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农学—研究报告

免耕留茬覆盖对土壤呼吸和土壤酶活性及养分的影响

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摘要:

研究了不同留茬高度与不同覆盖量组合的土壤呼吸与土壤酶活性的变化，为明确保护性耕作对内蒙古武川县上秃亥乡的气候变化和土壤生产力的影响以及当地农田科学管理提供理论依据。试验于2009年进行，共设3个处理：传统耕作(CT)、留低茬半量覆盖(DH)、留低茬全量覆盖(DW)、留高茬半量覆盖(GH)、留高茬全量覆盖(GW)。采用静态箱法测定农田土壤呼吸速率，并分层对土壤酶活性及土壤养分进行测定，来明确该地区的土壤肥力状况。结果表明，土壤呼吸速率季节变化在拔节期达到峰值，免耕留茬覆盖与传统耕作相比土壤呼吸速率显著降低，免耕同一留茬高度不同覆盖量差异显著，而免耕同一覆盖量不同留茬高度间差异不显著，土壤呼吸速率随秸秆覆盖量的增加而减少。日变化呈单峰曲线变化，免耕留高茬全量覆盖处理与大气温度的相关系数为0.9239。传统耕作的土壤呼吸速率与大气温度的相关系数为0.8652，均达到显著相关水平。免耕留茬覆盖处理可以显著提高0~5 cm和5~10 cm土层有机质、全量养分、速效养分含量及土壤水解酶和氧化还原酶的活性。土壤呼吸与除全氮及过氧化氢酶外的土壤养分和水解酶呈显著或极显著正相关关系，土壤有机质、养分和碱性磷酸酶、蔗糖酶活性间均达到显著正相关水平。免耕留茬覆盖较传统耕作能显著降低土壤呼吸速率，且全量覆盖的土壤呼吸速率低于半量覆盖，能提高土壤表层0~5 cm和5~10 cm土壤酶活性及土壤肥力，且全量覆盖优于半量覆盖。

关键词: 土壤养分

No-tillage Stubble with Residues on Soil Respiration and the Soil Enzyme Activity and Nutrient Influence

[2], [2], [2], [2]

Abstract:

Stubble height was studied with different leave covered the soil respiration and the quantity combination of change, the soil enzyme activity of Inner Mongolia for clear protective cultivation on the Shangtuhaixiang climate change and the influence of soil productivity as well as local farms provide theoretical basis for scientific management. Tests for 2009, a total of three treatment: traditional farming (CT), leave low stubbly half quantity coverage (DH), leave low stubbly total quantity coverage (DW), leave high stubbly half quantity coverage (GH), leave high stubbly total quantity coverage (GW). Static boxes of soil respiration rate determination of farmland, and the hierarchical soil enzyme activity and soil nutrient were determined to clear the region's soil fertility status. Soil respiration rate in jointing stage seasonal variation peak, no-till leave compared with conventional tillage crop cover soil respiration rate was significantly lower stubble height no-tillage same leave covered significant difference, different quantity of no-tillage same cover quantity and leave the difference between different crop height of soil respiration rate was not significant, with straw mulching quantity decreased. Diurnal variation of single-peak curve changes in no-tillage leave high crop total content covers processing and atmospheric temperature and the correlation coefficient was 0.9239. Conventional tillage soil respiration rate and the correlation coefficient for atmospheric temperature, 0.8652 significant related level. No-till leave stubbly cover treatment could greatly improve the 0-5 cm and 5-10 cm soil organic matter, total amount of nutrients, available nutrient content and soil amidohydrolase and oxidation and reduction of the enzyme activity. Soil respiration and total nitrogen and hydrogen peroxide, soil nutrient and outside the enzyme hydrolysis enzyme was a significant or very significant positive correlation between soil organic matter, nutrient and alkaline phosphatase, invertase activity significant positive correlation between levels. No-till crop coverage than traditional farming leave could significantly reduce soil respiration rate. To improve soil surface 0-5 cm and 5-10 cm soil enzyme activity and soil fertility.

Keywords: soil enzyme activity

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