PROGRAM
&
PROCEEDINGS

of the

64th ANNUAL MEETING

of the **SOUTHWESTERN BRANCH** of the

ENTOMOLOGICAL SOCIETY OF AMERICA

and the **ANNUAL MEETING** of the

SOCIETY OF SOUTHWESTERN ENTOMOLOGISTS

22-25 FEBRUARY 2016

Holiday Inn Tyler – South Broadway

TYLER, TX

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STUDENT AWARDS

ENTOMOLOGICAL SOCIETY OF AMERICA SOUTHWESTERN BRANCH

PERCIVAL

SOCIETY OF SOUTHWESTERN ENTOMOLOGISTS 1976

Awards

Awards

Percival Scientific Undergraduate Entomology Student Activity Award

and

Undergraduate Student Achievement in Entomology Award

Katrina Tilaon

University of Texas at Tyler, Tyler, TX

Advisor: Dr. Blake Bextine

John Henry Comstock Graduate Student Award

Derek Woller

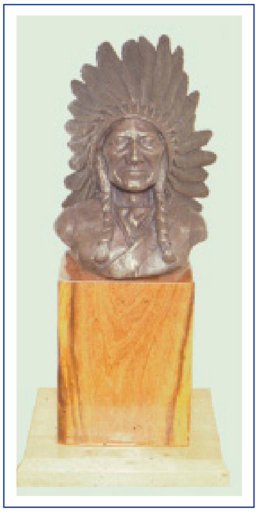
Texas A&M University, College Station, TX

Advisor: Dr. Hojun Song

Previous Recipients of the Ta-que-ne-whap Award

1978	Manning Price (Texas A&M University, College Station)
1978	Hugh Graham (USDA, Kerrville)
1987	Horace Van Cleave (Texas A&M University, College Station)
1996	Sid Kunz (USDA, Kerrville)
1998	Grant Kinzer (New Mexico State University)
1999	Don Rummel (Texas A&M University, Lubbock)
2002	Don C. Peters (Oklahoma State University)
2004	Pat Morrison (Texas A&M University, College Station)
2005	Russ Wright (Oklahoma State University)

The Ta-que-ne-whap Award for Distinguished Leadership and Service to the Southwestern Branch



The Award was established in 1977 by the Executive Committee of the Southwestern Branch to honor those members who, over a long period of years, have contributed exceptional leadership and service to the Branch.

The name of the Award (Ta-que-ne-whap) comes from the southern Comanche dialect and means "Chief' or "Captain". The Comanche tribe dominated the heart of the Branch area prior to the arrival of the Europeans. They were fiercely independent but willing to defend their "society", its interests and values regardless of personal risks.

The old chief symbolizes one who has lead and cared for his "society" over a long period, through good times and bad; giving of himself for the betterment of others. His long service is etched in the wrinkles of his face and brow, but his eyes look unblinkingly into the future. His full headdress depicts the many leadership roles, recognitions and honors that he has earned over the years which validate his sage words of counsel and guidance.

The award consists of a cast bronze of a Comanche Chief in full headdress. The bronze bust was created by Dr. H. Grant Kinzer (Branch member from New Mexico State University), a noted sculptor of western art whose pieces are displayed in galleries throughout the U. S. and collected by such noted personalities as John Wayne.

The bust rests on a symbolic pedestal of mesquite wood. The mesquite is found growing throughout the Branch area and is noted for its ability to survive under harsh conditions and flourish under more favorable times. It is a "tough" wood that weathers well and retains its strength. Under its rough bark, one finds an often hidden inner quality of beautiful grain and color.

The base is of tipu-tipuwana wood. The tipu-tipuwana was imported into the Branch area and grown in our southern regions. The tipu-tipuwana thus symbolizes the characteristic of our awardee who is open to new concepts and ideas which although foreign to him may have merit and value.

The pedestal and base were crafted by the late Mr. Herbert A. Dean (a Branch Member from Weslaco, Texas, a noted worker of native and exotic woods). This year's Award rests on the remaining base crafted by Mr. Dean.

It should be noted that such worthy individuals as these recipients are rare and do not pass our way frequently. Therefore, it is the intent of the Executive Committee that this award will not be given on an annual basis but only as justified by an exceptional record of leadership and service to the Branch. The 2016 recipient is only the 10th individual recognized for the Award since its inception in 1977.

Marvin K. Harris

Marvin K. Harris is a Professor Emeritus of Entomology at Texas A&M University. A joint research (TAMU Texas Agricultural Experiment Station) and teaching (TAMU College of Agriculture and Life Sciences) appointment during most of his career allowed participation that focused on basic and applied entomology primarily involving pecan insects and teaching and mentoring students at all levels. This facilitated developing and applying new knowledge in the classroom, scientific forums and the pecan agroecosystem, serving as major professor for 40 students who received degrees to date, teaching 2-4 courses annually that reached 800+ students in all, and interacting with colleagues and pecan producers to bring science to agriculture. Dr. Harris also served as an advocate for students, particularly undergraduates, on using professional societies to "Transition Their Educations Into Careers" as preparation for life after graduation.

His service to ESA includes: Chairman of Section F, 1984; Chairman and organizer for 1st and 2nd Robert H. Nelson Symposia; Chairman of Publications Council, 1985; Governing Council Representative of Amer. Reg. Prof. Entomol. (ARPE), 1985-1988; Southwestern Branch Representative to the Governing Board, 2003-2009; Chairman of the editorial board of Insecticide and Acaracide Tests of ESA, 1986; Chairman, Continuing Education Committee, ARPE, 1987; and Examiner for Pest Management Category of Certification for ARPE, 1986-1988.

Meeting Information

REGISTRATION:

All persons attending the meetings or participating in the program must register. On-site registration fees for the meeting are:

Full meeting

Active ESA member	$195
Student ESA member	$90
Non-member	$250
Spouse/Guest	$50
Honorary/Emeritus	$60

The full-meeting fee includes admission to all functions, including the banquet.

HOTEL LOCATION:

The Holiday Inn Tyler-South Broadway is located at 5701 South Broadway, Tyler, TX. The Discovery Science Place is located at 308 North Broadway Ave, 4.8 miles directly north of the hotel.

TRAVEL INFORMATION:

Tyler Pounds Regional Airport is located at 700 Skyway Boulevard, Tyler, TX, about 12 miles from the hotel. American Airlines and United Express provide service to Tyler through Dallas/Fort Worth and Houston-Intercontinental, respectively. The Holiday Inn offers a complimentary shuttle service for transport to and from the airport. To arrange a pick-up and drop-off, contact the Holiday Inn at 903.561.5800.

PROGRAM SCHEDULE AND MODERATORS:

Speakers are limited to the time indicated in the schedule, and moderators have the responsibility and authority to enforce restricting time to that in the schedule. Moderators should visit the Presentation Upload room to sign in before their assigned session and obtain speaker presentation files for the session. Moderators will upload all speaker files onto the A/V equipment in the meeting room.

AUDIOVISUAL & UPLOAD of PRESENTATIONS:

ONLY digital projectors with computers will be provided for oral presentations. Speakers must submit their presentations as Power Point files to the Upload / Presentation Preview Room one day before the session during which they will present.

POSTER PRESENTATION INFORMATION:

Poster Size: Poster must be contained within the 46 × 46 inch (117 × 117 cm) space provided. The poster must NOT exceed the size limit.

Set Up: Your poster must be displayed at your assigned space in Constellation Ballroom II the night before (i.e., either Monday or Tuesday, 6:00 – 8:00 PM) your poster is scheduled. **Bring your own Velcro strips or tacks to secure your display to the poster board.**

Author Presence: All **Student competitors are to stand next to their posters during designated BREAK times on Tuesday, February 23.** Regular member presenters should similarly be present at their posters during designated BREAK times on Wednesday, February 24.

ESA CERTIFICATION BOARD INFORMATION:

Information regarding the ESA Certification Board is available at the Registration Desk.

JOB OPPORTUNITY BOARD:

The Student Affairs Committee will host a Job Opportunities Board during the meeting. Employers are encouraged to post copies of available opportunities for prospective students. Prospective employees/students should bring multiple copies of CV or résumé to the Board for review by potential employers. Volunteers operating the Board will serve as liaisons to arrange interviews if needed.

LOST AND FOUND:

Articles should be turned in or reported to the Registration Desk or hotel main desk.

MESSAGES:

A message board is at the Registration Desk.

Program Information

Entomological Society of America Southwestern Branch

2015-2016 Executive Committee

Jerry Michels, President
asychis@aol.com

Carlos Bográn, Vice-President
cbogran@ohp.com

Bob Davis, Past-President
robert.davis@basf.com

Justin Talley, Secretary-Treasurer
justin.talley@okstate.edu

Ed Bynum, Secretary-Treasurer Elect
ebynum@ag.tamu.edu

David Ragsdale, ESA Governing Board Representative
dragsdale@tamu.edu

2015-2016 Committees

AUDIT COMMITTEE
Scott Armstrong (Chair)
Ed Bynum
Matthew Lee

AWARDS AND HONORS COMMITTEE
Charles Allen (Chair)
David Kattes
Sonja Swiger
Jane Pierce
Mike Brewer
Justin Talley
Jesus Esquivel
Matt Lee
Alvaro Romero
Kristopher Giles

BOARD CERTIFIED ENTOMOLOGIST
Molly Keck, BCE

BRANCH ARCHIVIST
Gregory Cronholm

FRIENDS OF THE SOUTHWESTERN BRANCH COMMITTEE
Carlos Bográn (Chair)
Jackie Lee
Scott Ludwig
Andrine Shufran

IN MEMORIAM COMMITTEE
Phillip G. Mulder, Jr. (Chair)
Edmond Bonjour
Jim Woolley

INSECT DETECTION COMMITTEE
Carol Sutherland (Chair)
Richard Grantham

INSECT EXPO COMMITTEE
Andrine Shufran (Chair)
Bonnie Pendleton
Tracey Payton-Miller
Kim Schofield
Molly Keck, BCE
Phillip G. Mulder, Jr.
Wizzie Brown

INSECT PHOTO SALON COMMITTEE
Carl Hjelmen (Chair)
Chris Powell
Sudip Gaire
Hame Kadi Kadi
Philip Osei Hinson
Jesus Esquivel

LINNAEAN GAMES COMMITTEE
Scott Bundy (Chair)
Blake Bextine
Bonnie Pendleton
David Kattes
Eric Rebek
Jackie Lee
Juliana Rangel
Phillip G. Mulder (Advisory)

2015-2016 Committees ...continued

LOCAL ARRANGEMENTS COMMITTEE
Blake Bextine (Chair)
Brad Kard
Kevin Shelton
Molly Keck, BCE
Natalie Cervantez
Tom Royer
Chris Powell, Student Representative

MEMBERSHIP COMMITTEE
Justin Talley (Chair)
Astri Wayadande
Bill Ree
Carlos Blanco
Jesus Esquivel
Juan Lopez
Manuel Campos
Rebecca Creamer
Sergio Sanchez-Pena

NOMINATING COMMITTEE
Bob Davis (Chair)
Carlos Blanco
Jesus Esquivel
Scott Bundy

PROGRAM COMMITTEE
Jesus Esquivel (Co-Chair)
Bob Davis (Co-Chair)
Chris Powell, Student Representative

PUBLIC INFORMATION COMMITTEE
Carol Sutherland (Chair)
Tom Royer

RESOLUTIONS COMMITTEE
Allen Knutson (Chair)
Bill Ree

SITE SELECTION COMMITTEE
Carlos Bogran (Chair)
Ali A. Zarrabi
Allen Knutson
Jerry Michels
Jesus Esquivel
Scott Bundy
Tom Royer

STUDENT AFFAIRS COMMITTEE
Chris Powell (Chair)
Carl Hjelmen
Sudip Gaire
Hame Kadi Kadi
Philip Osei Hinson
Tanner Jenkins

STUDENT RESEARCH PAPER AND POSTER AWARDS COMMITTEE
Bonnie Pendleton (Chair)
Ali A. Zarrabi
Blake Bextine
Eric Rebek
Jack Dillwith
Jane Pierce
Jerry Michels
Justin Talley
Scott Armstrong
Scott Bundy

YOUTH SCIENCE COMMITTEE
Mo Way (Chair)
Bonnie Pendleton
Andrine Shufran
Jane Pierce
Molly Keck, BCE
Roy Parker
Wizzie Brown

Past-Presidents & Chairmen of the Southwestern Branch

President	Year	Meeting Location
Bob Davis	2014-15	Tulsa (Catoosa), OK
Jesus Esquivel	2013-14	San Antonio, TX
Scott Bundy	2012-13	Las Cruces, NM
Allen Knutson	2011-12	Little Rock, AR
Tom Royer	2010-11	Amarillo, TX
Carlos Blanco	2009-10	Cancun, Mexico
Bonnie Pendleton	2008-09	Stillwater, OK
Greg Cronholm	2007-08	Ft. Worth, TX
David Thompson	2006-07	Corpus Christi, TX
Bart Drees	2005-06	Austin, TX
Phil Mulder	2004-05	Albuquerque, NM
John D. Burd	2003-04	Lubbock, TX
Terry Mize	2002-03	Oklahoma City, OK
W. Pat Morrison	2001-02	Guanajuato, Mexico
Jim Reinert	2000-01	San Antonio, TX
James A. Webster	1999-00	Ft. Worth, TX
Carol Sutherland	1998-99	Las Cruces, NM
Ann Weise	1997-98	Corpus Christi, TX
Pete Lingren	1996-97	Oklahoma City, OK
Charles L. Cole	1995-96	Austin, TX
J. Terry Pitts	1994-95	Dallas, TX
Sidney E. Kunz	1993-94	Monterrey, Mexico
John G. Thomas	1992-93	Albuquerque, NM
Don Bull	1991-92	Tulsa, OK
Aithel McMahon	1990-91	College Station, TX
Russel E. Wright	1989-90	San Antonio, TX
Joyce Devaney	1988-89	El Paso, TX
Russ Andress	1987-88	Dallas, TX
Don Rummel	1986-87	Austin, TX
John E. George	1985-86	Monterrey, Mexico
Paul D. Sterling	1984-85	San Antonio, TX
H. Grant Kinzer	1983-84	Oklahoma City, OK
James R. Coppedge	1982-83	Corpus Christi, TX
Bill C. Clymer	1981-82	El Paso, TX
Horace W. VanCleave	1980-81	San Antonio, TX
Robert L. Harris	1979-80	Brownsville, TX
Jimmy K. Olson	1978-79	Houston, TX
J. Pat Boyd	1977-78	Lubbock, TX
Robert A. Hoffman	1976-77	Guadalajara, Mexico
Weldon H. Newton	1975-76	Oklahoma City, OK
Harry L. McMenemy	1974-75	El Paso, TX
Roger O. Drummond	1973-74	Dallas, TX
Dieter S. Enkerlin	1972-73	San Antonio, TX
Stanley Coppock	1971-72	Mexico City, Mexico

Chairman	Year	Location
C.A. King, Jr.	1970-71	El Paso, TX
Ted McGregor	1969-70	Brownsville, TX
Neal M. Randolph	1968-69	Dallas, TX
Walter McGregor	1967-68	Oklahoma City, OK
Harvey L. Chada	1966-67	San Antonio, TX
R.L. Hanna	1965-66	El Paso, TX
H.E. Meadows	1964-65	Austin, TX
Dial E. Martin	1963-64	Monterrey, Mexico
Manning A. Price	1962-63	Houston, TX
Sherman W. Clark	1961-62	Oklahoma City, OK
O.H. Graham	1960-61	San Antonio, TX
Clyde A. Bower	1959-60	El Paso, TX
Paul Gregg	1958-59	Dallas, TX
C.R. Parencia	1957-58	Houston, TX
J.C. Gaines	1956-57	San Antonio, TX
D.C. Earley	1955-56	Ft. Worth, TX
John M. Landrum	1954-55	Houston, TX
D.E. Howell	1953-54	Dallas, TX
P.J. Reno	1952-53	Galveston, TX
R.C. Bushland	1951-52	San Antonio, TX
H.G. Johnston*	1950-51	Dallas, TX

*** Southwestern Branch, American Association of Economic Entomologists**

Plenary Session Schedule

Plenary Session Schedule

TUESDAY, FEBRUARY 23, 2016

8:00 AM – 10:00 AM **PLENARY SESSION**
Room: Constellation Ballroom I

8:00 AM – 8:15 AM **Call to Order and Welcome**
Jerry Michels, President – Southwestern Branch of ESA

8:15 AM – 8:25 AM **Welcome from the Society of Southwestern Entomologists**
Blake Bextine, President – Society of Southwestern Entomologists

8:25 AM – 8:45 AM **ESA Presidential Address**
May Berenbaum, President of the ESA

8:45 AM – 8:55 AM **ESA Society Update**
Debi Sutton, ESA Director of Membership & Marketing

8:55 AM – 9:05 AM **ESA Governing Board Report**
David Ragsdale, Branch Representative to the Governing Board

9:05 AM – 9:15 AM **Entomological Foundation Update**
Andrine Shufran, Member – Board of Counselors

9:15 AM – 9:25 AM **Board Certified Entomologists Report**
Molly Keck, Branch Representative

9:25 AM – 9:40 AM ***In Memoriam* Committee Report**
Phil Mulder, Jr., Chair

9:40 AM – 9:50 AM **Nominating Committee Report**
Bob Davis, Chair

Program Announcements
Jesus Esquivel and Bob Davis, Program Committee Co-chairs

9:50 AM – 10:00 AM **Local Arrangements Announcements**
Blake Bextine, Chair

10:00 AM – 10:20 AM **Break**
Room: Constellation Ballroom II

Program Summary

SUNDAY, FEBRUARY 21, 2016

Program	Time	Location
ESA Staff	12:00 PM - 6:00 PM	Pegasus
Insect Expo Staging	3:00 PM - 8:00 PM	North Star
Insect Expo Staging	3:00 PM - 8:00 PM	Phoenix
Insect Expo Staging	3:00 PM - 8:00 PM	Orion
Insect Expo Staging	3:00 PM - 8:00 PM	Constellation Ballroom III
Insect Expo Staging	3:00 PM - 8:00 PM	Constellation Ballroom II
Insect Expo Staging	3:00 PM - 8:00 PM	Constellation Ballroom I

MONDAY, FEBRUARY 22, 2016

Program	Time	Location
ESA Staff, Presentation Upload & Preview	7:00 AM - 5:00 PM	Pegasus
Silent Auction	7:00 AM - 5:00 PM	Pegasus

MONDAY, FEBRUARY 22, 2016 ...continued		
Insect Expo	9:00 AM - 1:00 PM	North Star
Insect Expo	9:00 AM - 1:00 PM	Phoenix
Insect Expo	9:00 AM - 1:00 PM	Orion
Insect Expo	9:00 AM - 1:00 PM	Constellation Ballroom III
Insect Expo	9:00 AM - 1:00 PM	Constellation Ballroom II
Insect Expo	9:00 AM - 1:00 PM	Constellation Ballroom I
Southwestern Branch Executive Committee Meeting	10:00 AM - 12:00 PM	Executive Boardroom
Lunch on your own	12:00 PM - 1:00 PM	
Insect Expo Take-Down	1:00 PM - 2:00 PM	North Star
Insect Expo Take-Down	1:00 PM - 2:00 PM	Phoenix
Insect Expo Take-Down	1:00 PM - 2:00 PM	Orion
Insect Expo Take-Down	1:00 PM - 2:00 PM	Constellation Ballroom III
Insect Expo Take-Down	1:00 PM - 2:00 PM	Constellation Ballroom II
Insect Expo Take-Down	1:00 PM - 2:00 PM	Constellation Ballroom I
Meeting Registration	1:00 PM - 5:00 PM	Pre-function Hall
Society of Southwestern Entomologists Executive Committee Meeting	2:00 PM - 3:30 PM	North Star
Society of Southwestern Entomologists General Membership Meeting	4:00 PM - 5:00 PM	North Star
Welcome Social	5:00 PM - 7:00 PM	Discovery Science Place
Student Competition Poster Set-Up	6:00 PM - 8:00 PM	Constellation Ballroom II
Student Affairs Committee Meeting / Photo Salon Judging	8:00 PM - 10:00 PM	Executive Boardroom

