THE MORFOLOGICAL VARIABILITY OF THREE CLONAL SELECTIONS OF THE PINOT NOIR CULTIVAR ESTABLISHED USING SOME NEW MEANS FOR PROCESSING OF AMPELOMETRIC DATA

VARIABILITATEA MORFOLOGICĂ A TREI SELECȚII CLONALE ALE SOIULUI PINOT NOIR STABILITĂ PRIN UTILIZAREA UNOR NOI MIJLOACE DE PRELUCRARE A DATELOR AMPELOMETRICE

STROE MARINELA VICUȚA, SAVU GEORGETA MIHAELA
University of Agronomic Sciences and Veterinary Medicine, Bucharest

Abstract. *Morphological variability of sorts and their clonal selections is impressiveand makes almost impossible the establishment of a unitar scientifical methodology that can allow easily recognise them.*

To eliminate the variation of phenotypic characters and their expression through numeric values, the ampelometric method is used, based on application of the „variation method" (H. Moog, 1938), expressing thus the variation of morphological characters in mathematic formula.

In this work, using ampelometry as a method of statistic investigation in elaborating data, new elements were obtained, that will certify the origin and the degree of similarity and dissimilarity between Pinot Noir sort's clones, the most eloquent of it's sort-population type.

Rezumat. *Variabilitatea morfologică a soiurilor şi a selecţiilor lor clonale este impresionantă şi face aproape imposibilă stabilirea unei metodologii ştiinţifice unitare pentru clasificare, care să permită recunoaşterea cu uşurintă a acestora.*

Pentru eliminarea variaţiei caracterelor fenotipice şi exprimarea lor prin valori numerice, se utilizează metoda ampelometrică, bazată pe aplicarea metodei „şirului de variaţie" (H. Moog, 1938), exprimând astfel variaţia caracterelor morfologice în formule matematice.

În prezenta lucrare, folosindu-se ampelometria ca metodă de investigare statistică în elaborarea datelor, au fost obţinute elemente noi, care să ateste originea şi gradul de similaritate şi disimilaritate între clonele soiului Pinot noir care este exemplul cel mai sugestiv al tipului soi-populaţie.

MATERIALS AND METHODS

Biological material necessary for this method was represented by adult leafage (20 leaves for each experiment), grown between nods 7 and 12 of copse from three clonal selection of the Pinot Noir sort (777, 115, 375), that were not suffering any disorder or pest. I chose this part of the plant for sampling because in the mentioned area the variability of the characters is little. Using the classical ampelometric method, I established I leaf's architecture 51 points of reference through 68 direct ampelometric measurements (fig.1) and results allowed calculation of 53 ampelometric values expressed as a report. Both values were measured and calculated for symmetric characters. The studied parameters are written in table no. 1.

The ampelometrical analysed sizes of the vine leaf were: the length of the main nervures (N1, N2, N3, N4); the distance among the basis lateral sinus and the petiole point (U, O) the opening of the lateral sinus (SS, Si) and of the petiole sinus (SP); length (ALT) and the width (AN) of the limb; external contour of the leaf (ENS, ENM, ENI, NL); the internal contour of the leaf (DS1, DS2, DS); the angle between median nervure and the end of the inferior lateral lobelet (ABE); the angles among main nervures (A,B,C), the angle which define the form of median lobelet; the reports between the lateral sinus basic and the nervures, the sinuses are propped up (UN2, ON3); the report between the length and width of the limb (L-A), the others having a small contribution.

