Andrew P. Michel, Ph. D.

224 Wooster Science Building
Department of Entomology
CFAES Wooster Campus
The Ohio State University
1680 Madison Ave.
Wooster, OH 44691

330-263-3730 (Off)
330-263-3819 (Lab)
330-347-8652 (Cell)
330-263-3686 (Fax)
michel.70@osu.edu
http://entomology.osu.edu/

PROGRAM MISSION

My goal is to understand how insect pests adapt to rapidly changing selection pressures in agroecosystems such as host-shifting to important crops or resistance to management tactics. Specifically, my research uses molecular ecology and population genomic techniques to characterize the genetic basis for insect pest adaptation and how these adaptive traits spread across the landscape. Understanding and demonstrating how insects adapt, as well as communicating research-based insect management recommendations, delays the evolution of resistance or emergence of pests, and ensures a safer, sustainable and more productive food supply.

PROFESSIONAL EXPERIENCE

Professor, Dept. of Entomology, OARDC, The Ohio State University, *Jul 2019-Present*

- Associate Chair, Entomology, *Oct. 2019-Present*
- Interim Associate Chair, Entomology, *Apr 2016-Oct 2019*
- Associate Director, Center for Applied Plant Sciences, *Mar 2017-Present*
- Associate Professor, *Sep 2013-Aug 2019*
- Assistant Professor, *Sep 2007-Aug 2013*
- 70% Research: Insect molecular ecology and adaptation (iMEAL)
- 30% Extension: Field crop insect management

Post-Doctoral Researcher, Department of Biological Sciences, University of Notre Dame, *Aug 2005-Aug 2007*

- Population genomics and speciation in North American apple maggot (*Rhagoletis. pomonella*) host races

EDUCATION

Ph.D., Department of Biological Sciences, University of Notre Dame, *2001-2005*

- Dissertation: Population genetic structure of the African malaria mosquito *Anopheles funestus*

B.S., Entomology, Purdue University, *1997-2001*

- Minors: Biology & International Studies
- Research: Population structure and gene flow among Honduran populations of the potato beetle *Leptinotarsa undecemlineata*

HONORS AND AWARDS

- 3rd Place, OSU Post-Doctoral Mentor Award Competition, *2018*

- International IPM Team Award of Excellence, Soybean Aphid Team (K. Tilmon, leader), *2018*
- OARDC Multidisciplinary Team Research Award, Soybean Research, *2016*
- Early Career Innovation Award, Entomological Society of America, *2015*
- OARDC Distinguished Junior Faculty Research Award, The Ohio State University, *2015*
- Schmitt Graduate Research Fellow, University of Notre Dame, *2001*
- Outstanding Sophomore Award, College of Agriculture, Purdue University, *1998*

PEER REVIEWED PUBLICATIONS (90 total, 82 @ OSU)

(last 5 years listed, see Appendix 1 for complete list)

1. Tilmon KJ, **Michel A**, and O'Neal ME. 2021. Aphid resistance is the future for soybean production, and has been since 2004: Efforts towards a wider use of host plant resistance in soybean. *Current Opinion in Insect Science.* Accepted.
2. Bansal R, Mian MAR, Michel A. 2021. Characterizing Resistance to Soybean Aphid: Antibiosis and Antixenosis Assessment. *Journal of Economic Entomology*. Accepted.
3. Bezerra do Nascimento AR, Pavinato VAC, Rodrigues JG, Silva-Brandão KL, Consoli FL, **Michel A**, Omoto C. 2021. There is more than chitin synthase in insect resistance to benzoylureas: Molecular markers associated with teflubenzuron resistance in Spodoptera frugiperda. *Journal of Pest Science*. Accepted.
4. Yates-Stewart AD, Pekarcik A, **Michel A,** Blakeslee JJ. 2020. Jasmonic acid-isoleucine (JA-Ile) is involved in the host-plant resistance mechanism against the soybean aphid (Hemiptera: Aphididae). *Journal of Economic Entomology*. 113:2972-2978.
5. Rajarapu SP, Bansal R, Mittapelly P, **Michel A**. 2020. Transcriptome analysis reveals functional diversity in salivary glands of plant virus vector, *Graminella nigrifrons*. *Genes*. 11:1289.
6. Esquivel CJ, Martinez EJ, Baxter R, Trabanino R, Ranger CM, **Michel A**, Cañas LA. 2020. Thiamethoxam differentially impacts survival of the generalist predators, *Orius insidiosus* and *Hippodamia convergens*, when exposed via the food chain. *Journal of Insect Science*. 20:13.
7. Cordeiro EMG, Pantoja-Gomez LM, de Paiva JB, Nascimento ARB, Omoto C, **Michel AP**, Correa AS. 2020. Hybridization and introgression between *Helicoverpa armigera* and *H. zea*: an adaptational bridge. 20:61. *BMC Evolutionary Biology*.
8. Yates-Stewart AD, Daron J, Wijeratne S, Slotkin RK, **Michel A.** 2020. Soybean aphids adapted to host-plant resistance by down regulating putative effectors and up regulating transposable elements. *Insect Biochemistry and Molecular Biology*. 121: 103363.
9. Coates et al. 2020. Genome scan detection of selective sweeps among biotypes of the soybean aphid, *Aphis glycines*, with differing virulence to resistance to *A. glycines* (*Rag*) traits in soybean, *Glycine max*. *Insect Biochemistry and Molecular Biology*. 124: 103364.
10. Murúa MG, Vera MA, **Michel A**, Casmuz AS, Fatoretto J, Gastaminza G. 2019. Performance of field-collected *Spodoptera frugiperda* (Lepidoptera: Noctuidae) strains exposed to different transgenic and refuge maize hybrids in Argentina. J. Insect Sci. 19:21.
11. Smith JL, DiFonzo CD, Baute TS, **Michel AP**, Krupke CK. 2019. Ecology and management of the western bean cutworm (Lepidoptera: Noctuidae) in corn and dry beans – Revision with focus on the Great Lakes region. *Journal of Integrated Pest Management*. 10:27.

12. Izascum Pérez-Valencia L, **Michel AP**, Moya-Raygoza G, Rodríguez A. 2019. Genetic variation and structure of *Diaphorina citri* (Hemiptera:Liviidae) in populations from México. *Annals of the Entomological Society of America*. 112: 379–387.
13. Mittapelly P, Bansal R, **Michel A**. Differential expression of cytochrome P450 CYP6 genes in the brown marmorated stink bug, *Halyomorpha halys* (Hemiptera: Pentatomidae). 2019. *Journal of Economic Entomology*. 112: 1403-1410.
14. Esquivel CJ, Ranger CM, Phelan L, Martinez EJ, Hendrix WH, Cañas LA, and **Michel AP**. 2019. Weekly survivorship curves of soybean aphid biotypes 1 and 4 on insecticidal seed-treated soybean. *Journal of Economic Entomology*. 112: 712–719.
15. Pérez-Alquicira J, **Michel A**., van der Knaap EE, Mercer K, Mitchell T, McHale L, Luna-Ruiz J, Texocotitla-Vázquez E, Vargas-Ponce O. 2019. Genetic structure of *Liriomyza trifolii* (Diptera: Agromyzidae) associated with host plants from southeastern Mexico. *Environmental Entomology*. 48: 253–262.
16. Angelella G, **Michel A,** and Kaplan I. 2019. Using host-associated differentiation to track source population and dispersal distance among insect vectors of plant pathogens. *Evolutionary Applications*. 12: 692-704.
17. Taitano N, Bernau V, Barbolla L, Leckie B, Mazourek M, Mercer K, McHale L, **Michel A.** Baumler D, Kantar M, van der knaap E. 2019. Genome-wide genotyping of a novel mexican chile pepper collection illuminates the history of landrace differentiation after *Capsicum annuum* L. domestication. *Evolutionary Applications*. 12:78-92.
18. Ng S, Dorrance AE, **Michel AP**, Lindsey L. 2018. Effect of Mid-Season Foliar Fungicide and Foliar Insecticide Applied Alone and In-Combination on Soybean Yield. *Crop and Soils Magazine.* July-August: 52-58.
19. Yates AD, **Michel AP**. 2018. Mechanisms of aphid adaptation to host plant resistance. *Current Opinion in Insect Science*. 26: 41-49.
20. Piermarini PM, Inocente EA, Acosta N, Hopkins CR, Denton JS, **Michel AP**. 2018. Inward rectifier potassium (Kir) channels in the soybean aphid *Aphis glycines*: Functional characterization, pharmacology, and toxicology. *Journal of Insect Physiology*. 110:57-65.
21. Hanson AA, Lorenz AJ, Hesler LS, Bhusal SJ, Bansal R, **Michel AP**, Jiang GL, Koch RL. 2018. Genome-Wide Association Mapping of Host-Plant Resistance to Soybean Aphid. *Plant Genome*. 11: 10.3835.
22. Murúa MG, Vera MA, Herrero MI, Fogliata SV, **Michel AP**. 2018. Defoliation of Soybean Expressing Cry1Ac Against Lepidopteran Pests. *Insects*. 9: E93
23. Bansal R, **Michel AP**. 2018. Expansion of cytochrome P450 and cathepsin genes in the generalist herbivore brown marmorated stink bug. *BMC: Genomics*. 19:60.
24. ESA Position Statement on Insect Resistance Management for Genetically Modified Crops. 2018. *Annals of the Entomological Society of America*. 111:3-5.
25. Pavinato VAC, **Michel AP**, de Campos JB, Omoto C, Zucchi M. 2018. Influence of historical land use and modern agricultural expansion on the spatial and ecological divergence of sugarcane borer, *Diatraea saccharalis* (Lepidoptera: Crambidae) in Brazil. *Heredity*. 120:25–37.
26. Fatoretto JC, **Michel AP**, Silva Filho MC, Silva N. 2017. Adaptive potential of fall armyworm limits Bt trait durability in Brazil. *Journal of Integrated Pest Management.* 8: 17.
27. Koch RL, **Michel AP**, Hunt T. 2017. Identification, biology, impacts and management of stink bugs (Hemiptera: Heteroptera: Pentatomidae) of Soybean and Corn in the Midwestern United States. *Journal of Integrated Pest Management.* 8: 11.

