

# WEED TECHNOLOGY

---

A Journal of the Weed Science Society of America

VOLUME 9

JULY-SEPTEMBER 1995

NUMBER 3



ISSN 0890-037X

WETEE9 9(3) 413-657 (1995)

# WEED TECHNOLOGY

A Journal of the Weed Science Society of America

*Weed Technology* published quarterly beginning each January–March issue, is included along with *Weed Science* and *WSSA Newsletter* to Weed Science Society of America (WSSA) members. Annual membership costs \$60 with \$20 student affiliate memberships on a calendar year basis only.

*Weed Technology*, subscriptions are \$60 per year (four issues per volume). New subscriptions begin with the January–March issue. Subscribers, including libraries and institutions, can obtain both *Weed Science* (volume of four issues per year) and *Weed Technology* for \$100 annually.

Changes of mailing address, inquiries about copies lost in the mail, and requests for back issues and for information about placing advertisements and about receiving journals, membership and subscriptions should be sent to WSSA, 1508 West University Ave., Champaign, IL 61821-3133. Send dues by December 1 each year. Claims for copies lost in the mail must be received within 30 days (90 days foreign) of the issue date to insure replacement at no charge.

Send manuscripts to Chester L. Foy, Editor, *Weed Technology*, Dept. of Plant Pathology, Physiology, and Weed Science, Virginia Polytechnic Institute and State Univ., 503 Price Hall, Blacksburg, VA 24061-0331. Directions for Contributors are published in each October–December issue of *Weed Technology*. Authors are charged \$50 per page (nonmembers \$100) to cover a portion of publication costs. The Editor can exempt page charges in advance when justified.

*Weed Technology* (ISSN 0890-037X) is published by the Weed Science Society of America. Copyright 1995 by the Weed Science Society of America. Printed in U.S.A. All rights reserved. Reproduction in part or whole is prohibited. Return POD Form 3579 to WSSA, 1508 West University Ave., Champaign, IL 61821-3133.

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 Technology* 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 that area who request such materials for the purpose of scientific research.

## WSSA OFFICERS

J. L. Barrentine, President  
S. O. Duke, President Elect  
G. C. Messersmith, Vice President  
A. G. Ogg, Jr., Past President  
C. Eberlein, Secretary  
L. L. Whatley, Treasurer  
A. Legere, Editor-in-Chief  
H. D. Skipper, Chair,  
Constitution and Operating Procedures



## Sustaining Members August 1, 1995

### PATRON

BASF Corporation  
Cenex/Land O'Lakes  
Compliance Service Int'l., Inc.  
DowElanco  
DuPont Agricultural Products  
ISK Bioscience Corporation  
Monsanto Agricultural Company  
Sandoz Crop Protection  
Valent USA Corporation

### CONTRIBUTING

AgrEvo USA Company  
FMC Corporation Ag Chem Group  
Griffin Corporation  
Miles Inc.  
O M Scott & Sons Company  
PBI/Gordon Corporation  
Terra Chemical Int'l. Inc.  
Uniroyal Chemical Company

### ASSOCIATE

Agri-Growth Research Inc.  
Agvise Laboratories  
A & L Agric. Laboratories Inc.  
ALMACO Company  
American Agricultural Services  
American Cyanamid Company  
Analytical Bio-Chemistry Lab.  
Ciba-Geigy Canada Ltd.  
Ciba-Geigy Corporation  
Concord Environmental Equipment  
Decagon Devices, Inc.  
Deere & Company Tech. Center  
Ecologistics Limited  
EPL Bio-Analytical Services  
Gandy Corporation  
Growmark Inc.  
Gylling Data Management Inc.  
HarvestMaster Inc.  
Heartland Technologies Inc.  
ICMS  
Kincaid Equipment Manufacture Corp.  
Landis International Inc.  
LI-COR Inc.  
MARATHON Ag/Environmental  
Minnesota Valley Testing Lab.  
Mycogen Corporation  
Nissan Chemical America Group  
R & D Sprayers, Inc.  
Research Options Inc.  
Rhone-Poulenc Ag Company  
Rohm & Haas Company  
Spraying Systems Company  
Springborn Laboratories Inc.  
Stewart Agric. Research Services  
The Andersons  
Thomson Publications  
United Agri Products  
Weed Systems Equipment Inc.  
Wintersteiger America Inc.  
ZENECA Inc.

