THE INFLUENCE OF THE CANOPY ON THE QUALITY OF THE YIELD AT FETEASCA NEAGRĂ VARIETY

INFLUENȚA COVORULUI VEGETAL ASUPRA CALITĂȚII PRODUCȚIEI LA SOIUL FETEASCĂ NEAGRĂ

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Abstract. *The anthocyans accumulation in the grapes is largely conditioned by the exposed leaf area and the direct solar radiation. The use of inadequate training systems that determine the increase of the canopy thickness and reduce the leaf area exposure to the solar radiation, prevents the anthocyans accumulation in the grapes and increases the total acidity of the must. For the Feteasca neagra variety the increase of the canopy thickness determined the decrease of the anthocyans content from 588.7 mg/kg of grapes to 372. 9 mg/kg of grapes, while the total acidity grew from 5. 24 g/l H_2SO_4 to 6.34 g/l H_2SO_4. The sugar content in the must was not significantly influenced by the canopy thickness,varying from 176.4 g/l to 173.1 g/l of must.*

Rezumat. *Acumularea antocianilor în pieliţa boabelor la soiurile de viţă de vie este condiţionată, în mare măsură, de expunerea aparatului foliar la radiaţie solară directă. Utilizarea unor sisteme de conducere necorespunzătoare, care determină îndesirea covorului vegetal şi împiedică expunerea frunzelor la radiaţie solară directă, are ca efect acumularea unor cantităţi mici de antociani în boabe şi creşterea acidităţii totale a mustului. La soiul Fetească neagră, îndesirea covorului vegetal a determinat diminuarea conţinutului de antociani de la 588.7 mg/kg struguri la 372.9 mg/kg struguri şi creşterea acidităţii mustului de la 5.24 g/l H_2SO_4 la 6.34 g/l H_2SO_4. Conţinutul mustului în zaharuri nu a fost influenţat în mod semnificativ de îndesirea covorului vegetal, fiind cuprins între 176.4 g/l şi 173.1 g/l.*

INTRODUCTION

The increase of economical efficiency in vine plantations is often related to the increase of the yield, a parameter which can be controlled more easily than the quality can. Usually the technologist uses bigger bud-loads or more fertilizers, technological measures that have tangible results, but which determine, at the same time, an excessive development of the foliar apparatus. The effect on the vine plants is, besides a yield augmentation, a decrease in the grapes quality, due to prominent thickness and shadows of the canopy, and a diminution of the leaf exposure to direct solar radiation. Research made on vine canopy, show that its shadowing limit sugar, aromatic compounds and antocyans accumulation slow down the malic acid diminution and generate favorable conditions for diseases.

The aim of canopy management is to maintain an optimum foliage surface, exposed entirely to direct solar radiation, with minimum thickness.

The work presents the influence of the canopy on yield quality for Feteasca neagra variety, in Copou – wine growing centre conditions, in Iasi vineyard.

MATERIAL AND METHOD

The research was carried out in grape-vines varieties Collection of the Faculty of Horticulture in 2006, on the local red wines variety Feteasca neagra. The trellising form of the vines is bilateral cordon, the height of the trunk is of 0.75 m, the distance between the rows is 2.2 m; the distance between the plants on the row is 1.1 m; the shoots are vertically trained and form a foliage plan of 1.1 m long, 1.1 m high and 0.45 m thick. There were established 4 experimental variants, with an equal number of inflorescences but a different number of shoots, as follows:

Variant 1 = 15 shoots, 15 inflorescences
Variant 2 = 20 shoots, 15 inflorescences
Variant 3 = 25 shoots, 15 inflorescences
Variant 4 = 30 shoots, 15 inflorescences

Determinations: total leaves area; exposed leaves area; canopy thickness; weight of the grapes; sugar, antocyans and organic acids content of the grapes.

RESULTS AND DISCUSSIONS

The data analysis (***tab. 1)*** shows that for V_1, the *total leaves area* ***(Sft)***is equal with the exposed leaves area ***(Sfe)***. As consequence, the canopy has an optimum thickness (IF = 0.98), the foliage is entirely exposed to direct solar radiation (Ef = 98%), and the grapes microclimate is favourable to sugar and antocyans accumulation.

