

JOURNAL OF ANIMAL SCIENCE

Curtiss M. Bailey, *Editor-in-Chief* (1987)
Denise L. York, *Assistant Editor*

SECTION EDITORS

Lloyd L. Anderson, *Physiology and Endocrinology* (1986)
Terry D. Etherton, *Growth and Developmental Biology* (1986)
John E. Garst, *Pharmacology and Toxicology* (1986)
Robert M. Koch, *Breeding and Genetics* (1987)
B. Bruce Marsh, *Meat Science* (1986)
R. L. Preston, *Applied Animal Science* (1987)
Theron S. Rumsey, *Ruminant Nutrition* (1987)
Richard C. Wahlstrom, *Nonruminant Nutrition* (1986)

EDITORIAL BOARD

David B. Batson (1987)	Ralph L. Fogwell (1986)	Russell B. Muntifering (1987)
Dale E. Bauman (1986)	John C. Forrest (1987)	Merlyn K. Nielsen (1987)
Larry L. Berger (1986)	Dale M. Forsyth (1986)	Richard F. Olsen (1987)
Thomas D. Bidner (1986)	Donald E. Franke (1988)	Donald L. Palmquist (1987)
R. Dean Boyd (1988)	George F. Fries (1986)	John A. Paterson (1986)
James S. Brinks (1988)	Rodney D. Geisert (1988)	Mark K. Petersen (1987)
Jack H. Britt (1987)	L. Wayne Greene (1986)	W. E. Pinchak (1988)
Kenneth L. Bryant (1987)	Daniel R. Hagen (1987)	John E. Follak (1986)
David S. Buchanan (1986)	Andrew C. Hammond (1988)	Terry J. Prince (1987)
Leonard S. Bull (1987)	Gary J. Hausman (1986)	Richard W. Rice (1986)
W. Ronald Butler (1987)	Harold B. Hedrick (1987)	Melvin Riley (1987)
Howard H. Casper (1987)	John P. Hitchcock (1986)	Daniel M. Schaefer (1986)
Peter R. Cheeke (1988)	Katherine A. Houpt (1987)	Robert W. Seerley (1986)
N. Andy Cole (1988)	William A. House (1986)	D. C. Sharp III (1988)
George E. Combs (1987)	James J. Ireland (1987)	Stephen B. Smith (1987)
Glenn H. Coulter (1986)	George Jesse (1988)	Harold G. Spies (1986)
Thomas D. Crenshaw (1988)	James E. Kinder (1987)	Norman C. Steele (1988)
Michael E. Davis (1986)	Terry Kiser (1986)	James R. Stouffer (1987)
Mark A. Diekman (1987)	John Klindt (1987)	W. Ray Stricklin (1987)
Fred R. Ehle (1987)	Kreg A. Leymaster (1988)	James L. Voss (1987)
Eugene J. Eisen (1987)	Richard M. Luther (1986)	John C. Waller (1987)
Royce J. Emerick (1987)	John J. McGlone (1986)	Roger L. West (1986)
Richard C. Ewan (1988)	Ralph R. Maurer (1986)	James E. Williams (1987)
Thomas R. Famula (1987)	Charles V. Maxwell (1987)	Raymond W. Wright, Jr. (1986)
R. A. Field (1988)	John E. Moore (1986)	Richard A. Zinn (1987)
	William M. Moseley (1988)	

Terms expire on August 31 of year indicated

OFFICERS AND DIRECTORS OF THE AMERICAN SOCIETY OF ANIMAL SCIENCE

J. P. Fontenot, <i>President</i>	R. G. Zimbelman, <i>Director-at-Large</i>	L. L. Wilson, <i>Northeast Director</i>
R. L. Preston, <i>President-Elect</i>	H. D. Hafs, <i>Director-at-Large</i>	B. Baker, Jr., <i>Southern Director</i>
C. B. Theurer, <i>Secretary-Treasurer</i>	B. D. Moser, <i>Midwestern Director</i>	G. L. Cromwell, <i>Southern Director</i>
C. M. Bailey, <i>Editor-in-Chief</i>	S. E. Curtis, <i>Midwestern Director</i>	D. E. Ray, <i>Western Director</i>
I. T. Omtvedt, <i>Past-President</i>	G. P. Lynch, <i>Northeast Director</i>	R. C. Bull, <i>Western Director</i>

Membership. Application is invited from persons with interest in animal science and livestock production. Annual dues in the Society, which includes the Journal of Animal Science, are \$50.00. Student Affiliate Membership to those who are certified by a Professional member as a regularly enrolled college student who does not hold a full-time position at the time of application for, or annual renewal of, affiliate membership, \$25.00 annually which includes receipt of the Journal of Animal Science. Institutional members (including receipt of the Journal of Animal Science), \$65.00 per year. Airmail postage to members and subscribers in foreign countries is an additional \$90.00 annually. Applications for membership with remittance should be mailed to the American Society of Animal Science, 309 West Clark Street, Champaign, IL 61820.

Manuscripts. Address manuscripts and correspondence concerning them to the Editor-in-Chief, Curtiss M. Bailey, Animal Science Department, University of Nevada-Reno, Reno, NV 89557-0004. See "Information for Contributors" at the back of the journal for the standard requirements for journal papers.

News and Notes. Announcements about meetings, personnel changes and other items of interest to the Society may be sent directly to Curtiss M. Bailey, Animal Science Department, University of Nevada-Reno, Reno, NV 89557-0004.

Placement. All announcements of positions that are available and notices for those who are seeking employment should be sent directly to the American Society of Animal Science, Attn. Gayle Gleichman, 309 West Clark Street, Champaign, IL 61820.

Address Change and Missing Copies. Notice of change in address should be received by the Executive Secretary in advance of change. Claims for missing copies should be received within 30 days (90 days foreign) of publication date to ensure replacement copies at no charge.

Journal of Animal Science (ISSN 0021-8812) is published monthly (except semimonthly in August) by the American Society of Animal Science. Second-class postage paid at Champaign, IL 61820 and at additional mailing offices. Form 3579 to be returned to the American Society of Animal Science, 309 West Clark Street, Champaign, IL 61820. Copyright 1985 by American Society of Animal Science. Printed in USA. All rights reserved. Reproduction in part or whole prohibited. Boyd Printing Company, Inc., 49 Sheridan Avenue, Albany, NY 12210.