



Effect of Genotype and Applied Management on Alfalfa Yield and Quality

Dragan Milić • Slobodan Katić • Snežana Katanski •
Goran Dugalić • Nikola Bokan • Sanja Vasiljević

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Summary: It is essential to apply advanced management for successful production of alfalfa hay with premium quality (high content of protein and minerals). The maximum yield and the best quality of alfalfa in Serbia can be obtained by cutting four or five times per year. In alfalfa stands, use of cutting system with three cuts per year is inefficient and does not allow full exploitation of cultivar genetic potential and environmental conditions. It is possible, and economically beneficial to grow alfalfa on pseudogley soils after application of lime and organic manure, with recommended rates 2.5 t ha^{-1} lime and 30 t ha^{-1} manure. Cutting alfalfa at the beginning of flowering stage (5 cuts per year) provides hay with better quality - higher content of crude protein and lower portion of fibre fractions (neutral detergent fibre, acid detergent fibre, acid detergent lignin), and there is no reduction in dry matter yield. There is no differences in alfalfa quality after application of lower (2.5 t ha^{-1}) and higher dose (5.0 t ha^{-1}) of lime + 30 t ha^{-1} of organic manure, but there is significant increase of dry matter yield and protein yield per hectare followed by higher level of metabolic energy per unit area. Upon the results of this study, base of successful alfalfa production would be to develop management system and cultivars for different environments that would maximize hay yields without significant losses of quality.

Keywords: alfalfa, crop yield, cultivars, cuttings, fertilization, genotyping, quality

Introduction

Alfalfa is an ancient crop well adapted to various agro-ecological conditions. It is grown all over the world, and estimates from late 1980s reported on sown areas of over 30 million hectares (Michaud et al. 1988), while in Serbia alfalfa is the most important forage crop with growing area of about 200,000 hectares and average hay yield of 5.7 t ha^{-1} (SYS 2011). However, use of certified seeds of selected cultivars, fertilization, irrigation, weed control, pest, disease, proper use and relevant cutting intensity can result in hay yield of $16\text{--}20 \text{ t ha}^{-1}$ in period of 4-5 years (Katić et al. 2013a). It is essential to apply advanced growing management for successful production of alfalfa hay with premium quality (high content of protein and minerals). In addition, providing sufficient amounts of nutrients by fertilization is a

very important factor in profitable alfalfa production (Lanyon & Griffith 1988).

The maximum yield and the best quality of alfalfa in Serbia can be obtained by cutting four or five times per year (Katić et al. 2007). Harvesting alfalfa at earlier development stages (early flower - 10% blooms in stand), produces alfalfa hay with improved quality, i.e. more crude protein and less crude cellulose (Lloveras et al. 1998, Katić et al. 2003). Harvest timing is the most powerful tool under the alfalfa grower's control to affect yield and quality and ultimately increase profitability potential; more so than the cultivar choice, fertilization and other management factors (Orloff & Putnam 2006). Cutting frequency, or more accurately the maturity of the alfalfa at the time of harvest, determines forage quality and yield (Orloff & Putnam 2010). Yield and quality of alfalfa hay are significantly influenced by the choice of cultivar. In addition, it is of great importance for each cultivar to choose optimal cutting schedule

D. Milić • S. Katić • S. Katanski • S. Vasiljević
Institute of Field and Vegetable Crops, 30 Maksima Gorkog, 21000
Novi Sad, Serbia
e-mail: dragan.milic@ifvcns.ns.ac.rs

G. Dugalić • N. Bokan
University of Kragujevac, Faculty of Agronomy, 34 Cara Dušana,
32000 Čačak, Serbia

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