

Variability of must acidity in self pollinated Chardonnay progeny

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S u m m a r y : From a total of 2,200 seedlings, obtained by self-pollination of cv. Chardonnay clone SMA 130, 250 plants were chosen and grown in a hot microclimate area. During 1986-88, morphological traits of shoot tip, leaf and bunch, as well as juice quality (sugars, pH, titratable acidity, malic and tartaric acid) were evaluated. A wide variability of the acid characteristics was noticed in the offspring. There was a significant positive correlation between total acidity and bunch size. Tartaric acid concentration was highest in medium-size bunches. A highly significant negative correlation was found between tartaric acid concentration and berry volume. More acid juice was also obtained from grapevines with a narrower apex.

K e y w o r d s : self-pollination, seedling, selection, biometry, analysis, morphology, shoot, leaf, bunch, must quality, acidity.

Introduction

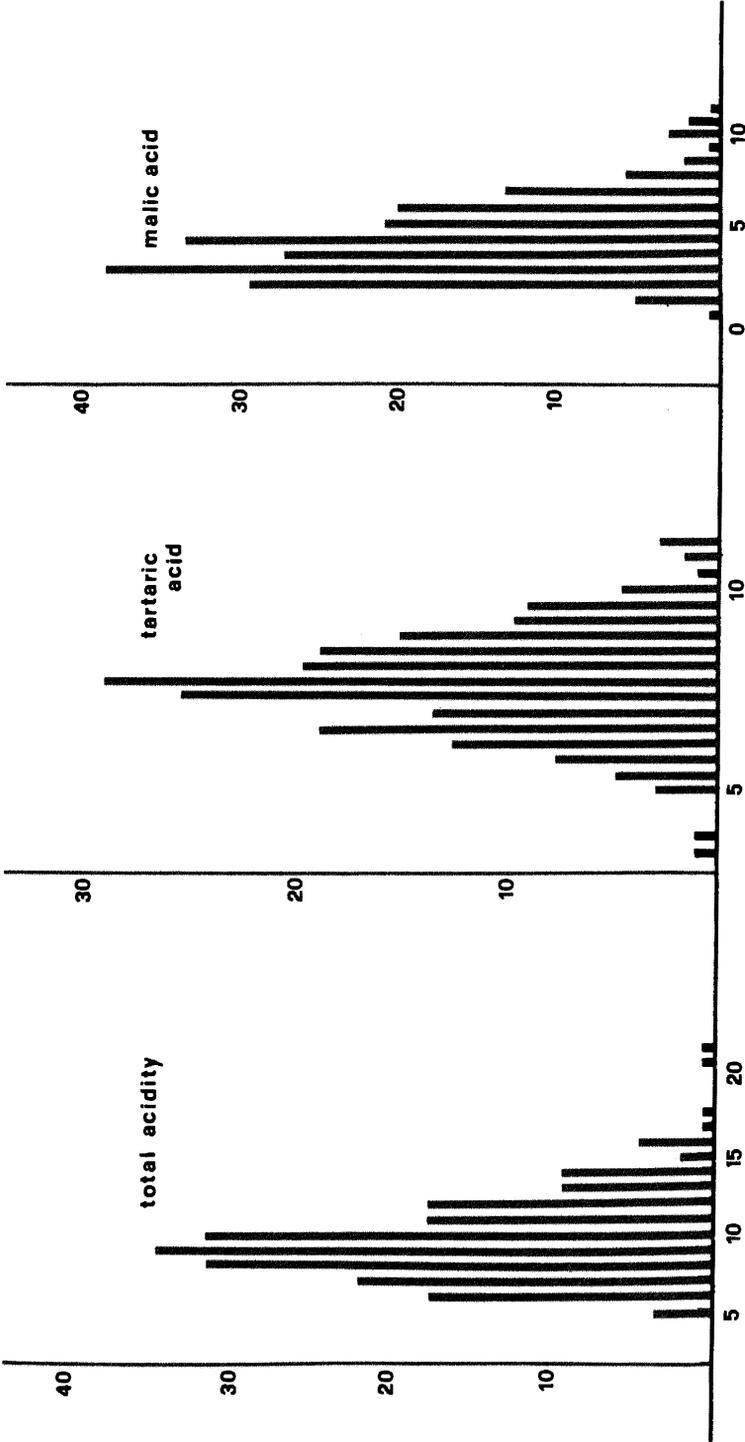
The heterozygous nature of grapevine is an interfering feature for any effective breeding program, hence the requirement for an investigation on the genetic variability of desirable traits within each clone (FANIZZA and RADDI 1973; FIROOZABADY and OLMO 1987). One of the classical approaches for gathering information about the distribution of the genes of interest across a given population is the study of the offspring from recurrent self-pollinations (WAGNER 1975; VINCOURT and GALLAIS 1983). According to this scheme, a genetic program was undertaken with the cv. Chardonnay. The trait considered was: highly acidic must – a most needed feature for grapes to be grown in hot climates across Italy.

