## 47<sup>th</sup> Meeting Weed Science Society of America

Location of Special Committees & Activities	1
Local Arrangements Committee	1
President's Welcome	2
The 2007 Program	2
2007 Program Committee	5
General Information	5
Committee Meetings	6
Summary of 2007 Program	9
Complete Program	13
Meeting Room Maps	50
Author Index	64
Common Herbicides	81
WSSA Board of Directors	85
WSSA Committees	86
WSSA Founder Award	93
WSSA Original Honorary Members	94
WSSA Fellows	94
WSSA Honorary Members	96
WSSA Past Presidents	96
Notes	98
Personal Time Schedule	100
Sustaining Members Inside Back Co	over

## Location of Special Committees and Activities February 2007

Photo Contest Display	Regency West
Photo Contest Judging*	Chula Vista Boardroom
Placement Service Information and	
Interviews	Medina
Registration (Including Spouses)	Los Rios Foyer
Board Meeting	Live Oak
CD Preview Room	Medina

<sup>\*</sup>Photos must be delivered to Registration Desk by 1:00 p.m. Monday, February 5th.

## Local Arrangements Committee 2007–San Antonio, Texas

Chair	Paul Baumann
Registration	James Grichar, Gary Schwarzlose
Exhibits and Posters	Gaylon Morgan
Computers/LCD loading	Peter Dotray, Todd Baughman
Leafy Greens Tour	Russ Wallace

#### Welcome to San Antonio

Welcome to the 47th Annual Meeting of the Weed Science Society of America. Jill Schroeder, Program Chair, and the Program Committee, have planned an exciting meeting that is educational and full of opportunities to meet other weed scientists as well as people who do not normally attend our meetings. There are opportunities to take a tour of the Wintergarden region of Texas on February 4, and a special one-day workshop on "Statistical Assessment of Dose-Response Curves with Free Software" on February 5. In addition there is a day long symposium, "Nursery Stock vs. Invasive Plant: Which Is It, and Why Do We Care?" on Thursday. This symposium will be widely advertised to attract a broad audience including local residents. Please take the time to thank the Program Chair, the Program Committee, and the Local Arrangements Committee for the hard work that has gone into planning the meeting.

The Awards Reception will be held Monday from 7:00 to 8: 00 pm. Please attend to congratulate the winners and to renew friendships. We have a special addition to our Awards presentation on Monday. Dr. Gale Buchanan, USDA Under-Secretary for Research, Education, and Economics, has accepted our invitation to share his vision on the future of Agricultural Research. Please take the time at the Awards reception to introduce yourself and to thank him for taking the time to visit with us as well as to share your views on the future of weed science.

Please participate in the noontime Roundtable discussion on Wednesday on the proposed new society journal Journal of Invasive Plant Science and Management and in the Business Meeting on Wednesday evening at 5:15 pm. This meeting is an opportunity for all members to speak and offer input for the direction of the society. A second reception will be held on Wednesday night after the Business Meeting where we can have further discussions on the future of our society. The Board of Directors is interested in your ideas and opinions so please attend all of these activities. This meeting is the end of my term as President. Thank you for allowing me to serve in this capacity. It has been a busy year and I have enjoyed it. I want to thank Joyce Lancaster for all of the help and support that she provided during the past two years of my tenure on the Board. Thanks also to the Board of Directors and all of the other volunteers who donate their time to WSSA.

Dale Shaner, President

#### THE 2007 WSSA PROGRAM

Pre-meeting events include a tour and a workshop. Sunday, February 4, Dr. Russ Wallace and colleagues will host a tour of the Wintergarden region to see the leafy green vegetable production areas of Texas (reservation required). Drs. Jens Streibig and Christian Ritz will again offer a special one-day

workshop on "Statistical Assessment of Dose-Response Curves with Free Software" on Monday February 5 (limited enrollment, reservation required).

The General Session and Awards Ceremony will be held at 4: 15 pm on Monday in the Regency East Ballroom at the Hyatt Regency San Antonio, followed by the Award Winners' Reception at 7:00 pm in the Rio Grande Ballroom. Dr. Gale Buchanan, USDA Under Secretary for Research, Education, and Economics and our keynote speaker, will share his vision on the future of Agricultural Research at the General Session. On Wednesday, plan on attending the society Business Meeting at 5:15 pm in Regency East #1 followed by our second member reception which will be held at the Buckhorn Museum across the street from the Hyatt.

