THE INFLUENCE OF LENGHT PRUNING ELEMENTS ON THE QUANTITY AND QUALITY OF FETEASCĂ NEAGRĂ GRAPEVINE VARIETY CULTIVATED IN COTNARI VINEYARD

INFLUENŢA LUNGIMII ELEMENTELOR DE ROD ASUPRA CANTITĂŢII ŞI CALITĂŢII PRODUCŢIEI DE STRUGURI LA SOIUL FETEASCĂ NEAGRĂ CULTIVAT ÎN PODGORIA COTNARI

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Abstract. *In this paper the authors presents the experimental data have obtained from the practice of cutting different lengths fruition at the Feteasc neagr variety grown in the vineyard Cotnari. First cutting short pruning system was applied (stems of 2-3 fruitful eyes), and second cutting on the long pruning system (fertile offshoots of 8-10 eyes). The research envisages obtained production levels, production and quality of grapes made from the use of two types of cut: Speroni Girdles and Guyot on arms with periodic replacement.*

Key words: Cotnari, Fetească neagră, short pruning system, long pruning system

Rezumat. *În lucrare autorii prezintă datele experimentale obţinute în urma practicării tăierii de rodire cu diferite lungimi de rod la soiul Fetească neagră cultivat în podgoria Cotnari. Pe de o parte s-a practicat tăierea în elemente scurte de rod (cepi de 2-3 ochi), dar şi tăierea în elemente lungi de rod (coarde de 8-10 ochi). S-a urmărit evidenţierea nivelului de producţie obţinut, dar şi calitatea producţiei de struguri realizate în urma folosirii celor două tipuri de tăiere: cordonul speronat şi Guyot pe braţe cu înlocuire periodică.*

Cuvinte cheie: Cotnari, Fetească neagră, sistem de tăiere scurt, sistem de tăiere lung.

INTRODUCTION

Cotnari region is placed in a transitional area between the two biggest relief units, profound different of Moldova: the High plateau of Suceava – represented here by the eastern unit Dealul Mare - Hârlău and the Hill plain of Moldova (Cotea D.V. and al., 2006). This contact between two relief units starts a long series of very important differences both in climate as well in vegetation and land distribution.

Inside Cotnari region the relief is fragmented, so that we can distinguish in its general slope towards south-east a series of isolated or grouped prominent, remains of structural surfaces once much more extended: The Cătălina hill (395 m), The Rock hill (360 m), The Cancer foot hill (337 m), The Liteanca hill (330 m), Vodă hill (347 m) e.g (Barbu N., Cotea V.V., 2002).

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The growing centers are: Cotnari 206 m, Hârlău 237 m, Cucuteni 169 m, Tg. Frumos 145 m from Iaşi county and Frumuşica 187 m from Botoşani county.

The general climate is hilly steppe, characterized by an active heat balance of 3167^0C, which 1219^0C represents the useful temperature. The determining factor is the local air masses hot dry wind phenomenon arrived from the Northwest side reaching the area only as hot dry winds (Ţârdea C., Dejeu L., 1995). Those effects are much more favorable for vine growing: vegetation period over 200 days, real heatstroke 1400-1500 hours, rainfall during the growing season 369 mm. As a local factor the warm long, drought, no rainfall autumn determines the positive to the vine growing and the noble rot development on grapes. The absolute minimum temperatures reach sometimes $-28,3^0$C, often put in danger the unprotected vine culture.

The use vineyards soils are: cambric chernozem, ash soils, rend sine limestone and rend sine limestone rich in humus. The geological deposits on which these soils were formed are made of loess clays, calcareous sandstone, calcareous oviform (Rotaru L., 2009).

The specific vine assortment varietes for Cotnari vineyard are: Grasă de Cotnari, Fetească albă, Frâncuşă and Tămâioasă românească (Ţârdea C. and al., 2010). Due to improve the thermal regime from the last few years now wine varieties can be cultivated with satisfying results. ***Fetească neagră***, a red wine variety, shows a good act.

MATERIAL AND METHOD

Inside COTNARI Stock Company, the surveys were held in No.4 farm, in vineyards cultivated with the ***Fetească neagră*** variety grown established in 1988, located in similar conditions of soil and slope position and aimed: elements of fertility and productivity, production levels, sugar accumulation and total acidity of grape production of specific 2010.

The rootstock used is Berlandieri x Riparia Kober 5 BB. Planting distances are 3,0/1,2 m and vine branches positioning vertical. On the one hand it was seen to the wine variety reaction driven form of bilateral cordon with cuts in short rod rings (replacement spigot 2 eyes + 2-3 eyes plug production), allowing ensuring average loads of 40-42 vine eyes/vine vine (V1), and on the other it was seen to the wine variety reaction driven form of Guyot on arms with periodical replacement, with cuts in bearing rings (replacement spigot 2 eyes + 10 eyes rope vine), allowing a fruit load around 50-52 eyes/vine vine (V2). The ground maintenance system is made of black field and the maintenance works applied vine is specific for industrial vineyard ecosystem.

