

**LOAN BAN** EXPIRES 29 APR 2000

# Weed Science

Journal of the Weed Science Society of America

29-OCT-1999 BSDS BOSTON SPA  
WEED SCIENCE LS23 78Q



9284.450000

VOL 47 PART 4

~~\*ETOC~~

1/1



**Volume 47 Number 4**  
**JULY-AUGUST 1999**

ISSN 0043-1745

# WEED SCIENCE

*Published six times a year by the Weed Science Society of America*

Robert L. Zimdahl, *Editor*

*Weed Science* accepts for review manuscripts describing original research on the biology, ecology, physiology, or management of weeds; and on herbicides, plant growth regulators, environmental issues, and other topics directly related to the science of weed management. Original research encompasses scholarship of discovery that brings forth new data, scholarship of integration that weaves knowledge into new patterns, and scholarship of application in which intellectual work applies existing knowledge.

Each published manuscript must be written as a logical unit that contributes to the advancement of scientific knowledge. Manuscripts should advance the conceptual framework of the science of weed management. Symposia papers and reviews are accepted.

## Associate Editors

**Robert E. Blackshaw**, Agriculture & Agri-Food Canada, P.O. Box 3000 Main, Lethbridge, AB, Canada T1J 4B1

**Michael E. Foley**, USDA-ARS, Biosciences Research Lab, Fargo, ND 58105-5674

**Frank Forcella**, USDA/ARS, North Central Soil Conservation Res. Laboratory, Morris, MN 56267

**B. Clifford Gerwick**, Agric. Products Dept., Dow Agrosciences, 9330 Zionsville Rd., Indianapolis, IN 46268

**Jeffrey L. Gunsolus**, University of Minnesota, 411 Borlaug Hall, 1991 Buford Circle, St. Paul, MN 55108

**J. Christopher Hall**, University of Guelph, Bovey Bldg., Room 2225, Guelph, ON, Canada N1G 2W1

**Alec McClay**, Biological Control of Weeds, Alberta Research Council, Bag 4000, Vegreville, AB, Canada T9C 1T4

**David A. Mortensen**, Agronomy Department, University of Nebraska, 309 Keim Hall, Lincoln, NE 68583

**John T. O'Donovan**, Pest Management Program, Alberta Environmental Centre, Bag 4000, Vegreville, AB, Canada T9C 1T4

**Emilie Regnier**, Horticulture/Crop Science, Ohio State University, Kottman Hall, 2021 Coffey Road, Columbus, OH 43210

**Dale L. Shaner**, American Cyanamid Co., P.O. Box 400, Princeton, NJ 08540

**Clarence J. Swanton**, Crop Science Dept., University of Guelph, Guelph, ON, Canada N1G 2W1

**John R. Teasdale**, USDA-ARS, Bldg. 001, Room 323, Beltsville, MD 20705

**Mahesh K. Upadhyaya**, Plant Science Department, University of British Columbia, 2357 Main Mall, Suite 248, Vancouver, BC, Canada V7C 2M9

**William K. Vencill**, Crop and Soil Sciences, University of Georgia, 3111 Miller Plant Science Bldg., Athens, GA 30602

**William W. Witt**, Agronomy Department, University of Kentucky, N-106C Ag. Science Ctr., North Lexington, KY 40546

Debra E. Palmquist, *Consulting Statistical Editor*

Sheila M. Rake, *Managing Editor*

## Officers of the Weed Science Society of America

James M. Chandler, *President*

Lawrence R. Oliver, *President-Elect*

Charlotte V. Eberlein, *Vice President*

F. Dan Hess, *Past President*

Jill Schroeder, *Secretary*

Joan Dusky, *Treasurer*

Anne Légère, *Director of Publications*

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

*Weed Science* (ISSN 0043-1745) is an official publication of the Weed Science Society of America, 810 East 10th Street, Lawrence, KS 66044-8897 (785-843-1235). 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 bimonthly, one volume per year, six issues per year beginning in January.

Membership is \$85 per year, student affiliate membership \$30, which includes receipt of *Weed Science*, *Weed Technology*, and *WSSA Newsletter*. Dues should be sent to WSSA, 810 East 10th Street, Lawrence, KS 66044-8897 not later than December 1 of each year. Membership in the society is on a calendar-year basis only.

Subscriptions (institutions, libraries, etc.) to *Weed Science* are \$95 per year, one volume per year of six issues beginning in January. Subscriptions to both *Weed Science* and *Weed Technology* (ISSN 0890-037X) (four issues per volume) are available for \$160 per year. New subscriptions and renewals begin with the first issue of the current volume and should be sent to WSSA, 810 East 10th Street, Lawrence, KS 66044-8897.

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, 810 East 10th Street, Lawrence, KS 66044-8897. 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.

One copy of the manuscript must be sent to the Editor, Robert L. Zimdahl, Weed Research Laboratory, Colorado State University, Fort Collins, CO 80523. Two copies of the manuscript must be sent to the Managing Editor, Sheila M. Rake, Allen Press, Inc., 810 East 10th Street, Lawrence, KS 66044-8897. Directions for contributors are published in the October–December issue of *Weed Science*. Authors are asked to pay \$50 per page 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 Lawrence, KS and at additional mailing offices.

Copyright 1999 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, 810 East 10th Street, Lawrence, KS 66044-8897.

