

研究报告

模拟酸雨及其酸化土壤对小麦幼苗体内可溶性糖和含氮量的影响

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摘要

以小麦为试材, 采用盆栽方法研究了模拟酸雨及其酸化土壤对小麦幼苗体内可溶性糖和含N量的影响. 结果表明, pH值为5.6、4.5、3.5、3.0和2.5的系列模拟酸雨引起了土壤酸化和盐基流失. 当模拟酸雨的pH值由5.6下降到2.5时, 被淋溶土壤的pH值由6.06下降到3.41, 土壤

中交换性盐基总量从56.5下降到41.1 mmol·kg⁻¹. 将小麦幼苗栽培在该系列酸化土壤上, 并分别用5种不同pH值的模拟酸雨喷淋地上器官, 导致小麦幼苗体内的可溶性糖含量、含N量迅速下降, 某些生理活动降低. 其中, 模拟酸雨喷淋对小麦幼苗茎叶可溶性糖含量、含N量、叶绿素含量以及光合速率的影响大于酸化土壤对其产生的影响. 而酸化土壤对小麦幼苗根系中可溶性糖含量、含N量、硝酸还原酶(NR)和谷氨酸合成酶(GOGAT)活性的影响大于模拟酸雨喷淋的影响. pH≤3.0的高强度酸雨以及由其产生的酸化土壤(T4、T5土壤)对小麦幼苗的碳素代谢和氮素代谢具有明显的抑制作用.

关键词 [模拟酸雨, 可溶性糖, 含N量, 光合速率, 硝酸还原酶](#)

分类号

Effects of simulated acid rain and its acidified soil on soluble sugar and nitrogen contents of wheat seedlings

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Abstract

The study showed that the cation release of simulated rain caused soil acidification and base ions release. With the decrease of simulated acid rain pH from 5.6 to 2.5, the acid rain leached soil pH decreased from 6.06 to 3.41, and its total amount of exchange base ions decreased from 56.5 to 41.1 mmol·kg⁻¹. Spraying simulated acid rain on the shoots of wheat seedlings planted on such acidified soils caused a rapid decrease in the soluble sugar and nitrogen contents of wheat seedlings, and reduced some of their physiological activities. The effect of spraying simulated acid rain on the soluble sugar, nitrogen, and chlorophyll contents and photosynthetic rate of wheat stems and leaves was larger than that of acidified soil, while the effect of the latter on the soluble sugar and nitrogen contents and the physiological activity of NR and GOGAT in root system of wheat seedlings was larger than that of the former. The intensive acid rain of pH≤3.0 and the corresponding acidified soil had an obvious harm to the growth and physiological activity of wheat seedlings.

Key words [Simulated acid rain](#) [Soluble sugar](#) [Nitrogen content](#) [Photosynthetic rate](#) [Nitrate reductase](#)

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