TUESDAY, FEBRUARY 23, 2016

Program	Time	Location
Student Competition - Master's Posters	7:00 AM - 4:30 PM	Constellation Ballroom II
Student Competition - Ph.D. Posters	7:00 AM - 4:30 PM	Constellation Ballroom II
Student Competition - Undergraduate Posters	7:00 AM - 4:30 PM	Constellation Ballroom II
ESA Staff, Presentation Upload & Preview	7:00 AM - 5:00 PM	Pegasus
Meeting Registration	7:00 AM - 5:00 PM	Pre-function Hall
Silent Auction	7:00 AM - 5:00 PM	Pegasus
Plenary Session	8:00 AM - 10:00 AM	Constellation Ballroom I
Break	10:00 AM - 10:20 AM	Pre-function Hall
Student Competition: Undergraduate Ten-Minute Papers	10:20 AM - 11:40 AM	Constellation Ballroom I
Student Competition: Master's Ten-Minute Papers	10:20 AM - 1:40 PM	Constellation Ballroom III
Lunch on your own	12:00 PM - 1:00 PM	

TUESDAY, FEBRUARY 23, 2016 ...continued		
Student Competition: Ph.D. Ten-Minute Papers	1:00 PM - 3:20 PM	Constellation Ballroom I
SYMPOSIUM: Vector-Borne Diseases Impacting Texas Citizens, Livestock, and Pets	1:55 PM - 4:15 PM	Constellation Ballroom III
Student Competition Poster Removal	4:30 PM - 6:00 PM	Constellation Ballroom II
Linnaean Games - Preliminary Round	5:00 PM - 7:00 PM	Constellation Ballroom III
Regular Posters Set-up	6:00 PM - 8:00 PM	Constellation Ballroom II
Student Social	7:00 PM - 10:00 PM	Gemini

WEDNESDAY, FEBRUARY 24, 2016

Program	Time	Location
Silent Auction	7:00 AM - 2:50 PM	Pegasus
Meeting Registration	7:00 AM - 3:00 PM	Pre-function Hall
Regular Posters	7:00 AM - 3:00 PM	Constellation Ballroom II
ESA Staff, Presentation Upload & Preview	7:00 AM - 5:00 PM	Pegasus
SYMPOSIUM: The Sugarcane Aphid on Sorghum: Management and Ecology	8:00 AM - 11:35 AM	Constellation Ballroom I
SYMPOSIUM: Urban Entomology	8:00 AM - 10:20 AM	Constellation Ballroom III
Regular Ten-Minute Orals	10:35 AM - 12:05 PM	Constellation Ballroom III
Lunch on your own	12:00 PM - 1:00 PM	
SYMPOSIUM: IPM of Emerging and Resilient Insect and Mite Pests in the Southwest	1:00 PM - 3:40 PM	Constellation Ballroom I
SYMPOSIUM: Plant Pathogen Vectors - Insights and Future Directions	1:00 PM - 2:45 PM	Constellation Ballroom III
Regular Poster Removal	3:00 PM - 4:00 PM	Constellation Ballroom II
Linnaean Games - Final Round	5:00 PM - 7:00 PM	Constellation Ballroom III
Awards Banquet, Photo Salon & Final Business Meeting	7:30 PM - 10:00 PM	Constellation Ballroom I & II

THURSDAY, FEBRUARY 25, 2016

Program	Time	Location
ESA Staff	7:00 AM - 3:00 PM	Pegasus
Southwestern Branch Executive Committee Meeting	8:00 AM - 10:00 AM	Constellation Ballroom I
Texas A&M AgriLife Professional Development Conference	8:00 AM - 5:00 PM	Constellation Ballroom II

Oral & Poster Presentation Schedule

TUESDAY, FEBRUARY 23, 2016, MORNING

Student Competition: Undergraduate Ten-Minute Papers

Constellation Ballroom I (Holiday Inn)

10:20 AM Introductory Remarks

10:25 AM 1-1 **Chill out: Refrigeration kills American cockroaches but not native species.**
David Bradt *(dave.bradt@okstate.edu) and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK*

10:37 AM 1-2 **A survey of *Odontomachus* (Hymenoptera: Formicidae) and general observations of nesting preferences in the Commonwealth of Dominica in the West Indies.**
Andrew Graf *(cipher_the_noble@tamu.edu), Texas A&M Univ., College Station, TX*

10:49 AM 1-3 **An updated checklist of the bees of the Commonwealth of Dominica (Hymenoptera: Apoidea: Anthophila).**
Shelby Kilpatrick *(entorocks527@tamu.edu)[1], Jason Gibbs[2] and James Woolley[1], [1]Texas A&M Univ., College Station, TX, [2]Michigan State Univ., East Lansing, MI*

11:01 AM 1-4 **True omnivores: Predation rates of fleahoppers on Lepidoptera juveniles.**
Morgan Beeman *(mbeeman11@austincollege.edu) and Loriann C. Garcia, Austin College, Sherman, TX*

11:13 AM 1-5 **Comparison of bacterial communities of *Diaphorina citri*, the Asian citrus psyllid, and *Bactericera cockerelli*, the potato psyllid, using 454 pyrosequencing.**
Chris M. Powell *(cpowell8@patriots.uttyler.edu) and Blake R. Bextine, Univ. of Texas at Tyler, Tyler, TX*

11:25 AM 1-6 **Comparison of different insecticidal application techniques for horn fly (*Haematobia irritans*) control in Oklahoma cow/calf operations.**
Kylie Sherrill *(kyliekd@okstate.edu)[1], Justin Talley[1], Dana Zook[2] and Tommy Puffinbarger[3], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma Cooperative Extension Service, Enid, OK, [3]Oklahoma Cooperative Extension Service, Cherokee, OK*

Student Competition: Master's Ten-Minute Papers

Constellation Ballroom III (Holiday Inn)

10:20 AM Introductory Remarks

10:25 AM 2-1 **Seeing spots in the southwest: What have we learned about spotted wing drosophila, *Drosophila suzukii* (Drosophilidae: Matsumura), in Oklahoma?**
Haley Butler *(haley.butler@okstate.edu) and Jackie Lee, Oklahoma State Univ., Stillwater, OK*

10:37 AM 2-2 **Repellency of essential oils on the Turkestan cockroach, *Blatta lateralis* (Blattodea: Blattidae).**
Sudip Gaire *(sudipg@nmsu.edu), Alvaro Romero and Mary O'Connell, New Mexico State Univ., Las Cruces, NM*

10:49 AM 2-3 **Arthropod diversity response to deforestation and desertification in the Sahel.**
Brandon Lingbeek *(brandonlingbeek@gmail.com)[1], David H. Kattes[1], Chris Higgins[1], Jim Muir[2] and Thomas Schwertner[1], [1]Tarleton State Univ., Stephenville, TX, [2]Texas A&M Agrilife, Stephenville, TX*

11:01 AM 2-4 **Analysis of pollen collected by honey bees (*Apis mellifera*) in developed areas.**
Pierre Lau *(plau0168@tamu.edu), Texas A&M Univ., Walnut, CA*

11:13 AM 2-5 **Short-range responses of *Triatoma rubida* to heat, moisture, and carbon dioxide.**
Andres Indacochea *(aindacoc@nmsu.edu) and Alvaro Romero, New Mexico State Univ., Las Cruces, NM*

11:25 AM 2-6 **Predicting occurrence of the American burying beetle, *Nicrophorus americanus*, at the northern limit of its range.**
Tanner Jenkins *(tanner.jenkins@okstate.edu)[1], Douglas Ryan Leasure[2] and W. Wyatt Hoback[1], [1]Oklahoma State Univ., Stillwater, OK, [2]Univ. of Arkansas, Fayetteville, AR*

11:37 AM 2-7 **Underwater ticks: Survival of immersion varies among six tick species.**
Dan St. Aubin *(danbs@okstate.edu)[1], W. Wyatt Hoback[2] and Bruce Noden[2], [1]Oklahoma Satte Univ., Stillwater, OK, [2]Oklahoma State Univ., Stillwater, OK*

11:49 AM Lunch on your own

1:00 PM 2-8 **Responses of *Amblyomma maculatum* to odorants to enhance field collection.**
Krista Pike *(krista.pike@okstate.edu) and Bruce Noden, Oklahoma State Univ., Stillwater, OK*

1:12 PM 2-9 Do fungus gardening-ants choose their fungus based on their experience or based on genetics?
Mattea Allert *(mallert@patriots.uttyler.edu)[1], Ulrich G. Mueller[2] and Katrin Kellner[1], [1]Univ. of Texas at Tyler, Tyler, TX, [2]Univ. of Texas at Austin, Austin, TX*

1:24 PM 2-10 Management of the red imported fire ant (*Solenopsis invicta* Buren) using an anthranilic diamide as a novel management technique.
Megan Rudolph *(rudolphm91@gmail.com) and Blake R. Bextine, Univ. of Texas at Tyler, Tyler, TX*

TUESDAY, FEBRUARY 23, 2016, AFTERNOON

Student Competition: Ph.D. Ten-Minute Papers

Constellation Ballroom I (Holiday Inn)

1:00 PM Introductory Remarks

1:05 PM 3-1 How do temperature differences relate to genome size variation?
Carl Hjelmen *(cehjelmen09@tamu.edu) and J. Spencer Johnston, Texas A&M Univ., College Station, TX*

1:17 PM 3-2 Selection of reference genes for expression analysis in the potato psyllid, *Bactericera cockerelli*.
Freddy Ibanez *(fibanez@neo.tamu.edu) and Cecilia Tamborindeguy, Texas A&M Univ., College Station, TX*

1:29 PM 3-3 Genetic and biological techniques to reduce corn pest and pathogen risk and improve yield.
Luke Pruter *(lpruter@tamu.edu)[1], Michael Brewer[2], Thomas Isakeit[3] and Seth Murray[4], [1]Texas A&M, Bryan, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX, [3]Texas A&M AgriLife Extension, College Station, TX, [4]Texas A&M, College Station, TX*

1:41 PM 3-4 Quantifying the diet of the red imported fire ant (*Solenopsis invicta*): A next-generation sequencing approach to molecular gut content analysis.
MacKenzie Kjeldgaard *(mkjeldgaard@tamu.edu), Jason Wulff, Gregory Sword and Micky Eubanks, Texas A&M Univ., College Station, TX*

1:53 PM 3-5 Red imported fire ant (*Solenopsis invicta* Buren) foraging behavior in the presence of swarming bacteria *Proteus mirabilis*.
Elida Espinoza *(ellyspnz@gmail.com)[1], Jeffery K. Tomberlin[1], Roger Gold[1] and Tawni L. Crippen[2], [1]Texas A&M Univ., College Station, TX, [2]USDA, Agricultural Research Service, College Station, TX*

2:05 PM 3-6 ZeroFly® Storage Bag as a barrier to insect pest infestation.
Sulochana Paudyal *(sulochana.paudyal@okstate.edu)[1], George Opit[1], Enoch A. Osekre[2], James Danso[3], Naomi Manu[3] and Evans Nsiah[4], [1]Oklahoma State Univ., Stillwater, OK, [2]Kwame Nkrumah Univ. of Science and Technology, Kumasi, Ghana, [3]Entomology, Kumasi, Ghana, [4]Entomology, Ejura, Ghana*

2:17 PM 3-7 Rangeland fire on the dung beetle community of the Texas Rolling Plains.
Britt Smith *(britt.smith@ttu.edu), Brad Dabbert and Robin M Verble-Pearson, Texas Tech Univ., Lubbock, TX*

2:29 PM Break

2:44 PM 3-8 Population genetics of the sugarcane aphid, *Melanaphis sacchari* (Zehntner), in the continental US.
Jocelyn R. Holt *(holtjocelyn@tamu.edu)[1], J. Scott Armstrong[2], Kyle Harrison[1] and Raul F. Medina[1], [1]Texas A&M Univ., College Station, TX, [2]USDA-ARS, Stillwater, OK*

2:56 PM 3-9 The synergistic effects of almond protection fungicides on honey bee (*Apis mellifera*) forager survival.
Adrian Fisher II *(solifuge9378@tamu.edu)[1], Juliana Rangel[1] and Clint Hoffmann[2], [1]Texas A&M Univ., College Station, TX, [2]USDA, ARS, Areawide Pest Management Research Unit, College Station, TX*

3:08 PM 3-10 Exploring the sexy frontiers of functional morphology...in 3D!!! (Orthoptera: Acrididae: *Melanoplus rotundipennis*).
Derek Woller *(asilid@gmail.com) and Hojun Song, Texas A&M Univ., College Station, TX*

SYMPOSIUM: Vector-Borne Diseases Impacting Texas Citizens, Livestock, and Pets

Constellation Ballroom III (Holiday Inn)

Moderators and Organizers: Sonja L. Swiger[1] and Janet Hurley[2], [1]Texas A&M Univ., Stephenville, TX, [2]Texas A&M AgriLife Extension Service, Dallas, TX

1:55 PM Introductory Remarks

2:00 PM 4-1 The biology of peridomestic *Triatoma gerstaeckeri* and potential IPM tactics for the prevention of autochthonous *Trypanosoma cruzi* exposure in south-central Texas.
Edward Wozniak *(edward.wozniak@dshs.state.tx.us), Texas Dept. of State Health Services, Uvalde, TX*

2:20 PM 4-2 Chagas disease epidemiology in border patrol dogs along the Texas-Mexico border.
Alyssa Meyers *(ameyers@cvm.tamu.edu), Italo Zecca and Sarah Hamer, Texas A&M Univ., College Station, TX*

2:40 PM 4-3 Determining the prevalence of Chagas disease in the Rio Grande Valley region of the Texas-Mexico border.
Italo Zecca *(IBZecca@cvm.tamu.edu), Rachel Curtis-Robles and Sarah Hamer, Texas A&M Univ., College Station, TX*

3:00 PM 4-4 Spatial analysis of *Culex* mosquito abundance and infection with West Nile virus during the 2012 Dallas County epidemic.
Karen Poh *(karenpoh@email.tamu.edu)[1], Scott Sawlis[2] and Gabriel Hamer[1], [1]Texas A&M Univ., College Station, TX, [2]Dallas County Mosquito Control, Dallas, TX*

3:20 PM Break

3:35 PM 4-5 Assessment of the geographic distribution of *Ornithodoros turicata* (Argasidae): Climate variation and host diversity.
Taylor Donaldson *(taylorgdonaldson@gmail.com)[1], Adalberto de Leon[2], Andrew Li[3], Ivan Castro-Arellano[4], Edward Wozniak[5], Pete Teel[1] and Job Lopez[6], [1]Texas A&M Univ., College Station, TX, [2]United States Dept. of Agriculture - Agricultural Research Service, Kerrville, TX, [3]USDA-ARS Knipling-Bushland U.S. Livestock Insects Research Laboratory, Kerrville, TX, [4]Texas State Univ. - San Marcos, San Marcos, TX, [5]Texas Dept. of State Health Services, Uvalde, TX, [6]Baylor College of Medicine, Houston, TX*

3:55 PM 4-6 Assessing Gulf Coast tick, *Amblyomma maculatum* Koch (Acari: Ixodidae) population changes in Texas using the U.S. Drought Monitor Classification Scheme.
Pete Teel *(pteel@tamu.edu), Texas A&M Univ., College Station, TX*

TUESDAY, FEBRUARY 23, 2016, POSTERS

Student Competition - Ph.D. Posters

Constellation Ballroom II (Holiday Inn)

P1-1 Defining an efficient sample unit for aphids infesting winter canola.
Aqeel Alyousuf *(aqeel.alyousuf@okstate.edu)[1], Kris Giles[1], George Opit[1] and Norman Elliott[2], [1]Oklahoma State Univ., Stillwater, OK, [2]USDA, ARS, Stillwater, OK*

P1-2 Development of thresholds for management of sugarcane aphid on sorghum.
John Gordy *(John.Gordy@ag.tamu.edu)[1], Michael Brewer[2], Darwin J. Anderson[3], Robert Bowling[4], M.O. Way[5], David L. Kerns[6], G. David Buntin[7], Nicholas Seiter[8], T. Royer[9] and Ali Zarrabi[9], [1]Texas A&M AgriLife Extension, Rosenberg, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX, [3]Texas A&M AgriLife Research, Corpus Christi, TX, [4]Texas A&M AgriLife Extension, Corpus Christi, TX, [5]Texas A&M Univ., Beaumont, TX, [6]Louisiana State Univ. Agricultural Center, Winnsboro, LA, [7]Univ. of Georgia, Griffin, GA, [8]Univ. of Arkansas, Monticello, AR, [9]Oklahoma State Univ., Stillwater, OK*

P1-3 Pesticide compatibility with *Aphidius colemani* (Hymenoptera: Braconidae) for biological control applications in greenhouse production systems.
Tracey Payton Miller *(tracey.payton@okstate.edu)[1], Eric Rebek[1], Steven Frank[2], Kris Giles[1] and Mike Schnelle[1], [1]Oklahoma State Univ., Stillwater, OK, [2]North Carolina State Univ., Raleigh, NC*

P1-4 Spatial relationships of plant bugs in large scale cotton operations: Do edge and ecotone matter?
Isaac Esquivel *(iesqu002@tamu.edu)[1], Michael Brewer[2] and Robert Coulson[1], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX*

P1-5 Farmer application of post-harvest management strategies in Tahoua and Maradi regions of Niger (West Africa).
Hame Abdou Kadi Kadi *(hkadikadi@yahoo.com)[1], Bonnie Pendleton[1] and Aboubacar Kadri[2], [1]West Texas A&M Univ., Canyon, TX, [2]Univ. of Niamey, Niger, Niamey, Niger*

Student Competition - Undergraduate Posters

Constellation Ballroom II (Holiday Inn)

P2-1 Examining post-fire ant responses at the Valles Caldera National Preserve.
Zac Tatum *(zachary.tatum@ttu.edu)[1], Jonathan Knudsen[1], Robert R. Parmenter[2] and Robin Verble-Pearson[1], [1]Texas Tech Univ., Lubbock, TX, [2]Valles Caldera Trust, Jemez Springs, NM*

P2-2 Impact of flonicamid on potato psyllid *(Bactericera cockerelli)* feeding behavior observed on both systemic and foliar application.
Katrina Tilaon *(mtilaon@patriots.uttyler.edu)[1], Sean Whipple[2], Chris M. Powell[1], Juan Macias-Velasco[3] and Blake R. Bextine[1], [1]Univ. of Texas at Tyler, Tyler, TX, [2]Univ. of Nebraska, Scottsbluff, NE, [3]Washington Univ. in St. Louis, St. Louis, MO*

P2-3 Electrical penetration graph recordings of mosquito (Diptera: Culicidae) feeding on artificial substrates.
Thomas Hess *(tmhess@okstate.edu), Astri Wayadande and Bruce Noden, Oklahoma State Univ., Stillwater, OK*

P2-4 Molecular identification of insects in residential structures from dust samples.
Riley Williams *(rwilliams49@patriots.uttyler.edu), Chris M. Powell and Blake R. Bextine, Univ. of Texas at Tyler, Tyler, TX*

P2-5 Decomposition of rats accurately reflected by the total body score index.
Victoria Pickens *(vpicken@ostatemail.okstate.edu)[1] and W. Wyatt Hoback[2], [1]Oklahoma State Univ., Stilwater, OK, [2]Oklahoma State Univ., Stillwater, OK*

P2-6 Controlling aphid populations in daylily crops using green lacewings (Chrysopidae).
Bret Nash *(bret2094@gmail.com), Texas A&M Univ., linden, TX*

P2-7 The daily meat grinder: Dung and carrion beetles are attracted to rotten carcasses.
Chase Morgan *(chase.m.morgan@okstate.edu) and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK*

Student Competition - Master's Posters

Constellation Ballroom II (Holiday Inn)

P3-1 CO_2 and CH_4 emissions by subterranean termites (Isoptera: Rhinotermitidae) on Oklahoma's tallgrass prairie.
Charles Konemann *(charles.e.konemann@okstate.edu) and Brad Kard, Oklahoma State Univ., Stillwater, OK*

P3-2 Effects of 43% relative humidity on survival of stored-product psocids (Psocoptera: Liposcelididea).
Abena Ocran *(abena.ocran@okstate.edu), Oklahoma State Univ., Stillwater, OK*

P3-3 Bait type matters when sampling for carrion beetles.
Theresa E. Andrew *(theresa.e.andrew@okstate.edu), W. Wyatt Hoback, Phillip G. Mulder and Andrine A. Shufran, Oklahoma State Univ., Stillwater, OK*

P3-4 Consumers' knowledge of health effects of agrochemical use in food production: A study at Agona West Municipality, Central Region, Ghana.
Philip Hinson *(philison2@gmail.com), West Texas A&M Univ., Canyon, TX*

P3-5 Species composition and seasonality of the natural enemies of sugarcane aphid on susceptible and resistant sorghum.
Erin Maxson *(elmaxson@gmail.com)[1], Michael Brewer[2] and James Woolley[1], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX*

P3-6 Entomology Extension learning methods: Experimental approach in evaluating competency differences between video and slide show presentations.
Jason Thomas *(jasonfalc@gmail.com)[1], Robert Bowling[2,3] and Michael Brewer[3], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M Univ., Corpus Christi, TX, [3]Texas A&M AgriLife Research, Corpus Christi, TX*

