

研究论文

稻草还田对晚稻土微生物及酶活性的影响

谭周进¹, 李倩¹, 陈冬林¹, 周清明¹, 肖启明¹, 李建国^{2, *}

1.湖南农业大学,长沙410128

2.湖南省农业厅,长沙410005

收稿日期 2006-3-9 修回日期 2006-8-15 网络版发布日期: 2005-10-25

摘要 通过早稻秸秆翻耕还田对晚稻土微生物数量与活度、秸秆腐解酶活性和氨化、硝化作用强度的动态影响试验研究表明: 稻草翻耕还田的条件下, 在晚稻生长发育过程中, 除土壤放线菌数量一直呈下降态势之外, 土壤好气性细菌、厌气性细菌和真菌数量均呈现前期急剧增加、中期缓慢减少、后期迅速减少的变化特征, 土壤微生物活度则呈现前期迅速增强、达到最大值, 中期迅速下降, 后期缓慢回升的变化趋势; 土壤木聚糖酶活性与土壤微生物数量变化趋势基本相同, 而土壤纤维素酶活性则呈前期增加、中期最高、后期迅速下降的特点; 土壤氨化作用强度一直呈下降态势, 而土壤硝化作用强度则呈前期增强、中期最高、后期下降的变化趋势。随着稻草还田量的增加, 上述土壤微生物数量与活度、秸秆腐解酶活性和氨化和硝化作用强度的动态变化趋势更加明显。土壤微生物及酶活性分析评价发现, 在晚稻栽培时, 配合水稻专用复混肥一次性施用, 以早稻秸秆2500~5000kg/hm²翻耕还田较为适宜。

关键词 秸秆还田; 水稻土 微生物区系; 微生物活度; 土壤酶

分类号 Q143, Q938, S154

TAN Zhou-Jin¹, LI Qian¹, CHEN Dong-Lin¹, ZHOU Qing-Ming¹, XIAO Qi-Ming¹, LI Jian-Guo^{2, *}

1. Hunan Agricultural University, Changsha 410128, China;

2. Agricultural Department of Hunan Province, Changsha 410005, China

Abstract Rice-straw is rich with nutrient elements for crop growth and it is an excellent natural resource for humans. Most of rice-straw is incinerated in farms of China; a lot of CO₂ is generated and released to the environment which may cause "greenhouse effect". To avoid this kind of problem and utilize rice-straw as a nutrient resource, rice-straw returned to the field right after the harvest has been becoming a common way in rice production in southern area of China. Many related field studies showed that the soil quality could be improved by rice-straw returned to the field and the crop growth could be promoted which resulted in higher yield. To investigate the effect of returning quantity of rice-straw to the field on biological characteristics of soil and provide scientific rational to the farmers for applying suitable amount of rice-straw, a field experiment with the different returning amount of 0%, 33%, 67%, 100% of harvested rice-straw to the field was conducted and the effects on soil microbial flora and activity in paddy soil were determined. The populations of aerobic bacteria, anaerobic bacteria, actinomyces and fungi, microbial activities in soil showed the highest at late-rice maximum tillering stage. Those populations and the microbial activities in soil applied with rice-straw were more than that in soil without the application of rice-straw. The order of aerobic bacteria amount in soil applied with different amount of rice-straw was 0% > 3% > 67% > 100% at late-rice maximum tillering stage. And the number of aerobic bacteria in soil without rice-straw application was the lowest. The order of anaerobic bacteria amount in soil was 33% > 67% or 100% > 0% of rice-straw. The situation of fungi in soil was same as aerobic bacteria. The number of actinomyces in soil covered with rice-straw was more than that without rice-straw. Soil microbial activity was stimulated by returning of rice-straw, the order of soil activity was 67% > 100% > 33% > 0 of rice-straw. The activities of ammonification and nitrification at late stage showed an ideal situation when 33% of rice-straw was returned. Cellulase activity in soil showed

扩展功能

本文信息

▶ [Supporting info](#)

▶ [\[PDF全文\]\(OKB\)](#)

▶ [\[HTML全文\]\(OKB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“秸秆还田; 水稻土” 的相关文章](#)

▶ [本文作者相关文章](#)

· [谭周进](#)

· [李倩](#)

· [陈冬林](#)

· [周清明](#)

· [肖启明](#)

· [李建国](#)

d the highest at late-rice maximum tillering stage, and xylanase activity in soil showed the highest at late-rice maximum booting stage. It was also demonstrated that applying 25005000 kg/hm² rice-straw to the field was suitable under most of the conditions.

Key words rice-straw returned to the field _ paddy soil _ microbial flora _ microbial activity _ soil enzymes

DOI

通讯作者 李建国 chenxuanyiyi@sohu.com