

研究简报

CO₂浓度升高对红松和长白松土壤呼吸作用的影响

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摘要 以开顶箱法研究了CO₂浓度升高对红松和长白松土壤呼吸作用的影响.结果表明, 500 μmol CO₂·mol⁻¹使红松和长白松土壤呼吸速率明显降低, 土壤表面CO₂浓度升高导致CO₂扩散受阻可能是土壤呼吸受到抑制的主要原因.500 μmol CO₂·mol⁻¹下两树种土壤表面CO₂浓度明显高于对照箱和裸地条件下的CO₂浓度, 增加幅度在40~150 μmol·mol⁻¹之间; 对照箱内长白松土壤表面CO₂浓度略高于裸地, 差异不显著, 红松差异显著.500 μmol CO₂·mol⁻¹下的长白松土壤全氮及总有机碳含量略高于对照组, 差异不显著, 红松裸地的碳氮含量明显低于500 μmol CO₂·mol⁻¹及对照箱内土壤碳氮含量; 500 μmol CO₂·mol⁻¹及开顶箱的微环境对地下3 cm处土壤温度没有明显影响.

关键词 [CO₂浓度升高](#) [土壤呼吸](#) [土壤表面CO₂浓度](#)

分类号

Soil respiration of *Pinus koraiensis* and *P. sylvestrifomis* trees growing at elevated CO₂ concentration

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Abstract

The study with open-top chamber showed that at 500 μmol CO₂·mol⁻¹, the soil respiration rate under *Pinus koraiensis* and *P. sylvestrifomis* decreased significantly, probably due to the slow diffusion of increased soil surface CO₂ concentration. The soil surface CO₂ concentration at 500 μmol CO₂·mol⁻¹ was significant higher than that in the control chamber and unchambered field, with an increment of 40~150 μmol CO₂·mol⁻¹. The soil surface CO₂ concentration of *P. sylvestrifomis* in the control chamber was higher than that on unchambered field, but the difference was not significant, while a significant difference was observed in *P. koraiensis*. The total nitrogen and total organic carbon contents in *P. sylvestrifomis* soil at 500 μmol CO₂·mol⁻¹ had no significant difference with those in the control chamber and on unchambered field, while their contents in *P. koraiensis* soil were significantly lower on unchambered field than those in the control chamber and at 500 μmol CO₂·mol⁻¹. Elevated CO₂ and the microenvironment of open-top chamber had little effect on the soil temperature at 3 cm depth.

Key words [Elevated CO₂ concentration](#) [Soil respiration](#) [Soil surface CO₂ concentration](#)

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