

Effect of Ecosil and EcoFungi on cotton

Report



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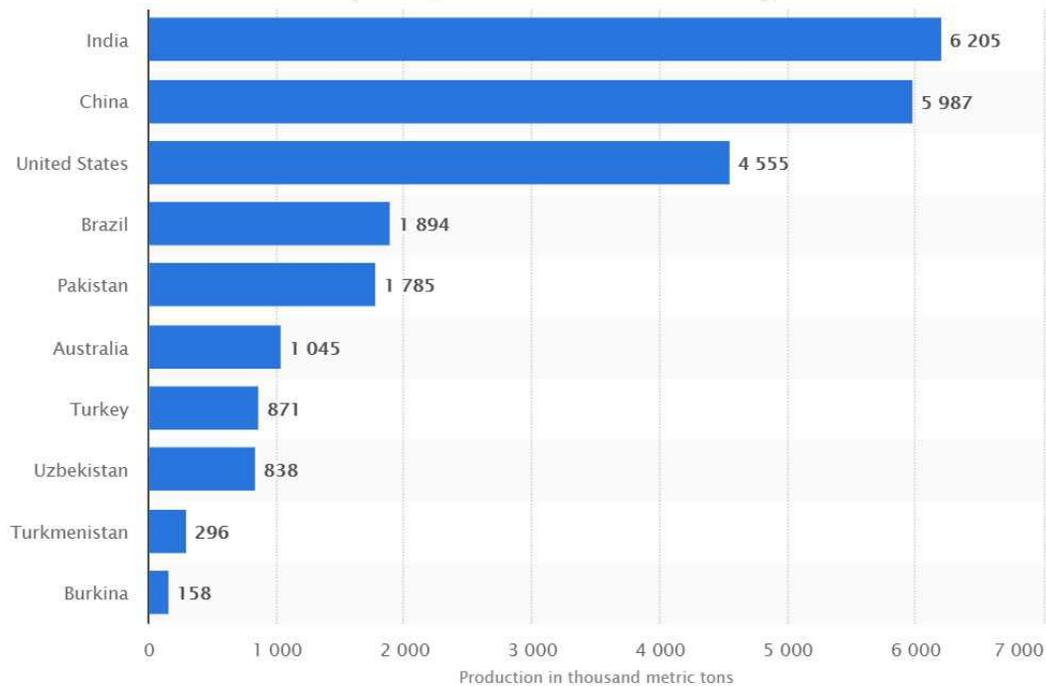
Introduction

The cotton (*Gossypium hirsutum* L.) is one of the most important agricultural plant. The total harvested area of cotton today is 32 979 140 hectares

(<http://www.factfish.com/statistic/seed%20cotton%2C%20area%20harvested>).

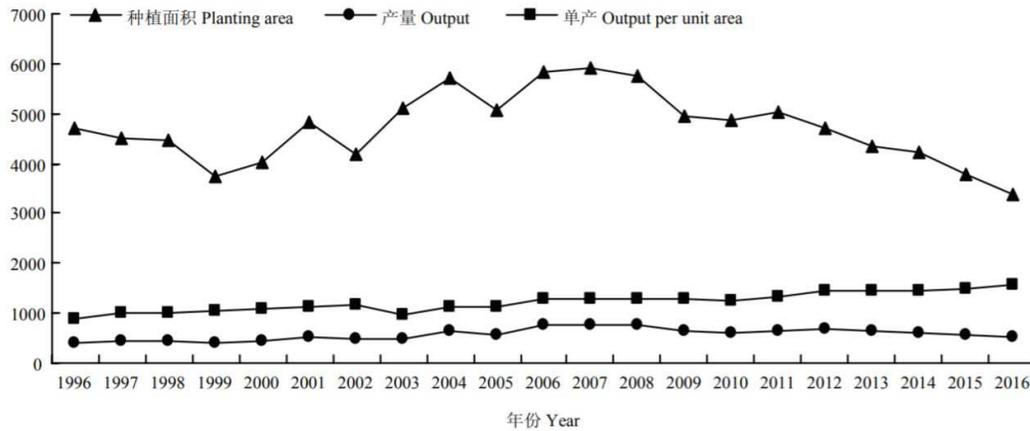
The largest area of cotton growing is present in India (12 200 000 ha), USA (4 492 220 ha), China (3 625 385 ha), Pakistan (2 699 000 ha), Uzbekistan (1 201 182 ha), Brazil (927 987 ha).

