

**ABOVE-GROUND PROCESSES  
IN THE ARS COTTON MODEL**

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**Abstract**

The new ARS cotton model has been developed by combining the best features of three earlier ARS cotton models with recent experimental results and new modeling tools. Model modularity and genericness were facilitated by using an object-oriented design programmed in C++. Every organ on the plant is represented separately. Most processes are simulated at the plant level. Photosynthesis, transpiration, plant-water relations and nitrogen uptake are calculated hourly while development, potential growth, partitioning, actual growth, abscission, and effects of spray applications are calculated daily. The basic element of plant structure is the nodal unit, consisting of an internode and the organs attached to its base (leaf, branch) and tip (fruit). All organs on the plant can be accessed by sending a command to the first mainstem nodal unit. Each nodal unit then passes on the commands to adjacent nodal units on the plant. An external file of cultivar characteristics allows the model to be adjusted for specific cultivars. The model was fully documented as it was developed.