# Weed Science

VOLUME 47

JULY–AUGUST 1999

NUMBER 4

## EDITORIAL

- My view. Leigh Murray, Tracy Sterling, and Jill Schroeder . . . . . 367

## PHYSIOLOGY, CHEMISTRY, AND BIOCHEMISTRY

- Genetic variability for resistance to trifluralin in *Zea mays*. Pierangelo Landi, Elisabetta Frascaroli, and Marcella M. Giullani . . . 369
- Weed control and *Zea mays* tolerance as affected by timing of RP-201772 application. Christy L. Sprague, Donald Penner, and James J. Kells . . . . . 375
- Physiological consequences of mutation for ALS-inhibitor resistance. Charlotte V. Eberlein, Mary J. Guttler, Phillip H. Berger, John K. Fellman, Carol A. Mallory-Smith, Donn C. Thill, Roger J. Baerg, and William R. Belknap . . . . . 383
- A serine-to-threonine mutation in linuron-resistant *Portulaca oleracea*. Joseph G. Masabni and Bernard H. Zandstra . . . . . 393
- A detoxification gene in transgenic *Nicotiana tabacum* confers 2,4-D tolerance. David I. Last and Danny J. Llewellyn . . . . . 401
- Resistance to glyphosate in *Lolium rigidum*. I. Bioevaluation. James Pratley, Nigel Urwin, Rex Stanton, Peter Baines, John Broster, Kerrie Cullis, David Schafer, Joseph Bohn, and Roger Krueger . . . . . 405
- Resistance to glyphosate in *Lolium rigidum*. II. Uptake, translocation, and metabolism. Paul C.C. Feng, James E. Pratley, and Joseph A. Bohn . . . . . 412

## WEED BIOLOGY AND ECOLOGY

- Weed population responses to weed control practices. I. Seed bank, weed populations, and crop yields. Douglas D. Buhler . . . . 416
- Weed population responses to weed control practices. II. Residual effects on weed populations, control, and *Glycine max* yield. Douglas D. Buhler . . . . . 423
- Seedling growth and leaf surface morphological responses of three rangeland weeds to ultraviolet-B radiation. Nancy H. Furness, Mahesh K. Upadhyaya, and Douglas P. Ormrod . . . . . 427
- Growth of *Kochia scoparia*, *Salsola iberica*, and *Triticum aestivum* varies with temperature. Cathy A. Nord, Calvin G. Messersmith, and John D. Nalewaja . . . . . 435
- Triticum aestivum* and *Lolium multiflorum* interaction during drought. Katherine H. Carson, Harry T. Cralle, James M. Chandler, Travis D. Miller, Rodney W. Bovey, Scott A. Senseman, and Martin J. Stone . . . . . 440
- Effects of temperature and photoperiod on *Setaria viridis*. Clarence J. Swanton, Jian Zhong Huang, William Deen, Matthijs Tollenaar, Anil Shrestha, and Hamid Rahimian . . . . . 446
- Effect of tillage systems, N, and cover crop on the composition of weed flora. Clarence J. Swanton, Anil Shrestha, Robert C. Roy, Bonnie R. Ball-Coelho, and Stevan Z. Knezevic . . . . . 454

## WEED MANAGEMENT

- Interactions between imazamox and diphenylethers. R. Darren Unland, Kassim Al-Khatib, and Dallas E. Peterson . . . . . 462
- Effects of soil temperature and tuber depth on *Cyperus* spp. control. Carlene A. Chase, Thomas R. Sinclair, and Salvatore J. Locascio . . . . . 467
- An improved granular formulation for a mycoherbicidal strain of *Fusarium oxysporum*. K. P. Hebbar, B. A. Bailey, S. M. Poch, J. A. Lewis, and R. D. Lumsden . . . . . 473

#### Accessing Your WSSA Business Office

*Memberships, subscriptions, address changes, missing journal issues, single journal issue and back issue orders, reprints, color plates and page charge payments, ordering special publications:* WSSA Business Office, 810 East 10th St., P.O. Box 1897, Lawrence, KS 66044-8897 [phone: 1-800-627-0629 (U.S. and Canada), 785-843-1235; fax: 785-843-1274; e-mail: [wssa@allenpress.com](mailto:wssa@allenpress.com)]. Executive Secretary: Joyce Lancaster (ext. 250; [jlancaster@allenpress.com](mailto:jlancaster@allenpress.com)); Association Manager: Rhonda Green (ext. 220; [rgreen@allenpress.com](mailto:rgreen@allenpress.com)).

#### Directions for Submission to *Weed Science*

Send two copies of the manuscript and all illustrations to Sheila M. Rake, Managing Editor, Allen Press, 810 East 10th St., P.O. Box 1897, Lawrence, KS 66044-8897 and one copy to R. L. Zimdahl, Editor, *Weed Science*, Weed Research Laboratory, Colorado State University, Fort Collins, CO 80523. In the accompanying cover letter to R. L. Zimdahl provide: 1) the corresponding author's name and telephone number, b) three stick-on labels showing the name and address of the corresponding author, c) the category that best describes the paper's content: Weed Management; Physiology, Chemistry, and Biochemistry; Weed Biology and Ecology; Soil, Air, and Water; or Special Topic, and d) a brief list of names, addresses, phone numbers, fax numbers, and e-mail addresses of suggested reviewers.

#### Directions for Submission to *Weed Technology*

Send three copies of the manuscript and all illustrations to Sheila M. Rake, Managing Editor, Allen Press, Inc., 810 East 10th St., P.O. Box 1897, Lawrence, KS 66044-8897 and one copy to Chester L. Foy, Editor, *Weed Technology*, Dept. of Plant Pathology, Physiology, and Weed Science, Virginia Polytechnic Institute and State Univ., 502 Price Hall, Blacksburg, VA 24061-0331. Please include the names, addresses, phone numbers, fax numbers, and e-mail addresses of suggested reviewers.

Cover drawing from: USDA/ARS Handbook No. 366. 1970. Selected Weeds of the United States, p. 291.