

Studies Regarding Water Use Efficiency and Water Valorization Coefficient at Vines in Transylvania

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SUMMARY

For quantitative characterization of water consumption by plants can be used specific indicators and coefficients such as: water use efficiency and water valorization coefficient (total water consumption of the culture per grapes yield). Water use efficiency (WUE) reflects the capability of consumed water in producing crop yield and refers to the obtained yield per each unit of consumed water during the growing season (Wample and Smithyman, 2002). For the same crop, WUE differs among regions due to the variation in both yield and water consumption (Matthew and Anderson, 1989). The studies were conducted in 2006-2008, in the specific climatic conditions of two experimental fields located in Cluj-Napoca and Blaj wine-growing center. Researches have aimed the behavior of three white wine grape varieties recommended for cultivation in Transylvania 'Fetească regală', 'Riesling italian' and 'Muscat Ottonel'. In both locations studied varieties grafted on rootstock selection 'Riparia x Berlandieri Crăciunel 2', are grown in the classic culture system at a planting distance of 2.0 x 1.2 m. Research determination on vine water consumption, in not irrigated condition, and monitoring the production results at all studied grape varieties, were made in a series of experiences using the method subdivided parcels. In experimental fields, vine water consumption was determined by soil water balance method. Mean values of WUE (2006-2008) oscillates from 1.265 to 4.276 in Blaj wine-growing center and between 0.866 and 3.247 in Cluj-Napoca. By the consumption of one m³ of water it was obtained 2.453 kg of grapes to Blaj, while in Cluj-Napoca was obtained only 1.877 kg. In both areas of culture, among the three varieties studied, the lowest value of water valorization coefficient is to variety Fetească regală (0.264 to 0.310), followed by Riesling Italian (0.589 to 0.814) and the highest value was to Muscat Ottonel (0.879-1.165), variety with shoots smaller vigor than the other two varieties (Tab. 1).

Tab.1

Influence of the cultural area and variety on water use efficiency and on water valorization coefficient

Average 2006-2008 Variety	WUE		Water valorization coefficient	
	Blaj, kg/m ³	Cluj-Napoca, kg/m ³	Blaj, m ³ /kg	Cluj-Napoca, m ³ /kg
Fetească regală	4.276	3.247	0.264	0.310
Muscat Ottonel	1.265	0.866	0.879	1.165
Riesling italian	1.818	1.519	0.589	0.676
Variety average	2.453	1.877	0.577	0.717

Keywords: vine, water consumption, production, water use efficiency

REFERENCES

1. Matthew, M.A. and M.M. Anderson (1989). Reproductive development in grape *Vitis Vinifera* L.: Response to seasonal water deficits. American Journal of Enology and Viticulture. 40:52-60.
2. Wample R.L. and R. Smithyman (2002). Regulated deficit irrigation as a water management strategy in *Vitis vinifera* production. Deficit Irrigation Practices. FAO Water reports. Vol. 22:109.