

Volume 32, No. 1
January - March 2004



PGRSA

Quarterly

Plant
Growth Regulation
Society of America

The Plant Growth Regulation
Society of America

QUARTERLY Reports on Plant Growth Regulation and Activities of the PGRSA

Volume 32, No. 1
January - March 2004

Editor

Caula Beyl
Dept. of Plant & Soil Science
Alabama A&M University
P.O. Box 1208
Normal, AL 35762
Phone: (256) 372-8093
Email: cbeyl@aamu.edu

Associate Editors

Duane W. Greene
Dept. of Plant & Soil Science
Univ. of Massachusetts
Bowditch Hall
Amherst, MA 01003

Wayne A. MacKay
Texas A&M Dallas
17360 Coit Road
Dallas, TX 75252-6599

Jeffrey P. Norrie
Acadian Seaplants Ltd. R&D Division
30 Brown Avenue
Dartmouth, Nova Scotia
CANADA B3B 1 X8

Editorial Assistant

Sharon Omahen

The Quarterly is published four times a year by the Plant Growth Regulation Society of America. *The Quarterly* supercedes the Society's *Bulletin* which was established in 1973 and published 16 volumes until July 1988 (Vol. 16, No. 3). Volume number for *The Quarterly* is continued without interruption beginning with Volume 16, No. 4 in 1988.

PGRSA membership is open to all persons interested in the regulation of plant growth and development. Inquiries regarding membership should be directed to...

Mr. Charles Hall
Executive Secretary
PGRSA
P.O.Box 2945
LaGrange, GA 30241
Telephone (706) 845-9085

The Quarterly is open to papers of merit dealing with all aspects of plant growth regulation and plant growth regulators. Manuscripts will be reviewed by two or more reviewers. Membership in the Society is not required. Newsworthy items, viewpoints and abstracts of theses and dissertations are also published as space permits.

TABLE OF CONTENTS

Articles	Page
Flurprimidol Foliar Sprays Control Growth of New Guinea Impatiens Brian E. Whipker, Ingram McCall, James L. Gibson, and Todd J. Cavins	4
31st Annual Conference Plant Growth Regulation Society of America	9
Annual Meeting Awards	16
PGRSA Publication List	19
PGRSA Steering Committee	20
PGRSA Sustaining Members	21
News Items	22
Till We Meet Again	24
Down The Road	26
Instructions to Authors of Technical Contributions	27

Flurprimidol Foliar Sprays Control Growth of New Guinea Impatiens¹

Brian E. Whipker, Ingram McCall, James L. Gibson, and Todd J. Cavins²

Abstract. Flurprimidol foliar sprays of 5 to 80 mg·L⁻¹ were applied to 'Pure Beauty Fuchsia' New Guinea impatiens (*Impatiens hawkerii* Bull.) for comparison to those of 10 mg·L⁻¹ paclobutrazol and 5 mg·L⁻¹ uniconazole for growth control. A 10 mg·L⁻¹ flurprimidol application resulted in 16% shorter and 14% smaller diameter plants compared to the non-treated control. Uniconazole at 5 mg·L⁻¹ provided similar plant height and plant diameter control as 10 mg·L⁻¹ flurprimidol application. Flurprimidol at 10 mg·L⁻¹, paclobutrazol at 10 mg·L⁻¹, and uniconazole at 5 mg·L⁻¹ delayed flowering by 3 to 4 days compared to the non-treated control. Paclobutrazol at 10 mg·L⁻¹ provided similar height control as 10 mg·L⁻¹ flurprimidol, but less plant diameter control. Application of 10 mg·L⁻¹ flurprimidol or 5 mg·L⁻¹ uniconazole resulted in proportionally sized, smaller diameter plants, which would be economically advantageous due to increased plant density.

Nomenclature: flurprimidol (a-(1-methylethyl)-a-[4-(trifluoromethoxy)phenyl]-5-pyrimidinemethanol) (Topflor), paclobutrazol ((2R, 3R+ 2S, 3S)-1-(4-chlorophenyl)-4,4-dimethyl-2-(1,2,4-triazol-1-yl) pentan-3-ol) (Bonzi), uniconazole ((E)-1-(p-chlorophenyl)-4,4-dimethyl-2-(1,2,4-triazol-1-yl)-1-penten-3-ol) (Sumagic). New Guinea impatiens (*Impatiens hawkerii* Bull.).

Additional Index Words: Bonzi, greenhouse crop production, plant growth retardants, Sumagic, Topflor.

INTRODUCTION

Excessive stem elongation can be problematic for container-grown plants. Plant growth retardants (PGRs) are commonly applied in order to produce high-quality, compact plants (Tayama et al., 1992). Commercial grower PGR recommendations for New Guinea impatiens include foliar sprays of 0.25 to 15 mg·L⁻¹ paclobutrazol (Syngenta, Greensboro, N.C.) or 300 mg·L⁻¹ ethephon (Monterey, Fresno, CA) (Whipker, 2003). Researchers' recommendations also include 67 mg·L⁻¹ ancymidol, 500 mg·L⁻¹ chlomequat, 1500

mg·L⁻¹ daminozide, 5 mg·L⁻¹ paclobutrazol, or 2 mg·L⁻¹ uniconazole to be effective (Corr, 1995; Pasutti and Weigle, 1980). Flurprimidol has been labeled as Cutless (SePRO, Carmel, IN) for ornamental crop use in the U.S. and commercially introduced as Topflor in Europe for greenhouse crops. Topflor (SePRO, Carmel, IN) has been tested on a number of greenhouse plants such as chrysanthemum (*Dendranthema x grandiflorum* Tzvelev) (Pobudkiewicz and Nowak, 1997), cape daisy (*Osteospermum ecklonis* DC) (Olsen and Andersen, 1995), and streptocarpus (*Streptocarpus hybridus* Voss.) (Pobudkiewicz, 2000) in Europe. Commercial recommendations call for foliar sprays of 7.5 to 15 mg·L⁻¹ to New Guinea impatiens (Spiess-Urania, 2001). Topflor has also been found to be effective on argyranthemum (*Argyranthemum frutescens* L. Schultz-Bib.)

¹ Received for publication 31 March, 2003 and in revised form 26 March, 2004.

