and balanced
Average bunch weight: 250g-300g
Average berry weight: 1.7g-2.0g
Bud fruitfulness: 1.41

Environmental & cultivation requirements
Good resistance to the main cryptogamic diseases. A hardy variety that adapts well to sub-optimal growing conditions. Needs to be trained long due to poor fertility of the basal buds.



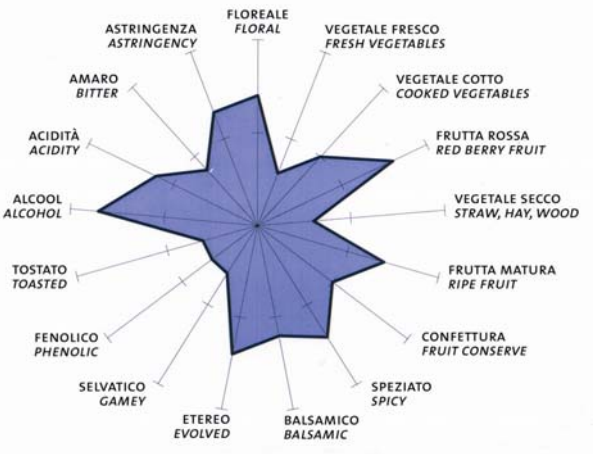
Anthocyanin profile of the wine:
1 = Delphinidin-3-monoglucoside
2 = Cyanidin-3-monoglucoside
3 = Petunidin-3-monoglucoside
4 = Peonidin-3-monoglucsside
5 = Malvidin-3-3monoglucoside

Chemotaxonomical characteristics of the variety
This variety has been placed in group 4 (Mattivi, 1989), which is characterized by approximately equal bi-substituted and tri-substituted anthocyanin contents. This group, which also contains the indigenous variety *Rossignola*, is marked by high quantities of peonidin.
NOTE: quantification is made from the spike area, this is then expressed in relationship to the relative quantity of malvidin.



Pre-harvest rate of sugar accumulation and acid loss.

Stages of technological ripeness
The variety has a high capacity for sugar accumulation in the pre-harvest period, especially straight after veraison. Acid loss also proceeds evenly up until the harvest.



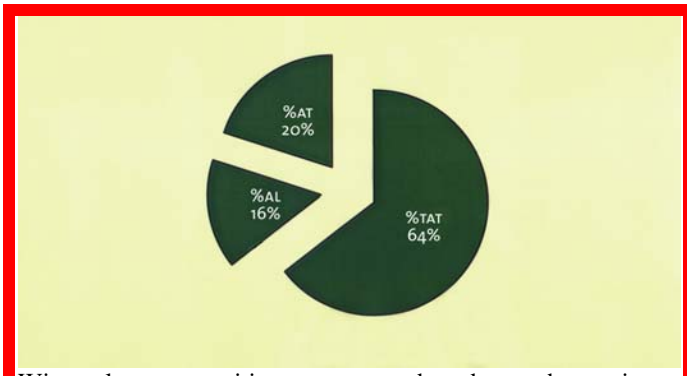
Sensory profile of the wine

Organoleptic characteristics
The wine obtained from the variety is a rather pale ruby red colour. The aromatic spectrum is marked by fruity and floral notes with light spicy scents. The palate has good body and good overall balance.

Wine styles
May be vinified as a monovarietal or blended with other local cultivars. When blended, gives admirable aromatic complexity along with good body and structure. In both cases the wines may be drunk young or following mid-term ageing.

