

CROP SCIENCE

BOARD OF DIRECTORS CROP SCIENCE SOCIETY OF AMERICA

V.B. CARDWELL, *President* C.W. STUBER, *Past President*
R.C. SHEARMAN, *President-Elect* R.F. BARNES, *Exec. Vice President*

CROP SCIENCE EDITORIAL BOARD

P.S. BAENZIGER, *Editor-in-Chief*
E.L. KLEPPER, *Editor, Crop Science*

Technical Editors

Crop Breeding, Genetics, and Cytology; Cell Biology and Molecular Genetics; and Plant Genetic Resources (Corresponds to CSSA Divisions C-1, C-7, and C-8)

R.R. DUNCAN
Agronomy Department
Univ. of Georgia Exp. Stn.
Griffin, GA 30223-1797

ROBERT STUCKER
(On sabbatical until late
June. Do not submit
to him until so notified)

JAMES E. SPECHT
Agronomy Department
Univ. of Nebraska
Lincoln, NE 68583-0915

STEVE ST. MARTIN
Dep. of Agronomy
Ohio State Univ.
Columbus, OH 43210

Crop Physiology and Metabolism; and Seed Physiology, Production, and Technology (Corresponds to CSSA Divisions C-2 and C-4)

ANTHONY E. HALL
Botany & Plant Sci. Dep.
University of California
Riverside, CA 92521

JOHN RADIN
USDA-ARS-NPS
Bldg. 005, BARC-West
Beltsville, MD 20705

Crop Ecology, Production, and Management; Turfgrass Science; and Crop Quality and Utilization (Corresponds to CSSA Divisions C-3, C-5, and C-6)

DOUGLAS L. KARLEN
National Soil Tilth Lab
2150 Pammel Drive
Ames, IA 50011

CRAIG A. ROBERTS
(Through September)
Agron. Dep., 214 Waters Hall
University of Missouri
Columbia, MO 65211

JEFFREY J. VOLENEK
(On sabbatical until
1 October. No
submissions until
then.)

Submit Review and Interpretation papers to the editor of the journal

BETTY KLEPPER
UDSA-ARS
P.O. Box 370
Pendleton, OH 97801

Associate Editors

C-1: W.C. BRIDGES, JR.
S.A. MACKENZIE
W.K. RUSSELL
D. STELLY
D.A. VAN SANFORD

C-1 & C-8:
T.E. CARTER, JR.
S.R. CIANZIO
T.W. PFEIFFER
S.E. SMITH
K.P. VOGEL
B. YOUNG

C-2: T.W. RUFTY, JR.
D.M. VIETOR
M.E. WESTGATE
C-3: D.J. BOQUET
L.M. DWYER
J.R. KINIRY
C. KLOPFENSTEIN

C-1 & C-7:
R.G. CANTRELL
J.G. CARMAN
D.T. TOMES

C-7 & C-8:
R.C. SHOEMAKER
C-2: K.A. ALBRECHT
J.J. BURKE
D.B. EGLI
D.A. GRANTZ
D.W. ISRAEL
S. LINGLE
E.V. MAAS
F.C. MEINZER

A.A. SCHNEITZER
C.C. SHAEFFER
R.H. WHITE
C-4: K.J. BRADFORD
J.J. STEINER
C-5: M.H. HALL
D.J. WEHNER
M.P. WESTCOTT
C-6: K.J. MOORE
W.D. PITMAN

C-1 & C-8:
A.A. BOE
B.F. CARVER
T.A. COFFELT
K.R. LAMKEY
M.S. MCINTOSH
J.P. MURPHY
J.F. PEDERSEN

WILLIAM R. LUELLEN, *Managing Editor*
R.F. BARNES, *Executive Vice President*
D.M. KRAL, *Associate Executive Vice President*

N.H. RHODEHAMEL, *Associate Editor*
BARB SEYBOLD, *Assistant Editor*
GUNDEGA KORSTS, *Assistant Editor, Registrations*

Published bimonthly by the Crop Science Society of America, Inc. Forms close 20 days prior to issuance of each number. Second class postage paid at Madison, WI, and at additional mailing offices. ISSN (0011-183X).

Postmaster: Send address change to *Crop Science*, 677 S. Segoe Rd., Madison, WI 53711.

Manuscript Submission Procedure: Submit your *Crop Science* manuscripts—regular paper, Note, and Review and Interpretation—directly to the editor or technical editor who will supervise the review. Choose the editor based on the subject matter category of your paper. The addresses for direct submission are given above.

