

园艺园林科学

锌胁迫对三种柑橘砧木的生理特性和锌分配的影响

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摘要:

为了探究锌胁迫对柑橘砧木生长的影响, 本文采用溶液培养的方法, 测定了不同锌浓度如0 mg?L-1(锌缺乏)、0.005 mg?L-1(锌低量)、0.05 mg?L-1(锌适量)、0.5mg?L-1(锌过量)条件下枳壳、酸橙与红橘的相关生理指标及不同部位锌含量变化。结果表明: 1) 锌胁迫显著抑制了枳壳及酸橙的生长, 而对红橘生长的影响较小。2) 与锌适量处理相比, 锌缺乏和锌低量处理时枳壳、酸橙根系POD活性均明显降低, 各锌处理间红橘根系CAT活性无显著性差异; 锌胁迫下三者叶片与根系脯氨酸含量均显著高于适量锌处理, 不同锌处理下枳壳叶片MDA及其根系脯氨酸含量均相对低于酸橙与红橘。3) 随着锌处理浓度的升高, 三者根、茎、叶的锌含量均趋上升, 且根系锌含量显著较高。锌过量处理下三者的叶/根、叶/茎、茎/根比均显著低于其他锌处理。可见, 三种柑橘砧木对锌胁迫的反应存在明显的差异。

关键词: 锌胁迫 柑橘砧木 生理特性 锌分配

Effects of Zinc Stress on Physiological Character and Zinc Distribution of the Three Citrus Rootstocks

Abstract:

In order to investigate effects of Zinc stress on growth of citrus rootstocks, changes relatively physiological indexes and zinc contents in different parts of trifoliolate orange, sour orange and red tangerine were determined under 0mg?L-1(zinc deficiency), 0.005 mg?L-1(low zinc), 0.05 mg?L-1(optimal zinc) and 0.5 mg?L-1(zinc excess) with hydroponics. The results showed that zinc stress remarkably inhibited the growth of trifoliolate orange and sour orange, whereas had little influence on growth of red tangerine, POD activities in roots of trifoliolate orange and sour orange were significantly lower under zinc deficiency and low zinc treatments than under optimal zinc treatment, while CAT activities in roots of red tangerine had no significant difference among Zn treatments; Pro content in leaves and roots of the three citrus rootstocks were notably higher under zinc stress than under optimal zinc treatment, leaf MDA and root Pro content of trifoliolate orange were relatively lower than those of sour orange and red tangerine under Zn treatments. Zn contents in roots, stems and leaves of the three citrus rootstocks increased with increasing supply of Zn, Zn contents in roots were higher than other parts on the same Zn treatment, the ratio of leaf/root, stem/root and leaf/stem of zin translocation coefficient under zinc excess were significantly lower than those of other Zn treatments. It's suggested that there exist differential response in relation to Zn stress among the three citrus rootstocks.

Keywords: Zinc stress Citrus rootstock Physiological character Zinc distribution

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