

RESEARCH ARTICLE

(Open Access)**Ampelographic evaluation of wild grapevine characters *Vitis Vinifera G. ssp Sylvestris* in Vlora's river valley**

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Abstract:

The wild grapevine (*Vitis vitifera G. ssp Sylvestris*) has been growing spontaneously for thousands of years in Vlora's river valley. It has been growing in the forests and the villages located along this river, starting from the low hills and ending with villages, located at approximately 600 - 700 m above the sea level such as Mesaplik, Brataj, Tërbaç, Vranisht, Kuç, Sevaster, ect. Observing the flower's characteristics we concluded that 13% of the flowers are hermaphrodites, 41% of the individuals have a functioning male flower and 46 % of the individuals have a functional female flower. The leaf has different dimensions starting from small to medium, it has 5 lobes, a pentagon form and a smaller petiole than the length of the grown leaf. Above the main venations there are no signs of anthocyanin pigmentation. The average length of the blade above the venation N_2 is $10.1 \setminus 9.6 = 1.05$. The grains contain 2-4 seeds with an average length of 4.85 mm and an average width of 4.5mm, the ratio length\width of the seed is $4.5 \setminus 4.85 = 0.92$. The pulp of the grain contains 44.5% must, 21% sugar and 13.1% acidity in total. In the forests and the villages of Vlora's river valley, the wild grapevine is usually accompanied with other plants like, *A. Unedo L.*, *C. Siliquastrum L.*, *C. Mas L.*, *E. Arborea L.*, *I. Aquifolium L.*, *Q. Cerris L.*, *P. Alba L.*, *Q. Frainetto Ten.*, *P. Spina - christi M.*, *O. Vulgareis L.*, *W. Pear*, *J. Oxycedrus L.*, *W. Plum*, *Blackberries*, *W. Rosse*, etc, and some herbaceous plants that typically grow in this area such as: *M. Camomila*, *Strawberry*, *Trifolium ssp*, *Lavandul*, *B. Perennis L.*, ect.

Keywords: wild grapevine, character, propagnation coeficient, population.

1. Introduction

The wild grapevine (*Vitis Sylvestris Gmel*) is a climbing plant circa 10-15 cm long. It has rounded branches, while the flowers are not placed near every leaf. The leaves have small-medium dimensions, and are green on both sides. On the bottom side they have a few hairs. The fruits are small, with little pulp and liquids. They are very sour, while the color of the membrane is brownish violet. It usually grows in the forests, fresh bushes, river valleys, etc. [2]

The wild grapevine in Vlora's river valley yields bunches of an average weight of some 111.5 gram, with a long loamy shape with spherical fruits covered from a black metalized colored membrane. Different populations have a variety of flowers, where hermaphrodite flowers, functional feminine flowers and functional masculine flowers prevail in different percentages. The differences related with the manner of appearance of the flower's sex, affects the reduction of the coefficient of propagation of the flowers, because circa 87% of the individuals of this population, cannot fructify, as a consequence they can't create seeds.

The wild grapevine is the oldest form of grapevine from which have derived all the domesticated cultivars of grapevine cultivated today, *Vitis Vinifera L. ssp Sativa*. [6]. This plant is diffused in countries of Center and South Europe, in Middle East, North Africa and Asian regions through the Black Sea and the Hindu Kush Mountains. [4,8].

Vitisvinifera L is part of the Vitaceae Lindley family and grows in wild conditions almost in all regions that have a temperate, cold or tropical climate between: north geographic width 53 and south geographic width 43 . For centuries it has been diffused in Albania and the other Mediterranean countries. [11].

The wild grapevine is a dioecious plant and displays morphological characteristics that are similar with those of the domesticated grapevine. [5]The main difference between them is the presence of female and male plants in the wild populations (dioecius) where the cross insemination is necessary. On the other hand, the cultivated varieties being hermaphrodites have a more emphasized possibility of auto-insemination. [1].The identification of the level of appearance of the ampelographic characters of the

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new scion, new leaf, flower, grown leaf, bunches, seed and canopy of the wild grapevine is based in the codes of *The International Plant Genetic Resources Institute*. [7]. The identification and nomination of high trees and herbaceous plants that accompany the wild grapevine are based on the schemes as given in the *Dendrology and Pomology* textbook published by the Agriculture University of Tirana.[3].

Not every grapevine that was planted or is growing in the forest in natural conditions can be called a wild grapevine. It's the identification of level of the appearance of the *ampelographic* characteristics and the plants of the habitat where the grapevine grows that serve to distinguish the plants of the wild grapevine. (*V. Vinifera ssp sylvestris* G) from other grapevine forms that grow in forests and have sprouted casually from seeds.[7].

2. Material and Methods

The survey and the measurements that were conducted in a representative sample were composed of 15 typical plants labeled with plastic tags during August 2011. On the labels were marked the numbers of every plant starting from 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14 and 15. The characterization of the features of the tree tops and the new scion was performed in the period from 15 to 25 April 2011, when the new scions have not become wooden and are 10-15 cm long. The characterization for the form of appearance of the sex of the flower, was performed in the period of flowering or circa from 15 to 20 May 2011.