Chemical characteristics of the wine:

Alcohol (%vol.)	Fixed acidity (g/l)	Non-reducing extract (g/l)	Malic Acid (g/l)	pH	Total polyphenols (mg catechin /l)	Total anthocyanins (mg malvidin /l)	Total flavonoids (mg catechin /l)	Non-anthocyanin flavonoids (mg catechin /l)	*Colour intensity*	Tonality
11,11	5,26	18,81	1,50	3,59	918	177,2	608,2	368,1	0,807	-0,602



Wine colour composition percentages based on anthocyanin fractions
FA=free anthocyanins (monomers)
TA=mono-condensed anthocyanins, subject to SO_2 decolouration
TAT=poly-condensed anthocyanins, not subject to SO_2 decolouration

Quality of colouring matter

Variety with moderate polyphenol and anthocyanin contents. Fractionation of the pigments reveals that a high percentage of the colour comes from poly-condensed anthocyanins, while almost equal quantities of free and mono-condensed anthocyanins make up the remaining 36%. Despite the medium-high content of free anthocyanins, the moderate tannin content does not predispose the wine for long ageing.

Molecular analysis

Nuclear DNA analysis expressed in length (no. bases)

Microsatellite	***VVS2***	***VVMD27***	**ZAG62**	**ZAG79**	**VVMD5**	**VVMD7**	**VVMD28**	**VVMD21**	**VVMD24**	**VVMD25**
Allele 1	139	183	199	236	222	245	255	241	206	237
Allele 2	153	183	201	248	222	261	259	247	214	261

Cabrusina




Synonyms None

Incorrect names *Montanara*, *Cabrusina Francese*

Origins & historical notes Found sporadically in the Valpolicella vineyards; in the past always used blended with other local varieties. First mentioned in 1825 when Acerbi described a variety with similar characteristics, calling it a "*cooking grape or plum grape*."

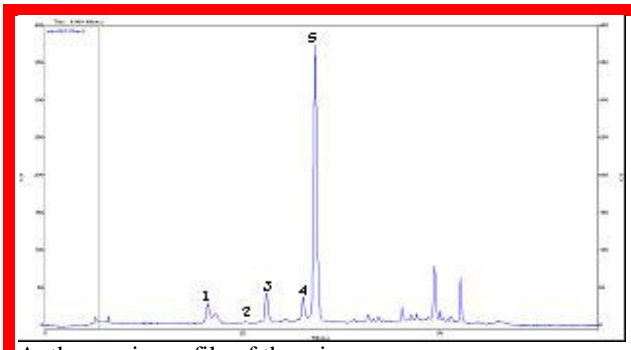
Ampelography
Growing tip: erect, medium length, white with bronze patches.
Flower cluster: pyramidal, 25-30 cm long
Leaf: medium-large, pentagonal, 5-lobed; open, U-shaped petiolar sinus; upper surface dark green and smooth, lower surface light green, some hairs along the veining; very pronounced lateral teeth.
Bunch: large, compact, pyramidal, single- or double-winged, with very long, broad stalk.

Development stages
Budbreak: normal-late
Flowering: normal
Veraison: late
Ripening: normal-late

Agronomic & growth characteristics
Growth habit: recumbent
Vigour: high but balanced
Average bunch weight: 200g-250g

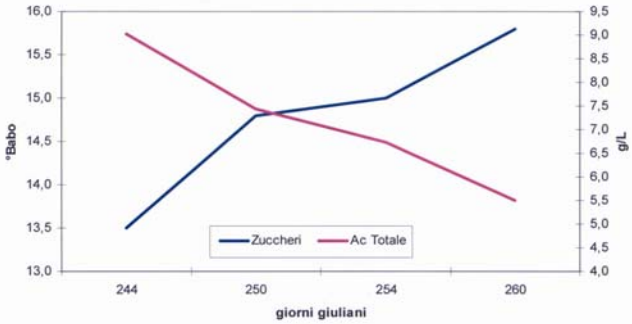
Average berry weight: 2.0g-2.5g
Bud fruitfulness: 1.1-1,.4

Environmental & cultivation requirements
Well suited to not particularly fertile hill terrains; prefers well-aspected sites. Avoids late frost damage and is fairly resistant to the main cryptogamic diseases.



