PROGRAM & PROCEEDINGS

of the

66th ANNUAL MEETING

of the **SOUTHWESTERN BRANCH** of the

ENTOMOLOGICAL SOCIETY OF AMERICA

and the **ANNUAL MEETING** of the

SOCIETY OF SOUTHWESTERN ENTOMOLOGISTS

March 25-29, 2018

Hotel Albuquerue at Old Town

Albuquerque, New Mexico

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STUDENT AWARDS

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Notes

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	$225
Student ESA member	$90
Honorary/Emeritus	$60
Non-member	$275
Spouse/Guest	$65
One day registration	$125

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

HOTEL LOCATION:

The Hotel Albuquerque at Old Town is located at 800 Rio Grande Blvd., Albuquerque, NM, 87104
(505) 843-6300.

TRAVEL INFORMATION:

The Albuquerque International Sunport Airport is located at 2200 Sunport Blvd. SE, Albuquerque, about 5 miles from the hotel.

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. Speakers should have their presentations uploaded in the Presentation Upload room no later than the evening before their presentation. 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. The Presentation Upload & Preview area will be located in the Alvarado C Room and will be open during the following hours:

Monday, March 26	3:00 PM – 5:00 PM
Tuesday, March 27	7:00 AM – 5:00 PM

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 the Alvarado F-G room the night before (i.e., either Monday or Tuesday, 6:00 – 8:00 PM) your poster is scheduled. **Bring your own Velcro strips to secure your display to the poster board.**

Author Presence: **All Student competitors are to stand next to their posters during designated BREAK time on Tuesday, March 27th.** Regular member presenters should similarly be present at their posters during designated BREAK time on Wednesday, March 28th.

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.

CODE OF CONDUCT

By attending the 2018 Southwestern Branch Annual Meeting, you agree voluntarily to abide by our ethics policy. The full policy may be found online at entsoc.org/conduct. If you need to file a complaint, please contact Rosina Romano at rromano@entsoc.org, 301-731-4535 x3010.

Program Information

Entomological Society Of America Southwestern Branch

2017-2018 Executive Committee

Justin Talley, President
justin.talley@okstate.edu

Carlos Bográn, Past-President
cbogran@ohp.com

Eric Rebek, Vice-President
eric.rebek@okstate.edu

Molly Keck, Secretary
mekeck@ag.tamu.edu

Wyatt Hoback, Secretary-Elect
whoback@okstate.edu

Ed Bynum, Treasurer
ebynum@ag.tamu.edu

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

2017-2018 COMMITTEES

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Matthew Lee
George Opit

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Wyatt Hoback
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Alvaro Romero
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LOCAL ARRANGEMENTS COMMITTEE
Alvaro Romero (Chair)

2017-2018 Committees ...continued

MEMBERSHIP COMMITTEE
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- Tom Royer

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- Ali A. Zarrabi
- Blake Bextine
- Robert Bowling
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- David Kattes
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- Jane Pierce
- Andrine Shufran

Past-Presidents and Chairmen of the Southwestern Branch

President	Year	Meeting Location
Carlos Bográn	2016-17	Austin, TX
Jerry Michels	2015-16	Tyler, TX
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	Meeting 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

TUESDAY, MARCH 27, 2018

Alvarado D (Hotel Albuquerque at Old Town)

8:00 am **Welcome and Call to Order**
Justin Talley, President – Southwestern Branch ESA

8:10 am **Welcome from the Society of Southwestern Entomologists**
Wizzie Brown, President – Society of Southwestern Entomologists

8:20 am **ESA Presidential Address**
Michael Parrella, ESA President

8:50 am **ESA Society Update**
David Gammel, Executive Director of ESA

9:00 am **Entomological Foundation Update**
Andrine Shufran, Board of Counselors

9:10 am **Board Certified Entomologists Report**
Molly Keck, SWB Representative to ESA

9:20 am **In Memoriam Committee Report**
Phil Mulder, Chair

9:40 am **Nominating Committee Report**
Justin Talley, Member

9:50 am **Local Arrangement Announcements**
Alvaro Romero, Chair

Program Announcements
Laura Weiser Erlandson and Wizzie Brown, Program Chair & Vice Chair

10:00 am **Break**

Program Summary

MONDAY, MARCH 26, 2018

Program	Time	Location
Insect Expo	9:00 AM - 1:00 PM	Alvarado D - H
Southwestern Branch Executive Committee Meeting	10:00 AM - 12:00 PM	Fireside Ballroom
Meeting Registration	1:00 PM - 5:00 PM	North Atrium
Presentation Upload & Preview Room	3:00 PM - 5:00 PM	Alvarado C
Society of Southwestern Entomologists Executive Committee Meeting	3:00 PM - 4:00 PM	Alvarado A
Society of Southwestern Entomologists General Membership Meeting	4:00 PM - 5:00 PM	Alvarado A
Welcome Social	5:00 PM - 7:00 PM	North Atrium
Student Competition Poster Set-Up	6:00 PM - 8:00 PM	Alvarado F, G

TUESDAY, MARCH 27, 2018

Program	Time	Location
Presentation Upload & Preview Room	7:00 AM - 5:00 PM	Alvarado C
Meeting Registration	7:00 AM - 5:00 PM	North Atrium
Silent Auction	7:00 AM - 5:00 PM	Alvarado C
Plenary Session	8:00 AM - 10:00 AM	Alvarado D
Student Poster Competition: Master's	8:00 AM - 4:00 PM	Alvarado F, G
Student Poster Competition: Ph.D.	8:00 AM - 4:00 PM	Alvarado F, G
Student Poster Competition: Undergraduate	8:00 AM - 4:00 PM	Alvarado F, G
Break	10:00 AM - 10:20 AM	Alvarado F, G
Undergrad: Medical, Urban, & Veterinary Entomology	10:20 AM - 11:45 AM	Alvarado A
PhD: Medical, Urban, & Veterinary Entomology	10:25 AM - 11:10 AM	Alvarado B
PhD: Physiology, Biochemistry, and Toxicology	11:10 AM - 11:40 AM	Alvarado B
PhD: Systematics, Evolution, & Biodiversity	11:40 AM - 11:50 AM	Alvarado B
Undergrad: Physiology, Biochemistry, & Toxicology	11:45 AM - 11:55 AM	Alvarado A
Undergrad: Plant-Insect Ecosystems	1:00 PM - 1:10 PM	Alvarado A
PhD: Plant Insect Ecosystems	1:00 PM - 2:10 PM	Alvarado B
Undergrad: Systematics, Evolution, & Biodiversity	1:10 PM - 1:30 PM	Alvarado A
Masters: Medical, Urban, & Veterinary Entomology	1:40 PM - 2:25 PM	Alvarado A
Break	2:30 PM - 2:50 PM	Alvarado F, G
Masters: Physiology, Biochemistry, & Toxicology	2:45 PM - 3:05 PM	Alvarado A
Masters: Plant Insect Ecosystems	3:05 PM - 3:35 PM	Alvarado A
Masters: Systematics, Evolution, & Biodiversity	3:35 PM - 3:55 PM	Alvarado A
Student Competition Poster Removal	4:00 PM - 6:00 PM	Alvarado F, G
Linnaean Games - Preliminary Round	5:00 PM - 7:00 PM	Alvarado D
Regular Posters Set-up	6:00 PM - 7:00 PM	Alvarado F, G
Student Social	7:00 PM - 10:00 PM	North Atrium

WEDNESDAY, MARCH 28, 2018

Program	Time	Location
Meeting Registration	7:00 AM - 5:00 PM	North Atrium
Silent Auction	7:00 AM - 2:30 PM	Alvarado C
ESA Town Hall	8:00 AM - 9:00 AM	Alvarado B
Regular Papers: Medical, Urban, and Veterinary Entomology	8:00 AM - 8:45 AM	Alvarado A
Regular Poster Session	8:00 AM - 5:00 PM	Alvarado F, G
Regular Papers: Physiology, Biochemistry, and Toxicology	8:45 AM - 9:35 AM	Alvarado A
Symposium: Urban and Landscape Entomology	9:00 AM - 11:30 AM	Alvarado B
Regular Papers: Systematics, Evolution, and Biodiversity	9:35 AM - 9:55 AM	Alvarado A
Break	10:00 AM - 10:20 AM	Alvarado F, G
Regular Papers: Plant–Insect Ecosystems	10:20 AM - 11:40 AM	Alvarado A
Symposium: Blood feeders: From physiology to vector biology of arthropods of public health importance	1:00 PM - 4:00 PM	Alvarado A
Symposium: Challenges and opportunities for implementing IPM	1:00 PM - 5:15 PM	Alvarado B
Break	2:30 PM - 2:50 PM	Alvarado F, G
Linnaean Games - Final Round	5:00 PM - 7:00 PM	Alvarado D
Regular Poster Removal	5:00 PM - 7:00 PM	Alvarado F, G
Awards Banquet and Final Business Meeting	7:30 PM - 10:00 PM	Franciscan Ballroom
Awards Banquet and Final Business Meeting	7:30 PM - 10:00 PM	Franciscan Ballroom

THURSDAY, MARCH 29, 2018

Program	Time	Location
Southwestern Branch Executive Committee Meeting	8:00 AM - 10:00 AM	Fireside Ballroom

Notes

Oral & Poster Presentation Schedule

TUESDAY, MARCH 27, 2018, POSTERS

Student Poster Competition: Master's / 8:00 AM-4:00 PM

Alvarado F, G (Hotel Albuquerque at Old Town)

P1-1 **Interaction of systemic acaricide with immunological control of *Rhipicephalus (Boophilus) microplus*.**
Charluz Arocho *(marioli@tamu.edu)[1], Robert John Miller[2], Pete Teel[1], Felix Guerrero[3] and Adalberto A. Pérez de León[3], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, Edinburg, TX, [3]USDA - ARS, Kerrville, TX*

P1-2 **Evaluating the synergistic effects of piperonyl butoxide on permethrin resistant and susceptible horn flies (Diptera: Muscidae) exposed to lambda cyhalothrin.**
Diego Garcia *(dg32695@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM*

P1-3 **Males are from Mars and females are from Venus: Differences between the sexes when exposed to hormetic conditioning.**
Jacqueline Figueroa *(tamashii@nmsu.edu), New Mexico State Univ., Las Cruces, NM*

P1-4 **Army maneuvers and American burying beetle conservation: A test of beetle habitat association on an active military base..**
Lexi Freeman *(lexi.freeman@okstate.edu) and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK*

P1-5 **Progress and potential of two biological control agents of the invasive giant reed (*Arundo donax* L.).**
Madeline Marshall *(madeline.marshall01@utrgv.edu), Univ. of Texas, Edinburg, TX*

P1-6 **Burgers, not pies: Association of American burying beetles with grazed lands in Oklahoma.**
Jacob Farriester *(jacob.farriester@okstate.edu)[1], W. Wyatt Hoback[2] and Phil Mulder[2], [1]Oklahoma State Univ. (Stillwater), Stillwater, OK, [2]Oklahoma State Univ., Stillwater, OK*

P1-7 **Coloring for insect conservation awareness.**
Elizabeth Knowlton *(edkbiology@gmail.com), Theresa E. Andrew, Andrine A. Shufran, Kerri Farnsworth-Hoback and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK*

Student Poster Competition: Ph.D. / 8:00 AM-4:00 PM

Alvarado F, G (Hotel Albuquerque at Old Town)

P2-1 **Evaluation of seed treatment against soybean aphid *Aphis glycines* (Matsumura) under controlled environment chamber.**
Aqeel Alyousuf[1], Ali Zarrabi[2], ***Tom Royer*** *(tom.royer@okstate.edu)[2], Kris Giles[2] and Mark Payton[2], [1]Oklahoma State Univ., STILLWATER, OK, [2]Oklahoma State Univ., Stillwater, OK*

P2-2 **Lab field bioassay (LFB) of seed treatments against the fall armyworm *Spodoptera frugiperda* (Smith) in sorghum and corn.**
Aqeel Alyousuf[1], Ali Zarrabi[2], Tom Royer[2], ***Kris Giles*** *(kris.giles@okstate.edu)[2] and Mark Payton[2], [1]Oklahoma State Univ., STILLWATER, OK, [2]Oklahoma State Univ., Stillwater, OK*

P2-3 **Population differentiation in host choice among sugarcane aphids (Hemiptera: Aphididae) from sorghum and sugarcane.**
Sulochana Paudyal *(sulochana.paudyal@okstate.edu)[1], J. Scott Armstrong[2] and Kris Giles[1], [1]Oklahoma State Univ., Stillwater, OK, [2]USDA - ARS, Stillwater, OK*

P2-4 **Tree crown nesting preferences of the fall webworm (*Hyphantria cunea*).**
Amy Adams *(amy.e.adams@ou.edu), Univ. of Oklahoma, Norman, OK*

P2-5 **Bioassay tests for sugarcane aphid (SCA) *Melanaphis sacchari* (Zehntner) on grain and forage sorghum.**
Aqeel Alyousuf *(aqeel.alyousuf@okstate.edu)[1], Ali Zarrabi[2], Tom Royer[2], Kris Giles[2] and S. Seuhs[2], [1]Oklahoma State Univ., STILLWATER, OK, [2]Oklahoma State Univ., Stillwater, OK*

P2-6 **Aquatic macroinvertebrates differ in time and space downstream of a Southeast Oklahoma reservoir.**
Melissa Reed *(mleath@okstate.edu)[1], W. Wyatt Hoback[1] and James Long[2], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma State Univ., Stillwater,, OK*

P2-7 **Diversity, abundance and temporal pattern of *Culex* vectors of Japanese encephalitis virus during summer months in western region of Nepal.**
Ajit Karna *(ajit.karna@gmail.com), New Mexico State Univ., Las Cruces, NM*

Student Poster Competition: Undergraduate / 8:00 AM-4:00 PM

Alvarado F, G (Hotel Albuquerque at Old Town)

P3-1 **Preconditioning of Parkinson's disease symptoms using the *Drosophila melanogaster* model and its possible implications.**
Nubia Rivas *(nrivas05@nmsu.edu) and Giancarlo Lopez-Martinez, New Mexico State Univ., Las Cruces, NM*

P3-2 **Effects of *Melanaphis sacchari* (Hemiptera: Aphididae) on the development and growth rate of *Coleomegilla maculata* (Coleoptera: Coccinellidae).**
Brad Burden *(bb037@my.tamuct.edu) and Laura Weiser Erlandson, Texas A&M Univ. - Central Texas, Killeen, TX*

P3-3 **Seasonal variation of the honey bee honey stomach microbiome.**
A H M Ashraf *(aa038@my.tamuct.edu)[1], Allyson Martinez[2] and Laura Weiser Erlandson[1], [1]Texas A&M Univ. - Central Texas, Killeen, TX, [2]Texas A&M Univ., College Station, TX*

P3-4 **Consumption of pollen between male and female blow flies.**
Betty Hernandez *(bettynicole.hernandez@gmail.com), Juliana Rangel, Aaron Tarone, Emily Hildinger, Pierre Lau and Vaughn Bryant, Texas A&M Univ., College Station, TX*

P3-5 **Change in foliage-dwelling arthropod diversity resulting from the conversion of bermudagrass to native warm-season grasses: Hemiptera and Coleoptera.**
Haley Vincze *(haley.vincze@gmail.com)[1], Madeline Stanfield[2], Leo Herzberger[2], David H. Kattes[2] and Jim Muir[3], [1]Tarleton State Univ., Wylie, TX, [2]Tarleton State Univ., Stephenville, TX, [3]Texas A&M Agrilife, Stephenville, TX*

P3-6 **Change in soil-dwelling arthropod diversity resulting from the conversion of bermudagrass to native warm-season grasses: Insecta.**
Josef Leachman *(josef.leachman@go.tarleton.edu)[1], Lauren Berman[1], Leo Herzberger[1], David H. Kattes[1] and Jim Muir[2], [1]Tarleton State Univ., Stephenville, TX, [2]Texas A&M Agrilife, Stephenville, TX*

P3-7 **Evaluating the effect of photoperiod on fitness of sugarcane aphid, *Melanaphis sacchari*, on sorghum.**
Ethan Triplett *(ethan.l.triplett@gmail.com) and Bonnie Pendleton, West Texas A&M Univ., Canyon, TX*

P3-8 **Change in foliage-dwelling arthropod diversity resulting from the conversion of bermudagrass to native warm-season grasses: Orthoptera, Diptera and Hymenoptera.**
Madeline Stanfield *(madeline.stanfield@go.tarleton.edu)[1], Haley Vincze[2], Leo Herzberger[3], David H. Kattes[3] and Jim Muir[4], [1]Tarleton State Univ., wylie, TX, [2]Tarleton State Univ., Wylie, TX, [3]Tarleton State Univ., Stephenville, TX, [4]Texas A&M Agrilife, Stephenville, TX*

P3-9 **Change in soil-dwelling arthropod diversity resulting from the conversion of bermudagrass to native warm-season grasses: Crustacea and arachinda.**
Lauren Berman *(lauren.berman@go.tarleton.edu)[1], Josef Leachman[1], Leo Herzberger[1], David H. Kattes[1] and Jim Muir[2], [1]Tarleton State Univ., Stephenville, TX, [2]Texas A&M Agrilife, Stephenville, TX*

P3-10 **The link between larval cannibalism in *Chrysoperla rufilabris* and egg stalk length.**
Kaitlyn Clark *(kaitlynlianeclark22@gmail.com) and Laura Weiser Erlandson, Texas A&M Univ. - Central Texas, Killeen, TX*

P3-11 **Non-majors' search for extra credit can be used to assess campus invertebrate biodiversity.**
Liam Whiteman *(liamw@okstate.edu) and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK*

P3-12 **Density-dependent phase polyphenism in *S. piceifrons*: a color analysis.**
Aria Deluna *(ariadeluna@tamu.edu)[1], Bert Foquet[2] and Hojun Song[2], [1]Texas A&M Univ., College Station, College Station, TX, [2]Texas A&M Univ., College Station, TX*

P3-13 **A fall bumble bee survey of Stillwater, Oklahoma.**
Michael Caballero *(michaelcaballero9@gmail.com)[1] and W. Wyatt Hoback[2], [1]Oklahoma State Univ.- Stillwater, Stillwater, OK, [2]Oklahoma State Univ., Stillwater, OK*

P3-14 **Evaluation of the diet breadth of *Odontomachus spp.* on the island of Dominica.**
Samuel Shook *(srshook@tamu.edu), James Woolley, Adrienne Brundage and Thomas Lacher, Texas A&M Univ., College Station, TX*

P3-15 **Comparing carrion beetle and carrion fly populations in different terrains to determine competition potential.**
Victoria Pickens *(vpicken@ostatemail.okstate.edu)[1], Astri Wayadande[2] and W. Wyatt Hoback[2], [1]Oklahoma State Univ., Stilwater, OK, [2]Oklahoma State Univ., Stillwater, OK*

P3-16 **Methods for capturing and monitoring insects in the families Buprestidae, Histeridae, and Silphidae at Sam Houston National Forest.**
Mark Barbosa *(jeffreybarb0827@email.tamu.edu), Texas A&M Univ., College Station, TX*

P3-17 **Evaluating horn fly (Diptera: Muscidae) tolerance to permethrin under various levels of induced starvation.**
Jovy Ramirez *(zarimarj@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM*

TUESDAY, MARCH 27, 2018, MORNING

Undergrad: Medical, Urban, & Veterinary Entomology

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: Carol Sutherland, New Mexico Dept. of Agriculture, Las Cruces, NM

10:20 **Introductory Remarks**

10:25 AM 1-1 **Comparison of two non-toxic particle films for control of juvenile lone star ticks *(Amblyomma americanum)*.**
Eduardo Munoz *(emunoz@schreiner.edu)[1], Allan Showler[2], Weste Osbrink[2] and Ryan Caesar[1], [1]Schreiner Univ., Kerrville, TX, [2]USDA - ARS, Kerrville, TX*

10:35 AM 1-2 **The effects of salinity on A*edes aegypti* reproductive behaviors.**
Rachel Brown *(rayleighb@hotmail.com), Bartlesville High School, Bartlesville, OK*

10:45 AM 1-3 **Establishing baseline susceptibilities of horn flies exposed to multiple active ingredients.**
Derek Cosper *(dcosper@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM*

10:55 AM 1-4 **Establishing a method to quantify the efficacy of natural compounds aimed at repelling horn fly (Diptera: Muscidae) infestations in a laboratory setting.**
Ramon Zepeda *(rz@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM*

11:05 AM 1-5 **Cluster size influence on the survivability of *Rhipicephalus (Boophilus) microplus* larvae under low relative humidity (RH) stress.**
Emily Zamora *(emily.zamora01@utrgv.edu)[1], Brenda Leal[1], Robert Dearth[1] and Don Thomas[2], [1]Univ. of Texas Rio Grande Valley, Edinburg, TX, [2]USDA - ARS, Edinburg, TX*

11:15 AM 1-6 **Population structure of the Chagas disease vector *Triatoma rubida* among the West Texas-Mexico Border.**
Olivia Calderon *(ocalderon2@miners.utep.edu)[1], Camilo Khatchikian[2], Brittny Blakely[3] and Alvaro Romero[3], [1]The Univ. of Texas at El Paso, El Paso, TX, [2]Univ. of Pennsylvania, Philadelphia, PA, [3]New Mexico State Univ., Las Cruces, NM*

11:25 AM 1-7 **Microbial interactions of necrophagous flies and their impact on disease transmission.**
Victoria Pickens *(vpicken@ostatemail.okstate.edu)[1], Astri Wayadande[2] and W. Wyatt Hoback[2], [1]Oklahoma State Univ., Stilwater, OK, [2]Oklahoma State Univ., Stillwater, OK*

11:35 AM 1-8 **Identifying cocirculating hemorparasites in the West Nile virus system.**
Dayvion Adams *(ajadams968@tamu.edu), Andrew Golnar and Gabriel Hamer, Texas A&M Univ., College Station, TX*

PhD: Medical, Urban, & Veterinary Entomology

Alvarado B (Hotel Albuquerque at Old Town)

Moderators: Steven Arthurs, Texas A&M Univ., College Station, TX and Ismael E. Badillo-Vargas, Texas A&M AgriLife Research, Weslaco, TX

10:25 **Introductory Remarks**

10:30 AM 2-1 **Science communication in entomology: Knowing what's bugging them can help us connect with communities.**
Joan King *(joanie_king@tamu.edu)[1], Joe Ballenger[2], Nancy Miorelli[3] and Edward Vargo[1], [1]Texas A&M Univ., College Station, TX, [2]Randstad, Florissant, MO, [3]Univ. of Georgia, Athens, GA*