Cotton production by country worldwide in 2017/2018 (in 1,000 metric tons)



<https://www.statista.com/statistics/263055/cotton-production-worldwide-by-top-countries/>

During last decade the profitability of the cotton production in China was dropped.



(LU XiuRu, JIA XiaoYue, NIU JiaHui , 2018)

This is related with increasing of the price fort fertilizers and decreasing of the cotton price. Therefore, for increasing of the farmer profitability is necessary new technologies.

Unfortunately, the investigation of the effect of Si on cotton were conducted very rare and without systematic. Main part of such investigations pay attention to biomass of 1 moth old plant, but not to cotton crop (lint and seeds).



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Ecotoxicology and Environmental Safety

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Alleviation of cadmium toxicity by silicon is related to elevated photosynthesis, antioxidant enzymes; suppressed cadmium uptake and oxidative stress in cotton

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Silicon (Si) alleviates cotton (*Gossypium hirsutum* L.) from zinc (Zn) toxicity stress by limiting Zn uptake and oxidative damage

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The aim of this investigations was to determine the effect of Si-rich materials and microbials on the cotton productivity and increasing cotton salt resistances.

Materials and Methods

The experiments had 3 parts:

1. Germination test

In all experiment the cotton variety “Omad” was used. 100 seeds of cotton (fussy and clean) were put to distilled water or salted water (1% NaCl). The Ecosil at concentration 100 ppm Si and DE (diatomites from Ulianovsk region, 10 g for 100 seeds) were applied as well. The germination was conducted during 1 week. After that the % of germinated seeds was calculated.

2. Obtaining of the cotton seeds and lint

The greenhouse test with cotton was conducted on Gray forest soil (pH=6.5; Corg – 1.5%). The experiment was conducted in the plastic pots 1.5-liter volume. The grounded and mixed soil was putted in to plastic pot, after this the fertilizers were applied and mix. The scheme of experiment was the follow:

- 1) Control (irrigation by distilled water, 200 ml of distilled water every 2 days);
- 2) NPK – where N was applied as (NH₄NO₃) at the rate 100 kg/ha; P as (Ca(H₂PO₄)₂·H₂O) at the rate 60 kg/ha and K as KCl at the rate 100 kg/ha.
- 3) Ecosil (irrigation by solution with concentration of monosilicic acid at 100 ppm Si, 200 ml per pot each week).
- 4) NPK+Ecosil

- 5) NPK+Ecosil+EcoFungi (EcoFungi (EcoMicrobials LLC, USA) was applied 2 times, first – just before soaked seeds planting and after 1 month of cotton growing. The procedure for application was the follow: first time - 1 g of EcoFungi mix with 20 ml of water and put in whole before seedling; second time 1 g of EcoFungi mix with 200 ml of water and irrigate.
- 6) Organic – the composted chicken manure was used at the rater 1 t/ha, the composition for chicken manure was the follow: total N – 4.0%; total P – 2.7% and total K – 4.0%.
- 7) Organic + Ecosil