Subscription rates: \$92 per year, \$17 per issue. All back volumes available at \$102 per volume, \$17 per issue. Add \$12.00 per volume or \$2 per issue on orders outside the USA. Indexed annually in the November–December issue. Cumulative author and subject index for vol. 1–5, vol. 6–10, vol. 11–15, vol. 16–20, and vol. 21–25 available at \$3 each. Payment in advance is required on international orders for back issues.

New subscriptions, renewals, and new memberships that include *Crop Science* begin with the January–February number of the current volume. Those signing

Crop Registration Committee

Members of the C852 Crop Registration Committee of the Crop Science Society of America review manuscripts on the registration of crop cultivars, germplasms, parental lines, and genetic stocks for publication in *Crop Science*. Authors should direct such manuscripts to the subcommittee chair for the specific crop or for other crops to the committee chair, at the addresses printed below.

COMMITTEE CHAIR

L.E. Wiesner
U.S. Nat. Seed Storage Lab
1111 E. Mason St.
Ft. Collins, CO 80521-4500

Rice

S.D. Linscombe
Rice Research Station
Box 1429
Crowley LA 70527-1429

SUBCOMMITTEES

Alfalfa

D.E. Brown
Land O'Lakes Research Farm
Rt. 6, Box 299, 16487 Lonkey La.
Caldwell ID 83605

Rye and Triticale

P.L. Bruckner
Plant and Soil Sci. Dep.
Montana State University
Bozeman MT 59715

Barley

D.C. Rasmusson
Univ. of Minnesota–Agronomy
1991 Buford Circle
St. Paul MN 55108

Sunflower, Castor, Rapeseed, Safflower, and Other Oilseeds

D.L. Auld
Dep. of Agronomy
Texas Tech University
Lubbock TX 79409-2122

Cotton

F.M. Bourland
Univ. of Arkansas–Agronomy
115 Plant Sciences Bldg.
Fayetteville AR 72701

Sorghum

K.D. Kofoid
Fort Hays Exp. Stn.
1232 240th Ave.
Hays KS 67601-9228

Grasses, Other

C.E. Watson
Mississippi State–Agronomy
Box 5248
Mississippi State MS 39762

Soybean

J.H. Orf
Univ. of Minnesota–Agronomy
1509 Gortner Ave.
St. Paul MN 55108

Legumes, Other

G.A. Pederson
USDA-ARS
P.O. Box 5367
Mississippi State MS 39762

Sugarbeet

R.T. Lewellen
USDA-ARS
1636 E. Alisal St.
Salinas CA 93905

Maize

J.G. Coors
Univ. of Wisconsin–Agronomy
1575 Linden Dr.
Madison WI 53706

Sugarcane

B.L. Legendre
USDA-ARS Sugarcane Res. Unit
P.O. Box 470
Houma LA 70361

Oat

F.L. Kolb
Univ. of Illinois–Agronomy
1102 S. Goodwin Ave.
Urbana IL 61801-4798

Tobacco

R.D. Miller
Tobacco Exp. Stn.
Route 5, Box 113
Greeneville TN 37743

Peanut

D.W. Gorbet
Agric. Res. & Educ. Ctr.
3925 Hwy 71
Marianna FL 32446

Wheat

J.S. Quick
Dep. of Agronomy
Colorado State Univ.
Ft. Collins CO 80523

up after 1 October have the option of starting with the next volume.

Changes of address should be received by the first of the month in which they are to take effect.

Claims for copies that fail to reach subscribers must be received within 3 months of publication date for domestic subscriptions, and within 6 months of publication date for international subscriptions.

Subscriptions, renewals, and membership fees for the current volume and orders for back numbers should be sent to the Crop Science Society of America, 677 S. Segoe Rd., Madison, WI 53711.

Publication charges in *Crop Science* are \$70 per page. Authors may be charged also for the cost of illustrations or tables beyond \$15 for each paper.

Trade names are sometimes listed in papers published in this journal. No endorsement of these products by the publisher is intended, nor is any criticism implied of similar products not mentioned.

Copyright © 1994 by the Crop Science Society of America, Inc. Permission for printing and for reprinting the material contained herein has been obtained by the publisher. Other users should request permission from the author(s) and notify the publisher if the "fair use" provision of the U.S. Copyright Act of 1976 (P.L. 94-553) is to be exceeded.