

研究报告

土壤水分亏缺条件下根源信号ABA参与作物气孔调控的数值模拟

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摘要

建立了根系吸水模型和根源ABA参与作物气孔调控过程相耦合的气孔导度模型, 该模型在根源信号ABA的产生项中考虑了根系吸水影响函数和根系密度分布函数. 利用该耦合模型模拟大田状况下根源ABA参与玉米气孔行为调控过程, 结果表明, 由于充分考虑了根区土壤水势和土壤中根长密度分布对根系吸水的影响, 较好地反映了土壤不同层次根系吸水强度, 更为确切地描述了当土壤水分亏缺时, 根系合成ABA的量、各层根系蒸腾流中ABA浓度、木质部ABA浓度以及最终ABA参与对气孔行为的调控作用.

关键词 [ABA](#) [气孔导度](#) [根系吸水模型](#)

分类号

Mathematical simulation of stomatal regulation involving root-sourced signaling ABA under soil drought condition

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Abstract

A stomatal conduction model consisting of root water uptake model and stomatal control model under the participation of root sourced signal ABA was developed in this paper, which considered the root water uptake effect function and root length density distribution function during root-sourced signal production. This model was used to simulate the course of maize stomatal conduction controlled by the root-sourced signal in field. The results showed that owing to the considering of the influence of root water uptake effect function and root length density distribution in soil profile, this model could more accurately depict the intensity of root water uptake, the ABA concentration produced in root system, the root ABA concentration in different soil layers and in xylem, and the controlling process of plant stomatal regulation by root sourced ABA.

Key words [ABA](#) [Stomatal conductance](#) [Root water uptake model](#)

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