RESULTS ABOUT THE IMPLEMENTATION OF THE FRACTAL ANALYSIS FOR THE VINE VARIETIES DESCENDANTS OF BABEASCA NEAGRA

REZULTATE PRIVIND APLICAREA ANALIZEI FRACTALE LA SOIURILE DE VIȚĂ DE VIE DESCENDENTE DIN BĂBEASCĂ NEAGRĂ

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Abstract. *In order to obtain new vine varieties, the vine breeders were focused on using the ancestral and productive varieties that are well adapted to the ecopedoclimatic conditions of our vineyards. Thus, for the Băbeascăneagrăvariety case it resulted the following romanian varieties: Băbeascăgri, Codană, Arcaş, Balada, Cristina and Mamaia to which was applied the method of fractal analysis to determine the degree of similarity. It resulted that the fractal dimension closest to the parent variety was at Mamamia variety of 1.1254, being the largest value, and the farthest was of 1.0067 at Balada variety.*
Key words: fractal analysis, Băbească neagră descendents, fractal dimension

Rezumat*. Pentru a obține creații noi de viță de vie în atenția amelioratorilor a stat şi folosirea soiurilor ancestrale, productive, care sunt bine adaptate condițiilor ecopedoclimatice din podgoriile noastre. Astfel, în cazul soiului Băbească neagră au rezultat ca descendenți următoarele creații româneşti: Băbească gri, Codană, Arcaş, Balada, Cristina şi Mamaia, la care s-a aplicat metoda analizei fractale pentru stabilirea gradului de similitudine. A rezultat că cea mai apropiată dimensiune fractală de soiul matern a fost la soiul Mamaia, de 1,1254, ea fiind şi cea mai mare valoare, iar cea mai îndepartată a fost de 1,0067 la soiul Balada.*
Cuvinte cheie: analiză fractală, descendenți Băbească neagră, dimensiune fractală

INTRODUCTION

Băbească neagră is an old romanian vine variety known before the invasion of phylloxera, described by chroniclers in "Chronicle of Moldova" in the fourteenth century and its origin is closely linked with the Nicoreşti vineyard. Being very well-adapted to the climate conditions of our country, with it have created new varieties of vine: Băbească gray, Codană, Archer, Ballad, Cristina and Mamaia.

With them, based on fractal analysis, determine the fractal dimension, in order to determine the similarityof this sortogrup (Țârdea *et al.,* 2008). Fractal dimension is a fractional amount, which quantifies the degree of irregularity and

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fragmentation of a structure or an object or geometric shapes in nature (Mandelbrot, 1998; Mancuso, 1999; Secelean, 2002; Oancea, 2006).

MATERIAL AND METHOD

The biological material necessary for this method was represented by adult leaves. 10 adult leaves from each variety were taken into study, which were scanned and then passed through various imaging programs in order to obtain a picture of black leaf on white background (tab. 1). The fractal dimension was obtained based on Harfa program.

The first to use this method was Stefano Mancuso in 2001, using fractal analysis in the study of vine leaves in order to determine differences between different varieties grown in Italy. In our country, the first to use this analysis was Ţârdea C. in 2008 and then, in 2014, Bosoi Marioara applied this analysis to Galbenă de Odobeşti sortogroup (Bosoi, 2014).

Table 1

The genetic material studied

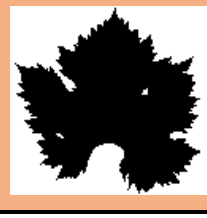
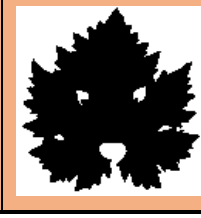
Variety name	Genitors	Homologation year	Authors and the unity where has been approved
Băbească neagră	Romanian local variety		
Băbească gri	Bud variation of Băbească neagră, fixed by a vegetive propagation	1975	Gh. Popescu, M. Oslobeanu, I. Poenaru, Margarita Băditescu - Statiunea de Cercetări Viti-Vinicole Odobesti
Codană	Băbească neagră x Fetească neagră	1975	Gh. Popescu, Margareta Băditescu, I. Poenaru, M. Oslobeanu - Staţiunea de Cercetari Viti-Vinicole Odobeşti
Arcaş	Cabernet Sauvignon x Băbească neagră	1985	P. Vârna, D. Danulescu, Gabriela Sandu-Ville, Eugenia Negulescu - IAS Husi si IVV Vaslui
Balada	Băbească neagră x Pinot noir	1994	Margareta Baditescu, N. Varga, Victoria Zaharia, Gh. Coman - Statiunea de Cercetari Viti-Vinicole Odobesti
Cristina	Chardonnay x Băbeascăneagră	1993	A. Ionescu, M. Oslobeanu - Statiunea de Cercetari Viti-Vinicole Murfatlar
Mamaia	Crossing varieties Merlot and a mixture of pollen of Băbească neagră and Muscat Ottonel varieties	1991	A. Ionescu, M. Oslobeanu - Statiunea de Cercetari Viti-Vinicole Murfatlar

RESULTS AND DISCUSSIONS

The results for fractal dimension of the leaves from Băbească neagră sortogroup are presented in table 2 and represented graphic in figure 1. In figure 2 and figure 3 are represented the minimum and maximum values of fractal dimension.