28. Lee S, Cassone BJ, Wijeratne A, Jun T-H, **Michel AP**. 2017. Transcriptomic dynamics in soybean near-isogenic lines differing in alleles for an aphid resistance gene, following infestation by soybean aphid biotype 2. *BMC: Genomics.* 18(1):47.
29. Leite NA, Correa AS, **Michel AP**, Alves-Pereira A, Pavinato VAC, Zucchi MI, Omoto C. 2017. Intra- and interspecific gene flow of *Helicoverpa armigera* and *H. zea* (Lepidoptera: Noctuidae) in the Americas. *Environmental Entomology*. 46:1024-1034
30. Koch R, Potter B, Glogoza P, Hodgson E, Krupke C, Tooker J, DiFonzo C, **Michel A**, Tilmon K, Prochaska T, Knodel J, Wright R, Hunt T, Jensen B, McCornack B, Estes K, Spencer J. 2017. Biology and economics of recommendations for insecticide-based management of soybean aphid. *Plant Health Progress.* 17:265-269.
31. Wenger JA, Cassone B, Cassone BJ, Legeai F, Johnston JS, Bansal R, Yates AD, Coates BS, Pavinato VAC, **Michel A**. 2017. Whole genome sequence of the soybean aphid, *Aphis glycines*. *Insect Biochemistry and Molecular Biology.* doi: 10.1016/j.ibmb.2017.01.005.
32. Pavinato VAC, Margarido GRA, Wijeratne AJ, Wijeratne S, Meulia T, Souza AP, **Michel AP** and Zucchi MI. 2017. RAD (Restriction site Associated DNA) for *de novo* sequencing and marker discovery in sugarcane borer, *Diatraea saccharalis* Fab. (Lepidoptera: Crambidae). *Molecular Ecology Resources*. 17:454-465.
33. Gunadi A, Bansal R, **Michel AP**, Finer JJ. 2016. Establishment and utility of in vitro soybean aphid culture, *Aphis glycines* (Hemiptera: Aphididae). *Pest Management Science*. 73: 1229-1235.
34. Bansal R, Mittapelly P, Chen Y, Mamidala P, Zhao C, **Michel A**. 2016. RNA interference and quantitative RT-PCR gene evaluation in the brown marmorated stink bug. *Plos:One*. 11(5): e0152730.
35. Stewart S, Roberston AE, Wickramasinghe D, Draper MA, **Michel A**, Dorrance AE. 2016. Population structure among and within Iowa, Missouri, Ohio, and South Dakota Populations of *Phytophthora sojae*. *Plant Disease*. 100: 367-379.
36. Mian MAR, McHale LK, **Michel AP**, Dorrance AE. 2016. Registration of 'Wyandot-14' Soybean with Resistance to Soybean Aphid and Powdery Mildew. Journal of Plant Registrations. Vol 10: 246-250.
37. Cassone BJ, Wenger JA, **Michel AP**. 2015. Whole genome sequence of the soybean aphid endosymbiont *Buchnera aphidicola* and genetic differentiation among biotype-specific strains. Journal of Genomics. 3: 85–94.
38. Cassone BJ, Redinbaugh MG, Dorrance AE, **Michel AP**. 2015. Shifts in *Buchnera aphidicola* density in soybean aphids (*Aphis glycines*) feeding on virus-infected soybean. *Insect Molecular Biology*. 24:422-3.
39. Chen Y, Redinbaugh MG, **Michel AP**. 2015. Molecular interactions and immune responses between Maize fine streak virus and the leafhopper vector *G. nigrifrons* through differential expression and RNA interference. *Insect Molecular Biology*. 24(3):391-401.
40. Flagel LE, Swarup S, Chen M, Bauer C, Wanjugi H, Carroll M, Hill P, Tuscan M, Bansal R, Flannagan R, Clark TL, **Michel AP**, Head GP, Goldman BS. 2015. Genetic markers for western corn rootworm resistance to Bt toxin. *G3: Genes | Genomes | Genetics. 2015 Jan 7. pii: g3.114.016485*.
41. Acharya B1, Lee S, Rouf Mian MA, Jun TH, McHale LK, **Michel AP**, Dorrance AE. 2015. Identification and mapping of quantitative trait loci (QTL) conferring resistance to *Fusarium graminearum* from soybean PI 567301B. *Theor and Appl Gen*. 2015 Feb 18.

42. Lee S, Freewalt KR, McHale LK, Song Q, Jun T-H, **Michel AP**, Dorrance AE, Mian MAR. 2015. A high-resolution genetic linkage map of soybean based on 357 recombinant inbred lines genotyped with BARCSoySNP6K. *Molecular Breeding*. 35:58.
43. Lee, S., Jun, T.H., Michel, A.P., Mian, M.A.R. 2015. SNP markers linked to QTL conditioning plant height, lodging, and maturity in soybean. *Euphytica,* (3), 521-532.
44. Bautista MA, Bhandary B, Wijeratne AJ, **Michel AP**, Hoy CW, Mittapalli O. 2015. Evidence for trade-offs in detoxification and chemosensation gene signatures in *Plutella xylostella*. Pest. Manag. Sci.. 71:423-432.
45. Bansal R, Mittapelly P, Cassone BJ, Mamidala P, Redinbaugh MG, and **Michel A**. 2015. Recommended reference genes for quantitative PCR analysis in soybean have variable stabilities during diverse biotic stresses *PLoS:One*. 10(8): e0134890.

Chapters in Editor Reviewed Books:

1. Bansal, RB and **Michel AP**. 2015. Molecular Adaptations of Aphid Biotypes in Overcoming Host Plant Resistance. In *Short Views on Insect Genomics and Proteomics*. [ed] R. Chandrasekar, M Goldsmith, Springer Publishing. (invited book chapter)
2. Bansal R, Jun T-H, Mian MAR, **Michel AP**. 2012. Developing Host-Plant Resistance for Hemipteran Soybean Pests: Lessons from Soybean Aphid and Stink Bugs. In *Soybean-Pest Resistance*. Ed. Hany A. El-Shemy. INTECH publishing, Vienna, Austria. (invited book chapter).
3. **Michel AP,** Mittapalli O, Mian MAR. 2011. Evolution of Soybean Aphid Biotypes: Understanding and Managing Virulence to Host-Plant Resistance. In: *Soybean: Molecular Aspects of Breeding*. pp. 355-372. Ed. A. Sudaric. INTECH publishing, Vienna, Austria. (invited book chapter).

ACTIVE GRANTS/FUNDING
Total as PI > $2 Million, as Co-PI >$7Million

Current (for Past Projects, see Appendix 2):

1. 08/2019-07/2022. Mechanisms of adaptation to terrestrial Antarctica through comparative physiology and genomics of Antarctic and sub-Antarctic insects. National Science Foundation Polar Programs. ($726,070, $296,994 to A. Michel). PI: N. Teets. Co-PI: A. Michel, P. Convey and S. Heyward
2. 10/2018-09/2021. Soybean entomology research and extension in the north central region. North Central Soybean Research Program. ($497,130; $52,218 to Michel). PI: K. Tilmon, Co-PI: A. Michel, M. O'Neal, E. Hodsgon, B. Koch, K. Rice.
3. 10/2021-09/2021. Research and management of soybean insects FY21. Ohio Soybean Council. ($58,000 total, $29,000 to Michel). PI: K. Tilmon, Co-PI: A. Michel.
4. 10/2019-03/2021. Research and management of soybean insects FY20. Ohio Soybean Council. ($58,000 total, $29,000 to Michel). PI: K. Tilmon, Co-PI: A. Michel.

STUDENT MENTORING

<u>Doctoral Student Advisor:</u>

1. Ana Trabinino, Entomology *Jan 2018-Present, Exp. Graduation Date: Summer 2022*
   -Improving IRM for fall armyworm (*Spodoptera frugiperda*)
2. Carlos Esquivel Palma (Co-Advisor), Entomology, *Aug 2015-Dec 2019*

-Current status: Post-doctoral Research Associate with Dr. Luis Cañas.
-Awarded Graduate Research Grant (OARDC-SEEDS), $3,000, *Jun 2016*
-Received OSU Presidential Fellowship, *Mar 2019-Dec 2010*
-Received multiple awards from Entomological Society of America (ESA) student competitions and other professional society meetings

3. Ashley Yates (Primary Advisor), Translational Plant Sciences Graduate Program, *Aug 2014-Dec 2019*
   -Current Status: Research Scientist, Bayer Crop Science (*May 2020*-present)
   -Awarded ESA P-IE Starks Graduate Student Award for Host-Plant Resistance, *Nov 2018*
   -USDA-NIFA Pre-doctoral Research Fellowship, *Mar 2017*
   -Ohio Soybean Council Graduate Research Award, *Mar 2016*
   -Awarded Graduate Research Grant (OARDC-SEEDS), $3,000, *Jun 2016*
4. Priyanka Mittapelly, Entomology, *Jan 2014-Dec 2018.*
   -Current Status: Post-Doctoral Researcher, USDA-ARS
   -Awarded Graduate Research Grant (OARDC-SEEDS), $3,000, *Jun 2016*
5. Julio Fatoretto Ph.D., *Aug 2013-April 2017,* Dual-Degree, Translational Plant Sciences. (Co-Advised by Dr. Marcio de Castro Silva Filho, University of São Paulo)
   -Current Status: Insect Resistance Management Lead, South America, Syngenta Corp.
   -First OSU/USP dual-degree student to earn Ph.D. in program
6. Jacob Wenger, Ph.D., Entomology *Sept 2010-Sep 2015*
   -Current Status: Assistant Professor, Fresno State University
   -The Ohio State University Presidential Fellowship (2014-2015)
   -NSF K-12 Graduate Research/Teaching Fellowship (2012-2014).
   -Awarded ESA P-IE Starks Graduate Student Award for Host-Plant Resistance, 2014
   -Awarded President's Prize, 2nd place, student competition, ESA, 2011 & 2012
   -Awarded Graduate Research Grant (OARDC-SEEDS), $3,000, *Jun 2012*
   -Awarded Ray Travel Award (OSU), $750, *Aug 2012*
7. Yuting Chen Ph.D., Entomology *Sep 2009-December 2013*
   -Awarded Graduate Research Grant (OARDC-SEEDS), $5,000, *Jun 2010*
   -Current Status: Post-Doctoral Research Associate, North Carolina State University

Master's Student Advisor:

1. Lucia Orantes, Entomology *Mar 2009-Graduated Aug 2011*
   -Awarded Graduate Research Grant (OARDC-SEEDS), $3,000, *Jun 2010*
   -Current Status: Epidemiologist, State of Vermont

Master's of Plant Health Management Advisor:
Jason Hartschuh, *Graduated Nov 2014*. (Co-Advised by Dr. Pierce Paul)

Doctoral Student Advisory Committee (Past and Current):

1. Adrian Pekarcik, Dept. of Entomology, Dr. Kelley Tilmon, Advisor
2. Clare Qin Guo, Dept. of Plant Pathology. Dr. Feng Qu, Advisor
3. Krystel Navarro-Acevedo, Dept. of Plant Pathology. Dr. Anne Dorrance, Advisor
4. Nelly Arguello-Blanco, Dept. of Horticulture and Crop Sciences. Dr. Clay Sneller, Advisor
5. Irene Kargbo, Dept. of Entomology, The Ohio State University. Dr. Luis Cañas, Advisor
6. Huayan Chen, Dept of Entomology, The Ohio State University. Dr. Norm Johnson, Advisor