10:40 AM 2-2 **Colony structure of *Reticulitermes* (Isoptera: Rhinotermitidae) in northwest Arkansas.**
Mark Janowiecki *(janowiecki@tamu.edu)[1], Amber D. Tripodi[2], Allen Szalanski[3] and Edward Vargo[1], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, Logan, UT, [3]Univ. of Arkansas, Fayetteville, AR*

10:50 AM 2-3 **Interactions between colonies of the eastern subterranean termite, *Reticulitermes flavipes*, and soilborne pathogens.**
Carlos Aguero *(cague001@tamu.edu)[1], Jason Martin[2], Mark S. Bulmer[2] and Edward Vargo[1], [1]Texas A&M Univ., College Station, TX, [2]Towson Univ., Towson, MD*

11:00 AM 2-4 **A comparative evaluation of questing height between populations of *Ixodes scapularis* in the northern and southern United States.**
Mackenzie Tietjen *(kenzietietjen@tamu.edu)[1], Maria Esteve-Gassent[1], Andrew Li[2] and Raul Medina[1], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, Beltsville, MD*

PhD: Physiology, Biochemistry, and Toxicology

Alvarado B (Hotel Albuquerque at Old Town)

Moderators: Steven Arthurs, Texas A&M Univ., College Station, TX and Ismael E. Badillo-Vargas, Texas A&M AgriLife Research, Weslaco, TX

11:10 AM 3-1 **Zapped! UV irradiation and its effects on *Drosophila melanogaster* performance.**
Raymond Berry *(Rayberry@nmsu.edu), New Mexico State Univ., Las Cruces, NM*

11:20 AM 3-2 **Comparing cardenolide resistance induced by substitutions from the Na,K-ATPase of *Danaus plexippus and Rattus norvegicus*.**
Fabian List *(fabian.list@tamu.edu), Texas A&M Univ., College Station, TX*

11:30 AM 3-3 **Synergistic effects of in-hive miticides and agro-chemicals on honey bee (*Apis mellifera*) colony growth.**
Alexandria Payne *(alexnpayne@gmail.com) and Juliana Rangel, Texas A&M Univ., College Station, TX*

PhD: Systematics, Evolution, & Biodiversity

Alvarado B (Hotel Albuquerque at Old Town)

Moderators: Steven Arthurs, Texas A&M Univ., College Station, TX and Ismael E. Badillo-Vargas, Texas A&M AgriLife Research, Weslaco, TX

11:40 AM 4-1 **The effect of habitat on the trophic position, diet breadth, and competitive interactions of an invasive ant (*Nylanderia fulva*).**
MacKenzie Kjeldgaard *(mkjeldgaard@tamu.edu) and Micky Eubanks, Texas A&M Univ., College Station, TX*

Undergrad: Physiology, Biochemistry, & Toxicology

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: Carol Sutherland, New Mexico Dept. of Agriculture, Las Cruces, NM

11:45 AM 5-1 **The effects of pyriproxyfen and bifenazate on honey bee *(Apis mellifera)* sucrose sensitivity.**
Makaylee Crone *(Makaylee.crone22@tamu.edu)[1], Olalekan Falokun[1], Pierre Lau[1], Adrian Fisher[2], Julie Mustard[3] and Juliana Rangel[1], [1]Texas A&M Univ., College Station, TX, [2]Arizona State Univ., Tuscon, AZ, [3]Univ. of Texas, Brownsville, TX*

TUESDAY, MARCH 27, 2018, AFTERNOON

Undergrad: Plant-Insect Ecosystems

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: J. Scott Armstrong, USDA - ARS, Stillwater, OK

1:00 PM 6-1 **Differences in pollen consumption between male and female blow flies.**
Betty Hernandez *(bettynicole.hernandez@gmail.com), Pierre Lau, Aaron Tarone and Juliana Rangel, Texas A&M Univ., College Station, TX*

PhD: Plant Insect Ecosystems

Alvarado B (Hotel Albuquerque at Old Town)

Moderator: Juliana Rangel, Texas A&M Univ., College Station, TX

1:00 PM 7-1 **Greenhouse biological control of *Myzus persicae* using the *Aphidius colemani-Rhopalosiphum padi* banker plant system.**
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*

1:10 PM 7-2 **Use of multiple natural enemies to manage whiteflies on poinsettias.**
Erfan Vafaie *(erfanv@tamu.edu)[1] and Kevin Heinz[2], [1]Texas A&M Univ., Overton, TX, [2]Texas A&M Univ., College Station, TX*

1:20 PM 7-3 **Evaluating botanicals to control maize weevil (Coleoptera: Curculionidae) in stored sorghum grain.**
Hame Abdou Kadi Kadi *(hkkadi@gmail.com)[1,2] and Bonnie Pendleton[2], [1]Institut National de la Recherche Agronomique, Niamey, Niger, [2]West Texas A&M Univ., Canyon, TX*

1:30 PM 7-4 **Population differentiation in host choice among sugarcane aphids (Hemiptera: Aphididae) from sorghum and sugarcane.**
Sulochana Paudyal *(sulochana.paudyal@okstate.edu), Oklahoma State Univ., Stillwater, OK*

1:40 PM 7-5 **Characterization of the sugarcane aphid microbiome in the continental US.**
Jocelyn R. Holt *(holtjocelyn@tamu.edu)[1], Alex Styer[2], Josephine Antwi[3], J. Scott Armstrong[4], Jason Wulff[1], Jennifer White[2], Samuel Nibouche[5], Laurent Costet[5], Gary Peterson[6], Neal McLaren[7] and Raul Medina[1], [1]Texas A&M Univ., College Station, TX, [2]Univ. of Kentucky, Lexington, KY, [3]Oregon State Univ., Hermiston, OR, [4]USDA - ARS, Stillwater, OK, [5]CIRAD - INRA, Saint-Pierre, France, [6]Texas A&M AgriLife Research and Extension Center, Lubbock, TX, [7]Univ. of the Free State, Bloemfontein, South Africa*

1:50 PM 7-6 **Rangeland fire's influence on plant-dwelling Orthoptera in northern Texas.**
Britt Smith *(britt.smith@ttu.edu) and Robin Verble, Texas Tech Univ., Lubbock, TX*

2:00 PM 7-7 **The feeding behavior of an isolated lineage of sugarcane aphid [*Melanaphis sacchari* (Zehntner) (Aphididae)].**
Greg Wilson *(gregwils@tamu.edu)[1] and David Kerns[2], [1]Texas A&M Univ., Bryan, TX, [2]Texas A&M Univ., College Station, TX*

Undergrad: Systematics, Evolution, & Biodiversity

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: J. Scott Armstrong, USDA - ARS, Stillwater, OK

1:10 PM 8-1 **Ant migration and colonization post-wildfire.**
Christopher Mitchell *(christopher.mitchell@ttu.edu), Jonathan Knudsen and Robin Verble, Texas Tech Univ., Lubbock, TX*

1:20 PM 8-2 **Where the pasture is greener for dung beetles: Coprophilous Scarabaeidae diversity is higher for a rural sheep farm than an urban sheep farm.**
Molly Drakeley *(Molly.drakeley@okstate.edu) and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK*

Masters: Medical, Urban, & Veterinary Entomology

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: J. Scott Armstrong, USDA - ARS, Stillwater, OK

1:40 **Introductory Remarks**

1:45 PM **9-1** **Detection of tick mediated host stress in bovine feces by the southern cattle tick, *Rhipicephalus (Boophilus) microplus*.**
Brian Rich *(briantaylorrich@gmail.com)[1], Pete Teel[1], Don Thomas[2], Robert John Miller[2], Jay Angerer[3], Doug Tolleson[4] and Adalberto A. Pérez de León[5], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, Edinburg, TX, [3]Texas A&M Agrilife Research and Extension Center, Temple, TX, [4]Texas A&M Univ., San Angelo, TX, [5]USDA - ARS, Kerrville, TX*

1:55 PM **9-2** **Guarding the National Guard: Assessment of mosquito populations on an Oklahoma military base.**
Thomas Hess *(tmhess@okstate.edu), W. Wyatt Hoback and Bruce Noden, Oklahoma State Univ., Stillwater, OK*

2:05 PM **9-3** **Involvement of detoxifying enzymes in deltamethrin resistance in bed bugs.**
Maria Gonzalez-Morales *(mgonzal@nmsu.edu)[1] and Alvaro Romero[2], [1]NEW MEXICO STATE UNIVERSITY, LAS CRUCES, NM, [2]New Mexico State Univ., Las Cruces, NM*

Masters: Physiology, Biochemistry, & Toxicology

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: Astri Wayadande, Oklahoma State Univ., Stillwater, OK

2:45 PM **10-1** **Not too cold or too hot: The effects of temperature on sugarcane aphid reproduction.**
Misael de Souza *(misael.de_souza@okstate.edu)[1], J. Scott Armstrong[2] and W. Wyatt Hoback[3], [1]Oklahoma State Univ., STILLWATER, OK, [2]USDA - ARS, Stillwater, OK, [3]Oklahoma State Univ., Stillwater, OK*

2:55 PM **10-2** ***Tenebrio molitor*** **as a model organism to characterize the hormetic effects of anoxia conditioning on their adult lifespan.**
Alyssa De La Torre *(alyssa_m@nmsu.edu), New Mexico State Univ., Las Cruces, NM*

Masters: Plant Insect Ecosystems

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: Astri Wayadande, Oklahoma State Univ., Stillwater, OK

3:05 PM **11-1** **Cross-crop resistance to corn and cotton in a Vip3A resistant strain of fall armyworm *Spodoptera frugiperda*.**
Ryan Gilreath *(rtg006@tamu.edu), David Kerns and Fei Yang, Texas A&M Univ., College Station, TX*

3:15 PM **11-2** **Phenology of *Erythroneura comes* (Homoptera: Cicadellidae) in Oklahoma vineyards.**
Kevin Jarrell *(kevin.jarrell@okstate.edu), Eric Rebek, Kris Giles and Astri Wayadande, Oklahoma State Univ., Stillwater, OK*

3:25 PM **11-3** **The effects of predators on sugarcane aphids (*Melanaphis sacchari*) in sorghum.**
Jeremy Hewlett *(jhewl@tamu.edu) and Micky Eubanks, Texas A&M Univ., College Station, TX*

Masters: Systematics, Evolution, & Biodiversity

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: Astri Wayadande, Oklahoma State Univ., Stillwater, OK

3:35 PM **12-1** **Determining the functional morphology of the eggs of *Sinea* spp. (Heteroptera: Reduviidae) and review of the genus in New Mexico.**
Danielle Lara *(djessie@nmsu.edu) and C. Scott Bundy, New Mexico State Univ., Las Cruces, NM*

3:45 PM **12-2** **Effects of wildfire on ant community structure at Valles Caldera national preserve.**
Jonathan Knudsen *(jonathan.a.knudsen@ttu.edu)[1], Robin Verble[1] and Robert R. Parmenter[2], [1]Texas Tech Univ., Lubbock, TX, [2]Valles Caldera Trust, Jemez Springs, NM*

WEDNESDAY, MARCH 28, 2018, POSTERS

Regular Poster Session / 8:00 AM-5:00 PM

Alvarado F, G (Hotel Albuquerque at Old Town)

P4-1 **Molecular analysis of feral colonies in South Texas demonstrates an increasing and sustained number of Africanized honey bee populations.**
Tonya Shepherd *(tshepherd@tamu.edu) and Juliana Rangel, Texas A&M Univ., College Station, TX*

P4-2 **Collecting moths leads to new discoveries, conservation, and preservation of moths.**
Eric Metzler *(metzlere@msu.edu), National Park Service, Holloman AFB, NM*

P4-3 **Predation of sentinel lepidopteran eggs in New Mexico pecan orchards.**
Patricia Yates Monk *(pyates@nmsu.edu)[1], Jane Breen Pierce[2], Nathan Guillermo[1] and Andrew Pierce[1], [1]New Mexico State Univ., Artesia, NM, [2]New Mexico State Univ., Las Cruces, NM*

P4-4 **New insights into the relationship between stink bug stylet canal dimensions and feeding mechanics.**
Jesus Esquivel *(jesus.esquivel@ars.usda.gov)[1], Robert Droleskey[2], Lauren Ward[3] and Roger Harvey[2], [1]USDA, ARS, Insect Control & Cotton Disease Research Unit, College Station, TX, [2]USDA, ARS, Food & Feed Safety Research Unit, College Station, TX, [3]BeeWeaver Apiaries, Navasota, TX*

P4-5 **Evaluation of seed treatment against the bird cherry-oat aphids *Rhopalosiphum padi* (Linnaeus) in the growth chamber and field on winter and spring wheat.**
Ali Zarrabi *(ali.zarrabi@okstate.edu)[1], Aqeel Alyousuf[2], Tom Royer[1], Kris Giles[1], S. Seuhs[1] and Mark Payton[1], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma State Univ., STILLWATER, OK*

P4-6 **Lab field bioassay (LFB) of seed treatments against the fall armyworm *Spodoptera frugiperda* (Smith) in sorghum and corn.**

P4-7 **Diversity and abundance of ground beetles in Texas cotton.**
Abdul Hakeem *(ahakeem@vols.utk.edu)[1], Megha Parajulee[1], Muhammad Ismail[2] and Katie Lewis[3], [1]Texas A&M Univ., Lubbock, TX, [2]Univ. of Sargodha, Sargodha, Pakistan, [3]Texas A&M AgriLife Research, Lubbock, TX*

P4-8 **Potential of lady beetle species for the biological control of the sugarcane aphid, *Melanaphis sacchari* (Hemiptera: Aphididae).**
Laura Weiser Erlandson *(laura.erlandson@tamuct.edu), Brad Burden and Kaitlyn Clark, Texas A&M Univ. - Central Texas, Killeen, TX*

P4-9 **Vlad the Impaler's cabinet of curiosities *or* impaled insect prey of the loggerhead shrike.**
Allen Knutson *(a-knutson@tamu.edu), Texas A&M Univ., Dallas, TX*

P4-10 **Predation of sentinel eggs in cotton and sorghum in New Mexico.**
Jane Breen Pierce *(japierce@nmsu.edu)[1], Patricia Yates Monk[2], Nathan Guillermo[2] and John Idowu[1], [1]New Mexico State Univ., Las Cruces, NM, [2]New Mexico State Univ., Artesia, NM*

P4-11 **The design and evaluation of assays used to measure healthspan in *Drosophila melanogaster*.**
Michael Balogh *(baloghm5@nmsu.edu), Nubia Rivas and Giancarlo Lopez-Martinez, New Mexico State Univ., Las Cruces, NM*

P4-12 **Polymorphisms in the GABA-gated chloride channel gene of fipronil-resistant *Rhipicephalus microplus*.**
Guilherme Klafke *(gmklafke@gmail.com)[1], Jason Tidwell[1], Robert John Miller[1] and Adalberto A. Pérez de León[2], [1]USDA - ARS, Edinburg, TX, [2]USDA - ARS, Kerrville, TX*

WEDNESDAY, MARCH 28, 2018, MORNING

Regular Papers: Medical, Urban, and Veterinary Entomology

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: Allen Knutson, Texas A&M Univ., Dallas, TX

8:00 **Introductory Remarks**

8:05 AM **13-1** **Statewide *Aedes aegypti* and *Aedes albopictus* mosquito surveillance project.**
Hannah Walker *(hannahag16@gmail.com)[1] and Sonja Swiger[2], [1]Tarleton State Univ., Stephenville, TX, [2]Texas A&M Univ., Stephenville, TX*

8:15 AM **13-2** **Education and outreach activities in the western gulf center of excellence for vector borne diseases.**
Pete Teel *(pteel@tamu.edu)[1], Craig J. Coates[1] and Sonja Swiger[2], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M Univ., Stephenville, TX*

8:25 AM **13-3** **Habitat preferences of container breeding mosquito populations in urban areas in southern Oklahoma.**
Jordan Sanders *(sdane@okstate.edu)[1], Bruce Noden[1] and Kristy Bradley[2], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma Dept. of Health, Oklahoma City, OK*

8:35 AM **13-4** **Integrated tick management of the winter tick, *Dermacentor albipictus* (Acari: Ixodidae), in grazing cattle systems.**
Samantha Hays *(samanthahays_85@tamu.edu)[1], Pete Teel[1], Brian Rich[1], Thomas Hairgrove[2], Jay Angerer[3] and Doug Tolleson[4], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M AgriLife Research and Extension, College Station, TX, [3]Texas A&M Agrilife Research and Extension Center, Temple, TX, [4]Texas A&M Univ., San Angelo, TX*

Regular Papers: Physiology, Biochemistry, and Toxicology

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: Allen Knutson, Texas A&M Univ., Dallas, TX

8:45 AM **14-1** **Evaluation of deltamethrin-impregnated nets as a barrier against Western flower thrips, *Frankliniella occidentalis* (Thysanoptera: Thripidae) and Orthotospoviruses.**
Steven Arthurs *(sarthurs@tamu.edu)[1], Pete Krauter[2], Kyle Gilder[1] and Kevin Heinz[1], [1]Texas A&M Univ., College Station, TX, [2]Texas A & M Univ., College Station, TX*

8:55 AM **14-2** **Regulation of mRNAs found post-mating in honey bee (*Apis mellifera*) queen spermathecae.**
Juliana Rangel *(jrangel@tamu.edu), Tonya Shepherd, Alejandra Gonzalez and Nancy Ing, Texas A&M Univ., College Station, TX*

9:05 AM **14-3** **Screening of *Bacillus thuringiensis* with insecticidal activity.**
Jessica LeFors *(jessica.lefors@ace.tamut.edu), Kari Valantine, Camryn Davis and Oscar Alzate, Ph.D., Texas A&M Univ., Texarkana, TX*

9:15 AM **14-4** **Detoxification mechanisms involved in ivermectin resistance in the southern cattle tick, *Rhipicephalus (Boophilus) microplus*.**
Guilherme Klafke *(gmklafke@gmail.com)[1], Valeria Lis Le Gall[2] and Tatiana Torres[3], [1]Instituto de Pesquisas Veterinarias Desiderio Finamor, Eldorado do Sul, Brazil, [2]Instituto de Biociencias - USP, Sao Paulo, Brazil, [3]Universidade de São Paulo, São Paulo, Brazil*

9:25 AM **14-5** **Tissue-specific transcriptional responses of the potato psyllid related to the horizontal and vertical transmission of the bacterial pathogen causing zebra chip disease of potato.**
Ismael E. Badillo-Vargas *(ismael.badillo@ag.tamu.edu)[1], Renesh Bedre[1], Gabriela Esparza-Diaz[2], Carlos Avila[1] and Kranthi Mandadi[1], [1]Texas A&M AgriLife Research, Weslaco, TX, [2]Amerstem, Inc, Camarillo, CA*

Symposium: Urban and Landscape Entomology

Alvarado B (Hotel Albuquerque at Old Town)

Moderators and Organizers: Wizzie Brown, Texas A&M Univ., Austin, TX and Molly Keck, Texas AgriLife Extension Service, San Antonio, TX

9:00 **Introductory Remarks**

9:05 AM **15-1** **Trelona termite baiting system, a five year study.**
Molly Keck *(mekeck@ag.tamu.edu)[1] and Wizzie Brown[2], [1]Texas AgriLife Extension Service, San Antonio, TX, [2]Texas A&M Univ., Austin, TX*

9:25 AM **15-2** **A new pest control training facility in Dallas: IPM experience house.**
Michael Merchant *(m-merchant@tamu.edu) and Janet Hurley, Texas A&M Univ., Dallas, TX*

9:45 AM 15-3 Using classroom response systems ('clickers') to enhance Master Gardener programs.
Eric Rebek *(eric.rebek@okstate.edu), Oklahoma State Univ., Stillwater, OK*

10:05 Break

10:25 AM 15-4 Efficacy of PT® Alpine pressurized fly spray on stable flies.
Sonja Swiger *(slswiger@ag.tamu.edu), Texas A&M Univ., Stephenville, TX*

10:45 AM 15-5 Subterranean termite (*Reticulitermes* spp.) colony activity over time within an 1 acre grid in central Texas.
Bob Davis *(robert.davis@basf.com), BASF Corporation, Pflugerville, TX*

11:05 AM 15-6 Reducing red imported fire ant populations in Cross Country Estates.
Wizzie Brown *(ebrown@ag.tamu.edu)[1], Paul Nester[2] and Cooper Terrell[3], [1]Texas A&M Univ., Austin, TX, [2]Texas A&M AgriLife Extension Service, Houston, TX, [3]Texas A&M Agrilife Extension Service, Georgetown, TX*

Regular Papers: Systematics, Evolution, and Biodiversity

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: Allen Knutson, Texas A&M Univ., Dallas, TX

9:35 AM 16-1 The remarkable endemism of moths at White Sands National Monument, New Mexico.
Eric Metzler *(metzlere@msu.edu), National Park Service, Holloman AFB, NM*

9:45 AM 16-2 Faunistic studies of selected Scarabaeidae (phytophagous and dung beetles) of district Mansehra, Pakistan.
Sultan Zaib *(Sultanzaib72@gmail.com), Government Degree College Nathiagali Abbottabad kp Pakistan, Abbottabad, Pakistan*

Regular Papers: Plant–Insect Ecosystems

Alvarado A (Hotel Albuquerque at Old Town)

Moderator: Manuel Campos, BioSafe Systems, East Hartford, CT

10:20 AM 17-1 PQZ™ a new insecticide for control of piercing sucking insects.
Scott Ludwig *(SLudwig@nichino.net)[1], Pedro Hernandez[2] and James Adams[2], [1]Nichino America, Arp, TX, [2]Nichino America, Inc, Wilmington, DE*

10:30 AM 17-2 Biological control of *Tamarix* in New Mexico: Are the leaf beetles winning?
Carol Sutherland *(csutherl@nmsu.edu), New Mexico State Univ., Las Cruces, NM*

10:40 AM 17-3 Comparison of western tarnished plant bug feeding behavior on insecticide-treated cotton using Electropenetrography.
Abdul Hakeem *(ahakeem@vols.utk.edu)[1], Elaine Backus[2], Felix Cervantes[2] and Megha Parajulee[1], [1]Texas A&M Univ., Lubbock, TX, [2]USDA - ARS, Parlier, CA*