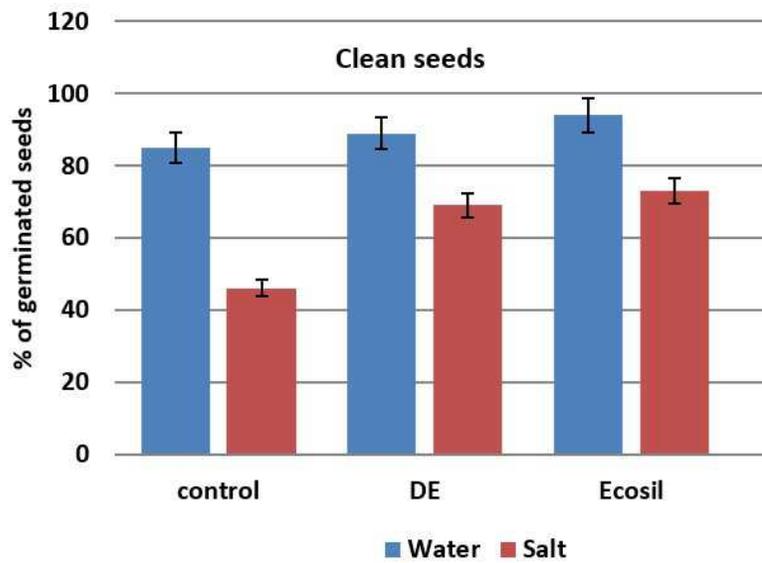
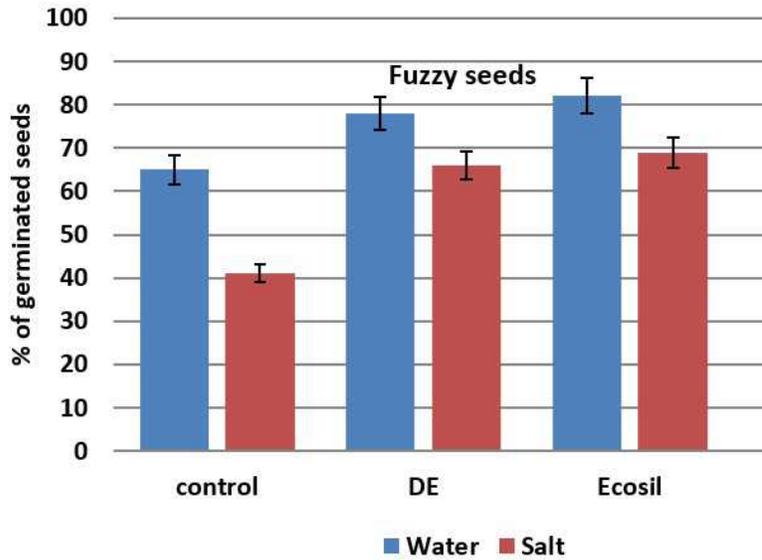
The soaked (1 days in distilled water) were placed in to soil, where the following substance were applied before. Cotton plants was growing from beginning of April to end of July.

The size of plant was tested in dynamic; the weight of plant was determined after harvesting, the number of flowers and bolls.