7. Katie D'Amico, Translational Plant Sciences, The Ohio State University. Dr. Jonathan Fresnedo, Advisor
8. Drew Spacht, Dept. of EEOB, The Ohio State University. Dr. David Denlinger, Advisor.
9. Yvan Delgado de la Flor, Dept. of Entomology, OARDC, The Ohio State University. Dr. Mary Gardiner, Advisor.
10. Erin O'Brien, Dept. of Entomology, OARDC, The Ohio State University. Dr. Dan Herms, Advisor. *Graduated April 2017*
11. Liu Yang, Dept. of Entomology, OARDC, The Ohio State University. Dr. Pete Piermarini, Advisor. *Graduated July 2017*
12. Megan Meuti, Dept. of Entomology, The Ohio State University. Dr. David Denlinger, Advisor. *Graduated Aug 2014*
13. Mathew Kost, Dept. of Horticulture and Crop Sciences, The Ohio State University, Dr. Kristen Mercer, Advisor. *Graduated Jul, 2014*
14. Harit Bal, Dept. of Entomology, OARDC, The Ohio State University. Dr. Parwinder Grewal, Advisor. *Graduated Dec 2012*
15. Sawsan Elateek, Dept. of Plant Pathology, OARDC, The Ohio State University. Dr. Sally Miller, Advisor. *Graduated Sept 2010*

Master's Student Advisory Committee (Past and Current):

1. James Radl, Dept. of Entomology, The Ohio State University. Dr. Dave Shetlar, Advisor
2. Sin Joe Ng, Dept. of Horticulture and Crop Science. Dr. Laura Lindsey, Advisor. *Graduated Mar 2017*
3. Molly Dieterich, Dept. of Entomology, OARDC, The Ohio State University. Dr. Mary Gardiner, Advisor. *Graduated May 2017*
4. Carlos J. Esquivel, Dept. of Entomology, OARDC, The Ohio State University. Dr. Pete Piermarini, Advisor. *Graduated May 2015*
5. Laura Kenyon, Dept. of EEOB, The Ohio State University. Dr. Zakee Sabree, Advisor. *Graduated Nov 2014*
6. Devon Rogers, Dept. of Entomology, OARDC, The Ohio State University. Dr. David Shetlar, Advisor. *Graduated Jun 2014*
7. Keith Freewalt, Dept. of Horticulture and Crop Sciences, The Ohio State University, Dr. Leah McHale, Advisor. *Graduated Jun 2014*
8. Chelsea Smith, Dept. of Entomology, OARDC, The Ohio State University. Dr. Mary Gardiner, Advisor. *Graduated Jul 2012.*
9. Wanying Zhao, Dept. of Horticulture and Crop Sciences, The Ohio State University. Dr. John Cardina, Advisor. *Graduated 2011.*
10. Monica Farfan, Dept. of EEOB, The Ohio State University. Dr. Hans Klompen, Advisor. *Graduated Jun 2010.*

Master's of Plant Health Management, Advisory Committee

Jack Weldock, *Graduated Jan 2018*
John Schoenfalls, *Graduated Feb 2016*
Ethan Smrtnick, *Graduated Nov 2015*

Post- Doctoral Research Associates:

1. Vitor AC Pavinato, *Jun 2015- Jun 2016*; *Jul 2019-Present*

2. Hilary, Edgington, *Sep 2017- July 2019,* Current: Visiting Asst. Professor, College of Wooster
3. Aline Sartori Guidolin, *Mar 2017-July 2018*, Current: Post-Doc, University of Sao Paulo
4. Swapna Priya Rajarapu, *Nov 2016-Dec 2018,* Current: Post-Doc, University of North Carolina
5. Raman Bansal, *Nov 2009-March 2015*, Current: USDA-ARS Res. Scientist
6. Sungwoo Lee, *May 2013-Jan 2015*. Current: Assistant Professor, Chungnam National University, South Korea.
7. Tae-Hwan Jun, *Apr 2009-Aug 2013*. Current: Assistant Professor, Pusan National University, South Korea

Visiting Scientists:
1. Nathalia Cavichiolli de Oliveira, University of São Paulo, Brazil. *Aug 2019-Sep 2020*
2. Abdelhadi Sabraoui, ICARDA-Morocco, *Aug 2018-Aug 2019*
3. Rogerio Nascimoto, ESALQ, University of São Paulo, Brazil, *Sep 2016-Sep 2017*
4. Xianlinag Huang, Northwest Agricultural and Forestry University, Shaanxi, China. *Nov 2016-Dec 2017*
5. Natalia Alves Leite, ESALQ, University of São Paulo, Brazil, *Sept 2015-Jan 2016*
6. Laura Izascum, University of Guadalajara, Mexico, *Aug 2014-Nov 2014*
7. Julio Fatoretto, ESALQ, University of São Paulo, Brazil, *Oct 2013-May 2014*
8. Vitor Pavinato, Fulbright Fellow, University de Campinas, Brazil, *Sept 2012-May 2013*
9. T. Michael Kates, Michigan State University *Jan 2011 and Jan 2012*
10. Amanda Bachmann, Penn State University *Sep 2009, Nov. 2010*
11. Lucia Orantes, *Jan 2009-Mar 2009*
12. Nelson Olivas-Daliva, *Feb 2008-Dec 2008*

Undergraduate/Student Research Interns:
1. Anna Favalon, Trinity University, *May 2019-Aug 2019*
2. Michelle Chang, College of Wooster, *May 2018- Dec 2018*
3. Daniel Huang, High school student, *Jun-Aug 2015*
4. Hannah Lee, High school student, *Jun-Aug 2014*
5. Monica Ramstad, Undergraduate student, *Jun-Aug 2012*
6. Rakin Rouf, Undergraduate student, *Jun-Aug 2010*
7. Geoff Parker, Undergraduate student, *Jun-Aug 2009*
8. Nikhil Vasudeva, High school student, *Jun-Aug 2008*

North-East Ohio Science Technology Engineering and Mathematics program (NEOHSTEM)
-Andras Szthmary: Aphids and endosymbionts, 1st place competition. *(Aug2013-April 2014)*
-Hannah Teed: Stink bug preference on soybean (*Aug 2014-Present*).

RESEARCH SEMINARS AND PRESENTATIONS

Invited Speaker (27 total):
1. **Michel A.** Genomic inferences on overcoming aphid-resistant soybean in the soybean aphid. Entomological Society of America Annual Meeting (virtual). *Dec. 2020.*

2. **Michel A.** Insect adaptation to resistant plants: Case studies in fall armyworm and the soybean aphid. Dep. of Entomology, The Ohio State University. *Aug 2020.*
3. **Michel A.** Molecular Interactions between Soybean Aphids and Aphid-Resistant Soybean. International Plant Resistance to Insects Workshop, Mexico City. *Mar 3*.
4. **Michel A.** Molecular Interactions between Soybean Aphids and Aphid-Resistant Soybean. Plant Animal Genomics Conference, San Diego. *Jan 2020*
5. **Michel A.** Soybean Aphid Adaptation to Aphid-Resistant Soybean. Dept. of Entomology, Iowa State University. Ames, IA. *Oct 2017*
6. **Michel A.** Soybean Aphid Adaptation to Aphid-Resistant Soybean. Dept. of Entomology, University of Nebraska-Lincoln. Lincoln, NE. *Nov 2016*
7. **Michel A,** Wenger J, Cassone B, Yates AD, Pavinato VAC. Rapid Adaptation to aphid-resistant soybean by the invasive soybean aphid. International Congress of Entomology, Orlando, FL. *Sept 2016*
8. **Michel A.** Insect Ecology Parameters and Resistance Evolution: Merging Population Genomics with IRM. Syngenta Corp, Cordoba, Argentina. *Aug 2016*
9. **Michel A.** Microbiomes of Hemipteran Plant Pests. Foundation for Food and Agriculture Research. Tampa, FL. *July 2016*
10. **Michel A,** Wenger J, Cassone B, Legeai F, Johnston S, Bansal R, Yates AD, Pavinato VAC. From Farms to Genomes: NCSRP and the Soybean Aphid Genome. ESA-NCB Annual Meeting. Cleveland, OH. *Jun 2016*
11. **Michel A**. Using Genomics to Understand Aphid Adaptation to Plant Resistance. Dept. of Biological Sciences, Bowling Green State University. *Nov 2015*
12. **Michel A.** "Use of PCR & Molecular Markers for Insect Species and Invasion Diagnostics" IPDN Pest Diagnostic Short Course, The Ohio State University, *Sep 2015*
13. **Michel A and Bansal R.** Genetic basis for insect pest adaptation and how these adaptive traits spread across the landscape. Brazilian Congress of Entomology, Goiania, Goias, Brazil. *Sep 2014*.
14. **Michel A.** Genetic basis for insect pest adaptation and how these adaptive traits spread across the landscape. Dept. of Entomology and Acarology, Escola Superior de Agricultura Luiz de Queiroz, Universidade de Sao Paulo, Piracicaba, Brazil. *Sep 2014*.
15. **Michel A** and Bansal R. "Molecular interactions with soybean aphid and soybean" Molecular & Cellular Biology of the Soybean, *Aug 2014.*
16. **Michel A**, Bansal R, Mian MAR, Mittapalli O. "The Interactomics of Host-Plant Resistance to the Soybean Aphid" Entomological Society of America Annual Meeting, *Nov 2013*
17. **Michel A,** Wenger JA, Bansal R, Mian MAR. "Population genomics perspective on insect biotypes related to host-plant resistance" Entomological Society of America Annual Meeting, *Nov 2013*
4. **Michel A.** "Use of PCR & Molecular Markers for Insect Species and Invasion Diagnostics" IPDN Pest Diagnostic Short Course, The Ohio State University, *Sep 2013*
5. **Michel A.** "Another Model Aphid? Genetics of *Aphis glycines*, the Soybean Aphid" Dept. of Biology, University of Nebraska Lincoln, *Dec 2012*
6. **Michel A.** "Aphid Stress Relief: Coping with Host-Alternation and Host Plant Resistance in the Soybean Aphid, *Aphis glycines*."Dept. of Entomology, Cornell University, *Sep 2012*
7. **Michel A.** "Use of PCR & Molecular Markers for Insect Species and Invasion Diagnostics" IPDN Pest Diagnostic Short Course, The Ohio State University, *Sep 2012*

