

## IMPACT OF LIMING ON CHEMICAL PROPERTIES OF SOIL IN RASPBERRY ORCHARD

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### Abstract

The decline and dieback of raspberry plantings observed in western Serbia not only lead to a decrease in yield in the current growing season, but also reduce productivity in future years. In order to determine possible causes of raspberry dieback, soil samples were taken in the 2012 growing season at Leušići (Municipality of Gornji Milanovac). Sampling results provided information on soil acidity, the content of available forms of macroelements (N, P, K, Ca, Mg) and microelements (Fe, Mn), the level of mobile aluminum and the total content of heavy metals (Ni, Pb, Cd, Cr). Samples of plant material (leaf and fruit) were also collected and analyzed for the concentrations of the above mentioned elements. To reduce acidity, two lime treatments, each at a rate of 500 kg/ha CaO, were applied, i.e. broadcasting treatment and row application. The soil exhibited an acid reaction (pH/H<sub>2</sub>O 5.70; pH/KCl 4.45), a moderate humus supply (4.56%), good availability of nitrogen and potassium, and phosphorous deficiency. Regardless of the good soil Ca and Mg availability, the ratio between the two elements was unfavorable. The content of microelements was within the allowable concentrations, with no aluminum detected. The total levels of Ni and Cr were above the maximum allowable concentrations and the content of Pb was within the allowable range, whereas no Cd was found. Lime-induced changes in the chemical properties of the soil were likely to match the implemented soil neutralization, with the broadcast application of CaO being more effective.

**Keywords:** *Raspberry, soil acidity, macro- and microelements, heavy metals*

### Introduction

Raspberries have highly specific requirements for good growing conditions, including the proper choice of soil and favorable climatic conditions. They grow best and produce the highest yields on deep, loose, fertile soils having a favorable nutrient ratio. Also, good results are achieved in upland and mountainous areas if a proper cultivar choice is made. However, the soil can act as a limiting factor in raspberry production under these agroenvironmental conditions, especially if it has an acid reaction due to intensive fertilizer use. On such soils, raspberry yields are lower, fruit quality is poorer and the risk of partial or complete decay of raspberry orchards is higher.

In western Serbia, acids soils account for more than 50% of the total land area (Stevanovic et al., 1987). Therefore, raspberry growing technology should necessarily involve the use of physiologically alkaline fertilizers, especially during supplemental fertilization, to reduce the risk of blocked nutrient uptake while creating favorable conditions to establish nutrient balance and obtain good quality fruit. The content of almost all macro- and microelements in the leaf is correlated with their content in the soil (Güleriüz et al., 1995; Yu-Yen, 2006).

While analyzing the soil situation and changes in soil properties in raspberry orchards in the Arilje region, Stevanovic et al. (2004) found that the agrochemical properties and nutrient content

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