

不同抗性烤烟品种根际微生物数量及多样性差异研究

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Microbe quantity and functional diversity in rhizospheres of different cultivars of flue-cured tobacco

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摘要 以不同烤烟品种云85(高抗)、K326(中抗)、净叶黄(中感)和红花大金元(高感)为材料,通过平板菌落计数法和Biolog方法比较了不同烤烟品种不同生育时期以及接种黑胫病菌后根际可培养微生物数量及群落功能多样性差异。结果表明,不同品种根际细菌数量随生育进程先增加后减少,真菌刚好相反,且细菌和真菌趋势拐点均出现在现蕾期,放线菌变化不大;团棵期和旺长期细菌和放线菌数量与品种抗性正相关,真菌数量与品种抗性呈负相关。人工接种黑胫病菌条件下,抗病品种根际环境刺激了细菌生长,而相对抑制感病品种细菌生长,不同品种均促进了根际真菌和放线菌生长,且真菌数量与品种抗性负相关。Biolog功能多样性分析表明,不同品种碳源总体利用能力及功能多样性存在一定差异,团棵期和旺长期抗病品种AWCD值、Shannon指数和McIntosh指数大于感病品种;接种降低了感病品种碳源总体利用能力及功能多样性。以上结果说明,不同品种微生物数量及群落多样性受生长发育和品种抗性影响,且抗性差异主要表现在烤烟现蕾以前;与黑胫病互作后根际微生物数量及群落多样性存在明显差异且与品种抗性密切相关。

关键词: 烤烟 黑胫病 抗性品种 根际微生物 功能多样性 Biolog

Abstract: Black shank (*Phytophthora parasitica* var. *nicotiana*) is considered to be the most serious disease which can damage all tobacco cultivars and lead to enormous economic loss in Yunnan tobacco area. Four different resistance cultivars, Yun85 (high resistance, R), K326 (middle resistance, MR), Jingyehuang (middle susceptibility, MS) and Hongda (high susceptibility, S) were selected as experiment materials to study difference of the quantity and diversity of rhizosphere microorganism at different stages and after inoculation by the method of plate culture count and the Biolog method. The purpose of this study was to build good foundation for further studying resistance mechanism of tobacco black shank. The results show that bacterial numbers of different cultivars are first increased and then decreased with the growing process, while fungal numbers are reverse. Meanwhile, the trend inflexions of bacteria and fungi are all happened at the flower budding stage, and that of actinomyces is relatively stable. There are positive correlations between rhizosphere microorganism counts of bacteria and actinomyces and cultivar resistance, and a negative correlation between fungal number and cultivar resistance at the rosette stage and the rapid growing stage. In addition, growth of bacteria is stimulated in rhizosphere environment of the resistance cultivars, while the growth is relatively restrained in the susceptible cultivars. And growths of fungi and actinomyces are promoted in all experiment materials. The analysis results of the Biolog method show that there are some differences in total utilization ability of carbon source and functional diversity in different growth stages of different cultivars, and the average well color development (AWCD), Shannon index and McIntosh index of the resistance cultivars are more than that of the susceptible cultivars in different growth stages of different cultivars. At the same time, AWCD values and functional diversity of the susceptible cultivars are decreased after inoculating *phytophthora parasitica* var. *nicotiana*. These results explain that rhizosphere microorganism counts of different resistance cultivars are influenced by its growth and development, and the difference of resistance is mainly showed before the flower budding stage of flue-cured tobacco. At the same time there are significant differences after the inoculation, and the difference and cultivar resistance is closely related.

Keywords: flue-cured tobacco black shank resistance cultivar rhizosphere microorganism functional diversity

Biolog

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