

## INFLUENCE OF PLANT DENSITY ON YIELD COMPONENTS, YIELD AND QUALITY OF SEED AND FORAGE YIELDS OF ALFALFA VARIETIES

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### ABSTRACT

Increasing yield and yield stability of alfalfa seed in South-east Europe is of high importance. Alfalfa seed is an expensive and competitive commodity market, as well as alfalfa for forage, which is an important and often scarce commodity in this region.

The research was done in four years, in two localities with different environmental conditions: Zajecar and Nis. In Zajecar, four cultivars (NS-Slavija, NS-H-11, Zajecarska-83 and Europe) were examined. The following three plant density were examined: spacing of 20 cm and seed amount of 18 kg ha<sup>-1</sup>, the spacing of 50 cm and seed amount of 9 kg ha<sup>-1</sup> and the spacing of 80 cm and seed amount of 4.5 kg ha<sup>-1</sup>. In Nis four local varieties (NS-Slavija, NS-H-11, Zajecarska-83 and Krusevacka-28) were used, and three plant density were tested: row spacing of 20 cm and the amount of seeds in the sowing of 15 kg ha<sup>-1</sup>, row spacing of 40 cm and the amount of seeds for sowing from 7.5 kg ha<sup>-1</sup>, row spacing of 60 cm and seed amount of 5 kg ha<sup>-1</sup>. The influence of density and cultivar on the total number of plants m<sup>-2</sup>, the stem number m<sup>-2</sup> (vegetative + generative), the number of generative stems m<sup>-2</sup>, seed yield calculated in kg ha<sup>-1</sup>, seed germination (%) and 1000 seed weight (g) was examined. There was no effect of density and cultivar on dry matter yields (t ha<sup>-1</sup>) obtained from the first and third growth. For the combined use of alfalfa, where the first and third cut was used for fodder, and the second for the production of seed, the best result was obtained with the spacing of 40-50 cm and seed amount of 7.5-9 kg ha<sup>-1</sup>, where the relationship between seed yield and forage yield was optimal, at both sites. Under the environmental conditions of Zajecar, the highest potential for seed yield was obtained by the NS Slavija, and for forage yield by Zajecarska-83. Domestic varieties were superior to the French cultivar Europe for forage, but not for seed yield. Under the environmental conditions of Nis cultivar Krusevacka 28 showed highest potential for yield, and NS Slavija for forage yield.

**Key words:** alfalfa for combined use, components of seed yield, seed yield, seed quality, forage yield.

### INTRODUCTION

In the region of South-east Europe, alfalfa (*Medicago sativa* L.) is highly adaptable to the environmental conditions, giving high yields and fodder of excellent quality. In this region seed production has a secondary importance because of variable quality and yield (Iannucci et al., 2002; Karamanos et al., 2009).

Alfalfa is the most important perennial forage legume: in Serbia it is grown on about 200 thousand hectares (Radović et al., 2010), in Romania on 350 thousand hectares (Moga and Schitea, 2005), in Croatia on 40-50

thousand hectares (Stjepanović and Popović, 2009).

Using appropriate breeding methods a number of cultivars that are characterized by improved forage quality were created (Schitea et al. 2007; Petolescu et al., 2010; Stjepanović and Popović, 2009; Radović et al., 2010). Improving the production of alfalfa seed is possible by creating high yielding varieties and by improved cultural practices. According to Bolanos-Aguilar et al. (2000, 2002) research on genetics and breeding showed that progress in achieving higher seed yield in alfalfa is limited.



















