

The impact of foliar application of mineral nutrients on the chlorophyll content in leaf and nodulation of red clover

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Abstract

Two factorial experiment with varieties of red clover K-39, K-17, Una and Viola and four foliar fertilization treatments (control, phosphorus and potassium, cobalt and boron) was set up in 2011 in Čačak. Regardless of foliar fertilization, the variety K-17 had a significantly lower chlorophyll content in leaves compared to the other cultivars. At the same time, this variety had a significantly higher number of nodules on the roots, as compared to the variety Viola. Foliar application of cobalt resulted in a significant reduction in chlorophyll content in the leaf in all of the varieties, as compared to the control. Foliar treatments cobalt and boron showed a positive effect on nodulation red clover.

Key words: red clover, fertilization, chlorophyll, nodulation.

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Introduction

In Southeast Europe, red clover (*Trifolium pratense* L.) seed crop is commonly established on acidic soils where certain macro- and micro-nutrients are less available to the plants.

Taylor and Quesenberry (1996) report that acid soils are rich in readily available forms of aluminium, iron and manganese but deficient in readily available phosphorus. Phosphorus is a constituent of all major classes of macromolecular and physiologically active compounds in the plant. It plays an important role in organogenesis, particularly in the development of generative organs (Petrović and Kastori, 1992). The low mobility of phosphorus within the plant (Koontz and Biddulph, 1957) and its high levels in the generative organs indicate the importance of the nutrient supply to plants. Potassium in plants is important for activation of enzymes, photosynthesis, synthesis and transport of different matters, transpiration, for better assimilation of the other macro- and micro-nutrients (Tiwari et al., 2001). Foliar or soil application of cobalt has a favourable effect on symbiotic nitrogen fixation in red clover (Vrany, 1978), plant growth, dry matter yield and seed yield of soybean (Reddy and Raj, 1975). As reported by Wilczek and Ćwintal (2008), a sufficient boron supply enhances pollen germination, fertilization and, hence, fertility i.e. seed number per inflorescence in red clover. Also boron has an important role in metabolism assimilation of nitrogen (Ruiz et al., 2006), but higher doses of boron have toxic effect on the plant (Ceyhan et al., 2007).

The aim of the study was to analyze the influence of foliar fertilization with phosphorus and potassium, cobalt and boron, on the chlorophyll content in red clover leaves and nodulation growing on acid soil.

