

# Genetska i simbiozna karakterizacija autohtonih sojeva rizobija izoliranih iz kvržica boba (*Vicia faba* L.)

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## Sažetak

Bob je mahunarka koja predstavlja bitan izvor proteina za ishranu ljudi i stoke na području Mediterana, Bliskog istoka, Kine i Azije. Uzgoj boba doprinosi održivosti biljne proizvodnje zbog mogućnosti iskorištavanja atmosferskog dušika u simbioznom odnosu s kvržičnom bakterijom *Rhizobium leguminosarum* bv. *viciae*, reduciranjem upotrebe mineralnih dušičnih gnojiva i fosilne energije, ostvarivanjem velikih količina proteinski bogate hrane te osiguravanjem organskih ostataka bogatih dušičnim hranjivom narednoj kulturi. Prema podacima iz literature, količine dušika koje se unose u tlo putem simbioznog odnosa boba i njegovog mikrosimbionta u poljskim istraživanjima variraju od 15 kg do 648 kg N/ha godišnje. Značajne razlike u količini usvojenog dušika posljedica su genetskih karakteristika i simbiozne učinkovitosti različitih sojeva vrste *R. leguminosarum* bv. *viciae* te njihove kompatibilnosti s sortimentom boba. Cilj ovih istraživanja je karakterizirati prirodnu populaciju sojeva *R. leguminosarum* bv. *viciae* koji u izolirani iz kvržica boba, a potom provjeriti njihovu nodulacijsku i simbioznu sposobnost kroz vegetacijski pokus. Kvržice su sakupljene sa biljaka boba uzgajano na području Korčule. Iz kvržica je izolirano sedam izolata koji su putem RAPD metode genetski identificirani. Utvrđena je značajna genetska varijabilnost unutar prirodne populacije sojeva *R. leguminosarum* bv. *viciae* kao i u odnosu na referentni soj 1001. Statističkom obradom rezultata vegetacijskog pokusa utvrđen je značajno niži broj kvržica na biljkama koje su inokulirane sa referentnim sojem 1001 u odnosu na sve korištene autohtone sojeve. Značajno niže vrijednosti zelene mase i suhe tvari biljaka dobivene su na kontrolnim varijantama te na varijantama inokuliranim s referentnim i sojem M2 u odnosu na inokulaciju s autohtonim sojem M3. Na osnovu dobivenih rezultata vegetacijskog pokusa utvrđena je značajnija simbiozna učinkovitost pojedinih autohtonih sojeva koja se treba provjeriti u poljskim uvjetima sa različitim sortimentom boba.

Ključne riječi: bob, autohtoni sojevi, *Rhizobium leguminosarum* bv. *viciae*, genetska karakterizacija, nodulacija

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# Genotypic and symbiotic characterization of indigenous rhizobial strains isolated from faba bean (*Vicia faba* L.) nodules

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## Abstract

Faba bean is a legume with a significant source of protein rich food and it is used as a human food and feed for livestock in Mediterranean region, Middle East, China and Asia. The faba bean contributes to the sustainability of cropping systems via: the ability to use atmospheric nitrogen in symbiotic relationship with nitrogen fixing bacteria *Rhizobium leguminosarum* bv. *viciae*, reducing fossil energy consumption and application of mineral nitrogen fertilizers in plant production, providing food rich in protein and provides source of nitrogen for future crop. The literature reports values of symbiotically fixed nitrogen under field conditions ranging from from 15 to 648 kg N/year. The high variations in amount of fixed nitrogen are result of genotypic characteristics and symbiotic efficiency of strains *R. leguminosarum* bv. *viciae* and their compatibility with faba bean cultivars. The main aim of this study was to characterize indigenous *R. leguminosarum* bv. *viciae* strains isolated from faba bean nodules and to evaluate nodulation and symbiotic efficiency of indigenous strains in greenhouse studies. Nodules were collected from faba bean plants grown on island of Korčula. Seven isolates were obtained from faba bean nodules and genetically identified using RAPD method. Significant genotypic variability among indigenous *R. leguminosarum* bv. *viciae* strains was determined as well as related to reference strain 1001. Results from greenhouse experiment revealed that significantly lower nodule number per plant was determined on plants inoculated with reference strain 1001 compared to inoculation with all tested indigenous strains. Significantly lower amount of forage and dry matter per plant was determined on non-inoculated plants as well as on plants inoculated with reference strain and isolate M2 compared to plants inoculated with isolate M3. The results of greenhouse experiment indicate that particular indigenous strains have more significant symbiotic efficiency which should be further evaluated under field conditions with different faba bean cultivars.

Key words: faba bean, indigenous strains, *Rhizobium leguminosarum* bv. *viciae*, genetic characterization, nodulation

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