

WEED SCIENCE

JOURNAL OF THE WEED SCIENCE SOCIETY OF AMERICA

VOLUME 40

APRIL-JUNE 1992

NUMBER 2

PHYSIOLOGY, CHEMISTRY, AND BIOCHEMISTRY

- Lactofen Increases Glyphosate-Stimulated Shikimate Production in Little Mallow (*Malva parviflora*). **Barbara H. Wells and Arnold P. Appleby** 171
- Growth Response of Wheat (*Triticum aestivum*) Callus to Imazapyr and In Vitro Selection for Resistance. **David C. Heering, Arron C. Guenzi, Thomas F. Peeper, and P. L. Claypool** 174
- Effect of Field Violet (*Viola arvensis*) Growth Stage on Uptake, Translocation, and Metabolism of Terbacil. **Douglas J. Doohan, Thomas J. Monaco, and Thomas J. Sheets** 180
- Mechanism of Inheritance of Diclofop Resistance in Italian Ryegrass (*Lolium multiflorum*). **Kevin J. Betts, Nancy J. Ehlke, Donald L. Wyse, John W. Gronwald, and David A. Somers** 184

WEED BIOLOGY AND ECOLOGY

- Dynamics of Yellow Starthistle (*Centaurea solstitialis*) Achenes in Field and Laboratory. **Donald B. Joley, Donald M. Maddox, David M. Supkoff, and Aubrey Mayfield** 190
- Germination and Emergence of Hairy Beggarticks (*Bidens pilosa*). **Krishna N. Reddy and Megh Singh** 195
- The Wounding Response of Dormant Barnyardgrass (*Echinochloa crus-galli*) Seeds. **Gerald R. Leather, Shi-Jean Sung, and Maynard G. Hale** 200
- Soil Temperature, Soil Moisture, and Seed Burial Depth Effects on Redstem Filaree (*Erodium cicutarium*) Emergence. **Robert E. Blackshaw** 204
- Effect of Soluble Sugars and Gibberellic Acid in Breaking Dormancy of Excised Wild Oat (*Avena fatua*) Embryos. **Michael E. Foley** 208
- Genetic Diversity for Competitive and Reproductive Ability in Wild Oats (*Avena fatua*). **Henri Darmency and Catherine Aujas** 215
- Competition for Light Between Tomatoes and Nightshades (*Solanum nigrum* or *S. ptycanthum*). **Milton E. McGiffen, Jr., John B. Masiunas, and John D. Hesketh** 220

WEED CONTROL AND HERBICIDE TECHNOLOGY

- Effect of Application Rate, Weed Species, and Weed Stage of Growth on Imazethapyr Activity. **Tracy E. Klingaman, Charles A. King, and Lawrence R. Oliver** 227
- Efficacy and Economics of Herbicides for Canada Thistle (*Cirsium arvense*) Control in No-till Spring Wheat (*Triticum aestivum*). **William W. Donald and Tony Prato** 233
- Population Dynamics and Control of Annual Weeds in Corn (*Zea mays*) as Influenced by Tillage Systems. **Douglas D. Buhler** 241
- Cotton (*Gossypium hirsutum*) Yield Response to Mechanical and Chemical Weed Control Systems. **Charles E. Snipes and Thomas C. Mueller** 249
- Herbicide Programs in No-Tillage and Conventional-Tillage Soybeans (*Glycine max*) Double Cropped After Wheat (*Triticum aestivum*). **Barry D. Sims and David R. Guethle** 255
- Timing of Herbicide Applications for Control of Larkspurs (*Delphinium* spp.). **Michael H. Ralphs, John O. Evans, and Steven A. Dewey** 264

SOIL, AIR, AND WATER

- Detection of Herbicides Using Fluorescence Spectroscopy. **Thomas C. Mueller, Thomas B. Moorman, and Martin A. Locke** 270

SPECIAL TOPICS

- Economic Impact of Leafy Spurge (*Euphorbia esula*) in North Dakota. **F. Larry Leistritz, Flint Thompson, and Jay A. Leitch** 275
- Foliar Absorption and Translocation of Herbicides from Aqueous Solution and Treated Soil. **Kassim Al-Khatib, Robert Parker, and E. Patrick Fuerst** 281
- Histology of Infection of *Hydrilla verticillata* by *Macrophomina phaseolina*. **Gary F. Joye and Rex N. Paul** 288

Use of Ecophysiological Models for Crop-Weed Interference: Relations Amongst Weed Density, Relative Time of Weed Emergence, Relative Leaf Area, and Yield Loss. M. J. Kropff, S. E. Weaver, and M. A. Smits	296
Use of Ecophysiological Models for Crop-Weed Interference: The Critical Period of Weed Interference. S. E. Weaver, M. J. Kropff, and R.M.W. Groeneveld	302
Modeling the Effects of Weed Interference Periods and Insects on Bell Peppers (<i>Capsicum annum</i>). J. Ray Frank, Paul H. Schwartz, Jr., and William E. Potts	308
Path Analysis of Red Rice (<i>Oryza sativa</i> L.) Competition with Cultivated Rice. D. J. Pantone, J. B. Baker, and P. W. Jordan	313
Insects, Nematodes, and Pathogens Associated with Horsenettle (<i>Solanum carolinense</i>) in Bermudagrass (<i>Cynodon dactylon</i>) Pastures Robert L. Nichols, John Cardina, Robert L. Lynch, Norman A. Minton, and Homer D. Wells	320
Propagation of <i>Euphorbia esula</i> for Leafy Spurge Biocontrol Agents. Rodney G. Lym	326
Biological Control of Ducksalad (<i>Heteranthera limosa</i>) by the Waterlily Aphid (<i>Rhopalosiphum nymphaeae</i>) in Rice (<i>Oryza sativa</i>). Michael J. Orazo and Albert A. Grigarick	333
Minutes of the Board of Directors Executive Meeting WEED SCIENCE SOCIETY OF AMERICA	337
Directions for Contributors to <i>Weed Science</i>	340