10:50 AM 17-4 Useful methods for identifying plant resistance in sorghum to the sugarcane aphid (Hemiptera: Aphididae).
J. Scott Armstrong *(scott.armstrong@ars.usda.gov)[1], Sulochana Paudyal[2] and Kris Giles[2], [1]USDA - ARS, Stillwater, OK, [2]Oklahoma State Univ., Stillwater, OK*

11:00 AM 17-5 Development of the embryonic GN1 cell line from the leafhopper, *Graminella nigrifrons*.
Astri Wayadande *(a.wayadande@okstate.edu) and Trenna Blagden, Oklahoma State Univ., Stillwater, OK*

11:10 AM 17-6 Update on rice delphacid, *Tagosodes orizicolus* (Muir), research in Texas.
Michael (Mo) Way *(moway@aesrg.tamu.edu)[1], Ismael E. Badillo-Vargas[2], Rebecca Pearson[1], Carra Curtice[1] and Peng Yu[3], [1]Texas A&M AgriLife Research, Beaumont, TX, [2]Texas A&M Univ., Weslaco, TX, [3]Texas A&M Univ., College Station, TX*

11:20 AM 17-7 Using *Beauveria bassiana* formulation for control of greenhouse thrips, *Frankliniella* spp.
Manuel Campos *(mcampos@biosafesystems.com), BioSafe Systems, East Hartford, CT*

11:30 AM 17-8 A new product for stored grain protection.
Edmond L. Bonjour *(edmond.bonjour@okstate.edu) and George Opit, Oklahoma State Univ., Stillwater, OK*

WEDNESDAY, MARCH 28, 2018, AFTERNOON

Symposium: Blood feeders: From physiology to vector biology of arthropods of public health importance

Alvarado A (Hotel Albuquerque at Old Town)

Moderator and Organizer: Alvaro Romero, New Mexico State Univ., Las Cruces, NM

1:00 Introductory Remarks

1:05 PM 18-1 What's lurking where we're not looking: unexpected adventures in vector-disease surveillance in Oklahoma.
Bruce Noden *(bruce.noden@okstate.edu), Oklahoma State Univ., Stillwater, OK*

1:30 PM **18-2** **Phylodynamic approaches to infer demographic changes in arthropod vectors of public health relevance.**
Camilo Khatchikian *(camilok@sas.upenn.edu), Univ. of Texas at El Paso, El Paso, TX*

1:55 PM **18-3** **Co-evolution of mosquito immunity and microbiota.**
Jiannong Xu *(jxu@nmsu.edu), New Mexico State Univ., Las Cruces, NM*

2:20 **Break**

2:40 PM **18-4** **Comparison of mosquito and sand fly probing activities using EPG (Electropenetrography) technology.**
Astri Wayadande *(a.wayadande@okstate.edu), Oklahoma State Univ., Stillwater, OK*

3:05 PM **18-5** **Artificial diets for mosquitos.**
Immo Hansen *(immoh@nmsu.edu), New Mexico State Univ., Las Cruces, NM*

3:30 PM **18-6** **Competence of bed bugs for the transmission of infectious agents.**
Alvaro Romero *(aromero2@nmsu.edu), New Mexico State Univ., Las Cruces, NM*

Symposium: Challenges and opportunities for implementing IPM

Alvarado B (Hotel Albuquerque at Old Town)

Moderator and Organizer: David Kerns, Texas AgriLife Extension Service, College Station, TX

1:00 **Introductory Remarks**

1:00 PM **19-1** **Bt technology for bollworm management: Current situation and future sustainability.**
David Kerns *(dkerns@agcenter.lsu.edu)[1] and Fei Yang[2], [1]Texas AgriLife Extension Service, College Station, TX, [2]Texas A&M Univ., College Station, TX*

1:20 PM **19-2** **Potential yield losses from SCA infestations on forage sorghum.**
Ed Bynum *(ebynum@ag.tamu.edu), Texas A&M Univ., Amarillo, TX*

1:40 PM **19-3** **Insect pest management in Texas High Plains cotton.**
Suhas Vyavhare *(suhas.vyavhare@ag.tamu.edu)[1], Blayne Reed[2], Kerry Siders[3], Katelyn Kesheimer[1], Tyler Mays[4] and John David Gonzales[5], [1]Texas A&M Univ., Lubbock, TX, [2]Texas A&M Univ., Plainview, TX, [3]Texas A&M AgriLife Extension Service, Levelland, TX, [4]Texas A&M AgriLife, Brownfield, TX, [5]Texas A&M Univ., Muleshoe, TX*

2:00 PM **19-4** **Bermudagrass stem maggot: Developing guidelines for management.**
Allen Knutson *(a-knutson@tamu.edu)[1], Forrest Mitchell[2] and Vanessa Corriher-Olson[3], [1]Texas A&M Univ., Dallas, TX, [2]Texas A&M Univ., Stephenville, TX, [3]Texas A&M AgriLife Extension, Overton, TX*

2:20 **Break**

2:40 PM **19-5** **Impactful 2017 Texas High Plains sugarcane aphid research trial results.**
Blayne Reed *(blayne.reed@ag.tamu.edu)[1], Patrick Porter[2], Katelyn Kesheimer[3] and Ed Bynum[4], [1]Texas A&M Univ., Plainview, TX, [2]Texas A&M AgriLife Extension, Lubbock, TX, [3]Texas A&M Univ., Lubbock, TX, [4]Texas A&M Univ., Amarillo, TX*

3:00 PM **19-6** **Sugarcane aphid management: Controlling an expensive pest in a low value crop.**
Katelyn Kesheimer *(katelyn.kesheimer@ag.tamu.edu)[1], Patrick Porter[2], Blayne Reed[3] and Ed Bynum[4], [1]Texas A&M Univ., Lubbock, TX, [2]Texas A&M AgriLife Extension, Lubbock, TX, [3]Texas A&M Univ., Plainview, TX, [4]Texas A&M Univ., Amarillo, TX*

3:20 PM **19-7** **Population cycles and management of the crapemyrtle bark scale.**
Erfan Vafaie *(erfanv@tamu.edu)[1], Michael Merchant[2], Mengmeng Gu[3] and Yan Chen[4], [1]Texas A&M Univ., Overton, TX, [2]Texas A&M Univ., Dallas, TX, [3]Texas A&M Univ., College Station, TX, [4]Louisiana State Univ., Hammond, LA*

3:40 PM **19-8** **Challenges of following IPM practices during a public health crisis or when a regulated arthropod appears.**
Sonja Swiger *(slswiger@ag.tamu.edu), Texas A&M Univ., Stephenville, TX*

4:00 PM **19-9** **Pecan Weevil: Distribution, management and impact on the pecan industry.**
Bill Ree *(w-ree@tamu.edu), Texas A&M AgriLife Extension, Bryan, TX*

Oral Abstracts

Student Ten-Minute Paper Competition

Undergrad: Medical, Urban, & Veterinary Entomology

1-1. **Comparison of two non-toxic particle films for control of juvenile lone star ticks *(Amblyomma americanum)***

Eduardo Munoz (emunoz@schreiner.edu)[1], Allan Showler[2], Weste Osbrink[2] and Ryan Caesar[1], [1]Schreiner Univ., Kerrville, TX, [2]USDA - ARS, Kerrville, TX

Global climate change and movement of livestock has caused increasing concerns about the re-colonization of arthropod disease vectors from areas where they had been previously eradicated. There are also myriad reasons to seek non-toxic control methods that minimize impact on non-target species. As such, the purpose of this study was to test the lethality of two non-toxic particle films in a laboratory setting using a tick model (*Amblyomma americanum*, lone star tick). The particle films in question were Cimexa, an engineered silica powder, and Kaolin, a powdered clay mineral. Treatments included a variety of applications at different concentrations to determine LD-50; these included immersion, contact with a treated surface, and sprayed aqueous suspensions. Ticks in the egg, larval, and nymph stages were used in these assays. It was determined that Cimexa was considerably more lethal that Kaolin and that treatment through immersion proved to be the most effective method. Furthermore, it was discovered that both powders didn't perform well in egg toxicity assays regardless of the concentration used.

1-2. **The effects of salinity on A*edes aegypti* reproductive behaviors**

Rachel Brown (rayleighb@hotmail.com), Bartlesville High School, Bartlesville, OK

One of the predominant insect disease vectors, the *Aedes aegypti* mosquito, has been recorded in both fresh and salt water environments. Understanding the relationships between *Aedes aegypti* and salt water is necessary in order to control this disease vector.This is an ongoing study to better understand the relationship between salinity and *Aedes aegypti* reproductive behaviors. For the first part of the experiment, the relationship between salinity and oviposition was observed. If salinity could be used as an attractant for oviposition site location, it could be used in an oviposition trap. The mosquitoes were raised in standard lab rearing conditions, allowed to mature, then they received two blood meals using the artificial feeding method. They were given 2-4 days to lay their eggs. In each tank there were two oviposition sites, one fresh water and one salt water of various concentrations. The eggs were then counted, and it was found that there was no significant numerical differences between the freshwater and the salt water substrates. The next portion focuses on the relationship between salinity and female mosquito blood meal selection. If blood meal hosts live in areas with higher salt concentrations in the water, their skin would have higher concentrations of salt after bathing or swimming in this water. The mosquitoes (upon reaching adult hood) were given a blood meal with various membrane salt concentrations. The number of times the mosquitoes land on the blood meal apparatus was measured, as was the number of eggs.

1-3. **Establishing baseline susceptibilities of horn flies exposed to multiple active ingredients**

Derek Cosper (dcosper@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM

The horn fly (*Haematobia irritans*) is an obligate blood feeding pest that affects range-land cattle. Alleviating the stress caused by this ectoparasite results in economic sustainability for the producer. However, utilizing multiple control options as part of an integrated pest management (IPM) program is not always feasible in range-land settings. As such, producers tend to rely on the use of various insecticides labeled for the control of horn fly populations. Overreliance on insecticidal forms of control as well as a lack of viable non-chemical control options has led to an increase in resistance expressions to multiple active ingredients horn fly field populations. However, detecting resistance in a given population usually occurs after product failure and when inadequate control is observed. A more rapid method to identify insecticide resistance in horn fly populations is critical in assuring sufficient control for monetary returns to be observed by the producer. Therefore, the objective of this study is to identify baseline susceptibility of a colonized horn fly population exposed to multiple active ingredients in a laboratory setting. Lethal dose estimates were determined for multiple compounds within the pyrethroid and organophosphate classes of insecticides using filter paper bioassays. Lethal dose estimates and diagnostic concentrations for each compound will be discussed.

1-4. **Establishing a method to quantify the efficacy of natural compounds aimed at repelling horn fly (Diptera: Muscidae) infestations in a laboratory setting**

Ramon Zepeda (rz@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM

Incorporating non-chemical control options to alleviate horn fly (*Haematobia irritans*) burdens is key in overcoming issues with insecticide resistance. One such approach recently garnering much attention is the use of natural compounds that maintain repellent properties against the fly pest. The need for a rapid on-animal evaluation is necessary to expedite screening processes

that account for both host and pest interactions with the product bypassing the need for costly yearly replications. The objective of this study was to establish a method to quantify the repellency of products aimed at controlling horn flies on cattle in a laboratory setting. Animal pair treatment groups were assessed using a 3 x 3 Latin Square design to evaluate product efficacy. A control (CNT) pair, consisting of 2 untreated animals, a treated (TRT) pair, consisting of 2 geraniol (GER) treated animals, and a mixed treatment (MXT) pair, consisting of 1 untreated and 1 GER treated animal, were evaluated across three experimental periods. In general, TRT and MXT horn fly populations were significantly lower ($P < 0.05$) than CNT populations following treatment application. Furthermore, TRT populations were significantly lower than MXT horn fly populations. Horn flies within the MXT animal pair almost exclusively resided on the untreated animal following GER treatment. Calculated reductions specific to TRT animal pairs ranged from 89.68 to 99.35 % throughout the 5 day post-treatment evaluation.

1-5. **Cluster size influence on the survivability of *Rhipicephalus (Boophilus) microplus* larvae under low relative humidity (RH) stress**

Emily Zamora (emily.zamora01@utrgv.edu)[1], Brenda Leal[1], Robert Dearth[1] and Don Thomas[2], [1]Univ. of Texas Rio Grande Valley, Edinburg, TX, [2]USDA - ARS, Edinburg, TX

Low relative humidity (RH) levels (≤63%) have been previously shown to be a determining factor in larval survival, regardless of temperature. Supporting this, large larval clusters can retain more water than isolated larvae. Thus, the goal of this study was to identify if cluster size plays a role in the survivability of *B.microplus* larvae exposed to low RH. Initially, 14-day old larvae were placed into individual packets inside enclosed terrariums. A total of 48 packets were made divided into 3 groups; 16 containing low numbers of larvae (≤10 larval ticks, LOW group), 16 containing intermediate numbers (~100 larval ticks, INT group), and 16 with high numbers (≥200; HIGH group). The groups were split and half placed in an enclosed terrarium with an internal RH of 55%. The other half of each group, served as controls, and placed in an enclosed terrarium at a RH of >75%. After 5 days the numbers of live and dead larvae were counted to determine the percentage of larval survival in each group. As expected, all larvae survived in each of the 3 groups in the control terrarium. In the low RH terrarium, no larvae survived in the LOW groups (0%), the INT group showed a low rate of survivability (0-32%), and the HIGH group had the largest survival rate (28-74%). Overall, these results suggest that larger cluster sizes do increase larval survival under low RH stress.

1-6. **Population structure of the Chagas disease vector *Triatoma rubida* among the West Texas-Mexico Border**

Olivia Calderon (ocalderon2@miners.utep.edu)[1], Camilo Khatchikian[2], Brittny Blakely[3] and Alvaro Romero[3], [1]The Univ. of Texas at El Paso, El Paso, TX, [2]Univ. of Pennsylvania, Philadelphia, PA, [3]New Mexico State Univ., Las Cruces, NM

The kissing bug Triatoma rubida (Hemiptera: Reduviidae) is a vector of Trypanosoma cruzi, the etiological agent of the Chagas disease. This insect is commonly found along the West Texas-Mexico border area, presenting high T. cruzi incidence, which makes this system extremely relevant for the public health. In the present study, we used a population genetic modeling framework to assess the demography and genetic structure of the insect population in this relevant area. Sampling included an isolated rural location and various locations associated with different degrees of urbanization and changes in the land use. We extracted DNA from the collected samples and sequenced both mitochondrial and nuclear loci in order to calculate genetic indexes, demographic estimators, and population dynamics among sampled locations. Our results suggest some differentiation between the sampled locations, which can been related with changes in land use or demographic changes among the insects present in the different locations.

Keywords. Triatoma rubida, Trypanosoma cruzi, Chagas disease, vector, population genetics, genetic structure.

1-7. **Microbial interactions of necrophagous flies and their impact on disease transmission**

Victoria Pickens (vpicken@ostatemail.okstate.edu)[1], Astri Wayadande[2] and W. Wyatt Hoback[2], [1]Oklahoma State Univ., Stilwater, OK, [2]Oklahoma State Univ., Stillwater, OK

Flies are commonly associated with the transmission of microorganisms and pathogens due to their physiology and feeding behavior. Due to their interaction with various environments, as well as characteristics favorable for microorganism attachment, the potential of disease transmission is considered to be high for flies. However, flies are also known to possess antimicrobial properties protecting themselves from their bacterial acquisitions while feeding. In order to understand the process by which flies transmit microorganisms, we chose to compare the microbiomes of flies exposed to decomposing rats with the microbiomes of flies left unexposed to this rich source of microorganisms. We also tested the microbiome of the rats before and after exposure to the flies to observe a potential change in bacterial flora on the rat. Dilutions of bacterial extract solutions from the flies and rat tissues were spread plated so that cultivable bacteria could be physically observed, counted and compared amongst the test groups. Rat tissue cultures yielded higher colony counts than fly cultures, and flies unexposed to a rat had higher colony counts than flies that interacted with rats. However, this method only demonstrates cultivable bacteria, a small portion of the microbiome, and so may not fully represent the relationship between the microbiomes of the rats and flies. To further determine a relationship, we are using 16S genomic sequencing of the bacterial extract solutions from the rat tissues and flies for a more accurate representation of the majority of bacteria in these organisms' microbiomes.

1-8. **Identifying cocirculating hemorparasites in the West Nile virus system**

Dayvion Adams (ajadams968@tamu.edu), Andrew Golnar and Gabriel Hamer, Texas A&M Univ., College Station, TX

Multiple parasites commonly infect host populations. How these parasites interact is still unclear. This project focuses on a very specific small scale interaction between West Nile Virus and Avian Malaria Parasites (*Haemoproteus spp.* and *Plasmodium spp.*). *Culex quinquefasciatus* mosquitoes were collected over a four month period in College Station, Texas in standard mosquito traps. Screening for Haemosporidian DNA in the collected mosquito pools is a strategy to broadly characterize the transmission ecology of avian malaria in an area where avian malaria dynamics are undocumented. Avian malaria prevalence may impact WNV transmission dynamics if this parasite co-circulates among WNV hosts and vectors. The presence of malaria in mosquitoes can impact vector survivorship creates the potential for direct or indirect interactions between WNV and malaria in mosquitoes. Documenting the dynamics of co-circulating pathogens is a step towards controlled field and laboratory experiments evaluating impacts of pathogen co-infections.

PhD: Medical, Urban, & Veterinary Entomology

2-1. **Science communication in entomology: Knowing what's bugging them can help us connect with communities**

Joan King (joanie_king@tamu.edu)[1], Joe Ballenger[2], Nancy Miorelli[3] and Edward Vargo[1], [1]Texas A&M Univ., College Station, TX, [2]Randstad, Florissant, MO, [3]Univ. of Georgia, Athens, GA

Ask an Entomologist (AaE) is an active science communication (SciComm) project. As mistrust between the public and scientists continues to build, establishing relationships with SciComm projects is necessary to connect the general public and scientists to form lasting communities based on trust. AaE tackles this by using social media platforms to connect with their audience and answer entomological questions. AaE engages the general public through streaming live Facebook video, blog posts, Twitter threads, Instagram photos, and email. A second aspect to AaE is to collect information from the questions received by its audience to determine patterns and predict entomological questions, seasonality of questions, phenology of insects, and possible public issues. Between Fall 2014 to Spring 2018, AaE has received over 2000 emails of the following themes: identification requests (43% of received questions), infestation not including delusory parasitosis (DP) (13.9%), DP (4.1%), physiology (11.3%), behavior (7%) ecology (5.9), and evolution, culture, pets, taxonomy, career among others (together 13.9%). The identities of the AaE audience are kept anonymous, and the senders specifically give AaE consent to share their question(s) publicly for blog posts or live video posts. Additionally, metrics can be obtained from various posts by the platforms used including Facebook Statistics and Twitter analytics to determine with whom AaE is connecting. The AaE team's goal is to give SciComm projects legitimacy in academia by hypothesis driven research while still connecting and providing a quality scientific service to the public.

2-2. **Colony structure of *Reticulitermes* (Isoptera: Rhinotermitidae) in northwest Arkansas**

Mark Janowiecki (janowiecki@tamu.edu)[1], Amber D. Tripodi[2], Allen Szalanski[3] and Edward Vargo[1], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, Logan, UT, [3]Univ. of Arkansas, Fayetteville, AR

Termites, as social insects, have a complicated life cycle that is difficult to study with traditional research methods. A termite colony can consist of a simple family (one male and one female), an extended family (multiple related males and/or females) or a mixed family (unrelated reproductives). While this is nearly impossible to determine from collecting and censusing colonies in the field, microsatellite DNA genotyping methods have been previously developed and have examined termites primarily along the east coast. In this study, we apply these methods to three species of *Reticulitermes* from three sites in northwest Arkansas. We found 57.4% of the 61 *Reticulitermes* spp. colonies sampled in northwest Arkansas were simple families, 37.7% were extended families, and 4.9% were mixed families. This is intermediate to previous studies of *R. flavipes* in North and South Carolina (which had a higher percentage of simple families), and in Massachusetts and Nebraska (which had a lower percentage simple families). The inbreeding coefficient (F_{IC}) is relatively high for the *R. virginicus* samples (0.370), indicating these colonies are more inbred than the *R. flavipes* and *R. hageni* samples ($F_{IC} \approx 0$). Further sampling across the native ranges of *Reticulitermes* spp. may enable a further understanding of the geographical patterns of family structure and inbreeding for these termite species.

2-3. **Interactions between colonies of the eastern subterranean termite, *Reticulitermes flavipes*, and soilborne pathogens**

Carlos Aguero (cague001@tamu.edu)[1], Jason Martin[2], Mark S. Bulmer[2] and Edward Vargo[1], [1]Texas A&M Univ., College Station, TX, [2]Towson Univ., Towson, MD

Termites are an important system for studying the evolution of social behavior in insects, but the cryptic nature of termite nests makes it difficult to observe the breeding structure of colonies in the field. It is still unknown how strongly termite colonies are affected by their environment, however, there is evidence that microbial pathogen pressure is a major selective force on termite colonies and that this could explain some of the observable patterns we see in termite colony structure. We examine this question in the eastern subterranean termite, *Reticulitermes flavipes* by: (1)

Comparing the responses of inbred and outbred termite colonies to a pathogenic challenge, and (2) Examining the effect termite nest material has on soil microbial diversity.

2-4. **A comparative evaluation of questing height between populations of *Ixodes scapularis* in the northern and southern United States**

Mackenzie Tietjen (kenzietietjen@tamu.edu)[1], Maria Esteve-Gassent[1], Andrew Li[2] and Raul Medina[1], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, Beltsville, MD

Lyme disease (LD) cases in the US are estimated at 300,000 cases annually. LD is vectored by the blacklegged tick, *Ixodes scapularis,* which ranges along the eastern half of the US. However, the majority of LD cases occur in the northeastern and northcentral US although the pathogen, *Borrelia burgdorfer*i, has been found in ticks and vertebrate hosts in the southeastern and southwestern US. Reasons for this geographic difference in LD prevalence are not fully understood. It has been suggested that this difference could be due to differences in the host seeking (i.e. questing) behavior between the northern and southern populations of *I. scapularis*. Questing is defined as a tick crawling onto the vegetation with its' forearms outstretched to wait for a passing by host to latch onto. The height at which this occurs is variable and if the southern population of *I. scapularis* are questing at lower heights compared to the northern population this might make them less likely to come into contact with humans resulting in a lower LD prevalence in the south. To test this, nymphs and adults were collected in a northeastern state (i.e. Maryland) and a southwestern state (i.e. Texas). All ticks were collected from the vegetation by flagging and dragging except for Texas nymphs. This is because nymphs cannot be collected from the vegetation in the southern US. Therefore, Texas nymphs were collected from small mammals and behavior assays were conducted. The height at which ticks quested, as well as additional behaviors, were recorded and analyzed. This study shows that Texas nymphs from small mammals quested at lower height compared to Maryland nymphs from the vegetation. Results will be presented for Maryland and Texas adults.

