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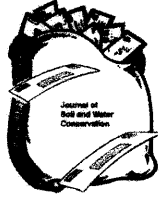
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Letters to the Editor

Use of Formal Numerical Integration Methods is Welcome

Arndt, C., B. Fecso, P.V. Preckel, and B. Stoneman 2001. *Soil selection for use*

in environmental analysis. Journal of Soil and Water Conservation 56 (2):165–171.

Arndt et al. (2001) introduced formal numerical integration to model erosion and runoff. This is a welcome—if not overdue—advancement. By using formal methods, accurate estimates with known error bounds can be obtained. Their method maintains certain distributional (frequency or probability) properties (e.g., means and variances) of the joint distribution of soil attributes. In other applications where expectations are computed, this approach produces accurate estimates with relatively few model evaluations, as Arndt et al. find with erosion and runoff.

However, this method has some difficulties. For distributions with one variable, software routines are available for computing these approximations, called Gaussian quadrature. Such routines are not available for generating multivariate, moment-preserving quadratures, called Gaussian cubatures (GC). So, researchers must write their own routines with optimization software. The increased time to generate cubatures may be offset by the reduced number of model evaluations when compared to less formal methods (e.g., Monte Carlo). Additionally, GCs

can generate extremely large errors when functions are ill-behaved. Detecting these errors can be difficult when using software packages such as EPIC.

Overcoming these difficulties may be worth any additional effort when it is critical to accurately predict outcomes associated with policy and management decisions.

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A Few Concerns

Mizuba, M.M. and J.E. Hammel. 2001. *Infiltration rates in fall-seeded winter wheat fields following preplant subsoil tillage. Journal of Soil and Water Conservation* 56(2):132–136.

I am encouraged by Mizuba and Hammel's work on increasing infiltration rates with subsoil tillage. This should add to the limited information published on this subject. However, having results from the fall of one year and spring of the next in just one study concerns me. This is very limited data to make sound conclusions.

It has been my observation that anytime tillage work of any kind is done, several years of data is needed before we know the consistency of any management technique. It appears the study area needs to be larger to accommodate a 1 m containment ring. Data accuracy would likely

be improved.

The article does not mention where any tillage was performed after the ripping process and before wheat planting. Should readers assume no additional tillage was necessary? We were also not told why the shank spacing and depth of operation with the paratill and subsoil tillage implementation were not the same. The difference between paratill and deep ripping was not significant. Also, the spring measurements showed the infiltration rate behind the deep rip shank to be significantly better than anything else. I'm not convinced the conclusions are totally accurate.

One significant item that was not addressed, but should have been, was the economics of such an operation. Will the benefits outweigh the costs? We are not told.

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Editor's Note:

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