8. **Michel A**, MAR Mian, L. Orantes. "Understanding Dispersal and Movement of *Aphis glycines* to Improve Durability of Aphid Resistant Soybean" International Congress of Entomology, Daegu, South Korea, *Aug 2012*
9. **Michel A**, R. Bansal and M. A. R. Mian. "Molecular inferences of *Aphis glycines*-resistant soybean and virulence evolution." International Plant Resistance to Insects Workshop. *Apr 2012.*
10. **Michel A**. "Uncovering genetic basis of selection using next generation sequencing." Monsanto Corp. *Feb 2012.*
11. **Michel A**, Bansal R, Orantes L, Mian MAR. Molecular interactions of soybean aphid biotypes and aphid resistant soybeans. Soybean Breeder's Workshop *Feb 2012*
12. **Michel A.** "Workshop on DNA sequence analysis: using DNASP and TCS to analyze simple, population genetic datasets."Dept. of Entomology, The Ohio State University, *May 2011*
13. **Michel A**. "Understanding Soybean Aphid Migration And Adaptation Through Genetic And Genomic Approaches."Dept. of Entomology, Penn State University, *Feb 2011*.
14. **Michel A.** "Use of PCR & Molecular Markers for Insect Species and Invasion Diagnostics" IPDN Pest Diagnostic Short Course, The Ohio State University, *Sep 2010*
15. **Michel A.** "Population genetics and genomics of an invasive aphid pest: What to do when you have no molecular markers." Dept. of Evolution, Ecology and Organismal Biology, The Ohio State University, *Apr 2010*
16. **Michel A.** "Understanding soybean aphid migration and adaptation through genetic and genomic advances" Dept. of Entomology, Purdue University, *Mar 2010*
17. **Michel A.** "Population Genetics and Genomics for Insect Pest Adaptation" Entomological Society of America, North Central Branch, Louisville, KY *Mar 2010*
18. **Michel A** and MAR Mian. "Integration of HPR into IPM part 3: soybean aphid resistance and virulence evolution." Entomological Society of America, National Meeting, Indianapolis, IN *Dec 2009*
19. **Michel A** "Use of PCR & Molecular Markers for Insect Species and Invasion Diagnostics" IPDN Pest Diagnostic Short Course, The Ohio State University, *Sep 2009*
20. **Michel A.** "Speciation and Adaptation in Insect Pests Department of Biology, College of Wooster, Wooster, OH *Nov 2008*
21. **Michel A.** "Use of PCR & Molecular Markers for Insect Species and Invasion Diagnostics" IPDN Pest Diagnostic Short Course, The Ohio State University, *Sep 2008*
22. **Michel A.** "Using evolutionary and ecological functional genomics to understand adaptation in agronomic pests" Entomological Society of America, North Central Branch, Columbus, OH *Mar 2008*
23. **Michel A.** "Of Pests and People: Understanding rapid evolution to environmental change using insect pest systems" Dept. of Entomology, University of Illinois, *Feb 2008*
24. **Michel A.** "Of Pests and People: Understanding rapid evolution to environmental change using insect pest systems" Dept. of Horticultural and Crop Sciences, The Ohio State University, *Oct 2007*
25. **Michel A.** "Of Pests and People: Understanding rapid evolution to environmental change using insect pest systems" Dept. of Entomology, Michigan State University, *Jan 2007*
26. **Michel A.** "Genetic variation of the apple maggot fly (*Rhagoletis pomonella*): A southern source for a northern host shift." International Plant Resistance to Insects, W. Lafayette, IN *Apr 2006.*

27. **Michel A.** "Population genetics of *Anopheles funestus* chromosomal forms" Entomological Society of America, North Central Branch, Kansas City, MO *Mar 2004*

International and National Meetings

Entomological Society of America Annual Meeting, Vancouver, CA Nov 2018

1. Trabanino A, Guidolin A, Fatoretto J, Michel A. 2018. The evaluation of Fortenza® seed treatment as a potential strategy to control Bt resistance in fall armyworm, *Spodoptera frugiperda*.
2. Mittapelly P, Phelan PL, Michel A. 2018. Impact of bacterial endosymbiont on free amino acid levels in brown marmorated stink bug.
3. Esquivel-Palma C, Cañas L, Hendrix B, Michel A. 2018. Effects of insecticides on lady beetles and insidiosus pirate bugs.
4. Yates AD, Blakeslee J, Michel A. 2018. A metabolomics approach to better understand soybean aphid (*Aphis glycines*) adaptation to aphid-resistant soybean.

Entomological Society of America Annual Meeting, Denver, CO Nov 2017

1. Mittapelly P and Michel AP. 2017. RNA interference in brown marmorated stink bug.
2. Esquivel CJ, Cañas L, Michel AP. 2017. Measuring tri-trophic impacts of neonicotinoids through soybean aphid and green peach aphid.
3. Guidolin A, Lagos-Kutz D, Pavinato VAC, Hartman G, Michel AP. 2017. Association mapping of virulence in soybean aphid (*Aphis glycines*)

International Congress of Entomology Meeting, Orlando, FL Sep 2016

1. Wenger JA, Michel AP, Legeai F, Bansal R, Johnston JS, Pavinato V, Yates A, Cassone B. 2016. Genome assembly of the soybean aphid (*Aphis glycines*) via hybrid approach.
2. Esquivel C, Cañas L, Michel AP. 2016. Length of thiamethoxam seed treatment activity against soybean aphid (*Aphis glycines*).
3. Yates AD, Bansal R, Pavinato VAC, Michel AP. 2016. Identifying changes in gene expression that may promote virulence in the soybean aphid, *Aphis glycines*
4. Pavinato VAC, Lagos-Kutz D, Hartman G, Hill CB, Chirumamilla A, Michel A. 2016. Characterization of quantitative trait loci associated with soybean aphid adaptation to resistant plants.

Entomological Society of America Annual Meeting, Minneapolis, MN Nov 2015

1. Pavinato, VAC, Campos, JB, Francischini, FJB, Pinheiro JB, Omoto C, Michel AP ; Zucchi MI. 2015 . Population genetic structure and migration revealed signal of spatial and ecological divergence among populations of sugarcane borer, *Diatraea saccharalis* (Lepidoptera: Crambidae).
2. Mittapelly P, Bansal R and Michel AP. 2015. Tissue specific expression analysis of CYP3 clan P450 genes and RNAi in *Halyomorpha halys*
3. Yates AD, Bansal R, Michel AP. 2015. Comparative transcriptomic analyses of soybean aphid, *Aphis glycines,* biotypes feeding on aphid-resistant soybean.
4. Wenger JA, Michel AP. 2015. A population genomic analysis of resistance breaking biotypes in soybean aphid, *Aphis glycines* (Hemiptera).

Entomological Society of America, North Central Branch, Kansas City MO May 2015

1. Bansal R, Michel AP. Characterizing digestive and detoxification genes and RNAi in the brown marmorated stink bug (*Halyomorpha halys*)

Entomological Society of America Annual Meeting, Portland, OR. 2014

1. Gardiner MM, Smith CA, Vossbrinck AM, **Michel AP**. Debate regarding the role of intraguild predation in restructuring lady beetle communities.
2. Enders L, Miller N, **Michel AP**. Investigating insect-symbiont dynamics under stress in the soybean aphid (*Aphis glycines*).
3. Wenger JA and **Michel AP**. Population genomics of biotype adaptation in soybean aphid (*Aphis glycines*)
4. Mittapelly, P and **Michel AP**. RNA interference in *Halyomorpha halys*, brown marmorated stink bug.

Entomological Society of America, North Central Branch, St. Louis, MO *Mar 2011*

1. R. Bansal and **A. P. Michel**. Potential of transcriptomic studies in soybean aphid management.

Entomological Society of America National Meeting, San Diego, CA *Dec 2010*

1. Bai, X., W. Zhang, L. Orantes, T-H. Jun, O. Mittapalli, M. A. R. Mian, and **A. P. Michel**. Combining next-generation sequencing strategies for rapid molecular resource development from an invasive aphid species, *Aphis glycines*. (poster)
2. Orantes, L, and **A. P. Michel.** Single nucleotide polymorphism for landscape genetic analysis of the soybean aphid, *Aphis glycines*. Student Presentation

Arthropod Genomics Symposium, Kansas City, MO *Jul 2010*.

1. Bai, X., W. Zhang, L. Orantes, T-H. Jun, O. Mittapalli, M. A. R. Mian, and **A. P. Michel**. Combining next-generation sequencing strategies for rapid molecular resource development from an invasive aphid species, *Aphis glycines*. (poster)

Entomological Society of America National Meeting, Indianapolis, IN *Dec 2009*

1. **Michel, A. P.,** W. Zhang and M. M. Gardiner. Development and characterization of microsatellite loci for the convergent lady beetle (*Hippodamia convergens*): a native species in decline. (poster).
2. *Orantes, L.C., W. Zhang and **A. P. Michel**. Testing a bottleneck hypothesis for soybean aphid (*Aphis glycines*) during colonization on soybean. (poster) *Master's student advisee.
3. *Bachmann A., **A. P. Michel**, S. Fleischer. Determining the source of soybean aphid (*Aphis glycines*) populations in Pennsylvania. (poster). *outside Doctoral student advisee

World Soybean Research Conference VIII, Beijing, China *Aug 2009*

1. **Michel A. P.**, W. Zhang, J. K. Jung, S. Kang, M. A. R. Mian. Molecular marker testing for measuring soybean aphid (*Aphis glycines*) migration and gene flow.
2. Mian, M.A.R. **A. Michel**, S. T. Kang, and R. B. Hammond. Characterization of aphid resistant soybean lines, development of resistant cultivars, and soybean aphid biotypes in U.S.A.

Entomological Society of America, North Central Branch, St. Louis, MO *Mar 2009*

1. Davila-Olivas N., M. A. R. Mian, **A. P. Michel**. Detached leaf assay for soybean aphid resistance. (poster).

Entomological Society of America National Meeting, Reno, NV *Dec 2008*

1. **Michel A. P.**, W. Zhang, J. K. Jung, S. Kang, M. A. R. Mian. Molecular marker testing for measuring soybean aphid (*Aphis glycines*) migration and gene flow.
2. Young C. E., J. B. Eisley, R. B. Hammond, **A. P. Michel**. Tracking the eastern edge of first-year western corn rootworm (*Diabrotica virgifera virgifera*) distribution in Ohio through trap efficacy comparisons. (poster)

3. Jewett M. R., C. D. DiFonzo, R. B. Hammond, **A. P. Michel**, and T. Baute. Eastward Range Expansion of western bean cutworm (*Striacosta albicosta*). (poster)

Society for the Study of Evolution, Minneapolis, MN *Jun 2008*

1. Sim S. B. (presenter), **A. P. Michel**, J. L. Feder. Genetic differentiation between apple and hawthorn host races of *Rhagoletis pomonella* as revealed by microsatellite loci.

Entomological Society of America, San Diego, CA *Dec 2007*

1. Michel A. P., J. L. Feder. Genome-wide clinal variation revealed through microsatellite genome scan of *Rhagoletis pomonella.*

Entomological Society of America, Indianapolis, IN *Dec 2006*

1. Michel A. P., J. Rull, M. Aluja, J. L. Feder. Extreme variation in gene flow among *Rhagoletis pomonella* in Mexico and its influence on a northern U.S. host shift.

Society for the Study of Evolution, Stony Brook, NY *Jun 2006*

1. Michel A. P., J. Rull, M. Aluja, J. L. Feder. Population genetic structure of *Rhagoletis pomonella* in Mexico and its influences on host-race evolution.

American Society for Tropical Medicine and Hygiene, Miami, FL *Nov 2004*

1. Michel A. P., M. J. Ingrasci, B. J. Schemerhorn, M. Kern, G. Le Goff, M. Coetzee, N. Elissa, D. Fontenille, J. Vulule, T. Lehmann, N. Sagnon, C. Costantini, N. J. Besansky. Population genetics of *Anopheles funestus* across Sub-Saharan Africa.

2. Grushko O. (presenter), **Michel A. P.,** Guelbeogo W. M., N. Sagnon, C. Costantini, N. J. Besansky. Genetic structure of *Anopheles funestus* populations in Burkina Faso.

