

23-SEP-1996 BLDSC BOSTON SPA  
WEED SCIENCE LS23 7BQ

\*ETOC

3-0030



9284.450000

VOL 44 PART 3

1/1

PB

18

# WEED SO

JOURNAL OF THE WEED SCIENCE SOCIETY OF AMERICA

VOLUME 44

JULY-SEPTEMBER 1996

NUMBER 3

## PHYSIOLOGY, CHEMISTRY, AND BIOCHEMISTRY

- Effect of Growth Stage and Environment on Foliar Absorption, Translocation, Metabolism, and Activity of Nicosulfuron in Quackgrass (*Elytrigia repens*). Joseph A. Bruce, J. Boyd Carey, Donald Penner, and James J. Kells ..... 447  
Root/Rhizome Exudation of Nicosulfuron from Treated Johnsongrass (*Sorghum halepense*) and Possible Implications for Corn (*Zea mays*). Nagabhushana G. Gubbiga, A. Douglas Worsham, and Frederick T. Corbin ..... 455  
Antagonism of Diclofop Control of Wild Oat (*Avena fatua*) by Tribenuron. Roger J. Baerg, John W. Gronwald, Charlotte V. Eberlein, and Robert E. Stucker ..... 461  
Adjuvant Effects on Imazethapyr, 2,4-D and Picloram Absorption by Leafy Spurge (*Euphorbia esula*). W. Mack Thompson, Scott J. Nissen, and Robert A. Masters ..... 469  
Two Distinct Alleles Encode for Acetyl-CoA Carboxylase Inhibitor Resistance in Wild Oat (*Avena fatua*). Bruce G. Murray, Anita L. Brûlé-Babel, and Ian N. Morrison ..... 476  
Absorption and Translocation of Glyphosate in Aspen (*Populus tremuloides* Michx.) as Influenced by Droplet Size, Droplet Number, and Herbicide Concentration. Shu Hua Liu, Robert A. Campbell, John A. Studens, and Robert G. Wagner ..... 482  
Influence of Adjuvants and Desmedipham plus Phenmedipham on Velvetleaf (*Abutilon theophrasti*) and Sugarbeet Response to Triflusulfuron. Robert J. Starke, Karen A. Renner, Donald Penner, and Frank C. Roggenbuck ..... 489

## WEED BIOLOGY AND ECOLOGY

- A New Approach To Determine When to Control Weeds. Antonio Berti, Claudio Dunan, Maurizio Sattin, Giuseppe Zanin, and Philip Westra ..... 496  
Scouting for Weeds, Based on the Negative Binomial Distribution. Harvey J. Gold, Jeff Bay, and Gail G. Wilkerson ..... 504  
Canopy Measurements as Predictors of Weed-Crop Competition. J. I. Vitta and C. Fernandez Quintanilla ..... 511  
Herbicide Susceptibility and Biological Fitness of Triazine-Resistant and Susceptible Common Lambsquarters (*Chenopodium album*). Robert J. Parks, William S. Curran, Gregory W. Roth, Nathan L. Hartwig, and Dennis D. Calvin ..... 517  
Temperature Thresholds for Bud Sprouting in Perennial Weeds and Seed Germination in Cotton. Jodie S. Holt and Deborah R. Orcutt ..... 523  
Postdispersal Predation of Velvetleaf (*Abutilon theophrasti*) Seeds. John Cardina, Heather M. Norquay, Benjamin R. Stinner, and David A. McCartney ..... 534  
Existence of Ecotypes Among Populations of Entireleaf Morningglory (*Ipomoea hederacea* var. *integriuscula*). Tracy E. Klingaman and Lawrence R. Oliver ..... 540  
Simulation of Competition for Photosynthetically Active Radiation Between Common Ragweed (*Ambrosia artemisiifolia*) and Dry Bean (*Phaseolus vulgaris*). David Chikoye, Leslie A. Hunt, and Clarence J. Swanton ..... 545  
Parametric Sequential Sampling Based on Multistage Estimation of the Negative Binomial Parameter  $k$ . Gregg A. Johnson, David A. Mortensen, Linda J. Young, and Alex R. Martin ..... 555  
Littleseed Canarygrass (*Phalaris minor*) and Short-spiked Canarygrass (*Phalaris brachystachys*) Interference in Wheat and Barley. Catherine G. Afentouli and I. G. Eleftherohorinos ..... 560  
Total Nonstructural Carbohydrates and Regrowth in Honey Mesquite (*Prosopis glandulosa*) Following Hand Defoliation or Clopyralid Treatment. Harry T. Cralle and Rodney W. Bovey ..... 566  
Environmental Factors Affecting Germination of Tropical Soda Apple (*Solanum viarum*). Rais U. Akanda, J. Jeffrey Mullahey, and Donn G. Shilling ..... 570  
Growth and Development of Wild Poinsettia (*Euphorbia heterophylla*) Selections in Peanut (*Arachis hypogaea*). Barry J. Brecke and Piotr Tobola ..... 575