A Journal of the Weed Science Society of America

## Table of Contents

### Technology Notes

- 413 News Notes of General Weed Science Interest

### • Feature

- 419 Littleseed Canarygrass (*Phalaris minor*) Resistance to Isoproturon in India. Ram K. Malik and Samunder Singh

### • Research

- 426 Effect of Adjuvants on Bentazon Efficacy in Green Pea (*Pisum sativum*). Kassim Al-Khatib, Sorkel Kadir, and Carl Libbey
- 432 Control of Persian Darnel (*Lolium persicum*) and Other Grasses with Clethodim. James H. Hunter
- 440 Response of MSMA-Resistant and -Susceptible Common Cocklebur (*Xanthium strumarium*) Biotypes to Cotton (*Gossypium hirsutum*) Herbicides and Cross-Resistance to Arsenicals and Membrane Disruptors. Chandrashekhar I. Nimbal, David R. Shaw, Stephen O. Duke, and John D. Byrd, Jr.
- 446 Broadleaf Weed Control with Trifluralin Plus Flumetsulam in Soybean (*Glycine max*). Daniel B. Reynolds, David L. Jordan, P. Roy Vidrine, and James L. Griffin
- 452 Effect of Shade on Velvetleaf (*Abutilon theophrasti*) Growth, Seed Production, and Dormancy. Iliya A. Bello, Micheal D. K. Owen, and Harlene M. Hatterman-Valenti
- 456 Efficacy and Economy of Weed Management Systems for Sicklepod (*Senna obtusifolia*) and Morning-glory (*Ipomoea* spp.) Control in Soybean (*Glycine max*). William K. Vencill, John W. Wilcut, and C. Dale Monks
- 462 Comparing Techniques for Quantifying Haloxyfop Absorption and Translocation in Johnsongrass (*Sorghum halepense*). Robert S. Peregoy, Lynn M. Kitchen, James L. Griffin, and Michael P. Braverman
- 468 Canola (*Brassica napus*) Response to Simulated Sprayer Contamination with Thifensulfuron and Thifensulfuron:Tribenuron (2:1). David A. Wall, Douglas A. Derksen, and Lyle F. Friesen

•Peer reviewed papers.

#### Cover

Peasants in India carting off on bicycles mainly littleseed canarygrass (*Phalaris minor* Retz.) with some wheat (*Triticum aestivum* L.) for use as forage. Some biotypes of littleseed canarygrass have developed resistance to isoproturon [*N,N*-dimethyl-*N'*[4-*U*-methylethyl)-phenyl]urea}, after years of continuous use. Control of littleseed canarygrass with isoproturon dropped from 78 to 21% from 1990 to 1993. So the "canary" sings on! The photograph was submitted by Jonathan Gressel (Weizmann Institute of Science, Rehovot, Israel) for Prof. Bam K. Malik, Department of Agronomy, Hisar, India. See the Feature article in this issue of *Weed Technology* for further details.

