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EFFECT OF ADDITIONAL FERTILIZING WITH NITROGEN ON FORAGE YIELD IN RED CLOVER-ITALIAN RYEGRASS GRASS-LEGUME MIXTURE

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Abstract

The high and stable yields of good quality forage on lawns can be achieved with proper fertilization and rational utilization. The aim of this study was to analyze the impact of the additional application of nitrogen fertilizer in red clover-Italian ryegrass grass-legume mixture on forage yield, hay yield and the proportion of red clover, Italian ryegrass and weeds in the total hay yield. The field experiment was set up 2011th in Zemun (Serbia) on fluvisol soil type, acid reaction (pH_{H2O} 4.8), using a randomized block design with three replications and experimental unit 5x1m. Together with the primary tillage in the autumn, the soil was entered 300 kg ha⁻¹ N₁₅P₁₅K₁₅. Red clover cv. K-39 and Italian ryegrass cv. Tetraflorum were seeded at 20 cm inter-row spacing, both with 12 kg ha⁻¹ seed. The experiment included two treatments: without fertilization (control) and additional application of nitrogen fertilizer (KAN - 27 % N) in the rate of 40 kg ha⁻¹ early in the spring 2012th and 2013th. Additional application of nitrogen did not significantly increase yields of forage and hay in all cuts in both years. In the second year, nitrogen fertilization led to a significant increase in the share of Italian ryegrass in the hay, with a proportional decrease of red clover and weeds, in both cuts. This may be due to the pronounced competitiveness and faster growth of Italian ryegrass in relation to red clover, especially in drought conditions. In the third year of cultivation, there were no plants of Italian ryegrass and additional feeding resulted in a significant increase in the proportion of red clover in the hay, at the expense of reducing the share of weeds.

Key words: *additional fertilization, Italian ryegrass, nitrogen, red clover*

Introduction

In the Republic of Serbia (RS) the lawns participate with over 27 % of agricultural land (Djukić et al., 2008). Forage production is mainly realized in natural meadows and pastures and partly in the growing fields of red clover, alfalfa, mixtures of grasses and legumes, etc. Along with efforts to reduce energy consumption, environmental pollution, to intensify sustainable agriculture systems and sustain biodiversity, the possibility of the more frequent introduction of the forage legumes into grass mixtures should be considered. In this way, the use of mineral nitrogen fertilizers is reduced and thus the possibility of loss of nitrogen from the soil by leaching or gas emission (Ledgard et al., 1999). According to Vinther and Jensen (1999), the symbiotic nitrogen fixation at legumes is a fundamental process for maintaining soil fertility of soils and continuous productivity of the organic growing systems. By the cultivation of legumes and grasses in mixture, the more profitable production and better quality forage is achieved (Nešić et al., 2007). The share of weeds in the total yield of grass-legume mixture is significantly lower than the pure crop of grasses or legumes (Sleugh et al., 2000).

In the period of 2001-2005, the average hay yield in the meadows of the RS ranged from 1.5-2.0 t ha⁻¹ (SGS, 2006). The most frequent cause of low and unstable sward yield, and low