The Graduate Student Organization is organizing several events including a symposium "Employment Opportunities and How to Make Yourself More Marketable" on Tuesday morning followed by a luncheon Business Meeting. One of the symposium presentations will be made by Holly Menninger of the American Institute of Biological Sciences on "Techniques and Tips for Communicating Your Science to the Media," a topic that may interest all members. The students also plan to initiate a Student Night Out Activity where non-student members pair with students to become acquainted over dinner and discussion. Please look for signup sheets at the registration desk.

Three additional symposia are planned for the meeting this year. The Weed Biology and Physiology sections have joined to offer a symposium "Using Emerging Technologies to Study Weed Biology: An Educational Forum" on Tuesday afternoon. James V. Anderson and Wun S. Chao are organizing this session. Debanjan Sanyal is organizing the second symposium, "Integrated Weed Management Revisited," which will be held on Wednesday afternoon. Finally, a day-long symposium "Nursery Stock vs. Invasive Plant: Which Is It, and Why Do We Care?" will be held on Thursday and is being organized by Alan Tasker and Nelroy Jackson in conjunction with the Turf and Ornamentals, Wildland and Aquatic Invasives, and Regulatory Aspects sections. Texas Nursery & Landscape Association and Texas Department of Agriculture Pesticide Applicator CEU credits are available for attendees of this symposium.

Michael A. Bowers, CSREES National Program Leader-Ecology, is chairing the 2007 Project Director meeting for the NRI Program, Biology of Weedy and Invasive Species in Agroecosystems, at the WSSA meeting. Project directors will be presenting their research within the poster session. In addition, the directors will participate in a discussion session and poster session Tuesday afternoon that is open to all society members.

The new Journal Committee, chaired by Vanelle Peterson and

Lars Anderson, and the Board of Directors are planning a noontime Roundtable discussion on Wednesday in the poster/ exhibit area. The goal of the discussion is to provide information on and obtain member input about the proposed new society journal Journal of Invasive Plant Science and Management. A Specialty Crop Roundtable Discussion is planned for Thursday afternoon. This will be an informal discussion of research results and issues that are common across the regions. A panel discussion, "Building Bridges between Industry and Academia in Formulation and Adjuvant Technology," is scheduled during the Formulation, Adjuvant, and Application Technology session Tuesday morning. The Education and Extension session Thursday afternoon will include a mini-symposium that discusses first-year results of a multi-state project designed to investigate long-term weed shifts in Roundup Ready crops.

The final program and abstracts are available by accessing the WSSA website (http://www.wssa.net). Abstracts of interest can be printed and meeting attendees have the option of preparing their personal schedule for the meeting in advance. The abstracts will also be available online, with search capability by author, subject (key word), or program section, after the meeting for a minimum of five years. Because of this online availability, we will not be producing a CD or printed hard copy of the WSSA Abstracts, Volume 47. All presentations will be made using PowerPoint and LCD projectors. Presenters must submit their final PowerPoint presentation to the website prior to the meeting; section chairs will then organize and download the presentations to their computers prior to the meeting. This feature will eliminate some of the problems we have encountered with sending section chairs the presentations. A CD preview room is available during the meeting.

The WSSA Board of Directors will meet all day Sunday and Monday. Committee meetings are scheduled for Monday and Tuesday. The Board and Committee chairs are scheduled to meet on Thursday morning prior to an all day meeting of the new Board on Friday. Please contact committee chairs or board members with any suggestions for or concerns about our society prior to or during the annual meeting. Thank you to the board for all their time and effort on behalf of our society and for their support of this program.

I would like to thank the Program Section chairs, the symposium organizers, the Local Arrangements Committee chaired by Paul Baumann, and the tour and workshop organizers for their work planning this excellent program. I would also like to extend a special thank you to Joyce Lancaster and Kate Counter for their contributions and work towards making this meeting a success.

Jill Schroeder, Program Chair

#### 2007 Program Committee

General Program Chair	Jill Schroeder
Vice Chair	Jeff Derr
Abstract Editor	Robert Kremer
Agronomic Crops	Ian Burke
Horticultural Crops	. Frederick Salzman
Turf and Ornamentals Jo	seph Scott McElroy
Pastures, Rangelands, Forests,	
& Right-of-Ways E	rnest David Dickens
Wildland and Aquatic Invasives	Lars WJ Anderson
Regulatory Aspects	
Teaching and Extension	
Formulation, Adjuvant, & Application	
Technology	Jinxia Susan Sun
Weed Biology and Ecology	
Biocontrol of Weeds	
Physiology	Wun S Chao
Soil and Environmental Aspects	Wondi Mersie
Integrated Weed Management	
Sustaining Member Exhibits Session	
Poster Sessions	

#### **General Information**

#### Hotel

The Hyatt Regency San Antonio is located across from the Alamo, with stunning views of the Riverwalk and Old San Antonio. The hotel's 16-story garden atrium is built over an extension of the San Antonio River, which flows through the lobby via a series of cascading waterfalls. Guest rooms include TV with remote control, video messaging, voice mail, individual climate control, electronic door locks, full bath amenities, iron and ironing board, AM/FM alarm clock, hair dryer, coffee maker, and mini-bar. The hotel has a heated outdoor swimming pool and whirlpool and a new 2800 sq ft hotel health club offering free weights, exercise cycles, stair climbers, treadmills, and Nautilus fitness equipment.