The surveys, measurements and the evaluation of the biometric indexes of the grown leaf were performed during the period between 20 and 30 July 2011, a time that coincides with the appearance of the red color in the fruit membrane. For the characterization of the adult leaf, for every plant were randomly chosen as many as 15 healthy and completely formed leaves over the joints in the middle of the scion.

The surveys and the measurements on the bunches, the fruits and the seeds, were performed in the period of maturation of the wild grapevine, a period that coincides between the period from 25 August till 5 September 2011.

The measurements of the chemical and technological indices of the pulp (the content in must, sugar and acidity) were performed in the Laboratory of Horticulture at the Agriculture University of

Tirana. The two-year study period (2011-2012) was deemed sufficient to achieve accurate conclusions on the condition of this species, the average level of the appearance of the *ampelographic* characters that are related to the replication, propagation and productivity of the wild grapevine in the forests and villages of the Vlorë's river valley.

3. Results and Discussion

From the exploration of Vlorë's river valley, it resulted that the wild grapevine in this region, especially in the upper part of the valley, are conserved pretty well. In the forests and villages along the Shushica's River valley the wild grapevine is accompanied and supported from other forest plants such as: *Fraxinus ssp*, *Salix ssp*, *Quercus ssp*, *Cornus ssp*, *Clematis ssp*, *Malus Sylvestris* Mill, *Pyrus Communis* L, *Pyrus Amygdaliformis*, *Sorbus Domestica* L, (*Marus ssp*, *Prunus Cerasifera* Ehrh, *Rubus ssp*, *Rossa Canina*, *Ficus Carica* L, *Hedra Helix*, *Juniperus ssp.*, ect). Typical herbaceous plants of this region are: *Thymus Serphyllum*, *Matricaria Camomila*, *Dianthus ssp*, *Euphorbia ssp*, *Fragaria Vesca*, *Saturea Montana*, *Trifolium ssp*, *Origanum ssp*, *L. Officinalis*, *R. Officinalis*, *S. Officinalis*, *Bellis ssp*, *Viola ssp*, *M. Sylvestris*. The form of the tip of the new scion (IPGRI 001) of all the individuals is open. From the survey for the type of the flower it resulted that 13% of the plants of the population, have hermaphrodite flowers, with a normal functioning of the masculine and feminine organs, 46% of the individuals of the population have functioning feminine flowers and 41% of the individuals have functioning masculine flowers (Figure 1).

This testifies that the wild grapevine that grows in Shushica's river valley comes in three morphological types of flowers. The results show that 13% of the individuals of the population are hermaphrodite flowers and are able to make bunches, seeds and fruits, 46% of the individuals of the population are with functional feminine flowers that can make few fruits and seeds only if they are pollinated from individuals with functional masculine flower that are incapable of forming fruits or seeds.

The leaf surface influences the performance of the photosynthesis, quantity of the organic matter, and oxygen [10], while the productivity of the photosynthesis is proportional with the growth of the leaf length of the wild grapevine [11]. The collected data from the biometric measurements for the length of the leaf and the length of the main nervations are reflected in Table 1.

The data above shows that the average length of the grown leaf is 100,2 mm, circa three times bigger than the leaves of the other plants that accompany it. This brings positive effects in the adjustment of the Carbon\Oxygen (C₂\O₂) proportion in the natural ecosystem in Vlora's river valley and in reducing the negative effects of the energy through its inhalation.

From the counting of the bunches, number of fruits and other measurements on the biometric and chemical indices of the bunches and the fruit, the data are represented in the table below.

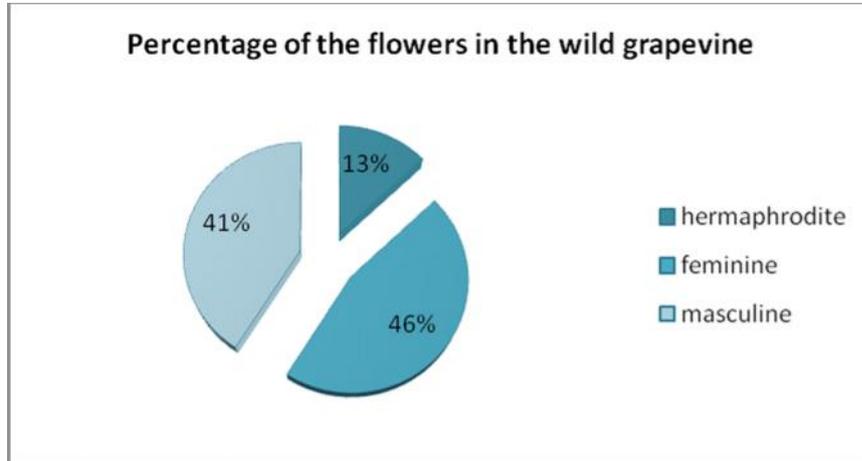


Figure 1. The difference because of the sex of the flower.