WEDNESDAY, FEBRUARY 24, 2016, MORNING

SYMPOSIUM: The Sugarcane Aphid on Sorghum: Management and Ecology

Constellation Ballroom I (Holiday Inn)

Moderators and Organizers: Robert Bowling[1] and Allen Knutson[2], [1]Texas A&M AgriLife Extension, Corpus Christi, TX, [2]Texas A&M Univ., Dallas, TX

8:00 AM Introductory Remarks

8:05 AM 5-1 **Sugarcane aphid on sorghum: Developing resistant germplasm and understanding resistance.**
Gary C. Peterson *(g-peterson@tamu.edu)[1], Lloyd Mbulwe[2] and William Rooney[2], [1]Texas A&M AgriLife Research, Lubbock, TX, [2]Texas A&M Univ., College Station, TX*

8:25 AM 5-2 **Variation in hybrid sensitivity and yield response to sugarcane aphid provide opportunities for integrated management of sugarcane aphid on sorghum.**
Michael Brewer *(mjbrewer@ag.tamu.edu)[1] and Robert Bowling[2], [1]Texas A&M Agrilife Research, Corpus Christi, TX, [2]Texas A&M AgriLife Extension, Corpus Christi, TX*

8:45 AM 5-3 **Towards efficient sampling and monitoring of sugarcane aphid in sorghum.**
T. Royer *(tom.royer@okstate.edu)[1], Norman Elliott[2], Nicholas Seiter[3], Michael Brewer[4] and Brian McCornack[5], [1]Oklahoma State Univ., Stillwater, OK, [2]USDA-ARS, Stillwater, OK, [3]Univ. of Arkansas, Monticello, AR, [4]Texas A&M Agrilife Research, Corpus Christi, TX, [5]Kansas State Univ., Kansas, KS*

9:05 AM 5-4 **Insecticides and best management practices, South Texas.**
Robert Bowling *(Robert.Bowling@ag.tamu.edu), Texas A&M AgriLife Extension, Corpus Christi, TX*

9:25 AM Break

9:40 AM 5-5 **Natural enemies of sugarcane aphid on sorghum in Texas: The most important species.**
James Woolley *(jimwoolley@tamu.edu)[1], Erin Maxson[1] and Michael Brewer[2], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX*

10:00 AM 5-6 **Economic decision aid for treating sugarcane aphid on sorghum.**
Levi Russell *(lrussell@tamu.edu)[1], Mac Young[2], Robert Bowling[3], Michael Brewer[4] and Josh McGinty[3], [1]Texas A&M, Corpus Christi, TX, [2]Agricultural Economics, Corpus Christi, TX, [3]Texas A&M AgriLife Extension, Corpus Christi, TX, [4]Texas A&M Agrilife Research, Corpus Christi, TX*

10:20 AM 5-7 **Sugarcane aphid on the Texas High Plains.**
Ed Bynum *(ebynum@ag.tamu.edu)[1], Patrick Porter[2], Blayne Reed[3], Kerry Siders[4] and Tommy Doederlein[5], [1]Texas A&M AgriLife Extension, Amarillo, TX, [2]Texas A&M AgriLife Extension, Lubbock, TX, [3]Texas AgriLife Extension, Plainview, TX, [4]Texas A&M AgriLife Extension Service, Levelland, TX, [5]Texas AgriLife Extension Service, Lamesa, TX*

10:40 AM 5-8 **Status of insecticides registered for sugarcane aphid and the regulatory process.**
Dale Scott *(Dale.Scott@TexasAgriculture.gov), Texas Dept. of Agriculture, Austin, TX*

11:00 AM 5-9 **Lessons learned from another invasive aphid: The soybean aphid, *Aphis glycines*.**
David W. Ragsdale *(dragsdale@tamu.edu), Texas A&M Univ., College Station, TX*

11:20 AM Panel Discussion

SYMPOSIUM: Urban Entomology

Constellation Ballroom III (Holiday Inn)

Moderators and Organizers: Molly Keck[1], Elizabeth Brown[2] and Janet Hurley[3], [1]Texas AgriLife Extension Service, San Antonio, TX, [2]Texas A&M Univ., Austin, TX, [3]Texas A&M AgriLife Extension Service, Dallas, TX

8:00 AM Introductory Remarks

8:05 AM 6-1 **Plano ISD School IPM program: An in-depth case study analysis.**
Janet Hurley *(ja-hurley@tamu.edu), Texas A&M AgriLife Extension Service, Dallas, TX*

8:25 AM 6-2 **Red imported fire ant management efforts in Corpus Christi Independent School District – Three Years Later.**
Paul Nester *(p-nester@tamu.edu), Texas A&M AgriLife Extension Service, Houston, TX*

8:45 AM 6-3 **Managing tawny crazy ants (*Nylanderia fulva* Mayr) in urban environments.**
Robert Puckett *(rpuck@tamu.edu), Texas A&M Univ., College Station, TX*

9:05 AM 6-4 **Efficacy of PT® Alpine® pressurized fly bait (BASF) on house flies.**
Sonja L. Swiger *(slswiger@ag.tamu.edu), Texas A&M Univ., Stephenville, TX*

9:25 AM Break

9:40 AM 6-5 **Mosquito species distribution across suburban, urban, and semi-rural residences in San Antonio, Texas.**
Megan Wise de Valdez *(megan.wisedevaldez@tamusa.edu), Texas A&M San Antonio, San Antonio, TX*

10:00 AM 6-6 **Cricket hunter wasps, *Liris* species (Hymenoptera, Crabronidae), as indoor pests in north Texas.**
Michael Merchant *(m-merchant@tamu.edu), Texas A&M Univ., Dallas, TX*

Regular Ten-Minute Orals

Constellation Ballroom III (Holiday Inn)

Moderators: Eric Rebek, Oklahoma State Univ., Stillwater, OK

10:35 AM Introductory Remarks

10:40 AM 7-1 **Boosting sorghum production by using sorghum midge-resistant varieties in Niger (West Africa).**
Hame Abdou Kadi Kadi *(hkadikadi@yahoo.com) and Bonnie Pendleton, West Texas A&M Univ., Canyon, TX*

10:52 AM 7-2 **Overview of sugarcane aphid (*Melanaphis sacchari*) management options in sorghum during 2015.**
Monti Vandiver *(monti.vandiver@syngenta.com)[1], Victor Mascarenhas[2] and J.P. Koenig[3], [1]Syngenta Crop Protection, Lubbock, TX, [2]Syngenta Crop Protection, Nashville, NC, [3]Syngenta Crop Protection LLC, Greensboro, NC*

11:04 AM 7-3 **Parasitism of cereal aphids in wheat by *Lysiphlebus testaceipes* is affected by landscape context.**
Norman Elliott *(norman.elliott@ars.usda.gov)[1], Kris Giles[2], Michael Brewer[3] and Georges Backoulou[2], [1]USDA, ARS, Stillwater, OK, [2]Oklahoma State Univ., Stillwater, OK, [3]Texas A&M Agrilife Research, Corpus Christi, TX*

11:16 AM 7-4 **Using multispectral imagery to detect stress induced to sorghum fields by the sugarcane aphid.**
Georges Backoulou*, Oklahoma State Univ., Stillwater, OK*

11:28 AM 7-5 **Impact of cotton fleahoppers on cotton yield under varying nitrogen levels .**
Abdul Hakeem *(ahakeem@vols.utk.edu), Megha N. Parajulee, Sean Coyle and Stanley C. Carroll, Texas A&M AgriLife Research, Lubbock, TX*

11:40 AM 7-6 **Discovery and efficacy of local strains of entomopathogenic fungi for black cutworm control.**
Eric Rebek *(eric.rebek@okstate.edu)[1], Stephen M. Marek[1] and Jose Rodriguez-Contreras[2], [1]Oklahoma State Univ., Stillwater, OK, [2]Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico*

11:52 AM 7-7 **Risk of encountering ticks and tick-borne pathogens within a rapidly growing metropolitan area in the U.S. Great Plains.**
Bruce Noden *(bruce.noden@okstate.edu), Scott Loss, Courtney Maichak and Faithful Williams, Oklahoma State Univ., Stillwater, OK*

WEDNESDAY, FEBRUARY 24, 2016, AFTERNOON

SYMPOSIUM: IPM of Emerging and Resilient Insect and Mite Pests in the Southwest

Constellation Ballroom I (Holiday Inn)

Moderators and Organizers: Juliana Rangel and Lauren Ward, Texas A&M Univ., College Station, TX

1:00 PM Introductory Remarks

1:05 PM 8-1 **Possible impact of the tawny crazy ant, *Nylanderia fulva*, in Texas pecan orchards.**
Bill Ree *(w-ree@tamu.edu), Texas A&M AgriLife Extension, Bryan, TX*

1:25 PM 8-2 **Challenges for IPM in fruit crops: Spotted wing drosophila.**
Jackie Lee *(jackie.lee@okstate.edu), Eric Rebek and Haley Butler, Oklahoma State Univ., Stillwater, OK*

1:45 PM 8-3 **Africanization of a feral honey bee (*Apis mellifera*) population in South Texas.**
Juliana Rangel *(jrangel@tamu.edu), Texas A&M Univ., College Station, TX*

2:05 PM 8-4 **Potential biocontrol of *Varroa destructor* mites in Texas apiaries with the generalist mite *Stratiolaelaps scimitus*.**
Lauren Ward *(lashley@tamu.edu), Texas A&M Univ., College Station, TX*

2:25 PM Break

2:40 PM 8-5 **Distribution and IPM strategies to control the Bermudagrass stem maggot in Texas.**
Allen Knutson *(a-knutson@tamu.edu), Texas A&M Univ., Dallas, TX*

3:00 PM 8-6 **Occurrence of sugarcane aphid on grain sorghum in North America since 2013.**
Robert Bowling *(Robert.Bowling@ag.tamu.edu), Texas A&M AgriLife Extension, Corpus Christi, TX*

3:20 PM 8-7 **Sugarcane aphid on the High Plains – a desperate and rapid IPM change of plan.**
Blayne Reed *(blayne.reed@ag.tamu.edu)[1], Patrick Porter[2] and Ed Bynum[3], [1]Texas AgriLife Extension, Plainview, TX, [2]Texas A&M AgriLife Extension, Lubbock, TX, [3]Texas A&M AgriLife Extension, Amarillo, TX*

SYMPOSIUM: Plant Pathogen Vectors - Insights and Future Directions

Constellation Ballroom III (Holiday Inn)

Moderators and Organizers: Sharon Andreason and Astri Wayadande, Oklahoma State Univ., Stillwater, OK

1:00 PM Introductory Remarks

1:05 PM 9-1 **Plant pathogen vectors: Insights from a historical perspective.**
Astri Wayadande *(a.wayadande@okstate.edu), Oklahoma State Univ., Stillwater, OK*

1:25 PM 9-2 **Decline of the Phoenix Palm: Implications in Texas.**
Megan Rudolph *(mrudolph@patriots.uttyler.edu) and Blake R. Bextine, Univ. of Texas at Tyler, Tyler, TX*

1:45 PM 9-3 **Exploration of the affect of Cyclaniliprole and Flonicamid on the Asian citrus psyllid (*Diaphorina citri*) and the transmission of Candidatus *Liberibacter asiaticus*.**
Gretta Sharp *(gsharp4@patriots.uttyler.edu) and Blake R. Bextine, Univ. of Texas at Tyler, Tyler, TX*

2:05 PM 9-4 **Detection of plant pathogens within insect vector transcriptome sequencing datasets.**
Sharon Andreason *(sharon.andreason@okstate.edu)[1], William Schneider[2] and Astri Wayadande[1], [1]Oklahoma State Univ., Stillwater, OK, [2]USDA, Agricultural Research Service, Fort Detrick, MD*

2:25 PM 9-5 **Impacts of BIG DATA on understanding insect vectors of plant pathogens.**
Blake R. Bextine *(Bbextine@uttyler.edu), Univ. of Texas at Tyler, Tyler, TX*

WEDNESDAY, FEBRUARY 24, 2016, POSTERS

Regular Posters

Constellation Ballroom II (Holiday Inn)

P4-1 **Design, use, and evaluation of an online IPM risk calculator for public schools.**
Janet Hurley *(ja-hurley@tamu.edu)[1], Michael Merchant[2] and Blake Bennett[1], [1]Texas A&M AgriLife Extension Service, Dallas, TX, [2]Texas A&M Univ., Dallas, TX*

P4-2 **Fine structure of the fibrillar adhesive pads in the lady beetle *Harmonia axyridis*.**
Myung-Jin Moon *(moonmj@dankook.ac.kr), Hoon Kim and Jong-Gu Park, Dankook Univ., Cheonan, Korea, The Republic of*

P4-3 **Functional microstructure of the egg plastron in the mosquito *Aedes albopictus*.**
Hoon Kim *(foxpotter@nate.com), Kyo-Jin Kim, Jae-Hwi Seo and Myung-Jin Moon, Dankook Univ., Cheonan, Korea, The Republic of*

P4-4 **Identifying cocirculating hemoparasites parasites in the West Nile Virus transmission cycle in East Texas.**
Dayvion Adams *(ajadams968@tamu.edu), Texas A&M Univ., Houston, TX*

P4-5 **Effects of two commercial neem-based products on horn fly knockdown, mortality, growth and development, and reproduction.**
Allan Showler *(allan.showler@ars.usda.gov), USDA - ARS, Kerrville, TX*

P4-6 **Invasive Eastern red cedar provides habitat for *Amblyomma americanum* to invade new areas of Oklahoma.**
Bruce Noden *(bruce.noden@okstate.edu) and Trisha Dubie, Oklahoma State Univ., Stillwater, OK*

P4-7 **Phenology and ecology of tick species parasitic on cattle and wildlife in Oklahoma.**
Trisha Dubie *(trishd@okstate.edu), Bruce Noden and Justin Talley, Oklahoma State Univ., Stillwater, OK*

P4-8 **Integrated management of sugarcane aphids in the Texas High Plains.**
Abdul Hakeem *(ahakeem@vols.utk.edu), Megha N. Parajulee and Sean Coyle, Texas A&M AgriLife Research, Lubbock, TX*

P4-9 **Evaluation and economic assessment of multiple insecticide strategies for managing pest complexes in sorghum, *Sorghum bicolor* (L.) Moench.**
Robert Bowling *(robert.bowling@ag.tamu.edu)[1], Michael Brewer[2], Mac Young[3] and Levi Russell[4], [1]Texas A&M AgriLife Extension, Corpus Christi, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX, [3]Agricultural Economics, Corpus Christi, TX, [4]Texas A&M, Corpus Christi, TX*

P4-10 **2015 occurrence of sugarcane aphid, *Melanaphis sacchari* (Zehntner), in the U.S. and Mexico with reference to occurrence in 2013 and 2014.**
Robert Bowling[1], **Michael Brewer** *(mjbrewer@ag.tamu.edu)[2], Stephen Biles[3] and John Gordy[4], [1]Texas A&M AgriLife Extension, Corpus Christi, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX, [3]Texas A&M Univ., Port Lavaca, TX, [4]Texas A&M AgriLife Extension, Rosenberg, TX*

P4-11 **Variable-pressure scanning electron microscopy images of sorghum predict resistance to storage insect pests.**
Bonnie Pendleton *(bpendleton@wtamu.edu)[1], Michael Pendleton[2] and Gary C. Peterson[3], [1]West Texas A&M Univ., Canyon, TX, [2]Texas A&M Univ., College Station, TX, [3]Texas A&M AgriLife Research, Lubbock, TX*

P4-12 **Host plant resistance in forage sorghums to the sugarcane aphid.**
J. Scott Armstrong *(scott.armstrong@ars.usda.gov)[1], William Rooney[2], Daniella Sekula-Ortiz[3] and Raul T. Villanueva[4], [1]USDA-ARS, Stillwater, OK, [2]Texas A&M Univ., College Station, TX, [3]Texas AgriLife, Weslaco, TX, [4]Texas A&M Univ., Weslaco, TX*

P4-13 **Mechanical transmission of *Enterococcus cecorum* by the lesser mealworm *Alphitobius diaperinus*.**
B. Lyons *(brandon.lyons@okstate.edu)[1], Astri Wayadande[1], J. Payne[2] and Justin Talley[1], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma State Univ., Muskogee, OK*

P4-14 **Current distribution of an invasive species, hedgehog grain aphid (*Sipha maydis*), in cereals and grasses in the Great Plains and Rocky Mountain states.**
Gary Puterka *(gary.puterka@ars.usda.gov)[1], Bob Hammon[2], Melissa Franklin[3] and Tessa R. Grasswitz[4], [1]ARS-USDA, Stillwater, OK, Stillwater, OK, [2]Colorado State Univ., Grand Junction, CO, [3]Tri-River Extension Service, Grand Junction, CO, [4]New Mexico State Univ., Los Lunas, NM*

P4-15 **Insecticide evaluations for grasshopper control in bermudagrass (pasture), *Cynodon dactylon* (L.), in Oklahoma.**
Ali Zarrabi *(ali.zarrabi@okstate.edu), S. Seuhs, T. Royer and Kris Giles, Oklahoma State Univ., Stillwater, OK*

P4-16 **Impact of varying water levels on cotton fleahopper management in Texas cotton.**
Sean Coyle *(sean.coyle@ag.tamu.edu)[1], Abdul Hakeem[1], Michael Brewer[2] and Megha N. Parajulee[1], [1]Texas A&M AgriLife Research, Lubbock, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX*

P4-17 **Distribution of southern green stink bug in the U.S. and Mexico.**
Jesus F. Esquivel *(jesus.esquivel@ars.usda.gov)[1] and J.E. McPherson[2], [1]USDA - ARS, College Station, TX, [2]Southern Illinois Univ., Carbondale, IL*

P4-18 **Economics of decision-making on cotton fleahopper management in Texas High Plains cotton.**
Chandra Dhakal *(chandra.dhakal@ttu.edu)[1], Megha N. Parajulee[2], Kelly Lange[1] and Eduardo Segarra[1], [1]Texas Tech Univ., Lubbock, TX, [2]Texas A&M AgriLife Research, Lubbock, TX*

P4-19 **Predation of sentinel bollworm (*Helicoverpa zea*) eggs in glanded and glandless cotton in New Mexico.**
Jane Breen Pierce *(japierce@nmsu.edu), Patricia E Monk and John Idowu, New Mexico State Univ., Las Cruces, NM*

P4-20 **Seasonal abundance patterns of bollworm, tobacco budworm, and beet armyworm moths in the Texas High Plains.**
Stanley C. Carroll and **Megha N. Parajulee** *(m-parajulee@tamu.edu), Texas A&M AgriLife Research, Lubbock, TX*

P4-21 **The picture of an entomologist: How non-majors view us.**
W. Wyatt Hoback *(whoback@okstate.edu), Oklahoma State Univ., Stillwater, OK*

P4-22 **The New Mexico State University Arthropod Collection.**
Jennifer Shaughney *(jshaugh1@nmsu.edu) and Scott Bundy, New Mexico State Univ., Las Cruces, NM*

Oral Abstracts

Student Ten-Minute Paper Competition

Student Competition: Undergraduate Ten-Minute Papers

1-1. **Chill out: Refrigeration kills American cockroaches but not native species**

David Bradt *and W. Wyatt Hoback, Oklahoma State University, Stillwater, OK*

The American cockroach (*Periplaneta americana)* is a common pest of human dwellings and structures. This species is native to Africa, but was introduced to North America in the 1600s. It is a pest because it contaminates food items through secretions, and can vector bacteria and other pathogens. The American cockroach is commonly found outdoors in Southern states but is rarely observed away from heated dwellings in more temperate zones, including Oklahoma. Even though cold temperatures are anecdotally reported to be detrimental to American cockroach survival, there are few published data to support this. This study tested the hypothesis that American cockroaches have similar cold tolerance as native cockroach species. We compared survival and activity of *P. americana* to native cockroach species under laboratory conditions. After four days at 8° C (47° F) approximately 40% of *P. americanana* died and another 40% were immobilized. In contrast, native cockroach species, including the fulvous wood cockroach *Parcoblatta fulvescens*, and the southern wood cockroach, *Parcoblatta divisa* were very resistant to cold temperatures. Native species continued normal activity and survived at temperatures below 8˚ C for 4 months. These species also survived short-term (< 7 days) exposure to 3° C (37° F). These results provide valuable information about potential control methods for the American cockroach and suggest a physiological reason for pest cockroach species to associate with human dwellings.