PhD: Physiology, Biochemistry, and Toxicology

3-1. **Zapped! UV irradiation and its effects on *Drosophila melanogaster* performance**

Raymond Berry (Rayberry@nmsu.edu), New Mexico State Univ., Las Cruces, NM

Understanding ecological influences can help gauge the organism's stress interaction. Environmental stress, like ultraviolet radiation (UVR), leads to the production of reactive oxygen species (ROS) which is the damaging force behind environmental insult by attacking lipids, proteins, and DNA. The protective effects of hormesis in animal models includes improved treatment survival, mating, extended longevity, and improved performance at old age (i.e. mating); amongst others (López-Martínez and Hahn 2014). Hormesis represents a multifarious response that results in the up regulation of many genes and gene pathways (Sarup et al. 2014). *Drosophila melanogaster* has been a scientific models in genetic research and being a well understood genetic model it us useful for studying the hormesis of UVR. By using the vinegar fly, *Drosophila melanogaster*, as our model organism, we test whether exposure to UVA helps lessen tissue destruction at the gene-level to find a UVA dose that is protective in *D. melanogaster*. Tubes containing pupae were separated from food and kept in same tube/vial and were exposed to 0, 30,45 or 60 minutes of ultraviolet radiation A (nm = 365) at a rate of mW/m2. Different rates of UVA exposure, produced by the distance from the source, show differences in treatment survival/adult emergence and flight ability. Exposure to prolonged UV conditions early in life (pupae) leads to increased or decreased performance later in life. Ultimately, data such as these can be refined to develop a model of dose response that can be used to estimate hormesis, or the biphasic response.

3-2. **Comparing cardenolide resistance induced by substitutions from the Na,K-ATPase of *Danaus plexippus and Rattus norvegicus***

Fabian List (fabian.list@tamu.edu), Texas A&M Univ., College Station, TX

The Na,K-ATPase is likely the most important ion carrier in the animal kingdom, enabling e.g. the excitability of nerve and muscle cells. In almost all animal species this carrier can be blocked by cardenolides, secondary plant metabolites that bind with high affinity to a specific binding pocket in the Na,K-ATPase α-subunit. However, some animals are resistant to the blocking effect of cardenolides, as first discovered for Na,K-ATPase 1α from *Rattus norvegicus*. Later several insects, feeding on cardenolide containing plants showed to have a similar resistance. In this study we compared the effect of the two resistance-conferring pairs of substitutions, Q111R, N122D originating from the rat and Q111V, N122H from the monarch butterfly, *Danaus plexippus*. Although both substitution pairs have been well characterized on their own, their effect in the genetic background of distantly related species is unknown. In this study each pair of substitutions was introduced by site-directed mutagenesis into both, the human and fruit fly Na,K-ATPase α-subunit gene. The recombinant genes were expressed by baculovirus infection of Sf9 insect cells. The harvested recombinant proteins were tested for their cardenolide sensitivity under increasing concentrations of ouabain. The results show that the recombinant enzymes remain functional, but show different IC50 values, depending on the genetic background of the gene. This analysis is complemented by ligand docking simulations to rationalize the observed differences in cardenolide sensitivity.

3-3. **Synergistic effects of in-hive miticides and agro-chemicals on honey bee (*Apis mellifera*) colony growth**

Alexandria Payne (alexnpayne@gmail.com) and Juliana Rangel, Texas A&M Univ., College Station, TX

The widespread use of agro-chemicals in the past two decades has led to a universal contamination of honey bee (*Apis mellifera*) beeswax in apiaries throughout the United States. Previous studies have demonstrated that pesticide-laden beeswax comb negatively affects the reproductive health, productivity, and longevity of mature queens in addition to negatively impacting drone sperm viability. The most commonly found agro-chemicals within beeswax comb include the miticides fluvalinate, coumaphos, and amitraz along with the fungicide chlorothalonil and the insecticide chlorpyrifos. It is not yet known how synergistic combinations of these pesticide residues in beeswax comb impact an overall honey bee colony's growth and survival. In this study, we investigated the effect of pesticide-laden beeswax on the growth and survival of honey bee colonies by comparing colonies reared on pesticide-laden beeswax foundation to control colonies reared on pesticide-free beeswax foundation. Experimental colonies were established and reared on wax foundation contaminated with field-relevant concentrations of either fluvalinate and coumaphos, chlorothalonil and chlorpyrifos, or amitraz. Monthly measurements of the amount of comb drawn, brood reared, and food stored were recorded in addition to bimonthly measurements of the total adult population from May-October 2017. It is necessary for the beekeeping community to be aware of whether or not these agro-chemicals are impacting the growth and survival of their honey bee colonies so that beekeeping practices can be altered in order to address this issue.

PhD: Systematics, Evolution, & Biodiversity

4-1. **The effect of habitat on the trophic position, diet breadth, and competitive interactions of an invasive ant (*Nylanderia fulva*)**

MacKenzie Kjeldgaard (mkjeldgaard@tamu.edu) and Micky Eubanks, Texas A&M Univ., College Station, TX

The tawny crazy ant (*Nylanderia fulva*) is a major invasive pest that can reach densities of nearly one million ants per hectare. We used stable isotope analysis, attraction of ants to baits, and pitfall sampling to investigate tawny crazy ant trophic position, diet breadth, and competitive interactions in different habitats. We found that tawny crazy ant trophic position was significantly higher in sites with tall, dense grasses than in sites with short or no grasses. Tawny crazy ants have enriched levels of nitrogen in sites with tall, dense grasses, indicating that most of their diet consists of herbivorous prey in these habitats. In sites with short or no grasses, nitrogen enrichment matched the enrichment of herbivorous insects, indicating that plant based food, perhaps seeds, extrafloral nectar, or honeydew, makes up the bulk of their diet in these locations. This difference in ant trophic position may be due to reduced availability of essential carbohydrate resources at sites with tall, dense grasses, or higher competition for these resources. Recruitment by ants to bait stations supports the hypothesis that competition is higher in sites with tall, dense grasses. We found that tawny crazy ants only dominated 40% of the baits in sites with tall, dense grasses, but they dominated 100% of the baits in sites with short or no grasses despite similar ant diversity and abundance. We are currently investigating the mechanisms and consequences of variation in tawny crazy ant diet and competitive interactions in different habitats.

Undergrad: Physiology, Biochemistry, & Toxicology

5-1. **The effects of pyriproxyfen and bifenazate on honey bee *(Apis mellifera)* sucrose sensitivity**

Makaylee Crone (Makaylee.crone22@tamu.edu)[1], Olalekan Falokun[1], Pierre Lau[1], Adrian Fisher[2], Julie Mustard[3] and Juliana Rangel[1], [1]Texas A&M Univ., College Station, TX, [2]Arizona State Univ., Tuscon, AZ, [3]Univ. of Texas, Brownsville, TX

The honey bee (*Apis mellifera*) contributes over $16 billion in pollination services annually. In particular, almonds are entirely dependent on honey bees for pollination. Almond growers face challenges to crop productivity due to several pests and pathogens which are combatted by multiple fungicides and insecticides. Over 60% of all managed bee hives are brought to almond orchards in California during almond bloom, potentially exposing them to these chemical applications. Pesticides are also often sprayed in conjunction, which can lead to a more severe impact on honey bee health.

In this study, we assessed the effects of the pesticides pyriproxyfen and bifenazate on honey bee sucrose sensitivity. Foragers were collected from a local apiary and exposed to the label dose, or a range of dose variants (from 0.5x to 3x the label dose) of each pesticide. We utilized a wind tunnel and atomizer set up (wind-speed: 2.9 m/s) to simulate field-relevant exposure of honey bees to pesticides during aerial application in almond orchards. Exposed foragers and a control group were subdued by cold temperature and transferred to plastic straw harnesses. Sucrose sensitivity was measured using a proboscis extension reflex (PER) setup 24 and 120 hours post exposure. Sensitivity was assessed by observing whether or not there was a stimulation of PER following the offer of differing concentrations of sucrose.

PhD: Plant Insect Ecosystems

7-1. **Greenhouse biological control of *Myzus persicae* using the *Aphidius colemani-Rhopalosiphum padi* banker plant system**

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

Banker plants (a.k.a, open rearing systems) consist of an arthropod natural enemy (i.e., predators or parasitoids), alternative prey or hosts for the natural enemy, and banker plants to support the alternative prey or hosts. In enclosed environments, banker plants provide long-term reproduction and dispersal of the natural enemy species aimed at control of a target pest. The *Aphidius colemani-Rhopalosiphum padi* banker plant system was compared with stand-alone augmentative releases of *A. colemani* to assess the advantages and disadvantages of each strategy against green peach aphid, *Myzus persicae*. Evaluations were made at three greenhouse cooperator sites in Oklahoma and replicated four times. Each time replicate consisted of three treatments: banker plants, augmentative releases, and imidacloprid drenches. For each treatment, 24 ornamental pepper plants (*Capsicum annuum* 'Black Pearl') were infested with *M. persicae*. Banker plant treatments consisted of a wheat banker plant infested with parasitized *R. padi* aphids, replaced weekly. Augmentative releases consisted of *A. colemani* mummies only. Peppers were checked weekly for seven weeks and evaluated for aphid and mummy densities. Winter wheat banker plants were observed for overall health and presence of *A. colemani* mummies. Efficacy of banker plants varied by season and site, but this method is less expensive than bi-weekly augmentative releases of parasitoids. Banker plants offer an environmentally friendly and innovative way to provide sustained management of common aphid pests in greenhouses.

7-2. **Use of multiple natural enemies to manage whiteflies on poinsettias**

Erfan Vafaie (erfanv@tamu.edu)[1] and Kevin Heinz[2], [1]Texas A&M Univ., Overton, TX, [2]Texas A&M Univ., College Station, TX

Poinsettias [*Euphorbia pulcherrima* (Willd. ex Klotzsch)] were valued at $140M in 2015, comprising approximately 1/6th of the total value of potted flowering plants in the US. The main pest of poinsettias are whiteflies, with *Bemisia tabaci* Gennadius (Hemiptera: Aleyrodidae) as the most common species occurring in southern USA greenhouses. The increasing prevalence of the Q-biotype whitefly, increasing instances of pesticide resistance, increasing restrictions imposed by the EPA on pesticide applicators, and increasing requirements from retailers are calling into question the long-term use of insecticides to manage *B. tabaci*. Two natural enemies demonstrate promise for use in management of *B. tabaci* in the warmer climates of southern USA; *Eretmocerus eremicus* Rose (Hymenoptera: Aphelinidae) and *Amblyseius swirskii* Athias-Henriot (Acari: Pytoseiidae). *Eretmocerus eremicus* can disperse over 10 meters in field conditions and find patches of whiteflies in the greenhouse. In contrast, *A. swirskii* is relatively immobile, but can persist on plants for four weeks or longer, providing a sustainable baseline approach to manage new whitefly populations. In this study, we investigate which natural enemy composition would best suppress *B. tabaci* populations in large cages (each with 12 potted poinsettias) at release rates economically comparable to current conventional insecticide inputs: *E. eremicus*, *A. swirskii*, or combination of *E. eremicus* and *A. swirskii*. The results provide insight into the use of multiple natural enemies to suppress pests in greenhouse crop production.

7-3. **Evaluating botanicals to control maize weevil (Coleoptera: Curculionidae) in stored sorghum grain**

Hame Abdou Kadi Kadi (hkkadi@gmail.com)[1,2] and Bonnie Pendleton[2], [1]Institut National de la Recherche Agronomique, Niamey, Niger, [2]West Texas A&M Univ., Canyon, TX

Insects damage 5-35% of stored grain worldwide, especially in the tropics. Maize weevil, *Sitophilus zeamais* Motschulsky, causes most damage to stored grain. Control of maize weevil in stored products relies on insecticide use. Alternatives such as inexpensive and eco-friendly botanicals are needed to effectively manage this pest and reduce pesticide residue in food. The objective was to evaluate effects of botanicals to control maize weevil in stored sorghum, *Sorghum bicolor* (L.) Moench. Evaluated were powders of neem bark, *Azadirachta indica*; mesquite pods, *Prosopis glandulosa* var. *glandulosa*; milkweed leaves, *Asclepias speciosa*; and a check (no plant powder). Weevils were exposed at 2-day intervals to three doses of each botanical separately to assess the number killed compared with the check. Percentage loss of grain was estimated based on initial and final weights. Feeding deterrence by botanicals was determined compared with the check. Incremental counts showed the powders differed in toxicity. Mesquite and milkweed killed most adults from days 2-6. Neem at 0.05 g was slow acting and killed most adults (two) 14 days after treatment. More weevils were killed before 18 days after exposure to the three doses of botanicals than the check. Botanicals at 0.2 g killed >90% adults, which resulted in least loss of grain (7-16.9%). Percentages of weevils killed by *A. indica* or *A. speciosa* did not differ between 0.05- and 0.1-g doses, but loss (18.6-22.9%) of grain was greater than with mesquite. Results will determine botanical extracts to use in formulating biopesticides to control insects in stored sorghum.

7-5. **Characterization of the sugarcane aphid microbiome in the continental US**

Jocelyn R. Holt (holtjocelyn@tamu.edu)[1], Alex Styer[2], Josephine Antwi[3], J. Scott Armstrong[4], Jason Wulff[1], Jennifer White[2], Samuel Nibouche[5], Laurent Costet[5], Gary

Peterson[6], Neal McLaren[7] and Raul Medina[1], [1]Texas A&M Univ., College Station, TX, [2]Univ. of Kentucky, Lexington, KY, [3]Oregon State Univ., Hermiston, OR, [4]USDA - ARS, Stillwater, OK, [5]CIRAD - INRA, Saint-Pierre, France, [6]Texas A&M AgriLife Research and Extension Center, Lubbock, TX, [7]Univ. of the Free State, Bloemfontein, South Africa

The sugarcane aphid (*Melanaphis sacchari* Zehntner) has been present in the continental United States (US) on sugarcane since 1977. It was not until 2013 however, that this insect became a pest in US sorghum. What could have caused this sudden pest outbreak in US sorghum after over 35 years of the sugarcane aphid (SCA) being established in sugarcane? The insect microbiome can play an important role in allowing populations of an insect species to consume different host plants. We examined the bacterial microbiome of SCA in agroecosystems before and after the 2013 pest outbreak as well as across the continental US on its most common host plants, which included grain sorghum, sugarcane and Johnson grass. Both Illumina Miseq and PCR were used to characterize the SCA microbiome. This allowed us to determine whether the sudden pest outbreak on sorghum was due to a difference in the bacterial microbiome among aphids on different host plants or post 2013. Sugarcane aphids were found to predominately harbor the primary aphid symbiont *Buchnera aphidicola*, while containing few other bacteria. This study characterizes the SCA microbiome and provides a foundation for understanding the role of endosymbiotic bacteria in the SCA pest outbreak on US sorghum.

7-6. **Rangeland fire's influence on plant-dwelling Orthoptera in northern Texas**

Britt Smith (britt.smith@ttu.edu) and Robin Verble, Texas Tech Univ., Lubbock, TX

Grasshoppers are economically and ecologically important insects in rangeland systems. Prescribed fire is a common land management practice in Texas rangelands to improve pasture forage and reduced woody plant abundance. We examined the post-fire response of plant-dwelling Orthoptera in north Texas rangelands. We conducted sweep netting in summer of 2014 and 2015 using 12 spring burned and unburned replicated areas. We identified Orthoptera to species and analyzed our data using model-based multivariate methods. Our model included treatment, vegetation visual obstruction, and percent live vegetation as predictor variables. We identified 29 species that were used in our analysis. We found a significant influence of percent live vegetation on our assemblage, and no significant effect of treatment or vegetation visual obstruction. We also found no significant influence of our predictor variables on individual species. Our study did not indicate a treatment effect of prescribed fire on our assemblage. We saw an influence of percent live vegetation on our assemblage, which influenced largely by precipitation and soil moisture.

7-7. **The feeding behavior of an isolated lineage of sugarcane aphid [*Melanaphis sacchari* (Zehntner) (Aphididae)]**

Greg Wilson (gregwils@tamu.edu)[1] and David Kerns[2], [1]Texas A&M Univ., Bryan, TX, [2]Texas A&M Univ., College Station, TX

Beginning in 2013, the sugarcane aphid [Hemiptera: Aphididae, *Melanaphis sacchari* (Zehtner)] rapidly emerged as one of the most important pests of grain sorghum in the United States and Mexico. Sorghum bicolor (L.), commonly called grain sorghum, is an important dietary staple for millions of people living in about 30 countries in the subtropical and semi-arid regions of Africa, Asia, and India, is a traditional source of food and fodder for small-landholding farms (subsistence farmers), is also used in the commercial farming sector as a high-input feed crop, and is fast emerging as a biofuel crop. Since the physiological basis for sugarcane aphid resistance in sorghum is not well understood, the electrical penetration graph technique was used to detect differences in feeding behaviors of two genetically distinct populations of sugarcane aphid. The electoral penetration graph technique was selected in order to clearly detect differences in electrical conductivity during the feeding and non-feeding behaviors of the aphid while occupying varieties of important graminous host species including: *Sorghum bicolor, Saccharum officinarum*, Miscanthus sinensis, and *Sorghum halepense*. Experiments conducted on 4th instar aphids in a copper faraday cage using an GIA-8D EPG amplifier with AD conversion rate of 100 Hz, a DAS-800 Digital Acquisition Card digitalized analog signals displayed and recorded using WinDaq/Lite software. Seventeen aphids were used per host and 10 recordings made during a 4 h period. Time spent feeding and non-probing durations were statistically analyzed since longer time spent ingesting phloem sap is an indication of host plant acceptance and suitability.

Undergrad: Systematics, Evolution, & Biodiversity

8-1. **Ant migration and colonization post-wildfire**

Christopher Mitchell (christopher.mitchell@ttu.edu), Jonathan Knudsen and Robin Verble, Texas Tech Univ., Lubbock, TX

The Las Conchas Wildfire was a large mixed severity wildfire that impacted the Valles Caldera National Preserve in Summer 2011. We examined ant colonization and migration post-fire. Pitfall traps were stratified across burned and unburned areas and among habitat types. We collected ants biweekly in the the growing season (May-November) from 2011-2015. We recorded all alate queens, dealate queens, and queens with colonies and analyzed their distribution across fire severities, habitat types, and years.

8-2. **Where the pasture is greener for dung beetles: Coprophilous Scarabaeidae diversity is higher for a rural sheep farm than an urban sheep farm**

Molly Drakeley (Molly.drakeley@okstate.edu) and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK

It is long hypothesized that coprophilous scarab (dung) beetles play an important role in parasite management amongst sheep. Unfortunately little research exists comparing the environmental factors that farm location plays on dung beetle population and diversity. The goal of this research was to compare the species diversity of dung beetles on a rural sheep farm located near Perkins, Oklahoma to that of a sheep pasture located within the city limits of Stillwater, Oklahoma. Five pitfall kill traps baited with pig manure were place randomly across two test fields. Traps were set from 9/22/17-10/17/17 and collected every 48 hours making a total of 130 samples collected during the study. More than 10,000 dung beetles were collected from the two locations and identification is underway. Results indicate a greater abundance and diversity of dung beetles from the rural sheep pasture compared with the pasture within city limits. Because of their importance in reducing manure and thus transmission of parasites, these results may help sheep farmers adapt farm conditions to encourage dung beetle occupancy.

Masters: Medical, Urban, & Veterinary Entomology

9-1. **Detection of tick mediated host stress in bovine feces by the southern cattle tick, *Rhipicephalus (Boophilus) microplus***

Brian Rich (briantaylorrich@gmail.com)[1], Pete Teel[1], Don Thomas[2], Robert John Miller[2], Jay Angerer[3], Doug Tolleson[4] and Adalberto A. Pérez de León[5], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, Edinburg, TX, [3]Texas A&M Agrilife Research and Extension Center, Temple, TX, [4]Texas A&M Univ., San Angelo, TX, [5]USDA - ARS, Kerrville, TX

The standard method of detecting Cattle Fever Ticks *(Rhipicephalus (B.) annulatus* and *R. (B.) microplus)* in the state-federal tick eradication program is physical examination of restrained cattle to find attached ticks. Ticks modulate host responses to blood feeding resulting in fecal chemistry changes through the immune, endocrine, digestive systems cascade. Fecal chemistry changes in tick infested cattle may provide a supplemental approach to detect infestations. This presentation will discuss differences in near infrared spectra from manure of cattle infested with *Rhipicephalus (Boophilus) microplus* during periods of pre-infestation and infestation through the life cycle of the Southern Cattle Tick.

9-2. **Guarding the National Guard: Assessment of mosquito populations on an Oklahoma military base**

Thomas Hess (tmhess@okstate.edu), W. Wyatt Hoback and Bruce Noden, Oklahoma State Univ., Stillwater, OK

Mosquitoes (Diptera: Culicidae) are annoying pests that can transmit a number of pathogens which cause illness or death in serious cases. Military bases support training activities for thousands of troops who move personnel and equipment around the world. These activities have the potential to introduce new mosquitoes including *Aedes albopictus*, *Aedes aegypti,* and *Aedes japonicas* to new areas. Camp Gruber Training Site is located in northcentral Oklahoma and has few permanent residents but activities that often increase the human populations into the thousands. We placed CDC light traps baited with dry ice in residential areas of the base to survey adult mosquitoes. Collected mosquitoes were identified and temporal patterns of the community were constructed. Sampling occurred approximately bi-weekly from April to August. We hypothesized that within the small area where trapping occurred, the mosquito species would be uniform in number and diversity. A total of 1,889 mosquitoes were collected belonging to 16 species in four genera, including *A. albopictus*. The most commonly occurring species was *Psorophora columbiae,* with 920 individuals captured. Counter to our hypothesis, the species diversity and distribution among our traps was highly variable. This information shows the need for a site-specific management plan for the facility and additional data to be collected in 2018 will allow us to investigate the effects of mass troop movements on the mosquito populations.