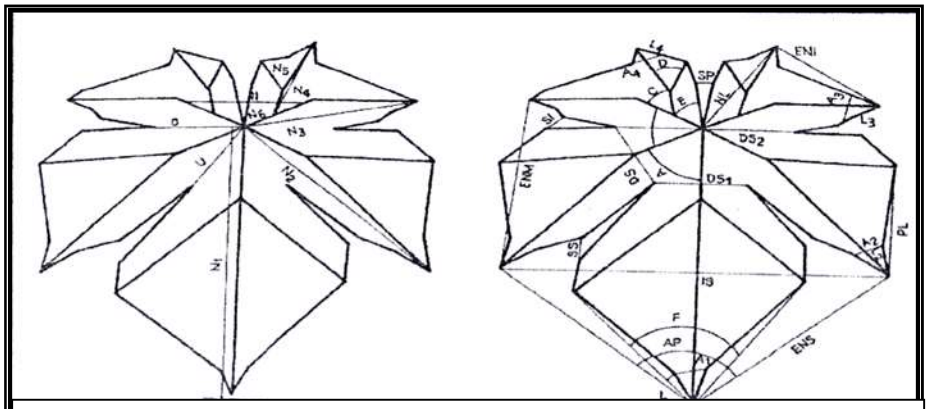


Figure 1. Diagramma representation of examined characters of vine leaf.

RESULTS AND DISCUSSIONS

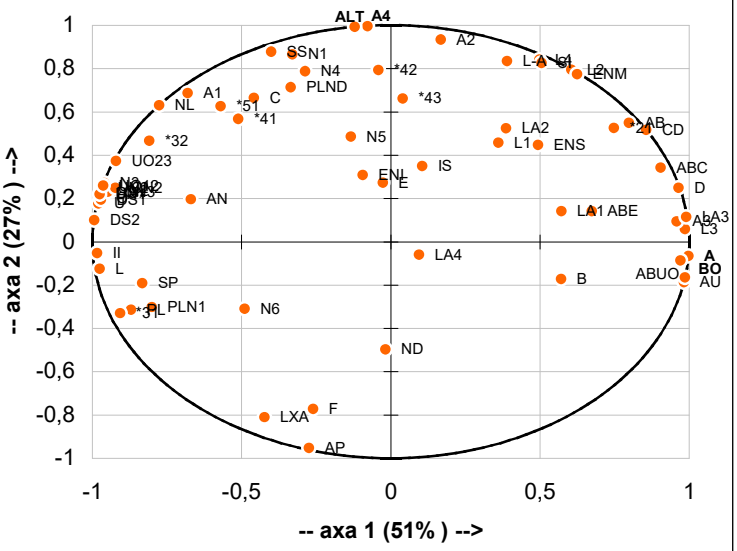
The application of the analysis in main components for Pinot Noir sort's clones

For applying the analyze method of the three sort's clones regarding the establishment of their relatedness and the sort they proceeded from, I extracted form table no 1 the medium values of all analyzed ampelometric parameters, for each experimental variant which was studied.

One first stage of the analysis in main components is, according to the descriptive informational method, the calculation of a correlative matrix between variables, based on Pearson coefficient (a simple correlation coefficient). It is calculated as an arithmetic average between standardized deviations of the two variables and which reflects the intensity of linear connexion between variables. It takes values from +1 to -1 and a value closed to these limits involves a stronger correlation between the two variables.

The next step consists in determinating the variables and their vectors in the area created by the first two main components.

Figure 2. The percentage of inertia for the components 1 si 2 (77%)



The percentage of inertia for the first two components, practically the most important, is 0,7725 (77%), from which 50,5% is on axis no 1 and 26,70 on axis no 2. It is renounced thus to present the components from the area that includes the total amount of parameters (of initial variables) and to the two-dimensional one (axis 1+axis 2) and it is kept the 77 percentage from total inertia.

The value of this percent is higher and reflects the fact that the two-dimensional representation distinguishes well linear correlations that exists between measured variables and those determined for all components.

If only the two components are analyzed, because they are the ones that represent the most of the inertia, it is observed that on main component no 1, the variables ENS (0,0842), ENM (0,1065), A (0,1702), B (0,0974), ABE (0,1149), *21 (0,1276), L-A (0,066) are positive, and these are situated on the circle of correlation at the extremity of axis 1, which it defines.

