

**Effect of different irrigation levels in sprinkler irrigation on yield
and water use efficiency of cotton (*Gossypium hirsutum* L.)**

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Abstract

A two years' field experiments was conducted to determine the cotton water need at Hashemabad cotton research Station. The Hashemabad Cotton Research Station is located in north of Iran at 36° 51' N latitude and 54° 16' E longitude at the south-east corner of Caspian Sea and its height from sea level is 13.3 meters. That station has a Mediterranean climate with relatively mild winters and dry summers. In this project, five Irrigation treatments contains T₁= 100%, T₂= 75%, T₃= 50%, T₄= 25%, T₅= 0% at three replications on Randomized complete bloke design using sprinkler Irrigation system were studied. By analysis of variance indicated that there was no significant difference between T1, T2 and T3, in terms of seed cotton yield. However, in term of numerically, the yield of T3 had 22 and 16 percent over T1 and T2, respectively. The relative water use efficiency of this treatment was over others. According to this research project, the recommended of cotton Irrigation water is 50 and 80 percent at wet and drought years respectively. The amount of cotton water needed in the humid region is 3200 and 4600 m³/ha at wet and drought years, respectively. Based on the results of this study, it seems necessary that reduce of the amount of cotton irrigation requirement in northern of Iran.

Keywords: Sprinkler Irrigation, Deficit Irrigation, Drought Stress, Water use efficiency

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Field study of municipal solid waste compost and nitrogen effects on quantitative and qualitative parameters of cotton and chemical properties of soil

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Abstract

In a field study, the effects of different amounts of municipal solid waste compost and nitrogen on cotton characteristics and chemical properties of soil were studied. The statistical design was split plot. Different levels of municipal solid waste compost (0, 20 and 40 t ha⁻¹) were considered as the main factor and different levels of nitrogen (0, 100 and 200 kg ha⁻¹) were considered as sub plots. The results of the experiment showed that the effects of municipal solid waste compost, the effect of nitrogen and their interaction on cotton yield and qualitative properties of the fibers are significant. Municipal solid waste compost and nitrogen, each alone, increased yield, but the highest yield was 4787 kg ha⁻¹ from municipal solid waste compost consumption of 40 tons per hectare with 100 kg / ha nitrogen per hectare. Consumption of more nitrogen at this level of compost did not have a significant effect on yield. Consumption of municipal solid waste compost had a significant effect on the chemical properties of soil, so that, with the use of municipal solid waste compost, soil reaction (pH) decreased significantly and the values of electrical conductivity, organic carbon, nitrate, available iron and zinc showed a significant increase. Therefore, in the same conditions, in order to achieve maximum yield, 50% reduction in nitrogen fertilizer consumption and improvement of qualitative characteristics of cotton fibers, increase of soil organic matter and uptake of nutrients absorbed in soil, consumption of 40 tons per hectare of municipal solid waste compost with 100 kg Nitrogen per hectare was recommended.

Keywords: Municipal solid waste compost, cotton, nitrogen, Fe and Zn

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Investigate the efficiency of cotton harvester in new cotton cultivars

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Abstract

Cotton, as a strategic crop, plays an important role in providing the human food and clothing needs due to oil, protein and fiber. Due to the high cost of cotton production (due to the high number of working days required), the use of cotton harvesting machines is in the interest of most farmers. In this study, the performance of cotton picker in new cotton cultivars was compared with each other. In this research, the efficiency of Performance of John Deere 9920 Cotton picker was investigated on five new cotton cultivars Golestan, Armaqan, Kashmar, Sajedi and Khorshid. The project was implemented in a Randomized Complete Block Design with three replications and data was analyzed by using SAS software. The results indicated that there was a significant difference between the five cultivars in terms of machine harvest efficiency. Golestan cultivar had the best performance with an average of 87.6 percent of total harvestable seed cotton. Considering 8% of the residues per plant of this cultivar, the machine harvest efficiency will have reached to 95.6 % if we could have used cotton picker again.

Keywords: Cotton Picker, Losses of Harvest, Cotton cultivars, Cotton harvester

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Effect of different tillage methods on some soil physical and mechanical properties and cotton yield

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Abstract

In order to investigate the effect of different tillage methods on some soil physical properties and crop yield, an experiment in a randomized complete block design with four replications was conducted at the cotton research farm, located at Hashemabad of Gorgan in 2012. Three levels of tillage methods include surface tillage (disc harrow), minimum tillage (cyclo tiller + disc harrow) and conventional tillage (mouldboard plow + disc harrow) were taken as independent variable and soil physical properties include of particle density, humidity, fragmentation (MWD) in two depths (0-15 and 15-30 cm) also, cone index, residue burial and cotton yield as dependent variables were investigated. Results showed that the depth has a significant effect on soil bulk density, fragmentation and soil cone index as in first depth, surface tillage had the maximum bulk density (1.4 g/cm^3), minimum fragmentation and maximum cone index (1723 kPa), additionally, conventional tillage had minimum bulk density (1.19 g/cm^3), maximum fragmentation and minimum cone index (912 kPa). During all stages of cotton growth, tillage methods had no significant effect on the humidity in both depths. Residue burial, minimum and maximum values were relative to surface tillage and conventional tillage, respectively. Amount of crop yield in surface tillage as 1534 kg per hectare was higher than other tillage systems.

