

Nitrogen Shortage in a Tomato Crop; Scaling up from Effects on Electron-Transport Rate to Plant Productivity

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Optimization of nitrogen supply in a tomato plant is stepwise assessed, from chloroplast characteristics to whole crop performance. Experiments are reported in which important key processes are quantified in relation to the nitrogen content of leaves. Interactions of N effects with leaf aging and canopy light distribution are analyzed.

A simulation model that integrates this knowledge is constructed. The results of three nitrogen partitioning scenarios for Rubisco suggest that optimization of the distribution of Rubisco between leaf layers is less important for plant productivity than within-leaf optimization of the photosynthetic apparatus.