

研究论文

大豆对胞囊线虫(*Heterodera glycines* Ichinohe) 1号和4号生理小种抗性的遗传分析

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收稿日期 2005-5-26 修回日期 2005-9-29 网络版发布日期 接受日期

摘要 大豆胞囊线虫(*Heterodera glycines* Ichinohe)是我国大豆的全国性主要病害之一。1号和4号生理小种是黄淮地区的优势小种。以Essex×ZDD2315、Peking×ZDD2315、PI88788×ZDD2226、Peking×ZDD2226的P1、P2、F1、BC1F2为材料,用主基因+多基因混合遗传模型分析大豆对胞囊线虫1号和4号生理小种抗性的遗传机制。结果表明,ZDD2315、ZDD2226对1号生理小种的抗性受主效基因控制,未发现多基因效应,且与Peking存在相同的抗病基因;抗性遗传表现组合特异性,Essex×ZDD2315组合为3对加性主基因遗传模型,主基因遗传率72.02%,PI88788×ZDD2226组合为2对显性上位主基因遗传模型,主基因遗传率62.33%。对4号生理小种的抗性为主基因+多基因混合遗传模型,Essex×ZDD2315、Peking×ZDD2315、PI88788×ZDD2226等3个组合为3对主基因+多基因遗传模型,主基因遗传率分别为67.76%、72.46%和53.25%,多基因遗传率分别为24.48%、21.31%和35.77%;Peking×ZDD2226表现为2对主基因遗传模型,主基因遗传率45.40%。抗性基因表现为隐性,育种上可以在早代选择。培育多抗品种应以抗4号生理小种为主要目标进行基因聚合。

关键词 [大豆\[Glycine max \(L.\) Merr.\]](#) [胞囊线虫\(Heterodera glycines Ichinohe\)](#) [抗性遗传](#) [主基因+多基因混合遗传模型](#)

分类号 [S565](#)

Inheritance of Resistance to Race 1 and Race 4 of Cyst Nematode (*Heterodera glycines* Ichinohe) in Soybeans

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Abstract Soybean cyst nematode (*Heterodera glycines* Ichinohe) is one of the two most important nation-wide soybean diseases in China. Race 1 and 4 of the pathogen, especially the latter, are most popular in Huang-Huai Valleys and ZDD2315 and ZDD2226 have been identified as elite resistance sources. The present study was aimed to reveal the genetic mechanism of resistance to the two races by using the two resistant materials. Genetic analysis was performed under major gene + polygene mixed inheritance model in the four BC1F2 populations derived from the soybean crosses of Essex×ZDD2315, Peking×ZDD2315, PI88788×ZDD2226 and Peking×ZDD2226. The results showed that the resistance to Race 1 was controlled by two or three major genes, but no polygene effect detected. In Cross Essex×ZDD2315, three major genes contributed to the resistance to Race 1 with the heritability of 72.02%, while two dominant-epistasis major genes were detected with the heritability of 62.33% in Cross PI88788×ZDD2226. The two resistance sources, ZDD2315 and ZDD2226, might have the same resistant genes with Peking conferring resistance to Race 1 because the two crosses Peking×ZDD2315 and Peking×ZDD2226 did not segregate in reaction to Race 1. The resistance to Race 4 was mainly conditioned by three major genes plus polygene in the crosses of Essex×ZDD2315, Peking×ZDD2315 and PI88788×ZDD2226 with the major gene heritability of 67.76%, 72.46% and 53.25%, respectively and the polygene heritability of 24.48%, 21.31% and 35.77%, respectively. However only two major genes were identified in the cross of Peking×ZDD2226. All the F1s and the detected additive effects had a similar response to susceptible parents, indicating the resistance to Race 1 and Race 4 mainly was controlled by recessive genes. Therefore, selection could be taken at early generations in breeding programs and pyramiding of genes resistant to both races should emphasize on resistance to Race 4 because most of the BC1F2 lines resistant to Race 4 also showed resistance to Race 1.

Key words [Soybean](#) [Heterodera glycines Ichinohe](#) [Inheritance](#) [Major gene + polygene mixed inheritance model](#)

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