The negative vectors, on first main components there are many, these variables can be found on the correlation circle, in dial III and IV.

For axis 2, positive vectors many : N1 (0,2032), N2 (0,0551), N3 (0,0638), N4 (0,1847), Ss (0,2060), ALT (0,2330), variables that are situated on axis 2 or in dial I of correlation circle. The negatives vectors for axis 2 are SP (-0,0448), A (-0,0155), B (-0,0405), F (-0,1813), AP (-0,2236), variables situated in dial II-III of

correlation circle. The assessment of the experimental variants on factorial plan determined by it's main components, based on components coordinates on main axis , is represented in figure no 3, and only those with the greatest contribution to defining main factors placed eccentrically on main axis direction are important in realizing this study.

The observation of the diagram on the whole allows marking some areas (in which we find two experimental variants) that can be considerate groups to be, but to confirm this assumption it is necessary a cluster analysis of this homogeneous group composed of 3 clonal selections and the sort they came from.

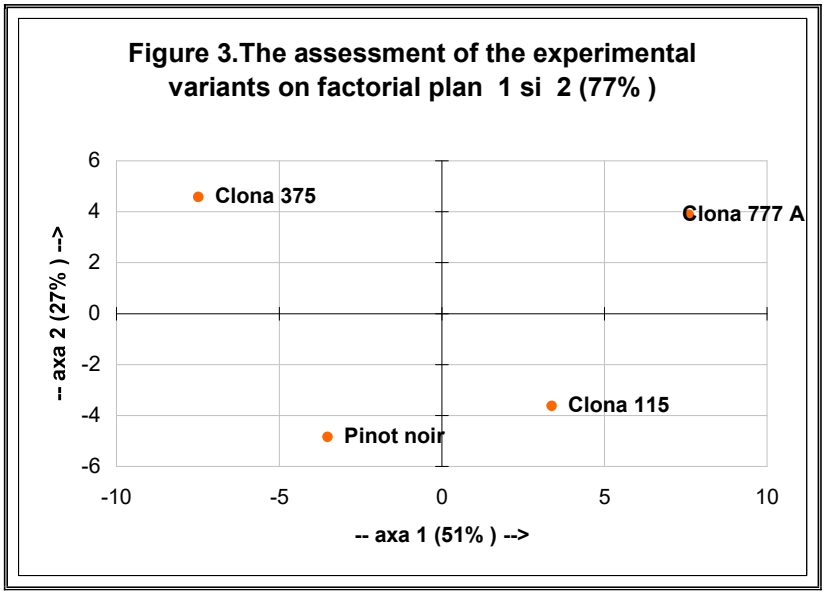


Figure 3.The assessment of the experimental variants on factorial plan 1 si 2 (77%)

For defining factor 1, clonal selection 777 (7,6037) had the greatest contribution, followed by 115 (3,33852), selection that united and formed a homogeneous group, with medium leaves, tronconical, pentalobate. They are situated at the extremity of axis 1.

At the other end there is clone 375 (-7,4791), which contribution was negative, and the sort Pinot Noir (-3,5070), variants with medium leaves orbicular, with less accentuated polymorphism.

Factor 2 was defined mostly by 375 (4,5806), in a positive way, and by selection 115 and Pinot Noir in negative way, that is (-3,6201) and (-4,8428).

Their position is eccentrically in one way and in the other, and the leaf's form differs for these experimental variants.