Results

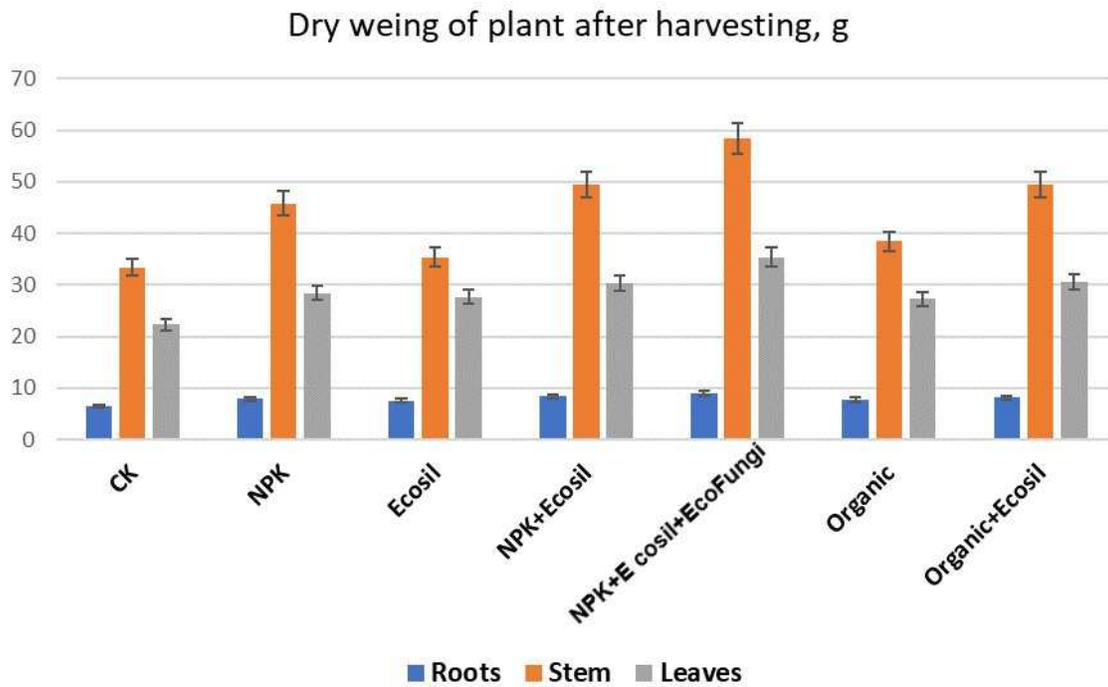
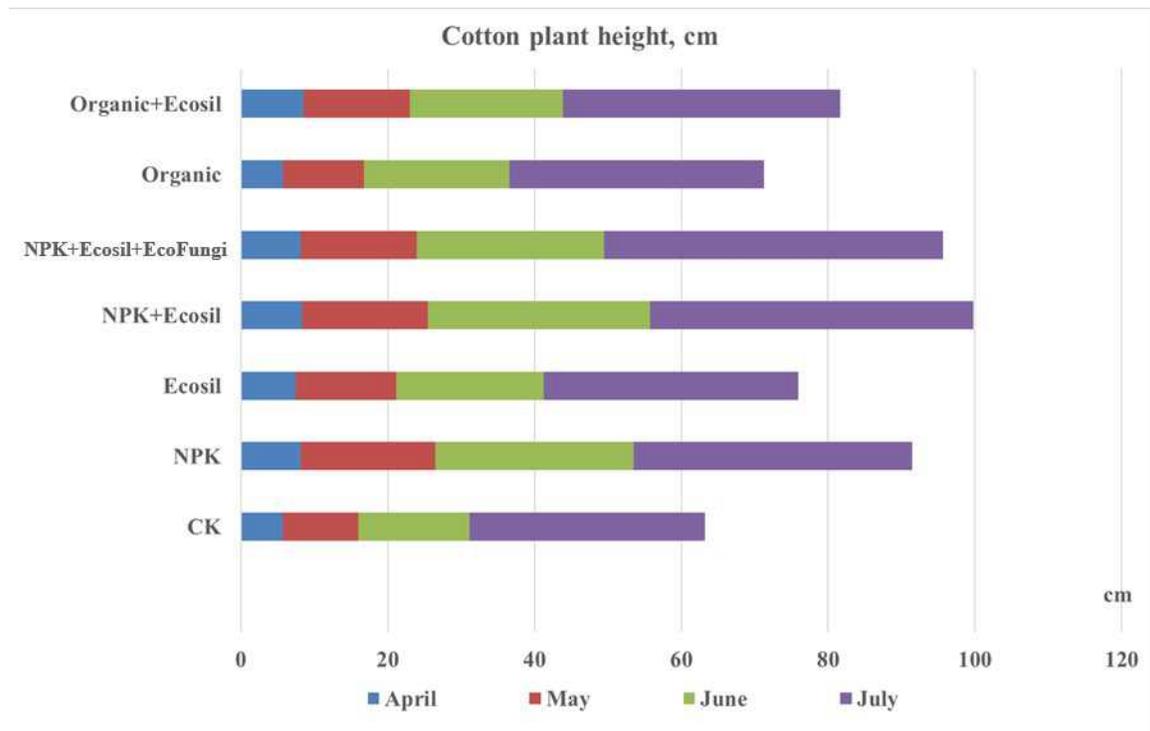
1. Germination test

The obtained data showed that Ecosil or DE application significantly increased the cotton seeds resistance to salt.