- 477 Detection of Yellow Hawkweed (*Hieracium pratense*) with High Resolution Multispectral Digital Imagery. Hubert W. Carson, Lawrence W. Lass, and Robert H. Callihan
- 484 Sugarbeet (*Beta vulgaris*) Response to and Sorption Characteristics of Nicosulfuron and Primisulfuron. Karen M. Novosel, Karen A. Renner, James J. Kells, and Andrew J. Chomas
- 490 Absorption, Translocation, and Metabolism of Triclopyr in Rice (*Oryza sativa*). Michael P. Braverman
- 494 Weed Control in Rice (*Oryza sativa*) with Quinclorac and Bensulfuron Coating of Granular Herbicides and Fertilizer. Michael P. Braverman
- 499 Tomato (*Lycopersicon esculentum*) Cultivar and Weed Sensitivity to DPX-E9636. Thomas A. Bewick, Kenneth Smith, William M. Stall, and Steven M. Olson
- 504 Response of Soybean (*Glycine max*) and Rice (*Oryza sativa*) in Rotation to AC 263,222. Charles F. Grymes, James M. Chandler, and Paul R. Nester
- 512 Interactions of Foliar Insecticides Applied with Pyriithiobac. Ralph L. Allen and Charles E. Snipes
- 518 Cross-Resistance of a Large Crabgrass (*Digitaria sanguinalis*) Accession to Aryloxyphenoxypropionate and Cyclohexanedione Herbicides. Ronald J. Wiederholt and David E. Stoltenberg
- 525 Effectiveness of Adjuvants with Nicosulfuron and Primisulfuron for Wirestem Muhly (*Muhlenbergia frondosa*) Control in No-Till Corn (*Zea mays*). Vijay K. Nandula, William S. Curran, Gregory W. Roth, and Nathan L. Hartwig
- 531 Weed Control Efficacy and Pinto Bean (*Phaseolus vulgaris*) Tolerance to Early Season Mechanical Weeding. Mark J. VanGessel, Lori J. Wiles, Edward E. Schweizer, and Phil Westra
- 535 Expert System Evaluation and Implementation for Soybean (*Glycine max*) Weed Management. C. Dale Monks, David C. Bridges, John W. Woodruff, Tim R. Murphy, and Daniel J. Berry
- 541 HOE 075032 for Wild Mustard (*Sinapis arvensis*) Control in Canola (*Brassica rapa*). Kenneth J. Kirkland
- 546 Sweet Potato (*Ipomoea batatas*) Clones Differ in Response to Ethyl-Metribuzin. Carl E. Motsenbocker and Thomas J. Monaco
- 553 Soybean (*Glycine max*) Response to AC 263,222 and Chlorimuron as Influenced by Soil Moisture. Larry J. Newsom and David R. Shaw
- 561 Growth Characteristics of Selected Dinitroaniline-Resistant and -Susceptible Goosegrass (*Eleusine indica*) Population. James R. Harris, Billy J. Gossett, and Joe E. Toler
- 568 The Effect of Nicosulfuron Tank-Mixes and Time of Application on Sunrunner Peanut (*Arachis hypogaea*). Terry A. Littlefield, Daniel L. Colvin, Barry J. Brecke, and Lambert B. McCarty
- 574 Effect of Nicosulfuron on Johnsongrass (*Sorghum halepense*) Control and Corn (*Zea mays*) Performance. Nagabhushana G. Gubbiga, A. Douglas Worsham, Harold D. Coble, and Richard W. Lemons
- 582 Response of Sulfonylurea-Tolerant Soybean (*Glycine max*) and Selected Weed Species to Imazethapyr and Thifensulfuron Combinations. D. M. Simpson and E. W. Stoller
- 587 Salts and Surfactants Influence Nicosulfuron Activity. John D. Nalewaja, Tadeusz Praczyk, and Robert Matysiak
- 594 Winter Wheat (*Triticum aestivum*) Yield Response to Winter Annual Broadleaf Weed Control. Robert C. Scott, Thomas F. Peeper, and Jeffrey A. Koscelny
- 599 Use of Remote Sensing for Detecting and Mapping Leafy Spurge (*Euphorbia esula*). James H. Everitt, Gerald L. Anderson, David E. Escobar, Michael R. Davis, Neal R. Spencer, and Roger J. Andrascik
- 610 Bentazon Tank-Mixtures for Improved Redroot Pigweed (*Amaranthus retroflexus*) and Common Lamb-quarters (*Chenopodium album*) Control in Navy Bean (*Phaseolus vulgaris*). David A. Wall

• **Note** 

---

---

617 Edible Weeds in Morocco. Abbas Tanji and Fatima Nassif

• **Education/Extension** 

---

---

621 Wildfire Suppression—A Paradigm for Noxious Weed Management. Steven A. Dewey, Michael J. Jenkins, and Robert C. Tonioli

• **Review/Education** 

---

---

628 Design, Construction, and Operation of an Agricultural Pesticide Facility. Orvin C. Burnside, Brian C. Wass, Kent A. Rees, and Thomas W. Warnke

**Review** 

---

---

638 Constraints in the Development of Bioherbicides. Bruce A. Auld and Louise Morin

**The Intriguing World of Weeds** 

---

---

653 Poison-Ivy/Poison-Oak/Poison-Sumac—The Virulent Weeds. Larry W. Mitich

**Helpful Hints for Technical Writing** 

---

---

657 Drastic Revision May Be Needed. J. H. Dawson

**EDITOR**

Chester L. Foy

**TECHNICAL EDITOR**

Leanne D. Mitchell

**ASSOCIATE EDITORS**

Randy L. Anderson

Thomas A. Bewick

Prasanta C. Bhowmik

Barry J. Brecke

Douglas Buhler

William J. Chism

William W. Donald

Jerry M. Green

K. Neil Harker

George Kapusta

James R. Martin

John Masiunas

Robert F. Norris

Thomas F. Peeper

Edward P. Richard

Phillip Stahlman

William H. Vanden Born

Leslie Weston

Gail Wicks

John Wilcut

**VOLUME 3**

# The Biology of Canadian Weeds

*The Biology of Canadian Weeds* provides detailed biological, taxonomic and economic information about species known to be weedy in Canada, as well as methods of control. Each account is written by one or more scientists who have worked with the species described.