LOAN BAN EXPIRES

24 MAR 1997

Allelopathic Influence of Germinating Seeds and Seedlings of Cover Crops on Weed Species. <b>Melinda L. Hoffman, Leslie A. Weston, John C. Snyder, and Emilie E. Regnier</b>	579
<b>WEED MANAGEMENT</b>	
Reduced Rates of Preemergence and Postemergence Herbicides for Large Crabgrass ( <i>Digitaria sanguinalis</i> ) and Goosegrass ( <i>Eleusine indica</i> ) Control in Bermudagrass ( <i>Cynodon dactylon</i> ). <b>B. Jack Johnson</b>	585
Modeling the Economics of Controlling Nodding Broomrape ( <i>Orobanche cernua</i> ) in Sunflower ( <i>Helianthus annuus</i> ). <b>L. García-Torres, M. Castejón-Muñoz, M. Jurado-Expósito, and F. López-Granados</b>	591
Potential of Rye ( <i>Secale cereale</i> ) for Weed Management in Transplant Tomatoes ( <i>Lycopersicon esculentum</i> ). <b>Reid J. Smeda and Stephen C. Weller</b>	596
Predisposition of Melaleuca ( <i>Melaleuca quinquenervia</i> ) to Invasion by the Potential Biological Control Agent <i>Botryosphaeria ribis</i> . <b>Min B. Rayachhetry, George M. Blakeslee, and Ted D. Center</b>	603
Growth and Competitiveness of Common Lambsquarters ( <i>Chenopodium album</i> ) after Foliar Application of <i>Ascochyta caulinis</i> as a Mycoherbicide. <b>Corné Kempenaar, Petra J. F. M. Horsten, and Piet C. Scheepens</b>	609
Postemergence AC 263,222 Systems for Weed Control in Peanut ( <i>Arachis hypogaea</i> ). <b>John W. Wilcut, John S. Richburg, III, Gerald L. Wiley, and F. Robert Walls, Jr.</b>	615
Economic Evaluation of Field Bindweed ( <i>Convolvulus arvensis</i> ) Control in a Winter Wheat-Fallow Rotation. <b>Allen F. Wiese, Clay D. Salisbury, Brent W. Bean, Monty G. Schoenhals, and Steve Amosson</b>	622
Leafy Spurge ( <i>Euphorbia esula</i> ) Genotype Affects Gall Midge ( <i>Spurgia esulae</i> ) Establishment. <b>Rodney G. Lym, Scott J. Nissen, Martha L. Rowe, Donald J. Lee, and Robert A. Masters</b>	629
Interaction Between Wheat ( <i>Triticum aestivum</i> ) and Diclofop to Reduce the Cost of Annual Ryegrass ( <i>Lolium rigidum</i> ) Control. <b>Deirdre Lemerle, Birgitte Verbeek, and Neil E. Coombes</b>	634
Investigations into the Growth Suppressing Effect of Nicosulfuron-Treated Johnsongrass ( <i>Sorghum halepense</i> ) on Corn ( <i>Zea mays</i> ). <b>Nagabhushana G. Gubbiga, A. Douglas Worsham, and Frederick T. Corbin</b>	640
Biological Control of Kudzu ( <i>Pueraria lobata</i> ) with the Plant Pathogen <i>Pseudomonas syringae</i> pv. <i>phaseolicola</i> . <b>Nina K. Zidack and Paul A. Backman</b>	645
Multi-Year Validation of a Decision Aid for Integrated Weed Management in Row Crops. <b>Frank Forcella, Robert P. King, Scott M. Swinton, Douglas D. Buhler, and Jeffrey L. Gunsolus</b>	650
<b>SOIL, AIR, AND WATER</b>	
Impact of Vegetative Filter Strips on Herbicide Loss in Runoff from Soybean ( <i>Glycine max</i> ). <b>Eric P. Webster and David R. Shaw</b>	662
Primsulfuron and Rimsulfuron Degradation in Aqueous Solution and Adsorption in Six Colorado Soils. <b>Alberto Vicari, Robert L. Zimahl, Brian K. Cranmer, and Giovanni Dinelli</b>	672
Sorption of Bentazon and Degradation Products in Two Mississippi Soils. <b>Lewis A. Gaston, Martin A. Locke, Steven C. Wagner, Robert M. Zablotowicz, and Krishna N. Reddy</b>	678
Detection and Dissipation of Isoxaben and Trifluralin in Containerized Plant Nursery Runoff Water. <b>C. Wilson, T. Whitwell, and M. B. Riley</b>	683
Comparison of Solid Phase Extraction Techniques for Herbicides. <b>Melissa B. Riley and Renee J. Keese</b>	689
Effect of Thiazopyr in Soybean Growth and Dissipation in Soil. <b>Thomas C. Mueller and Robert M. Hayes</b>	694
Effect of Crop Presence on Persistence of Atrazine, Metribuzin, and Clomazone in Surface Soil. <b>Kent Gallaher and Thomas C. Mueller</b>	698
<b>SPECIAL TOPICS</b>	
Spatial and Temporal Analysis of Weed Seedling Populations Using Geostatistics. <b>Gregg A. Johnson, David A. Mortensen, and Carol A. Gotway</b>	704
Herbicide Effects on <i>Rhizoctonia solani</i> In Vitro and Rhizoctonia Foliar Blight of Soybean ( <i>Glycine max</i> ). <b>D. David Black, John S. Russin, James L. Griffin, and Johnnie P. Snow</b>	711
<b>SYMPOSIUM</b>	
Structure-activity Relationships: Approaches to Herbicide Design. <b>Tracy M. Sterling</b>	717
Computer Assisted Molecular Design: Overview of Modern Techniques in Quantitative Structure Activity Relationships (QSAR). <b>Roy Vaz</b>	718
Biochemical Approaches to Herbicide Discovery: Advances in Enzyme Target Identification and Inhibitor Design. <b>Lynn M. Abell</b>	734
Quantifying the Inhibitor-Target Site Interactions of Photosystem II Herbicides. <b>John L. Huppertz</b>	743
Phloem Mobility of Xenobiotics. VII. The Design of Phloem Systemic Pesticides. <b>Daniel A. Kleier and Francis C. Hsu</b>	749
Translation of <i>In Vitro</i> Activity to <i>In Vivo</i> Activity: Lessons from the Triazoloypyrimidine Sulfonanilides. <b>B. Clifford Gerwick, Csaba T. Cseke, Gerry Deboer, William A. Kleschick, and Paul R. Schmitzer</b>	757
Errata	762

