

Adapt-N: A New Tool for Adaptive N Management for Corn

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In the past three years, we sent out N sidedress recommendations for corn that suggested adjustments to the standard Cornell recommendations based on early-season weather conditions. They were made for 15 regions in New York State based on model simulations and the suggested adjustments have ranged from –40 to +40 lbs/ac. We have now developed a web-based decision support tool (*Adapt-N*), that provides field-specific sidedress N recommendations. The *Adapt-N* tool represents a new approach in decision management by combining the use of the PNM (*Precision Nitrogen Management*) model with the most up-to-date high-resolution climate data. It involves advanced computational methods that can be employed through a relatively simple web interface.

This is how *Adapt-N* works: Users will generally use the tool shortly before sidedress application by accessing it on the web at <http://adapt-n.eas.cornell.edu/>. You then enter a user ID, field ID, longitude and latitude, and simple inputs related to soils, tillage, N management (manure, sod and fertilizer), and crop management via the interface.. The model is then run in real-time and outputs a recommended N sidedress rate. The tool also provides users with information on changes in soil N and crop N uptake. A key attribute of the *Adapt-N* tool is automatic access to the most up-to-date high resolution climate data that drive the PNM model. Weather data are highly variable over the landscape and, until this year, we have not had climate data at a sufficiently fine spatial resolution to use for N management on a field-specific basis. To overcome this limitation, the Northeast Regional Climate Center and the Cornell Center for Advanced Computing have developed methods to produce and distribute high resolution (4 x 4 mile gridded) temperature and precipitation data for the Northeast. These data are updated daily on advanced database servers and can be automatically accessed by the *Adapt-N* tool for the location (longitude and latitude) inputted by the user.

The *Adapt-N* tool was developed based on our research (Sogbedji et al., 2001; Kahabka et al., 2004) and that of others (e.g., Kay et al., 2006) indicating that variation in soil N associated with early season weather contributes to the well-documented variability in economic optimum corn N rates. The *Adapt-N* tool and the underlying PNM model have been calibrated and tested for manured and non-manured corn production systems for a range of soil types in New York State (Sogbedji et al., 2001a, 2001b, 2006). Simulating early-season soil N levels with high-resolution climate data therefore allows for quite precise estimates of sidedress N needs and can improve N use efficiency in corn production systems (whether involving manure applications or not). Cornell University is the first to offer an adaptive N management tool, and we encourage its use to increase farm profitability and reduce environmental impacts. For questions, please contact Jeff Melkonian at jjm11@cornell.edu.

References:

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