1-2. **A survey of *Odontomachus* (Hymenoptera: Formicidae) and general observations of nesting preferences in the Commonwealth of Dominica in the West Indies**

Andrew Graf, *Texas A&M University, College Station, TX*

Odontomachus spp. were collected from various locations across the Commonwealth of Dominica in the West Indies. Specimens were collected in nest series and information about their location, elevation, nesting substrate, and co-habitation with Termitidae and other Formicidae were recorded. Many colonies were found to be co-habitating in terrestrial termite mounds or rotting wood along with their termitidae inhabitants. No *Odontomachus* spp. were found in elevations higher than 1686 ft above sea level. High resolution images of each species collected were recorded. Two species were found, most prominently *Odontomachus bauri* (Emery), and additionally in a single sample, *Odontomachus ruginodis* (Smith). The specimens of *O. ruginodis* that were collected are new records for the Commonwealth of Dominica.

1-3. **An updated checklist of the bees of the Commonwealth of Dominica (Hymenoptera: Apoidea: Anthophila)**

Shelby Kilpatrick[1], *Jason Gibbs*[2] *and James Woolley*[1], [1]*Texas A&M University, College Station, TX,* [2]*Michigan State University, East Lansing, MI*

A checklist of the bees of the Commonwealth of Dominica, Lesser Antilles is provided. Three new records from the family Apidae are documented. Based on recent collections from 12 sites on the island using colored bowl traps, Malaise traps, sweep nets, and light sheets, bowl traps and sweep nets were the most effective techniques for collecting bees. A total of 77 specimens representing 13 bee species in the families Apidae and Halictidae were collected and identified between 29-V-2015 and 16-VI-2015. Of the species identified, *Centris decolorata* Lepeletier, *Centris lanipes* (F.), and *Melitoma segmentaria* (F.) are new records for the island of Dominica. Four halictid species collected were only recently described as new.

1-4. **True omnivores: Predation rates of fleahoppers on Lepidoptera juveniles**

Morgan Beeman *and Loriann C. Garcia, Austin College, Sherman, TX*

Cotton fleahoppers, *Pseudatomoscelis seriatus*, are small hemipteran insects with piercing, sucking mouthparts that are widely known for their ability to damage crops like cotton. Previous research indicates that fleahoppers can also be omnivores that eat lepidopteran eggs and larvae. The purpose of this investigation was to quantify predation rates of fleahoppers on beet armyworm, *Spodoptera exigua*, eggs and larvae and to determine fleahopper diet preferences between plant and animal material. Fleahoppers used in this investigation were either field-collected or raised from eggs found in dove croton (*Croton setigerus*) stems, a known host plant. Adult and late instar fleahoppers were used in choice and no choice tests and time budget scan sampling to better understand their predation rates. Preliminary data indicates that fleahoppers consume or damage 87% of eggs and 56% of larvae. Fleahoppers predation on lepidopteran pests could lessen their pest status. Their presence in fields as caterpillar predators would be beneficial because caterpillars are more harmful to crop yields than fleahoppers. Therefore, the benefits of having fleahoppers in fields could outweigh the negative effects of their herbivory.

1-5. **Comparison of bacterial communities of *Diaphorina citri*, the Asian citrus psyllid, and *Bactericera cockerelli*, the potato psyllid, using 454 pyrosequencing**

Chris M. Powell *and Blake R. Bextine, University of Texas at Tyler, Tyler, TX*

The Asian citrus psyllid, *Diaphorina citri* , is an invasive insect pest that transmits Candidatus *Liberibacter* spp. This insect/pathogen system was first identified in North America in the early 2000's and has become the top threat to the citrus industry. The potato psyllid, *Bactericera cockerelli*, is also an invasive insect pest that transmits a Candidatus *Liberibacter* spp. that affects the production of solanaceous crops in North and Central America. 454 pyrosequencing of the gut was performed to audit bacterial presence in order to begin to identify any relationship between psyllid symbionts and C. *Liberibacter* spp.

1-6. **Comparison of different insecticidal application techniques for horn fly (*Haematobia irritans*) control in Oklahoma cow/calf operations**

Kylie Sherrill[1]*, Justin Talley*[1]*, Dana Zook*[2] *and Tommy Puffinbarger*[3]*, *[1]*Oklahoma State University, Stillwater, OK, *[2]*Oklahoma Cooperative Extension Service, Enid, OK, *[3]*Oklahoma Cooperative Extension Service, Cherokee, OK*

The horn fly, *Haematobia irritans* (L.), is a significant economic pest of cattle found throughout North America. The economic losses associated with horn fly infestations are attributed to irritation and blood loss of cattle leading to decreased milk production, decreased weaning weights of calves, and decreased weight gains in growing cattle. Estimates of annual losses due to horn fly damage and control costs exceed $1 billion in the U.S. Insecticide resistance in horn fly populations can result in up to a 90% reduction in product efficacy. Since the adult horn fly spends almost its entire life on livestock, the majority of insecticides and application techniques have been successful in controlling horn flies at some point in time. The objective of this study was to determine the efficacy of commonly used insecticide treatments on horn fly populations and determine the influence of various horn fly control tactics. Treatment groups with insecticidal ear tags kept the horn fly population below the recommended threshold of 200 flies per animal through 3 months' post treatment. Treatment groups utilizing pour-on and sprays did not provide control at threshold level with the exception of Stangard® in June, Boss®/Prolate Lintox HD® rotation in June and July and the Saber®/Boss® rotation in July and September. Horn fly populations in August exceeded threshold levels in all treatments. This study indicates that the application and use of insecticidal products are still a viable option for horn fly control in cow/calf operations but application technique will have varying results.

Student Competition: Master's Ten-Minute Papers

2-1. **Seeing spots in the southwest: What have we learned about spotted wing drosophila, *Drosophila suzukii* (Drosophilidae: Matsumura), in Oklahoma?**

Haley Butler *and Jackie Lee, Oklahoma State University, Stillwater, OK*

Spotted wing drosophila is an invasive fruit pest that has recently been found in Oklahoma. Since its discovery in 2013, populations have been monitored in locations throughout Oklahoma to gain insight into the seasonality and distribution of this pest. Along with monitoring, determining the threat to Oklahoma's fruit crops has been paramount. Data have shown that six commonly grown blackberry varieties are susceptible to SWD infestation in Oklahoma. Alternative host plants have also been discovered. Oklahoma State is continuing to learn more about biotic and abiotic factors that affect population levels. It is important for research to continue with spotted wing drosophila in order to make science based recommendations to Oklahoma growers for effective control of this species and to mitigate the effects of their presence in fruit production areas.

2-2. **Repellency of essential oils on the Turkestan cockroach, *Blatta lateralis* (Blattodea: Blattidae)**

Sudip Gaire*, Alvaro Romero and Mary O'Connell, New Mexico State University, Las Cruces, NM*

The Turkestan cockroach is a peridomestic pest that has become an important invasive species throughout the Southwestern United States and is found mostly in animal facilities and occasionally in human dwellings. Our study aims to evaluate ecofriendly management strategies that help manage this pest. We evaluated the repellency of six botanical-derived components against late instar nymphs of Turkestan cockroaches. Essential oils were chosen for further studies based on the presence of effective compounds in those oils. Test arena floors were divided into halves; one half sprayed with the test material at 1% and the other half was sprayed with a solvent control. Nymphal responses to dry residues were recorded for 20 minutes with an EthoVision video-tracking setup. Repellency was calculated as the ratio of time spent by nymphs in the treated half vs control half of the test arenas. Nymphs spent significantly less time (35.8%) in zones treated with thymol; the other five compounds (geraniol, eugenol, trans-cinnamaldehyde, methyl eugenol and p-cymene) did not have a detectable effect on nymph behavior. Gas chromatography-mass spectrometry analysis demonstrated the primary components were 8.02% thymol in red thyme oil, 2.26% geraniol in java citronella oil and 10.60% eugenol in clove bud oil. Behavioral assays confirmed that all these oils have repellency effects against nymphs. In conclusion, plant essential oils which contains thymol is promising candidate for Turkestan cockroach's management. However, other essential oils are also repellent and this effect is possibly due to synergistic effects of different compounds present in those oils.

2-3. Arthropod diversity response to deforestation and desertification in the Sahel

Brandon Lingbeek[1], *David H. Kattes*[1], *Chris Higgins*[1], *Jim Muir*[2] *and Thomas Schwertner*[1], [1]*Tarleton State University, Stephenville, TX,* [2]*Texas A&M Agrilife, Stephenville, TX*

Biodiversity loss, due to anthropogenic activities, is occurring at alarming rates around the world. I conducted my study in Senegal which is a country in West Africa suffering from environmental degradation. I researched ground-dwelling arthropod diversity within protected areas and communal, agricultural lands to determine the effects of deforestation and desertification on biodiversity in the Sahel. I collected arthropods with pitfall traps at three locations in both the dry and rainy season of 2014. I collected a total of 126,897 arthropods and calculated species richness and Shannon diversity for arthropod orders, beetle families and ant genera. I conducted an independent t-test to compare diversity between each protected area and the adjacent communal land. The results show greater arthropod order diversity within protected areas, beetle family diversity varies depending on location and season, and ant genus diversity is greater in communal lands. The difference in results illustrates the importance of studying multiple locations, seasons, and taxonomic groups before drawing conclusions about the biodiversity of an ecosystem.

2-4. Analysis of pollen collected by honey bees (*Apis mellifera*) in developed areas

Pierre Lau, *Texas A&M University, Walnut, CA*

Honey bee (*Apis mellifera* L.) colony maintenance depends on foraging workers to obtain resources from flower and water sources year round. While nectar provides the carbohydrates needed for the colony's energetic needs, pollen is the main source of protein, providing them with essential amino acids and proteins critical for growth and development. Studies indicate that a polyfloral diet is a large factor on improving colony immunocompetence. Thus, having a diverse food source available to bees can greatly improve their health. In addition, honeybees in urban settings may be exposed to pesticides applied in home and gardens through the pollen and nectar they bring back to their hives. The goal of this project is to identify the floral sources urban bees are foraging on to better understand the floral ecology of four major developed ares in the United States and general bee floral preferences. Pollen and nectar samples are being collected once a month from fifteen sites in Florida, Michigan, California, and Texas. Pollen is processed and identified Texas A&M University using standard acetolysis procedures. Pollen is identified to the family, genus, or species by light microscopy and a relative abundance count was taken. Nectar samples and a subset of the pollen from Austin is sent to USDA-ARS-NSL (Gastonia, NC) for pesticide residue screening as a side project to determine the abundance of residues bees are bringing back to their colony. This study is the foundation for future studies looking at honey bee nutrition and floral preferences in urban environments.

2-5. Short-range responses of *Triatoma rubida* to heat, moisture, and carbon dioxide

Andres Indacochea *and Alvaro Romero, New Mexico State University, Las Cruces, NM*

The haematophagous bug *Triatoma rubida* is a species of kissing bug that has been marked as a potential vector for transmission of Chagas disease mainly in the Southern U.S. and Northern Mexico. These insects use host-derived cues to locate and take a blood meal. Our study aims to characterize the short-term response of late-instar nymphs of *T. rubida* to various temperatures (25, 32, 36, 40, 45, and 55°C), humidities (5, 30, 60, and 90% RH), and concentrations of CO_2 (0, 800, 1600, and 3200 ppm) using a modern infrared video tracking system. To test for responses to heat, we constructed an arena with a ceramic resistor mounted in the center and concentric zones for analysis were set at various distances from the source. For humidity and CO_2, we used a four-choice olfactometer and behavior near the ports was analyzed. When compared to the control (25° C), bugs were about twice as likely to visit the source at 40 and 45° C and spent about twice as much time within 4.5 cm from the source at 36, 40, and 45° C, an effect that was lost at 55° C. Bugs spent the most time near the 30% RH treatment and chose it the most. No bugs chose the 90% RH treatment. Bugs also chose 1600 ppm of CO_2 the most often. This data supports our hypothesis that *T. rubida* nymphs orient preferentially to certain temperatures, humidities, and concentrations of CO_2.

2-6. Predicting occurrence of the American burying beetle, *Nicrophorus americanus*, at the northern limit of its range

Tanner Jenkins[1], *Douglas Ryan Leasure*[2] *and W. Wyatt Hoback*[1], [1]*Oklahoma State University, Stillwater, OK,* [2]*University of Arkansas, Fayetteville, AR*

American burying beetle (ABB), *Nicrophorus americanus*, historically occurred in the eastern 35 U.S. States from Canada to Texas and is classified as a habitat generalist. ABB was listed as federally endangered species in 1989 with a remaining distribution in only six U.S. States. Within these states, population of ABB are disjunct, occurring in mostly undisturbed habitats associated with multiple soil types. In Nebraska, the distribution of ABB has been mapped in two ecoregions, the Sandhills and the Loess Canyons. In this project we developed a model of ABB distribution at its northern and eastern edge in the Northern Plains ecoregions of Nebraska and South Dakota. Because of its endangered status agencies require sampling and habitat mitigation plans for American burying beetle where it is predicted to occur. We used baited pitfall sampling for 5 trap nights at 482 unique sites to establish presence of American burying beetles at 177 sites. Distribution was not uniform in the plains ecoregions allowing the use of a random forest model to predict occurrence. This model reduces the need to survey and conduct habitat mitigation for ABB in approximately 77,938 hectares of Nebraska and South Dakota.

2-7. Underwater ticks: Survival of immersion varies among six tick species

Dan St. Aubin[1], *W. Wyatt Hoback*[2] *and Bruce Noden*[2], [1]*Oklahoma Satte University, Stillwater, OK,* [2]*Oklahoma State University, Stillwater, OK*

Many flightless terrestrial arthropods are capable of surviving immersion by flood waters. For terrestrial insects, survival in water has been documented to extend to more than a week in some species. Several species of ticks (Acari: Ixodidae) have been reported to survive immersion for up to two months, although some reports are anecdotal and tests have been limited to only a few species. We hypothesized that survival of immersion was similar among all hard ticks and we conducted a laboratory-based study to compare immersion survival of six species of ticks. Sets (N = 16) of five ticks of each species were placed in vials and submerged in spring water then placed in a darkened environmental chamber at 20^{o} C. Tubes containing ticks were removed daily to assess survival over a period of 16 days. Survival varied among species. All *Dermacentor andersoni* died after 6 days, while 97% of *Ixodes scapularis* were dead after 8 days, and all *Amblyomma maculatum* were dead after 9 days. *Dermacentor variabilis* survived to 12 days and 50% of *Rhipicephalus sanguineus* and 40% of *Amblyomma americanum* survived until 16 days. The results of this study provide important insights about how flooding may impact tick distribution in Oklahoma. Because most species survive multiple days, flooding may provide an important dispersal mechanism for these flightless, medically-important parasites.

2-8. Responses of *Amblyomma maculatum* to odorants to enhance field collection

Krista Pike *and Bruce Noden, Oklahoma State University, Stillwater, OK*

The Gulf Coast tick, *Amblyomma maculatum* Koch, is emerging as an arthropod of medical, veterinary, and economic importance. Current monitoring methods (dragging, flagging, and carbon dioxide trapping) produce low capture rates despite populations existing within economic thresholds. The responses of mixed-sex adult *A. maculatum* to chemicals associated with hosts or conspecifics was evaluated using a Y-tube olfactometer selection bioassay. We hypothesized that rumen fluid would elicit the strongest positive response when compared with the other chemicals of biological origin. Host-associated semiochemicals tested included: 1-octen-3-ol, ammonium hydroxide, and CO_2 in addition to the known conspecific semiochemical, 2-6-dichlorophenol, a component of tick pheromone. Host-associated substances included exudate collected from the ears of cattle and rumen fluid. Chemicals which elicited a positive response in the laboratory bioassay will be tested in a field setting against lab-reared *A. maculatum*, using mark-release-recapture methods, and wild populations. The outcome of these studies will be used to develop a field trap with enhanced capture capability for *A. maculatum* in order to better assess tick populations in a pasture and evaluate risks associated with those populations.

2-9. Do fungus gardening-ants choose their fungus based on their experience or based on genetics?

Mattea Allert[1], *Ulrich G. Mueller*[2] *and Katrin Kellner*[1], [1]*University of Texas at Tyler, Tyler, TX,* [2]*University of Texas at Austin, Austin, TX*

Most fungus gardening-ants acquire their fungus from their parent colony, ensuring that they are familiar with that fungus, if they lose their fungus and acquire an unfamiliar one the colony may fail or have reduced fitness as a consequence. Fungus gardening-ants have a symbiotic relationship to their fungus, both the ants and fungus rely on each other for food sources, without one, the other could not exist. Each ant species is associated with a specific fungus linage. If the ant acquires the wrong fungus lineage it can have dire consequences for that colony. In this research we explored how ants choose the right fungus symbiont. We used colonies of the Attine ant *Mycocepurus smithii* which have been growing foreign fungus for over 3 years. By offering either the original (back switch) or the current (control switch) fungus to naïve workers we were able to test the ants' preference for either type. Thus determining how ants choose their fungus. We found that ants preferred fungus grown by the same lineage of ants but did not prefer the same lineage of fungus when grown by a different lineage of ants. This suggests that ant lineages impart characteristics to their fungus that is independent of genetics. This gives us insight into why some colonies succeed and others fail. This indicates that the ants exhibit fidelity to their fungus while the fungus appears to be more promiscuous and does not necessarily need a specific species of ant.

2-10. Management of the red imported fire ant (*Solenopsis invicta* Buren) using an anthranilic diamide as a novel management technique

Megan Rudolph *and Blake R. Bextine, University of Texas at Tyler, Tyler, TX*

The red imported fire ant, *Solenopsis invicta* Buren (Hymenoptera: Formicidae), is an invasive species endemic to South America that was inadvertently introduced into the United States. This invasive species costs over six billion dollars (USD) annually and causes substantial ecological and agricultural damage. While traditional pesticides have been effective, they are not realistic for the long-term management of *S. invicta*. Anthranilic diamides are novel chemical insecticides that selectively target the insect ryanodine receptor in the endoplasmic reticulum, causing calcium release and insect mortality. In this study, an anthranilic diamide was used to cause significant mortality in *S. invicta* workers. The cuticular administration of this chemical insecticide to *S. invicta* workers instigated substantial lethargy and significant mortality with increasing concentrations, exhibiting the potential for this pesticide to be used as an effective management tool.

Student Competition: Ph.D. Ten-Minute Papers

3-1. How do temperature differences relate to genome size variation?

Carl Hjelmen *and J. Spencer Johnston, Texas A&M University, College Station, TX*

Genome size has been found to vary extensively across organisms - up to 200,000 fold in eukaryotes and up to 7,000 fold in animals. This extreme variation has not been found to correlate with complexity, but rather is due to increased regions of nongenic DNA. Numerous theories have been proposed to explain why there is such variation in nongenic DNA ranging from low effective population sizes to adaptation to climatic environmental change. Based on the climatic rule of increased body size with increasing distance from the equator and decreasing temperature (Bergman's Rule), it is hypothesized that genome size should increase with decreasing environmental temperature. Increased genome size leads to increase cell-size, which can in turn, increase the body size of the organism. Interestingly, this relationship has not been extensively investigated and the most extreme example, *Belgica antarctica* (Diptera*:* Chironomidae), shows the opposite trend. Its environment is the coldest and its range the southernmost, yet it has smallest genome known to date in insects. Here, we investigate the question of temperature's impact on genome size for approximately 50 *Drosophila* species. Preliminary results have found a marginally significant relationship of increasing genome size with decreasing geographic temperatures. We will analyze this relationship further using comparative phylogenetic methods and use novel multivariate regression methods in an effort to tease out the contribution of phylogenetic relationship and additional climatic parameters on the genome size and temperature relationship.

3-2. Selection of reference genes for expression analysis in the potato psyllid, *Bactericera cockerelli*

Freddy Ibanez *and Cecilia Tamborindeguy, Texas A&M University, College Station, TX*

The selection of reference genes is a crucial step for quantitative real-time PCR analyses and increasingly the use of more than one reference gene for an accurate and reliable normalization is been recommended. In this study, a set of six genes: *Ferritin, β-actin, Glyceraldehyde-3-phosphate dehydrogenase* (*Gapdh*)*, Ribosomal protein subunit L5* (*RpL5*)*, Ribosomal protein subunit 18* (*RpS18*) and *Elongation factor-1a* (*Ef-1a*) were selected and their stability was assessed in different life stages and female organs (bacteriomes, alimentary canals and reproductive organs) of *Bactericera cockerelli* harboring or not the bacterial pathogen '*Candidatus* Liberibacter solanacearum' (Lso) haplotype B. The stability of each gene was determined using three different programs: GeNorm, NormFinder and BestKeeper. Our results determined that *Ef-1a, RpL5* and *RpS18* were the most stable genes across the life stages and the presence of Lso haplotype B did not affect the stability of these genes; they only differed in their respective ranking. By contrast, among the different female organs tested, bacteriomes, alimentary canals and reproductive organs, we could not find a common set of normalizers.