Table 2

Fractal dimensions at Băbească neagră sortogroup

Variety / Leaf Nr.	Băbească neagră	Băbească gri	Codană	Arcaş
1	1.1210	1.1199	1.1386	1.0938
2	1.0826	1.0649	1.0769	1.0519
3	1.0555	1.0061	1.0146	1.0548
4	1.0652	1.0396	1.0703	1.0459
5	1.0744	1.0520	1.0629	1.0611
6	1.0505	1.0422	1.0425	1.0985
7	1.0868	1.0673	1.0536	1.0506
8	**1.0036**	1.0747	1.0292	1.0611
9	1.0324	1.0312	1.0315	1.0955
10	1.0915	1.0220	1.0134	1.0699
Average	**1.0665**	**1.0520**	**1.0534**	**1.0683**
				

Continue of table 2

	Balada	Cristina	Mamaia
1	1.0762	1.1041	1.1122
2	1.0304	1.0999	1.0799
3	1.0328	1.0490	1.0658
4	1.0953	1.0935	1.0576
5	1.0297	1.1590	1.0618
6	1.0058	**1.1595**	1.0655
7	1.0347	1.1556	1.0987
8	1.0354	1.0940	1.0790
9	1.0707	1.0856	1.0803
10	1.0643	1.1206	1.0921
Average	**1.0475**	**1.1121**	**1.0793**
			

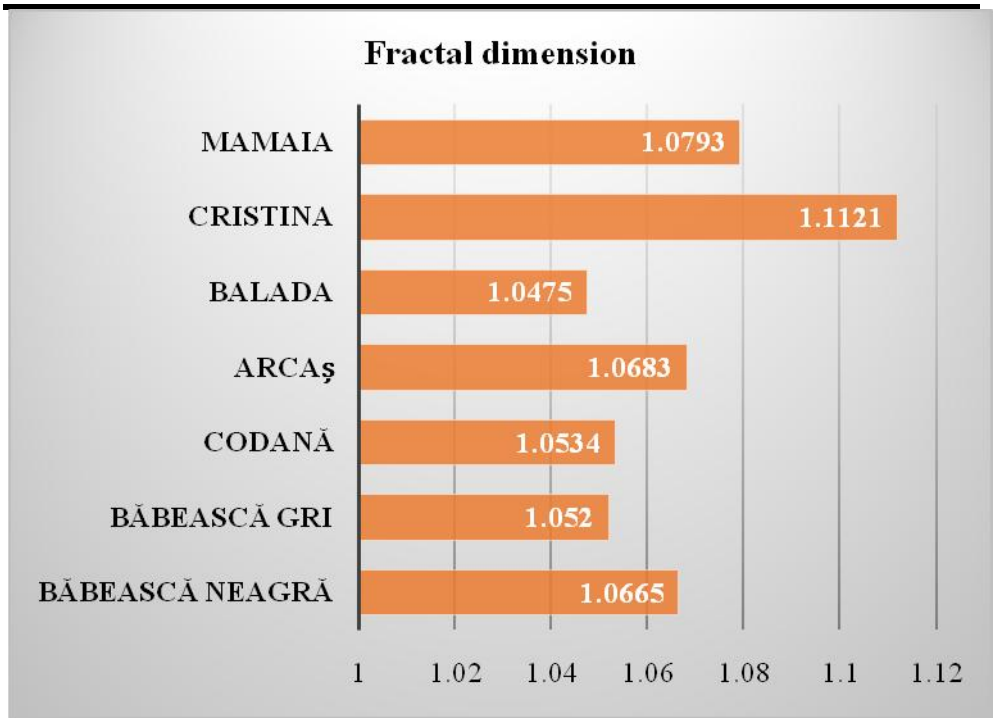


Fig. 1 Fractal dimension obtained at Băbească neagră sortogroup (average values)

From the analysis of the data obtained it can be seen that the average values of the fractal dimension of the leaves belonging to the Băbeascăneagrăsortogroup ranges between 1.0036 (Băbească neagră variety) and 1.1595 (fig. 3).

Intermediate values of the fractal dimensions of the leaves had all the other 5 varieties, respectively Băbească gri (1.0673), Codană (1.0769), Arcaş (1.0938), Balada (1.0762) and Mamaia (1.0803).

