PLANT NUTRITION AND FERT

ISSN 1008-505X
CN 11-3996/S

植物营养与肥料学报 » 2009, Vol. 15 » Issue (3) :670-676 DOI:

滴灌条件下盐分对棉花养分及盐离子吸收的影响

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Effects of soil salinity on nutrients and ions uptake in cotton with drip irrigation under film

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摘要

在温室条件下，通过盆栽试验研究了滴灌条件下不同土壤盐度对棉花养分、盐离子吸收的影响。结果表明，棉花干物质生产受土壤盐分影响显著，高盐度条件下棉花生育进程滞后，生殖生长与营养生长不协调，造成脱落率增加，经济产量下降。土壤盐度显著影响棉花对N、P和K养分的吸收和分配；N、P和K的积累总量以及在籽棉和铃壳中的吸收量随土壤盐度增加显著降低，而茎秆和叶片受影响较小。棉花植株体内的盐分离子（Ca^{2+}、Na^{+}与Cl^{-}）含量随土壤盐度的增加显著增加；吸收的盐分离子主要积累在茎叶，尤其以叶片中的盐分离子含量为最高，而籽棉的盐分离子含量较少。

关键词： 膜下滴灌 棉花 土壤盐分 养分 盐离子 膜下滴灌 棉花 土壤盐分 养分 盐离子

Abstract：

Soil salinity is an important limiting factor for agricultural production in arid and semiarid regions. The under-film drip irrigation has gained widespread popularity as an efficient and economically viable irrigation method for increasing water use efficiency and reducing the adverse effects of salinity on plant growth and yield. A pot experiment was carried out to investigate effects of soil salinity on nutrients and ions uptake in cotton under greenhouse conditions. Cotton was grown in plastic containers (height 54 cm, diameter 48 cm) filled with a loamy soil. Three soil salinity ($EC_{1:5}$) level were set as 0.32, 1.12 and 1.90 dS/m（namely E1, EC2, EC3, respectively）. A drip irrigation system was used for water application. Dry matter accumulation of cotton was influenced significantly by soil salinity. Under higher salinity condition ($EC_{1:5}$= 1.90 dS/m), Vegetative and reproductive growth of cotton were incoordinate and development was delayed. Shedding and seed cotton yield were decreased with salinity increase. Accumulations and distributions of N, P and K in cotton plant were affected by soil salinity. Accumulations of N, P and K in boll were markedly reduced by soil salinity, but there were no significant difference in leaf and stem among three treatments. With soil salinity increasing, content of Ca^{2+}, Na^{+} and Cl^{-} in cotton plant were increased. Ca^{2+}, Na^{+} and Cl^{-} were mainly accumulated in leaf and stem, but there were very low in seed cotton.

Keywords：

Received 2008-04-17;

引用本文:

龚 江[1]， 吕 宁[2]， 茹思博[1]， 侯振安[1*].滴灌条件下盐分对棉花养分及盐离子吸收的影响[J] 植物营养与肥料学报, 2009,V15(3): 670-676

GONG Jiang[1]，Lü Ning[2]，Ru Si-bo[1]， HOU Zhen-an[1*].Effects of soil salinity on nutrients and ions uptake in cotton with drip irrigation under film
[J] Acta Metallurgica Sinica, 2009,V15(3): 670-676

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