Room Reservations: To make your room reservations, please call the hotel directly at 888-421-1442 or 210-222-1234. Please be sure to mention you are with the Weed Science Society, to obtain the group-discounted rate. Our room block will be held until January 15, 2007. Accommodations requested beyond the cut off date will be offered based on availability.

## Transportation

#### San Antonio International Airport

SAT is serviced by 16 air-carriers: Aerolitoral, American Airlines, America West, Continental, Continental Express, Delta, and Delta Connection Carriers (ASA, Comair, and Skywest), Frontier, Mexicana, Midwest, Northwest, Southwest, Sky West, and United. These airlines collectively offer nonstop service to 31 different markets. San Antonio International Airport is approximately 8 miles from downtown and the River Walk and is directly linked via US Hwy. 281.

#### **SATRANS Airport Shuttle**

1331 N. Pine San Antonio, TX 78202 (210) 212-5395

Reservations: (210) 281-9900

(800) 868-7707 Fax: (210) 212-4514

"http://www.saairportshuttle.com"

www.saairportshuttle.com

Service between airport and downtown hotels \$12 each way with purchase of round trip, or \$14 one way. Services also available to other area destinations. ADA accessible mini-buses.

#### **Taxicabs**

Metered service based on \$1.60 during daytime hours (5 am.-9 pm); \$2.60 during nighttime hours (9 pm-5 am). Time to downtown business district is approximately 15 minutes, average fare \$19.00—\$20.00 plus tip. There is no extra charge for additional passengers. Rates subject to change.

### **Program Booklet and Abstracts**

All those registering for the annual meeting will receive a program booklet. To view and download the program go to the WSSA website at www.wssa.net. To find the time and location of specific papers, look up the author in the author index in the back of the program.

#### No Smoking

By action of the Board of Directors, smoking is not permitted in the sessions.

## **Committee Meetings**

#### SUNDAY, February 4

7:30 a.m. – 5:30 p.m. Leafy Green Vegetable Tour ...... Meet in Hotel Lobby (Buses will depart from main entrance)

7:30 a.m. – 5:00 p.m.

Board of Directors ...... Live Oak

10:00 a.m. - 12:00 noon Endowment Committee (F3) ...... Directors

## MONDAY, February 5

_ , , ,
7:00  a.m. - 8:00  a.m Fellows & Honorary Member Committee (W3a) Directors
7:30 a.m 3:00 p.m.  Board of Directors Live Oak
8:00 a.m 10:00 a.m. Weed Alert Committe (W13) Directors
8:00 a.m 10:00 a.m.  Integrated Weed Management Committee (W17)
9:00 a.m 11:00 a.m. Herbicide Resistant Plants Committee (E12) 
10:00 a.m 11:00 a.m. Membership & Affiliations Committee (F4) Mesquite
10:00 a.m. – 12:00 noon.  Weed Science Editorial Committee (P2)
10:00 a.m. – 12:00 noon  Weed Technology Editorial Committee (P3) Frio
10:00 a.m -12:00 noon Federal Noxious and Invasive Weeds Committee (E4) Directors
11:00 a.m. — 1:00 p.m. History Committee (W8)
11:00 a.m 1:00 p.m. Herbicides for Minor Uses Committee (E10) Llano
11:00 a.m 1:00 p.m. Sustainable Ag Committee (W20) Chula Vista
$12:00\ noon\ -\ 1:00\ p.m.$ Standardized Plant Names Subcommittee (P22b) Mesquite
12:00 noon - 1:30 p.m. Awards Committee (W3) Directors
12:00 noon - 2:00 p.m. Environmental Quality Control Committee (E8) Nueces
1:00 p.m 3:00 p.m.  Research Committee (E6) Blanco