Regarding the comparison with the mother variety, respectively Băbeascăneagră, the closest values had the Arcaş, Băbească gri, Codană and Mamaia varieties, while Balada and Cristina varieties had very different values witha difference from the average over 0.4 regarding Cristina variety.

In figures 2 and 3 we can see the minimum and the maximum values of the fractal dimension obtained at this sortogroup.

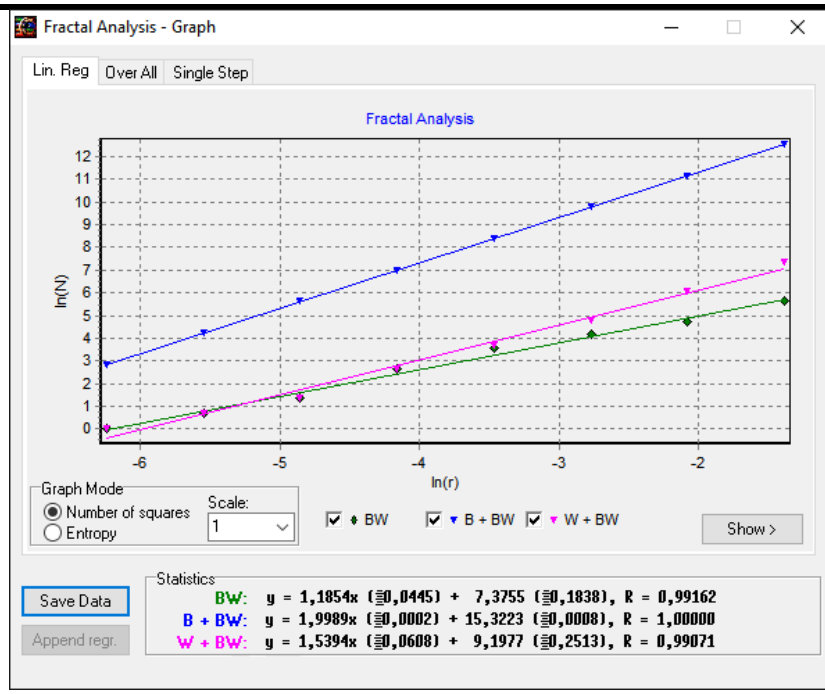


Fig. 2 Minimum fractal dimension obtained at Băbească neagră sortogroup

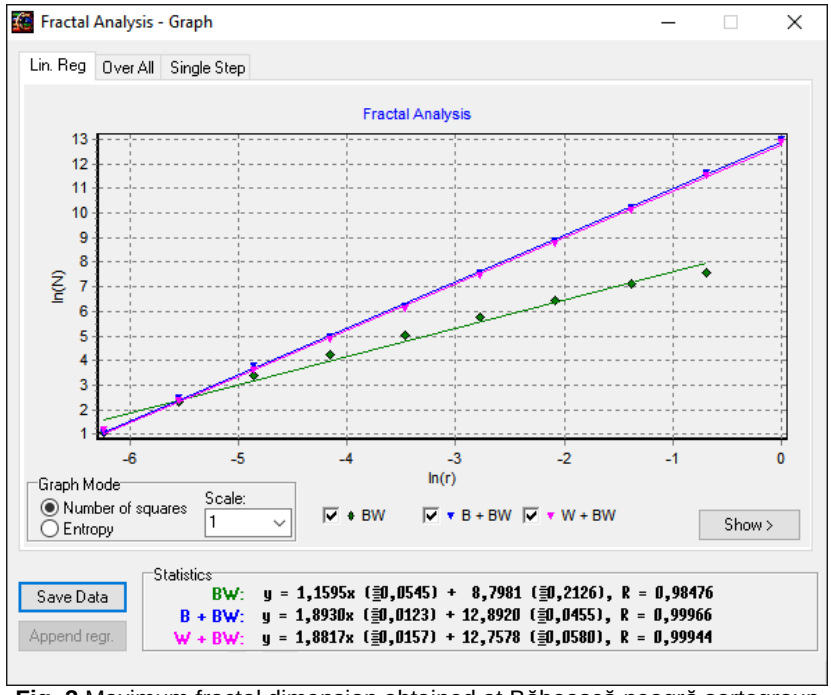


Fig. 3 Maximum fractal dimension obtained at Băbească neagră sortogroup

CONCLUSIONS

The fractal analysis at Băbească neagră sortogroup revealed the following:

1. The average values of fractal dimension at Băbească neagră sortogroup varies between 1.0036 at Băbească neagră variety and 1.1595 at Cristina variety.

2. The values close to Băbească neagră variety had Arcaş, Băbească gri, Mamaia and Codana varieties, while the values obtained for Cristina and Balada varieties were very different, with a difference of average over 0.4.

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