Table 1

The canopy parameters depending on the number of shoots for Feteasca neagră variety

SPECIFICATION	V_1	V_2	V_3	V_4
Total leaves area (m^2/m row)	2.65	3.48	4.34	4.94
Total leaves area/grape (m^2/grape)	0.194	0.255	0.318	0.329
Exposed leaves area (m^2/m row)	2.65			
Foliar index (SFe/SFt)	0.98	0.75	0.61	0.53
Leaves exposure at direct solar radiation (Ef, %)	98	75	61	53

For V_2, V_3 and V_4 variants, the increased the number of shoots determines an alteration of canopy thickness: the canopy is partially thick for V_2 (IF=0.75), thick for V_3 (IF=0.61) and severely thick for V_4 (IF=0.53). The leaves proportion exposed to direct solar radiation decreases with the thickness of canopy to 75% for V_2, 61% for V_3 and 53% for V_4. The canopy modification does not influence the yield level and increases from 3.19 kg/vine for V_1, to 5.07 kg/vine for V_4 **(tab. 2).**

Table 2

The grapes weight and the yield level for the Feteasca neagră variety

SPECIFICATION	V 1	V 2	V 3	V 4
Grapes weight (kg)	0.213	0.283	0.331	0.338
The yield (kg/but.)	3.19	4.24	4.96	5.07

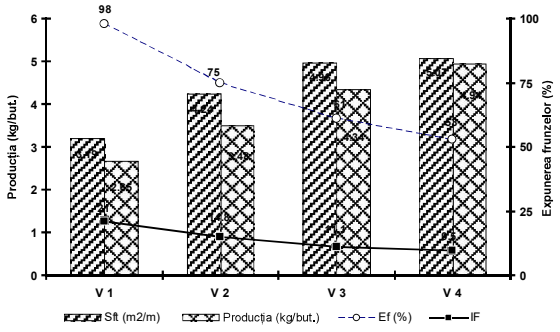

Fig. 1 Correlations between canopy parameters and the yield for Feteasca neagră variey

The yield (kg grapes/vine) is positively correlated with the total leaves area and does not depend on the foliage thickness or its exposure to direct solar radiation **(fig. 1)**. But these factors significantly influence the content of the grapes in organic compounds (**tab. 3**). This is because of the diminished values of light and temperature, characteristic for the dense vegetal canopies: the shadowed berries temperature is 6.7 ºC less than shiny berries and the shadowed leaves intercept only 2 - 6% from the direct solar radiation **(Smart R., 1973).**

Table 3

The sugar content, the anthocyans and the total acidity for Feteasca neagra variety

SPECIFICATION	V 1	V 2	V 3	V 4
Sugar content (g/l)	176.4	173.4	173.6	173.1
Antocyanins (mg/kg grapes)	588.7	523.4	433.1	372.9
Total acidity (g/l H_2SO_4)	5.24	5.67	6.34	6.34

Sugar accumulation was not significantly influenced by the thickness and shadows of the canopy. The maximum sugar content was registered at V_1 (176.4 g/l), and the minimum one at V_4 (173.1 g/l). Significant differences were registered in the case of the anthocyans content and the total acidity of the must (**fig. 2**).

The anthocyans content was maximum at V_1 (588.7 mg/kg grapes), whose foliage was of 98 % exposed to direct solar radiationm, and minimum at V_4 (372.9 mg/kg grapes), whose canopy is the thickest, shadowed and of only 53% exposure to direct solar radiation.

The total acidity of the must increased at the same time with total leaves area and canopy shadowing. The lowest acidity (5.24 g/l H_2SO_4) was registered for V_1, whose foliage is well exposed to direct solar radiation (98%), and the highest for V_4 (6.34 g/l H_2SO_4), whose canopy is dense and shadowed. This evolution is explained by an intense diminution of the malic acid in shiny berries from V_1, whose temperature is higher because of their optimum exposure to direct solar radiation.

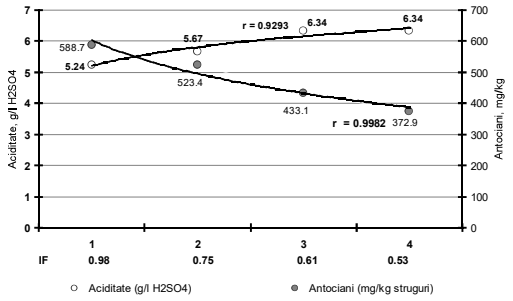

Fig. 2 Correlation between the canopy parametres and the quality of the yield on Feteasca neagra variety

CONCLUSIONS

1. The yield is positively correlated with the total leaves area and is not significantly influenced by the canopy thickness.

2. The canopy thickness influences the grapes microclimate and determines important variations of their organic compounds.

3. Antocyanins compounds of the grapes are positively correlated with the berries exposure to direct solar radiation. For Feteasca neagră variety, the highest antocyans content (588.7 mg/kg grapes) was registered at the variant with an optimum exposure of the foliage to direct solar radiation (Ef = 98 %).

4. The total acidity of the must is positively correlated with the leaves exposure to direct solar radiation. For Feteasca neagră variety, the lowest acidity was registered at the variant with a shiny canopy (Ef = 98 %), and the highest (6.34 g/l H_2SO_4) at V_4, with a significant shadowed canopy (Ef = 53%).

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