9-3. **Involvement of detoxifying enzymes in deltamethrin resistance in bed bugs**

Maria Gonzalez-Morales (mgonzal@nmsu.edu)[1] and Alvaro Romero[2], [1]NEW MEXICO STATE UNIVERSITY, LAS CRUCES, NM, [2]New Mexico State Univ., Las Cruces, NM

The common bed bug, *Cimex lectularius L.* (Hemiptera: Cimicidae), is an obligate hematophagous insect that has resurged worldwide in the past 15 years. Control of bed bugs is based on intensive application of a limited number of insecticides, mainly pyrethroids. Intensive application of pyrethroid products has led to the development of resistance to these compounds in many populations worldwide. Failure to eliminate resistant bed bugs could be a contributing factor for further spread of this pest. Therefore, effective management strategies for the management of insecticide resistance in bed bugs needs to be developed. We explored the use of synergists to understand the involvement of detoxifying enzymes in resistance and to evaluate their potential to overcome pyrethroid resistance in field populations. We used Piperonyl butoxide (PBO), S,S,S-tributyl phosphorotrithioate (DEF), Triphenyl phosphate (TPP) and Diethyl maleate (DEM) to assess the role of Cytochrome monooxygenase (P450s), Estereases, Glutathione S-tranferase (GTS) and Carboxyesterase (CarE) respectively in two pyrethroid resistant strains, Jersey City and Cincinnati. Positive SRs

after inhibitor treatments indicates that these enzymes contribute to pyrethroid resistance in bed bugs. Addition of synergists to pyrethroids might increase the effectiveness of treatments against resistant bed bugs.

Masters: Physiology, Biochemistry, & Toxicology

10-1. **Not too cold or too hot: The effects of temperature on sugarcane aphid reproduction**

Misael de Souza (misael.de_souza@okstate.edu)[1], J. Scott Armstrong[2] and W. Wyatt Hoback[3], [1]Oklahoma State Univ., STILLWATER, OK, [2]USDA - ARS, Stillwater, OK, [3]Oklahoma State Univ., Stillwater, OK

The sugarcane aphid, *Melanaphis sacchari,* is native to tropical areas of Africa, but has been widely introduced. Since 2012, it has rapidly spread into grain sorghum, *Sorghum bicolor*, in the major sorghum producing regions of the U.S. causing an economic loss of more than $23 million in 2014-2015. It appears that the sugarcane aphid is unable to overwinter in most areas and must colonize crops by dispersing from the south each year. A major factor involved in the rapid spread of this aphid pest is its high reproductive rate at optimal temperatures. Thus, understanding the thermal limits (i.e. the lower and upper threshold temperatures) as well as the optimal temperatures for maximal population growth is critical to predicting economic impacts. We tested aphid survival and reproduction at 5, 10, 15, 20, 25, 30 and 35 C on a susceptible sorghum hybrid. Aphids died without reproduction at 5 and 35C. Very little reproduction occurred at 10C. Reproduction occurred and increased at 15, 20 and 25 C respectively, while at 30 C, the reproduction rate decreased still occurred. These data suggest both a lower and upper threshold for infestation and population growth and will be useful in adding temperature to models of economic threshold.

10-2. ***Tenebrio molitor*** **as a model organism to characterize the hormetic effects of anoxia conditioning on their adult lifespan**

Alyssa De La Torre (alyssa_m@nmsu.edu), New Mexico State Univ., Las Cruces, NM

Hormesis, a biphasic response, offers protection upon low level exposures to environmental stress lethal at higher doses. Physiological oxygen conditioning is known to elicit beneficial effects across taxa. When cells experience changes in oxygen concentration, mitochondria enter a defensive state via upregulation of protective genes in preparation for resulting reactive oxygen species (ROS) production. These biological defense products are then readily available when excessive free radical damage occurs. All organisms are combated with maintaining homeostasis despite repeated exposures to oxidative stress from exogenous and endogenous sources. Oxidative damage results from accumulation of ROS fueled by environmental stress, leading to long term effects that are potentially detrimental to organismal performance. It is known that excessive accumulation of free radicals leads to an increase in the natural aging process and leaves an organism more susceptible to disease development.

Tenebrio molitor is used as a model to characterize the hormetic effects of oxygen conditioning on overall organismal performance by exploring both short and long term effects of anoxia (0% oxygen) exposure. Pharates were exposed to anoxia for specific time periods during different pupal stages prior to emergence and were assessed throughout their adult life span. Longevity, activity, oxidative damage and total antioxidant capacity were measured to determine the effects of anoxia during stages of development. We further investigate how exposure of the parental generation affects F1 generation emergence. The results suggest that the hormetic effects of anoxia are dependent on dosage, sex, and stage of life while exhibiting a cost of hormesis.

Masters: Plant Insect Ecosystems

11-1. **Cross-crop resistance to corn and cotton in a Vip3A resistant strain of fall armyworm S*podoptera frugiperda***

Ryan Gilreath (rtg006@tamu.edu), David Kerns and Fei Yang, Texas A&M Univ., College Station, TX

Transgenic crops producing *Bacillus thuringiensis* (Bt) have become a major tool for control of insect pests worldwide. Evolution of insect resistance to the Bt toxins has become a serious threat to the sustainability of this technology. Gene-pyramiding, combining two or more dissimilar Bt proteins in a crop has been used to delay insect resistance. However, the durability of gene-pyramiding can be reduced by cross-resistance. Resistance to Cry1F in the fall armyworm (FAW), *Spodoptera fruigiperda* (J.E. Smith), has occurred in the Southern U.S. Vip3A is a relatively new Bt protein with a different mode of action and has been introduced into almost all recently released Bt corn and cotton products. In this study, we provided the first documentation of cross crop resistance in FAW selected with Viptera 3111 corn (Vip3A+Cry1Ab) to multiple Bt corn and cotton products. Corn varieties used included SMT (Cry1F+Cry1A.105+Cry2Ab2), VT2P (Cry1A.105+Cry2Ab2), Viptera 3111 (Vip3A+Cry1Ab), HX (Cry1F), and Leptra (Cry1F+Vip3A). Cotton varieties include TL (Cry1Ab+Cry2Ae), TL+ (Cry1Ab+Cry2Ae+Vip3A), WS (Cry1Ac+Cry1F), WS3 (Cry1Ac+Cry1F+Vip3A), BG2 (Cry1Ac+Cry2Ab2), and BG3 (Cry1Ac+Cry2Ab2+Vip3A). Three insect genotypes were used, resistant (RR), known susceptible (SS), and a heterozygote (RS). RR had high survival on Viptera 3111, while SS and RS had low survivorship. SS and RS performed similarly on other Bt corn hybrids and cotton varieties with low survivorship. Pyramided technologies containing Cry1 or Cry2 proteins negated

the resistant mechanisms of RR larvae which suggest these technologies are capable of managing Vip3A resistant FAW.

11-2. **Phenology of *Erythroneura comes* (Homoptera: Cicadellidae) in Oklahoma vineyards**

Kevin Jarrell (kevin.jarrell@okstate.edu), Eric Rebek, Kris Giles and Astri Wayadande, Oklahoma State Univ., Stillwater, OK

Eastern grape leafhopper, *Erythroneura comes* (Say), is an important pest of grapes in the northeastern and midwestern United States. Integrated pest management programs frequently consider the influence of temperature on the phenology (i.e., seasonal development) of pests, so that chemical applications are timed for when the pest is most susceptible to control. Growing degree day (DD) models are used for describing this temperature-phenology relationship. We used three such models to accumulate degree days above a lower developmental threshold of 50°F to investigate the phenology of *E. comes* at one Oklahoma vineyard in 2016 and at three Oklahoma vineyards in 2017. Leafhopper nymphs were counted weekly on randomly selected grape leaves throughout the vineyards. In 2016 three peaks in population abundance occurred at the only vineyard sampled, indicating three separate generations, while in 2017 four peaks occurred at two of the vineyards, while two peaks occurred at the third vineyard. This difference between generation number is discussed, as well as differences between the degree day models and implications for the development of more effective management protocols for this leafhopper in Oklahoma.

11-3. **The effects of predators on sugarcane aphids (*Melanaphis sacchari*) in sorghum**

Jeremy Hewlett (jhewl@tamu.edu) and Micky Eubanks, Texas A&M Univ., College Station, TX

The sugarcane aphid (*Melanaphis sacchari*) (Hemiptera: Aphididae) is an emerging pest in sorghum. It was first reported feeding on sorghum in Texas in 2013 and by 2015 sugarcane aphids were found feeding on sorghum in most of the sorghum-producing southeastern states. Sugarcane aphids have caused significant economic and yield loss through depletion of host plant nutrients, host plant death, and reduced quality of harvest. To better understand the population dynamics between these aphids and their predators in sorghum, we quantified the number of sugarcane aphids consumed by lady beetles (*Coccinella septempunctata*, *Harmonia axyridis*) (Coleoptera: Coccinellidae) and green lacewings (*Chrysoperla rufilabris*) (Neuroptera: Chrysopidae) under varying aphid densities. We found that consumption rate of prey increased as the density of prey increased, and all predators are able to significantly reduce the growth of sugarcane aphid populations and prevent outbreaks at intermediate aphid densities. Our results suggest that predators have the potential to reduce the number of insecticide applications needed to control sugarcane aphids in sorghum.

Masters: Systematics, Evolution, & Biodiversity

12-1. **Determining the functional morphology of the eggs of *Sinea* spp. (Heteroptera: Reduviidae) and review of the genus in New Mexico**

Danielle Lara (djessie@nmsu.edu) and C. Scott Bundy, New Mexico State Univ., Las Cruces, NM

Assassin bugs are predatory insects that are opportunistic feeders and can be found in many environments. Members of the genus *Sinea* have been studied in the Midwestern U.S., but no research has been conducted for the species that are present in the Southwest, including New Mexico. Our research consists of two parts: 1) examination of the functional morphology of eggs of *Sinea* spp. and 2) review of the genus in New Mexico. *Sinea* eggs have a collar that surrounds the operculum exhibiting a mechanical response similar to the opening/closing of some flower species; this is odd because the structures are non-living. This response previously has been reported in one species, but the mechanism by which it functions is not understood. Our data shows this response occurs in multiple species and suggests the movement could be related to moisture. To examine the response, eggs were tested in various conditions through a series of experiments.

There is no information available on members of *Sinea* in New Mexico. The most recent revision of the genus was completed in 1901. Several species have been described or removed from the genus since that time making it outdated. The review of *Sinea* was completed by field collection and documentation of museum specimens from around New Mexico. These specimens were used for comparison and revision of the original key and expansion of biological data on the genus.

12-2. **Effects of wildfire on ant community structure at Valles Caldera national preserve**

Jonathan Knudsen (jonathan.a.knudsen@ttu.edu)[1], Robin Verble[1] and Robert R. Parmenter[2], [1]Texas Tech Univ., Lubbock, TX, [2]Valles Caldera Trust, Jemez Springs, NM

Fires impact local ecosystems at multiple spatial scales, and many species take advantage of changes in habitat and food availability. We are examining the long-term (5 years) effects of the Las Conchas Wildfire (June 26-August 3, 2011) on ant communities in the Valles Caldera National Preserve (Jemez Springs, NM, USA). Ants are bottom-up indicators of ecosystem health and function; they are sensitive to disturbance and fill a variety of roles in their ecosystems, including dispersing seeds, altering soil chemistry and are often a key food resource. We analyzed long-term trends in species richness, abundance, and activity level among a trio of vegetation types. Community structure was influenced by wildfire presence, severity, vegetation type, and season.

Regular Ten-Minute Paper Oral

Regular Papers: Medical, Urban, and Veterinary Entomology

13-1. **Statewide *Aedes aegypti* and *Aedes albopictus* mosquito surveillance project**

Hannah Walker (hannahag16@gmail.com)[1] and Sonja Swiger[2], [1]Tarleton State Univ., Stephenville, TX, [2]Texas A&M Univ., Stephenville, TX

Until recently, the West Nile Virus has been the only major disease of concern to impact Texas directly. Mosquitoes being the primary vector for the disease, have raised awareness due to the numerous other deadly diseases they are able to carry and transmit, including the Zika Virus inevitably arriving in the United States. For obvious reasons, the Zika Virus has brought the attention of many entomologists in Texas and the Department of State Health Services (DSHS) to join forces and look into the population status of *Aedes aegypti* and *Aedes albopictus*, species known to transmit Zika. The objective is to conduct a county-wide surveillance for *Aedes aegypti* and *Aedes albopictus* in Texas. Thus, updating the species distribution maps for *Aedes aegypti* and *Aedes albopictus*. The new maps will allow the entomologists and DSHS to determine areas potentially at risk for local transmission of Zika, CHICK, and dengue viruses. On Mondays, five ovitraps were placed at each of five locations in 64 counties. The traps were collected the following Thursday morning. Once the cups were collected, the paper strips were removed from the cups and grouped by location into one Ziploc bag (5 strips per bag). Each bag had the location, date of pick up and a submission form that was attached to the front of each Ziploc bag. Once the processing was complete, the five Ziploc bags were grouped and mailed weekly to Dr. Sonja Swiger in the pre-addressed envelops.

13-2. **Education and outreach activities in the western gulf center of excellence for vector borne diseases**

Pete Teel (pteel@tamu.edu)[1], Craig J. Coates[1] and Sonja Swiger[2], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M Univ., Stephenville, TX

The CDC Western Gulf Center of Excellence for Vector Borne Diseases was established in 2017 to address emerging and persistent vector and vector borne disease issues in the region. An essential task of the center project is education and training opportunities for communities of practice and for the future generation of medical-veterinary entomologists and public health practitioners. This presentation will outline ongoing and planned activities to achieve these objectives.

13-3. **Habitat preferences of container breeding mosquito populations in urban areas in southern Oklahoma**

Jordan Sanders (sdane@okstate.edu)[1], Bruce Noden[1] and Kristy Bradley[2], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma Dept. of Health, Oklahoma City, OK

Aedes aegypti, the yellow fever mosquito, is a significant arbovirus vector worldwide and one that has gained prominence recently in the US as a primary vector for Zika virus. In 2016, *A. aegypti* was discovered again in four cities during surveillance activities in southern Oklahoma. While pockets of *A. aegypti* in several Oklahoma cities were identified, there is limited understanding of the nature and extent of these populations within given urban areas or regions of the state. In this study, we hypothesize that *A. aegypti* are more likely to occur in the southern part of the state and populations can be mapped within regional urban areas using measurable parameters. Between May to August 2017, mosquitoes were collected in 6 urban areas along two transects in central and western Oklahoma between the Red River (Texas border) and cities 60 miles from the border. Bi-weekly mosquito collection utilized Gravid Aedes traps (GAT) and BG-sentinel traps across urban gradients. Of the 6,628 female mosquitoes collected, 80% were the container breeding species (*A. albopictus* and *A. aegypti*) with proportions differing between different urban areas. Most (67%) of the container-breeding mosquitoes were collected using BG-sentinels. Using Geographical Information Systems (GIS) analysis, container-breeding mosquito populations were significantly associated with tree canopy cover ($p>0.02$) and container availability ($p>0.04$). The results of this study will assist in the prediction of vector mosquito habitat in urban areas of Oklahoma and potentially demonstrate how arboviruses could impact these cities should an outbreak occur.

13-4. **Integrated tick management of the winter tick, *Dermacentor albipictus* (Acari: Ixodidae), in grazing cattle systems**

Samantha Hays (samanthahays_85@tamu.edu)[1], Pete Teel[1], Brian Rich[1], Thomas Hairgrove[2], Jay Angerer[3] and Doug Tolleson[4], [1]Texas A&M Univ., College Station, TX, [2]Texas A&M AgriLife Research and Extension, College Station, TX, [3]Texas A&M Agrilife Research and Extension Center, Temple, TX, [4]Texas A&M Univ., San Angelo, TX

External parasites annually cost the U.S. beef cattle industry $2.4 billion through the direct effects of parasitism, and an even greater cost when animal handling and treatment expenses are included. Tick parasitism of range cattle can occur year-round. While most species are active in spring and summer months, certain species such as the winter tick, *Dermacentor albipictus*, are active in fall and winter when forage quality and quantity are low. *Dermacentor albipictus* is recognized as a one-host tick economically important in large ungulates and is a known vector that has previously been shown to transstadially transmit *Anaplasma marginale*, causal agent of bovine anaplasmosis. Direct production losses accrue from tick parasitism through bloodloss, irritation, poor rates of gain, weightloss, loss of body condition, and diminished reproductive capacity. Integrated tick management (ITM) strategies have been developed that have defined tactics including habitat management, wildlife management, fencing, grazing rotations

and cattle treatments with acaricides. Tick management requires producers to gather and physically inspect animals on a regular basis to determine tick presence and abundance, and make informed decisions regarding management tactics. Animal stress, time, labor, facilities wear and expense are disincentives to ITM adoption. This presentation will first evaluate the implementation of near infrared reflectance spectroscopy (NIRS) analysis of bovine feces for the strategic use of acaricides on tick infested animals at a northwest Texas cow-calf production ranch and furthermore displays current field studies in the west Texas region to potentially provide a future management protocol for *D. albipictus* in grazing cattle systems.

Regular Papers: Physiology, Biochemistry, and Toxicology

14-1. **Evaluation of deltamethrin-impregnated nets as a barrier against Western flower thrips, *Frankliniella occidentalis* (Thysanoptera: Thripidae) and Orthotospoviruses**

Steven Arthurs (sarthurs@tamu.edu)[1], Pete Krauter[2], Kyle Gilder[1] and Kevin Heinz[1], [1]Texas A&M Univ., College Station, TX, [2]Texas A & M Univ., College Station, TX

The use of insecticide-treated nets is under investigation for use in various agricultural applications. We are evaluating long-lasting deltamethrin-impregnated netting (DIN) for its effectiveness as a barrier screen against western flower thrips. Unlike traditional very finely woven thrips mesh, DIN have larger hole sizes (ca. 2 mm) that allow better air circulation (less resistance), but may more easily permit the passage of thrips. Our tests also showed that black DIN reduced thrips movement and reproductive success significantly, when compared with no nets (physical barrier) as well as untreated black nets of equivalent porosity (chemical barrier). Residual exposure tests revealed a LT_{50} of approximately 2 minutes for thrips in contact with nets. Efforts to increase time thrips spend on treated surfaces will increase their effectiveness. We are also experimenting with yellow-nets.

14-2. **Regulation of mRNAs found post-mating in honey bee (*Apis mellifera*) queen spermathecae**

Juliana Rangel (jrangel@tamu.edu), Tonya Shepherd, Alejandra Gonzalez and Nancy Ing, Texas A&M Univ., College Station, TX

Because of her specialized function within a honey bee (*Apis mellifera*) colony, the queen's phenotype has been optimized for extreme longevity and reproduction. Our goal is to use molecular tools to identify key genetic markers that help maintain queen longevity. Although we have little information on the mRNAs that are encoded in sperm from insect species, the concentrations of certain mRNAs and miRNAs in mammalian sperm are known to be related to the health and viability of sperm in species, including humans. We used RNA-sequencing to characterize the messenger RNAs (mRNAs) and in spermathecae from virgin and mated queens along with semen from drones. Nine cDNA libraries were generated from three spermathecae from virgin queens, three from mated queens, and three from semen from individual drones. RNA-seq-mediated comparisons identified 13,157 mRNAs across all three tissue types. Ten of the mRNAs were more highly expressed in the spermathecae of mated queens compared to those of virgin queens or drone semen. Using quantitative RT-PCR, we validated the differential expression of those mRNAs across tissue types. We are currently evaluating differential expression of miRNAs in those samples. Our studies shed light on the transcripts that are in honey bee sperm and spermathecae, and will allow us identify the effects of environmental stressors on the expression of these genes, which likely have important functions in the long term sperm storage abilities of queens.

14-3. **Screening of *Bacillus thuringiensis* with insecticidal activity**

Jessica LeFors (jessica.lefors@ace.tamut.edu), Kari Valantine, Camryn Davis and Oscar Alzate, Ph.D., Texas A&M Univ., Texarkana, TX

Bacillus thuringiensis (*Bt*) has been in use since the 1920s as an entomopathogenic bacterium. It is still one of the most widely used bio-pesticides because it releases crystal-associated toxins (known as Cry, and Cyt toxins) specific for targeted insects. During the sporulation stage, some *Bt* strains produce crystal inclusions encapsulating multiple toxins, many of which are known to have insecticidal capacity. To date, *Bt* has been found to be toxic against 11 Insecta orders. There are also reports of *Bt* toxicity against nematodes, mites, and ticks. Recently, *Bt* has attracted increased attention as some of its proteins have exhibited toxicity against human cancer cells without causing harm to red blood cells. Currently 307 different *Bt* holotypes displaying differing functions have been identified. In our laboratory, we have implemented a screening method to isolate novel *Bacillus thuringiensis* strains. During this process *Bacillus sp.* are extracted directly from soil, grown on a nutrient rich agar supplemented with species-specific antibiotics, isolated, and colonized in a nutrient broth, preserved, visualized, and then sequenced. With this method we have found several different strains of *Bacillus sp*.

14-4. **Detoxification mechanisms involved in ivermectin resistance in the southern cattle tick, *Rhipicephalus (Boophilus) microplus***

Guilherme Klafke (gmklafke@gmail.com)[1], Valeria Lis Le Gall[2] and Tatiana Torres[3], [1]Instituto de Pesquisas Veterinarias Desiderio Finamor, Eldorado do Sul, Brazil, [2]Instituto de Biociencias - USP, Sao Paulo, Brazil, [3]Universidade de São Paulo, São Paulo, Brazil

The cattle tick *Rhipicephalus (Boophilus) microplus* is one of the most important ectoparasites with great sanitary and economic impact for cattle rearing in Brazil, and it is commonly controlled by Ivermectin. The use of ivermectin in the last 30 years has led to the selection of resistant populations of *R. microplus*, and thus, the loss of efficacy in the control of the cattle tick. Considering this, we aim to determine the metabolic mechanisms that contribute to ivermectin resistance in a resistant strain of this species. To do so, we carried out lethal-time bioassays with synergists using two strains of ticks: the susceptible strain Mozo, and the resistant strain Juarez. We used four enzymatic inhibitors or synergists to test the involvement of different families of proteins responsible for detoxification of ivermectin: cytochrome P450, esterases, glutathione-S-transferase, and ATP Binding Cassette Transporters. We calculated the synergistic factor for each synergist and strain. All of the tested synergists altered, in different degrees, the mortality rates in the strain Juarez, indicating that the resistant phenotype is due to multiple mechanisms. Detoxification mechanisms mediated by ABC transporters are the most important. Esterases, glutathione-S-transferases and cytochrome-oxidases play a less important role in detoxification.