² Associate Professor of floriculture and corresponding author, research technician, former graduate research assistant currently on faculty at University of Florida, and former graduate research assistant currently on faculty at Oklahoma State Univ., respectively. Dept. of Horticultural Science, Box 7609, North Carolina State Univ., Raleigh, NC 27695-7609.

(Cavins et al., 2003) and six bedding plants (Whipker et al., 2003). Our study was conducted to determine the efficacy of flurprimidol foliar sprays under U.S. growing conditions and compare the resultant growth control with recommended paclobutrazol and uniconazole applications.

MATERIALS AND METHODS

Rooted cuttings of 'Pure Beauty Fuchsia' New Guinea impatiens were transplanted into 750-mL (12.5-cm diameter) round, plastic containers (Dillen Products, Middlefield, OH) on 14 June 2001 using Fafard® 4P root substrate (Fafard, Anderson, SC). Plants were fertigated at each irrigation with 150 mg·L⁻¹ N from Excel® 15-5-15 Cal-Mag (Scotts, Marysville, OH) (15N-2.1P-12.5K). Greenhouse temperature day/night set points were 24/18 °C and the plants were grown under natural daylength with 30% shading. The PGR foliar sprays were applied six weeks after transplanting using a volume of 204 mL·m⁻². Treatments were flurprimidol at 1.25, 2.5, 5, 10, 20, 40 and 80 mg·L⁻¹; paclobutrazol at 10 mg·L⁻¹; uniconazole at 5 mg·L⁻¹; or a non-treated control. The experiment was a completely randomized design with 10 single-plant replications of the ten treatments. Date of anthesis was recorded. On 31 Aug., total plant height (measured from the pot rim to the uppermost part of the inflorescence) and plant diameter (measured at the widest dimension, turned 90°, and averaged) were recorded.

Plant height and diameter values for flurprimidol were regressed using the PROC REG procedure (SAS Inst., Cary, NC) to determine the best-fit linear or quadratic model. Terms of the model were judged to be significant or nonsignificant and included in the final model based on a comparison of F values at $\alpha = 0.05$. The NLIN procedure in SAS, as

modified by Cox (1992), was used to calculate linear-plateau functions (model IV) relating plant height and diameter to flurprimidol foliar spray concentrations. The quadratic (R^2) and the linear-plateau (r^2) models were compared to determine the best-fit models.

RESULTS AND DISCUSSION

Plant height. The response of 'Pure Beauty Fuchsia' New Guinea impatiens plants was best fit to a quadratic model (Fig. 1a and 2). Concentrations of flurprimidol ≥ 10 mg·L⁻¹ were required to achieve significantly shorter plants (16%) than the non-treated control. Flurprimidol foliar sprays of 10 mg·L⁻¹ were comparable to foliar sprays of 10 mg·L⁻¹ paclobutrazol (9.6% shorter than the non-treated control) or 5 mg·L⁻¹ uniconazole (10.4% shorter than the non-treated control). Flurprimidol foliar sprays of ≥ 40 mg·L⁻¹ were considered excessive.

Plant diameter. Plant diameter of 'Pure Beauty Fuchsia' New Guinea impatiens was best fit to a linear-plateau model with no additional response in plant diameter being observed at concentrations of 25.2 mg·L⁻¹ (the joinpoint, x_0) or greater (Fig. 1b). With 25.2 mg·L⁻¹ flurprimidol, plants were 19% smaller in diameter compared to the non-treated control. Flurprimidol foliar sprays of 10 mg·L⁻¹ (35.7 cm) provided a similar degree of control of plant diameter as 5 mg·L⁻¹ uniconazole (36.2 cm) (14% and 12% smaller diameters, respectively, than the non-treated control). Less control of plant diameter occurred with 10 mg·L⁻¹ paclobutrazol (37.4 cm) (9% smaller in diameter than the control). Smaller diameter plants would be advantageous to wholesale producers because a greater number of pots could fit on shipping carts and trucks.

Flowering date. Flowering was delayed by 3 days with flurprimidol concentrations ≥ 5

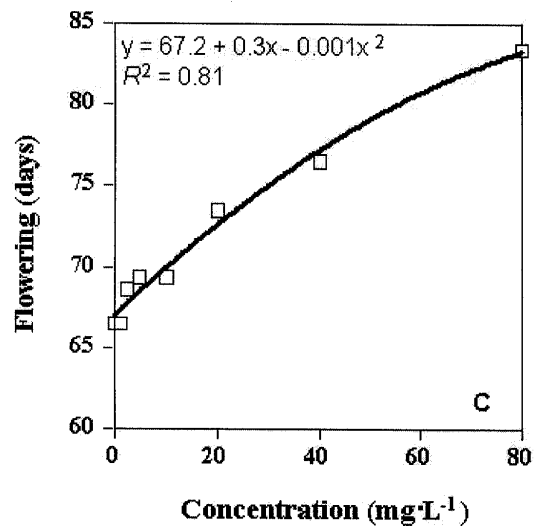
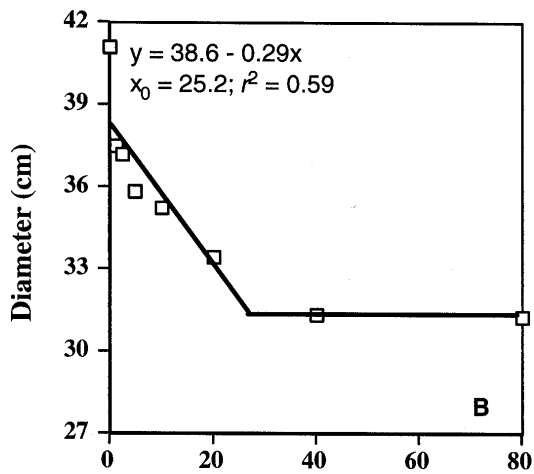
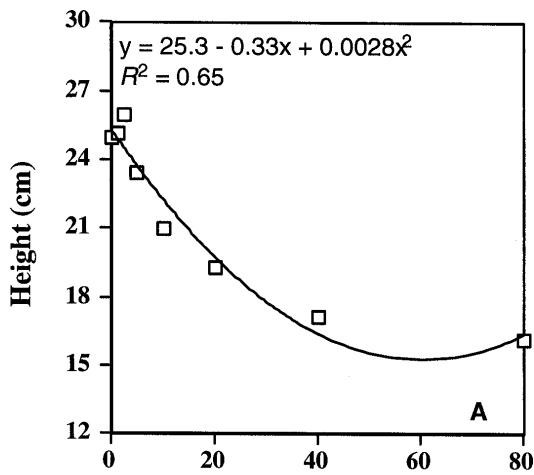


