

根区温度对黄瓜生长和土壤养分利用的影响

Effect of root zone temperature on growth of cucumber and nutrient utilization in soils

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中文关键词: [土壤温度](#) [黄瓜](#) [干物重](#) [养分吸收](#) [土壤性质](#) [酶活性](#)

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中文摘要:

采用盆栽试验,研究了不同土壤温度(对照不加温 $10\pm 2^{\circ}\text{C}$ 、加温至 $18\pm 2^{\circ}\text{C}$ 、加温至 $26\pm 2^{\circ}\text{C}$)和不同盐分含量土壤(1#>2#>3#)对黄瓜干物质积累、矿质元素吸收与分配特征的影响,并对土壤性状、酶活性的影响进行了研究。结果表明:与对照不加温 10°C 相比,加温至 18°C 和 26°C 可以克服冬季土壤低温对黄瓜生长的限制作用,促进黄瓜苗的正常生长,为黄瓜开花结果提供保障。随着土壤温度升高,黄瓜果实干物重增加;加温至 26°C 与加温至 18°C 相比,三种盐分含量土壤1#、2#、3#黄瓜果实干物重分别增加了41.84%、15.49%、3.59%,同时反映了盐分含量高的土壤加温对提高黄瓜产量更明显。与对照不加温相比,土壤加温使黄瓜单株N、P、K的总摄取量增加,促进黄瓜根系吸收的养分向地上部转移,使土壤中速效养分(碱解氮、速效磷、速效钾)含量降低。土壤加温使土壤脲酶活性明显升高,对磷酸酶和过氧化氢酶影响不大。因此,冬季升高土壤温度可增加黄瓜产量,促进土壤养分转化,提高土壤养分利用率。

英文摘要:

A pot experiment was carried out to study effects of soil temperature and soil salinity on soil physico-chemical properties and enzyme activity in the soil as well as dry matter accumulation, nutrient uptake and distribution of cucumber. The experiment was designed to have 3 levels of soil temperature (10°C as control, 18°C and 26°C) and 3 levels of salinity (1# > 2# > 3#). Results showed that compared with control, 18°C and 26°C wiped out the obstacle of low soil temperature for growth of the plant in winter, promoted normal growth of cucumber seedlings and provided the plants with guarantee to blossom and yield. With soil temperature rising from 18°C to 26°C , cucumber fruit dry weight increased by 41.84%, 15.49%, and 3.59% in soil 1#, soil 2# and soil 3#, respectively, demonstrating that the effect of higher soil temperature was more significant in soils high in salt content. Higher soil temperature increased total nutrient (N, P and K) uptake of the plant, promoted transfer of nutrients from roots to shoots and reduce the contents of readily available nutrients (alkalysitic N, readily available P and readily available K) in the soil. Higher soil temperature significantly increased urease activity, but did not have much effect on the activities of phosphatase and catalase. Therefore, raising soil temperature in winter can increase cucumber yield, promote soil nutrient transformation and improve soil nutrient utilization efficiency.

闫秋艳,段增强,李 汛,董金龙,王媛华,邢 鹏,董飞.根区温度对黄瓜生长和土壤养分利用的影响[J].土壤学报,2013,50(4):752-760.Yan Qiuyan,Duan Zengqiang,Li Xun,Dong Jinlong,Wang Aihua,Xing Peng and Dong Fei.Effect of root zone temperature on growth of cucumber and nutrient utilization in soils[J].Acta Pedologica Sinica,2013,50(4):752-760

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