14-5. **Tissue-specific transcriptional responses of the potato psyllid related to the horizontal and vertical transmission of the bacterial pathogen causing zebra chip disease of potato**

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The potato psyllid, *Bactericera cockerelli* (Hemiptera: Triozidae), is the insect vector of the fastidious alpha-proteobacterium "*Candidatus Liberibacter solanacearum*" (Lso). This bacterial pathogen causes diseases in several solanaceous crops, including zebra chip, an economically important disease of potato in United States, Mexico, Central America, and New Zealand. Lso is transmitted in a persistent propagative manner by *B. cockerelli* where it infects and multiplies in the digestive track, reproductive organs, and salivary glands of its insect vector. Lso infection of the reproductive organs of *B. cockerelli* is hypothesized to be a prerequisite for transovarial transmission of the pathogen to the insect offspring. It has been previously shown that Lso has a detrimental effect on the fecundity and nymphal survival rate of *B. cockerelli*. To better understand the molecular bases of these biological consequences in the insect vector due to the bacterial infection, we have conducted a tissue-specific transcriptome analysis of *B. cockerelli* organs involved in the horizontal and vertical transmission of Lso. Total RNA was extracted from pools of dissected salivary glands and ovaries from non-infected (Lso-) and infected (Lso+) insects using three biological replicates. Libraries were prepared and sequenced using poly-A enriched RNA coupled with Illumina Hi-Seq technology. Bioinformatics analyses are being conducted to identify the transcriptional changes in these insect tissues in response to the bacterial infection. Identification of responsive candidate genes from *B. cockerelli* is expected to increase our understanding of a vector-bacteria interaction that results in some detrimental effects to the insect host and might ultimately aid in the development of novel control strategies to mitigate losses caused by this economically important pathosystem.

Regular Ten-Minute Paper Oral

Regular Papers: Systematics, Evolution, and Biodiversity

16-1. **The remarkable endemism of moths at White Sands National Monument, New Mexico**

Eric Metzler (metzlere@msu.edu), National Park Service, Holloman AFB, NM

White Sands National Monument, 289.4 sq. km, is 40% of the world's largest gypsum dunes field located in the Tularosa Basin in south-central New Mexico. The National Park Service initiated a ten-year study of moths beginning in 2007. Within 2 years, approximately 10 undescribed species of moths were collected at discrete sample sites along a 2.4 km by 300 m transect. The sample sites were selected to represent a variety of habitat types. At the end 2017, the supposed termination of the ten-year study, approximately 60 undescribed species of moths were discovered. All but 5 of the new species are known from no localities outside the gypsum dunes. The remaining 55 new species, of the approximate 550 species identified to date, are apparently endemic in the dunes gypsum dunes. This represents a rate of endemism of approximately 10%. These data mean that more endemic species of moths are in White Sands National Monument than any other single location in North America. Because the dunes are only 8000 years old this apparent rate of evolution is remarkable, although the mechanisms triggering the evolution are unknown, there are reasons to believe the causes are directly related to the gypsum soils. These data support the National Park Service's contention that White Sands National

Monument represents the equivalent of the Galapagos Islands of North America. The number of new species described from the study is now 20, and 5 more are in manuscript. Undergraduate students from New Mexico State University are assisting with the descriptive process.

16-2. **Faunistic studies of selected Scarabaeidae (phytophagous and dung beetles) of district Mansehra, Pakistan**

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It is found that the scarab beetles have strong relationship with the places where human population is at normal level and those peoples have some cultural values and also those people have their domesticated animals with then, farming must be the profession of them. These families like Scarabaeidae, Melolonthinae, Cetoniinae, Dynastinae and Rutelinae are the main part for their fertile soil during the season of summer from May to August. These beetles also helpful in nitrogen cycle, and dung recycling but they also move towards the living areas due to light which is necessary for their mating. And the diversity of family Scarabaeidae was high as compared to other families like Melolonthinae was on second number with the collection number the number of individuals of Scarabaeidae was 148 which seem to be more abundant as compared to other families Melolothinae were 91, Cetoniinae were 45, Dynastinae were 45 and Rutelinae were 68. The temperature and elevation is recorded according to the occurrence of species, like the species of phytophagous beetles are found in these areas of different temperature and in different months like these families like Scarabaeidae, Melolonthinae, Cetoniinae, Rutelinae and Dynastinae are surely available in the months of May, June, July and August. The species of these families are also defined in results those can be collected in respective months with related temperature from the selected areas. And the species were Scarabaeidae 13, Melolothinae 8, Cetoniinae 4, Dynastinae 4 and Rutelinae 6. The total number of individual were collected were *Melolontha melolontha* 5, *Scarabaeus sacer* 85 was very much rare, in abundance like , *Phyllophaga implicita* 3, *Onthophagus taurus* 3, *Rhizotrogus marginipes* 3, P*hanaeus pyrois* 5, *Dellacasiellus* 1, *Circellium bacchus* 6, *Scarabaeus sacerina* 8, *Incertae sedis* 2, *Cotinis nitida* 3, *Pelidnota virescens* 5, *Pseudocopris tubericollis* 5, *Macroderes bias* 6, , *Pachylomerus femoralis* 7, *Tropidonitis paradoxus* 5 *Anomala rutilinae* 5, *Polyphylla decemlineata* 9, *Anoplognathus montanus* 11, *Plusiotis resplendens* 8, *Hilarianus* 12, *Polyphylla astaenosiagum* 20, *Protaetia himalayana* 31, *Anoplognathus* 19, *Anomala tibialis* 13, *Cotalpa consobrina* 9, *Xylotrupes* Gideon 15, *Xylotrupes gideo* 12, *Polyphylla decemlineata* 16, *Phyllophaga nitida* 23, *C. batesi* 4, and *Pelidnota punctata* 10. With the mean value of 41% from the residential area and 30% from the forms of selected areas and also 29.9% from the forest areas which indicate that these beetles have strong interrelationship with humans and cattle which are the bioindicators for the scarabs and hence these can be collected easily from all those areas where human population have the cattle with them and storing dung in their lands.

Regular Papers: Plant–Insect Ecosystems

17-1. **PQZ™ a new insecticide for control of piercing sucking insects**

Scott Ludwig (SLudwig@nichino.net)[1], Pedro Hernandez[2] and James Adams[2], [1]Nichino America, Arp, TX, [2]Nichino America, Inc, Wilmington, DE

Pyrifluquinazon is a new chordotonal organ TRPV channel modulator currently being developed by Nichino America. It currently is registered as Rycar® for use on greenhouse grown ornamental crops. It will be registered as PQZ™ for use on brassica vegetables, citrus fruits, cotton, cucurbits, fruiting vegetables, grape, leafy vegetables, pome fruits, potato, stone fruits and tree nuts for the control of aphids, whiteflies, thrips, leaf hoppers, potato psyllid, and mealybugs. Pyrifluquinazon controls a broad spectrum of piercing and sucking hemipteran and thysanopteran insects. Pyrifluquinazon disrupts coordination and feeding of plant-sucking insects thus halting transmission of viral diseases. It is classified as an Insecticide Resistance Action Committee (IRAC) group 9B mode of action (MOA). Pymetrozine, the only other IRAC group 9B insecticide, controls aphids and potato psyllid, but only provides suppression of whiteflies. Pyrifluquinazon offers an IRAC 9B MOA for control of whiteflies, citrus thrips, leaf hoppers, mealybugs and aphids, and will be the only IRAC group 9B insecticide registered for use on citrus fruits, grape, pome fruits, stone fruits, and tree nuts (except pecan). As a result, pyrifluquinazon will be a useful tool to manage both insect resistance and disease transmission.

17-2. **Biological control of *Tamarix* in New Mexico: Are the leaf beetles winning?**

Carol Sutherland (csutherl@nmsu.edu), New Mexico State Univ., Las Cruces, NM

While all four species of *Diorhabda* have been documented in New Mexico since 2014, two of them have spread widely and have been amazingly effective at finding and damaging even remote, sparse stands of this noxious weed.

17-3. **Comparison of western tarnished plant bug feeding behavior on insecticide-treated cotton using Electropenetrography**

Abdul Hakeem (ahakeem@vols.utk.edu)[1], Elaine Backus[2], Felix Cervantes[2] and Megha Parajulee[1], [1]Texas A&M Univ., Lubbock, TX, [2]USDA - ARS, Parlier, CA

A study was conducted to compare feeding behavior of *Lygus hesperus* on insecticide-treated cotton using electropenetrography at Texas A&M AgriLife Research Center, Lubbock, TX. A four-channel AC-DC monitor was used in this experiment. Recordings were recorded at Ri 10^7 Ω for five hours. Preliminary analysis indicated reduced frequency of ingestion on insecticide-treated cotton plants compared to control plants.

17-4. **Useful methods for identifying plant resistance in sorghum to the sugarcane aphid (Hemiptera: Aphididae)**

J. Scott Armstrong (scott.armstrong@ars.usda.gov)[1], Sulochana Paudyal[2] and Kris Giles[2], [1]USDA - ARS, Stillwater, OK, [2]Oklahoma State Univ., Stillwater, OK

The sugarcane aphid (*Melanaphis sacchari* (Zehntner), (SCA), has been an economically threatening pest of sorghum in the United States since 2013, whereas previously it was known to be a vector of yellow leaf virus to sugarcane in Louisiana and Florida from the 1970's to the present. Prior to the SCA epidemic in the U.S. greenbug biotypes were of concern in sorghum but the last ten years or so greenbugs have not been the economic threat they notoriously were. Therefore, the use for screening sorghums for aphid resistance was no longer needed and no longer conducted by Industry and University sorghum breeders. However, the need for screening and identifying sources of resistant sorghum germplasm emerged again with the sugarcane aphid threat. Our laboratory has screened thousands of sorghum since the fall of 2013 and has used older methodology and developed some newer methods that help in screening, evaluating, and Identifying sources of SCA resistant sorghum. This presentation will familiarize those that are needing to screen sorghum with the methods that can be used for success.

17-5. **Development of the embryonic GN1 cell line from the leafhopper, *Graminella nigrifrons***

Astri Wayadande (a.wayadande@okstate.edu) and Trenna Blagden, Oklahoma State Univ., Stillwater, OK

Leafhoppers transmit several plant viruses and mollicutes to susceptible plants. Many of these pathogens propagate within the body of their leafhopper vector. To facilitate the study of leafhopper-transmitted phytopathogens, an embryonic cell line was initiated from eggs of the leafhopper, *Graminella nigrifrons*. Eggs were dissected from plant tissue at the red-eye stage (3/4 migration), surface sterilized and crushed. Tissue explants attached and cells proliferated in tissue culture plates. It took approximately 6-8 weeks for cells to grow in sheets large enough for passage. The cells will be used to study plant virus propagation rates in an *in vitro* system.

17-6. **Update on rice delphacid, *Tagosodes orizicolus* (Muir), research in Texas**

Michael (Mo) Way (moway@aesrg.tamu.edu)[1], Ismael E. Badillo-Vargas[2], Rebecca Pearson[1], Carra Curtice[1] and Peng Yu[3], [1]Texas A&M AgriLife Research, Beaumont, TX, [2]Texas A&M Univ., Weslaco, TX, [3]Texas A&M Univ., College Station, TX

The rice delphacid is native to Central and South America where it is a key pest of rice. It damages rice by direct feeding and by transmitting a virus which causes hoja blanca disease. We found it in high numbers attacking ratoon rice in Texas in 2015. Populations were very high and damaging. We have monitored for this exotic pest since the outbreak in 2015, but have not observed it since then. However, we are conducting proactive research in case the rice delphacid invades Texas again. This presentation describes our efforts to address this potential problem.

17-7. **Using *Beauveria bassiana* formulation for control of greenhouse thrips, *Frankliniella* spp**

Manuel Campos (mcampos@biosafesystems.com), BioSafe Systems, East Hartford, CT

BioCeres WP formulation contains live *Beauveria bassiana* spores, strain ANT-03 with approximately $1x10^{10}$ viable conidia in 1 g of the product. Thrips feeding on plants can damage fruit, leaves, and shoots and very noticeably affect plants' cosmetic appearance. Vegetable crops, are more susceptible to serious injury from thrips feeding and thrips-vectored viruses, especially when plants are young. On some plants, thrips can cause severe stunting to the early season flush of terminal growth and by the time their damage is observed, such as after buds open, the thrips may no longer be present.

17-8. **A new product for stored grain protection**

Edmond L. Bonjour (edmond.bonjour@okstate.edu) and George Opit, Oklahoma State Univ., Stillwater, OK

Sensat ™ is a new product for stored grain protection. It is an effective, reduced risk insecticide for the protection of stored grains including wheat, triticale, corn, sorghum, barley, oats, millet, and bird seed. It contains spinosad, the first new active ingredient for use in the stored grain industry in several years. This product is very effective in controlling the lesser grain borer which causes insect damaged kernels (IDK). It also protects stored grains from injury by several other insects and suppresses the populations of other stored grain insects to low levels.

Poster Abstracts

Student Poster Competition

Student Poster Competition: Master's

P1-1. **Interaction of systemic acaricide with immunological control of *Rhipicephalus (Boophilus) microplus***

Charluz Arocho (marioli@tamu.edu)[1], Robert John Miller[2], Pete Teel[1], Felix Guerrero[3] and Adalberto A. Pérez de León[3], [1]Texas A&M Univ., College Station, TX, [2]USDA - ARS, Edinburg, TX, [3]USDA - ARS, Kerrville, TX

Of all the agricultural sectors, the livestock sector is one of the most developed and dynamic. Breeding and domestication of livestock for production of human food is an enterprise that promotes economic stability at a global level. But the southern cattle fever tick (CFT), *Rhipicephalus (Boophilus) microplus,* causes large economic losses in cattle production specially in tropical and subtropical parts of the world. Ectoparasites develop easily and abundantly in this climate and are responsible for large economic losses in cattle industry through weight loss, hide damage, and death from anemia. The southern cattle tick *R. microplus* (Canestrini) is a one-host tick species, considered one of the most important parasites of livestock of the world and is associated with an important financial loss in relation to the transmission of hemoparasites. Cattle losses occur directly through tick feeding and by the transmission of *Babesia bovis*, *B. bigemina*, and *Anaplasma marginale* the causative agents of babesiosis and anaplasmosis, respectively. Unfortunately, ticks around the world are evolving resistance to all pesticides available on the market, leading to a need to develop new research techniques that identify more effective methods to control this species. *R. microplus* has a high potential for population growth due to it is relatively short life cycle and adaptation to the climates. Vaccination against ticks using the gut protein BM86 has been shown to be effective against acaricide-resistant ticks and has been tested in Puerto Rico and Texas for the control of *R. microplus* on dairy and beef cattle. The results have been promising. Recently, use of a modern version of the BM86 vaccine has been approved for use in Puerto Rico and in the Texas (CFT) Eradication Program. Field studies in Puerto Rico indicate that anti-tick vaccination in conjunction with acaricide use may produce a synergistic response. In this research, *In vitro* feeding of ticks with IgG from cattle vaccinated with BM86 and other new antigens will be used to screen antigen/acaricide combinations prior to on-animal studies. The goal of this project is to reduce *R. microplus* by the introduction of a recombinant anti-tick vaccine in an integrated control strategy.

P1-2. **Evaluating the synergistic effects of piperonyl butoxide on permethrin resistant and susceptible horn flies (Diptera: Muscidae) exposed to lambda cyhalothrin**

Diego Garcia (dg32695@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM

The majority of commercially produced synthetic insecticides belong to the class of pyrethroids. In fact, many pyrethroid containing products are labeled as premise treatment formulations aimed at controlling various crawling and flying insects as well as for on-animal control of pest fly, tick, and flea species. In an attempt to combat issues with insecticide resistance, many of these products are combined with synergistic compounds known to increase product efficacies against target pests and extend duration of control. In regard to the horn fly (*Hameatobia irritans*), extended insecticidal control will lead to increased animal performance and maximized production gains observed by producers. However, the synergistic effects in conjunction with target-site insensitivities exhibited by pyrethroid resistant horn fly populations may differ from susceptible populations. In which case, specific combinations of insecticidal and synergistic compounds that maximize horn fly control may likewise vary. Therefore, the objective of the current study is to evaluate the synergistic effects of piperonyl butoxide (PBO) when combined with lambda cyhalothrin against both permethrin susceptible and resistant horn fly strains. Both strains of horn flies were exposed to individual filter papers impregnated with PBO and lambda cyhalothrin alone, as well as with various combinations of the two. Lethal dose estimates were established for both fly strains and were used to calculate resistance and synergistic ratios.

P1-3. **Males are from Mars and females are from Venus: Differences between the sexes when exposed to hormetic conditioning**

Jacqueline Figueroa (tamashii@nmsu.edu), New Mexico State Univ., Las Cruces, NM

Living organisms contain regulative mechanisms for maintaining health and vitality. Hormetic research focuses on manipulating such mechanisms to understand the natural adaptation of cells through conditioning. Previous research has shown a low dose of environmental stress can activate a protective response, and up-regulate certain pathways to prevent future damage. In this experiment, an anoxic conditioning treatment (oxygen-free nitrogen atmosphere) was used on the cabbage looper, *Trichoplusia ni* (Lepidoptera:Noctuidae), to observe its hormetic effects and compare between the sexes. Pupae were treated with a one-hour anoxic dose, and as adult moths were exposed to both starvation and non-starvation conditions.

Fecundity, fertility, longevity, and median life span were observed, and oxidative damage was measured in moth lipids and proteins. Males and females responded differently to the treatment, with males seemingly gaining the greater benefit. Treated moths also appear to have less oxidative damage, and there were no detrimental changes observed in the insect's fecundity and fertility. Previous experimentation has shown hormetic conditioning to up-regulate protective molecules such as antioxidants or HSPs, to preserve the health and vitality of an organism, and has implications for diseases caused by oxidative damage. Yet, research is only beginning to describe the significant differences experienced between sexes in response to a treatment. It is important to continue to acknowledge these differences, and explore the appropriate conditions necessary for an effective treatment for both sexes.

P1-4. **Army maneuvers and American burying beetle conservation: A test of beetle habitat association on an active military base.**

Lexi Freeman (lexi.freeman@okstate.edu) and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK

Within the past century, the American burying beetle, *Nicrophorus americanus*, (ABB) disappeared from roughly 90% of its historic range of 35 central and eastern U.S. states. As a result, it was listed as federally endangered in 1989. Although there are many proposed causes for the decline in ABB populations, the most widely accepted is that the population declined as a result and alterations in habitat and changes in carrion availability. Because of its historic range, the ABB is hypothesized to be a habitat generalist. We conducted field surveys of ABB at Camp Gruber Training Center, an Army National Guard training site located in northeastern Oklahoma. We conducted bi-weekly sampling using baited pitfall traps in three habitat types: savannah, grassland, and forested areas to determine ABB habitat use and assess potential impacts from training. To compare across seasons, ABB were sampled from July 16, 2016 to June 23, 2017. We trapped a total of 726 unique individual ABB along with 3,861individuals of 10 other Silphidae species. ± 1 SE) of 4.28 ± 0.755, grasslands had 5.26 ± 0.898, and savannah had 5.42 ± 1.039 ABB per trap night. It is likely that habitat heterogeneity increases the potential carrion sources and provides microhabitats used by ABB. In areas such as Camp Gruber that are active military training sites, activities should continue to be scheduled so that some exercise areas are rotated.

P1-5. **Progress and potential of two biological control agents of the invasive giant reed (*Arundo donax* L.)**

Madeline Marshall (madeline.marshall01@utrgv.edu), Univ. of Texas, Edinburg, TX

Biological control, or the use of natural enemies for pest management, may the best long-term option for managing the invasive *Arundo donax,* a noxious weed dominating riparian habitats globally and along the Rio Grande River. This work reports on the progress and potential of two arundo biological control agents permitted for release in Texas and Mexico. The arundo wasp, T*etramesa romana*, released in 2009, is having significant impacts as reported from various field locations around the world, described here using standard exit hole counts. The highest density levels were found in Texas (introduced range) compared to relatively low populations in the native range (ave. exit holes = 79.98, p = 0.001 and 4.81, p = 0.001 respectively). *Lasioptera donacis*, the arundo leaf miner, is currently permitted for release in North America. Field research was conducted in the native range of *L. donacis* (Greece) to evaluate the biotic and abiotic factors that influence population density. *Lasioptera donacis* feeding damage was documented on 40.4 and 67.8 % of dead and decaying leaf sheaths respectively across all sites. *Lasioptera donacis* was active in all locations including highly disturbed sites, but showed a slight preference for sites near running freshwater sources (R = -0.514, p = 0.000) and lower densities adjacent to salt water sources (R = 0.463, p = 0.000). The environmental preferences of *L. donacis* in Europe signal strong potential for impact in the U.S. where *A. donax* is invasive.

P1-6. **Burgers, not pies: Association of American burying beetles with grazed lands in Oklahoma**

Jacob Farriester (jacob.farriester@okstate.edu)[1], W. Wyatt Hoback[2] and Phil Mulder[2], [1]Oklahoma State Univ. (Stillwater), Stillwater, OK, [2]Oklahoma State Univ., Stillwater, OK

Despite the debate concerning the habitat association of *Nicrophorus americanus* (American Burying Beetle/ABB) in naturally occurring, unaffected environments, there is little understanding of how the species reacts to anthropogenic changes. This federally endangered species is present in Eastern Oklahoma, where natural grasslands have been largely converted for agriculture with cattle grazing and pecan orchards common conversions in eastern Oklahoma. In summer 2017, we conducted carrion beetle sampling near or within the ABB's Oklahoma range, testing for their presence on cattle pastures and pecan orchards. We sampled 554 successful trapnights (15-20 traps at each location sampled for 5 continuous nights) at 6 locations using pitfall traps baited with rotted rats. A total of 1596 Silphidae were captured belonging to 8 species. A total of 42 ABB were collected from habitats with grazing, while none were collected from pecan orchards. The closely-related *N. orbicollis* was also collected less often in pecan orchards than in pastures. These data suggest that burying beetles favor prairie and pastures over pecan orchards and unimpacted forest. Further trapping in 2018 will expand our knowledge of ABB's

response to human land usage to determine activities that may be compatible with the species.