Figure 1. Flurprimidol (0.38% Topflor) foliar spray effects on (a) plant height, (b) diameter, and (c) flowering date of 'Pure Beauty Fuchsia' New Guinea impatiens. The regression lines were generated from the best-fit model (n=10). Paclobutrazol at 10 mg L⁻¹ resulted in plants 22.6 cm tall, 37.4 cm in diameter, which flowered 69 days after transplanting. Uniconazole at 5 mg L⁻¹ resulted in plants 22.4 cm tall, 36.2 cm in diameter, which flowered 71 days after transplanting.



Figure 2. Flurprimidol (0.38% Topflor) foliar spray effects on plant growth of ‘Pure Beauty Fuchsia’ New Guinea impatiens (left to right: non-treated control, flurprimidol at 1.25, 2.5, 5, 10, 20, 40, and 80 mgL⁻¹).

mgL⁻¹ compared to the control (Fig. 1c). A delay of 7 days would be commercially significant for commercial greenhouse operations (M. Bell, SePRO Corp., personal communication) and that occurred with ≥ 20 mgL⁻¹ flurprimidol. Foliar sprays of 10 mgL⁻¹ flurprimidol, 10 mgL⁻¹ paclobutrazol, and 5 mgL⁻¹ uniconazole were all similar in delaying flowering by 3 to 4 days.

Our recommended concentration of flurprimidol at 10 mgL⁻¹ is in agreement with the European grower recommendations of 7.5 to 15 mgL⁻¹ (Spiess-Urania, 2001). Based on observations in the landscape, there was no carryover effect with ≤ 20 mgL⁻¹ flurprimidol. A flurprimidol foliar spray of 10 mgL⁻¹ provided plant growth control and limited flowering delay of ‘Pure Beauty Fuchsia’ New Guinea impatiens comparable to the recommended uniconazole foliar spray of 5 mgL⁻¹. Paclobutrazol at 10 mgL⁻¹ provided similar control of plant height, but less control of plant diameter. Paclobutrazol concentrations higher than the 10 mgL⁻¹ used in this study would have to be tested to determine what concentration would provide plant diameter control comparable to 10 mgL⁻¹ flurprimidol. Use of 10 mgL⁻¹ flurprimidol or 5 mgL⁻¹ uniconazole resulted in plants that

were proportionally sized and smaller in diameter, which would be an economic advantage to commercial growers due to increased plant density on greenhouse benches.

ACKNOWLEDGMENTS

This research was funded in part by the North Carolina Agricultural Research Service (NCARS), Raleigh, NC. Use of trade names in this publication does not imply endorsement by the NCARS of products named nor criticism of similar ones not mentioned. Thanks to The Flower Fields for the plant material, Fafard Inc. for the root substrate, Scotts Co. for the fertilizer, Dillen Products for pots, and for grant support, the North Carolina Commercial Flower Growers’ Association and SePRO Chemical Co.

LITERATURE CITED

- Cavins, T. J., L. Greer, J. L. Gibson, B. E. Whipker, and J. Dole. 2003. Response of marguerite daisy (*Argyranthemum frutescens*) 'Comet Pink' to plant growth regulators. PGRSA Quarterly 31(1):2-7.
- Corr, B. 1995. Seed New Guinea impatiens: seed to plug to finish. Pp. 105-111. In: New Guinea Impatiens (W. Banner and M. Klopmeier, Eds.). Ball Publ., Batavia, Ill.
- Cox, F. R. 1992. Range in soil phosphorus critical levels with time. Soil Sci. Soc. Amer. J. 56:1504-1509.
- Olsen, W. W. and A. S. Andersen. 1995. Growth retardation of *Osteospermum ecklonis*. Acta Hort. 397:129-138.
- Pasutti, D. W. and J. L. Weigle. 1980. Growth-regulated effect on New Guinea impatiens hybrids. Scientia Hort. 12:293-298.
- Pobudkiewicz, A. 2000. Controlling the growth habit of *Streptocarpus hybridus* with flurprimidol. J. Fruit and Orn. Plant Res. 8(1):9-17.
- Pobudkiewicz, A. and J. Nowak. 1997. Response of chrysanthemum (*Dendranthema grandiflora* Tzvelev) cvs. Altis and Surf to flurprimidol application. J. Fruit and Orn. Plant Res. 5(1):135-142.
- Spiess-Urania. 2001. Topflor. pp. 464-472. In: Spiess-Urania Chemicals GMBH Produktinformation. 2002, Hamburg, Germany.
- Tayama, H. K., R. A. Larson, P. A. Hammer, and T. J. Rolls, Eds. 1992. Tips on the use of chemical growth regulators on floriculture crops. Ohio Florists' Association, Columbus, Ohio, 92 pp.
- Whipker, B. E. 2003. Plant growth regulators for floriculture crops. pp. 34-43. In: 2003-2004 North Carolina Commercial Flower Growers' Assn. Handbook, NCCFGA, Raleigh, N.C., 64 pp.
- Whipker, B. E., I. McCall, J. L. Gibson, and T. J. Cavins. 2003. Efficacy of flurprimidol (Topflor) on bedding plants. Acta Hort. (ISHS) 624:413-418.

31st Annual Conference
Plant Growth Regulation Society of America
August 1-4, 2004
Charleston Riverview Hotel
170 Lockwood Blvd., Charleston SC 29403

The 31st annual meeting of the Plant Growth Regulation Society of America will be held in the Charleston Riverview Hotel, August 1-4, 2004. This unique event is an opportunity for researchers, scientists, and industry professionals interested in all aspects of plant growth regulation, including plant growth substances and natural products, to learn and present the most recent advances in this growing field.

