

THE EFFECT OF SYMBIOTIC ASSOCIATIONS ON THE PRODUCTIVITY OF *VICIA FABA* L. AND *PISUM SATIVUM* L.

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Abstract. Legumes are economically important crop, and yearly increase of legume crop areas can be observed not only in Latvia, but also throughout the world. Legumes are high-quality, protein-rich animal feed and wholesome source of nutrition for people. Moreover, they are valuable crop in different crop rotation systems. Legume productivity largely depends on the successful formation of the symbiosis between the plant and soil microorganisms. The most important among these microorganisms are *Rhizobium leguminosarum* and mycorrhiza fungi. An experiment was performed in order to evaluate the effectiveness of two *Rhizobium leguminosarum* strains separately and in association with the mycorrhiza fungi on the growth and productivity of legumes. This experiment was supported by EU 7th frame EUROLEGUME project (Enhancing of legumes growing in Europe through sustainable cropping for protein supply for food and feed). *Rhizobium leguminosarum* strains (RL23 and RL407) were taken from the collection of Latvia University of Agriculture, but mycorrhiza fungi were received from Czech company "Symbiom". Field experiments were conducted using grey pea (*Pisum sativum* L.) cultivar 'Retrija' and broad bean (*Vicia faba* L.) cultivar 'Bartek'. Seeds were treated with bacteria suspension before sowing, while mycorrhiza fungi suspension was applied during sowing. Control plants were not treated with any microorganisms. Plant length, dry matter formation and weight of nodules were analyzed at the flowering stage, while number of pods, seed yield and protein content in seeds - at the end of experiment. Experiments were done in four replications. Data were tested by Analysis of Variance, using Student criteria and correlation analysis between plant growth parameters and protein content in seeds. Results showed differences in plant growth and yield between both legume species using co-inoculation with *Rhizobium leguminosarum* strains and mycorrhiza fungi. Fresh weight and dry weight of the plants did not show any significant differences between microorganism treatments. A trend was observed that suggested the use of both strains of rhizobia (RL23 and RL407) together with mycorrhiza fungi on beans, while another trend suggested the use of rhizobium strain RL407 in the case of peas. Broad beans showed higher response to co-inoculation than grey peas. Correlation analysis found a medium correlation ($r=0.52$) between plant and nodule weight. The co-inoculation of rhizobia and mycorrhiza fungi enhanced protein accumulation in the seeds of broad bean, although the degree of influence varied between rhizobium strains; therefore, it is crucial to find compatible components for the co-inoculation.

Key words: rhizobia, mycorrhiza fungi, protein, legumes.