P1-7. **Coloring for insect conservation awareness**

Elizabeth Knowlton (edkbiology@gmail.com), Theresa E. Andrew, Andrine A. Shufran, Kerri Farnsworth-Hoback and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK

The Endangered Species Act currently protects more than 1,500 species, of which 74 are insects. Species include the American Burying Beetle (ABB), *Nicrophorus americanus*, and the Rusty Patched Bumble Bee, *Bombus affinis*. Additionally, insects that are experiencing population declines, such as the Monarch butterfly, *Danaus plexippus*, are under consideration for protection. Awareness of biological diversity and the ability to recognize an endangered species or beneficial insect can begin at an early age with simple resources. Here, we present a classroom activity designed to promote insect species awareness. We introduced a coloring exercise to elementary and middle school students in Tulsa, Oklahoma, USA. We assessed students' insect identification abilities by presenting a quiz on species diversity and ABB identification before and after the coloring exercise. Inspired by the quiz results, we present additional coloring templates for more insect species, including the Monarch butterfly, lady beetles, and bumble bees. These additional coloring exercises offer clues to identifying the focal rare species versus closely-related, more common species. We hope the low-cost and accessible nature of these exercises can promote awareness of rare and endangered species in classrooms and improve interest in science and nature.

Student Poster Competition: Ph.D.

P2-1. **Evaluation of seed treatment against soybean aphid *Aphis glycines* (Matsumura) under controlled environment chamber**

Aqeel Alyousuf[1], Ali Zarrabi[2], **Tom Royer** (tom.royer@okstate.edu)[2], Kris Giles[2] and Mark Payton[2], [1]Oklahoma State Univ., STILLWATER, OK, [2]Oklahoma State Univ., Stillwater, OK

Soybean aphid was first reported as a serious pest of soybean Glycine max (L.) Merrill since it invaded of the crop in the US in 2000 causing yield losses reaching 40% by direct feeding and transmitting viral plant diseases. Seed treatments can be useful for controlling early season pests. The efficacy of seed treatments were evaluated against soybean aphids in growth chambers in this study.

P2-2. **Lab field bioassay (LFB) of seed treatments against the fall armyworm *Spodoptera frugiperda* (Smith) in sorghum and corn**

Aqeel Alyousuf[1], Ali Zarrabi[2], Tom Royer[2], **Kris Giles** (kris.giles@okstate.edu)[2] and Mark Payton[2], [1]Oklahoma State Univ., STILLWATER, OK, [2]Oklahoma State Univ., Stillwater, OK

The fall armyworm (FAW), is an economically important pest of corn and sorghum throughout the US causing considerable foliage injury occurred to sorghum in the whorl stage preventing the plant from further growth. A protocol for evaluation of the efficacy of seed treatment against fall armyworm in sorghum and corn using the leaf-field bioassays (LFB) is investigated.

P2-3. **Population differentiation in host choice among sugarcane aphids (Hemiptera: Aphididae) from sorghum and sugarcane**

Sulochana Paudyal (sulochana.paudyal@okstate.edu)[1], J. Scott Armstrong[2] and Kris Giles[1], [1]Oklahoma State Univ., Stillwater, OK, [2]USDA - ARS, Stillwater, OK

The sugarcane aphid (*Melanaphis sacchari* (Zehntner) is a new emerging pest of sorghum in the United States since 2013. It has been reported attacking sugarcane since 1970's. Sudden outbreak of *M. sacchari* in sorghum led scientists to speculate whether it is host switch from sugarcane to sorghum or an emergence of new biotypes or population as a result of wind-aided movement. Aphids have a history of ecological speciation or biotype development. This study is conducted to investigate the performance of the sugarcane aphid populations collected from sugarcane and sorghum in its three hosts, sorghum, sugarcane, and johnsongrass. No-choice test was conducted to determine the reproductive performance of the collected aphid populations. The reproductive potential for the population collected from sorghum was significantly higher in susceptible sorghum and johnsongrass, however, few of these populations reproduced in sugarcane. The result was contrast when the reproductive potential of populations from sugarcane was observed; it was significantly higher in sugarcane and johnsongrass than in sorghum. These results indicate that the performance of the *M. sacchari* individuals inhabiting sugarcane and sorghum differs as a consequence of the contrasting feeding environments of host species provides. However, both populations performed well on the johnsongrass, which might indicate that johnsongrass is the common alternate host. Further work is needed to elucidate whether the reproductive performance will be same in field condition.

P2-4. **Tree crown nesting preferences of the fall webworm (*Hyphantria cunea*)**

Amy Adams (amy.e.adams@ou.edu), Univ. of Oklahoma, Norman, OK

Lower, middle, and upper portions of tree crowns vary in terms of nutrient content, water potential, and exposure to light and heat. Consequently, certain portions of the tree crown may be more optimal than others for herbivore foraging and shelter. I surveyed larval nests of a native defoliating social moth species known as the fall webworm (*Hyphantria cunea*), which builds webs and feeds in deciduous trees during summer and fall. I measured tree height and placement of nests in the tree, among other variables, in order to determine caterpillar nesting preferences in Oklahoma, USA. The insects preferred the lower and middle tree crown.

P2-5. **Bioassay tests for sugarcane aphid (SCA) *Melanaphis sacchari* (Zehntner) on grain and forage sorghum**

Aqeel Alyousuf (aqeel.alyousuf@okstate.edu)[1], Ali Zarrabi[2], Tom Royer[2], Kris Giles[2] and S. Seuhs[2], [1]Oklahoma State Univ., STILLWATER, OK, [2]Oklahoma State Univ., Stillwater, OK

Since the arrival of sugarcane aphid in Oklahoma in 2013, scientists at Oklahoma State University worked with cooperators in other sorghum producing states to develop a multi-pronged approach to assist growers in managing this pest. This poster highlights ongoing research on SCA management strategies that include evaluation of resistance of grain sorghum hybrids and phenotypic screening of few hundred experimental lines germplasm to SCA; and the nutritional and yield benefits of using Sivanto in forage sorghum.

P2-6. **Aquatic macroinvertebrates differ in time and space downstream of a Southeast Oklahoma reservoir**

Melissa Reed (mleath@okstate.edu)[1], W. Wyatt Hoback[1] and James Long[2], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma State Univ., Stillwater,, OK

Existing literature stresses the importance of examining spatial and temporal variability of macroinvertebrates in aquatic systems, but little is known about the variability of macroinvertebrate communities inhabiting systems that are the result of bottom water (hypolimnion) releases from upstream reservoirs. The release of hypolimnetic water from reservoirs alters downstream water quality, especially water temperatures and flow regimes, which often disrupts the natural stream community. We examined the benthic macroinvertebrate community of the Lower Mountain Fork river below Broken Bow reservoir, to investigate longitudinal and seasonal changes in the taxonomic and quantitative composition of macroinvertebrate assemblages. We used kick seines to collect macroinvertebrates from riffles, at 14 sites originating below the spillway dam and extending downstream 19 km. We conducted sampling monthly, from May 2016 through July 2017. We collected approximately 22,000 individuals belonging to more than 70 taxa (primarily genera) from the study sites, which were mostly comprised of Trichoptera, Diptera and Isopoda. The faunas changed both temporally and spatially and distinct longitudinal patterns were evident, which likely affects the stocked trout fishery in this system.

P2-7. **Diversity, abundance and temporal pattern of *Culex* vectors of Japanese encephalitis virus during summer months in western region of Nepal**

Ajit Karna (ajit.karna@gmail.com), New Mexico State Univ., Las Cruces, NM

Japanese encephalitis virus (JEV) is a mosquito-borne flavivirus that is maintained in an enzootic cycle between *Culex* mosquitoes, pigs, and water birds in southern Asia and northern Australia. The virus gets spill over into humans via the bite of ecologically relevant mosquitoes either directly from the enzootic cycle or can be amplified in pigs and thence transmitted to humans. Currently JEV is the leading cause of vaccine-preventable encephalitis in Asia. Mosquito surveillance for arboviruses is infrequently pursued in Nepal, and the *Culex* species vectors of human pathogens, especially for Japanese encephalitis virus, are never characterized. The study aimed to characterize the diversity of *Culex* vectors of JEV, estimate their abundance, blood feeding activity, and temporal pattern of their abundance. A 13-week mosquito sampling in the Rupandehi district of Nepal was carried out at eight different but fixed locations from July to October of 2014 using CDC light traps. Members of *Culex vishnui* subgroup including *Culex tritaeniorhynchus* was the most common vector during the course of the study, although 16 additional *Culex* species were detected. Although a varying trend in mosquito abundance by species was observed during the study period, the abundance and the blood feeding activity of *Culex vishnui* subgroup was relatively higher during mid-August to mid-October. A high abundance of vectors known to transmit JEV support the contention that the environment was highly conducive to virus transmission.

Student Poster Competition: Undergraduate

P3-1. **Preconditioning of Parkinson's disease symptoms using the *Drosophila melanogaster* model and its possible implications**

Nubia Rivas (nrivas05@nmsu.edu) and Giancarlo Lopez-Martinez, New Mexico State Univ., Las Cruces, NM

Parkinson's disease [PD] is the world's second leading neurodegenerative disease characterized by the loss of dopaminergic neurons, and the number one movement disorder. This is believed to be caused by the accumulation of alpha synuclein filled lewy bodies which leads to the inability to control movement with

increasing age, muscle rigidity, and compromised lifespan and healthspan. Early life stress events can have consequences on organismal performance later in life and these effects vary with exposure severity. If the severity is mild enough it could lead to positive effects on performance later on in life, termed hormesis. Exposure to ionizing radiation can lead to oxidative damage which leads to negative effects on performance but can also lead to hormesis. In this study, we used x-ray radiation conditioning hormesis as a pretreatment in transgenically modified *Drosophila melanogaster* flies in order to not only lessen the severity of their symptoms but also improve their lifespan and healthspan. We determined that Parkinson's disease fly model is able to support the biological basis for this specific human disease research. Using activity monitors, we established that x-ray radiation significantly lessened the uncontrollable movements in relation to PD. Additionally, we were able to extend longevity by lessening the rate of aging in x-ray radiated flies. We are currently investigating whether a second dose of x-ray radiation will allow the continuation of controlled movement. Lastly, further biochemical work is needed to determine the cellular effect of hormetic x-ray radiation.

P3-2. **Effects of *Melanaphis sacchari* (Hemiptera: Aphididae) on the development and growth rate of *Coleomegilla maculata* (Coleoptera: Coccinellidae)**

Brad Burden (bb037@my.tamuct.edu) and Laura Weiser Erlandson, Texas A&M Univ. - Central Texas, Killeen, TX

The sugarcane aphid, *Melanaphis sacchari* (Hemiptera: Aphididae), is a major agricultural pest that feeds on sorghum in the United States and Mexico. As with most invasive pests, it was introduced without its natural enemies. Coccinellids, commonly found in agricultural systems, are generalist predators of aphids. *Coleomegilla maculata* (Coleoptera: Coccinellidae), a common lady beetle, feeds upon *M. sacchari* and may be a potential agent for biological control in sorghum fields. In this study, we quantified the development and growth rate of *C. maculata* on an *ad libitum* diet of either *M. sacchari* or the common pea aphid, *Acrythosiphon pisium* (Hemiptera: Aphididae). Data recorded included daily measurements of larvae, developmental time for each life stage, and size (length and width) of adults. *Coleomegilla maculata* was able to complete its full life cycle on a diet of *M. sacchari*. Evaluation of the effects of *M. sacchari* on the growth and development of *C. maculata* will help determine its efficacy as a biological control agent of the sugarcane aphid.

P3-3. **Seasonal variation of the honey bee honey stomach microbiome**

A H M Ashraf (aa038@my.tamuct.edu)[1], Allyson Martinez[2] and Laura Weiser Erlandson[1], [1]Texas A&M Univ. - Central Texas, Killeen, TX, [2]Texas A&M Univ., College Station, TX

The digestive tract of honeybees contains a specialized organ called the honey stomach that functions to process nectar into honey. Honey produced by different bee hives varies considerably in appearance, taste, and commercial viability due to its chemical composition. Furthermore, the microbiome of the honey stomach may influence the compositional makeup of the honey. Previously, we have seen that there is a difference in the microbiome content between the gastrointestinal tract and the honey stomach. In addition, it is known that the microbiome of the honey stomach contributes to the composition of honey. The aim of this study is to determine if there is a seasonal difference in the microbiome content of the honey stomachs. We determined the composition of the microbiome communities of the honey stomachs of four different honey bee hives through dissection and removal of the honey stomachs. The microbiomes of each sample were characterized by 16S rRNA amplification and sequencing, and analyzed using QIIME. There was a difference in the microbiome content between Fall 2016 and Spring 2017 samples. This difference may be a result of several factors such as mutation, source of nectar, different seasonal flowers, presence of parasites or pathogens, insecticidal or antimicrobial treatments, or differences in diet.

P3-4. **Consumption of pollen between male and female blow flies**

Betty Hernandez (bettynicole.hernandez@gmail.com), Juliana Rangel, Aaron Tarone, Emily Hildinger, Pierre Lau and Vaughn Bryant, Texas A&M Univ., College Station, TX

More than 80% of our crops are pollinated by insects. For the most part, *Apis mellifera* are the go to pollinators, however, their recent decline in population numbers have been worrisome. A study done in 2015, "Effects of floral scent, color and pollen on foraging decisions and oocyte development of common green bottle flies", show that the common blow fly could be a great pollinator. Building on previous work done by Emily Hildinger, this study is to see if there is a difference between male and female blow fly's ingestion of pollen. The study only used caught wild flies to sex, identify, and run pollen acetolysis in order to see the pollen grains found in males and female flies.

P3-5. **Change in foliage-dwelling arthropod diversity resulting from the conversion of bermudagrass to native warm-season grasses: Hemiptera and Coleoptera**

Haley Vincze (haley.vincze@gmail.com)[1], Madeline Stanfield[2], Leo Herzberger[2], David H. Kattes[2] and Jim Muir[3], [1]Tarleton State Univ., Wylie, TX, [2]Tarleton State Univ., Stephenville, TX, [3]Texas A&M Agrilife, Stephenville, TX

In 2015, various techniques were tested in Stephenville, TX to convert bermudagrass into native grassland to improve the habitat for quail and other native birds. Subsequent to bermudagrass control, the following habitats were established:

bare-ground, pure stand bermudagrass, and standard native seed mix. The standard native seed mix included little bluestem, indiangrass, switchgrass, sideoats gramma, and eastern gammagrass. Habitats represented treatments and each was replicated three times. On September 7, 2017, arthropods were collected by sweep net while walking diagonally across each plot. The arthropods were placed in 70% ethanol and the total number of Hemiptera and Coleoptera were enumerated.

P3-6. **Change in soil-dwelling arthropod diversity resulting from the conversion of bermudagrass to native warm-season grasses: Insecta**

Josef Leachman (josef.leachman@go.tarleton.edu)[1], Lauren Berman[1], Leo Herzberger[1], David H. Kattes[1] and Jim Muir[2], [1]Tarleton State Univ., Stephenville, TX, [2]Texas A&M Agrilife, Stephenville, TX

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P3-7. **Evaluating the effect of photoperiod on fitness of sugarcane aphid, *Melanaphis sacchari*, on sorghum**

Ethan Triplett (ethan.l.triplett@gmail.com) and Bonnie Pendleton, West Texas A&M Univ., Canyon, TX

Little is known of the biology of sugarcane aphid, *Melanaphis sacchari* (Zehntner), that became a devastating and persistent pest of sorghum, *Sorghum bicolor* (L.) Moench, in North America in 2013. Understanding the fitness of sugarcane aphid in relation to environmental conditions would aid in understanding how aphids develop and in evaluating sorghum for resistance to this major insect pest. Effect of three photoperiods of 14:10, 13:11, and 12:12 light:dark hours were evaluated on sugarcane aphids on susceptible 'Tx399 x RTx430' sorghum at daily light (day) and dark (night) temperatures of 30 and 20°C, respectively, in an incubator. A sugarcane aphid from a pure colony was placed individually into a clip cage, with two clip cages per each of four plants in six pots. When each aphid produced a nymph, the mother aphid was discarded and the nymph was retained and allowed to mature and produce offspring until it died in the clip cage. Nymphs produced were counted and removed each day. The pre-reproductive period was ~32% longer (4.3 days) at 13:11 light:dark hours than at the other photoperiods. The reproductive period at 14:10 was 18.7 days, 5.4 days longer than at 12:12 (13.3 days). The post-reproductive period averaged 10.4 days at 14:10, 5.8 days shorter than at 13:11 (16.3). Total fecundity was 78.6, 67.4, and 65.7 aphids at 14:10, 13:11, and 12:12, respectively. Developmental times and fitness of sugarcane aphids differed significantly at the different photoperiods. Photoperiod should be considered when evaluating sorghum for more durable resistance against sugarcane aphids.

P3-8. **Change in foliage-dwelling arthropod diversity resulting from the conversion of bermudagrass to native warm-season grasses: Orthoptera, Diptera and Hymenoptera**

Madeline Stanfield (madeline.stanfield@go.tarleton.edu)[1], Haley Vincze[2], Leo Herzberger[3], David H. Kattes[3] and Jim Muir[4], [1]Tarleton State Univ., wylie, TX, [2]Tarleton State Univ., Wylie, TX, [3]Tarleton State Univ., Stephenville, TX, [4]Texas A&M Agrilife, Stephenville, TX

In 2015, various techniques were tested in Stephenville, TX to convert bermudagrass into native grassland to improve the habitat for quail and other native birds. Subsequent to bermudagrass control, the following habitats were established: bare-ground, pure stand bermudagrass, standard native seed mix. The standard native seed mix included little bluestem, indiangrass, switchgrass, sideoats gramma and eastern gammagrass. Habitats represented treatments and each was replicated three times. On September 7, 2017, arthropods were collected by sweep net while walking diagonally across each plot. The arthropods were place in 70% ethanol and the total number of Orthoptera, Diptera and Hymenoptera were enumerated.

P3-9. **Change in soil-dwelling arthropod diversity resulting from the conversion of bermudagrass to native warm-season grasses: Crustacea and arachinda**

Lauren Berman (lauren.berman@go.tarleton.edu)[1], Josef Leachman[1], Leo Herzberger[1], David H. Kattes[1] and Jim Muir[2], [1]Tarleton State Univ., Stephenville, TX, [2]Texas A&M Agrilife, Stephenville, TX

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P3-10. **The link between larval cannibalism in *Chrysoperla rufilabris* and egg stalk length**

Kaitlyn Clark (kaitlynlianeclark22@gmail.com) and Laura Weiser Erlandson, Texas A&M Univ. - Central Texas, Killeen, TX

Lacewings are used as a form of biological control against plant pests, such as aphids. Larval lacewings feed on aphids using their piercing mouthparts, and decrease the population levels of aphids in agriculture. Unfortunately, lacewings exhibit cannibalism as larvae. Presumably, lacewing adults evolved to lay their eggs on stalks to inhibit cannibalism. There is a considerable variation in the length of the egg stalk and this may affect the rate of cannibalism among larvae. To study the effect of variable stalk length on cannibalism in *Chrysoperla rufilabris* (Burmeister) (Neuroptera: Chrysopidae), the larval behaviors and rate of cannibalism of *C. rufilabris* larvae were examined on varying lengths (short and long) of egg stalks. We also examined the level of cannibalism among larvae of different age classes. Cannibalism occurred in the majority of the trials. The behavior of cannibalism in lacewings in relation to the egg stalk length provides essential information that may aid in biological control programs.

P3-11. **Non-majors' search for extra credit can be used to assess campus invertebrate biodiversity**

Liam Whiteman (liamw@okstate.edu) and W. Wyatt Hoback, Oklahoma State Univ., Stillwater, OK

Recent studies have reported sharp declines in insect populations across the globe. At Oklahoma State University, a non-majors' general education course, Insects and Society, is taught to more than 250 students per semester. In the Fall of 2017, 266 students were offered a chance to earn extra credit by bringing live insects to class. From mid-September through the end of November of 2017, over 600 insects/arthropods were collected by 134 students (50% participation). Students were provided no equipment and instead caught organisms by hand in bags or jars. Analysis of the arthropods collected allowed us to compile a biological inventory that provided a snapshot of biodiversity in Stillwater, Oklahoma. At the order level, Coleoptera, Orthoptera, and Araneae were most commonly collected. The absence or low representation of certain orders may reveal trends that can be monitored. With potential declines in species richness and diversity raising alarms worldwide, recruiting non-major students, who would otherwise kill invertebrates, to bring live specimens to class could be a powerful tool to help monitor populations and increase awareness of biological diversity. Such efforts over a large geographic scale may also reveal trends in invertebrates associated with college and university campuses.

P3-12. **Density-dependent phase polyphenism in *S. piceifrons*: a color analysis**

Aria Deluna (ariadeluna@tamu.edu)[1], Bert Foquet[2] and Hojun Song[2], [1]Texas A&M Univ., College Station, College Station, TX, [2]Texas A&M Univ., College Station, TX

Like other locusts, *S. piceifrons*, the Central-American Locust, exhibits swarming behavior under intermittently suitable conditions, while demonstrating density-dependent phase polyphenism. This phenotypic plasticity is characterized by behavioral, morphological, molecular, and other visible changes between individuals in low versus high density environments. A difference in pigmentation and marking patterns can be seen in locusts that mature in solitary versus gregarious environments. While solitary insects may find it beneficial to be inconspicuous within their natural surroundings, gregarious insects may be more benefited by having bright warning-coloration that is characteristic of aposematism. It has been observed that the coloration and amount of black pattern differs between solitary and gregarious *S. piceifrons* in the field. While it has not been tested under lab conditions for this species, evidence exists for other species of locusts that background color, black patterning, and overall size differ depending on the phase that they are in. Based on this, it is expected that there will be different amounts of luminance between the solitary and gregarious grasshoppers along with different amounts of black patterning. To test this hypothesis, Images of gregarious and solitary *S. piceifrons* in their fifth instar were captured using a digital camera. A consistent area on both the leg and pronotum was selected for comparison of background color. Further, the degree of black patterning and the length of thorax and hind femur were measured. The images were analyzed using multispectral imaging in ImageJ and the R-package patternize.

P3-13. **A fall bumble bee survey of Stillwater, Oklahoma**

Michael Caballero (michaelcaballero9@gmail.com)[1] and W. Wyatt Hoback[2], [1]Oklahoma State Univ.- Stillwater, Stillwater, OK, [2]Oklahoma State Univ., Stillwater, OK

Bumble bees (Apidae) comprise approximately 40 species of native pollinators in North America. In recent years, a number of species have declined leading to the federal protection of the rusty patched bumble bee, *Bombus affinis* in 2017. Across Oklahoma ten species of bumble bee have been recorded but bumble bee diversity appears to have declined over the last century. As part of an on-going project to increase awareness of bumble bees, we conducted a fall survey to document species diversity and abundance in Stillwater Oklahoma. We sampled three areas around Stillwater, the Oklahoma State University Campus, the Oklahoma State University Botanic Gardens, and Teal Ridge, a managed wetland within the city limits of Stillwater. We used aerial nets to collect 96 bumble bees. They belonged to four species: *Bombus fraternus* (1), *Bombus griseocollis* (1), *Bombus pensylvanicus* (25), and *Bombus impatiens* (69). The dominance of *B. impatiens* in our survey was surprising as it is commonly

called the eastern bumble bee and Oklahoma is at the edge of its range. In the Spring populations will be monitored and species diversity will be compared. Repeated fall surveys such as this one can detect changing populations and distributions giving valuable information for monitoring ecosystem health and insect response to global climate change.