Rendezvous with history in Charleston, South Carolina. For more than 300 years, the city of Charleston and its surrounding areas have been making visitors feel welcome and hosting successful meetings. Charleston has a rare combination of a carefully preserved but fully accessible historical district, a flavor rich in culture and cuisine, and multiple local attractions. By day, visit the historical pre Civil War Charleston, the Charleston Aquarium, Patriots Point, the largest naval museum in the world, local plantations, military fortifications, craft markets, art galleries and coastal beaches. By night, visit the many restaurants, theaters and comedy clubs that make Charleston home to the world famous Spoleto Arts Festival, or, take a Charleston ghost walk to connect with the denizens of Charleston's past.

The preconference tour will be a Sunday, August 1, afternoon trip to see the Confederate Submarine, H. L. Hunley. On February 24, 1864 the H. L. Hunley successfully sank the Housatonic, a Union warship blockading the Charleston Harbor. After this first successful submarine attack in history, the Hunley flashed a blue light signaling she was returning only to mysteriously sink beneath waters until August 8, 2000, when the submarine was raised and her crew given a full military burial. You will see the Hunley at the Warren Lasch Conservation Center in North Charleston. You will also visit Patriot's Point, the world's largest naval and maritime museum, where the famous fighting lady of WWII, the aircraft carrier, Yorktown, the Laffey, a participant of D-Day at Normandy, and other WWII fighting ships and boats, as submarines are called, are on display.

Registration will begin Sunday, August 1, at noon followed by an evening Opening Reception featuring the famous low country fare of Charleston. The scientific program will begin on Monday, August 2.

Four research symposia covering both basic and applied science will be featured at the 2004 meeting: (1) **Trends and Uses of PGRs in Ornamentals and Greenhouses** organized by Drs. Brian Whipker and Ray Kessler; (2) **Hormone Delivery Systems** organized by Dr. Sonja Maki; (3) **Physiology and Gene Expression between PGR Application and Desired Plant Response** organized by Dr. Edward Stover; and (4) **Conifer Tree Architecture** organized by Drs. Ron Smith and Hannah Rasmussen.

Contributed papers of original research on all aspects of plant growth regulation from the fundamental to the most applied research are welcomed. There will be a large allotment of time and space for contributed papers and posters, as well as a special industry workshop and sustaining members' breakfast to highlight industry developments and issues. All presentations will be published in the 2004 Proceedings of the Plant Growth Regulation Society of America. Graduate students are particularly encouraged to submit contributed papers and posters and enter the graduate student competition. Cash prizes are awarded for best oral and poster presentations. Two travel awards are also available for graduate students. An award is available to support travel and presentation of research for young scientists at the annual meeting. For updated schedules visit our web site at <http://www.griffin.peachnet.edu/pgrsa/>.

The conference will end on Wednesday, August 4, with a gala colonial evening in the most important building in historic Charleston, the Old Exchange and Provost Dungeon. Enjoy an hors d'oeuvres reception and take a tour, complete with period-costumed guides, in rooms where George Washington once negotiated for military support and the dungeon where the debtors of colonial Charleston languished.

Conference Hotel Information

The meeting will be held at the Charleston Riverview Hotel located at 170 Lockwood Blvd. in Charleston, overlooking the Ashley River, Brittlebank Park and the Joe Riley Baseball Park, home of the 'Charleston River Dogs.' The hotel has ample free parking and is conveniently located 10 miles/20 minutes from the Charleston International Airport. Local commercial shuttles are available.

The hotel has an outdoor pool and sundeck, fitness room and gift shop. All guestrooms have coffeemakers, hairdryers, irons and ironing boards, free cable and HBO, and data port phones. Two concierge and business class floors are available. Park your car at the hotel and enjoy historic Charleston the best way, on foot. The hotel is just a seven-minute trolley ride from downtown historic Charleston via the Broad Street Shuttle which stops immediately in front of the hotel twice an hour from 8 AM through 11 PM daily. Trolley passes will be given to all meeting registrants and registered accompanying persons. Children under six ride free if accompanied by an adult.

The hotel also has a café for breakfasts and light meals. However, the meeting and accompanying person registration includes virtually all meals from Sunday PM through Wednesday PM. Daily continental breakfasts, lunches, morning and afternoon refreshments, and Sunday, Tuesday and Wednesday evening receptions featuring heavy hors d'oeuvres and tickets for two complimentary drinks are included in participant and accompanying person registrations. Monday evening is the only time food is not provided. The receptions will feature the low country fare for which Charleston is famous.

Meeting room rates are \$109 plus 12% taxes and are available three days before and after the meeting. Reservations must be made no later than May 31, 2004 in order to guarantee this excellent rate. After that date, the rate will be honored only if space is available. To make

reservations, please call the hotel directly (1-843-723-3000) and ask for the PGRSA meeting room rate. You can obtain general information on the hotel by linking directly to their web site (<http://charlestonriverviewhotel.com>).

Charleston, South Carolina and Surroundings

Charleston is unique among the cities of the South in that it was not destroyed by Sherman's march to the sea during the Civil War. The lovely antebellum historical district homes remain intact. A carriage ride through historical Charleston at night is the same way a privileged Charlestonian cotton planter would have traveled. Only the many art galleries, restaurants, theaters and clubs in the evening entertainment district remind one that it is now the 21st century. During the day, visitors have the option of taking tours to see Patriots Point, the world's largest naval museum, Fort Sumter, where the Civil War began, the Charleston Aquarium, local 'Gullah' ware markets, the local barrier islands and working plantations, or taking self-guided excursions. Shopping, particularly for the local 'Gullah' woven reed wares and local art, is readily available. Ocean beaches, golf, tennis, and the Charleston 'River Dogs', the local baseball team, are all within half an hour of the hotel. Day and evening cruises of the Ashley and Cooper Rivers that flank Charleston and lead to the sea depart daily from the port. Charleston is the third ranked vacation destination in the US.

Transportation / Parking

Charleston International Airport (CHS) is served by most major airlines. Commercial shuttles are readily available for transportation to the hotel only 10 miles or 20 minutes away. All major car rental agencies are available at the airport. Taxi service is also available curbside in the domestic arrivals area for all arriving flights. For those driving to the conference, there is plenty of parking available to guests of the hotel at no cost. However, a car is not necessary to reach downtown Charleston from the hotel as all meeting participants and registered accompanying persons will be given shuttle passes good through the duration of the meeting. The Broad Street Shuttle stops in front of the hotel two times per hour daily from 8 AM through 11 PM. Parking in downtown historic Charleston is limited and expensive. Therefore, if you would like to see the area surrounding Charleston before or after the meeting, it may be less expensive to rent a car for that time only as one is unnecessary during the meeting.

