

丛枝菌根对神东煤矿区塌陷地的修复作用与生态效应

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摘要 利用丛枝菌根真菌进行土地复垦是目前研究的热点技术之一。在神东煤矿区塌陷地上接种丛枝菌根真菌 5 个月后, 系统地研究菌根对向日葵植株的生长发育、对土壤性状的改良以及根际微生物种群数量的影响。结果表明, 接种菌根 3 个月后, 向日葵的开花期较对照可提早 2 周。接种菌根 5 个月后其侵染率提高, 菌丝密度明显增加。接种区植物生长较对照区明显提高, 地上部叶片数和干重较对照明显增加。菌根植物的根系发育状况良好, 植株干重提高, 籽粒产量增加。菌根植物根际土壤磷和钾含量的有效性增加, 微生物数量明显提高, 取得较好的菌根生态效应。在采煤塌陷地上接种丛枝菌根真菌, 可改善复垦土壤的性状, 有利于生态的恢复与稳定, 为微生物复垦技术的推广应用奠定了较好的理论基础, 具有重要的现实指导意义。

关键词 丛枝菌根真菌; 向日葵; 塌陷地; 土地复垦

中图分类号 TD88

文献标识码 A

文章编号 1000-7857(2010)07-0041-04

The Reclamation and Ecological Effects of Arbuscular Mycorrhiza on Subsided Land in Shendong Coal Mine Areas

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Abstract It takes special technologies to apply arbuscular mycorrhiza fungi to the land reclamation. This paper studies sunflower growth, soil properties remediation and microbe population fluctuation after arbuscular mycorrhizal fungi being inoculated on the Shendong coal mine subsided land for 5 months. The following results are obtained. Arbuscular mycorrhizal fungi can shift the plant flowering period two weeks earlier than the control group. After 5 months growth, the mycorrhizal inoculation rate and the hyphal density are both increased. Mycorrhiza can promote plant growth. The leaf number and the weight of the mycorrhizal plants are increased as compared with the control group. The mycorrhizal plant root extends well. Mycorrhizal plant's dry weight is higher than the control group. The sunflowers' productions are also increased. The effectiveness of phosphorus and potassium is increased in the mycorrhizosphere soil. The populations of the microorganism are increased. All those show that their ecological effects are significantly improved. Arbuscular mycorrhizae would promote reclaimed soil properties that will help the rehabilitation and sustainability of the ecological systems. These results provide a theoretical base for the micro-reclamation application in the coal mine areas, also for the reclamation practice.

Keywords arbuscular mycorrhizal fungi; sunflower; subsided land; land reclamation

收稿日期: 2009-11-05

基金项目: 国家科技支撑计划项目(2006BAC09B03); 教育部新世纪优秀人才计划项目(NCET-06-0200)

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