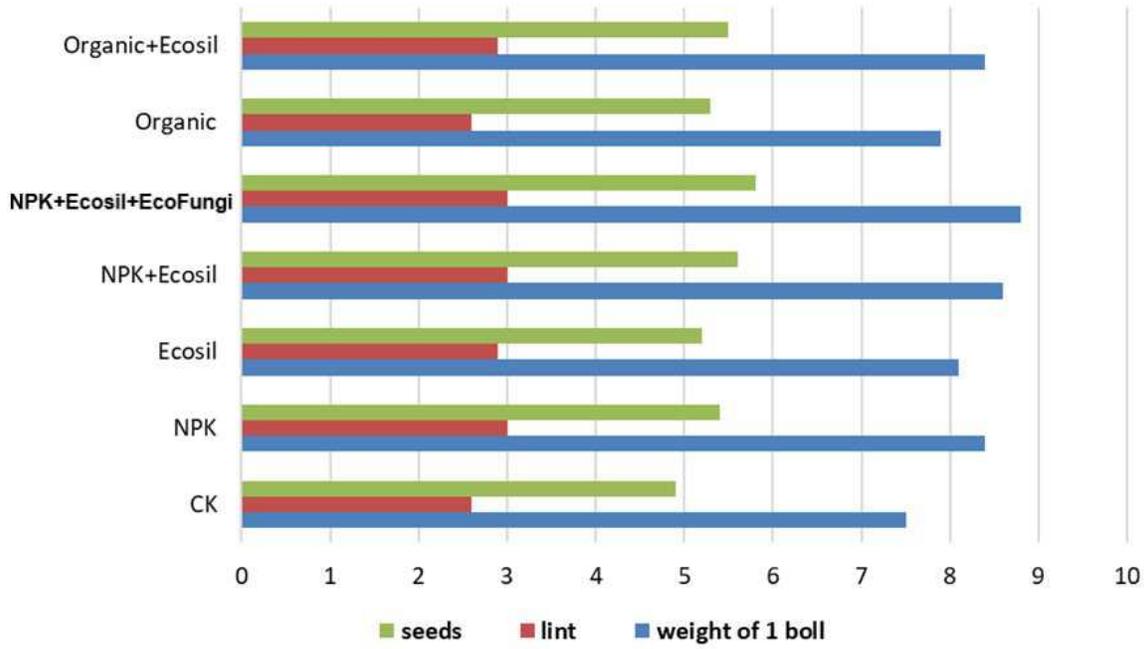


2. Obtaining of the cotton seeds and lint

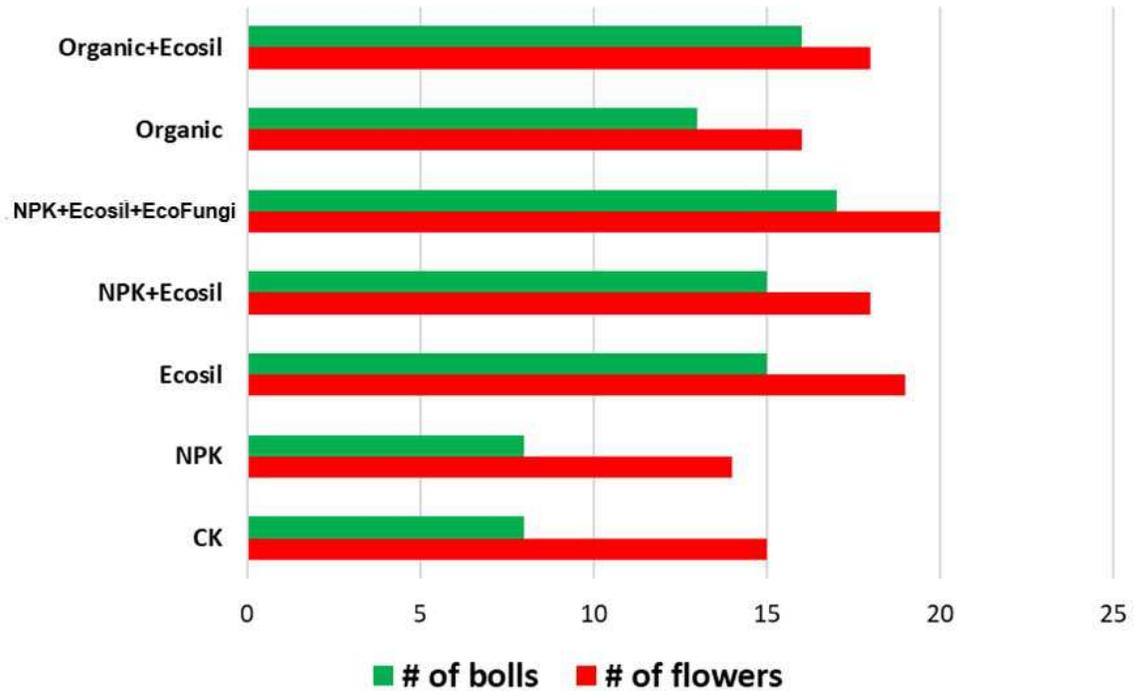
There are main data:

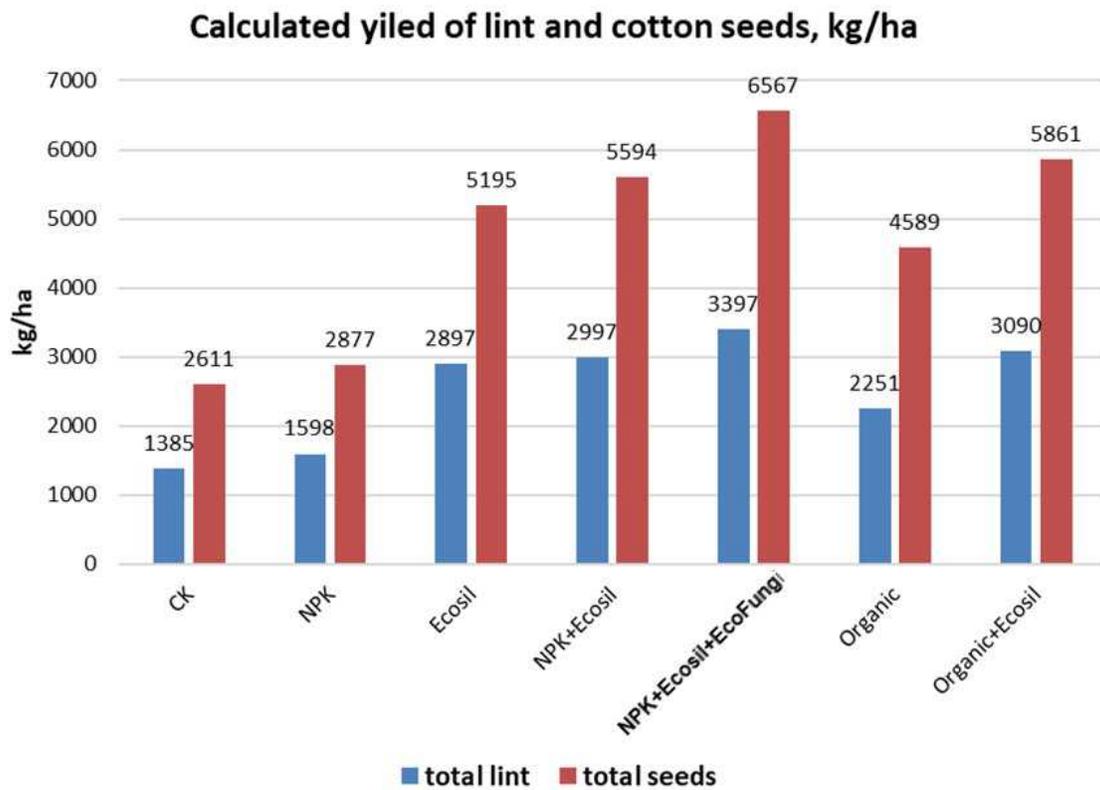


Average weight of seeds and lint in one boll



Average numbers of flowers and bolls per plant





Conclusions

The using of Ecosil along can significantly increase the production of the cotton, because more flowers are formed and more bolls formed form flowers.

The best combination is NPK+Ecosil+EcoFungi for cotton growing.

The using of organic matter along have not so high effect, but the combination of the organic matter with Ecosil have very high effect and this cotton can be classified as organic cotton.