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ABSTRACT

A Two-year study was conducted at Kafr EL-Hamam Agricultural Research Station, ARC, Sharkia Governorate, Egypt during 2009/2010 and 2010/2011 seasons to investigate the effect of new cropping systems of growing cotton by planting it in relay intercropping with faba bean and wheat compared to solid plantings after these winter crops. The treatments were laid out in a split plot design with three replications. Two cotton cultivars (Giza 86 and Giza 90) were grown in the main plots meanwhile cropping systems were devoted in sub plots as followed: cotton after Egyptian clover (E.c) at 20th March, 20th April and 20th May. Relay intercropping cotton with faba bean and wheat at 20th March. Cotton seeds were grown after faba bean and wheat at 20th April and 20th May, respectively, however faba bean seeds were grown on one side (low density) or both sides of the ridge (high density), as well as, wheat grains were grown at two rows (low density) or three rows per ridge (high density). The obtained results could be summarized as follows:

Cotton cultivars had insignificant effects on preceding crops of wheat and faba bean while cropping systems had significant effects on grain yield /fad. and its components. Wheat (solid) planting in two rows/ridge (S10) had higher values in each of grain weight/spike, grain yield / m², grain yield / fad., Faba bean planting in two sides (solid) per ridge had the highest value in grain yield/ fad

Cotton cultivar Giza 86 had higher values of each of plant height, number of total open bolls per plant, seed cotton yields per plant and per fad. , as well as, fiber technology traits than those of another cotton cultivar. Plant height, numbers of total and open bolls per plant, boll weight, seed cotton yields per plant and per fad. , as well as, fiber technology traits were affected significantly by cropping systems. Growing cotton plants as followed by E.c or intercropping with faba bean at 20th March or solid planting after faba bean at 20 April had the same results. Also, there were no significant differences between planting cotton after faba bean at 20 April and intercropping with wheat at 20 March. Late planting date of cotton (20th May) as followed after Egyptian clover or wheat caused significant reductions in all cotton traits. Growing cotton after/with legumes had positive effects on cotton traits in a comparison with those of wheat. Yield of relay intercropping cotton with wheat at 20th March was increased significantly than those of solid cultures at 20th May. Low plant population densities of faba bean and wheat under intercropping cotton caused significant increaments in cotton traits. Cotton cultivar Giza 86 had significant increase in cotton characters than Giza 90, meanwhile, Giza 90 was more tolerant to late planting than Giza 86. The results indicated that there were significant differences between cultivars, cropping systems and their interactions on relative yields of cotton and land equivalent ratios as compared with traditional planting or double cropping systems of winter crops. Also, intercropping systems gave an advantage in (LER) as compared with sequential cropping systems. The results revealed that cotton cultivar Giza 86 had higher total and net returns than the other cultivar (Giza 90). In regard to cropping systems, total and net returns of cotton after faba bean at 20th April gave the highest total and net returns, while planting cotton after wheat at 20th May was the lowest one

Key words: Cotton , wheat, faba bean , relay intercropping , total return

DEDICATION

I dedicate this work to whom my heart felt thanks; to my parents and my sons and my wife as well as to my brothers, sister and my friends for all the support they lovely offered along the period of my post graduation.

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