3-3. Genetic and biological techniques to reduce corn pest and pathogen risk and improve yield

Luke Pruter[1]*, Michael Brewer*[2]*, Thomas Isakeit*[3] *and Seth Murray*[4]*, *[1]*Texas A&M, Bryan, TX, *[2]*Texas A&M Agrilife Research, Corpus Christi, TX, *[3]*Texas A&M AgriLife Extension, College Station, TX, *[4]*Texas A&M, College Station, TX*

Some of the most common environmental factors that present challenges for South Texas corn farmers are high temperatures, a large pest presence, and variable rainfall. Major environmental issues such as limited water availability reduce plant defenses, potentially increasing risk to insect injury to corn ears and aflatoxin contaminations attributed to the fungus *Aspergillus flavus.* Genetic and biological methods we manipulated to address these pest, pathogen, and water stress challenges are use of genetic, "added-value traits," designed to reduce pest feeding (Bt transgenes) and maintain cellular function during reduced water availability (drought tolerance), and the intentional contamination of maize with A-toxigenic strains of *A flavus* to prevent contamination by its toxigenic counterpart that produces aflatoxin. Under the experimental conditions tested, corn pest activity and aflatoxin contamination were reduced in selected genetic and biological treatments, while yield was less affected by the genetic and biological treatments.

3-4. Quantifying the diet of the red imported fire ant (*Solenopsis invicta*): A next-generation sequencing approach to molecular gut content analysis

MacKenzie Kjeldgaard*, Jason Wulff, Gregory Sword and Micky Eubanks, Texas A&M University, College Station, TX*

We performed a next-generation sequencing (NGS) molecular gut content analysis of red imported fire ant (*Solenopsis invicta*) brood in natural and agricultural ecosystems. NGS can broadly unravel trophic interactions by amplifying total gut/ body DNA of a predator. We can then use general primers to identify most, if not all, consumed prey. NGS offers an alternative to traditional PCR-based techniques that are limited by primer specificity and a narrow focus on distinct prey species. The NGS gut content analysis was performed on DNA amplicons extracted from fire ant brood collected from field sites varying in habitat type. We chose to use 4th instar brood because they process solid food for the colony and retain this digested food until prepupation, potentially prolonging our ability to detect consumed prey DNA. We collected 4th instars from five sites in Texas that included differently managed cotton fields and one natural site. We extracted DNA and amplified a mitochondrial COI fragment, the gene most commonly used in DNA barcoding to identify animal species. We then sequenced the pooled amplicons on an Illumina HiSeq 2500. The resulting reads were processed and analyzed to identify unique taxa. We identified nine different arthropod orders consumed by fire ants across all sites, with the highest representation in Orthoptera and Lepidoptera. We found that fire ant diet correlated with crop management practices. This technique will be expanded with greater spatial and temporal sampling to determine fire ant impacts on communities.

3-5. Red imported fire ant (*Solenopsis invicta* Buren) foraging behavior in the presence of swarming bacteria *Proteus mirabilis*

Elida Espinoza[1], *Jeffery K. Tomberlin*[1], *Roger Gold*[1] *and Tawni L. Crippen*[2], [1]*Texas A&M University, College Station, TX,* [2]*USDA, Agricultural Research Service, College Station, TX*

Bacteria can sense bacterial population abundance in their immediate surroundings and release proteins, such as autoinducer molecules or volatiles, to further stimulate gene expression, interaction, and behavior in other bacterial cells. These molecules also facilitate cross-signaling communication between prokaryotes and eukaryotes, affecting many behaviors, like foraging and mating, in mammals and insects alike. Previous bacterial studies involving the red imported fire ant (*Solenopsis invicta* Buren) have focused on isolating and identifying concomitant bacteria and searching for bacteria-ant mutualisms or infections. In this laboratory study, fire ants were exposed to food coupled with swarming bacteria *Proteus mirabilis* to observe colonoid foraging responsiveness. Increasing bacterial concentrations were used to monitor their effect on ant feeding, aggregation, and foraging rate. Ant feeding and foraging efforts differed amongst colonies, while food without bacteria was preferred. However, aggregation of ants within the foraging chamber told a clearer story of foraging rate associated with bacterial presence. These experiments begin to explore the dynamics of interkingdom associations and the role bacteria play in shifting ant foraging, knowledge that could translate to our understanding of animal behavior and novel methods for biological control.

3-6. ZeroFly® Storage Bag as a barrier to insect pest infestation

Sulochana Paudyal[1], *George Opit*[1], *Enoch A. Osekre*[2], *James Danso*[3], *Naomi Manu*[3] *and Evans Nsiah*[4], [1]*Oklahoma State University, Stillwater, OK,* [2]*Kwame Nkrumah University of Science and Technology, Kumasi, Ghana,* [3]*Entomology, Kumasi, Ghana,* [4]*Entomology, Ejura, Ghana*

The deltamethrin-incorporated polypropylene (PP) bag, ZeroFly® Storage Bag, is a new technology to reduce postharvest losses caused by stored-product insect pests. ZeroFly bags filled with untreated maize were compared with PP bags filled with Betallic Super-treated-maize and PP bags filled with untreated maize (control). The experiment was conducted from February−August 2015, at four sites in different locations of the Middle Belt of Ghana. Moisture content (MC), number of live and dead insects, insect damaged kernels (IDK), and maize weight loss data were collected monthly. ZeroFly bags and Betallic treatment significantly reduced insect damage compared to the control treatment. ZeroFly bags were able to keep IDK level below 5% for 4 mo, but the levels increased to 5.2 and 10.2% after 5 and 6 mo, respectively. In the control, IDK increased significantly over time and reached 32% after 6 mo. The ZeroFly bag was effective against *Sitophilus*, *Tribolium*, and *Cryptolestes* species for 4 mo. Mean weight loss of ≤ 3.68% was recorded in ZeroFly bags during 6 mo of storage whereas 11.88% weight loss occurred in the PP bags after 6 mo. Among the three methods of storage, treating maize with Betallic was more effective in terms of suppressing insect pests' populations, reducing IDK, and minimizing weight loss. Based on our results, ZeroFly bags are effective for short-term storage, but could also protect grains for longer if insect-free grains are used to fill the bags.

3-7. Rangeland fire on the dung beetle community of the Texas Rolling Plains

Britt Smith, *Brad Dabbert and Robin M Verble-Pearson, Texas Tech University, Lubbock, TX*

Dung beetles are an ecologically and economically important insects in rangeland ecosystems. They recycle nutrients and reduce livestock parasites. The use of fire on rangelands is a common management tool to control brush and improve forage. The influence of prescribed rangeland fire on the dung beetle community in the United States is an understudied issue. Burned areas can influence grazing animal distribution since grazing animals are attracted to regrowing vegetation. As a result, grazing animals create a strong contrast in vegetation structure between burned and unburned areas. This aggregation of grazing animals and contrast in vegetation structure may influence dung beetle abundance in recently burned areas. Our study was conducted Jun 9th – June 16th, 2015 at Matador Wildlife Management Area within the Texas rolling plains. Three prescribed burns of 23, 454, and 2800 ha were conducted in the spring of 2015. We created six sample

locations across the three burned areas on the edge of the burn units. Each sampling location contained four baited pitfall traps with two in the burned area and two in the adjacent unburned area. Traps were collected daily for a total of six days. Trap bait was replaced every other day. Pitfall traps were filled with a 50:50 solution of water and popylene glycol with a drop of unscented dish detergent. Dung beetles are currently being identified to highest taxonomic resolution. We will analyze the data using constrained ordination methods. Our environmental variables will consist of treatment, vegetation visual obstruction, and cattle dung density.

3-8. **Population genetics of the sugarcane aphid, *Melanaphis sacchari* (Zehntner), in the continental US**

Jocelyn R. Holt[1], *J. Scott Armstrong*[2], *Kyle Harrison*[1] *and Raul F. Medina*[1], [1]*Texas A&M University, College Station, TX,* [2]*USDA-ARS, Stillwater, OK*

The sugarcane aphid (SCA), *Melanaphis sacchari*, was reported as a damaging pest of sorghum in the United States (US) for the first time in 2013. However, this aphid is not new to the US. Since 1920s up until 2013 SCA have occurred on sugarcane in Florida and later in Louisiana, causing minimal damage to this crop. Soon after SCA populations were reported in US sorghum, this pest rapidly expanded its range across the southern region. Today, SCA can be found from Texas to Florida and causes average estimated yield loss of between 20 to 30% when uncontrolled. In order to fully understand what may have caused the host-switch from sugarcane to sorghum the population genetics of SCA on its three most common host plants (i.e., sorghum, sugarcane, and Johnson grass) was characterized across its distribution in the continental US. Using AFLPs, no significant genetic differences were detected among populations on different host-plants or geographic locations. These findings agree with previous work on this aphid that have found them to occur as superclones over broad geographic regions.

3-9. **The synergistic effects of almond protection fungicides on honey bee (*Apis mellifera*) forager survival**

Adrian Fisher II[1], *Juliana Rangel*[1] *and Clint Hoffmann*[2], [1]*Texas A&M University, College Station, TX,* [2]*USDA, ARS, Areawide Pest Management Research Unit, College Station, TX*

The honey bee (*Apis mellifera*) contributes approximately $17 billion annually in pollination services for several major food crops in the United States including almonds. Commercial beekeepers from around the country transport over a million honey bee colonies into almond orchards during the bloom period in California. As with much of agriculture, almond growers face challenges to crop productivity from several pests and pathogens which are addressed with a multitude of chemical applications. For instance, fungicides are often applied in combination with other products to control fungal pathogens. The potential synergistic effects of fungicides on honey bee health are poorly understood. To assess the effects of select fungicides used during almond bloom on honey bee forager mortality, we collected honey bee foragers from a local apiary and exposed them to the label dose, or a range of dose variants (from 0.25 to 2X the label dose) of the fungicide iprodione. Foragers were also treated with fungicide combinations including iprodione, boscalid + pyraclostrobin (Pristine®) and azoxystrobin (Quadris®). We utilized a wind tunnel atomizer set up (wind speed: 2.9 m/s) to simulate field-relevant exposure of honey bees to these chemicals during aerial application in almond fields. We then caged groups of 40-50 exposed foragers, as well as unexposed control groups, and kept them in an incubator with daily provisions of 50:50 sucrose/water solution and water. Forager mortality was monitored daily over a ten-day period. By conducting a Kaplan-Meier survival analysis we observed a significant negative effect of fungicide combinations on forager survival.

3-10. **Exploring the sexy frontiers of functional morphology...in 3D!!! (Orthoptera: Acrididae: *Melanoplus rotundipennis*)**

Derek Woller *and Hojun Song, Texas A&M University, College Station, TX*

One of the oldest ecosystems in the southeastern U.S.A. is scrub, often associated with ridges, typically in Florida, which are thought to have been used as refugia during sea level shifts 1-3 million years ago. The sea has now receded and relatively stabilized, but the ridges essentially remain landlocked islands due to their unique soil composition and relative lack of plant diversity. Thus, scrub is home to a myriad of endemic species, particularly arthropods, some of which belong to the grasshopper (Orthoptera: Acrididae) genus, *Melanoplus.* The genitalia of these *Melanoplus* species are highly diverse, driven initially by isolation and now, most likely, sexual selection. Integral to better comprehending this evolutionary force is learning more about the role of the many genitalia components of both sexes during the copulation process. Thus, one of these species, *M. rotundipennis* (Scudder, 1878), was chosen to be the test subject for an exploration of the frontiers of functional morphology combining a more recent technique, micro computed tomography (micro-CT), with older ones: scanning electron microscopy (SEM) and digital SLR photography. After freezing a pair of specimens *in copula* and scanning them with a micro-CT machine, the program Amira was utilized to construct 3D models of all male and female genitalia morphology to discover how the parts interacted. These models were then compared to SEM and DSLR images to gain a comprehensive overview of functional morphology. In addition to the discovery of structures new to science, great insight has been gained into how genitalia components interact physically.

Symposia

SYMPOSIUM: Vector-Borne Diseases Impacting Texas Citizens, Livestock, and Pets

4-1. The biology of peridomestic *Triatoma gerstaeckeri* and potential IPM tactics for the prevention of autochthonous *Trypanosoma cruzi* exposure in south-central Texas

Edward Wozniak, *Texas Department of State Health Services, Uvalde, TX*

American trypanosomiasis (Chagas' disease) is a well-recognized vector borne protozoal disease in Mexico and Central and South America with sporadic autochthonous cases being documented in the southern United States. The disease is caused by the zoonotic kinetoplastid protozoal parasite, *Trypanosoma cruzi* which can be vectored by several genera and numerous species of New World kissing bugs (Hemiptera: Reduviidae: Triatominae), five of which are native to south-central Texas. Because of differences in the biology and feeding habits between triatomine species, some are more likely than others to be involved in zoonotic transmission cycles of *T. cruzi*. This presentation will cover the biology of peridomestic *Triatoma gerstaeckeri* in south-central Texas, discuss and illustrate surveillance tactics for their detection, and summarize some of the control tactics that can be implemented to develop an effective strategic IPM program for their control and the prevention of Chagas disease exposure in humans and domestic animals.

4-2. Chagas disease epidemiology in border patrol dogs along the Texas-Mexico border

Alyssa Meyers, *Italo Zecca and Sarah Hamer, Texas A&M University, College Station, TX*

Chagas disease, a potentially deadly cardiac disease of humans and canines, is caused by the protozoan parasite *Trypanosoma cruzi*. The parasite is transmitted by infected hematophagous triatomine insects, commonly known as 'kissing bugs'. Chagas disease is estimated to infect nearly 6 million people throughout Latin America, and is increasingly recognized across the southern United States. Canine Chagas disease may be particularly widespread in Texas, where a recent study found that 8-14% of shelter dogs across the state were infected. Our objective was to assess the prevalence and distribution of canine Chagas disease in border patrol dogs along the Texas-Mexico border and identify risk factors for exposure. Border patrol dogs may be at high risk due to their prolonged work outdoors in geographic areas with established kissing bug populations. In fall 2015, we collected blood samples from 259 border patrol dogs from Rio Grande Valley, Laredo and Del Rio Sectors along the Texas-Mexico border. Canine plasma was screened for anti-*T. cruzi* antibodies by rapid immunochromatographic serological dipstick tests. Preliminary results indicate over 16% of dogs are exposed, with highest prevalence in the southern tip of the state. We will further analyze Chagas seroprevalence data with respect to dog breed, age, sex, geographic location, and canine job duty (tracking, detection, narcotics, search and rescue, or agriculture detection) to identify potential risk factors for Chagas exposure. Understanding the epidemiology of Chagas disease along the border will be a first step toward implementing control measures to protect the health of these high-value working dogs.

4-3. Determining the prevalence of Chagas disease in the Rio Grande Valley region of the Texas-Mexico border

Italo Zecca, *Rachel Curtis-Robles and Sarah Hamer, Texas A&M University, College Station, TX*

Chagas disease is a zoonotic parasitic disease affecting an estimated 8 million people and countless dogs worldwide that can lead to life-threatening heart and digestive disease. The parasite, *Trypanosoma cruzi*, is most prevalent across Latin America where the triatomine 'kissing bug' vectors commonly inhabit rural homes. Despite well-recognized parasite transmission between wildlife and vectors in the southern US, the human and veterinary health burden of Chagas disease in the US is largely unknown. However, reports of diagnoses in immigrants, locally-exposed persons, and domesticated dogs have been increasing in the US. We studied the epidemiology of Chagas disease in medically-underserved human and canine populations of six south Texas communities, known as colonias. In summer and fall of 2015, a cross-sectional study was conducted to determine the associations among human and animal infection, vector occurrence, and socioeconomic and environmental features. Through the aid of a promotora, a culturally-competent community health worker, we conducted door-to-door outreach and collected blood samples from humans and cohabiting dogs. Through serological testing of 161 humans, we identified three positive individuals (1.9%) confirmed by at least two independent antibody detection platforms, of which two report no travel history outside of south Texas. Of 113 dogs, antibodies were detected in 24 (21.2%) and parasite DNA in 4 (3.5%) dogs, indicative of an active infection. An exposed dog and human shared the same household. Under a one-health framework, the documentation of local transmission of Chagas disease is a first step in developing public health interventions.

4-4. Spatial analysis of *Culex* mosquito abundance and infection with West Nile virus during the 2012 Dallas County epidemic

Karen Poh[1], *Scott Sawlis*[2] *and Gabriel Hamer*[1], [1]*Texas A&M University, College Station, TX,* [2]*Dallas County Mosquito Control, Dallas, TX*

Since the introduction to the United States in 1999 and subsequent spread, West Nile Virus (WNV) has become the arbovirus with the greatest geographic distribution. In 2012, the United States experienced the largest outbreak of WNV, with the majority of cases and deaths occurring in Texas. Texas reported 1,868 cases of WNV, 844 cases of WNV neuroinvasive disease, and 89 deaths throughout the state, with the majority of incidents occurring in Dallas, TX and surrounding areas. Previous studies explored relationships between human cases of WNV and demographic, landscape, and environmental variables; however, the infection of mosquitoes can better reflect spatial variation in transmission intensity than human cases. In this study, we conducted a spatial analysis of the 2012 WNV epidemic in Dallas County to characterize heterogeneity of *Culex quinquefasciatus* abundance and infection with WNV. Furthermore, we conducted a spatial analysis to identify relationships between environmental and demographic features of the landscape and *Culex* WNV infection rates. Over 25,000 mosquitoes were pooled and tested for WNV, of which 22,000 *Cx. quinquefasciatus* mosquitoes were identified. Out of 1,494 pools containing at least one *Cx. quinquefasciatus* mosquito, 237 pools tested positive for WNV (15.9%). Major mosquito and WNV activity occurred between June and August, with a peak in the infection rate during the second week of July (47.7 per 1,000). We found hotspots for WNV-positive mosquitoes in north central Dallas County. Results of the statistical models testing the ability of environmental and demographic variables to predict WNV *Culex* infection rate will be provided.

4-5. **Assessment of the geographic distribution of *Ornithodoros turicata* (Argasidae): Climate variation and host diversity**

Taylor Donaldson[1], *Adalberto de Leon*[2], *Andrew Li*[3], *Ivan Castro-Arellano*[4], *Edward Wozniak*[5], *Pete Teel*[1] *and Job Lopez*[6], [1]*Texas A&M University, College Station, TX,* [2]*United States Department of Agriculture - Agricultural Research Service, Kerrville, TX,* [3]*USDA-ARS Knipling-Bushland U.S. Livestock Insects Research Laboratory, Kerrville, TX,* [4]*Texas State University - San Marcos, San Marcos, TX,* [5]*Texas Department of State Health Services, Uvalde, TX,* [6]*Baylor College of Medicine, Houston, TX*

Ornithodoros turicata (Argasidae) is recognized as a vector of the relapsing fever spirochete, *Borrelia turicatae*, and African Swine Fever Virus. Several historical collections of *O. turicata* have been made from specimens from Latin America to the southern United States, but this geographic distribution is poorly understood in relation to environmental variables, their hosts, and the pathogens they vector. We conducted field surveys and used several preexisting collection databases to obtain localities for *O. turicata*. These localities were then used with a maximum entropy model (Maxent) in order to predict the possible distribution of *O. turicata* under predefined environmental variables. GIS analyses were conducted to ascertain the area of shared occupancy of both the hosts. Maxent analyses indicated previously unrecognized regions of the United States that were predicted as probable for the occurrence of *O. turicata*. A unique environmental gap also seems to exist between the western population and the eastern population. A total of 58 known and suspected hosts were found to occupy the predicted distribution. Further tick surveillance efforts and research are needed to understand host communities and to define suitable habitat that supports the maintenance of *O. turicata* and the pathogens it vectors.

4-6. **Assessing Gulf Coast tick, *Amblyomma maculatum* Koch (Acari: Ixodidae) population changes in Texas using the U.S. Drought Monitor Classification Scheme**

Pete Teel*, Texas A&M University, College Station, TX*

The Gulf Coast tick, *Amblyomma maculatum*, is an annual pest of cattle, horses, and wildlife throughout the Southern U.S. It is a vector of pathogens to ruminants, humans and canines. Off-host survivorship in the 3-host life cycle is negatively affected by duration and level of desiccation in tick habitats, a subject extensively studied at the micro- and meso-climate levels. This study tests the hypothesis that the U.S. Drought Monitor Classification Scheme can explain regional-level population changes of *A. maculatum*. A retrospective, observational study was conducted using tick collection records from the state-wide tick surveillance program and regional drought data for Texas for the period 2000–2014. Repeated measures analyses were used to separately compare both *A. maculatum* population changes and drought stress across the 15-year period between two adjacent geographical areas of Texas, and to test whether trends in *A. maculatum* population changes could be explained by corresponding changes in drought stress. Drought stress category and tick life history periods were assessed in a step-wise fashion. Results support the hypothesis that *A. maculatum* population changes in Texas can be associated with drought stress and that 2-year rolling predictive models provided the best explanations.