American Society for Tropical Medicine and Hygiene, Philadelphia, PA *Dec 2003*

1. Michel A. P., Guelbeogo W. M., Grushko O., N. Sagnon, C. Costantini, N. J. Besansky. Population genetics of *Anopheles funestus* chromosomal forms. (poster)

EXTENSION

Presentations (last 5 years, for full list see Appendix 3):

2020:

1. Insect Management Update. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Jan 24.* 100 Participants
2. Insects on Small Grains: worms, aphids, beetles Oh My! Auglaize County Small Grains Workshop. *Jan 9,* 30 Participants.
3. Worms in my ears: controlling caterpillars in corn. Huron County Extension Agronomy Day. *Jan 8*. 75 Participants

2019:

1. Stink bugs and defoliators in soybean. OSU Western Ag Research Station Field Day. South Charleston, OH. *Jul 17* 75 Participants.
2. Insect Update for 2017/2018. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Feb 22* 100 Participants
3. Insect Management in Soybean. Carroll County Agronomy School. Carrollton, OH. *Feb 21*. 50 Participants
4. Insect Management in Soybean. NE Ohio Agronomy School. Bristolville, OH. *Feb 20*. 100 Participants
5. Testing for Bt using test strips. OARDC Agronomy School. Wooster, OH. *Feb 8*. 20 Participants
6. Managing insects without Bt. Ohio Ag Business Association. Columbus, OH. *Jan 31*. 80 Participants

7. Insect Update for 2017/2018. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Jan 15.* 25 Participants

2018:
1. Scouting for Insects in Corn. IPM Scouting School. Ashtabula, OH. *Jul 18* 50 participants
2. Scouting for Insects in Corn. IPM Scouting School-Western Agricultural Research Station. *Jul 18* 30 participants
3. Insect Update for 2017/2018. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Feb 15* 100 Participants
4. Insect Update for 2017/2018. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Dayton, OH. *Jan 11* 100 Participants

2017:
1. Insect Concerns for Wheat and Soybean. Ohio Seed Improvement Association Seed School. Wooster, OH. *Jan 19*. 60 participants.
2. How to manage European Corn Borer and Western Corn Rootworms without Bt traits. Stewart Seeds. Celina, OH. *Feb 9*. 50 participants
3. Insect Update for 2016/2017. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Dayton, OH. *Feb 10* 100 Participants
4. Insect Update for 2016/2017. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Feb 15* 30 Participants
5. Agronomic Crop Insect Management for 2016/2017. 2017 Agronomy Workshop Delaware County. Waldo, OH. *Feb 23*. 50 Participants
6. Western Bean Cutworm Management Update. Northeast Ohio Agronomy Day. Williamsfield, OH. *Mar 15*. 100 Participants
7. Insect Update for Corn and Soybean. Western Agricultural Research Station Agronomy Day. South Charleston, OH. *Jul 19*. 100 Participants

2016:
1. Insect Concerns for Wheat and Soybean. Ohio Seed Improvement Association Seed School. Wooster, OH. *Jan 15*. 60 participants
2. Corn and Soybean Insect Update. Ohio Top Farmers. Columbus, OH. 80 Participants. *Jan 23*. 80 Participants
3. Agronomic Crop Insect Update. Muskingum Valley Agronomy Day, Coshocton, OH. *Jan 27*. 30 Participants.
4. Insect Update—2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Jan 28* 100 Participants
5. Seed Treatment Update 2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Jan 28*. 100 Participants
6. Insect Update—2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Feb 3* 20 Participants
7. RNA Interference Based Insect Control. Ohio Agriculture Business Association. Columbus, OH. *Feb 4*. 100 Participants
8. Soybean Insect Update. Soybean Workshop-Clinton County. Wilmington, OH. *Feb 8*. 35 Participants.

9. Insect Pressure on Today's Genetics and Future Control. Darke County Corn College. Greenville, OH. *Feb 9,* 90 Participants
10. Monitoring for Bt Resistant Rootworms. OARDC Agronomy Workshops. Wooster OH. *Feb 15 and 16*. 60 Participants
11. Insect Update for Corn and Soybean. Williamsfield, OH. *Feb 23*. 80 Participants.
12. No more Bt? New molecular methods for insect control. Conservation Tillage Conference. Ada, OH. *Mar 2*, 100 Participants
13. Managing Soybean Pests. Ada, OH. Conservation Tillage Conference. *Mar 3.* 100 Participants
14. Is it time to Cry over Cry1F Control of WBC. Indianapolis, IN. Indiana CCA conference. *Dec 13*. 100 Participants

2015:

1. Agronomic Crop Insect Update. OSU Extension Educator Inservice. Columbus, OH. *Dec 15*. 100 Participants.
2. Late season soybean insects to watch for. CCA @ Farm Science Review. London, OH. *Sep 15*. 100 Participants.
3. Late season soybean insects to watch for. Western Ohio Field Day. Woodstock, OH. *Jul 31*. 100 Participants
4. Insect Update – 2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Columbus, OH. *Mar 22*. 75 Participants
5. Insect Update – 2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Feb 18*. 20 Participants
6. Soybean Insect Pests – why late season leaf & pod feeders are eating our lunch. Intensive Soybean Workshop. Wauseon, OH. 50 Participants. *Feb 17*.
7. The Good and the Bad of Insecticidal Seed Treatments. Ohio AgriBusiness Association Industry Conference. Columbus, OH. 75 Participants. *Feb 5*.
8. Insect Issues in Soybean. Intensive Soybean Workshop. Xenia, OH. 22 Participants. *Feb 4*.
9. Late Season Insect Issues in Soybean OSU Agronomy Extension Program Webinar. *Feb 3.*
10. Promoting Effective and Safe Insect Pest Management through Seed Treatments and RNAi. Bug University-Univar Corp. Austin, TX. 50 Participants. *Jan 29*.
11. Insect Update—2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Feb 22*. 50 Participants
12. Soybean Insect Pests – why late season leaf & pod feeders are eating our lunch. Intensive Soybean Workshop. Paulding, OH. 20 Participants. *Jan 20*.
13. Corn and Soybean Insect Update. Ohio Top Farmers. Columbus, OH. 80 Participants. *Jan 17*.
14. Insect Concerns for Wheat and Soybean. Ohio Seed Improvement Association Seed School. Columbus, OH. *Jan 15*. 80 participants
15. Corn and Soybean Insect Update. Western Ohio Agronomy Day. Ft. Loramie, OH. *Jan 12*. 250 participants

Papers in Proceedings:

1. Tilmon K.J. and A. Michel. 2018. Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2018 Recertification Conference. OSUE

2. Tilmon K.J. and A. Michel. 2017. Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2017 Recertification Conference. OSUE
3. Tilmon K.J. and A. Michel. 2016. Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2016 Recertification Conference. OSUE
4. A. Michel. 2015. 2015 Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2015 Recertification Conference. OSUE
5. Hammond, R., and A. Michel. 2014. 2014 Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2014 Recertification Conference. OSUE
6. Hammond, R., and A. Michel. 2014. 2014 Update on Insect Management Tactics. 2014 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
7. Hammond, R., and A. Michel. 2014. 2014 Update on Field Crop Insect Activity. 2014 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
8. Hammond, R., and A. Michel. 2013. 2013 Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2013 Recertification Conference. OSUE
9. Hammond, R., and A. Michel. 2013. 2013 Update on Field Crop Insect Activity. Ohio Pesticide Commercial Applicator 2013 Recertification Conference. OSUE
10. Hammond, R., and A. Michel. 2013. 2013 Update on Insect Management Tactics. 2013 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
11. Hammond, R., and A. Michel. 2013. 2013 Update on Field Crop Insect Activity. 2013 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
12. Hammond, R., and A. Michel. 2012. 2012 Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2012 Recertification Conference. OSUE
13. Hammond, R., and A. Michel. 2012. 2012 Update on Field Crop Insect Activity. Ohio Pesticide Commercial Applicator 2012 Recertification Conference. OSUE
14. Hammond, R., and A. Michel. 2012. 2012 Update on Insect Management Tactics. 2012 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
15. Hammond, R., and A. Michel. 2012. 2012 Update on Field Crop Insect Activity. 2012 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
16. Hammond, R., and A. Michel. 2012. 2012 Update on Forage Insect Activity. 2012 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
17. Hammond, R., and A. Michel. 2011. 2011 Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2011 Recertification Conference. OSUE
18. Hammond, R., and A. Michel. 2011. 2011 Update on Field Crop Insect Activity. Ohio Pesticide Commercial Applicator 2011 Recertification Conference. OSUE
19. Hammond, R., and A. Michel. 2011. 2011 Update on Insect Management Tactics. 2011 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
20. Hammond, R., and A. Michel. 2011. 2011 Update on Field Crop Insect Activity. 2011 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
21. Hammond, R., and A. Michel. 2010. 2010 Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2010 Recertification Conference. OSUE
22. Hammond, R., and A. Michel. 2010. 2010 Update on Field Crop Insect Activity. Ohio Pesticide Commercial Applicator 2010 Recertification Conference. OSUE
23. Hammond, R., and A. Michel. 2010. 2010 Update on Insect Management Tactics. 2010 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
24. Hammond, R., and A. Michel. 2010. 2010 Update on Field Crop Insect Activity. 2010 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE

25. Hammond, R., and A. Michel. 2009. 2009 Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2009 Recertification Conference. OSUE
26. Hammond, R., and A. Michel. 2009. 2009 Update on Field Crop Insect Activity. Ohio Pesticide Commercial Applicator 2009 Recertification Conference. OSUE
27. Hammond, R., and A. Michel. 2009. 2009 Update on Insect Management Tactics. 2009 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
28. Hammond, R., and A. Michel. 2009. 2009 Update on Field Crop Insect Activity. 2009 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
29. Hammond, R., and A. Michel. 2008. 2008 Update on Insect Management Tactics. Ohio Pesticide Commercial Applicator 2008 Recertification Conference. OSUE
30. Hammond, R., and A. Michel. 2008. 2008 Update on Field Crop Insect Activity. Ohio Pesticide Commercial Applicator 2008 Recertification Conference. OSUE
31. Hammond, R., and A. Michel. 2008. 2008 Update on Insect Management Tactics. 2008 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE
32. Hammond, R., and A. Michel. 2008. 2008 Update on Field Crop Insect Activity. 2008 Ohio Pesticide Private Applicator Recertification Proceedings. OSUE

Extension Publications, Bulletins and Technical Reports

1. **Michel, A. P.**, C. Welty, R., Hammond, and J. B. Eisley. 2009. Western Bean Cutworm. Columbus, Ohio: OSUE. (Report No. FC-ENT-40-09).
2. Hammond, R., **A.P. Michel,** and B. Eisley. 2009. Alfalfa Weevil on Alfalfa. Columbus, OH: OSUE. (Report No. FC-ENT-0032-09).
3. Hammond, R., **A.P. Michel**, and B. Eisley. 2009. Armyworm on Wheat. Columbus, OH: OSUE. (Report No. FC-ENT-36-09).
4. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Bean Leaf Beetle on Soybean. Columbus, OH: OSUE. (Report No. FC-ENT-0023-09).
5. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Black Cutworm on Corn. Columbus, OH: OSUE. (Report No. FC-ENT-35-09).
6. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Cereal Leaf Beetle. Columbus, Ohio: OUSE. (Report No. FC-ENT-38-09).
7. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Corn Rootworm Management. Columbus, OH: OSUE. (Report No. FC-ENT-0016-09).
8. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Defoliators on Soybean. Columbus, Ohio: OSUE. (Report No. FC-ENT-39-09).
9. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. European Corn Borer. Columbus, OH: OSUE. (Report No. FC-ENT-0015-09).
10. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Monitoring Western Corn Rootworm Activity in Soybeans to Predict Rootworm Injury in First-Year Corn. Columbus, OH: OSUE. (Report No. FC-ENT-0017-09).
11. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Potato Leafhopper on Alfalfa. Columbus, OH: OSUE. (Report No. FC-ENT-0033-09).
12. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Slugs on Field Crops. Columbus, OH: OSUE. (Report No. FC-ENT-0020-09).
13. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Soybean Aphid. Columbus, OH: OSUE. (Report No. FC-ENT-37-09).