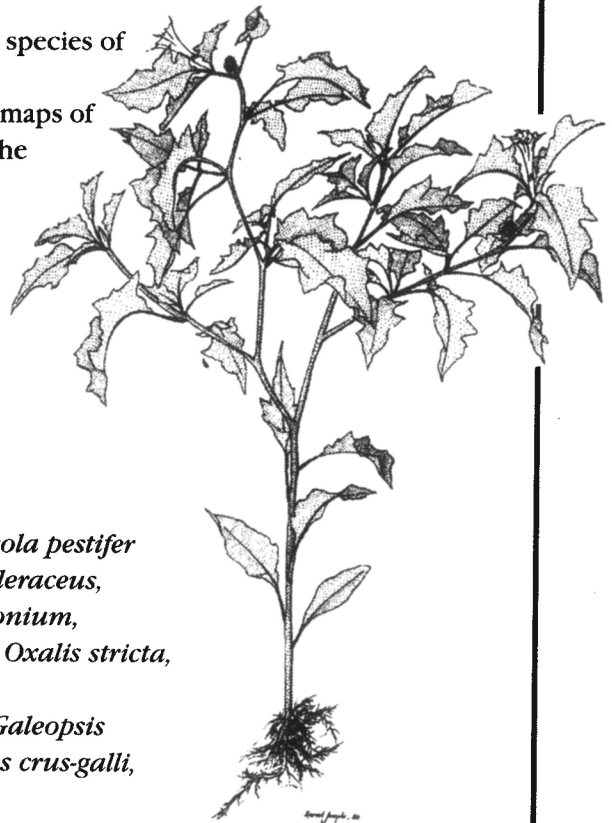
Each article provides a clear description of a species or related species of weeds, details of its economic importance, both beneficial and detrimental, a summary of Canadian legislation on the species, maps of Canadian distribution and details of distribution elsewhere in the world, as well as information on habitats occupied, means of reproduction, growth and development, and any hybridization that occurs with other species.

In addition, the population dynamics and cultural, chemical and biological control methods are described.

May 1995, 344 pp. + index, price C\$25.00

## NEW SPECIES COVERED IN VOLUME 3

*Setaria viridis*, *Echinochloa crus-galli*, *Bromus tectorum*, *Salsola pestifer*, *Typha latifolia*, *Typha angustifolia*, *Sonchus asper*, *Sonchus oleraceus*, *Solanum carolinense*, *Hypericum perforatum*, *Datura stramonium*, *Fagopyrum tataricum*, *Holcus lanatus*, *Potamogeton crispus*, *Oxalis stricta*, *Oxalis corniculata*, *Vicia cracca*, *Vicia sativa*, *Vicia villosa*, *Vicia angustifolia*, *Solanum nigrum*, *Solanum ptycanthum*, *Galeopsis tetrahit*, *Lappula squarrosa*, *Artemisia absinthium*, *Crataegus crus-galli*, *Apera spica-venti*, *Veratrum viride*, *Atriplex patula*.



The Biology of  
Canadian Weeds, Volume 3,  
is published by  
The Agricultural Institute of  
Canada  
with the sponsorship of  
CIBA-GEIGY CANADA LTD.,  
ZENECA AGRO  
A BUSINESS OF ZENECA CORP.  
and  
RHONE-POULENC CANADA INC.

## ORDER FORM The Biology of Canadian Weeds Volume 3

Please send me      copies of *The Biology of Canadian Weeds*, Volume 3 at C\$25.00 plus shipping and handling (Canadian residents add C\$4.00, USA residents add C\$6.00, residents of other countries add C\$7.00 for surface mail or C\$16.00 for air mail).

Name

Company

Address

City  State/Prov  Post code

Phone  Fax

Amount enclosed \$  PQ#

TO ORDER fill out this form and mail it together with your cheque or money order to the address below. Make cheques payable to The Agricultural Institute of Canada. Price subject to change. Canadian residents add 7% GST on the total amount (registration no. 106689094).

### MAIL YOUR ORDER TO:

The Agricultural Institute of Canada  
Suite 907, 151 Slater Street  
Ottawa, Ontario, Canada K1P 5H4  
Tel: (613) 232-9459 Fax (613) 594-5190