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接种茄病镰刀菌 (Fusarium solani f. sp. glycines) 大豆植株和须根的影响 (PDF)

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Title: Genotype Response of Soybean (Glycine max) Whole Plants and Hairy Roots to Fusarium solani f.sp.glycines Infection

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摘要: 茄病镰刀菌(Fusarium solani f. sp. glycine)是一种土生细菌,通过侵染大豆根系引发猝死综合症。利用温室盆栽试验和须根培养试验研究了接种茄病镰刀菌对13个不同基因型

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大豆的影响。结果表明：接种后所有盆栽大豆主根都有明显深褐色的侵染病斑；移植后21 d 测定了盆栽植株叶部发病程度，Peking 表现最为严重，然后依次为 Spencer, Ripley, P3981, Williams 82, Essex, Forrest, Iroquois, PI 520733, Hartwig, PI 567650B, Jack, 和 PI 567374。叶部发病程度与冠高($r=-0.422, P=0.0018$)、冠重($r=-0.857, P<0.0001$)和根重($r=-0.732, P<0.0001$)呈显著负相关。主根病斑长度与叶部发病程度没有相关性，表明大豆对病原菌的抗性不能仅通过根系得到充分控制。对培养的大豆须根接种茄病镰刀菌菌丝体10 d 后，不同基因型大豆的菌落直径的变化范围为17~40 mm, 差异显著 ($P=0.05$)，其中 Spencer 和 Peking 须根上的菌落直径显著 ($P=0.05$) 大于 PI 567374 和 PI 520733。对 Spencer 和 PI 567374 的须根接种10 μ L 茄病镰刀菌常量成分悬液，10 d 后菌落直径分别为50 和38 mm, 差异显著 ($P=0.05$)。通常，不同基因型大豆向茄病镰刀菌在培养须根上的生长与整株的症状尚有一定的相关性，但不总是这样，这是因为即使根系对毒素产生抗性来减少叶部病害症状，但并不是所有的大豆都表现出明显的根系抗性。

Abstract: *Fusarium solani* f.sp.glycines, a soilborne fungus, infects soybean roots and causes sudden death syndrome. The response of 13 soybean genotypes to *F. solani* f.sp.glycines infection was tested with potted greenhouse grown plants and with cultured hairy roots. The taproots of all genotypes grown in the greenhouse had dark brown lesions following inoculation. Foliar disease severity for greenhouse grown plants measured 21 days after planting was greatest for Peking, followed by Spencer, Ripley, P3981, Williams 82, Essex, Forrest, Iroquois, PI 520733, Hartwig, PI 567650B, Jack, and PI 567374. There were significant negative correlations between foliar disease severity and shoot length ($r=-0.422, P=0.0018$), shoot weight ($r=-0.857, P<0.0001$), root weight ($r=-0.732, P<0.0001$), and total plant dry weights ($r=-0.855, P<0.0001$). The taproot lesion length was not correlated with foliar disease severity indicating that soybean resistance may not be fully controlled at the root level. When cultured hairy roots were inoculated with *F. solani* f.sp.glycines mycelial plugs, the colony diameters after 10 days were significantly ($P=0.05$) different among soybean genotypes ranging from 17 to 40 mm. Fungal colony diameters on hairy roots of Spencer and Peking were greater ($P=0.05$) than on PI 567374 and PI 520733. In another experiment, following inoculation of Spencer and PI 567374 hairy roots with 10 μ L of *F. solani* f.sp.glycines macroconidial suspensions, 10-day-colony diameters were 50 and 38 mm, respectively ($P=0.05$). While there was generally a correlation between the growth of *F. solani* f.sp.glycines on the cultured hairy roots and the whole plant symptoms of the different genotypes, this was not always the case. The exceptions may be due to the fact that none of the genotypes showed clear root resistance even though they may show toxin resistance that would result in fewer foliar symptoms.

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