WEED SCIENCE

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

R. J. Aldrich, *Editor*

Associate Editors

David C. Bridges, 1109 N. Experiment St., Griffin, GA 30223

G. Euel Coats, P.O. Drawer PG, Department Pl. Path. and Weed Sci., Mississippi State University, Mississippi State, MS 39762

J. F. Derr, Hampton Roads Ag. Exp. Station, 1444 Diamond Springs Road, Virginia Beach, VA 23455

Charlotte Eberlein, University of Idaho, Aberdeen Research and Extension Center, Aberdeen, ID 83210

Sidney S. Harper, Tennessee Valley Authority, National Fertilizer Development Center, Muscle Shoals, AL 35660

R. H. Hodgson, USDA ARS NER, Fort Detrick Building 1301, Frederick, MD 21701

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

S. C. Weller, Department of Horticulture, Purdue University, West Lafayette, IN 47907

Allen F. Wiese, Texas Agricultural Experiment Station, Texas A&M University System, P.O. Drawer 10, Bushland, TX 79012

Jerry Oot, *Technical Editor*

AC/217-892-4329

Reviewers

Robin Bellinder

R. E. Blackshaw

D. D. Buhler

Sharon Clay

Jeffrey Conn

Garvin Crabtree

A. G. Dexter

Joseph M. DiTomaso

William E. Dyer

Michael E. Foley

Neil K. Harker

Kent Harrison

W. Carroll Johnson

Mary L. Ketchersid

R. J. Kremer

Claudel Lemieux

Rex Liebl

Martin A. Locke

John Lydon

Wondi Mersie

Tom Mueller

U. Nandihalli

Jill Schroeder

C. E. Snipes

Ronald J. Turco

M. K. Upadhyaya

Glenn Wehtje

Leslie A. Weston

John Wilcut

Frank Young

Officers of the Weed Science Society of America

Joe Antognini, *President*

H. D. Coble, *President-Elect*

Alex G. Ogg, Jr., *Vice President*

J. R. Abernathy, *Past President*

D. C. Thill, *Secretary*

J. M. Chandler, *Treasurer*

B. Truelove, *Editor-in-Chief*

R. A. Schmidt, *Executive Secretary*

Weed Science (ISSN 0043-1745) is an official publication of the Weed Science Society of America, 309 West Clark Street, Champaign, IL 61820 (AC/217-356-3182). 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 \$60 per year, student affiliate membership \$20, which includes receipt of *Weed Science*, *Weed Technology*, and *WSSA Newsletter*. Dues should be sent to WSSA, 309 West Clark Street, Champaign, IL 61820 not later than December 1 of each year. Membership in the society is on a calendar-year basis only.

Subscriptions (institutions, libraries, etc.) are \$100 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, 309 West Clark Street, Champaign, IL 61820.

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, 309 West Clark Street, Champaign, IL 61820. 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, Richard J. Aldrich, 701 Wildwood Drive, Columbia, MO 65203 (Oct. 16 to April 30); or Box 236, Marcell, MN 56657 (May 1 to Oct. 15). Directions for contributors are published in the January 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.

Weed Science published by the Weed Science Society of America.

Second class postage paid at Champaign, IL and at additional mailing offices.

Copyright 1992 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, 309 West Clark Street, Champaign, IL 61820.

Sustaining Members
WEED SCIENCE SOCIETY OF AMERICA
June 2, 1992

A & L Agricultural Laboratories	ICI Americas, Inc.
ABC Laboratories Inc.	Ishihara Sangyo Kaisha Ltd.
ACDS Inc.	ISK Biotech Corporation
Agri Diagnostics Associates	Kincaid Equipment Manufacturers
Agrolinz Inc.	Lehigh Agric. & Biological Service
Agvise	LI-COR, Inc.
Allen Machine Works	Mandel Scientific Company Ltd.
ALMACO	MARATHON Ag/Environmental
American Agricultural Services Inc.	Minnesota Valley Testing Lab
American Cyanamid Company	Mobay Corp./Ag Chem. Div.
The Andersons	Monsanto Company
Asgrow Seed Company	Mycogen Company
BASF Corporation	Nissan Chemical America Corp.
Battelle	NOR-AM Chemical Company
Cenex/Land O'Lakes	PBI/Gordon Corporation
CIBA-GEIGY Canada Inc.	Plant Sciences Inc.
CIBA-GEIGY Corporation	R & D Sprayers Inc.
Concord Inc.	Research Development Alternatives
Deere & Company	Rhone Poulenc Ag Company
Dow Chemical USA	Ricerca Inc.
DuPont Agricultural Products	Rohm & Haas Company
Environmental Technologies	Sandoz Crop Protection
EPL Bio-Analytical Services	O. M. Scott & Sons Company
FMC Corporation	Stewart Agricultural Research Service Inc.
Farmland Industries	Sumitomo Chemical America Inc.
Gandy Corporation	Terra International Inc.
Griffin Corporation	Uniroyal Chemical Corporation
Growmark Inc.	United Agri Products
Gylling Data Management, Inc.	Valent USA Corporation
Heartland Technologies, Inc.	Weed Systems Equipment Inc.
Hoechst-Roussel Agri Vet	Wintersteiger America Inc.