Keywords: Tillage, Soil physics, Cone index, Cotton yeild

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The effect of irrigation and planting system on morphological parameters and yield of two cotton cultivars

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Abstract

Optimizing water use in cotton is one of the main ways to save water and achieve optimal yield. Therefore, in order to study the effect of planting system and irrigation on morphological characteristics and yield of two cotton cultivars, this research was conducted in Hashem Abad Cotton Research Station in Gorgan in 2016. This experiment was conducted as a split plot design in a completely randomized block design with four replications. Treatments were included irrigation levels in 4 levels (irrigation based on 0, 40, 80 and 120% evaporation from evaporation pan), cultivars in two levels (Latif and Golestan) and planting system in two levels (transplanting and direct). The results of the experiment showed that the number of monopodia and the size of the simpodia above the ground in the transplanting system was more than direct system. By increasing irrigation water, the number of simpodia, plant height, and the size of simodia and monopodia increased significantly but had no effect on the number of monopodia. Latif cultivar had higher plant height and simpodia size and simpodia size above the ground compared to Golestan cultivar, but the number of monopodia in Golestan was more than Latif. The two cotton cultivars were similar in terms of number of simpodia and monopodia size. Cotton yield in transplanting system was 24% higher than direct system but this difference was not significant. The yield of two cotton cultivars had no significant difference. By increase in irrigation water from 0 to 80% of water use, yield increased but yield in the treatment of 120% water use decreased so that the highest yield (2515 kg / ha) was related to 40% water use treatment, which had no significant difference with 80% treatments but had significant difference with 0 and 120% treatments. The interaction effect of planting system on irrigation was significant only on plant height and simpodia size but the interaction effect of planting system in cultivar on morphological parameters was not significant. The interaction effect of irrigation on cultivars was significant on all morphological parameters except simpodia size above the ground.

Keywords: Cotton, Direct and Transplanting systems, Irrigation, and Cotton yield
The Effect of Compost and Vermicompost as Biological Fertilizers on Qualitative and Quantitative Traits

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Abstract

Biological fertilizers have a potential role to increase soil nutrient and reduce dependence on expensive chemical fertilisers. Present study was conducted to evaluate the effect of municipal compost and vermicompost on qualitative and quantitative traits of cotton (Varamin cultivar) at 2015-2016 cropping year. The experiment was based on completely randomized block design with 10 treatments at three replications in research field station of Agricultural Jihad and Natural Resources of Tehran Province at Varamin region, Iran. In this research the factors like plant height, vegetative and reproductive branch number, and number of bolls, 20-bolls weight at the harvesting time, cotton yield were evaluated. The results of analysis of variance showed that compost and vermicompost as biological fertilizers significantly affected whole studied traits ($P < 0.05$). Application of biological fertilizers resulted to increase in plant height, vegetative and reproductive branch number, and number of bolls, 20-bolls weight and cotton yield. Among treatments, vermicompost application (20 ton/ha) had highest bolls number and 40 ton/ha vermicompost resulted to highest plant height (149.78 cm) and reproductive branches (26 branches) and 20-bolls weight. In the most of studied traits, vermicompost treatment had highest amounts. Totally, the results of present study showed that application of compost and vermicompost fertilizers could have efficient contribution in increasing efficiency of cotton plant production.

Keywords: Biofertilizer, Fungi, Yield, Organic matter

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Detection of *Fusarium* contamination of cotton seeds using morphological traits and molecular markers

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Abstract

In order to investigate the contamination of cotton seeds with *Fusarium* fungi, samples of different classes of 10 cotton cultivars were obtained from Southern Khorasan, Razavi, Golestan and Fars provinces. Various sections of a seed such as full seed, coat, kernel (endosperm and embryo), endosperm and embryo were cultured on the nutrient medium of potato dextrose agar and water agar. Of the 23 cotton seed samples, 76 isolates of *Fusarium* was obtained. The contamination in fuzzy and delinted seeds were 98.7 and 1.3 percent respectively. The highest percentage of purified *Fusarium* was from kernel. Identification based on morphological traits showed that the isolates with the frequency of 39, 23, 10, 2, 1 and 1 isolates belonging to the species *Fusarium equiseti*, *F. proliferatum*, *F. semitectum*, *F. compactum*, *F. nygamai* and *F. solani*. Species of *F. compactum* and *F. nygamai* are reported for the first time from Iran. The application of Polymerase chain reaction and the use of specific primers of *F. equiseti* and *F. proliferatum* dominant species have led to the production of proprietary DNA bands using the DNA of the relevant fungal species, as well as the seed DNA that naturally contaminated these species. In this way, the results of identification of these two species based on morphological traits were confirmed by the molecular method. This study revealed that *Fusarium* traces are detected in infected seeds using the PCR reaction.

Keywords: Endosperm, Morphological, Molecular, Fuzzy, Varamin

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