

重碳酸根对不同小麦基因型生长及锌营养的影响

田霄鸿, 买文选, 陆欣春, 杨习文, 李生秀

西北农林科技大学资源环境学院, 陕西杨凌 712100

Effects of bicarbonate on growth and zinc nutrition of different wheat genotypes

TIAN Xiao-hong, MAI Wen-xuan, LUXin-chun, YANG Xi-wen, LI Sheng-xiu*

College of Resource and Environment Science, Northwest A & F University, Yangling, Shannxi 712100, China

摘要

参考文献

相关文章

Download: PDF (490KB) HTML 0KB Export: BibTeX or EndNote (RIS) Supporting Info

摘要 石灰性土壤上小麦锌缺乏问题在世界范围内广泛存在, 而高含量的 HCO_3^- 被认为是造成缺锌的主要原因之一。本试验采用土培试验方法, 选用3种小麦基因型(中育6号、S02-8、远丰998), 研究了不同 HCO_3^- 浓度水平对小麦生长及Zn营养的影响。结果表明, HCO_3^- 对小麦植株生长(尤其是对根系)及Zn吸收有一定的抑制作用, 且在较低浓度(15 mmol/L)条件下表现更为明显。另外, 高浓度 HCO_3^- 对土壤中有有效锌含量及对锌从小麦根系向地上部的转运率均会产生不利的影响, 在 HCO_3^- 30 mmol/L条件下, 与未进行 HCO_3^- 处理的对照相比, 土壤有效锌及锌向地上部的转运率分别下降11.1%和5.0%, 表明 HCO_3^- 对小麦锌营养的影响可能主要是通过以下途径实现的: 1) 对土壤中有有效锌的钝化; 2) 对小麦根系生长的抑制; 3) 抑制锌从小麦根系向地上部的转运, 其中前两个途径可能起着更为重要的作用。总体来看, 土壤中高含量的 HCO_3^- 对供试的3种冬小麦基因型的生长及Zn吸收的抑制作用比较轻微, 这可能与它们对高浓度的 HCO_3^- 具有较高的耐性有关。

关键词: 石灰性土壤 碳酸氢根 锌 小麦基因型 石灰性土壤 碳酸氢根 锌 小麦基因型

Abstract:

Zinc deficiency of wheat plants in calcareous soil area is widespread throughout the world, and high bicarbonate concentration has been regarded as a major influencing factor. In this study, a soil pot experiment was conducted to investigate the influence of bicarbonate (HCO_3^-) on growth of wheat plants and zinc nutrition with three different wheat genotypes (Zhongyu6, S02-8, Yuanfeng998), which have different sensitivity to Zn deficiency. The results indicated that wheat growth (especially roots) and zinc uptake were inhibited under the condition of high concentrations of HCO_3^- solution, and the negative effect was more obvious under relatively low concentration HCO_3^- (15 mmol/L) than that of higher one (30 mmol/L). Under the conditions of high HCO_3^- concentration (30 mmol/L), the available Zn content in soil and the translocation ratio of Zn from root to shoot was decreased by 11.1% and 5.0%, respectively. The results suggest that the negative effects of HCO_3^- on Zn nutrition of wheat plants was caused by three reasons: firstly, bicarbonate caused the immobilization of Zn in soil; secondly, it inhibited root growth of wheat plants; thirdly, it decreased the translocation of Zn from root to shoot, and the first and second causes were probably major influencing factors. In conclusion, the effects of HCO_3^- on growth and zinc uptake of three genotypes of winter wheat plants tested was not as serious as expected, and this is perhaps because these wheat genotypes have high tolerance to high concentrations of bicarbonate.

Keywords:

Received 2006-11-27;

引用本文:

田霄鸿, 买文选, 陆欣春, 杨习文, 李生秀.重碳酸根对不同小麦基因型生长及锌营养的影响[J] 植物营养与肥料学报, 2008,V14(1): 9-16

TIAN Xiao-hong, MAI Wen-xuan, LUXin-chun, YANG Xi-wen, LI Sheng-xiu.Effects of bicarbonate on growth and zinc nutrition of different wheat genotypes[J] Acta Metallurgica Sinica, 2008,V14(1): 9-16

Service

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ Email Alert
- ▶ RSS

作者相关文章