SYMPOSIUM: The Sugarcane Aphid on Sorghum: Management and Ecology

5-2. **Variation in hybrid sensitivity and yield response to sugarcane aphid provide opportunities for integrated management of sugarcane aphid on sorghum**

Michael Brewer[1] *and Robert Bowling*[2], [1]*Texas A&M Agrilife Research, Corpus Christi, TX,* [2]*Texas A&M AgriLife Extension, Corpus Christi, TX*

Research results from 2014 and 2015 from three replicated field studies will be reviewed.

SYMPOSIUM: Urban Entomology

6-1. Plano ISD School IPM program: An in-depth case study analysis

Janet Hurley, *Texas A&M AgriLife Extension Service, Dallas, TX*

Quantifying the cost of a school system's pest management program is typically obtained by observing the pest control budget; however budgets are categorized in different ways by each school district. An alternative approach is to analyze pest control-related work orders to estimate the annual costs of responding pest complaints. We looked at two full years' worth of pest management work orders at a large Texas school district. Work orders were analyzed to determine: How many work hours were spent per pest? During which months did pest pressure occur? What were labor and material costs per pest? What were costs of preventative versus reactive pest control? Also, how much time was devoted to dead-end (no activity) requests for service? In this study we demonstrate the utility of this alternative approach to analyzing the true costs of integrated pest management.

6-2. Red imported fire ant management efforts in Corpus Christi Independent School District – Three Years Later

Paul Nester, *Texas A&M AgriLife Extension Service, Houston, TX*

This report is a follow-up to the September 2013 death of a Corpus Christi Independent School District (CCISD) middle school student from numerous red imported fire ant (RIFA) stings in Corpus Christi, TX, the attempts of the CCISD to address improvements to their existing RIFA management program, and the efforts of the Texas A&M AgriLife Extension Service to assist and monitor the efforts. After the initial event Texas A&M AgriLife Extension Service School Integrated Pest Management Program team was contacted to assist in reviewing the districts' IPM program, review the RIFA management program and make recommendations. The review assessed the actual school IPM program and reviewed the RFA management protocols and develop a new treatment protocol for the district. After several meetings and revisions to the RIFA management plan for CCISD, the district implemented an improved RIFA management program in spring 2014. It can now be reported that after two years of an intense RIFA management effort consisting of a targeted application of a fipronil granule to specific sports venues, and utilization of scheduled broadcast fire ant bait products applied over athletic outdoor training areas and school properties, CCISD is pleased with the effectiveness of the RIFA management efforts. Minimal numbers RIFA mounds are seen, calls and work orders for RIFA have decreased, and stinging events are low. This team continues to work closely with this district to monitor the program and answer questions regarding weather and bait applications.

6-3. Managing tawny crazy ants (*Nylanderia fulva* Mayr) in urban environments

Robert Puckett, *Texas A&M University, College Station, TX*

This presentation will address the biology, behavior, and complications associated with management of tawny crazy ants (*Nylanderia fulva* Mayr). Since introduction in Texas in 2002, these ants have expanded their known range to include 28 Texas counties, as well as locations in Louisiana, Mississippi, Alabama, Florida, and Georgia. Once established, *N. fulva* become significant pests of urban and agricultural systems. Results of recent field and laboratory studies which were designed to develop practical management strategies for this invasive ant species will be presented.

6-4. Efficacy of PT® Alpine® pressurized fly bait (BASF) on house flies

Sonja L. Swiger, *Texas A&M University, Stephenville, TX*

House flies pose a serious pest for barn/stable operators and dairy operators throughout the United States. When the population rises well above a manageable rate they begin to travel to nearby houses and businesses. House flies do not bite but are extremely annoying and are not appreciated by the general public. In addition to their nuisance status, house flies have the ability to mechanically transmit over 200+ pathogens that cause disease to humans and animals. Therefore it is important for barn/stable operators and dairy operators to keep their house fly numbers suppressed. A laboratory study was initiated at the Texas A&M AgriLife Research and Extension Center in Stephenville, Texas to test the efficacy of PT® Alpine Pressurized Fly Bait (BASF) on house flies against multiple types of materials (plastic, wood, metal, concrete and glass). A laboratory study was also initiated to determine the efficacy of PT® Alpine Pressurized Fly Bait (BASF) in comparison to Alpine WSG Insecticide, Maxforce Fly Spot Bait, QuickBayt, QuikStrike and Golden Malrin inside insect cages, 24 x 24 x 24 inches. House flies from two local dairies (wild-caught), imidacloprid-resistant house flies (obtained from USDA) and susceptible house flies (obtained from USDA) were placed into the cages (20 / cage) and observed over a period of time. The PT® Alpine Pressurized Fly Bait (BASF) proved to be very effective against the house flies and another potential dairy barn control product.

6-5. Mosquito species distribution across suburban, urban, and semi-rural residences in San Antonio, Texas

Megan Wise de Valdez, *Texas A&M San Antonio, San Antonio, TX*

San Antonio, Texas is a border city with Mexico, an area endemic for mosquito-borne diseases, yet no formal long-term mosquito surveillance occurs within the city. We aim to establish a long-term surveillance program, beginning in the summer of 2015 with a population survey addressing the distribution of mosquito species across different residential land-use habitats within San Antonio. We collected adult female mosquitoes weekly from June 1 – July 29 using CO_2-baited light traps and BG-Sentinel™ traps in 18 urban, suburban, or semi-rura residential backyards. We identified 3076 females to 28 species in 6 genera. The most prevalent species were *Aedes aegypti* (36%), *Culex quinquefasciatus* (12%), and *Aedes albopcitus* (8.7%), all are primary disease vectors. When sites were separated based on residential land-use, *Ae. aegypti* was most prevalent in each, but more so in the urban and suburban (both with 43%) than in semi-rural (21%). *Culex quinquefasciatus* was the only other species that had a prevalence of over 5% in each habitat. Mosquito species diversity was higher in the semi-rural habitats than in urban or suburban. Semi-rural and suburban habitats were most similar in species incidence. All mosquitoes were tested by Texas Department of State Health Services for arbovirus; none were positive. In 2016, we will expand our survey to address seasonal distribution and risk assessment of disease transmission. Long-term surveillance in San Antonio is needed due to the high human traffic with Mexico and the fact that many mosquito vectors that transmit diseases endemic to Mexico are found in San Antonio.

6-6. **Cricket hunter wasps, *Liris* species (Hymenoptera, Crabronidae), as indoor pests in north Texas**

Michael Merchant, *Texas A&M University, Dallas, TX*

Liris beatus (Cameron) is a widespread species of square-headed wasp (Crabroninae) reported from southern half of the U.S., and ranging from California to the east coast. It is one of the solitary wasps that provisions nest with crickets (Gryllinae). In natural sites, L. beatus uses rodent burrows and other underground cavities as nest sites; however in urban areas this wasp has been observed to use holes in and under structures as nests. In north Texas L. beatus has become an occasional indoor pest when its offspring emerge indoors, sometimes by the hundreds. This paper describes the pest habits of Liris beatus in Texas.

Regular Ten-Minute Paper Oral

Regular Ten-Minute Oral

7-1. **Boosting sorghum production by using sorghum midge-resistant varieties in Niger (West Africa)**

Hame Abdou Kadi Kadi *and Bonnie Pendleton, West Texas A&M University, Canyon, TX*

Sorghum, *Sorghum bicolor* (L.) Moench, is the most important cereal in the semi-arid tropics. It is a staple for the poorest and most food-insecure people. In Niger, sorghum is the second staple crop after pearl millet, *Pennisetum glaucum* (L.) R. Br. Sorghum provides food, feed, and forage, but grain yields on farms are low, partly because of damage by insect pests. Sorghum midge, *Stenodiplosis sorghicola* (Coquillett), is the main constraint to sorghum production and results in low yields in Niger. Sorghum midge is reported to cause 70% loss of sorghum grain. Introduction and testing of resistant sorghum varieties to control sorghum midge did not yield expected outputs because of non-adaptability of the introduced varieties and lack of acceptance by farmers. In Niger, development of new sorghum lines resistant to sorghum midge started with crossing 'Mota Maradi' (early maturing local variety) and 'ICSV 88032' (sorghum midge-resistant variety developed by ICRISAT). Numerous crosses were made and promising sorghum lines selected by single-seed descent (SSD) methodology and evaluated in preliminary and advanced experiments at research stations. After the advanced experiments, 'SSD-35' was released to farmers. The first on-farm tests were done in 2002 at Maradi. SSD-35 was resistant to sorghum midge (yielding 700-1000 kg/ha) compared with local varieties (350-550 kg/ha). Results were confirmed in similar tests in the Tahoua region in 2008. After on-farm testing, the SSD-35 variety was fully adapted to many sorghum-growing areas. Private seed producers are producing and marketing the SSD-35 variety, which helped boost sorghum production in Niger.

7-2. **Overview of sugarcane aphid (*Melanaphis sacchari*) management options in sorghum during 2015**

Monti Vandiver[1], *Victor Mascarenhas*[2] *and J.P. Koenig*[3], [1]*Syngenta Crop Protection, Lubbock, TX,* [2]*Syngenta Crop Protection, Nashville, NC,* [3]*Syngenta Crop Protection LLC, Greensboro, NC*

In 2013, large populations of sugarcane aphids (*Melanaphis sacchari*), an emerging pest of grain sorghum, were reported on sorghum in four states within the Continental US and in northeastern Mexico. By September 30, 2015 sugarcane aphid (SCA) was confirmed in 17 states, 417 counties, and as far north as Colorado and Illinois. Severe yield losses have been attributed to this pest.

Currently only one effective insecticide (Sivanto™, IRAC Class 4D) is approved for use in sorghum. Sorghum producers need additional tools to manage SCA. Thiamethoxam, the active ingredient in Centric® insecticide, is a reliable insecticide which provides good knockdown and residual control of sucking pests with minimal impact on beneficial insects. Centric would be a viable SCA management tool and would also provide a separate IRAC class (4A) insecticide in grain sorghum. In the event of a mulitpest infestation which needs to be managed by one spray, Endigo® ZCX, a premix of thiamethoxam and lambda-cyhalothrin currently pending EPA registration, is an effective control tool with the correct spectrum of activity to provide good knockdown and residual suppression of both chewing and sucking pests.

Results from 13 University trials and one internal Syngenta trial indicate that Centric and Endigo ZCX provide very good control of SCA with no crop phytotoxicity. Centric provided consistent control of SCA and performed as well as or better than competitive options evaluated. Centric and Endigo ZCX are currently not registered for use on sorghum. Anticipated EPA submission is planned for the first quarter of 2016.

7-3. Parasitism of cereal aphids in wheat by *Lysiphlebus testaceipes* is affected by landscape context

Norman Elliott[1], *Kris Giles*[2], *Michael Brewer*[3] *and Georges Backoulou*[2], [1]*USDA, ARS, Stillwater, OK,* [2]*Oklahoma State University, Stillwater, OK,* [3]*Texas A&M Agrilife Research, Corpus Christi, TX*

Parasitism of cereal aphids in wheat fields in central Oklahoma by Lysiphlebus testaceipes was affected by structure of the landscape surrounding the field. In autumn, when aphids were colonizing the wheat crop, parasitism was affected by the acreage of wheat surrounding the wheat field. Increasing mean fractal dimension of habitat patches, patch density (mean patch size), and patch richness within an area of radius two km centered on the field was associated with an increase in parasitism rate, while an increase in the acreage of wheat surrounding the field was associated with a decrease in parasitism rate.

7-4. Using multispectral imagery to detect stress induced to sorghum fields by the sugarcane aphid

Georges Backoulou, *Oklahoma State University, Stillwater, OK*

The sugar cane aphid *Melanaphis schari* (Zehntner) has been detected in grain sorghum commercial fields near the Gulf Coast and Lower Rio Grande Valley in Texas, Louisiana, Mississippi, Oklahoma, and South of Kansas since the summer of 2013. The yield losses reported due to the infestations have been estimated to 50 percent of the production. The study explores the potential of using multispectral images acquired nadir from a 3-band-camera to assess stress induced by sugar cane aphid to commercial sorghum fields.

7-6. Discovery and efficacy of local strains of entomopathogenic fungi for black cutworm control

Eric Rebek[1], *Stephen M. Marek*[1] *and Jose Rodriguez-Contreras*[2], [1]*Oklahoma State University, Stillwater, OK,* [2]*Universidad Autónoma Agraria Antonio Narro, Saltillo, Mexico*

We isolated naturally occurring entomopathogenic fungi from soil samples collected from Oklahoma golf courses, sequenced the ITS gene region of each isolate for identification, and assessed all isolates for relative pathogenicity via laboratory bioassay using mealworms, *Tenebrio molitor* L. We tested the efficacy of the five most pathogenic isolates, all of which were *Metarhizium* spp. Sorokin, against black cutworm, *Agrotis ipsilon* (Hufnagel), in plots of creeping bentgrass, *Agrostis palustris* Huds. 'Penn G6'. Preliminary results suggest the five isolates are viable candidates for effective biological control of black cutworm infestations on putting greens, but further work is needed to isolate pure cultures of select fungal colonies, assess LC_{50} values of each pure isolate against black cutworm in lab bioassays, and ultimately test their effectiveness against black cutworm in the field using application rates that are similar to commercial microbial products.

7-7. Risk of encountering ticks and tick-borne pathogens within a rapidly growing metropolitan area in the U.S. Great Plains

Bruce Noden, *Scott Loss, Courtney Maichak and Faithful Williams, Oklahoma State University, Stillwater, OK*

The prevalence of tick-borne diseases has increased dramatically in many urban areas of the U.S yet little is known about the ecology of ticks and tick-borne pathogens in relation to urbanization patterns. This study aimed to begin identifying the risks for encountering ticks and tick-borne pathogens within a rapidly expanding metropolitan area in the southern U.S. Great Plains. Ten sites across Oklahoma City, Oklahoma were chosen based on presence of tick habitat and gradient of urbanization intensity. Sampling was conducted by CO_2 traps and flagging in June, July and October 2015. A total of 546 ticks were collected across eight parks within the Oklahoma City metropolitan area. The majority of ticks collected were *Amblyomma americanum* (N=534 (97.8%)) followed by *Dermacentor variabilis* (N=10 (1.8%)) and *Amblyomma maculatum* (N=2 (0.3%)). *A. americanum* nymphs (N=2) and *Ixodes scapularis* adult females (N=4) were collected in October. The majority of ticks were collected from parks surrounded by a relatively high proportion of undeveloped land (e.g., Martin Park Nature Center (83.7%)). However, ticks were also collected in sites surrounded by moderate/high density urban development (Trinity School (1.6%) and Dolese Youth Park (0.2%)). Collected ticks are currently being tested for prevalence of Rickettsia and Ehrlichia sp. Our data suggest that the risk of encountering ticks and tick-borne pathogens exists throughout the entire metropolitan area of Oklahoma City, even in highly developed areas near the downtown core. Continued research is needed to better understand which characteristics of urban landscapes contribute to encountering tick populations and elevated disease risk.

Poster Abstracts

Student Poster Competition

Student Competition - Ph.D. Posters

P1-1. **Defining an efficient sample unit for aphids infesting winter canola**

Aqeel Alyousuf[1], *Kris Giles*[1], *George Opit*[1] *and Norman Elliott*[2], [1]*Oklahoma State University, Stillwater, OK,* [2]*USDA, ARS, Stillwater, OK*

The most important insect pests of winter canola in the Southern Plains are aphids that sporadically attack winter canola *Brassica napus* throughout the growing season and ultimately reduce seed yield. Three aphid species commonly infest canola fields: the cabbage aphid, *Brevicoryne brassicae* L., green peach aphid, *Myzus persicae* (Sulzer) and the turnip aphid, *Lipaphis pseudobrassicae* (Davis). The goal of this research is to define an efficient sample unit for aphids infesting winter canola.

P1-2. **Development of thresholds for management of sugarcane aphid on sorghum**

John Gordy[1], *Michael Brewer*[2], *Darwin J. Anderson*[3], *Robert Bowling*[4], *M.O. Way*[5], *David L. Kerns*[6], *G. David Buntin*[7], *Nicholas Seiter*[8], *T. Royer*[9] *and Ali Zarrabi*[9], [1]*Texas A&M AgriLife Extension, Rosenberg, TX,* [2]*Texas A&M Agrilife Research, Corpus Christi, TX,* [3]*Texas A&M AgriLife Research, Corpus Christi, TX,* [4]*Texas A&M AgriLife Extension, Corpus Christi, TX,* [5]*Texas A&M University, Beaumont, TX,* [6]*Louisiana State University Agricultural Center, Winnsboro, LA,* [7]*University of Georgia, Griffin, GA,* [8]*University of Arkansas, Monticello, AR,* [9]*Oklahoma State University, Stillwater, OK*

The sugarcane aphid (*Melanaphis sacchari*) is an emerging pest of sorghum. Because this pest has caused significant economic injury to grain sorghum since its detection in the southern US in 2013, we evaluated the yield—aphid density relationship by using insecticide to obtain a range of aphid infestation levels. Susceptible grain sorghum varieties were subjected to 50, 125, 250 & 500 aphids/leaf treatment trigger levels, as well as a non-treated check. The trials were performed at six locations – two along the Texas gulf coast and one each in Oklahoma, Louisiana, Arkansas, and Georgia. Treatments were randomized and replicated three (one Texas location) or four (all other locations) times. Leaves were examined weekly beginning with the first detection of aphids. Transform WG was applied to maintain aphid populations at designated treatment levels. Aphid-yield response data were collected and regression analyses were performed to determine economic injury levels and economic thresholds. Yield loss ranged from 120 to 410 pounds/acre per 100 aphids/leaf. The data support an economic threshold of 35-135 aphids per leaf under the most common range of commodity value and aphid control costs. This range is similar to the 50-125 aphids/ leaf threshold recommended for the 2015 growing season. Measurements such as plant response and percentage of plants infested with >10 or >25 aphids/leaf were considered as an alternative to estimating aphid densities. Alternative methods show promise but will need additional evaluation.

P1-3. **Pesticide compatibility with *Aphidius colemani* (Hymenoptera: Braconidae) for biological control applications in greenhouse production systems**

Tracey Payton Miller[1], *Eric Rebek*[1], *Steven Frank*[2], *Kris Giles*[1] *and Mike Schnelle*[1], [1]*Oklahoma State University, Stillwater, OK,* [2]*North Carolina State University, Raleigh, NC*

Aphidius colemani (Viereck) is a commercially available parasitoid used in augmentative and banker plant biological control applications. The parasitoid is used for management of the green peach aphid (*Myzus persicae*) and the melon aphid (*Aphis gossypii*). For successful biological control, information is needed regarding the use of *A. colemani* in conjunction with greenhouse pesticides to control for other aphid pests, mealybugs, spider mites, whiteflies, and fungi. Pesticide compatibility was evaluated at medium and high label rates for 12 insecticides and 2 fungicides for use in controlled environments. Ornamental pepper (*Capsicum annuum* 'Black Pearl') leaves were dipped in the pesticide solutions and air dried. Treated leaves were hydrated, placed in petri dishes containing a water source and honey streak and 5-*A. colemani* adults were introduced per dish. Experiments were replicated 14 times and parasitoid mortality was measured at 6, 12, 24, and 48 h. Results were classified by IOBC guidelines as harmless (<30% mortality within 48 h), slightly harmful (30-79% mortality within 48 h), moderately harmful (80-98% mortality within 48 h), and harmful (>99% mortality within 48 h).

P1-4. **Spatial relationships of plant bugs in large scale cotton operations: Do edge and ecotone matter?**

Isaac Esquivel[1], *Michael Brewer*[2] *and Robert Coulson*[1], [1]*Texas A&M University, College Station, TX,* [2]*Texas A&M Agrilife Research, Corpus Christi, TX*

The cotton fleahopper, and the verde plant bug (Hemiptera: Miridae) have become more problematic in recent years in the cotton growing region of South Texas. They feed on reproductive tissue: squares (cotton fleahopper) and young bolls (verde plant bug). Feeding during these stages can cause severe damage to the final cotton yield as well as introduce cotton boll rot. A pest management issue is that outbreaks vary from year to year and their densities vary from field to field. Edges and ecotones are often used in landscape ecology to aid in interpreting the functional heterogeneity of an organism. In the case of these cotton insects, how the surrounding landscape effects their population occurrence and movement from squaring through flowering. The goal of this study was to investigate the spatial relationships with these pest populations to get a better understanding on why some of these pests are present is some areas and not present in others. Our study found both a edge effect for both verde plant bugs and cotton fleahoppers (more bugs were found nearer to the field edge) and ecotone modifies the strength of the edge effect. Edge effect was more predominant in the Cotton/Natural habitat ecotone than the others. This information can prove to be useful in pest management as it may help managers focus on fields or areas of fields that may be of higher risk to colonization by these pests.