2004 PGRSA Annual Meeting Registration Form

 (Dr., Mr., Mrs., Ms.) First Name Middle Initial Last Name

 Professional Affiliation (Business, University, Department, etc.)

 Mailing Address (Street or Post Office Box)

 City State/Province/Department Postal Code Country

 Telephone Fax E-mail

Standard Registration (includes receptions, breaks, and luncheon)
 PGRSA Members - \$295 (\$345 after June 1) \$ _____
 Non-Members - \$345 (\$395 after June 1) \$ _____

Student Registration - \$90 (\$110 after June 1) \$ _____

Accompanying person - (Includes receptions, business luncheon)
 Adult - \$125 \$ _____
 Child - \$50 \$ _____

One-day registration fees
 Sunday - \$50 (Includes opening reception) \$ _____
 Monday - \$100 \$ _____
 Tuesday - \$125 (Includes poster reception) \$ _____
 Wednesday - \$125 (Includes awards luncheon and final Gala) \$ _____

PRGSA MEMBERSHIP _____ 2004 _____ 2005
 North America: \$40; International \$55; Student \$15; Sustaining \$500 \$ _____

Total Fees \$ _____

 Credit Card_Type (AmEx, MC, Visa) Card Number Expiration Date

 Signature

Please submit payment in U.S. currency drawn on a U.S. bank. Make checks or other methods of remittance payable to the Plant Growth Regulation Society of America. Send payment and completed registration form, or address questions regarding registration to:

Charles T. Hall, Jr., Executive Secretary Phone: (706) 845-9085
 Plant Growth Regulation Society of America Fax: (706) 883-8215
 P.O. Box 2945, LaGrange, GA 30241 Email: chall@asginfo.net

CALL FOR ABSTRACTS

The Society invites presentations in any area of plant growth regulation and natural products. Abstracts are due by May 15, 2004. All abstracts will be published in Issue 2 of the 2004 *PGRSA Quarterly*. Papers may be given as oral or poster presentations. Oral presentations will be limited to a total of 15 minutes, including discussion. All oral presentations will be PC-based PowerPoint and must be on CDs or USB bus. The PGRSA especially encourages students to submit papers, with a \$250 award being given for each of the two top student presentations. A 4 x 4 foot (120 cm x 120 cm) backing will be provided for poster displays and authors will be assigned a time to present their posters during the reception planned for Tuesday evening, August 3. Membership in PGRSA is not a requirement for submission of abstracts; however, it is strongly encouraged. The PGRSA needs strong membership support to conduct its mission and welcomes members from a wide range of disciplines.

INSTRUCTIONS FOR PREPARING ABSTRACTS / MANUSCRIPTS

The entire abstract, including title, authors, and addresses will be reproduced exactly as submitted **without reduction or enlargement**. Please fit the abstract in a box of dimensions 14 cm (5.5 in.) wide by 8.9 cm (3.5 in.) high. This will permit about 20 lines of 64 characters (Times New Roman) per line at 12 characters per inch. The entire abstract must fit within the box! Type the title in full capitals, beginning at the top left corner of the box. Place the author(s) name(s) underlined on the second line. Where there is more than one author, indicate the presenter with an asterisk*. Place the authors' address(es) beginning on the third line. Begin the body of the abstract on the next line, indenting five spaces. Single-space the entire abstract including the title, author(s) and address lines. An example abstract is included below.

**PROPER FORMAT FOR ABSTRACT PREPARATION FOR THE 31st ANNUAL
PGRSA CONFERENCE IN CHARLESTON, SOUTH CAROLINA**

L. Ferguson^{1*} and E. Curry²

¹Department of Pomology, University of California, Davis, Kearney Agricultural Center, 9240 South Riverbend Ave., Parlier CA 93648 USA

²USDA, ARS, Tree Fruit Research Laboratory, 1104 N. Western Avenue, Wenatchee, WA 98801 USA

The body of the abstract should begin immediately below the affiliation and be indented 5 spaces. The abstract should contain a clear and concise summary of the research to be presented. The abstract should not exceed 20 lines of text (Times New Roman; 12 CPI) and it should fit within a box that does not exceed a width of 14 cm (5.5 in.) and a height of 8.9 cm (3.5 in.). Please keep in mind that the width and height of this sample abstract box displayed on your computer screen will depend on your screen size and browser (when viewed through the internet). For guidance, please consult Volume 31, No. 2 of the *PGRSA Quarterly*, which contains the abstracts from the 2003 annual meeting.

ABSTRACTS ARE DUE May 15, 2004.

All presenters are expected to submit either an expanded abstract or a full-length manuscript based on their talk or poster at the time of the meeting. (The expanded abstract or manuscripts are distinct from the brief abstract to be submitted by May 15, 2004.) These will be published in the proceedings of the meeting. Detailed instructions for preparation of expanded abstracts and manuscripts will be sent to authors after the program chair receives the abstract.

SUBMISSION OF ABSTRACTS

Authors should send their abstracts via email as a Microsoft Word (preferably) or WordPerfect attachment to program assistant joann@uckac.edu, formatted as described above. (Please note PGRSA in subject line of your email.) All abstracts must be received by May 15, 2004 for acceptance to be guaranteed. If email is not available, authors should send one hard copy postmarked by May 15, 2004 and received no later than June 1, 2004 for acceptance to be guaranteed. The inclusion of a 3.5" diskette, containing an electronic copy of the abstract(s) is encouraged.

Include with the abstract...

Name: _____

Affiliation: _____

Complete Address: _____

Telephone: _____ FAX: _____

E-mail address: _____

Choice of presentation: _____ Oral _____ Poster

Are you eligible for the Graduate Student Competition? _____ Yes _____ No

From the list below choose three categories (in ranked order) best describing your abstract:

- | | |
|----------------------------------|---------------------------------|
| _____ Assimilate Partitioning | _____ Biotic and Abiotic Stress |
| _____ Cell and Tissue Culture | _____ Flowering |
| _____ Seed and Fruit Development | _____ Fruit Development |
| _____ Senescence | _____ Gene Expression |
| _____ Tropisms | _____ Metabolism |
| _____ Natural Products | _____ Photoregulation |
| _____ Other | |

The program chairs will make every effort to group presentations by these categories.