P3-14. **Evaluation of the diet breadth of *Odontomachus spp.* on the island of Dominica**

Samuel Shook (srshook@tamu.edu), James Woolley, Adrienne Brundage and Thomas Lacher, Texas A&M Univ., College Station, TX

While a number of studies have been done on the association of trap-jaw ants in the genus *Odontomachus* and termites, including their habit of preying on them, little has been done with their predation of other groups of insects. They are known to take different kinds of prey other than termites, although the diversity of prey has not been extensively investigated, and were noted on one occasion as scavenged, although this has not been confirmed by other studies. This leaves room for both confirmation of what has already been observed, and further exploration of facets of the lives of the ants that have not been studied in detail. The purpose of this study is to examine the diet breadth of nests of *Odontomachus bauri Emery* and *Odontomachus ruginodis* Smith on the island of Dominica, cataloging the types of insect prey being brought in by foragers, the number of each type of prey, and if possible whether the prey was captured live or scavenged. These are highly predatory ants, and so predation is one of the primary ways in which they interact with other insects, making understanding their habits as predators important to fully understanding their life history. By gathering information about the ants' feeding habits, it is hoped that this can act as a foundation on which a complete picture of the place of these ants in the insect community of the island can be created.

P3-15. **Comparing carrion beetle and carrion fly populations in different terrains to determine competition potential**

Victoria Pickens (vpicken@ostatemail.okstate.edu)[1], Astri Wayadande[2] and W. Wyatt Hoback[2], [1]Oklahoma State Univ., Stilwater, OK, [2]Oklahoma State Univ., Stillwater, OK

When an organism dies, carrion-feeding insects respond and compete for the resources in the body. Flies, especially Calliphoridae, are of particular interest and are often the first respondents to a deceased organism. Carrion beetles, Silphidae, including those in the Genus *Nicrophorus* also arrive early and assess a carcass for reproductive suitability. Given that both flies and burying beetles utilize decaying bodies for reproduction, it is possible their competition influences the others' survival and population size. This relationship could be especially important for determining risks to the federally endangered American burying beetle that requires carcasses up to 200 grams upon which to breed. Because flies also use this carcass size, we hypothesized that areas with higher beetle captures would have lower fly numbers and vice versa. In this experiment, carrion fly traps were hung over carrion beetle traps in various terrain types to determine the relationship between adult fly and beetle populations. Grassland, savanna, and forested areas were chosen to test habitats that might favor one or the other insect types tested. We sampled at a military base in north-central Oklahoma during the fall of 2017. Across all traps and habitat types, we found a positive relationship between collected carrion beetles and flies. Although habitat type did not appear to influence the insect populations, more flies were collected than beetles at every site. Future studies should design a trap that equally samples for both insects to better observe potential competition between these insect families for a single bait resource.

P3-16. **Methods for capturing and monitoring insects in the families Buprestidae, Histeridae, and Silphidae at Sam Houston National Forest**

Mark Barbosa (jeffreybarb0827@email.tamu.edu), Texas A&M Univ., College Station, TX

Sam Houston National Forest (SHNF) consists of 163, 037 acres within Montgomery, San Jacinto, and Walker counties, Texas. The primarily Loblolly pine forest contains abundant flora and fauna even while being exposed to regular prescribed fires as well as flooding rivers and areas of land. Vertebrate diversity has been well documented due to the amount of game animals at the park. However, there has been little work done on the park's insect diversity. With previous collecting experience on various trails, a few beetle families were chosen for this survey. Beetles in the families Buprestidae (Leach 1815), Histeridae (Gyllenhaal 1808), and Silphidae (Latreille 1806) have all been caught in the forest in the past using traps and baits. In this ongoing project, buprestid beetles will be baited using colored sticky traps, and each trap's efficacy will be tested based on color preferences. For the Histerids and Silphids different types of meats will be used as baits. The captured insects will be identified using the most recent keys and a list will be generated. Currently, there are traps in place throughout several different areas in SHNF and they are being checked three times a week and replaced as needed. Significant numbers *of Necrophila americana*, *Nicrophorus orbicollis*, *Oiceoptoma inaequale*, and *Chalcophora virginiensis* are expected to be found based on previous collecting attempts.

P3-17. **Evaluating horn fly (Diptera: Muscidae) tolerance to permethrin under various levels of induced starvation**

Jovy Ramirez (zarimarj@nmsu.edu) and Brandon Smythe, New Mexico State Univ., Las Cruces, NM

The use of push-pull strategies for horn fly control may provide alternative approaches to help alleviate on-going issues with

insecticidal control methods. However, the current push-pull model assumes that pest species can be deterred (pushed) into a state of attraction (pulled) with little attention given to costs associated with transitioning between the two stimuli. As an obligate hematophagous pest, horn flies require multiple blood meals throughout the day. Extended transition times in which horn flies relocate to a suitable host will induce moderate states of starvation and associated energy depletion of the fly. Therefore, the objective of the current study is to determine the fitness cost associated with extended states of starvation of the horn fly as measured by insecticide tolerance. Lethal dose estimates were established for multiple horn fly colonies exposed to technical grade permethrin using filter paper bioassays. Flies from each colony were fed throughout the assay or starved for 4, 8, 12, and 16 hours prior to initiation and assessed for mortality. Mortality responses and lethal dose estimates were compared between and within fly strains at each level of induced starvation. Incorporating transition state factors into current push-pull models may lead to reduced insecticide use and more comprehensive integrated pest management programs aimed at controlling the horn fly.

Regular Posters

Regular Poster Session

P4-1. **Molecular analysis of feral colonies in South Texas demonstrates an increasing and sustained number of Africanized honey bee populations**

Tonya Shepherd (tshepherd@tamu.edu) and Juliana Rangel, Texas A&M Univ., College Station, TX

Texas was the first state to report Africanized honey bees in 1990. Africanized honey bees (AHBs) are a hybrid between European and African subspecies of honey bee (*Apis mellifera subsp* and *Apis scutellata* respectively). AHBs are known for their aggressive and defensive nature which creates friction during human and livestock interactions. Additionally, AHBs' ability to readily migrate, to overtake other colonies, and to fend off varroa mite infestations better than their European counterparts has significantly contributed to AHBs' success in immigrating and expanding in the States. AHBs have been reported as far north as Washington. AHBs in southern TX have been closely monitored and researched since their appearance in 1990. This project is a continuation of that effort. Collected honey bees from feral colonies in Welder Wildlife Refuge (28°07' 18", -97°26'34") are haplotyped to assess European and African lineages. RFLP and sequencing efforts have revealed that the feral populations in southern TX are predominantly of African lineages (A), however, there exist still strongholds of European lineages (M).

P4-2. **Collecting moths leads to new discoveries, conservation, and preservation of moths**

Eric Metzler (metzlere@msu.edu), National Park Service, Holloman AFB, NM

My work for the Ohio Department of Natural Resources, The Nature Conservancy, the US Fish and Wildlife Service, the Wisconsin Department of Natural Resources, the Ohio Biological Survey, Carlsbad Caverns National Park, White Sands National Monument, Guadalupe Mountains National Park, and others from 1973 through 2016 allowed me to collect moths in pristine specialized habitats such as native tallgrass prairies, wetlands, snow-white gypsum dunes and protected northern Chihuahuan Desert. Moths were systematically collected in USDA type kill-traps at discrete locations in many preserved areas in Ohio, Indiana, Iowa, Texas, and New Mexico. Each specimen was recorded in access relational database. The moths were identified using normal techniques of preparation, dissection, and DNA barcoding. The accumulated data over these 43 years permitted me to compare species of moths from specialized habitats to species of moths from highly disturbed habitats. Based on my findings and descriptions of new species that are specialists of the habitats, The Nature Conservancy and the Ohio Department of Natural Resources revised management plans, purchased land, and otherwise utilized the data from the moth inventories to assist with habitat management and public relations. Beginning in 2016, White Sands National Monument hosted 3 National Moth Week celebrations at the Monument for the general public, and Sevilleta National Wildlife Refuge hosted two festivals of moths. Support from the agencies and the public is positive. The research continues.

P4-3. **Predation of sentinel lepidopteran eggs in New Mexico pecan orchards**

Patricia Yates Monk (pyates@nmsu.edu)[1], Jane Breen Pierce[2], Nathan Guillermo[1] and Andrew Pierce[1], [1]New Mexico State Univ., Artesia, NM, [2]New Mexico State Univ., Las Cruces, NM

Predation of pecan nut casebearer and aphid pests is an important source of control in Southeastern New Mexico. Sentinel bollworm eggs have been used to evaluate predation and the impact of management practices on predation since 2010. In 2015, a field trial was conducted in a remote area of the Pecos Valley with little nearby vegetation. Groups of 30-60 sentinel bollworm eggs were attached to 10 leaves in 40 trees. Eggs were removed after 48 hours then examined for signs of predation. Egg 'masses' were also monitored every two hours to directly observe and identify predators. After 48 hours 31% of sentinel eggs 'masses' had moderate to high levels of predation with only 6% of the masses having 100% predation. This was a relatively low level of predation compared to previous trials throughout southeastern New Mexico. Egg masses in trees in unmowed plots had twice

as much predation 28% vs 14% in mowed plots despite plots being adjacent to each other. Surprisingly adult green lacewing were the most common predator, representing 37% of predators collected feeding on eggs. Rove beetles were also common 32% of predators, followed by ants 9%, thrips 7% and spiders 4%. Most predators were collected at night with 99% of green lacewing adults and 72% of rove beetles collected feeding on eggs from 8 pm to 4 am. Green lacewings were particularly common late at night with 85% collected at 10 pm.

P4-4. **New insights into the relationship between stink bug stylet canal dimensions and feeding mechanics**

Jesus Esquivel (jesus.esquivel@ars.usda.gov)[1], Robert Droleskey[2], Lauren Ward[3] and Roger Harvey[2], [1]USDA, ARS, Insect Control & Cotton Disease Research Unit, College Station, TX, [2]USDA, ARS, Food & Feed Safety Research Unit, College Station, TX, [3]BeeWeaver Apiaries, Navasota, TX

The southern green stink bug continues to be a pest of high-value cash crops, and shown to transmit disease-causing pathogens of cotton. Dimensions of the food canal, salivary canal, and overall stylet bundle were calculated to examine potential influence of canal size on the transmission of disease pathogens. These findings are presented with discussion on new insights regarding structural changes along the lengths of the food and salivary canals relative to the feeding mechanics of the southern green stink bug.

P4-5. **Evaluation of seed treatment against the bird cherry-oat aphids *Rhopalosiphum padi* (Linnaeus) in the growth chamber and field on winter and spring wheat**

Ali Zarrabi (ali.zarrabi@okstate.edu)[1], Aqeel Alyousuf[2], Tom Royer[1], Kris Giles[1], S. Seuhs[1] and Mark Payton[1], [1]Oklahoma State Univ., Stillwater, OK, [2]Oklahoma State Univ., STILLWATER, OK

Bird cherry-oat aphid (BCOA) is one of the most important pests that infested spring and winter wheat in the Northern and Southern Great Plains in the US, reducing the yields by direct feeding or as a virus efficient vectors and decreasing quality of wheat flour. Based on seed treatments studies, insecticide provides excellent control of BCOA and can be economically beneficial by reducing BCOA populations and increasing yield of winter wheat. The effectiveness of seed treatments were investigated in growth chambers and in the field, respectively.

P4-7. **Diversity and abundance of ground beetles in Texas cotton**

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Seventeen species of ground-dwelling predatory beetles were found in Texas cotton. While no significant differences were observed in beetle densities across three cropping systems, conventional production system appeared to have favored the activity of ground-dwelling predators in cotton in the Texas High Plains. Additional data are being analyzed to examine the species diversity in these three cropping systems and their impact on pest management.

P4-8. **Potential of lady beetle species for the biological control of the sugarcane aphid, *Melanaphis sacchari* (Hemiptera: Aphididae)**

Laura Weiser Erlandson (laura.erlandson@tamuct.edu), Brad Burden and Kaitlyn Clark, Texas A&M Univ. - Central Texas, Killeen, TX

Melanaphis sacchari (Zehntner) (Hemiptera: Aphididae) is a key pest of grain sorghum. Most pest management of this insect pest is achieved by insecticide application and the efficacy of control by natural enemies is currently unknown. We examined the feeding rates of several common lady beetle predators on *M.* sacchari in a "no choice" experiment. Each of the species examined readily fed on *M. sacchari* and the larval stages typically consumed more prey than the adults. Further research will evaluate the feeding rates of other natural enemies commonly found in sorghum as well as their preference for *M. sacchari* over other prey found in the same fields.

P4-9. **Vlad the Impaler's cabinet of curiosities *or* impaled insect prey of the loggerhead shrike**

Allen Knutson (a-knutson@tamu.edu), Texas A&M Univ., Dallas, TX

Insects impaled on thorns by the loggerhead shrike were collected in west Texas and identified. This collection provides insight into the insect prey of this bird, its unusual behavior of impaling prey for later consumption and its feeding habits in this desert region of Texas.

P4-10. **Predation of sentinel eggs in cotton and sorghum in New Mexico**

Jane Breen Pierce (japierce@nmsu.edu)[1], Patricia Yates Monk[2], Nathan Guillermo[2] and John Idowu[1], [1]New Mexico State Univ., Las Cruces, NM, [2]New Mexico State Univ., Artesia, 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. Sentinel cotton bollworm eggs were attached to glanded and glandless cotton plants from 2015 to 2017 to evaluate potential differences in predation. Insects were also sampled from plots weekly using sweep nets. In 2016, unlike earlier years, there was only one date where sentinel eggs had significantly higher predation in Acala 1517-08, a glanded cultivar. More importantly, there was not significantly higher predation in the second glanded cultivar indicating that any differences are unlikely due to the presence of glands. Early flowering was recorded in 2016 as a possible explanation for higher spider presence in Acala 1517-08 in 2015 but was not found to be significantly different. Direct observations of predators for 24 hours indicated that sweep net samples underestimate predation by a few important predators. Overall similarity in predation rates in glanded and glandless cotton suggests that predation will be an important source of control of insect pests in commercial glandless cotton production.

P4-11. **The design and evaluation of assays used to measure healthspan in *Drosophila melanogaster***

Michael Balogh (baloghm5@nmsu.edu), Nubia Rivas and Giancarlo Lopez-Martinez, New Mexico State Univ., Las Cruces, NM

With growing interest in the field of aging research, the need for consistent and predicative assays to measure an organism's healthspan increases as well. Although *Drosophila melanogaster* (Diptera: Drosophilidae) flies are a well-established laboratory model of aging and age-related disease, there remains a deficiency of performance assays that reliably correlate the organism's age and health. In this study, we developed a novel assay to measure the flight ability of *Drosophila* flies, using inexpensive (<$5/cage) and readily available household items (water bottles, plastic paint buckets, wedding veil, talcum powder, and spray paint). This easy to construct assay is reliable and predictive of flight, the most metabolically active behavior of the fly, in both the most widely used *Drosophila* strains in the United States (Canton S and Oregon R) and the transgenic diseased *Drosophila* line (the Parkinson's disease strain). Additionally, we developed a new assay which improves upon the widely used starvation-tube assay. The current *Drosophila* starvation assay is inconsistent and does not account for the full flying and mating activity of the flies, especially when large population sizes are needed. Our new assay allows the organisms a much greater space to fly and to interact with hundreds of other flies. The data and design of the assays are presented, which can then be utilized in assessing the effectiveness of hormetic treatments.

P4-12. **Polymorphisms in the GABA-gated chloride channel gene of fipronil-resistant *Rhipicephalus microplus***

Guilherme Klafke (gmklafke@gmail.com)[1], Jason Tidwell[1], Robert John Miller[1] and Adalberto A. Pérez de León[2], [1]USDA - ARS, Edinburg, TX, [2]USDA - ARS, Kerrville, TX

The southern cattle tick, *Rhipicephalus microplus*, is one of the most damaging pests that parasites cattle in tropical and subtropical regions of the world. For its control, several chemical groups have been used, including fipronil. Fipronil and cyclodienes exert action by blocking GABA-gated chloride channels (GABA-Cl) present in the nervous system of arthropods and mutations in its gene have been associated with fipronil/cyclodiene resistance in different pest species (*Rdl* mutation). The objective of the present study was to look for mutations in the GABA-Cl gene of *R. microplus* resistant to fipronil. As source of DNA it was used ticks from a fipronil-susceptible reference strain (Deutch) and from a fipronil-resistant Mexican strain (FIP-RES) established at the USDA-ARS Cattle Fever Tick Research Laboratory (Edinburg, TX). Cross-resistance to fipronil and lindane (cyclodiene compound) was confirmed with toxicological bioassays. DNA fragments of the GABA-Cl gene spanning the *Rdl* mutation were obtained by PCR and directly sequenced. In total, 22 point mutations were observed in the DNA sequences of the resistant strain. Ten of them resulted in five amino acid substitutions comparing to the susceptible strain Deutch (S281T; A286S; V317I; T328A; A329S). The alanine to serine mutation at residue 286 is located in the same alanine residue mutated in fipronil/cyclodiene-resistant individuals of other species. The association of these mutations with resistance to fipronil is yet to be confirmed by genotyping a larger number of individuals over tick samples with different levels of resistance to this acaricide.

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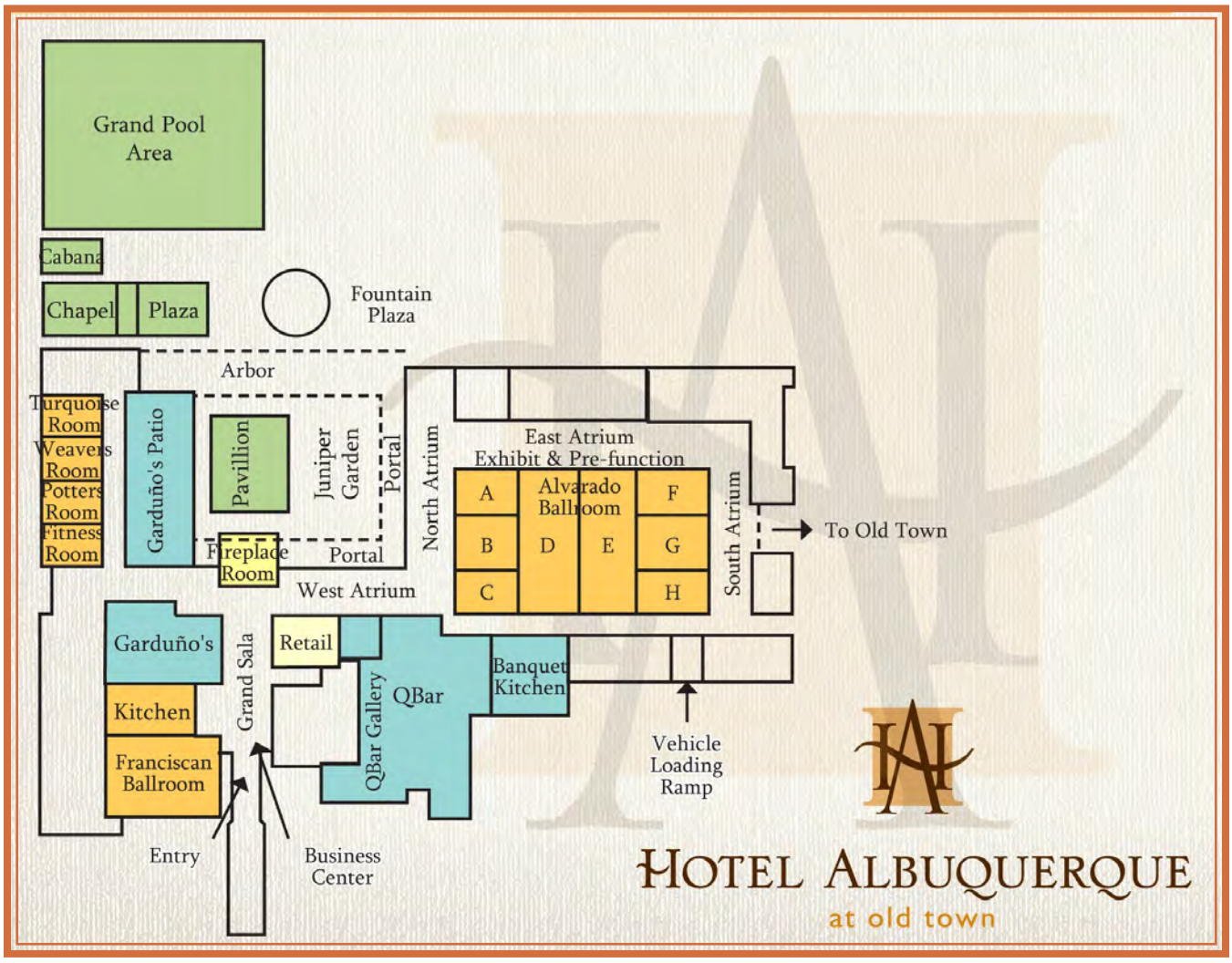
Hotel Albuquerque at Old Town

FLOOR PLAN



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Vancouver, our host city

As a bustling seaport and Canada's greenest city, Vancouver offers a plethora of culinary delights, museums and markets, along with a colorful past. You can easily walk, bike or ride around the city; be sure to stop at Stanley Park for a breathtaking view of the harbor and its constant activities.

Entomology 2018 takes place in the Vancouver Convention Centre, one of the greenest structures in Canada, offering a 6-acre living grass roof and a seawater heating and cooling system. It even boasts its own European honeybee hives, that help pollinate the plants on the living roof while supplying honey for its 'scratch' kitchen.

Watch eNews and visit **entsoc.org/entomology2018** for details.

IMPORTANT DATES/DEADLINES:	
Paper/poster submission, and Lunch & Learns deadline	4 JUNE 2018
Functions (complimentary) deadline	30 JUNE 2018
Virtual Poster deadline	31 JULY 2018