# WEED SCIENCE

Published four times a year by the Weed Science Society of America

Robert L. Zimdahl, *Editor*

## Associate Editors

- James D. Burton, North Carolina State University, Box 7609, Raleigh, NC 27695  
Michael E. Foley, Botany and Plant Pathology, Purdue University, 1155 Lilly Hall of Life Science, West Lafayette, IN 47907-1155  
Clifford Gerwick, Natural Products Discovery, DowElanco, 9330 Zionsville Rd., Indianapolis, IN 46268  
Nicholas Jordan, Agronomy & Plant Genetics, University of Minnesota, 1991 Buford Circle, St. Paul, MN 55108  
Robert Hartzler, Iowa State University, 2104 Agronomy Hall, Ames, IA 50011  
Robert J. Kremer, USDA-ARS, 144 Mumford Hall, University of Missouri, Columbia, MO 65211  
Martin Locke, Southern Weed Science Lab., USDA-ARS, P.O. Box 350, Stoneville, MS 38776  
Tom Mueller, Plant/Soil Science Department, University of Tennessee, P.O. Box 1071, Knoxville, TN 37901-1071  
Karen Ann Renner, Crop & Soil Sciences, Michigan State University, 466 Plant/Soil Science Bldg., East Lansing, MI 48824  
Dale L. Shaner, American Cyanamid Company, P.O. Box 400, Princeton, NJ 08540  
Clarence J. Swanton, Crop Science Department, University of Guelph, Guelph, ON, Canada N1G 2W1  
Susan E. Weaver, Agriculture Canada, Research Station, Harrow, ON, Canada N0R 1G0  
Lori J. Wiles, Great Plains System Research, USDA-ARS, 301 South Howes, Room 353, Fort Collins, CO 80522  
Robert G. Wilson, Panhandle Station, University of Nebraska, 4502 Avenue I Panhandle Sta., Scottsbluff, NE 69361

Gayle Rodcay, *Technical Editor*

## Reviewers

Yuguang Bai	David Johnson	Wondi Mersie	Emilie Regnier	M. K. Upadhyaya
Todd Baughman	Wayne Keeling	Todd L. Mervosh	Jill Schroeder	Mark VanGessel
Roger Becker	Carol Mallory-Smith	David A. Mortensen	Reid Smeda	Glenn Wehtje
Robert E. Blackshaw	Diane R. Manthey	Michael Owen	Tracy Sterling	Leslie A. Weston
William Dyer	Bruce Maxwell	Krishna Reddy	Thomas Tworkoski	John Wilcut