14. Hammond, R., **A. P. Michel**, and B. Eisley. 2009. Twospotted Spider Mite on Soybean. Columbus, OH: OSUE. (Report No. FC-ENT-0024-09).
15. Williams R. N., D. S. Fickle, **A. P. Michel**, and K. Goodell. 2008. Biology and behavior of the squash bee. OSUE fact sheet.
16. Hammond, R. B., **A. P. Michel,** and J. B. Eisley. 2008. Insect Control. In *Improving Wheat Profits in* Ohio. OSUE Bulletin 938.

Popular Publications

1. **Co-Author on over 300 articles in OSU-Extension Agronomic Crops Team's CORN Newsletter (citations available on request, see http://corn.osu.edu/)**
2. On the hunt for kudzu bugs in Ohio. Ohio Soybean News, Summer 2014.
3. Early season pests are out in force around Ohio. Ohio Country Journal. Mid-June 2014.
4. Protecting bees during spring planting. Crop News Weekly. Corn and Soybean Digest. April 3, 2013. http://enewspro.penton.com/preview/cropnewsweekly/SO-02/20130403_SO-02_453/display
5. Hammond, R. B., and A. Michel. 2013. Insecticide seed treatments on field crops. Leader Letter, Ohio Soybean Assoc., May 2013.
6. Hammond, R. B., and A. Michel. 2013. Catch the Buzz - Don't Spray Beans In Bloom. Bee Culture Blog. July 2013
7. Michel, A., and R. B. Hammond. 2013. Check corn roots for signs of resistant western corn rootworm. Ohio's Country Journal August 2013.
8. Michel, A., and R. B. Hammond. 2013. Mid-summer pest update. Ohio's Country Journal August 2013.
9. Hammond, R. B., and A. Michel. 2013. Late Season Insect Concerns. Ohio Soybean News, Ohio Soybean Association, Summer II, 2013.
10. Michel, A., and R. B. Hammond. 2012. The search is on for invasive bugs in Ohio. Ohio Soybean News, Summer II 2012.
11. Hammond, R. B., and A. Michel. 2012. Stink bugs showing up in soybeans. Ohio's Country Journal. September 2012
12. Michel, A., and R. B. Hammond. 2012. The search is on for invasive bugs in Ohio. Ohio's Country Journal. September 2012
13. Hammond, R. B., and A. Michel. 2012. Southern corn rootworm in soybean. Ohio Soybean Associate Leader Letter. September/October 2012
14. Hammond, R. B., and A. Michel. 2012. Fall populations of soybean aphids non-existent. Ohio's Country Journal. Mid-November 2012
15. Michel, A., and R. B. Hammond. 2012. Will the two year soybean aphid cycle last? Ohio Soybean News. Winter 2012.
16. A. Michel. Dec 2012. "Reporting website for overwintering brown marmorated stink bug" (Newspaper Article). Ohio Country Journal.
17. R. Bansal and A. Michel. Dec 2012. "Fact-Finding on the Risk of Kudzu Bugs in Ohio" (Magazine Article). Ohio Soybean News.
18. R. Bansal and A. Michel. Nov 2012. "Fact-Finding on the Risk of Kudzu Bug in Ohio" (Magazine Article). Ohio Soybean Association Leader Letter.
19. Michel, A., R. Bansal, M. A. Mian, and R. B. Hammond. 2013. Using soybean aphid resistant varieties. Ohio Soybean News, Ohio Soybean Association Leader Letter,

July/August, 2013.A. P. Michel "Current Status of Soybean Aphid Biotypes" Ohio Soybean Council Bulletin, 2010
20. Hammond, R.B. and **A. P. Michel**. "Soybean Aphids in Ohio." Ohio Soybean Council Bulletin, 2009.
21. Hammond, R., **A. P. Michel**, and B. Eisley. Corn rootworm control in 2009. January, 2009. Ohio's Country Journal.
22. Hammond, R., R. Mian, **A. P. Michel**, B. Eisley, A. Dorrance, D. Mills, B. Meiring, G. Arnold, and M. Koenig, 2008 Ohio pest research highlights. January, 2009. Ohio's Country Journal.
23. Hammond, R., **A. P. Michel**, B. Eisley, Updated IPM and Insects. February, 2009. AG Professional. http://agprofessional.com/show_story_du.php -id=56878.
24. Hammond, R. B., and **A. P. Michel**. Researching ways to manage the soybean aphid. September, 2009. Soybean Review.
25. Hammond, R., **A. P. Michel**, and B. Eisley. 2007. Transgenic corn and refuge requirements. Ohio's Country Journal. December, 2007.

TEACHING

1. ENT7930: Scientific Writing. *Autumn 2013* (co-taught with Dr. Susan Jones), *Autumn 2015* (co-taught with Dr. Elizabeth Long)
2. ENT6940: Insect Ecology and Evolutionary Processes (co-taught with Dr. Dan Herms and Dr. Mary Gardiner). *Autumn 2010, 2012, 2014, 2016*
3. HCS830: Plant Domestication (co-taught with Dr. Esther van der Knapp). *Winter 2011.*
4. ENT795: Molecular Agroecology: Overview of Population Genetic and Molecular Ecology Techniques for Agriculturally Related Species. *Summer 2010*
5. EEOB 881.04: Seminar in Analysis of Population Genetic Data. Contributed to lectures and analyses, *Autumn 2007*

SERVICE

<u>Department</u>
1. Chair, Entomology Graduate Studies Committee, *Oct 2013-May 2016*
2. Entomology Faculty Search Committee, Agronomic Crops Insects, Chair, *Oct 2014-Present*
3. Entomology Faculty Search Committee, Veterinary/Livestock Ent., Co-Chair, *April 2010-Jan 2011*
4. Administrative Advisory Committee, Dept. of Entomology, *Jan 2010-Present*
5. Entomology Seminar Committee, Chair, *Oct 2009- Dec 2011*
6. Entomology Graduate Committee, *2009-2011*
7. Judge for Delong Award Competition, Dept. of Entomology, OSU, *May 2008, 2010*
8. "A BugsWorld" contributor for Agricultural Ecology and Beetle Blitz, *Apr 2008-Present*
9. Entomology Graduate Curriculum Committee, *2008-2009*
10. Entomology Faculty Search Committee, Molecular Insect-Plant Interactions *Sep 2007-Apr 2008*
11. Entomology Social Committee (Wooster), *2007-2009*

<u>University</u>

1. Chair, Molecular and Cellular Imaging Center Strategic Planning Committee, CFAES Wooster Campus (*Feb 2020- Present)*
1. Chair, CFAES Wooster Campus Strategic Planning Committee for Greenhouses (*June 2020-Present)*
2. OARDC-SEEDS Research Committee, 2011-2015 (Chair, 2014-2015)
2. OARDC-MCIC Faculty Advisory Committee, *Apr 2009-Present*
3. OARDC Faculty Research Awards Committee: *Oct 2008-Oct 2011*
4. OSU Roads Scholar Program, *Sep 9-10, 2009*

Professional Societies & Meetings

1. President, Entomological Society of America North Central Branch, *Mar 2019-Mar 2020*
2. Secretary, Entomological Society of America, P-I E Section, *Nov 2013-Nov 2016*
3. Co-Author, Resistance Management in GM Crops Position Statement, Entomological Society of America Science Policy Committee
4. Student Awards Committee for Entomological Society of America, North Central Branch, *2008-Present*
5. Symposium co-Organizer and co-Moderator, Management of Soybean Aphid in North America: Current Research and Future Prospects." ESA-NCB Meeting, *Mar 2011*
6. Symposium co-Organizer and co-Moderator, "Insect Scientist/Plant Breeder Interactions: Working Together Towards Host Plant Resistance in Soybeans." ESA National Meeting, *Dec 2009*
7. Judge for Plant-Insects and Ecosystem Student Competition, ESA National Meeting, *Dec 2009*
8. Judge for Plant-Insects and Ecosystem Student Competition, ESA-NCB Meeting, *Mar 2009*
9. Judge for Plant-Insects and Ecosystem Student Competition, ESA National Meeting, *Nov 2008*
10. Symposium Organizer and Moderator, "Genetics and Genomics of Agronomic Pests: From Populations to Individuals to Genes." Entomological Society of America, *Mar 2008*
11. Gamma Sigma Delta Ohio State Chapter, Vice President (2010), and President (2011) *2010-Present*
12. Moderator, Student Competition, Systematics, Morphology & Evolution
13. Entomological Society of America, *Dec 2006*
14. Moderator, Speciation Symposium
15. Society for the Study of Evolution, *Jun 2006*
16. Graduate Student Paper Competition Judge, *Apr 2006*
17. International Plant Resistance to Insects

Editorial Positions and *Ad Hoc* Reviews

Current Opinion in Insect Science, Editorial Board, *Dec 2013-Present*
Editor, *Neotropical Entomology*, *Sept 2014-Present*
Journal of Medical Entomology, Editorial Board, *Dec. 2009-Dec 2013*

PNAS, BMC: Genomics, BMC Evolutionary Biology, PLoS:ONE, Heredity, Journal of Heredity, American Journal of Tropical Medicine & Hygiene, Medical and Veterinary Entomology, Molecular Ecology, Bulletin of Entomological Research, Journal of the Kansas Entomological Society, Environmental Entomology, Agricultural and Forest Entomology, Entomologia

Experimentalis et Applicata, Acta Tropica, Infection, Genetics and Evolution, National Health Laboratory Service Research Trust (research proposal review), Agri-Food Canada (research proposal review), University of Guelph (research proposal review), National Science Foundation, DEB (research proposal review).