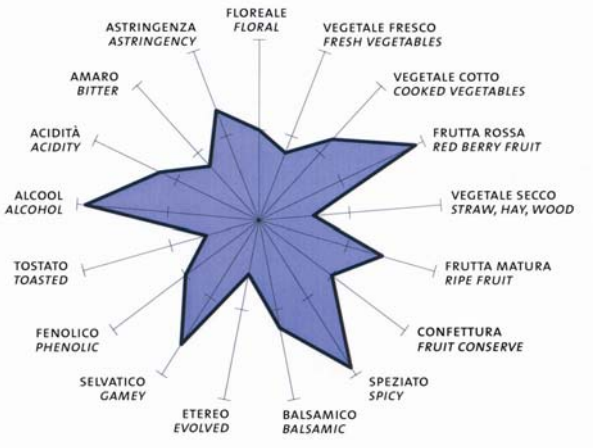
Anthocyanin profile of the wine:
1 = Delphinidin-3-monoglucoside
2 = Cyanidin-3-monoglucoside
3 = Petunidin-3-monoglucoside
4 = Peonidin-3-monoglucside
5 = Malvidin-3-monoglucoside

Chemotaxonomical characteristics of the variety
This variety has been placed in group 1A (Mattivi, 1989), which is characterized by preferential synthesis of tri-substituted anthocyanins, most prevalently malvidin.
NOTE: quantification is made from the spike area, this is then expressed in relationship to the relative quantity of malvidin.



Pre-harvest rate of sugar accumulation and acid loss.

Stages of technological ripeness
The maturation kinetics of the grapes show even sugar accumulation and acid loss throughout. By the time of harvest the grapes have generally achieved a fair sugar-acid balance.



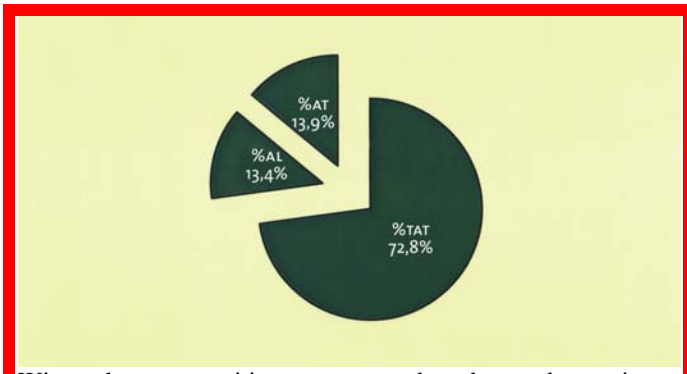
Sensory profile of the wine

Organoleptic characteristics
The wine is a violet-tinged ruby red. The aromatic spectrum is balanced, has medium-high intensity and is marked out by red berry fruits and spices. Astringency and the sensation of alcohol on the palate are medium.

Wine styles
May be blended with other local cultivars, thereby adding colour, acidity and greater aromatic complexity to the resulting wines. As a monovarietal it gives wines of highly esteemed characteristics which may be drunk young or with mid-term ageing.

Chemical characteristics of the wine:

Alcohol (%vol.)	Fixed acidity (g/l)	Non-reducing extract (g/l)	Malic Acid (g/l)	pH	Total polyphenols (mg catechin /l)	Total anthocyanins (mg malvidin /l)	Total flavonoids (mg catechin /l)	Non-anthocyanin flavonoids (mg catechin /l)	*Colour intensity*	Tonality
10,82	6,43	20,82	0,07	3,54	1410	182,6	903,2	521,8	0,830	-0,743



Wine colour composition percentages based on anthocyanin fractions
FA=free anthocyanins (monomers)
TA=mono-condensed anthocyanins, subject to SO_2 decolouration
TAT=poly-condensed anthocyanins, not subject to SO_2 decolouration

Quality of colouring matter

The comparative degree of polymerization of the anthocyanins with the tannins gives an indication of a wine's ageing potential. In this case the high stable anthocyanin fraction ensures the wine's good colour retention, thereby permitting ageing over the shorter- or longer-term.

