

组培苗光合速率测量系统的研制与试验

Design and trial on the measuring system for photosynthesis rate of plantlets in vitro

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中文摘要:

光合生长模型是组培微环境调控的依据, 组培苗光合速率测量系统是定量研究生长模型所必备的实验装置。现有成熟的植物光合速率测量系统, 如Li-6400不能适用于组培苗的测量。该文在综合分析国外现有测量系统的基础上, 兼顾国内在大型组培育苗设施类型选择上的经济可行性, 采用CO₂传感器和自动控制技术, 研制了半开放式组培苗光合速率测量系统。该系统自动化程度高, 能够实现整个生长过程在线连续测量, 测量误差小, 不干扰组培微环境, 数据真实性好, 所建立的光合模型可以直接应用于半开放式组培设施环境的调控系统。以阶段III甘薯组培苗为实验材料, 采用本测量系统对其第8 d的光合速率进行了测定, 并建立了CO₂浓度和光合光子通量密度的2因子光合生长模型。

英文摘要:

The photosynthetic growth model for plantlets in vitro is the basis for its micro-environment control, the measuring system for photosynthesis rate of plantlets in vitro is the vital equipment for developing the growth model. There are some existing measuring systems for photosynthesis rate of plants, such as Li-6400, but they cannot be used for plantlets in vitro. In this paper, based on the analyses of the existing equipment and the consideration of the feasibility in type choice in the large-scale facilities for plant tissue culture, a half-opened measuring system for photosynthesis was designed and developed. It can work in real time automatically and reliably and continuously, and has no disturbance to the micro-environment. The data from the system can reveal the plantlets growth in truth, and so it can be used directly in micro-environmental control system. By using the system, the photosynthetic rate on 8th day for the Ipomoea batatas(L.)lam plantlets on stage III in vitro was measured, and then, the photosynthetic growth model related to 2 factors of CO₂ concentration and photosynthetic photo flux density was developed.

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