To submit abstracts or for more information contact:

Dr. Louise Ferguson, Program Chair
Ms. JoAnn Coviello, Program Assistant
Plant Growth Regulation Society of America
Department of Pomology @ UCKAC
9240 South Riverbend Ave.
Parlier, CA 93648
Phone: (559) 646-6500
Fax: (559) 646-6593
Email: Louise@uckac.edu
Email: Joann@uckac.edu

Mr. Charles T. Hall, Jr., Executive Secretary
Plant Growth Regulation Society of America
P.O. Box 2945
301 South Broom Street, Suite 203
LaGrange, GA 30241
Phone: (706) 845-9085
Fax: (706) 883-8215
Email: chall@asginfo.net

2004 PGRSA ANNUAL MEETING AWARDS

Graduate Student Paper and Poster Awards

These competitive awards are presented in recognition of outstanding performance in oral and poster presentations by graduate students presenting research on plant growth regulation at the annual meeting. The Outstanding Paper and Poster Awards, which have been presented at the annual meeting since 1992, each consists of a \$250 payment and an award certificate highlighting the accomplishment. The awards underscore Bayer CropScience's commitment to the field of plant growth regulation. Bayer CropScience and the Plant Growth Regulation Society of America encourage all interested graduate students to participate at the annual meeting.

Graduate Student Travel Awards

As in previous years, travel awards will be offered for the 31st annual meeting of the Plant Growth Regulation Society of America. PGRSA will award two travel grants in the amount of \$500 each on a competitive basis to be used by graduate students to help defray the cost of travel to its 31st Annual Conference in Charleston, South Carolina, August 1-4, 2004. The student registration fee also will be waived. To be eligible the student must be the senior author of an abstract submitted for consideration either as a poster or oral presentation at the conference. The travel award will be made to both the student and the major professor, but the funds can only be used by the student.

Young Scientist Travel Award

PGRSA has recently established an award to recognize outstanding accomplishments in the field of plant growth regulation by young scientists. The award will be made in May 2004 for the 31st Annual Meeting in Charleston, South Carolina, August 1-4, 2004. To be eligible for this year's award of \$500 plus waiver of registration for the annual meeting, applicants or nominees 1) must be conducting research in the area of plant growth regulation, and 2) must have completed their final degree within 5 years of application. Previous recipients of this award are not eligible.

Applications for awards are due May 15, 2004

Graduate Student Travel Award Application - 2004 PGRSA

(Please retain a copy of this application form for your records)

Name: _____ Major Professor: _____
Address: _____
Institution: _____
City: _____ State: _____ Country: _____
Postal Code: _____ Phone: _____ FAX: _____
Email: _____

TITLE OF PRESENTATION: _____

ABSTRACT: Attach a copy of your abstract for the 2004 program. (One copy should have already been submitted to Dr. Louise Ferguson; Program Chair, Louise@uckac.edu and Ms. JoAnn Coviello; Program coordinator, joann@uckac.edu; UCKAC, 9240 South Riverbend Ave. Parlier CA 93648 USA

EDUCATION:

Graduate Degree Specialization Institution Date: Award/Expect

For current degree: Number of hours completed: Grade Point Average:

AWARDS AND HONORS: _____

PROFESSIONAL ACTIVITIES: (Conferences attended, formal presentations, publications, society memberships, etc.) _____

STATEMENT: On a separate page, briefly explain how attendance and participation in the PGRSA annual conference will advance your career goals. Why do you think you should be selected to receive a travel award?

Applications for awards are due May 15, 2004 and should be mailed to:

Dr. Caula A. Beyl, PGRSA Travel Award Chairperson
Department of Plant Sciences, Alabama A&M University
P.O. Box 1208
Normal, AL 35762
Email: cbeyl@aamu.edu

Young Scientist Travel Award Application 2004 PGRSA

(Please retain a copy of this application form for your records)

APPLICANT OR NOMINEE:

Name: _____
Institution: _____
Address: _____
City: _____ State: _____ Country: _____
Postal Code: _____ Phone: _____ FAX: _____
Email: _____
Date of Birth: _____ Place of Birth: _____
Nominator (if applicable): _____
Address: _____
City: _____ State: _____ Country: _____
Postal Code: _____ Phone: _____ FAX: _____
Email: _____

REQUIREMENTS:

- 1. Vita:** A complete vita of the applicant/nominee outlining his/her significant contributions to the study of plant growth regulation and the goals of the Society.
- 2. Letter from Applicant/Nominator:** Letter explaining why the applicant/nominee is well qualified to receive the award.
- 3. Abstract or Summary:** An abstract of the research to be published in the Proceedings and presented as an oral paper at the annual meeting.
- 4. Photo and Biographical Sketch:** A black and white head and shoulder photo approximately 4 X 5 inches (10 X 13 cm) must be submitted, together with a single paragraph biographical sketch of the applicant or nominee. The photograph and sketch will be used for the PGRSA Quarterly and publicity if the nominee is selected. They are not used in the selection process.

Send three (3) copies of the application packet (only 1 photo) by May 15, 2004 to:

Dr. Louise Ferguson; Program Chair
% Ms. JoAnn Coviello; Program Coordinator
University of California, Kearney Agricultural Center
9249 South Riverbend Ave.
Parlier CA 93648 USA
Phone: 559-646-6525
Fax: 509-664-6593
Joann@uckac.edu
Louise@uckac.edu

Award notification will be made by May 30, 2004

2004 PGRSA

Charles T. Hall, Jr. - Executive Secretary
PGRSA
P.O. Box 2945
LaGrange, GA 30241
Phone: 706-845-9085

MEMBERSHIP**	COST*
Membership for 2004	
U.S./Canada/Mexico	40.00
International	55.00
Student	15.00
Sustaining	500.00
 PUBLICATIONS	
Current Proceedings	
U.S./Canada/Mexico	40.00
International	55.00
Back Issues (1979-2001) Indicate Year _____	30.00
 Plant Growth Regulator Handbook - 1990	30.00
 Chemical Vegetation Management - 1988	40.00
 Bioassay Handbook - 1986	20.00
 PGRSA Membership Directory - 1999	16.00
 PGRSA Quarterly Back Issues	18.00

*All prices include shipping

**All memberships include *PGRSA Quarterly*; Proceedings available at an additional charge. Please make payments in U.S. currency drawn on a U.S. bank. Make checks payable to Plant Growth Regulation Society of America. Send check and this invoice to the address shown above. AmEx, MC and VISA accepted.