Molecular analysis

Nuclear DNA analysis expressed in length (no. bases)

Microsatellite	***VVS2***	***VVMD27***	**ZAG62**	**ZAG79**	**VVMD5**	**VVMD7**	**VVMD28**	**VVMD21**	**VVMD24**	**VVMD25**
Allele 1	142	183	191	248	228	245	233	247	206	239
Allele 2	149	187	193	248	228	251	253	254	212	247

Oseleta




Synonyms *Oselina*

Incorrect names *Uccellina* or *Oselina rossa*

Origins & historical notes Its name derives from the preference birds show to this variety's berries. It would seem to descend from domestication of local wild vines.

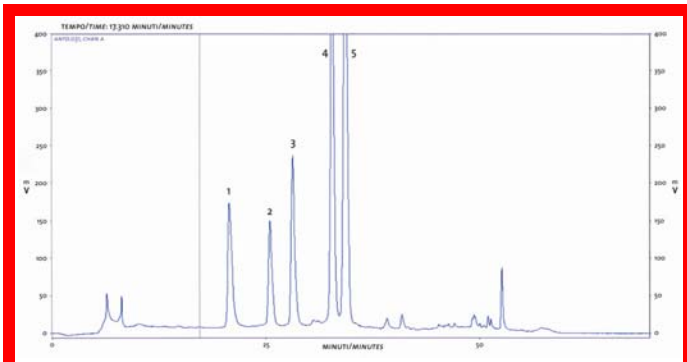
Ampelography
Growing tip: average, woolly, white with white patches along edges
Flower cluster: cylindrical long: 5-10 cm
Leaf: small size, pentagonal, 5-lobed, U-shaped petiolar sinus; upper surface dark green, slightly puckered, and smooth; lower surface light green and smooth; lateral teeth very pronounced and convex.
Cluster: small, very compact, cylindrical-pyramidal, often single-winged.

Development stages
Budbreak: late
Bloom: average
Veraison: average
Maturity: average-late

Agronomic & growth characteristics
Growth habit: erect
Vigour: fair
Average cluster weight: 130g-150g

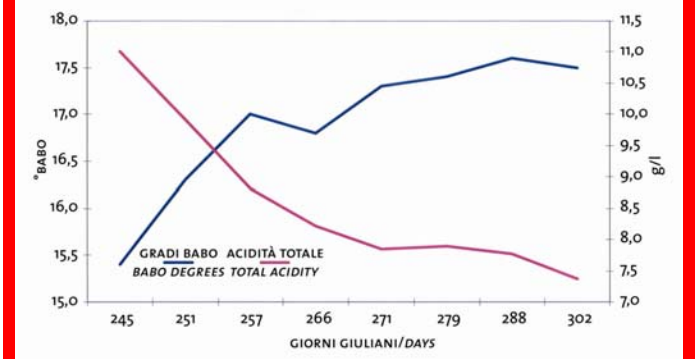
Average berry weight: 0.7g-0.9g
Fruitfulness of buds: 1.9

Environmental & cultivation requirements
No damage from late frosts. Despite compactness of cluster, little susceptibility to botrytis, and adapts well even to loft-drying. Because of low basal bud fruitfulness, does best with long training systems.



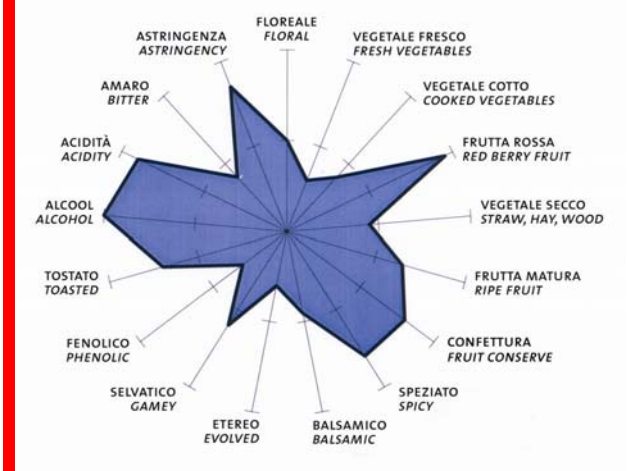
Anthocyanin profile of the wine:
1 = Delphinidin-3-monoglucoside
2 = Cyanidin-3-monoglucoside
3 = Petunidin-3-monoglucoside
4 = Peonidin-3-monoglucsside
5 = Malvidin-3-monoglucoside