## Officers of the Weed Science Society of America

- Stephen O. Duke, *President*  
Calvin G. Messersmith, *President-Elect*  
F. Dan Hess, *Vice President*  
James L. Barrentine, *Past President*  
Jodie S. Holt, *Secretary*  
Laura L. Whatley, *Treasurer*  
Ann Légère, *Editor-in-Chief*  
Robert A. Schmidt, *Executive Secretary*

Horace D. Skipper, *Chair, Constitution and Operating Procedures*

Weed Science (ISSN 0043-1745) is an official publication of the Weed Science Society of America, 1508 West University Ave., Champaign, IL 61821-3133 (AC/217-352-4212). It contains refereed papers describing the results of research that elucidates the nature of phenomena relating to all aspects of weeds and their control. It is published quarterly, one volume per year, four issues per year beginning in January.

Membership is \$75 per year, student affiliate membership \$30, which includes receipt of *Weed Science*, *Weed Technology*, and *WSSA Newsletter*. Dues should be sent to WSSA, 1508 West University Ave., Champaign, IL 61821-3133 not later than December 1 of each year. Membership in the society is on a calendar-year basis only.

Subscriptions (institutions, libraries, etc.) are \$125 per year, one volume per year of four issues beginning in January. New subscriptions and renewals begin with the first issue of the current volume and should be sent to WSSA, 1508 West University Ave., Champaign, IL 61821-3133.

Change of address affecting the mailing list for members, students, and subscribers, inquiries about copies lost in the mail, requests for back issues, and all matters pertaining to the receipt of the Journal, membership and subscription information should be sent to WSSA, 1508 West University Ave., Champaign, IL 61821-3133. Claims for copies lost in the mail must be received within 30 days (90 days foreign) of the date of issue to insure replacement at no charge.

Manuscripts must be sent to the Editor, Robert L. Zimdahl, Weed Research Laboratory, Colorado State University, Fort Collins, CO 80523. Directions for contributors are published in the October–December issue of *Weed Science*. Authors are asked to pay \$50 (member) or \$100 (nonmember) per page charge as a portion of the cost of publication. The Editor can make exceptions in advance when justified.

The Weed Science Society of America fully subscribes to the belief that progress in science depends upon the sharing of ideas, information, and materials among qualified investigators. Authors of papers published in *Weed Science* are therefore encouraged, whenever practicable and when state and federal laws permit, to share genotypically unique, propagative materials they might possess with other workers in the area who request such materials for the purpose of scientific research.

*Weed Science* published by the Weed Science Society of America.

Periodical postage paid at Champaign, IL and at additional mailing offices.

Copyright 1996 by the Weed Science Society of America. Printed in USA.

All rights reserved. Reproduction in part or whole prohibited.

POSTMASTER: Send address changes to WSSA, 1508 West University Ave., Champaign, IL 61821-3133.

**Sustaining Members**  
**WEED SCIENCE SOCIETY OF AMERICA**  
**May 16, 1996**

**Patron**

American Cyanamid Company  
BASF Corporation  
DuPont Agricultural Products  
ISK Bioscience Corporation  
Monsanto Agricultural Company  
Sandoz Crop Protection  
Valent USA Corporation  
Zeneca Ag Products

**Contributing**

AgrEvo USA Company  
Bayer Corporation  
Compliance Service Int'l., Inc.  
FMC Corporation Ag Chem Group  
Griffin Corporation  
Terra Chemical Int'l. Inc.

**Associate**

ABC Laboratories  
Agri-Growth Research Inc.  
Agvise Laboratories  
Allen Machine Works  
ALMACO Company  
American Agricultural Services  
The Andersons  
Astrix  
Burch Company

Cenex/Land O'Lakes  
Chemorse Ltd.  
Ciba-Geigy Canada Ltd.  
Ciba-Geigy Corporation  
CIRTA  
Concord Environmental Equipment  
Decagon Devices, Inc.  
Deere & Company Tech. Center  
EPL Bio-Analytical Services  
Gandy Corporation  
Growmark Inc.  
Gylling Data Management Inc.  
Heartland Technologies Inc.  
Kincaid Equipment Manufacture Corp.  
LABServices  
LI-COR Inc.  
MARATHON Ag/Environmental  
Minnesota Valley Testing Lab.  
Mycogen Corporation  
Nissan Chemical America Group  
PBI/Gordon Corporation  
R & D Sprayers, Inc.  
Research Options Inc.  
Rhone-Poulenc Ag Company  
Rohm & Haas Company  
The Scotts Company  
Spraying Systems Company  
Stewart Agric. Research Services  
Sumitomo Chemical America, Inc.  
Uniroyal Chemical Company  
United Agri Products  
Weed Systems Equipment, Inc.