

植物生产层

氮素形态对饲料桑树幼苗生长和光合特性的影响

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摘要:

以饲料桑树品种“青龙桑”(Morus alba cv Qinglong)为试验材料,通过水培方式研究了等氮条件下铵态氮和硝态氮两种形态氮源及其配比对桑树幼苗生长和光合特性的影响。结果表明,桑树幼苗在单一硝态氮或单一铵态氮条件下,植株高度、叶片数、叶片面积和根系长度均低于铵态氮和硝态氮配合施用,桑树叶片和根系生物量的变化也呈现类似趋势。铵态氮和硝态氮摩尔浓度比为50:50和25:75时桑树幼苗生长和生物量最高,而当铵态氮和硝态氮摩尔浓度比例为25:75时桑树净光合速率(Pn)、气孔导度(Gs)和水分利用效率(WUE)高于其他处理,单一硝态氮或单一铵态氮处理降低了桑树叶片表观量子效率(AQE),提高了桑树叶片的光补偿点(LCP)。以上结果说明饲料桑树是一种偏硝性的植物,以铵态氮和硝态氮摩尔浓度比为(50:50)~(25:75)最适合。

关键词: 饲料桑树 氮源 净光合速率

Effects of nitrogen form on seedling growth and its photosynthetic characteristics of forage mulberry

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Abstract:

A hydroponic experiment was carried out to determine the effects of different proportions of nitrate and ammonium nitrogen on seedling growth and its photosynthetic characteristics of mulberry (Morus alba) variety “Qinglong” under the same nitrogen amount. This study indicated that the combination of nitrate and ammonium nitrogen increased the plant height, leaf number, leaf area, root length, and leaf and root biomass of mulberry seedlings when compared to application of single ammonium or nitrate nitrogen. The plant growth and biomass of mulberry seedlings were the highest when the proportions of nitrate and ammonium nitrogen were 50:50 and 25:75. The net photosynthetic rate (Pn), stomatal conductance (Gs) and water use efficiency (WUE) in leaves of mulberry seedlings growing in 25:75 proportion solution of ammonium and nitrate nitrogen were higher than those of other proportion solutions. Single ammonium or nitrate nitrogen greatly improved the apparent quantum yield (AQY) and decreased the light compensation point (LCP) in leaves of mulberry seedlings. This study suggested that forage mulberry varieties “Qinglong” preferred to nitrate nitrogen, and the optimal proportions of nitrate and ammonium nitrogen for mulberry seedling were between 50:50 and 25:75.

Keywords: forage mulberry nitrogen source net photosynthetic rate

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