Table 1

Ampelometric mesures for the analysis in main components of Pinot Noir sort's clones

Clones/characters	N1	N2	N3	N4	U	O	SP	AN	ALT	ENS	ENM	ENI
Pinot noir	8,845	7,4125	5,4075	2,995	4,1475	3,97	1,42	12,265	12,46	7,3175	6,15	3,58
115	8,715	7,2	5,285	3,1725	3,37	3,7075	0,245	11,945	12,49	7,055	6,285	3,9025
777	8,96	7,24	5,2775	3,1775	3,2625	3,5225	0,3205	12,115	12,82	7,6475	6,4575	3,7
375	9,025	7,4975	5,5225	3,385	4,66	4,3875	1,07	12,23	12,915	7,195	6,31	3,8875
	NL	**DS1**	**DS2**	**DS**	**SS**	**SI**	**A**	**B**	**C**	**F**	**AP**	**ABE**
Pinot noir	3,7725	5,105	7,99	4,115	0,125	0,5175	63,05	51,95	49,75	98,65	105	145,8
115	3,6725	4,195	7,325	3,625	0,0325	0,53	65,15	62,15	48,05	101	104,45	159,675
777	3,7475	4,15	6,91	3,565	0,22	0,69	66,175	56,15	49,95	94,2	99,925	155,6155
375	4,0525	5,655	8,62	4,51675	0,31	0,5905	61,625	54	50,5	97,2	101,4	151,15
	***21**	***31**	***41**	**UN2**	**ON3**	**L-A**						
Pinot noir	0,8375	0,608	0,3435	0,536	0,723	1,015						
115	0,82625	0,6025	0,3595	0,472	0,70175	1,04435						
777	4,785	0,5825	0,35	0,449	0,66975	1,0605						
375	0,831	0,6115	0,3785	0,6205	0,789	1,05335						

CONCLUSIONS

The analysis in main components is a method statically- mathematics multidimensional, which can be applied in ampelometrics to establish in a first stage the characters that determine the differentiation of an assembly with phoenotipical similar characters.

The percentage of inertia of first 2 main components is 0,7725 (77%), from which 50,5% on axis 1 and 26,70 on axis 2, which reflects that two-dimensional representation of the plan determined by these sets off well the linear
connexions that exist between the 30 analyzed variables of the 3 clonal selections of Pinot Noir sort.

-it can be said that these variables that these variables separate best the experimental variants among themselves, by obtained values and by their variation and their contribution to the leaf's architecture is special for each of them, because they influence mainly the form of the leaf and less it's measures

-for factor 1, the greatest contribution had clonal selection 777 (7,6037) followed by 115 (3,3825), selections that united and formed a homogeneous group, with medium leaves, tronconical, pentalobate;

-factor 2 was defined mainly by clone 115 and Pinot Noir in a negative way, that is (-3,6201) and (-4,8428). At the other end it is situated clone 375 (-7,4791), which contributed negatively and Pinot Noir sort (-3,5070), variants with medium leaves, orbicular, with less accentuate polymorphism

-experimental variants are differentiated by polymorphism accentuated angle, of leaf's form and secondary by size angle. The size is influenced by clime conditions, applicated technology, and used parent stock

This comes to confirm from a statistical angle what was obtained with ampelometric descriptors.

REFERENCES

1. Dettweiler Erika, 1997 - *The European network for grapewine genetic resources conservation and characterisation* - XXV- eme Congres mondial de la vigne et du vin.

2. Indreaş Adriana, Liliana Rotaru, **Marinela Vicuța Stroe**, **Alina Mărcuță**, 2004 - *Folosirea analizei în componenți principali (ACP), un nou mijloc de prelucrare a datelor ampelometrice.* Simpozion ştiinţific anual, "Horticultura – ştiinţă, calitate, diversitate-armonie", Iaşi 28-29 mai, 2004, pag.52.

3. Rotaru Liliana, Târdea C., 2002 – *Contribuții la prelucrarea datelor ampelometrice prin analiza în componenți principali*. Analele Universității din Craiova, vol. VII (XLIII).

4. xxx, 1992 **-** A.A.V.V. *Repertorio dei cloni SMA., Pino nero*. Quaderni di esperienze e ricerche, Istituto Agrario San Michelle All'Adige, Trento, pp. 120.