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长期施肥下红壤旱地CO₂、N₂O排放特征

黄晶, 刘宏斌, 王伯仁

1. 中国农业科学院红壤实验站
- 2.

摘要:

摘要: 基于中国农业科学院红壤实验站长期定位试验, 采用静态箱/气相色谱法, 研究红壤旱地小麦生长季节不同施肥处理(CK、NP、NPK、NPKM、1.5NPKM)下土壤CO₂、N₂O排放差异。结果表明, 长期不同施肥处理形成不同的土壤肥力以及作物生长的差异是影响土壤呼吸CO₂、N₂O排放的重要因素, 红壤旱地小麦季土壤呼吸CO₂、N₂O排放具有明显的季节变化特征; 在小麦生长季, 不同施肥处理之间土壤呼吸CO₂、N₂O排放通量差异显著, 土壤呼吸CO₂年累积排放量在8284.02 kg?ha⁻¹~15863.48 kg?ha⁻¹之间, N₂O年累积排放量在0.37 kg?ha⁻¹~2.04 kg?ha⁻¹之间。各处理土壤呼吸CO₂排放通量的大小变化: 1.5NPKM>NPKM>NPK>CK>NP; 土壤呼吸N₂O平均排放通量大小顺序为1.5NPKM>NPKM>NPK>NP>CK; 有机肥的施用显著增加了土壤呼吸CO₂和N₂O的排放(P<0.05)。土壤呼吸CO₂与N₂O排放分别与土壤温度和土壤水分显著相关性。

关键词: 关键词: 长期施肥 红壤旱地 CO₂ N₂O

CO₂、N₂O Emission from red soil dry-land under long-term fertilization

Abstract:

Abstract: Diurnal variation of soil respiration affected by long-term different fertilization at various growth stages of wheat in red soil dry-land was investigated with the static dark chamber method and gas chromatograph technique at the Experimental station of red soil CAAS. Results show that the different soil fertility and crop growth under long-term different fertilization is an important factor to effect the soil CO₂, N₂O emissions. During the growth stages of wheat, soil respiration rate displayed an obvious seasonal curve. CO₂, N₂O emission fluxes in different experimental treatments had significant differences Cumulative emissions of CO₂ and N₂O in the year varying in the range of 8284.02 kg?ha⁻¹~15863.48 kg?ha⁻¹ and 0.37 kg?ha⁻¹~2.04 kg?ha⁻¹. In terms of the effect of fertilization, the CO₂ emissions followed an order of 1.5NPKM>NPKM>NPK>CK>NP, and N₂O emissions followed an order of 1.5NPKM>NPKM>NPK>NP>CK, The treatment with organic manure increase in CO₂ and N₂O emissions significantly (p < 0.05) than the others. The change of CO₂ emissions was obviously related to soil temperature, but the change of N₂O emissions was obviously related to soil water content.

Keywords: Key words: long-term fertilization red soil dry-land CO₂ N₂O

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