1:00 p.m. — 3:00 p.m. Weed Loss Committee (E11) Frio
1:00 p.m 4:00 p.m. Photo Contest Judging (W3j) Chula Vista Boardroom
2:00 p.m 4:00 p.m.  Weed ID CD Committee (S60) Llano
2:00 p.m. – 4:00 p.m. Herbicide Handbook Committee (P6)
2:00 p.m 4:00 p.m. BioControl of Weeds Committee (W16) Directors
2:00 p.m 4:00 p.m. Biology of Weeds Committee (W4)
2:00 p.m 4:00 p.m. Professional Development Committee (S64) Chula Vista
2:00 p.m 4:00 p.m.  Terminology Committee (P22)
TUESDAY, February 6
7:00 a.m. – 8:00 a.m. Sustaining Member Committee (F5) Directors
7:00 a.m 8:00 a.m. 2007/2008 Program Committee (W1a) Frio
7:00 a.m 8:30 a.m. Education Committee (W5)
7:00 a.m 9:00 a.m. Resolutions Committee (W19)
7:00 a.m. – 9:00 a.m.  Formulation, Adjuvant, and Application Technology Committee (W15) and Formulation, Adjuvant, and Application Terminology Subcommittee (P22a) Blanco
7:30 a.m 9:30 a.m. Science Policy Committee (E2) Pecos
8:00 a.m 10:00 a.m. Strategic Planning Committee (W7) Directors
8:00 a.m 10:00 a.m. Website Committee/Computer Applications (S61) Frio
10:00 a.m 12:00 noon IWSS Liaison Committee (S63)

WEDNESDAY, February 7	
6:30 a.m 8:00 a.m. Christian Fellowship Breakfast Directors	
7:00 a.m 8:30 a.m. President's Breakfast with Regional Presidents Live Oak	
8:00 a.m 10:00 a.m. Finance Committee (F2)	
THURSDAY, February 8	
7:00 a.m 8:30 a.m.  Board of Directors and Committee Chairs  External Activities	
FRIDAY, February 9	
7:30 a.m. — 4:00 p.m.  Board of Directors Live Oak	
WSSA Committee meetings are open to all WSSA members. However, some non-WSSA committee meetings (e.g., Herbicide Resistance Action Committee) are open only to invited participants. If in doubt, check at the beginning of the meeting with the Committee Chair.	
Contact Kate Counter of Allen Marketing and Management (1-800-627-0629, Ext. 220) to arrange space for committee meetings or room assignments not scheduled in this program.	
SUMMARY OF 2007 PROGRAM	
SUNDAY MORNING, February 4	
7:30 a.m 5:00 p.m. Board of Directors Live Oak	
7:30 a.m 5:30 p.m. Leafy Green Vegetable Tour Meet in Hotel Lobby (Buses will depart from Main Entrance)	
MONDAY MORNING, February 5	
7:00 a.m 4:00 p.m. Statistical Assessment Workshop Pecan	
7:30 a.m 3:00 p.m  Board of Directors Live Oak	

9:00~a.m.-4:00~p.m. Placement Service Information and Interviews ...... Medina

10:00 a.m 4:00 p.m.  Registration Los Rios Foyer
12:00 noon — 4:00 p.m. Exhibit & Poster Set-Up
MONDAY AFTERNOON, February 5
1:00 p.m. — 4:00 p.m. Photo Contest Judging Chula Vista Boardroom
3:00 p.m 4:00 p.m. CD review for Tuesday's oral papers
4:15 p.m 6:45 p.m. General Session and Awards Presentations Regency East
7:00 p.m 8:00 p.m. WSSA Awardees Reception
TUESDAY MORNING, February 6
7:30 a.m. – 5:00 p.m. Registration Los Rios Foyer
7:15 a.m 7:30 a.m.  Poster Session Business Meeting
7:30 a.m. – 9:30 a.m.  Poster Session
8:00 a.m 5:00 p.m. Sustaining Members Exhibits
8:00 a.m 5:00 p.m.  Placement Service Information and Interviews Medina
8:00 a.m 9:00 a.m. CD review for Wednesday's oral papers Medina
9:30 a.m. — 12:00 noon  Symposium: Employment Opportunities for  Weed Scientists and How to Make Yourself  More Marketable
9:30 a.m. – 11:30 a.m. 1. Agronomic Crops
9:30 a.m. – 12:00 noon 5. Wildland and Aquatic Invasive Plants

