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Examination of the nutrient uptake by the view of grapevine rootstock-scion interaction

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Grape is one of the most ancient cultivated plants on the earth by humans. The culture of grapes began 6-8000 years ago in the Neolithic era in the present land of Turkey, Armenia and Iran. It was distributed all around the world by the exploration of the continents (Bényei et al. 1999.) The area of cultivated grapes covers 9-10 million ha on Earth. This is 0.22% of the total 4500 million ha cultivated agricultural land. Every third country of the world produces either smaller or larger amount of grapes.

Grapevine rootstocks have been used since the accidental introduction of grape phylloxera in Europe, which happened at the end of the XIX century. 20-25% of the "historical" vineyard of Hungary was reconstructed with grafting after the vineyard decline caused by phylloxera (Csepregi and Zilai 1989). At the beginning the phylloxera resistance and lime tolerance were the most important to achieve by breeding. Nowadays the fertilization of the vineyard is based on the results of the leaf and soil analysis (Eifert et al. 1974; Báló et al. 1975; Szőke 1991). The status of the mineral nutrition of the grafting, determined by leaf analysis, can improve our knowledge about the rootstock-scion interaction and inform us about the specification caused by the different combinations of rootstock and scion (Lehoczky and Kocsis 1998)

Materials and Methods

A field experiment was set up at the vineyard of Georgikon Faculty of Agriculture, University of Veszprém at Cserszegtomaj in 2000. The research station is located in the Side of Lake Balaton vine-district inside of the North – Transdanubian wine production region. Six rootstock varieties were used in the trial (Berlandieri x Riparia Teleki 5C, Berlandieri x Riparia Teleki Kober 5BB, Berlandieri x Riparia Teleki 8 BG.K.10, Georgikon 28, Fercal, Ruggeri 140) and one state certified variety (Olasz rizling GK1), two candidate of varieties (Magyar rizling,Vinitor) were grafted on the rootstocks.

The vineyard was established in 1992 and it was designed in randomised blocks. The leaves were collected from the 8th node of the shoots of 10 vines per combinations at 19th May 2000. The numbers of the repetitions were four.

All data were processed for statistical analysis by ANOVA using SPSS 9.0 vers software.

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Results and Discussion

The N content was highest in the leaves. The rootstocks significantly did not affect the leaf N content. The highest N content was measured in the scion leaves grafted on Georgikon 28. The Ca content were very even among the combinations, but more different occurred according to the rootstocks in the Ca content than in the N content. The potassium and phosphor concentration in the leaves were lower than the optimum range (1.21-1.4%) given by the literature, because of the dry season of the year. The results of leaf analysis were similar in previous years.

The Fe content of the leaves was very variable. Rootstocks did significantly affect the Fe contents, causing two times differences between combinations. Mg content significantly differed according to the rootstocks too. The rootstocks were divided into two groups according to the Mg content. One of the group consists Georgikon 28, T 8B, T.K. 5BB, these rootstocks resulted 50% higher Mg content in the scion leaves as the second group of rootstocks as T. 5C, Ruggeri 140, and Fercal. The manganese content was very even.

In generally effect of the rootstocks was not expressed in the uptake of nitrogen. The phosphor content of the leaves was lower than the optimal range given in the literature. The Ca and Mg content was determined by both, the rootstock and scion. The Fe content was above in all the combination of the optimal value. The uptake of the Mn was driven by the rootstocks.

Our results suggest that the scion varieties have more

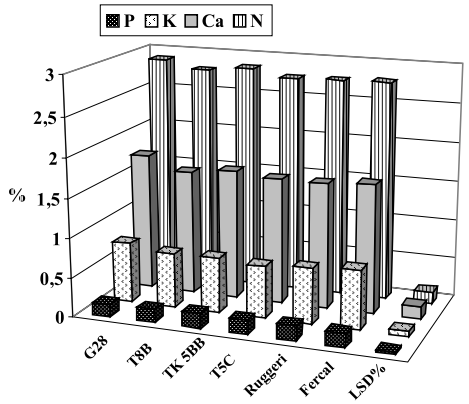

Figure 1. The N, P, K and Ca concentrations of the leaves at blooming (%).

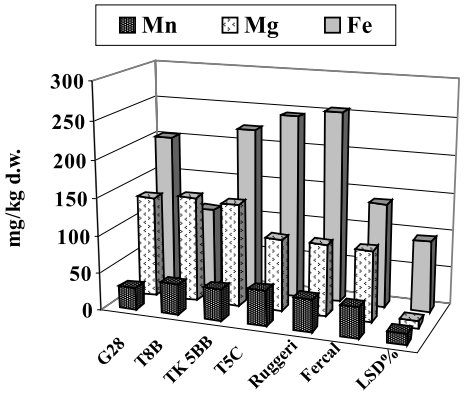

Figure 2. Fe, Mn and Mg concentrations of the leaves at blooming (mg/kg dw.).

influences in the nutrient uptake than the rootstocks under same environmental conditions. However the indirect effect of rootstocks was certified on mineral nutrition of the scion in all cases.

The usage of the rootstock varieties primarily necessary because of the protection against grape phylloxera damage, but their positive effect on mineral uptake can be used for more economic productions.

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References

Bényei F, Lőrincz A, Sz. Nagy L (1999) Szőlőtermesztés. Mezőgazdasági Kiadó, Budapest.

Báló E, Pánczél M, Prileszky Gy (1975) Die Rolle der Blattdiagnose bei der Feststellung von Stickstoff-Kali und Phosphor-Bedürfnissen der Weinanlagen. Weinberg und Keller 10:423-439.

Csepregi P, Zilai J (1989) Szőlőfajtaismeret és használat. Mezőgazdasági Kiadó, Budapest.

Eifert J, Füri J, Szőke L, Várnai Zsné (1974) A szőlőültetvények korszerű tápanyagellátásának gyakorlati eredményei és kutatási problémái. Szőlészeti és Borászati Kutató Intézet Kiadványa. Budapest. 27-41.

Lehoczky É, Kocsis L (1998) Nutrient content of grapevine leaves in various graft combinations. Commun. Soil Sci. Plant Anal 29:1983-1989.

Szőke L (1991) A szőlő okszerű trágyázása az egri borvidéken. PhD Thesis.