P1-5. **Farmer application of post-harvest management strategies in Tahoua and Maradi regions of Niger (West Africa)**

Hame Abdou Kadi Kadi[1], *Bonnie Pendleton*[1] *and Aboubacar Kadri*[2], [1]*West Texas A&M University, Canyon, TX,* [2]*University of Niamey, Niger, Niamey, Niger*

In Niger (West Africa), sorghum, *Sorghum bicolor* (L.) Moench, and millet, *Pennisetum glaucum* (L.) R. Br., are the most important cereals in terms of acreage and annual production. Biotic and abiotic stresses result in low productivity of the crops. Insect pests attack and damage the crops during production and storage, thus reducing the quantity and quality of grain. Insect pests cause significant postharvest loss. Farmers rely on insecticide to control storage insect pests. But, insecticides are costly and toxic to living species and the environment. A survey assessed farmer knowledge of storage pests and control methods. Moisture and humidity were the main constraints for storage for 82.5 and 100% of farmers surveyed. Ants, termites, and insects were recognized as storage pests of sorghum and millet by 31.3, 67.5, and 70.0%, respectively, of respondents. Birds were not cited as a constraint during storage. By contrast, 23.8% of farmers recognized rodents as storage pests. Insecticides were used by all farmers. Most (100%) of the surveyed farmers used phostoxin tablets and actellic powder (2%). Eight plants with insecticidal effect were commonly used as substitutes for insecticides. The plant *Cenchrus biforus* Roxb. was used to trap rodents. The farmers also used inert materials (sand and ash) against insect pests in stored grain. To solve problems of cost and toxicity of pesticides, alternative control strategies are needed to effectively manage storage pests and protect grain quality, humans, and the environment.

Student Competition - Undergraduate Posters

P2-1. **Examining post-fire ant responses at the Valles Caldera National Preserve**

Zac Tatum[1], *Jonathan Knudsen*[1], *Robert R. Parmenter*[2] *and Robin M. Verble-Pearson*[1], [1]*Texas Tech University, Lubbock, TX,* [2]*Valles Caldera Trust, Jemez Springs, NM*

Fires are important and naturally occurring disturbances in most terrestrial ecosystems. However, changes in climate and poor forest management (e.g., fire suppression) have created conditions under which unnaturally large wildfires can occur. The Valles Caldera National Preserve (Jemez Springs, NM, USA) recently experienced two such fires—the Las Conchas Wildfire (2011) and Thompson Ridge Fire (2013). We are examining the effects of these fires on ant communities across a mosaic of habitat types, fire severities, and elevations. Ants are collected via pitfall traps, preserved in ethanol, and identified to the lowest taxonomic resolution possible. We are currently analyzing long-term trends in community structure, species richness, composition, and abundance among burned and unburned sites within the Preserve.

P2-2. **Impact of flonicamid on potato psyllid *(Bactericera cockerelli)* feeding behavior observed on both systemic and foliar application**

Katrina Tilaon[1], *Sean Whipple*[2], *Chris M. Powell*[1], *Juan Macias-Velasco*[3] *and Blake R. Bextine*[1], [1]*University of Texas at Tyler, Tyler, TX,* [2]*University of Nebraska, Scottsbluff, NE,* [3]*Washington University in St. Louis, St. Louis, MO*

The *Bactericera cockerelli*, the potato psyllid, is the primary vector for the bacterium *Candidatus Liberibacter solanacearum* the causal agent of zebra chip of potato. Flonicamid is a novel anti-feedant compound that belongs to the class of pyridinecarboxamides used to manage hemipterous pests, including potato psyllids. Feeding behavior was observed using time laps photography for five days and image analysis to assess the affectiveness of the compound. Reduction of feeding duration and higher rates of mortality were observed in insects feeding on treated plants. Furthermore, foliar and systemic application of flonicamid was compared to assess which method yields greater success in rates of mortality. Systemic application was more efficient in managing potato psyllids because it can reduce mortality as effectively as foliar application however using lower doses of flonicamid.

P2-3. **Electrical penetration graph recordings of mosquito (Diptera: Culicidae) feeding on artificial substrates**

Thomas Hess, *Astri Wayadande and Bruce Noden, Oklahoma State University, Stillwater, OK*

Electrical penetration graph (EPG) technology has been used to study plant-feeding insects, but not blood feeding arthropods.

New EPG technology can now be used to study blood feeders like mosquitoes and ticks. In this study, adult female *Aedes aegypti* mosquitoes were recorded for 18 hours while feeding on cotton balls soaked with 10% sucrose using 0.1 mV applied DC voltage. The mosquitoes readily probed, producing at least three distinct EPG waveform patterns; one was a 1 Hz pattern, one was a variable Hz pattern, and the last one was a high amplitude pattern. The mosquitoes had lengthy feeding periods of 15 min or longer. Unlike anything observed with hemipterans, this mosquito did not produce any patterns resembling pathway (salivary sheath deposits). We will continue to characterize the feeding patterns of this important pathogen vector in order to better understand malarial parasite and virus transmission.

P2-4. **Molecular identification of insects in residential structures from dust samples**

Riley Williams*, Chris M. Powell and Blake R. Bextine, University of Texas at Tyler, Tyler, TX*

Arthropod monitoring techniques in residences may miss any individuals that are not easily observed or attracted to traps. These individuals must leave evidence of their presence via feces and other detritus, containing dead cells and therefore DNA. Dust samples were collected from residences and subjected to DNA extraction, PCR, and Illumina sequencing of the Cytochrome oxidase 1 gene (CO1). From the resulting sequences non-observed arthropods were identified, and classified. This technique may prove a useful tool in monitoring the historical presence of arthropods in structures.

P2-5. **Decomposition of rats accurately reflected by the total body score index**

Victoria Pickens[1] *and W. Wyatt Hoback*[2], [1]*Oklahoma State University, Stilwater, OK,* [2]*Oklahoma State University, Stillwater, OK*

Forensic scientists often estimate post-mortem interval using the measures of temperature, the size of insect larvae and an estimate of the stage of decomposition. Another measure, the total body score (TBS) has been developed and tested with large bodies including pigs and human corpses. Unfortunately, replication of these studies is often limited by costs associated with the bodies and space to perform the experiments. An alternative would be to use small, readily available animals such as laboratory rats. Decomposition studies using these models can have higher numbers of replications, but research is required to determine if the carcass decomposition reflects what occurs with larger animals. Systems such as the TBS may be inaccurate because small organisms have a higher surface area to volume ratio. We hypothesized that the TBS could be used to accurately document the stages of decomposition of laboratory rats. Rat carcasses were fitted with thermocouples and placed on boards in shade, partial shade, and direct sun near the campus of Oklahoma State University in Stillwater, OK. Decomposition was monitored and the Megyesi *et al.* (2005) TBS was calculated. Decomposition patterns were positively correlated with temperature. Overall, the TBS worked on the small carcasses to classify stages of decomposition. However, in early stages of decomposition, the presence of fur on the rat carcasses obscured some decomposition characteristics. Follow up research is planned to further assess the effect of body size on TBS for decomposition and to test variables that have been found to alter rates in other studies.

P2-6. **Controlling aphid populations in daylily crops using green lacewings (Chrysopidae)**

Bret Nash*, Texas A&M University, linden, TX*

This project is set up to reduce the number of Aphids of various species from the flowering plants known commonly as Daylilies. Mrs. Lisa Egner of Texas Heritage Gardens maintains a wholesale crop of Daylilies in an open field outside of Linden, Texas, and has had significant problems with aphids destroying the crop. Chemical treatment for aphids around daylilies proves difficult due to the crop being susceptible to damage by various insecticides on the market. Another form of control is that of biological control. Some natural predators of Aphids include ladybugs and, for the purposes of this project, green lacewings are to be used in the hopes of regulation for the upcoming May 2016 flowering season.

P2-7. **The daily meat grinder: Dung and carrion beetles are attracted to rotten carcasses**

Chase Morgan *and W. Wyatt Hoback, Oklahoma State University, Stillwater, OK*

Carrion represents an important ephemeral protein source used by many vertebrates and invertebrates. Among the beetles using this resource, carrion beetles have received the most attention. However, dung beetles are also often encountered in traps baited with vertebrate carrion during the summer. We hypothsized that carrion baited traps would effectively capture both carrion and dung beetles in the Fall when the speices are likely to be seeking food resources. We used pitfall traps baited with rotten mice to conduct research near the city of Stillwater OK. Four pitfall traps were spaced approximately 2.5 Km apart on road right-of-ways bordering pasture land and checked between September 22 and October 26. A total of 583 beetles were captured. The most abundant species (45% of the total) captured was the dung beetle, *Onthophagus hecate* (263). Three other dung beetles, *Phaneus vindex* (2), *Geotrupes opacus* (9), and *Geotruoes blachbunii* (7) were also collected. The most abundant (23% of total) carrion beetle collected was *Nicrophorus orbicollis* (132). Four other silphids, *N. tomentosus* (9), *N. orbicollis* (132), *N. pustulatus* (2), and *Necrodes surinimensis* (46) were also collected. These data suggest that carrion is a viable bait for dung beetle surveys and that dung beetles may represent a significant competitor to carrion beetles including the federally endangered American burying beetle. Future work will compare dung baits with carrion to assess niche partitioning by dung beetles.

Student Competition - Master's Posters

P3-1. **CO_2 and CH_4 emissions by subterranean termites (Isoptera: Rhinotermitidae) on Oklahoma's tallgrass prairie**

Charles Konemann *and Brad Kard, Oklahoma State University, Stillwater, OK*

Subterranean termite's digestive system contains symbiotic protozoa and bacteria that enables them to digest cellulosic materials. By-products of this are carbon dioxide (CO_2) and methane (CH_4). These gases are released into the soil environment and subsequently into the atmosphere. Contributions of these gases by mound-building termites have been well studied. However, CO_2 and CH_4 emissions by temperate zone, non-mound-building subterranean termites are poorly defined. This field experiment was conducted to quantify gas output from foraging *Reticulitermes flavipes* (Kollar) on Oklahoma's Joseph H. Williams Tallgrass Prairie Preserve (TGPP). During May through December 2014, gas samples were collected monthly from in-ground flux chambers and analyzed via gas chromatography. Termites emitted the greatest volumes of CO_2 during May (11.5 mg CO_2 L^{-1} h^{-1}) and June (5.1 mg CO_2 L^{-1} h^{-1}), then these emissions steadily declined from July through December. The greatest CH_4 emissions occurred during May (3.2 μg L^{-1} h^{-1}), then decreased and stabilized in June, July, and August (2.1, 2.0, and 2.1 μg L^{-1} h^{-1}, respectively). During cooler October and December seasonal temperatures, significantly lower CO_2 and CH_4 emissions occurred. This study demonstrates that *R. flavipes* contributes significant amounts of CO_2 and CH_4 to baseline TGPP soil gas emissions released into the atmosphere.

P3-2. **Effects of 43% relative humidity on survival of stored-product psocids (Psocoptera: Liposcelididea)**

Abena Ocran*, Oklahoma State University, Stillwater, OK*

Psocids, especially *Liposcelis* species (Psocoptera: Liposcelididae), are recognized pests of stored-products that infest storehouses, grain processing facilities, and product warehouses worldwide. Standard practices of disinfestation and protection are usually ineffective against psocids. A logical alternative for psocid control is the use of low relative humidity. Therefore, the effects of 43% RH on survival of *Liposcelis bostrychophila* Badonnel, *Liposcelis decolor* (Pearman), *Liposcelis entomophila* (Enderlein), and *Liposcelis paeta* Pearman were investigated. Survival of all life stages of the four species of psocids at 43% and 75% RH was determined after 0, 2, 4, 8, 10, 12, 14, and 16 d at 30°C. At 43% RH, 100% mortality of all stages of *L. entomophila*, *L. decolor*, *L bostrychophila*, and *L. paeta* occurred after 6, 8, 10, and 12 d, respectively. At 75% RH, numbers of nymphs and adults of all the four species increased over the 30-d period of the experiment. These data indicate that dehumidification can be effectively used for psocid management.

P3-3. **Bait type matters when sampling for carrion beetles**

Theresa E. Andrew*, W. Wyatt Hoback, Phillip G. Mulder and Andrine A. Shufran, Oklahoma State University, Stillwater, OK*

Carrion beetles (Coleoptera: Silphidae) utilize vertebrate carcasses for feeding and reproduction. These beetles find carcasses using chemoreceptors located on their antennae which detect volatiles released during decomposition. Surveys for carrion beetles, including the federally endangered American burying beetle, *Nicrophorus americanus*, utilize various bait types ranging from whole laboratory rats to pieces of chicken that are rotted at warm temperatures for several days. Environmental variability during the bait preparation is likely to cause inconsistency which may have substantial effects on survey outcomes. We hypothsized that the type of rotting bait would not have significant effects on the number of carrion beetles attracted and that commercially available catfish baits could be used as an alternative to rotting meat. In this study, we compared capture rates for silphids using whole rotten baits and commercially available stink baits, a commercially available chemical, cadaverine, tuna, and chicken drumsticks. Sampling occurred from July 7-23, 2015 near Oshkosh, NE, and 16,748 silphid beetles were captured. Among bait types, tuna caught the most silphids (45 per day) with chicken drumsticks (31 per day) and mice (7 per day) catching less. Among artificial baits, Punchbait (2 per day) and Dynamite (1.5 per day) catfish baits (2) caught more silphids than corpse scents (<0.8 per day). These results emphasize the importance of standardized sampling methods for population estimate studies and conservation. Our results suggest that rotted tuna fish can be used as readily available attractive bait for surveys of carrion beetles including *Nicrophorus americanus*.

P3-4. **Consumers' knowledge of health effects of agrochemical use in food production: A study at Agona West Municipality, Central Region, Ghana**

Philip Hinson*, West Texas A&M University, Canyon, TX*

Agrochemicals significantly enhance the ability of Ghana to produce sufficient and affordable food and fiber. However, increased use of agrochemicals can cause detrimental effects to human health and the environment. Although there is concern for effects of agrochemicals on farmers, knowledge by consumers of health effects of consuming crops treated with agrochemicals has not been studied. A survey of 100 respondents (67% females and 33% males) at Agona West Municipality in Ghana examined consumer knowledge of health effects of agrochemical use. The mean age of respondents was 41, but ranged from 22 to 68. Most (64%) were adults (36-60 years), 27% were youth (18-35 years), and 9% were elderly (>60). Thirteen percent of the respondents had no formal education and 87% were literate of which 32% had a junior high school education. Except for not knowing mental damage was caused by agrochemical use in food production, most consumers knew of other health effects such as risk of cancer, infertility, and birth defects. Respondents believed that water pollution (77%), air pollution (68%), and killing beneficial organisms (62%) were effects of agrochemical use. However, 53% disagreed that reduction of soil quality was an environmental effect of agrochemical use. Results of consumer perception of effects of foods produced with agrochemicals will be useful to agencies such as the Food and Agricultural Organization and Food and Drugs Authority of Ghana. Such knowledge will aid in educating the public on the effects and safe use of agrochemicals for food production.

P3-5. **Species composition and seasonality of the natural enemies of sugarcane aphid on susceptible and resistant sorghum**

Erin Maxson[1], *Michael Brewer*[2] *and James Woolley*[1], [1]*Texas A&M University, College Station, TX,* [2]*Texas A&M Agrilife Research, Corpus Christi, TX*

Predators and parasitoids of the invasive sugarcane aphid (*Melanaphis sacchari*) were surveyed in sorghum fields in Nueces County and Brazos County, TX, from May through August 2015 and August through October 2015, respectively. Two hybrid strains of sorghum, aphid-susceptible and aphid-resistant, were used. The natural enemy communities in both counties had nearly-identical species composition. Five species of lady beetle (Coleoptera: Coccinellidae) were observed: *Coccinella septempunctata*, *Coleomegilla maculata*, *Cycloneda sanguinea*, *Harmonia axyridis*, *Olla v-nigrum*, as well as three morphospecies of dusky lady beetle (Coccinellidae: Scymninae). Brown lacewings (Neuroptera: Hemerobiidae) of the genus *Hemerobius* were present, as were the green lacewings (Neuroptera: Chrysopidae) *Ceraeochrysa* sp., *Chrysopa quadripunctata*, *Chrysoperla* sp., and *Leucochrysa sp*. Hoverflies (Diptera: Syrphidae) included *Allograpta obliqua*, *Pseudodorus clavatus*, and a yet-to-be-identified species (Syrphidae: Syrphini). Two species of parasitoid were reared from aphid mummies: *Aphelinus nigritus* (Hymenoptera: Aphelinidae), and *Lysiphlebus testaceipes* (Hymenoptera: Braconidae). *A. nigritus* mummies were heavily hyperparasitized by *Syrphophagus aphidivorus* (Hymenoptera: Encyrtidae). The minute pirate bug (Hemiptera: Anthocoridae) *Orius insidiosus* and the aphid fly (Diptera: Chamaemyiidae) *Leucopis* sp. were present in trace numbers. All species were observed on aphid-infested sorghum in both juvenile and adult life stages, suggesting that these natural enemies are successfully reproducing after locating sugarcane aphid outbreaks. Aphid populations in Nueces County peaked June 10-11 (aphid-resistant hybrid) and June 30-July 1 (susceptible). In Brazos County, aphid populations peaked September 26-27 (resistant) and September 20-22 (susceptible). The peak abundance of most natural enemies lagged behind by one to two weeks.

P3-6. **Entomology Extension learning methods: Experimental approach in evaluating competency differences between video and slide show presentations**

Jason Thomas[1], *Robert Bowling*[2,3] *and Michael Brewer*[3], [1]*Texas A&M University, College Station, TX,* [2]*Texas A&M University, Corpus Christi, TX,* [3]*Texas A&M AgriLife Research, Corpus Christi, TX*

Extension services have long held the role of disseminating and streamlining emerging research to serve the public's needs. Accomplishing this mission can be done through varying presentation methods. The goal of this study is to determine if there are any differences in audience competency and engagement between professional video productions and slideshow presentations, one common (slides) and one more contemporary (video) extension media practices. Using the current issue of the invasive species, the sugarcane aphid (*Melanaphis sacchari*) in sorghum, materials will be developed to educate about identification of the pest and estimating populations, two key principles to control this pest. Audiences gathered from key affected areas in Texas will be sorted into two groups each receiving either the video or slideshow training. Prior to receiving trainings initial competency tests will be administered to the participants. Months after the trainings, participants will receive the same competency test to evaluate differences. This experimental approach will guide our development of sugarcane aphid extension materials using classical and contemporary media to optimize time, effort, and learning outcomes.

Regular Posters

P4-1. **Design, use, and evaluation of an online IPM risk calculator for public schools**

Janet Hurley[1], *Michael Merchant*[2] *and Blake Bennett*[1], [1]*Texas A&M AgriLife Extension Service, Dallas, TX,* [2]*Texas A&M University, Dallas, TX*

The IPM Calculator was designed to assist school IPM coordinators in performing inspections on their campuses and assessing their pest risks. Users are provided with risk scores and recommendations for improvements to lower their risk. National surveys indicate that schools can make the largest improvements in their pest risk scores by focusing on the structure of their buildings first, followed by behavior within the schools. The impact of making the IPM Calculator recommendations increases as the pest risk level in schools increases. Further, results suggest that more problems are being found with external doors and walls than any other feature of schools across the U.S.

P4-2. **Fine structure of the fibrillar adhesive pads in the lady beetle *Harmonia axyridis***

Myung-Jin Moon*, Hoon Kim and Jong-Gu Park, Dankook University, Cheonan, Korea, The Republic of*

The attachment system on the lady beetle *Harmonia axyridis* is composed of a pair of pretarsal claws and adhesive pads at the tarsal segments. The claws, which are connected to the pretarsal segment, are mainly used to hold the rough substrates by their apical diverged hooks. In contrast, the adhesive pads have an adhesive function when landing on smooth surfaces. They are interspersed at the ventral adhesive pad of each tarsomere, and are composed of two kinds of hairy setae. The discoid tip seta (DtS) is located at the central region of each adhesive pad. The DtS has a spoon-shaped endplate with a long and narrow shaft. In contrast, the pointed tip seta (PtS) is interspersed along the marginal regions of each adhesive pad, and has a hook-shaped s¤Ápine near the tip. In the present study, we found numerous fine cuticular pores beneath the setae, which seem to be related to the secretion of some adhesive fluids. It may be deduced that ladybird beetles can attach to smooth surfaces more effectively by employing adhesive fluids filling in surface crevices to overcome problems cause by their larger size endplates.

