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小麦株高及其构成因素的遗传及相关性分析

Genetic and Correlation Analysis of Plant Height and Its Components in Wheat

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中文摘要:

为了给小麦抗倒伏育种提供依据,以7个株高差异较大的冬小麦品种为亲本,按Griffing双列杂交法Ⅱ配制21个杂交组合,研究了小麦株高及其构成因素的遗传和相关性。结果表明,株高及其构成因素的遗传均符合加性-显性模型,以加性效应为主,显性程度为部分显性,遗传力高,早代选择有效。控制株高、穗长、倒一、倒二、倒三、倒四节间长的增效等位基因为显性,而控制倒五节间长的减效等位基因为显性。宁麦8号、宁麦9号、扬麦9号和扬麦11具有控制株高、倒一、倒二、倒三和倒四节间较长的隐性基因;望水白具有控制穗长最多的显性基因;扬麦9号具有控制穗长和倒五节间较长的显性基因。株高可能受3~4对主效基因控制,而其构成因素可能受1~3对主效基因控制。相关分析表明,株高与其构成因素呈极显著遗传正相关。株高构成因素对株高的作用大小依次为倒一节>倒二节>倒三节>倒五节>倒四节>穗长。

英文摘要:

Based on F_1 diallel crosses involving seven genetically diverse wheat cultivars and their crosses, the genetic and correlation analysis of plant height and its components were conducted. The results showed that the inheritance of plant height and its components fit in with the additive dominance model, and was controlled by both additive and dominant genetic effects, and the additive effect was much more important than the dominant effect. The degree of dominance was partial dominance, with higher narrow sense heritability, varying from 76.62% to 95.08%. Epistasis was found absent for all the characters studied. For all the traits, selection in the early generations would be most effective. The alleles increasing plant height, spike length, first, second, third and fourth internode length were dominant, while the alleles reducing fifth internode length were dominant. Ningmai 8, Ningmai 9, Yangmai 9 and Yangmai 11 had more recessive genes controlling plant height, first, second, third and fourth internode length, Wangshuibai had maximum dominant genes controlling spike length and Yangmai 9 had more dominant genes controlling spike length and fifth internode length. Plant height might be controlled by three or four pairs of major dominant genes, while its components might be controlled by one to three pairs of major genes. The correlation analysis showed that plant height was positively genetically associated with its components, spike length ($r=0.6847^{**}$), first, second, third, fourth and fifth internode length ($r_{[JP2]}=0.9486^{**}$, $r=0.9735^{**}$, $r=0.9562^{**}$, $r=0.9707^{**}$, $r=0.8495^{**}$, respectively). The order of relative contribution of its components to plant height was first internode > second internode > third internode > fifth internode > fourth internode > spike length.

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