Material and methods

The population under investigation over the 1986-88 period included the SMA 130 Chardonnay clone and 250 fertile plants out of the about 2,200 seedlings obtained through self-pollination. The vines were planted on their own roots in the vineyard of the Centro Vitivinicolo Provinciale, Brescia, which is located in a hot microclimate area. The circumference of the trunk 20 cm above ground and the number of nodes were used to define the general vigor. A number of morphological traits (tip form, leaf size, lobe number, tooth shape, shape of petiolar sinus, cluster size, berry shape and size) were classified according to O.I.V. standards (O.I.V. 1983). The width and length of the cluster were measured and their compactness rated as: 1 = compact, 2 = well filled, 3 = loose. The fruits were crushed and total sugar content, pH, titratable acidity, malic and tartaric acid concentration of juice were determined. Data reduction was by uni- and multivariate statistics.

Results

The figure shows the frequency distribution of titratable acidity, tartaric and malic acid, as measured in the must from the offspring of self-pollinated Chardonnay. Table 1 compares the range of variability for the characters above within the parent clone and among the seedlings in 3



Frequency distribution of titratable acidity, tartaric acid and malic acid in the must from the offspring of self-pollinated Chardonnay.

Table 1: Variability range on 3 harvest years for quality traits in a Chardonnay clone and its self-pollination

	ACIDITY		MALIC ACID		TARTARIC ACID	
	parent	offspring	parent	offspring	parent	offspring
1985	4.42-6.72	5.25-9.21	2.13-5.85	3.49-7.39	2.22-3.70	2.24-3.70
1986	6.61-10.7	6.85-12.7	2.07-5.81	2.46-6.32	6.24-8.40	6.29-9.11
1987	6.90-11.6	6.10-10.8	2.36-7.10	1.38-5.44	4.02-4.81	3.51-5.99
mean	5.97-9.67	6.06-10.9	2.18-6.25	2.44-6.38	4.16-5.63	4.01-6.26

Table 2: Correlation between must acidity and morphological traits for the self-pollinated progeny from a Chardonnay clone

	ACIDITY	MALIC ACID	TARTARIC ACID
CLUSTER SIZE	0.315***	0.077	-0.139*
BERRY SIZE	-0.090	0.054	-0.356***
BERRY SHAPE	-0.071	-0.087	-0.054
NUMBER OF NODES	0.051	-0.002	-0.051
GENERAL VIGOR	0.094	0.037	-0.107
FORM OF TIP	-0.109	-0.217***	0.048
LEAF SIZE	-0.001	-0.110	-0.053

subsequent years. Only a minor improvement was observed in the seedling population, and there is little variation of the figures over the 3-year test period.

Table 2 relates some morphological traits versus titratable acidity and its components. A significant positive correlation is observed between total acidity and bunch size, while no relationship seems to exist with other parameters. An opposite trend is found for bunch size and tartaric acid, whose concentration is highest in medium-size bunches. Very significant is then the (negative) relationship of acidity versus berry volume, i.e. the increase of tartaric acid concentration with decreasing fruit size. Better (= more acidic) grapes were also obtained from plants bearing leaves with a lower number of lobes and with a narrower apex.

Conclusions

Since its establishment, the cv. Chardonnay has undergone a – direct or indirect – selection favoring the biotypes with highly acidic must, intended for the production of sparkling wine. This character is very stable within the clone, as shown by the constancy of the figures evaluated on different vintages as well as from the small standard deviation for this character among the progeny seedlings.

Also to be taken into account and further tested in any future breeding program is the finding that in this cultivar a larger bunch but a smaller berry size parallel a higher acidic content.

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Characterization of *Vitis vinifera* biotypes through biochemical methods

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Abstract: We have shown that the soluble protein fraction from pollen wall was clone specific and independent of environmental as well as cultural conditions.

Along this line, we have compared several biotypes belonging to the cultivar Nebbiolo; the samples were collected in two distinct, typical areas. When analyzed with two different electrophoretic procedures, the protein pattern varied extensively between the groups while it was constant within each group.

Three supposedly distinct cultivars – Vermentino, Pigata and Favorita – grafted on the same rootstock and grown in the same farm, gave exactly the same electrophoretic pattern for pollen wall proteins as well as storage and enzyme components from the seed. This evidence suggests that the three cultivars share an identical genetic background.