P4-3. **Functional microstructure of the egg plastron in the mosquito *Aedes albopictus***

Hoon Kim*, Kyo-Jin Kim, Jae-Hwi Seo and Myung-Jin Moon, Dankook University, Cheonan, Korea, The Republic of*

Although the eggs of mosquitoes encounter aquatic conditions, the eggs still survive and undergo the early development for successful hatching. It is known that the plastron structure on the egg surface enables proper respiration of various species. This simple exoskeletal structure traps a thin layer of air film so that sufficient oxygen supply would be continued through simple diffusion by concentration gradient. Our microstructural investigation via scanning electron microscopy (FESEM) reveals that the eggshells of the mosquito *Aedes albopictus* has a distinct pattern of convex polygons in association with Dirichlet domains. In particular, tiny aeropyles were found around the polygons and the bulge at the center which seem to be connected all together to form a channel for oxygen supply. These microstructural characteristics would seem to provide an evidence that the plastrons of mosquitoes not only resist wetting in aquatic condition by hydrostatic pressures, but could breathe even with intermittent exposure to water.

P4-4. **Identifying cocirculating hemoparasites parasites in the West Nile Virus transmission cycle in East Texas**

Dayvion Adams*, Texas A&M University, Houston, TX*

Topic: The importance of the research I will be doing is to identify the relationship in infection patterns of West Nile Virus among avian and mosquito hosts around Texas as well as the cocirculation of Haemosporida between the two. It will also be determined if *Plasmodium* affects the transmission and infection rate of WNV.

Methods: The majority of this research will be comprised of screening avian and different genus' of mosquitoes blood banks to determine the presence of Haemosporida. These samples were collected from throughout Texas and were labeled accordingly.

Expected Outcomes: Upon completion, we will understand the impact that *Plasmodium* has on WNV transmission and infection in Texas, and will have a disease model to estimate the impact of *Plasmodium* in the understudied regions of East Texas. We will also have a better understanding of the *Plasmodium*-bird and *Plasmodium*-mosquito interactions.

P4-5. **Effects of two commercial neem-based products on horn fly knockdown, mortality, growth and development, and reproduction**

Allan Showler*, USDA - ARS, Kerrville, TX*

The horn fly, *Haematobia irritans irritans* (L.), is an obligate blood-feeder that mainly attacks cattle in Europe, Asia, and North and South America. Because of horn fly resistance to conventional insecticides, bioactive natural products are being researched. Two commercial formulations of neem-based home garden products at different doses were assessed for multiple effects. Although topical application to eggs failed to induce mortality, the insect growth regulator properties of the azadirachtin caused greater mortality to adults developing inside pupae (even when the pupae were removed from the treated manure substrate) than when larvae pupated. The LD_{50} and LD_{90} for larvae-to-adult mortality in Neemix-treated manure were 473 ppm and 1,006 ppm, respectively, and for AzaSol, 0.45 ppm and 0.85 ppm, respectively. Neemix volatile action caused complete mortality of adult flies in closed containers and more limited mortality in containers with some ventilation. Neemix was mildly repellent against adults in a static air olfactometer and it was a weak repellent when used to keep the flies of blood-soaked cotton. Only a relatively high sublethal dose of Neemix applied to mated females caused a substantial reduction in oviposition, but egg hatchability was not affected. Unlike Neemix, AzaSol did not cause other effects other than relatively growth regulator action. The possibility that bioactive compounds in Neemix other than azadirachtin induced the observed repellency, adult mortality when exposed to volatiles, and sublethal effects on reproduction is discussed and related to the substantially greater concentrations of bioactive limonoid compounds nimbolide, nimbin, and salannin detected in Neemix than in AzaSol.

P4-6. **Invasive Eastern red cedar provides habitat for *Amblyomma americanum* to invade new areas of Oklahoma**

Bruce Noden *and Trisha Dubie, Oklahoma State University, Stillwater, OK*

Tick-borne diseases are increasing in the United States. Spotted fever group rickettsia and Ehrlichiosis, two main tick-borne diseases in Oklahoma, are associated with *Amblyomma americanum*, *Amblyomma maculatum*, and *Dermacentor variabilis*. Recent surveillance efforts demonstrated a western movement of *A. americanum* (Lone star ticks) in the last 30 years. While the habitat for Lone Star in the eastern and central regions are well characterized, the dry, arid, drought prone areas in western Oklahoma are considered too harsh to support the establishment of the species. The discovery of Lone star in western Oklahoma has been accompanied by increasing reports of tick-borne diseases. Eastern red cedar (*Juniperus virginiana*) is a pine species invading large portions of the Great Plains region. We hypothesized that this invasive tree species is also creating conditions for the establishment of Lone Star populations in otherwise improbable areas. In the spring and summer of 2015, 6 representative sites were chosen across central and western Oklahoma, each characterized by varying levels of eastern cedar invasion. Results indicate that Eastern red cedar does indeed support Lone Star tick populations at different levels of invasion. Future studies will evaluate the invasion of Lone star into areas of red cedar where they were not found previously and the utilization of red cedar by other arthropod vectors in the region.

P4-7. **Phenology and ecology of tick species parasitic on cattle and wildlife in Oklahoma**

Trisha Dubie, *Bruce Noden and Justin Talley, Oklahoma State University, Stillwater, OK*

Pastured cattle are parasitized by several different species of ticks capable of transmitting pathogens that impact veterinary and human health. In the United States, limited research has focused on the activity of tick species and abundance of ticks on both cattle and pastureland. Additionally, there is limited information on wildlife hosts, their interactions within cattle pastures, and the effects of wildlife on tick populations within cattle pastures. The current study is aimed toward identifying tick species free living on pastures and feeding on pastured cattle in cow-calf systems across different ecoregions and in different habitats throughout the year in Oklahoma. Current results show clear differences in the abundance of ticks recovered from pasture and woodland biotopes at each field site as well as differences between the species recovered from cattle and collected in pastures. Transects just inside the trees in each pasture yielded significantly more ticks than pasture transects for all species with exception to *Amblyomma maculatum*. *Amblyomma americanum* was the primary species recovered from flagging and CO_2 trapping at the majority of field sites. Despite the primarily dry climate, both *A. americanum* and *Dermacentor variabilis* have been abundantly recovered from pasture areas with trees in southwestern Oklahoma. Parasite numbers on cattle grazing in the same pastures were noticeably different. Several different types of wildlife have also been photographed in the pastures where cattle regularly graze. Understanding the ecology and seasonal fluctuations of tick populations is essential to the development of programs aimed at ectoparasite control and disease prevention.

P4-8. **Integrated management of sugarcane aphids in the Texas High Plains**

Abdul Hakeem, *Megha N. Parajulee and Sean Coyle, Texas A&M AgriLife Research, Lubbock, TX*

An integrated approach has been adapted to control sugarcane aphids on sorghum in the west Texas High Plains.

P4-9. **Evaluation and economic assessment of multiple insecticide strategies for managing pest complexes in sorghum, *Sorghum bicolor* (L.) Moench**

Robert Bowling[1], *Michael Brewer[2], Mac Young[3] and Levi Russell[4], [1]Texas A&M AgriLife Extension, Corpus Christi, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX, [3]Agricultural Economics, Corpus Christi, TX, [4]Texas A&M, Corpus Christi, TX*

Sorghum is a low-input, low risk crop making it an attractive companion to cotton and corn, especially in water-limited environments. Arthropods may challenge sorghum as a production option, especially when multiple insecticide applications are needed to manage pests. We evaluated performance of selected insecticides to control several pest complexes occurring on sorghum during head development. Results and economic evaluations of treatments are reported.

P4-10. **2015 occurrence of sugarcane aphid, *Melanaphis sacchari* (Zehntner), in the U.S. and Mexico with reference to occurrence in 2013 and 2014**

Robert Bowling[1], **Michael Brewer**[2], *Stephen Biles[3] and John Gordy[4], [1]Texas A&M AgriLife Extension, Corpus Christi, TX, [2]Texas A&M Agrilife Research, Corpus Christi, TX, [3]Texas A&M University, Port Lavaca, TX, [4]Texas A&M AgriLife Extension, Rosenberg, TX*

The sugarcane aphid (SCA), *Melanaphis sacchari* (Zehntner), occurrence on sorghum was mapped in 2015. Highlights of SCA occurrence in 2015 included early detecting in the High Plains of TX where it was reported in the South High Plains and TX Northern High Plains by August. These reports were two months earlier than 2014 reports. The Aphid moved across Kansas up to the KS NE border. SCA was not confirmed on Sorghum in NE. There were 5 new state records where SCA was confirmed on sorghum in 2015 including NM, CO, IL, KY, and VA. In 2015, 17 states and over 400 counties had confirmed reports of SCA on sorghum. This is a 25% increase in occurrence from 2014. In 2015, the 17 states with confirmed sugarcane aphid on sorghum accounted for 97% (7,405,000 acres) of the sorghum acres and 98% (560,253,000 bushels) of the total sorghum production in the U.S. (USDA-NASS, 2015).

P4-11. Variable-pressure scanning electron microscopy images of sorghum predict resistance to storage insect pests

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Insect pests destroy 30-40% of stored grain especially in developing countries in the tropics. The maize weevil, *Sitophilus zeamais* Motschulsky, is the most important insect pest of stored sorghum, *Sorghum bicolor* (L.) Moench, and other grains worldwide. Maize weevil larvae and adults feed on grain in the field and storage. The female chews into a kernel, deposits an egg, and seals the hole. As many as 400 eggs can be produced per female. Diarisso found Seguifa sorghum very resistant against storage insect pests in Mali. Chitio evaluated resistance of sorghum grain to maize weevil in a laboratory. A Tescan Vega 3 XMU Variable-Pressure Scanning Electron Microscope was used to compare morphology of sorghum genotypes to determine if differences in grain were related to resistance. The degree of resistance to maize weevil was positively correlated to distance from the pericarp to aleurone layer of the kernels. The depth from the pericarp to aleurone layer ranged from 15-46 µm for sorghum genotypes evaluated, with a depth of 46 µm for very resistant Seguifa compared with only 15 µm in susceptible CE151. This method eliminated fixation, dehydration, embedding, and block-face sectioning previously used for observing cross-sectioned sorghum kernels by scanning electron microscopy. Distance from the pericarp to aleurone layer of kernels of other sorghum genotypes can be compared to predict resistance to maize weevil without evaluating damage during many weeks. Quickly determining differences in internal features of kernels of different sorghum genotypes would allow rapid prediction of resistance to weevils in stored grain.

P4-12. Host plant resistance in forage sorghums to the sugarcane aphid

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We sought and found some highly resistant sources of forage sorghum to the sugarcane aphid. From the approximatley 30 lines that we evaluated, six expressed high resistance to the sugarcane aphid, and these included both non-preference and antibiosis forms of resistance based on the types of experiments that we conducted. Two of the lines are parental and will help with breeding programs in developing a broader base lines that can be used in diverse of environments.

P4-13. Mechanical transmission of *Enterococcus cecorum* by the lesser mealworm *Alphitobius diaperinus*

B. Lyons[1], *Astri Wayadande*[1], *J. Payne*[2] *and Justin Talley*[1], [1]*Oklahoma State University, Stillwater, OK,* [2]*Oklahoma State University, Muskogee, OK*

Alphitobius diaperinus, commonly known as the lesser mealworm, is a cosmopolitan pest of poultry facilities. The primary concern for this pest in a broiler facility rests in its damage to insulation in the walls of the buildings. The lesser mealworm is also an important vector for pathogens that can harm the chickens as well as humans, such as *E. coli* and *Salmonella*. *Enterococcus cecorum*, a normal gut inhabitant of poultry, is a pathogen that has recently been implicated as the causative agent in the Spondylitis disease that paralyzes broilers leading to a typical 5% loss in the flock. The lesser mealworm can number the millions in each house and can be harboring this pathogen inside the houses. This study tested the ability of the lesser mealworm to spread bacteria mechanically by having beetles walk on a surface of *E. cecorum* inoculated blood agar for 30 minutes and then transferred individual beetles to a sterile blood agar surface to see if the bacteria would culture on that surface. All 15 blood agar plates had bacteria growth that was physically similar to *E. cecorum*. PCR confirmation is still required to confirm this bacteria's presence, but this shows that the lesser mealworm can pick up this pathogen then potentially spread it within broiler houses.

P4-14. Current distribution of an invasive species, hedgehog grain aphid (*Sipha maydis*), in cereals and grasses in the Great Plains and Rocky Mountain states

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Sipha maydis Passerini is an aphid that attacks a variety of different wild grasses and cereal crops in Europe, the Middle East, Central Asia, Pakistan, and India. It is also a vector of a serious disease of wheat and barley, barley yellow dwarf virus. Recently, S. *maydis* was reported to have invaded grasses and cereals in S. Africa in 1991 and S. America in the early 2000's. Soon, this aphid arrived in the United States in 2007 where it was found infesting wild rice in California. In 2014, *S. maydis* had spread to New Mexico where in was discovered in oats. The objectives of our study was to determine how wide-spread *S. maydis* has become in the Rocky Mountain and Great Plains States on cereals and wild grasses in a survey conducted in 2015.

P4-15. Insecticide evaluations for grasshopper control in bermudagrass (pasture), *Cynodon dactylon* (L.), in Oklahoma

Ali Zarrabi, *S. Seuhs, T. Royer and Kris Giles, Oklahoma State University, Stillwater, OK*

Selected insecticides were evaluated for control of a mixed population of 2nd and 3rd instar *Melanoplus* spp. grasshoppers on Bermuda grass pasture in two years. Also, the effectiveness of RAAT (reduced agent and area treatments) chemical control strategy in which the rate of the chemical is lowered and applied in alternating strips was investigated.

P4-17. Distribution of southern green stink bug in the U.S. and Mexico

Jesus F. Esquivel[1] *and J.E. McPherson*[2], [1]*USDA - ARS, College Station, TX,* [2]*Southern Illinois University, Carbondale, IL*

The southern green stink bug is an invasive species recently demonstrated to transmit disease-causing pathogens in cotton. This report presents current distribution records for southern green stink bug in the United States and Mexico.

P4-19. Predation of sentinel bollworm (*Helicoverpa zea*) eggs in glanded and glandless cotton in New Mexico

Jane Breen Pierce, *Patricia E Monk and John Idowu, New Mexico State University, Las Cruces, NM*

Cotton glands produce gossypol, a natural defense against insect pests. Glandless cotton varieties are available, but losses from pests have prevented commercial development. Some areas of New Mexico have lower insect pressure, with high predation and desiccation suppressing pest populations. With appropriate management and monitoring of insect pests, growers could potentially produce glandless varieties as a niche crop with greatly added seed value. Field to lab trials were conducted on New Mexico State University farms to evaluate predation rates in glandless vs. glanded cotton in an effort to develop pest management strategies for glandless cotton protection. Sentinel cotton bollworm eggs were attached to glanded and glandless cotton plants on multiple dates in 2015 to evaluate potential differences in predation. Insects were also sampled from plots weekly using sweep nets.

Total predation was 56% and 57% in glanded and glandless cotton respectively in 2015, Damage to eggs was classified as being from predators with chewing or sucking mouthparts. Predators were generally collected in similar numbers in glanded and glandless cotton plots. However, there were significantly more spiders in glanded cotton plots early season in 2015 which was similar to results in previous years. Unlike previous years predation by predators with chewing mouthparts was not significantly higher in 2015 with an average 36% vs 37% predation of sentinel eggs in glanded vs glandless plots. Overall similarity in predation rates in glanded and glandless cotton suggests that predation will be an important source of control of insect pests in glandless cotton.

P4-21. The picture of an entomologist: How non-majors view us

W. Wyatt Hoback, *Oklahoma State University, Stillwater, OK*

Insects and Society is a popular non-majors course taught at Oklahoma State University. Approximately 300 students enroll each semester and learn about insects and the positive and negative interactions with humans. As a first assignment, students are asked to create a one-page biography illustrated with three or four pictures about them. In addition, students are asked to include a sketch of what they think an entomologist looks like and how any knowledge of entomology could impact their future career. Although the class has an approximately 50:50 sex ratio and approximately 15% of students are non-Caucasian, the overwhelming majority of entomologist illustrations represent a white male, usually with glasses or a magnifying glass. This short writing exercise allows the instructor to learn about the class and also provides insights into how entomology and entomologists are perceived by the general public.

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Maps & Floor Plans

Fig. 1. Property layout of the Holiday Inn Tyler – Broadway South: host hotel for the 2016 Annual Meeting of the Southwestern Branch of the ESA.

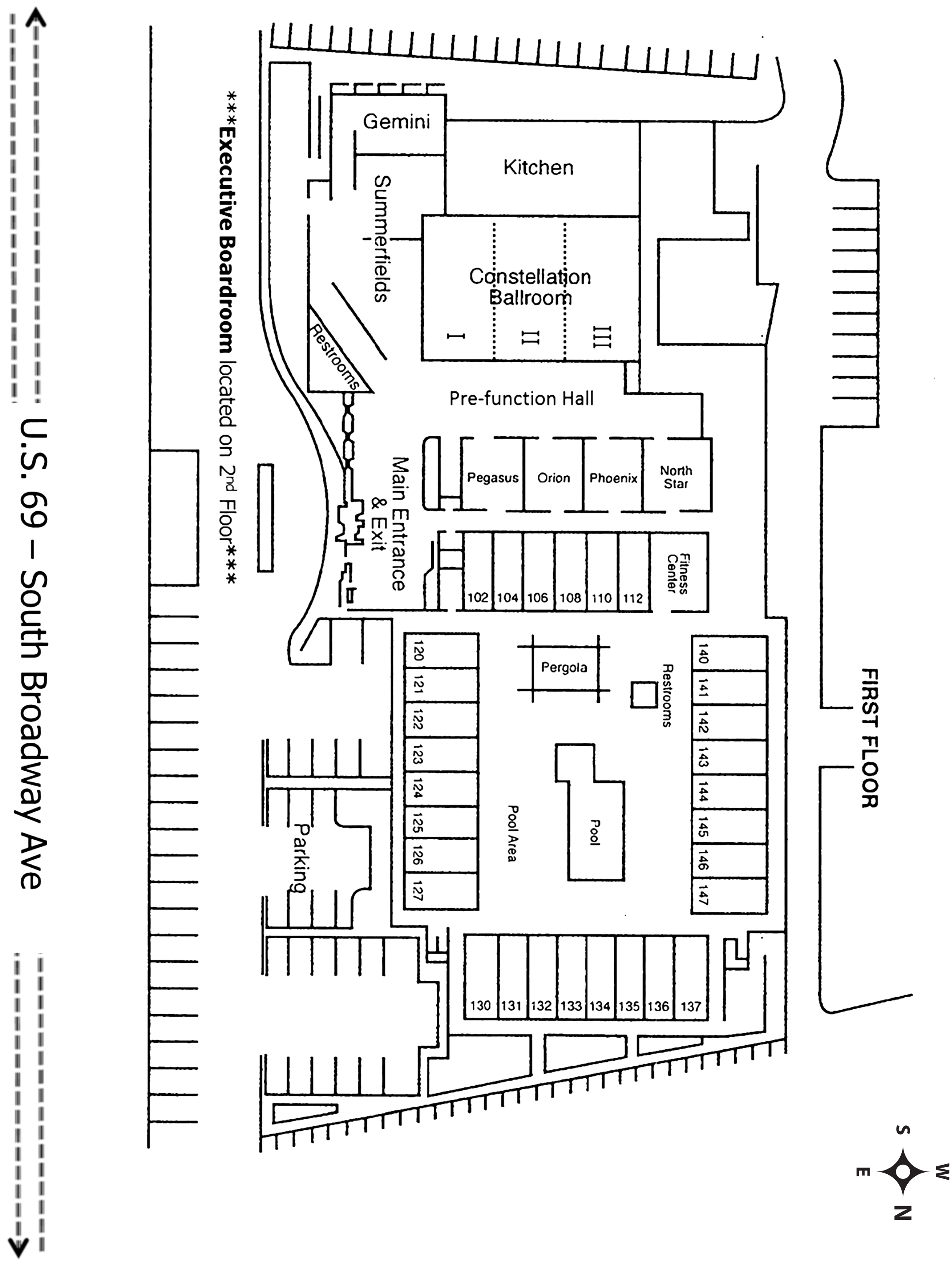

Fig. 2. Meeting rooms for the 2016 Annual Meeting of the Southwestern Branch of the ESA.