Professional Memberships
Member, Entomological Society of America, *Jun 2006-Present*

Regional Committees
Michel A.P. NC-246: Ecology and Management of Arthropods in Corn. 2009-Present (Secretary 2016; Vice President, 2017; President 2018)
Michel A. P. S-1039. Biology, Impact, and Management of Soybean Insect Pests in Soybean Production Systems. *2009-Present (President, Feb 2012-Mar 2013, Secretary, Feb. 2011-Present)*
Michel A. P. NC-205: Ecology and Management of European Corn Borer and Other Lepidopteran Pests of Corn. *2008-2014*
Michel A. P. NCERA-213: Migration and Dispersal of Agricultural Biota. *2007-Pres (Secretary and Treasurer, Oct 2008-Oct 2009; Vice-President, Oct 2009-2010; President Oct. 2010-Present)*

APPENDIX 1 —COMPLETE LIST OF PUBLICATIONS

PEER REVIEWED PUBLICATIONS (90 total, 82 @ OSU)
(last 5 years listed, see Appendix for complete list)

1. Tilmon KJ, **Michel A**, and O'Neal ME. 2021. Aphid resistance is the future for soybean production, and has been since 2004: Efforts towards a wider use of host plant resistance in soybean. *Current Opinion in Insect Science.* Accepted.
2. Bansal R, Mian MAR, Michel A. 2021. Characterizing Resistance to Soybean Aphid: Antibiosis and Antixenosis Assessment. *Journal of Economic Entomology*. Accepted.
3. Bezerra do Nascimento AR, Pavinato VAC, Rodrigues JG, Silva-Brandão KL, Consoli FL, **Michel A**, Omoto C. 2021. There is more than chitin synthase in insect resistance to benzoylureas: Molecular markers associated with teflubenzuron resistance in Spodoptera frugiperda. *Journal of Pest Science*. Accepted.
4. Yates-Stewart AD, Pekarcik A, **Michel A,** Blakeslee JJ. Jasmonic acid-isoleucine (JA-Ile) is involved in the host-plant resistance mechanism against the soybean aphid (Hemiptera: Aphididae). *Journal of Economic Entomology*. Accepted.
5. Esquivel CJ, Martinez EJ, Baxter R, Trabanino R, Ranger CM, **Michel A**, Cañas LA. Thiamethoxam differentially impacts survival of the generalist predators, *Orius insidiosus* and *Hippodamia convergens*, when exposed via the food chain. 2020. *Journal of Insect Science*. 20:13.
6. Cordeiro EMG, Pantoja-Gomez LM, de Paiva JB, Nascimento ARB, Omoto C, **Michel AP**, Correa AS. 2020. Hybridization and introgression between *Helicoverpa armigera* and *H. zea*: an adaptational bridge. 20:61. *BMC Evolutionary Biology*.
7. Yates-Stewart AD, Daron J, Wijeratne S, Slotkin RK, **Michel A.** 2020. Soybean aphids adapted to host-plant resistance by down regulating putative effectors and up regulating transposable elements. *Insect Biochemistry and Molecular Biology*. 121: 103363.

8. Coates et al. 2020. Genome scan detection of selective sweeps among biotypes of the soybean aphid, *Aphis glycines*, with differing virulence to resistance to *A. glycines* (*Rag*) traits in soybean, *Glycine max*. *Insect Biochemistry and Molecular Biology*. 124: 103364.
9. Murúa MG, Vera MA, **Michel A**, Casmuz AS, Fatoretto J, Gastaminza G. 2019. Performance of field-collected *Spodoptera frugiperda* (Lepidoptera: Noctuidae) strains exposed to different transgenic and refuge maize hybrids in Argentina. J. Insect Sci. 19:21.
10. Smith JL, DiFonzo CD, Baute TS, **Michel AP**, Krupke CK. 2019. Ecology and management of the western bean cutworm (Lepidoptera: Noctuidae) in corn and dry beans – Revision with focus on the Great Lakes region. *Journal of Integrated Pest Management*. 10:27.
11. Izascum Pérez-Valencia L, **Michel AP**, Moya-Raygoza G, Rodríguez A. 2019. Genetic variation and structure of *Diaphorina citri* (Hemiptera:Liviidae) in populations from México. *Annals of the Entomological Society of America*. 112: 379–387.
12. Mittapelly P, Bansal R, **Michel A**. Differential expression of cytochrome P450 CYP6 genes in the brown marmorated stink bug, *Halyomorpha halys* (Hemiptera: Pentatomidae). 2019. *Journal of Economic Entomology*. 112: 1403-1410.
13. Esquivel CJ, Ranger CM, Phelan L, Martinez EJ, Hendrix WH, Cañas LA, and **Michel AP**. 2019. Weekly survivorship curves of soybean aphid biotypes 1 and 4 on insecticidal seed-treated soybean. *Journal of Economic Entomology*. 112: 712–719.
14. Pérez-Alquicira J, **Michel A**., van der Knaap EE, Mercer K, Mitchell T, McHale L, Luna-Ruiz J, Texocotitla-Vázquez E, Vargas-Ponce O. 2019. Genetic structure of *Liriomyza trifolii* (Diptera: Agromyzidae) associated with host plants from southeastern Mexico. *Environmental Entomology*. 48: 253–262.
15. Angelella G, **Michel A,** and Kaplan I. 2019. Using host-associated differentiation to track source population and dispersal distance among insect vectors of plant pathogens. *Evolutionary Applications*. 12: 692-704.
16. Taitano N, Bernau V, Barbolla L, Leckie B, Mazourek M, Mercer K, McHale L, **Michel A.** Baumler D, Kantar M, van der knaap E. 2019. Genome-wide genotyping of a novel mexican chile pepper collection illuminates the history of landrace differentiation after *Capsicum annuum* L. domestication. *Evolutionary Applications*. 12:78-92.
17. Ng S, Dorrance AE, **Michel AP**, Lindsey L. 2018. Effect of Mid-Season Foliar Fungicide and Foliar Insecticide Applied Alone and In-Combination on Soybean Yield. *Crop and Soils Magazine.* July-August: 52-58.
18. Yates AD, **Michel AP**. 2018. Mechanisms of aphid adaptation to host plant resistance. *Current Opinion in Insect Science*. 26: 41-49.
19. Piermarini PM, Inocente EA, Acosta N, Hopkins CR, Denton JS, **Michel AP**. 2018. Inward rectifier potassium (Kir) channels in the soybean aphid *Aphis glycines*: Functional characterization, pharmacology, and toxicology. *Journal of Insect Physiology*. 110:57-65.
20. Hanson AA, Lorenz AJ, Hesler LS, Bhusal SJ, Bansal R, **Michel AP**, Jiang GL, Koch RL. 2018. Genome-Wide Association Mapping of Host-Plant Resistance to Soybean Aphid. *Plant Genome*. 11: 10.3835.
21. Murúa MG, Vera MA, Herrero MI, Fogliata SV, **Michel AP**. 2018. Defoliation of Soybean Expressing Cry1Ac Against Lepidopteran Pests. *Insects*. 9: E93
22. Bansal R, **Michel AP**. 2018. Expansion of cytochrome P450 and cathepsin genes in the generalist herbivore brown marmorated stink bug. *BMC: Genomics*. 19:60.
23. ESA Position Statement on Insect Resistance Management for Genetically Modified Crops. 2018. *Annals of the Entomological Society of America*. 111:3-5.

24. Pavinato VAC, **Michel AP**, de Campos JB, Omoto C, Zucchi M. 2018. Influence of historical land use and modern agricultural expansion on the spatial and ecological divergence of sugarcane borer, *Diatraea saccharalis* (Lepidoptera: Crambidae) in Brazil. *Heredity*. 120:25–37.
25. Fatoretto JC, **Michel AP**, Silva Filho MC, Silva N. 2017. Adaptive potential of fall armyworm limits Bt trait durability in Brazil. *Journal of Integrated Pest Management.* 8: 17.
26. Koch RL, **Michel AP**, Hunt T. 2017. Identification, biology, impacts and management of stink bugs (Hemiptera: Heteroptera: Pentatomidae) of Soybean and Corn in the Midwestern United States. *Journal of Integrated Pest Management.* 8: 11.
27. Lee S, Cassone BJ, Wijeratne A, Jun T-H, **Michel AP**. 2017. Transcriptomic dynamics in soybean near-isogenic lines differing in alleles for an aphid resistance gene, following infestation by soybean aphid biotype 2. *BMC: Genomics.* 18(1):47.
28. Leite NA, Correa AS, **Michel AP**, Alves-Pereira A, Pavinato VAC, Zucchi MI, Omoto C. 2017. Intra- and interspecific gene flow of *Helicoverpa armigera* and *H. zea* (Lepidoptera: Noctuidae) in the Americas. *Environmental Entomology*. 46:1024-1034
29. Koch R, Potter B, Glogoza P, Hodgson E, Krupke C, Tooker J, DiFonzo C, **Michel A**, Tilmon K, Prochaska T, Knodel J, Wright R, Hunt T, Jensen B, McCornack B, Estes K, Spencer J. 2017. Biology and economics of recommendations for insecticide-based management of soybean aphid. *Plant Health Progress.* 17:265-269.
30. Wenger JA, Cassone B, Cassone BJ, Legeai F, Johnston JS, Bansal R, Yates AD, Coates BS, Pavinato VAC, **Michel A**. 2017. Whole genome sequence of the soybean aphid, *Aphis glycines*. *Insect Biochemistry and Molecular Biology.* doi: 10.1016/j.ibmb.2017.01.005.
31. Pavinato VAC, Margarido GRA, Wijeratne AJ, Wijeratne S, Meulia T, Souza AP, **Michel AP** and Zucchi MI. 2017. RAD (Restriction site Associated DNA) for *de novo* sequencing and marker discovery in sugarcane borer, *Diatraea saccharalis* Fab. (Lepidoptera: Crambidae). *Molecular Ecology Resources*. 17:454-465.
32. Gunadi A, Bansal R, **Michel AP**, Finer JJ. 2016. Establishment and utility of in vitro soybean aphid culture, *Aphis glycines* (Hemiptera: Aphididae). *Pest Management Science*. 73: 1229-1235.
33. Bansal R, Mittapelly P, Chen Y, Mamidala P, Zhao C, **Michel A**. 2016. RNA interference and quantitative RT-PCR gene evaluation in the brown marmorated stink bug. *Plos:One*. 11(5): e0152730.
34. Stewart S, Roberston AE, Wickramasinghe D, Draper MA, **Michel A**, Dorrance AE. 2016. Population structure among and within Iowa, Missouri, Ohio, and South Dakota Populations of *Phytophthora sojae*. *Plant Disease*. 100: 367-379.
35. Mian MAR, McHale LK, **Michel AP**, Dorrance AE. 2016. Registration of 'Wyandot-14' Soybean with Resistance to Soybean Aphid and Powdery Mildew. Journal of Plant Registrations. Vol 10: 246-250.
36. Cassone BJ, Wenger JA, **Michel AP**. 2015. Whole genome sequence of the soybean aphid endosymbiont *Buchnera aphidicola* and genetic differentiation among biotype-specific strains. Journal of Genomics. 3: 85–94.
37. Cassone BJ, Redinbaugh MG, Dorrance AE, **Michel AP**. 2015. Shifts in *Buchnera aphidicola* density in soybean aphids (*Aphis glycines*) feeding on virus-infected soybean. *Insect Molecular Biology*. 24:422-3.