RESULTS AND DISCUSSIONS

The ***Fetească neagră variety grown*** is one of the oldest Romanian varieties, resulted from the popular selection practiced by anonymous growers (*Vitis silvestris* Gmel.). The place of origin is supposed to be the Prut River Valley, somewhere around Uricani, Iaşi County. Therefore the variety is well adapted to the eco-pedoclimatic conditions specific on the North East part of the wine region Moldova Hills, where is otherwise the Cotnari vineyard situated too.

Fertility and productivity of the variety (tab. 1). Fertility varieties, expressed by percentage of fertile shoots express a much larger biological potential for ***Fetească neagră variety grown*** to which the practice of cutting in short rod elements 39% fertile shoots, while cutting long rod elements, the fertile shoots formed on vine vine are around 36%. Fertility coefficient values indicate that the average number of inflorescence formed on a fertile vine shoot is 1,33 for V1 and only 1,14 for V2. As for fertility is found relatively quite low because of large number of the sterile shoots that forms on the vine vine.

Table 1

Fertility and productivity of the Fetească neagră variety grown

Variant	Fertile shoots (%)	Absolute fertility coefficient	Relative fertility coefficient	Average weight of a grape (g)	Absolute Productivity index	Relative Productivity index
V1	39	1,33	0,52	222	295,3	115,4
V2	36	1,14	0,45	216	246,3	97,2

The variety productivity is conditioned, on the one hand, by the number of grapes that is formed and on the other conditions by the average weight of those. The productivity index values are bigger in the situation of cutting in short rod elements, but the average weight of one grape is bigger too in this case. The smallest relative productivity index value is that registered in the situation of cutting in long rod elements.

In conclusion, the Fetească neagră variety grown capitalize in a higher level the biological potential of fertility and productivity, in terms of culture from the growing center Cotnari, in the situation of cutting in short rod elements.

Grape production (tab. 2). The productive potential of the variety we have studied was expressed by the average number of grapes formed on the vine vine, the average weight of a grape, the achieved production on a vine vine and that one calculated per hectare. The average density is 2777 vine vine/ha.

The grape production, decisive element for the technological appreciation value of a variety, indicates the fact that ***Fetească neagră variety grown*** has a great productivity potential, in the situation of cutting in short rod elements obtaining 13,56 tones of grapes/ha, while cutting in long rod elements the production levels are smaller than 10,19 tones grape/ha.

Table 2

Grape production on Fetească neagră variety grown

Variant	Grape production (kg/vine vine)	Production per hectare (t/ha)	Average number of grape per vine vine	Average weight of a grape (g)
V1	4,89	13,56	22	222
V2	3,67	10,19	17	216

The quality of grape production (tab.3). The quality of grape production, expressed by the sugar accumulation and total acidity values of grape, proving that in both cases the differences is not so big. In the first case, the ***Feteasсă neagră variety grown*** accumulates bigger quantities of sugar 205 g/l, but in cutting in long rod elements the ***Fetească neagră variety grown*** has accumulated 202g/l sugar. The total grape acidity has values over 5 g/l H_2SO_4 in the case of cutting in short rod elements, but we can say that in qualitative aspect the differences are not so big between the two variant.

Table 3

The grape quality production harvesting the *Fetească neagră variety grown*

Variant	Weight for 100 grains (g)	Sugar Content (g/l)	Acidity Content (g/l H_2SO_4)	Alcoholic potential (%vol.)	Glico-acidimetric Index
V1	225	205	5,42	11,38	37,82
V2	209	202	4,91	11,22	41,14

CONCLUSIONS

1. The ***Fetească neagră variety grown***, cultivated in Cotnari vineyard, fully exploits the eco-climate conditions of the area, being able to obtain red wines of good quality with special organoleptic qualities.

2. In terms of fertility and productivity, the ***Fetească neagră variety grown*** is the best exploited when cutting in short rod elements, the fertility and the productivity index are much more bigger than in case of cutting long elements.

3. The grape quantity production is superior then in the case of rod cuttings in vine shoots for ***Fetească neagră variety grown*** versus lower levels registered in cutting long rod elements.

4. The production quality is less influenced, in both cutting systems for ***Fetească neagră variety grown***, in Cotnari vineyard being able to obtain wines of good quality.

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REFERENCES

1. Barbu N., Cotea V.V., 2002 – *Geography of vineyard and wine in Romania*. Studies and geographycal research. Editura Academiei Romane, Bucuresti.
2. Cotea D.V., Ciubotaru M., Barbu N.N., Cotea V.V., Magazin P.G., Grigorescu C.C., 2006 - *The Cotnari vineyard*. Ed. Academiei Române, Bucuresti.
3. Rotaru Liliana, 2009 – *Vine varieties for wine grapes*. Edit. Ion Ionescu de la Brad, Iaşi.
4. Ţârdea C., Dejeu L., 1995 - *Viticulture*. Edit. Didactică şi Pedagogică, Bucureşti.
5. Ţârdea C., Sârbu Gh., Ţârdea Angela, 2010 – Wine treaty. Edit. Ion Ionescu de la Brad, Iaşi.