



CONFERENCE ABSTRACTS



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ABSTRACTS OF THE 4TH WORLD ALFALFA CONGRESS

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ABSTRACTS

Closing the nitrogen cycle: from alfalfa symbiotic fixation to crop and animal production

- Oral

Pre-sowing inoculation of rhizobia and arbuscular mycorrhizal fungi as a way to increase alfalfa (*Medicago sativa* L.) variety productivity on acid soil

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In regions with well-developed livestock farming, alfalfa (*Medicago sativa* L.) holds significant agricultural value due to its high yield of biomass, rich protein, vitamin, and calcium content, and exceptional digestibility. One of the things that limit the long-term growth of alfalfa in acidic soil is reduced microbial activity. Rhizobia and arbuscular mycorrhizal fungi (AMF) synergistically enhance alfalfa productivity, making microbial inoculation a sustainable solution for acidic soils. It is important to examine how the selected rhizobia strain and AMF inoculants affect the productivity of alfalfa varieties grown on acidic soil. This study monitored the effects of pre-sowing seed inoculation: control, rhizobia-Ensifer meliloti strain 218, arbuscular mycorrhizal fungi, and their mixed inoculation in three alfalfa cultivars (K-28, Zuzana, and Nijagara). The pots experiment was conducted under semi-controlled conditions in a greenhouse at the Institute for Forage Crops in Kruševac . Acidic soil (pHKCl 4.55) from the Mafčkovac location at a depth of 0-30 cm was used for sowing. Measurements included the number of nodules, mycorrhizal colonization, shoot dry matter yields, root dry matter yields, protein yield, and phosphorus content. Results from (Graph 1) show that the application of both inoculants significantly affected all treatments. The application of Ensifer meliloti strain 218 significantly increased the number of nodules by 25-40% and root dry matter yields by 20-40% compared to the other treatments. All inoculation treatments had a highly positive effect on shoot dry matter yields, with increases of up to 30%, and significantly increased protein yields compared to the control treatments. The AMF and mixed inoculation treatments significantly increased mycorrhizal colonization on alfalfa roots compared to the other treatments, which resulted in higher phosphorus uptake. The Zuzana variety produced the highest number of nodules in all inoculation treatments compared to other varieties, while the K-28 variety with rhizobia showed significantly higher dry matter of shoots and protein yields compared to other varieties. The Nijagara cultivar exhibited the highest dry matter yield of roots in rhizobia treatments. According to the findings, alfalfa productivity is positively impacted by both single and mixed inoculation, with mixed inoculation and AMF treatments standing out as particularly beneficial for nutrient uptake and overall growth. In future research, it is necessary to assess how these inoculants perform under field conditions and determine their long-term effects.

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