Chemotaxonomical characteristics of the variety
This variety has been placed in group 3 (Mattivi, 1989), characterized by a bi-substituted anthocyanin content roughly equal to its tri-substituted. In addition, this group has a high quantity of delphinidin.
NOTE: The quantity is desumed from the area of the spike, which can then be related to the quantity of malvidin.



Pre-harvest rate of sugar accumulation and acid loss.

Stages of technological ripeness
The maturation phase of the grape extends for a markedly lengthy time. Sugar accumulation and acid loss occur more rapidly in the phase immediately following veraison; at the time of harvest the variety achieves good sugar-acid balance.



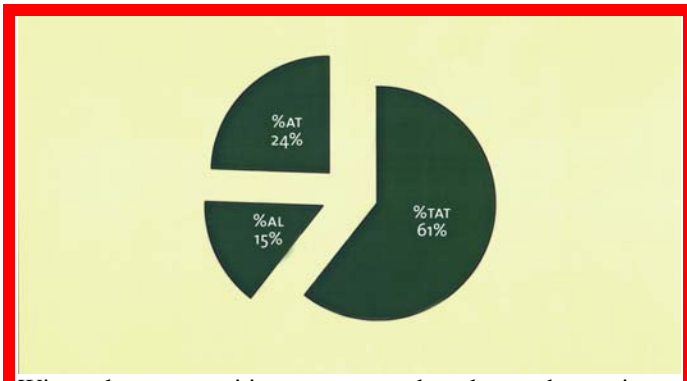
Sensory profile of the wine

Organoleptic characteristics
The wine is a very deep ruby red in appearance, tending to blue. The aromatic spectrum shows intense scents of fruit and spice, as well as gamey and toasted notes. It is structured, tannic, savoury, and persistent.

Wine styles
Suitable for monovarietal wine or for blending with other local cultivars, since its polyphenolic depth confers colour intensity and ageing potential. It is well suited to loft-drying for Amarone production.

Chemical characteristics of the wine

Alcohol (%vol.)	Fixed acidity (g/l)	Non-reducing extract (g/l)	Malic acid (g/l)	pH	Total polyphenols (mg catechin /l)	Total anthocyanins (mg malvidin /l)	Total flavonoids (mg catechin/l)	Non-anthocyanin flavonoids (mg catechin/l)	*Colour intensity*	Tonality
11.07	7.58	27.00	1.83	3.34	1913	654.2	1241.6	488.3	2.270	-2.645



Wine colour composition percentages based on anthocyanin fractions
FA=free anthocyanins (monomers)
TA=mono-condensed anthocyanins, subject to SO_2 decolouration
TAT=poly-condensed anthocyanins, not subject to SO_2 decolouration

Quality of colouring matter

A variety with a very high quantity of polyphenols and anthocyanins. The high stable anthocyanin concentration, together with a good tannin level, gives the wine excellent colour stability, suiting it for more or less lengthy ageing.

Molecular analysis

Nuclear DNA microsatellite analysis expressed in length (no. bases)

Microsatellite	***VVS2***	***VVMD27***	**ZAG62**	**ZAG79**	**VVMD5**	**VVMD7**	**VVMD28**	**VVMD21**	**VVMD24**	**VVMD25**
Allele 1	149	177	187	248	228	237	229	247	206	261
Allele 2	149	189	195	248	228	255	259	247	214	265