9:30 a.m 11:45 a. m.  8. Formulation, Adjuvant, and Application Technology
10:00 a.m 5:00 p.m. Posters on display without authors Regency West
12:00 noon — 1:30 p.m.  Graduate Student Luncheon and Business Meeting Rio Grande Center
TUESDAY AFTERNOON, February 6
1:00 p.m 5:30 p.m.  Symposium: Using Emerging Technologies to  Study Weed Biology
1:00 p.m 5:15 p.m. 1. Agronomic Crops
1:00 p.m 6:15 p.m. 10. Biocontrol of Weeds Rio Grande West
1:00 p.m 5:30 p.m.  National Research Initiative Project Meeting
WEDNESDAY MORNING, February 7
6:30 a.m 8:00 a.m. Christian Fellowship Breakfast Directors
7:00 a.m 8:30 a.m. Presidents Breakfast Live Oak
7:30 a.m. – 5:00 p.m.  Registration
7:30 a.m. – 9:30 a.m.  Poster Session
8:00 a.m 5:00 p.m. Sustaining Members Exhibits
8:00 a.m 5:00 p.m.  Placement Service Information and Interviews
8:00 a.m 9:00 a.m. CD review for Thursday's oral papers Medina
9:30 a.m 5:00 p.m.  Posters on display without authors Regency West

9:30 a.m 11:30 a.m.  3. Turf and Ornamental Crops
10:00 a.m 11:30 a.m. 2. Horticultural Crops
11:30 a.m 1:00 p.m.  Roundtable Discussions—New Journal on Invasive Plant Science and Management Regency West
WEDNESDAY AFTERNOON, February 7
1:00 p.m 5:00 p.m.  Symposium: Integrated Weed Management Revisited
1:00 p.m 5:15 p.m.  9. Weed Biology and Ecology
5:15 p.m. – 6:30 p.m. WSSA Society Business Meeting
6:30 p.m. – 8:30 p.m.  Reception
Reception Buckhorn Museum (The Buckhorn Museum is located at 318 E. Houston, a
Reception

10:30 a.m. — 11:45 a.m. 12. Soil and Environment
THURSDAY AFTERNOON, February 8
1:00 p.m 5:00 p.m.  Symposium: Nursery Stock vs. Invasive Plant: Which Is It, and Why Do We Care Regency East #2 & 3
1:00 p.m 5:00 p.m. 2. Horticultural Crops Rio Grande East
1:00 p.m 4:45 p.m. 7. Teaching and Extension Rio Grande West
3:00 p.m 4:00 p.m.  Dismantle posters and exhibits
FRIDAY MORNING, February 9
7:30 a.m. – 4:00 p.m.

## COMPLETE PROGRAM MONDAY PM, February 5 GENERAL SESSION

Board of Directors ...... Live Oak

Location: Regency East

4:15 p.m.

**Introduction and Announcements,** Jill Schroeder, President-Elect, WSSA.

4:20 p.m.

President's Remarks, Dale Shaner, President, WSSA

4:35 p.m.

**Keynote Address, The Future of Agricultural Research,** Dr. Gale Buchanan, Under Secretary, Research, Education, and Economics, USDA, Washington, DC

5:05 p.m.

**Presentation of Awards,** Neil Harker, Chair, Awards Committee, WSSA

6:00 p.m.

Presentation of Fellow and Honorary Member Awards, Jim Barrentine, Chair, Fellows and Honorary Member Subcommittee, WSSA

7:00 p.m. to 8:00 p.m.

WSSA Awardee Reception and Member Social

Location: Rio Grande

### TUESDAY to THURSDAY February 6 to 8

## WSSA SUSTAINING MEMBERS EXHIBITS SESSION

Location: Regency West

Chair: Bert Schou, Acres Research

7:45 a.m. Tuesday

Sustaining Members Exhibits Session meeting to elect a Chair-

Elect.

Setup 12:00 noon to 4:00 p.m. Monday

8:00 a.m. to 5:00 p.m. Tuesday 8:00 a.m. to 5:00 p.m. Wednesday 8:00 a.m. to 2:00 p.m. Thursday

Please remove exhibits by 4:00 p.m. on Thursday

## **Exhibitor and Representative**

AgroTechnology Research	Patrick McMullan
E.I.Dupont	Wynn John
Gylling Data Management	Steve Gylling
Herbiseed	Steve Morton
Lehigh Agric & Biological Services	James Steffel
MARATHON Ag/Environmental	Phil Banks
Weed Systems	Wayne Curry

# TUESDAY AM, February 6 POSTER SESSION

Location: Regency West

Chair: Tom Mueller, University of Tennessee,

Knoxville, TN.

Posters may be set up on Monday from 12:00 noon until 4:00 pm prior to the General Session and Monday evening from 6:30 to 8:30 pm. Authors should remove posters before 4:00 pm on Thursday afternoon.

7:15 a.m. - 7:30 a.m.

**Business Meeting to elect Chair-Elect** 

7:30 a.m. - 9:30 a.m

Odd Numbered Posters will be presented by authors

9:30 a.m. - 5:00 p.m.

Posters open for viewing without authors