

## 毛管埋深和土壤层状质地对地下滴灌番茄根区水氮动态和根系分布的影响

Effects of lateral depth and layered textural soils on water and nitrate dynamics and root distribution for drip fertigated tomato

中文关键词: [地下滴灌](#) [毛管埋深](#) [土壤层状质地](#) [水分](#) [硝态氮](#) [根系分布](#)

英文关键词: [subsurface drip irrigation](#) [lateral depth](#) [layered textural soil](#) [water](#) [nitrate nitrogen](#) [root distribution](#)

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中文摘要:

通过2年日光温室滴灌施肥灌溉试验,探讨毛管埋深和土壤层状质地对根区土壤水分、NO<sub>3</sub>-N和番茄根系分布的影响,为地下滴灌的设计和运行提供依据。毛管埋深取0、15和30cm三个水平,设置0、150和225kgN/hm<sup>2</sup>三个施氮量水平,3种土壤包括均质壤土(L)、上砂下壤土壤(SL)和壤土中有砂土夹层土壤(LSL)。研究表明,番茄生育期内根区平均土壤含水率和根长密度在0~20cm土层中随毛管埋深的增加而降低,在20~70cm土层中随毛管埋深的增加而增大。地下滴灌土壤NO<sub>3</sub>-N含量在0~20cm土层中较地表滴灌有所增加。毛管埋深番茄总根长密度影响不显著,而最大根长密度随毛管埋深增加而降低,且出现的土层变深。层状土壤质地对土壤水分、NO<sub>3</sub>-N和番茄根系在土壤剖面上的分布影响较大,与均质壤土处理相比,LSL处理0~20cm土层土壤含水率降低18%,NO<sub>3</sub>-N含量降低23%,根长密度增加44%,土壤剖面上总根长密度与均质壤土处理相当;SL处理0~20cm土层土壤含水率降低28%,NO<sub>3</sub>-N含量降低55%,根长密度降低35%,土壤剖面上总根长密度较均质壤土处理降低37%,因此在上粗下细层状土壤中应慎用地下滴灌。

英文摘要:

Drip fertigation experiment of tomato were conducted in a solar heated greenhouse in 2006 and 2007 to investigate the effects of lateral depths and layered textural soils on water and nitrogen dynamics and root distribution. In the experiment, three lateral depths, three nitrogen application levels and three types of textured soils were considered. The results indicate that, for uniform sandy loam soil, both the average soil water content and root length density decrease in the depth 0~20cm, but they increase in depth 20.70cm, following the increase of buried depth. The content of NO<sub>3</sub>-N in depth 0~20cm is higher than that of surface drip irrigation. The total length density is not significantly affected by the lateral depth, while the maximum density occurs at a greater depth as the lateral depth increases. The lateral textural soils impose some influences on water and nitrogen dynamics and root distribution. The average soil water content and NO<sub>3</sub>-N for sandy loam sandy sandy loam soil in depth 0~20cm are lower than those of uniform sandy loam soil by 18% and 23% respectively, and the root length density is higher by 44%. The average soil water content, NO<sub>3</sub>-N and root length density for sandy over sandy loam soil in depth 0~20cm are higher than those for uniform sandy loam soil by 28%, 55% and 35% respectively. It is concluded that the subsurface drip irrigation should be used carefully in layered textural soils, especially in coarse over fine soil such as sandy over sandy loam soil.

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