PGRSA STEERING COMMITTEE 2003-04

[Http://www.griffin.peachnet.edu/pgrsa/comite.htm](http://www.griffin.peachnet.edu/pgrsa/comite.htm)

Dr. Wayne A. Mackay (Past President)

Texas A&M Research & Extension Center
17360 Coit Road, Dallas, TX 75252-6599
(972) 231-5362 (972) 952-9216 (Fax)
w-mackay@tamu.edu

Dr. Eric A. Curry (President)

USDA/ARS
Tree Fruit Research Laboratory
1104 Western Ave.
Wenatchee, WA 98801
(509) 664-2280, ext. 209
(509) 664-2287 (Fax)
curry@tfrl.ars.usda.gov

Dr. Louise Ferguson (1st Vice-President)

Kearney Agricultural Center
9240 South Riverbend Ave.
Parlier, CA 93648
(559) 646-6541 (559) 646-6593 (Fax)
louise@uckac.edu

Dr. Sonja L. Maki (2nd Vice-President)

Biology Department
Carleton College
One North College St.
Northfield, MN 55057
(507) 646-4544 (507) 646-5757 (fax)
smaki@carleton.edu

Dr. Ed. Stover (Secretary)

University of Florida
Indian River Research & Education Center
2199 South Rock Road
Ft. Pierce, FL 34945
(772) 468-3922 ext. 130 (772) 468-5668 (fax)
ewstover@mail.ifas.ufl.edu

Dr. Ricardo A. Menendez (MAL-3)

Valent BioSciences Corporation
870 Technology Way, Suite 100
Libertyville, IL 60048
(847) 968-4715 (847) 968-4801 (Fax)
ricardo.menendez@valent.com

Dr. Jeffrey P. Norrie (MAL-2)

Acadian Seaplants Ltd. - R&D Division
30 Brown Ave.
Dartmouth, Nova Scotia
CANADA B3B 1 X8
(902) 468-2840 (902) 468-3474 (fax)
jnorrie@acadian.ca

Dr. Ron Smith (MAL-1)

Natural Resources Canada
Canadian Forest Service
P.O. Box 4000
Fredericton, NB E3B 5P7, Canada
(506) 452-3533
(506) 452-3525 (fax)
rosmith@nrcan.gc.ca

Dr. Richard T. Dunand (Business Mgr.)

Rice Research Station
P.O. Box 1429, Crowley, LA 70527-1429
Shipping: 1373 Caffey Rd., Rayne, LA 70578
(337) 788-7531 (337) 788-7553 (Fax)
rdunand@agctr.lsu.edu

Dr. Thomas Tworkoski (Exec. Officer)

USDA-ARS
Appalachian Fruit Research Station
45 Wiltshire Road, Kearneysville, WV 25431
(304) 725-3451, ext. 390 (304) 728-2340 (Fax)
ttworkos@afrs.ars.usda.gov

Dr. Caula A. Beyl (Editor, PGRSA Quarterly)

Dept. of Plant and Soil Science
Alabama A&M University
P.O. Box 1208, Normal, AL 35762
(256) 372-8093 (256) 372-8162 (Fax)
caula.beyl@email.aamu.edu

Mr. Charles T. Hall, Jr. (Exec. Secretary)

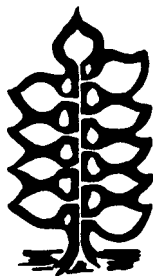
ASG/PGRSA
P.O. Box 2945, La Grange, GA 30241
Shipping address: 301 Broome St., Suite 203
La Grange, GA 30240
(706) 845-9085 (706) 883-8215 (Fax)
chall@asginfo.net

2003 PGRSA SUSTAINING MEMBERS

Acadian Seaplants Limited - Jeffrey Norrie
Amvac Chemical Corporation - John Immaraju
Bayer CropScience - Jim Collins
BAL Planning Co., Ltd. - Yasuo Kamuro
BASF - John Harden
Dormex Co. USA, LLC - Maurice DeBenedetto
Dynamac Corporation - Gary Stutte
Fine Agrochemicals Ltd. - Steve Wilson
Nufarm Americas Inc. - James Spadafora
Olympic Horticultural Products - Jeffrey Dobbs
PBI/Gordon Corp. - Gary Custis
SePro Corporation - Michelle Bell
Stoller Enterprises, Inc. - Jerry Stoller
Syngenta Professional Products - Dennis Shepard
Valent BioSciences Corporation - Prem Warrior

2003 PGRSA ANNUAL MEETING SPONSORS

Acadian Seaplants, Ltd. - Jeffrey Norrie
Dormex Company USA, LLC - Maurice DeBenedetto
Fine Agrochemicals, Ltd. - Steve Wilson
Stoller Enterprises, Inc. - Jerry Stoller
SePRO Corporation - Michelle Bell
Valent BioSciences Corporation - Ricardo Menendez



News Items

A Tribute To Bruce Bernot Stowe 1927-2003

The first time I met Bruce Stowe, I was particularly struck by his warm personality. During the late 1950's and early 60's we were both independently engaged in solving the enigma of the plant growth (PGR) properties of the long fatty acids and alcohols. These compounds had been irritatingly seductive in that when they worked, plant growth was dramatic. The problem was that one could never predict exactly when they would elicit a response, except to say that they did so 50 percent of the time; but the exact 50 percent was never predictable – as the flipping of a coin for 'heads or tails' illustrates only too well. We had both burned much midnight oil attempting to solve the riddle, which still remains with us today. Hence, when we finally met face-to-face, we found ourselves to be zealous companions in science, the latter being the motto of Sigma Xi, a scientific society to which we both belonged.

