



## Quantifying and Understanding Plant Nitrogen Uptake for Systems Modeling

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# **Quantifying and Understanding Plant Nitrogen Uptake for Systems Modeling**

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**Discusses New Advancements to Improve Existing Simulations of Plant Nitrogen**

Written by research pioneers and leading scientists in the area of agricultural systems, **Quantifying and Understanding Plant Nitrogen Uptake for Systems Modeling** comprehensively covers plant N uptake in agricultural system models, especially for building soil-plant system models.

The text illustrates how to minimize the transportation of nitrogen fertilizers in crop production to surface and ground waters, as even moderate errors in uptake estimations lead to a dramatic increase in the amount of nitrogen leached into groundwater. It also highlights the knowledge gaps preventing correct simulation of this process and explains what to look for when using a system model and interpreting simulation results.

**Applies to a Variety of Crops, Including Oilseed, Wheat, Potatoes, and Maize**

Addressing quantification and synthesis in the context of system modeling, this text introduces cutting-edge and original information regarding N uptake not previously offered by other research texts in the field. This, in turn, benefits scientists, professors, system modelers, and model users in interpreting modeling results for enhancing nitrogen management and developing decision support tools.

This volume documents, with complex, detailed models, plant N uptake based on absorption kinetics of transporters across the root cell membranes, mass flow, and diffusion to the root surface of single or composite roots. It also provides simpler models used in N uptake simulations at the field and watershed scales.

## **Discusses All Areas of the Complex Process**

In addition to the important processes of nitrogen translocation, remobilization, and grain protein formation, the book documents various philosophies, mechanisms, and scales in simulating plant N uptake in agricultural system models, while providing an extensive review of the uptake of dissolved organic nitrogen by plants in ecosystems.



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