Influence of Soil Reaction on Grapevine Phosphorus Content in the Plešivica Vine-growing Region

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Abstract

Influence of soil reaction on vine phosphorus content was investigated on Sauvignon variety in the Plešivica vine-growing region in 2007. Investigations were conducted on two different locations: vitisol on dystric cambisol, pseudogleyic (pH $_{KCl}$ 3.62-5.17) – "Rečki gaj", and vitisol from rendzina on marl (pH $_{KCl}$ 7.21-7.42) – "Boričkа". Concentrations of exchangeable aluminium in acid soil ranged from 0.40 to 32.41 mg Al^{+3} 100 g^{-1} soil, and concentrations of available lime in alkaline soil ranged from 11.50 to 25.0% CaO. Average concentration of plant available phosphorus in acid soil ranged from 2.52 (30-60 cm) to 17.13 (0-30 cm), and in alkaline soil from 4.05 to 9.46 mg P_2O_5 100 g^{-1} soil. The trial was set according to the strip-plot design with three replications. To determine the amount and dynamics of phosphorus in plant material, leaf samples were taken three times in the course of the growing period: at the flowering and verasion stages and at the end of the growing period. Besides in leaves, phosphorus content was also determined in stalks, mark and must at the end of the growing period. At all samplings, significantly higher lead phosphorus values were found in alkaline soil compared to acid soil. These differences may be attributed to better solubility of calcium phosphates compared to aluminium and iron phosphates in acid soils. Differences in phosphorus concentrations in must and in mark did not significantly depend on soil reaction.

Key words: soil reaction, phosphorus, grapevine, aluminium, lime

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Utjecaj reakcije tla na koncentraciju fosfora u vinovoj lozi na području Plešivičkog vinogorja

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Sažetak

Utjecaj reakcije tla na količinu fosfora u vinovoj lozi istraživan je na sorti Sovignon u 2007. godini, na području Plešivičkog vinogorja. Istraživanja su provedena na dva različita lokaliteta: vitisol na distričnom kambisolu, pseudoglejnom (pH $_{KCl}$ 3,62-5,17) - „Rečki gaj" i vitisol iz rendzine na laporu (pH $_{KCl}$ 7,21-7,42) - „Borička". Količine zamjenjivog aluminija u kiselom tlu kretale su se u rasponu od 0,40 do 32,41 mg Al^{+3} 100 g^{-1} tla, a količina fiziološki aktivnog vapna u alkalnom tlu u rasponu od 11,50 do 25,0 % CaO. Prosječna koncentracija bilju pristupačnog fosfora u kiselom tlu kretala se u rasponu od 2,52 (30-60 cm) do 17,13 (0-30 cm), a u alkalnom tlu od 4,05 do 9,46 mg P_2O_5 100 g^{-1} tla. Pokus je postavljen po strip-plot dizajnu u tri ponavljanja. Za utvrđivanje količine i dinamike fosfora u biljnom materijalu uzorci lišća uzimani su tri puta u tijeku vegetacije: u fazi cvatnje, fazi šare i na kraju vegetacije. Osim u lišću, količine fosfora određene su na kraju vegetacije u peteljci, tropu i moštu. U svim uzorkovanjima značajno veće vrijednosti fosfora u lišću utvrđene su na alkalnom tlu u odnosu na kiselo tlo. Utvrđene razlike moguće je objasniti boljom topivošću kalcijevih fosfata u odnosu na aluminijeve i željezne fosfate u kiselim tlima. Razlike u količini fosfora u moštu te u tropu nisu bile značajno različite ovisno o reakciji tla.

Ključne riječi: reakcija tla, fosfor, vinova loza, aluminij, vapno

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