Scientifically, Bruce had a sterling record. He was a giant in the field of plant growth regulators and he was part of that small, influential phalanx of plant physiologists who were the backbone of that discipline when it was emerging in the 1950's. Born in France, he took his BS at the California Institute of Technology in 1950, then, at Harvard University he won his MA (1951) and PhD (1954). He also had an honorary degree, an MA, from Yale University which, considering the rivalry between the two institutions, was quite a feat. His other accolades and accomplishments are many and may be viewed in "American Men and Women of Science".

Bruce was plagued by ill health during his final years, but he was comforted by his family and, as the letter announcing his death stated he "...went down teaching." He had wanted to donate his body to a medical school, but a better option existed and that was the donation of "tissues" which are more easily stored and used. Importantly, Bruce's final wish caused the entire tissue donor system to be positively reevaluated.

I shall miss Bruce, but I have a sneaking feeling that as I write he is standing over my shoulder, chuckling in a pleasant way. After all, when he finally met the Creator, I bet he asked Him, "How do the long chain fatty acids and alcohols exert their PGR properties?" The Creator winked and Bruce had the answer.

Submitted by Hank Cutler

Changes in the Editorial Team of the Plant Growth Regulation Society *Quarterly*

After serving diligently in the capacity of Associate Editor for PGRSA for nine years, Carole Bassett has stepped down, but she continues to support the activities of the Plant Growth Regulation Society of America. *The Quarterly* can only continue with the generous donation of time and effort of Associate Editors, and Carole's dedication and long time of service is certainly appreciated.



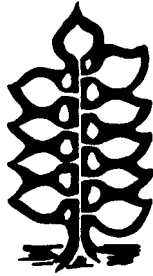
Carole Bassett

Joining the *Quarterly* editorial team as a new Associate Editor is Jeff Norrie. Jeff represents important industry perspective, since he is the Agricultural Research Manager with Acadian Seaplants Ltd. He received his doctoral degree from Laval University and brings to the position expertise in plant stress physiology and natural plant growth regulation. His past work has focused on assimilate translocation and field studies using plant growth regulators in intensive cereal management systems, greenhouse vegetable horticulture and fertility management in turf and ornamentals. His work with Acadian involves fundamental and practical research on the use of seaweed products in agriculture with particular interest in cytokinins and other stimulatory organic compounds.



Jeff Norrie

Jeff currently sits on several committees with the American Society of Horticultural Science and serves as Member at Large-2 for the Plant Growth Regulation Society. He has reviewed many articles on in-house university review committees as well as ad hoc reviews for USDA and Canadian government funding agencies. PGRSA is pleased to welcome Jeff in this new capacity.



Till We Meet Again

January 14 - 15, 2004

Western Plant Growth Regulator Society
Sacramento, California
Email djbarcel@sbcglobal.net for more information.

February 19-20, 2004

Plant Responses to Abiotic Stress
Sante Fe, New Mexico
www.keystonesymposia.org

March 23 - 28, 2004

International Society for Horticultural Sciences (ISHS)
Symposium for "Protected Culture in a Mild-Winter Climate"
Orlando, Florida
www.ipgsa.org

May 4, 2004

Plant Micropropagation Symposium
Leu Gardens, Orlando, Florida
Sponsored by IAPTC and IPPS
www.hort.cornell.edu/IAPTCB

May 24 - 28, 2004

3rd International Symposium on Plant Dormancy:
From Molecular Level to Whole Plant
Wageningen, The Netherlands
www.seedcentre.nl

July 10 - 15 2004

The 7th International Plant Cold Hardiness Seminar
Hokkaido University, Sapporo, Japan
<http://news7a1.atm.iwate-u.ac.jp/~ipchs/index.htm>

July 17 - 20, 2004

American Society for Horticultural Science
101st Annual International Conference
Renaissance Hotel, Austin, TX
<http://www.ashs.org/annualmeeting/index.html>

July 24-28, 2004

American Society of Plant Biologists Annual Meeting
Disney's Coronado Springs Resort & Convention Center
Lake Buena Vista (near Orlando), Florida
www.aspb.org/meetings/pb-2004/

July 31 - August 4, 2004

31st Annual Meeting of the Plant Growth Regulation Society of America
Charleston, South Carolina
www.griffin.peachnet.edu/pgrsa/events.html

July 31 – August 4, 2004

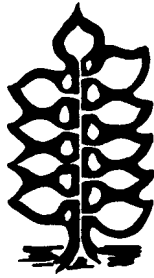
American Phytopathological Society Annual Meeting
Anaheim Convention Center, Anaheim, CA
www.apsnet.org/meetings

August 28 - 31, 2004

17th Annual Lettuce and Leafy Vegetable Conference
Hotel Sandman (Longueuil), Quebec, Canada
www.cshs.ca/ILLVC2004

September 20 - 24, 2004

18th International Conference on Plant Growth Substances
Canberra, Australia
www.conlog.com.au/ipgsa2004



Down the Road

July 10 -15, 2005

Xth International Turfgrass Research Conference

Llandudno, North Wales, UK

www.aber.ac.uk/itrc2005

June 26 - 30, 2005

10th International Symposium on Plant Bioregulators in Fruit Production

Saltillo, Mexico

www.salttillo2005.org

Plant Growth Regulation Society of America
Instructions to Authors of Technical Contributions

Send three clear copies of the typed manuscript and all illustrations to...

PGRSA Editor, Caula Beyl
Dept. of Plant & Soil Sciences
Alabama A&M University,
P.O. Box 1208
Normal, AL 35762
Email: cbeyl@aamu.edu.

Manuscripts will be reviewed for technical content and presentation by two or more reviewers.

Retain the originals of the manuscript and illustration until the manuscript is accepted. Manuscripts submitted in Microsoft Word 2000 and WordPerfect 6.0 or higher for Windows are preferred; however, WordPerfect 3.0 (or higher) or Microsoft Word 6.0 (or higher) for the Macintosh will be accepted. The contents of the articles must not have been published previously or submitted elsewhere, other than as an abstract of an oral or poster presentation.

The *PGRSA Quarterly* conforms to the Council of Biological Editors Style Manual, ed 5, 1983, Council of Biology Editors, Inc., Bethesda, MD. Manuscripts should conform to accepted standards of English style. The *PGRSA Quarterly* does not have a technical editorial staff to provide complete redactional services. However, we will attempt to assist authors to improve clarity and conciseness where desirable.

ISSN #1042-3524