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研究报告

植物排放N_2O和CH_4的研究

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Investigation of N_2O and CH_4 Emissions from Plants

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摘要 N_2O和CH_4是2种重要的温室气体, 但其排放源尚未得到充分鉴别。1990年和2006年先后报道植物能排放N_2O和CH_4, 并日益受到广泛的关注。然而, 迄今为止对植物排放这2种气体的研究均是分开单独进行的。该文以8种陆生草本植物为研究对象, 首次同步考察了新鲜离体植物地上部排放N_2O和CH_4的通量。研究结果表明: 8种植物均能排放这2种气体。其中, 黑麦草(*Lolium perenne*)、抱茎苦荬菜(*Ixeridium sonchifolium*)和菠菜(*Spinacia oleracea*)的CH_4通量较高, 分别为165.38、 52.28和21.64 ngCH$_4$·g^{-1}dw·h^{-1}; 抱茎苦荬菜、蒙古蒿(*Artemisia mongolica*)、大豆(*Glycine max*)和菠菜的N_2O通量较高, 分别为7.19、6.92、5.44和4.05 ngN$_2$O·g^{-1}dw·h^{-1}。研究结果不仅为植物本身既能排放N_2O又能排放CH_4在植物中可能具有普遍性提供了进一步的实验依据, 而且为深入研究其机理找到了几种适宜的植物种(如抱茎苦荬菜、菠菜)。

关键词: 排放通量 N_2O和CH_4 陆生植物

Abstract: N_2O and CH_4 are two important greenhouse gases. However, their sources have not been well characterized. Plants are known to emit N_2O and CH_4, which has received widespread attention. We investigated N_2O and CH_4 emissions from fresh aboveground parts (branches and leaves) of 8 xerophytic herbaceous plants. All species could emit both N_2O and CH_4. *Lolium perenne*, *Ixeridium sonchifolium* and *Spinacia oleracea* showed high CH_4 emission, with fluxes of 165.38, 52.28 and 21.64 ngCH$_4$·g^{-1}dw·h^{-1}, respectively. *I. sonchifolium*, *Artemisia mongolica*, *Glycine max* and *S. oleracea* emitted more N_2O, with fluxes of 7.19, 6.92, 5.44 and 4.05 ngN$_2$O·g^{-1}dw·h^{-1}, respectively. These results provide further evidence of the universality of plants emitting N_2O and CH_4 but also reveal suitable plant species (*I. sonchifolium* and *S. oleracea*) for further mechanistic studies.

Keywords: emission flux N_2O and CH_4 terrestrial plants

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