

农学—研究报告

棉花苗期氮营养高效品种筛选

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摘要:

以33个棉花品种(系)为材料,采用温室苗期水培方法,在低氮和正常供氮2个水平下,对耐低氮棉花基因型的筛选指标进行了分析,并对氮高效型品种进行了筛选。结果表明,相对整株干重与相对氮积累量呈极显著正相关( $r=0.946^{**}$ ,  $N=33$ ,  $P<0.01$ ),与相对氮利用效率呈显著正相关( $r=0.432^*$ ,  $N=33$ ,  $P<0.05$ ),说明整株干重可作为棉花苗期氮高效基因型筛选的主要指标,相对氮积累量与相对氮利用效率呈显著正相关( $r=0.445^*$ ,  $N=33$ ,  $P<0.05$ ),这2个指标可作为苗期筛选的辅助指标。不同棉花品种的耐低氮能力不同,其中新陆早12号、新陆早21号、新陆早32号、新陆中26号、新陆中31号、新海25号品种的相对整株干重较高,具有在低氮条件下氮积累干物质能力强,氮利用效率较高等特点;炮台一号、新陆早19号、新陆早36号、A杂交铃、新海3号、新海13号为氮低效基因型品种,具有正常氮条件下干物质积累较少、吸氮能力相对较弱等特点。通过对不同时期苗期水培试验,在正常和缺氮条件下对不同棉花基因型形态和生理指标进行了分析比较,初步探讨了氮高效的机理,以为棉花优质、高产、高效栽培和棉花氮素高效利用品种的选育提供理论依据。

关键词: 棉花; 苗期; 氮营养; 筛选

Screening of Cotton Varieties with High Nitrogen Efficiency at Seedling Stage

Abstract:

This experiment was conducted to study the growing and Nitrogen (N) nutrition and to screen of the nitrogen high efficiency of 33 cotton varieties through water culturing. The experiment adopted H<sub>2</sub>C?C? АВДОНИН ingredient water culturing and installed two N levels (1 mmol/L and 5 mmol/L), and every level was three repetitions, analytic the total plant dry weight, N utilization index of total plant, N concentration of plant, the total plant weight, root-top ratio of different cotton varieties. Significant positive correlations ( $r=0.946^{**}$ ,  $N=33$ ,  $P<0.01$ ) were observed between the relative dry weight of the whole plant with N concentration of plant, and positive correlations ( $r = 0.432^*$ ,  $N=33$ ,  $P<0.05$ ) were observed between with N utilization index of total plant. Thus, the total plant dry weight could be first screening index for low N tolerance. Positive correlations ( $r = 0.445^*$ ,  $N=33$ ,  $P<0.05$ ) were observed between N concentration of plant with N utilization index of total plant, and they could be secondary screening index for low N tolerance. The results indicated that there were great difference among cotton varieties in the low nitrogen ability, XLZ12, XLZ21, XLZ26, XLZ31, XLZ32, XH25 had higher N utilization efficiency, stronger N absorption ability, and higher N utilization index in low N level; while cultivars PTYH, XLZ 19, XH3, XH13, AJJL and XLZ 36 had lower N efficiency, fewer N absorption ability and lower N utilization index in normal N level. Our conclusion is that preliminary screening of cotton genotypes tolerant to low-potassium at the seedling stage was feasible using a hydroponic culture. However, some important genotypes would need further screening in the field.

Keywords: cotton seeding stage nitrogen nutrition screening

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