

Ecological aspects of biophosphorous utilization and their effect on growth and agronomy factors of corn (*zea mayz* L.) and grass pea (*lathyrus sativus* L.) in intercropping system

Abstract

In order to investigate the effects of biological and chemical phosphorous fertilizers and various proportions of maize and grass pea intercropping on yield and yield components of both crops in Research Farm of Kerman University and commercial convention farm of Bardsir-Dashtkar, two experiments were conducted simultaneously in 2009-2010. The experimental design at two regions was factorial, based on randomized complete block design with four replications. The investigated factors included four phosphorous levels (biological phosphorous, chemical phosphorous, 50% biological phosphorous+50% chemical phosphorous and control) and five intercropping patterns (Pure cultures of maize, 75:25, 50:50, 25:75 and pure cultures of grass pea). The compound analysis of data showed that the effect of location on yield and yield component (grass pea and maize) was significant, as thousand seed weight, biological and grain yield and harvest index of maize in Kerman were respectively 10, 19, 17 and 21 percent more than Bardsir. In contrast, the number of seeds per pod, grain yield and biological yield of green pea in Bardsir were respectively 42, 5 and 7 percent more than Kerman. The effect of phosphorous levels and various intercropping patterns on thousand seed weight, seed numbers per row, grain yield, biological yield and harvest index of maize. The effect of intercropping patterns and phosphorous levels on thousand seed weight, seed numbers per row, biological and grain yield and harvest index was significant. Interaction effect of intercropping patterns and phosphorous levels on number of pods per plant, number of seeds per pod, grain yield and biological yield of green pea was significant. As higher as in 75% maize + 25% grass pea and 50% phosphorous biofertilizer + 50% chemical fertilizer treatment. The evaluation LER showed that the mixed culture caused ($LER \geq 1$). and the highest LER observed in 25% grass pea + 75% maize. WSC, DMD, CP, Ash, ADF and NDF were strongly influenced by intercropping patterns and phosphorous levels on whole except Ash % was significant. WSC, DMD, and CP was influenced by the interaction of intercropping patterns and phosphorous levels. Forage quality in mixed culture maize and green pea was higher than the pure culture. The better quality was due to being higher WSC, DMD, CP and Ash and being lower ADF and NDF. Combined application of chemical and biological fertilizers was improved forage quality. This could be due to increased solubility of insoluble phosphorus in soil, phosphorus uptake, and nitrogen and potassium content of plant tissues in using biological phosphorus fertilizer.

Key words: Intercropping pattern, CP, DMD, LER



**University of Zabol
Graduate school
Faculty of Agriculture
Department of Agronomy and Plant Breeding**

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Supervisors:

D. Mohammad Galavi
D. Mahmud Ramrodi

Advisors:

D. Baratali Seahsar
D. Mostafa Heidari
D. Ali Akbar Maghsoudi Moud

Prepared by:

Mahdi Naghzadeh

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