

基于辐射照度的作物冠层光分布计算系统设计 Calculation System of Light Distribution within Crop Canopy Based on Radiosity Method

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摘要: 以玉米为例,使用C++语言和OpenGL图形函数库,在Windows平台下,开发基于辐射度-图形学结合模型(RGM)的作物冠层光分布计算系统。以相对成熟的RGM方法提取模型参数,并针对作物冠层特点对方法做适当改进。在冠层三维模型基础上,通过用户交互指定参数,可计算出冠层内每个面元的光分布状态。该系统所需模型参数少,且参数均具有较为明确的植物学和农学意义,便于与传统作物模型相结合,操作界面友好、使用方便。In order to provide an effective tool for light distribution calculation within crop canopy on Windows platform, a light distribution calculation system derived from RGM model was developed using C++ language and OpenGL library. A maize canopy geometrical model was taking as the experimental example. Parameters were selected on the basis of feasible RGM model. The related methods were improved according to the characteristics of crop canopy. On the basis of 3-D maize canopy model, the light distribution situation of each organ facet could be calculated in real time by using parameters input via human-computer interaction. The system had user-friendly interface and was easy to operate. It only needed few input parameters and most parameters were meaningful in botany and agriculture.

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