

Abstract

In order to evaluate the effect of different soil fertility management on sesame-cowpea intercropping productivity in rotation with cotton, a split plot experiment based on randomized complete block design was carried in Fars province, Fasa city, during 2014 and 2015. The main plots were five fertilizer levels including: chemical fertilizer, organic fertilizer system, biofertilizer, 50% chemical fertilizer + 50% organic fertilizer and 50% chemical fertilizer + 50% biofertilizer, and cropping systems including sole sesame, sole cowpea, 50:50 sesame-cowpea intercropping, 75:25 sesame-cowpea intercropping and 25:75 sesame-cowpea intercropping were tested in subplots. The efficiency of six 2-year successions (fallow-cotton, sesame-cotton, cowpea-cotton, 50:50 sesame/cowpea-cotton, 75:25 sesame/cowpea-cotton and 25:75 sesame/cowpea-cotton) on cotton production were evaluated in second year. The results showed that soil fertility systems and cropping systems affected the yield and yield components of sesame and cowpea significantly. The highest yield of both crops obtained from sole cropping and among fertilizer treatments the highest yield of sesame and cowpea was belonged to bioorganic and 50% chemical fertilizer + 50% biofertilizer treatments, respectively. But LER, ATER, LUE and NDI indices showed that 50:50 sesame-cowpea intercropping was more productive than other treatments. A, CR and AYL values were greater for sesame than cowpea indicating that sesame was more competitive partner than cowpea and the fact that MAI and IA values indicate that 50:50 sesame-cowpea seeding ration had the highest economic advantage. These findings suggest that specific function of each crop within the intercropping, could raising of system productivity. But the results of second experiment, showed that planting cotton after cowpea and 75:25 sesame-cowpea had maximum cotton yield (they produce 29.97 % more yield than others). But the results of systems production efficiency revealed that the highest efficiency were obtained from cowpea-cotton ($21.69 \text{ kg ha}^{-1} \text{ day}^{-1}$) and 25:75 sesame/cowpea-cotton rotations and the lowest was belonged to fallow-cotton ($12.42 \text{ kg ha}^{-1} \text{ day}^{-1}$) rotation. Likewise, cowpea-cotton had more yield than other successions and system productivity in terms of economic value and benefit was the highest, as well (The system with cotton sown on fallow land was the least economical). This study indicates that there is a potential yield benefit for the cowpea-cotton cropping system and thus could be adopted by the farmers as alternative options for more production.

Keywords: economic benefit, cotton, crop rotation, yield, intercropping



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**Assessment of ecophysiological aspects of soil fertility
management in intercropping of sesame and cowpea on growth
characteristics and productivity of cotton
(*Gossypium hirsutum* L.)**

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