JOURNAL OF SOIL AND WATER
Conservation
THIRD QUARTER 2001 VOLUME 56, NUMBER 3

On the cover
Iowa NRCS photo by Lynn Betts
June 1997

STATEMENT OF OWNERSHIP, MANAGEMENT, AND CIRCULATION

IA. Title of Publication: Journal of Soil and Water Conservation
IB. Publication Number: 0282-8800 **2. Date of Filing:** September 31, 2001 **3. Frequency of Issue:** Four times per year in January, April, July, October **3A. Number of Issues Published Annually:** Four **3B. Annual Subscription Price:** $55 **4. Complete Mailing Address of Known Office of Publication:** 7515 Northeast Ankeny Road, Ankeny, Iowa 50021-9764 (Polk County) **5. Complete Mailing Address of the Headquarters of General Business Offices of the Publisher:** 7515 Northeast Ankeny Road, Ankeny, Iowa 50021-9764 **6. Names and Complete Addresses of Publisher, Editor and Managing Editor:** Publisher: Soil and Water Conservation Society, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021-9764. Editor: Deb Happe-vonArb, Soil and Water Conservation Society, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021-9764 **7. Owner:** Soil and Water Conservation Society, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021-9764; Polk County. **8. Known Bondholders, Mortgages, and Other Security Holders Owning of Holding 1 Percent or More of Total Amount of Bonds, Mortgages or Other Securities:** None **9.** The purpose, function, and non-profit status of this organization and the exempt status for federal income tax purposes has not changed during the past 12 months **10. Extent and Nature of Circulation:**

	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
A. Total No. Copies Printed (net press run)	4,850	5,000
B. Paid and/or Requested Circulation	3,969	4,264
1. Sales through Dealers and Carriers, Street Vendors, and Counter Sales (Not Mailed)	0	0
2. Paid or Requested Mail Subscriptions		
C. Total Paid and/or Requested Circulation	3,969	4,264
D. Free Distribution by Mail (Samples, Complimentary, and Other Free)		
E. Free Distribution Outside Mail		
F. Total Free Distribution		
G. Total Distribution	3,969	4,264
H. Copies Not Distributed	881	736
1. Office Use, Left Over, Spoiled		
2. Returns from News Agents		
I. Total	4,850	5,000
Percent Paid and/or Requested Circulation	100%	100%

II. I certify that the statements made by me above are correct and complete.
Deb Happe-vonArb, Communications Director, Soil and Water Conservation Society

Journal of Soil and Water Conservation (ISSN 0022-4561) is published four times a year in January, April, July, October by the Soil and Water Conservation Society, 7515 N.E. Ankeny Road, Ankeny, Iowa 50021-9764. Periodicals postage paid at Ankeny, Iowa, and additional mailing offices. POSTMASTER: Send address changes to *Journal of Soil and Water Conservation*, 7515 N.E. Ankeny Road, Ankeny, Iowa 50021-9764. Address all editorial and business correspondence to *Journal of Soil and Water Conservation*, 7515 N.E. Ankeny Road, Ankeny, Iowa 50021-9764; telephone (515) 289-2331; fax (515) 289-1227. Subscription is by membership in the Soil and Water Conservation Society or by subscription. Membership dues are $60 a year ($75 outside the United States and Canada); individual subscriptions are $54 a year ($67 outside the United States and Canada). Institutional subscription rates are $64 and $83. Page charges are assessed to published authors.

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. Junior 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 implement 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.

Carlyle A. Thompson
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Editor's Note:

"Letters to the Editor" are a forum for Journal *readers and should be no longer than 200 words. If you have a comment on any of the articles or viewpoints, you may address those comments to: Editor,* Journal of Soil and Water Conservation, *7515 NE Ankeny Rd, Ankeny, IA 50021–9764. Or you can email your comments to pubs@swcs.org.*