Table 1. The length of the main venatures on the grown leaf

Nr Plant	Length. N1	Length. N2 (mm)		Length N3 (mm)		Length N5 (mm)	
		Left	Right	Left	Right	Left	Right
01	71	59	52	48	48	26	25
02	106	67	66	53	49	32	34
03	89	48	59	57	54	31	32
04	117	78	72	61	57	37	38
05	113	90	84	68	65	35	37
06	87	66	58	51	51	34	33
07	94	69	65	50	49	38	37
08	112	84	86	61	60	29	31
09	117	87	83	67	68	34	35
10	88	59	65	56	56	34	34
11	102	69	73	57	57	36	35
12	86	64	61	48	47	34	34
13	117	87	87	60	59	38	38
14	85	60	64	52	52	35	36
15	119	89	88	68	67	37	39
Total	1503	1076	1063	857	839	510	518
Mean	100.2	71.7	70.9	57.1	55.9	34	34.5

Table 2. The level of the appearance of the characteristics of the bunch, fruit and seed.

Code	201	502	205	206	223	505	506	242	243
Character	Number of bunches	The weight of the bunch	Nr of fruits	Length of the petiole	% of must	% of sugar	% of acidity	Length of the seed	Width of the seed
Nr of Plant	(bunch\scion)	(gr)	(fruit\bunch)	(cm)	(%)	(%)	(%)	(mm)	(mm)
01	-	-	-	-	-	-	-	-	-
02	2	118	107	11	43	21	13	4.8	4.4
12	3	105	98	13	46	21	13.2	4.9	4.6
Total	5	223	205	24	89	42	26.2	9.7	9
Mean	2.5	111.5	102.5	12	44.5	21	13.1	4.85	4.5

Table 3. Results of variance analysis

ANOVA	F	P	Fc
For the feaures of the grown leaf	F- calculated	P-value	F crit
Variation between plants (Rows)	18.7	3E-08	2.61
<ul style="list-style-type: none"> For the features of the bunch and grain 			
Variation between plants (Rows)	5.28	3E-14	2.37

The data as given in the table above indicates that:

- Only two plants pertaining to numbers 02 and 12 or 13% of the individuals of the wild grapevine in Vlora’s river valley, can fructify forming 2-3 bunch\scion. While none of the plants with functional feminine or masculine flowers, were found with fruits or seeds.
- The average weight of the bunch is 111.5 gram, bunches are loamy, long, and contain approximately 102,5 grains\bunches.
- The average content of must in fruit (code 223) is 44.5% and is evaluated at a low content compared with the cultivated cultivars used for wine. The must contains 21% sugar and 13.1% acidity. The big content of acidity draws attention to this species, because it can be used successfully in the improvement of enological qualities of the cultivars with a low content of acidity.
- The grains contain 2-4 seeds with an average length of 4.85 mm and an average width of 4.5mm. The ratio width\length of the seed is a value equal

to 0.92 ($4.5/4.85=0.92$). The existence of this difference between individuals, is verified from the statistical analysis for the biometric indices of the adult leaf (Table 1), bunches, the fruit and the seed. (Table 2)

From the results of the analysis of variance (Table 3) we notice that:

- In both cases, the statistical index of variance $F_{\text{calculated}} > F_{\text{critic}}$ is concretely $18.7 > 2.61$ and $5.28 > 2.37$. This proves that in the case of the feature of the grown leaf, exists a difference which is also proved statistically.
- The other statistical index $P_{\text{value}} < \alpha$ ($\alpha = 0.01$) is equal to $3E-8E < 0.01$ and $4E-36 < 0.01$. This mathematical value is very small and is equal to $P_{\text{value}} = 3E-0.8 = 3/10^8$

The values of the indices above prove the existence of a genetic variance. This means that there are significant statistical differences between plants (*individuals*). There are different phenotypes that can be useful to identify, collect, store and use in different programs of genetic improvement with the purpose of creating new cultivars with better enological qualities in terms of acidity and tannin contents in wine.

4. Conclusions

- The wild grapevine displays 3 morphological types of flower: hermaphrodite, feminine and masculine. Only the hermaphrodite flowers (circa 13% of the individuals) are able to produce bunches, fruits and seeds and to develop young plants.
- The grown leaf has an average length of 100.2 mm. It also has a regular pentagonal shape, 5 lobes separated from deep grooves, the petioles slightly colored with an anthocyanin pigment.
- The plants with hermaphrodite flowers form small long and loamy bunches with an average weight of 111.5 gram/bunch and circa 102.5 grains/bunch. While the grains contain 2-4 seeds/fruit, the seeds have an average size of 4.85 x 4.5 mm.
- The pulp of the grain contains an average content of 44.5% must, while the must contains 21% sugar and 13.1% acidity. The population of the grapevine in Vlora river valley has a wide genetic variation. Inside the population there are interesting phenotypes to be collected, stored, and used in programs for the creation of new cultivars and the improvement of the existing cultivars that are used in the production of red wine.

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