38. Chen Y, Redinbaugh MG, **Michel AP**. 2015. Molecular interactions and immune responses between Maize fine streak virus and the leafhopper vector *G. nigrifrons* through differential expression and RNA interference. *Insect Molecular Biology*. 24(3):391-401.
39. Flagel LE, Swarup S, Chen M, Bauer C, Wanjugi H, Carroll M, Hill P, Tuscan M, Bansal R, Flannagan R, Clark TL, **Michel AP**, Head GP, Goldman BS. 2015. Genetic markers for western corn rootworm resistance to Bt toxin. *G3: Genes | Genomes | Genetics. 2015 Jan 7. pii: g3.114.016485*.
40. Acharya B1, Lee S, Rouf Mian MA, Jun TH, McHale LK, **Michel AP**, Dorrance AE. 2015. Identification and mapping of quantitative trait loci (QTL) conferring resistance to *Fusarium graminearum* from soybean PI 567301B. *Theor and Appl Gen*. 2015 Feb 18.
41. Lee S, Freewalt KR, McHale LK, Song Q, Jun T-H, **Michel AP**, Dorrance AE, Mian MAR. 2015. A high-resolution genetic linkage map of soybean based on 357 recombinant inbred lines genotyped with BARCSoySNP6K. *Molecular Breeding*. 35:58.
42. Lee, S., Jun, T.H., Michel, A.P., Mian, M.A.R. 2015. SNP markers linked to QTL conditioning plant height, lodging, and maturity in soybean. *Euphytica,* (3), 521-532.
43. Bautista MA, Bhandary B, Wijeratne AJ, **Michel AP**, Hoy CW, Mittapalli O. 2015. Evidence for trade-offs in detoxification and chemosensation gene signatures in *Plutella xylostella*. Pest. Manag. Sci.. 71:423-432.
44. Bansal R, Mittapelly P, Cassone BJ, Mamidala P, Redinbaugh MG, and **Michel A**. 2015. Recommended reference genes for quantitative PCR analysis in soybean have variable stabilities during diverse biotic stresses *PLoS:One*. 10(8): e0134890.
45. Bansal R, Mian MA, Mittapalli O, **Michel AP.** 2014. Soybean aphid feeding on resistant soybean leads to induction of xenobiotic stress response and suppression of salivary effector genes. *BMC Genomics.* 15:972.
46. Wenger JA, Mian MAR, *Ramstad M, **Michel AP**. 2014. Fitness, movement and competition of soybean aphid biotypes and their impact on a refuge based, host-plant resistance strategy for virulence management. *Journal of Economic Entomology*. 107: 1599–1609. *undergraduate student
47. Bansal R, **Michel AP**, Sabree Z. 2014. The crypt-dwelling primary bacterial symbiont of the polyphagous pentatomid pest *Halyomorpha halys* (Hemiptera: Pentatomidae). *Environmental Entomology*. 43:617-622.
48. Bal H, **Michel AP,** Grewal PS. 2014. Genetic selection of the ambush foraging entomopathogenic nematode, *Steinernema carpocapsae* for enhanced dispersal and its associated trade-offs. *Evolutionary Ecology*. 28:923-939.
49. Flagel LE, Bansal R, Kerstetter RA, Chen M, Carroll M, Goldman BS, **Michel AP**. 2014. Western corn rootworm (*Diabrotica virgifera virgifera*) transcriptome assembly and genomic analysis of population structure. *BMC:Genomics*. 15:195.
50. Cassone BJ, Cisneros Carter FM, **Michel AP**, Stewart LR, Redinbaugh MG. 2014. Genetic insights into *Graminella nigrifrons* competence for maize fine streak virus infection and transmission. PLoS One. 9(11): e113529.
51. Cassone BJ, **Michel AP**, Stewart LR, Bansal R, Mian MA, Redinbaugh MG. 2014. Reduction in fecundity and shifts in cellular processes by a native virus on an invasive insect. *Genome Biology and Evolution*. 6(4):873-85.
52. Cassone BJ, Wijeratne S, **Michel AP**, Stewart LR, Chen Y, Yan P, Redinbaugh MG. 2014. Virus-independent and common transcriptome responses of leafhopper vectors feeding on

maize infected with semi-persistently and persistent propagatively transmitted viruses. *BMC:Genomics.* 15:133.
53. Jun TH, Freewalt K, **Michel AP**, Mian MA. 2014. Identificaiton of novel QTL for leaf traits in soybean. *Plant Breeding*. 133:61-66.
54. Bansal R, Mian MA, **Michel AP**. 2014. Microbiome diversity of *Aphis glycines* with extensive superinfection in native and invasive populations. *Environmental Microbiology Reports*. 6: 57-69.
55. Wenger JA, and **Michel AP**. 2013. Implementing an evolutionary framework for understanding genetic relationships of phenotypically defined insect biotypes in the invasive soybean aphid (*Aphis glycines*). *Evolutionary Applications.* 6:1041-53
56. Bansal R, Mian MA, **Michel AP.** 2013. Identification of novel sources of host plant resistance to known soybean aphid biotypes. *Journal of Economic Entomology.* 3:1479-1485.
57. Bansal R, Mian MA, Mittapalli O, **Michel AP**. 2013. Molecular characterization and expression analysis of soluble trehalase gene in *Aphis glycines*, a migratory pest of soybean. *Bulletin of Entomological Research*. 103:286-295.
58. Bansal R, **Michel AP.** 2013. Core RNAi Machinery and Sid1, a component for systemic RNAi, in the Hemipteran insect, *Aphis glycines*. *Int J Mol* Sci.14:3786-801.
59. Jun TH, Mian MA, **Michel AP.** 2013. Genetic mapping of three quantitative trait loci for soybean aphid resistance in PI 567324. *Heredity*. 111:16-22.
60. Jun TH, **Michel AP**, Wenger JA, Kang ST, Mian MA. 2013. Population genetic structure and genetic diversity of soybean aphid collections from the USA, South Korea, and Japan. *Genome* 56:345-350.
61. Molecular Ecology Resources Consortium. 2012. Permanent Genetic Resources added to Molecular Ecology Resources Database 1 August 2012 - 30 September 2012. *Molecular Ecology Resources.* 13: 158-159.
62. Jun T-H, Mian MAR, Kang S, **Michel AP**. 2012. Genetic mapping of the powdery mildew resistance gene in soybean PI 567301B. *Theoretical and Applied Genetics.* 125: 1159-1168.
63. Bansal R, Mian MAR, Mittapalli O, **Michel AP.** 2012 Characterization of a chitin synthase encoding gene and effect of diflubenzuron in soybean aphid, *Aphis glycines*. *International Journal of Biological Sciences*. 8: 1323-1334.
64. Jun T-H, **Michel AP**, Mian MAR. 2012 Characterization of EST-based microsatellites from the soybean aphid, *Aphis glycines*. *Journal of Applied Entomology*. 136: 614-625.
65. Chen Y, Cassone B, Bai X, Redinbaugh M, **Michel AP**. 2012. Transcriptome of the plant virus vector *Graminella nigrifrons*, and the molecular interactions of Maize fine streak rhabdovirus transmission. *PLoS:One*. 7: e40613.
66. Bansal RB, Mamidala P, Mian MAR, Mittapalli O, **Michel AP**. 2012. Validation of reference genes for gene expression studies in soybean aphid, *Aphis glycines* Matsumura. *Journal of Ecological Entomology*. Vol. 105: 1432-1438.
67. Orantes L, Zhang W, Mian MAR, **Michel AP.** 2012. Maintaining genetic diversity and population panmixia through dispersal and not gene flow in a holocyclic heteroecious aphid species. *Heredity*. 109:127-34.
68. Jun T-H, **Michel AP,** Mian MAR. 2012 Genetic mapping revealed two loci for soybean aphid resistance in PI 567301B. *Theoretical and Applied Genetics*. 124: 13-22.

69. Rodríguez G, Muños S, Anderson C, Sim S-C, **Michel A**, Causse M, McSpadden-Gardener B, Francis D, van der Knapp E. 2011. Distribution of SUN, OVATE, LC and FAS in the tomato germplasm and their role in fruit shape diversity. *Plant Physiology*. 156:275-85.
70. Jun T-H, **Michel AP**, Mian MAR. Development of soybean aphid genomic SSR markers using next generation sequencing. 2011. *Genome*. May, 54:360-7.
71. Mittapalli O, Rivera-Vega L, Bhandary B, Bautista MA, Mamidala P, **Michel AP**, Shukle RH, Mian MAR. 2011. Cloning and characterization of mariner-like elements in the soybean aphid, *Aphis glycines* Matsumura. *Bulletin of Entomological Research.* May 12:1-8.
72. Sim S-C, Robbins MD, Van Deynze A, **Michel A** and Francis D. 2011. Genetic differentiation and population structure associated with breeding history and selection in tomato (*Solanum lycopersicum* L.). *Heredity.* 106: 927–935.
73. **Michel AP,** Sim S, Powell T, Taylor M, Nosil P, Feder J. 2010. Natural selection generates widespread genomic divergence during sympatric speciation. *Proceedings of the National Academy of Sciences, USA.* 107: 9724-9. Article featured in: Kelleher, E. S. and D. A. Barbash. 2010. Expanding islands of speciation. *Nature*. 465: 1019-1020. Edtior's Choice, *Science*. 328:1209.
74. Bai X, Zhang W, Orantes L, Jun T-H, Mittapalli O, Mian MAR, **Michel AP**. 2010. Combining next-generation sequencing strategies for rapid molecular resource development from an invasive aphid species, *Aphis glycines*. *PLoS:One*. 5(6): e11370.
75. **Michel AP,** Mian MAR, Davila-Olivas NH, Cañas LA. 2010. Detached leaf and whole plant assays for soybean aphid (*Aphis glycines*) resistance: differential responses among resistance sources and biotypes. *Journal of Economic Entomology*. 103:949-57
76. **Michel AP,** Zhang W, Mian MAR. 2010. Genetic diversity and differentiation among laboratory and field populations of the soybean aphid, *Aphis glycines. Bulletin of Entomological Research*. May 27:1-8.
77. **Michel AP,** Krupke C, DiFonzo C, Baute T. 2010. Ecology and management of the western bean cutworm, *Striacosta albicosta* (Smith), in corn and dry beans. *Journal of Integrated Pest Management.* 1:1-10.
78. **Michel AP**, Zhang W, Jung JK, Kang S, Mian MAR. 2009. Population genetic structure of the soybean aphid, *Aphis glycines*. *Environmental Entomology.* 38:1301-1311.
79. **Michel AP**, Zhang W, Jung JK, Kang S, Mian MAR. 2009. Cross-species amplification and polymorphism of microsatellite loci in the soybean aphid, *Aphis glycines*. *Journal of Economic Entomology*. 102:1389-1392.
80. Bai X, Saeb A, **Michel AP**, Grewal PS. 2009. Isolation and characterization of microsatellite loci in entomopathogenic nematode *Heterorhabditis bacteriophora. Molecular Ecology Resources.* 9: 207–209.
81. Olsson SB, Linn Jr C, Feder JL**, Michel A,** Dambroski HR, Berlocher SH, Roelofs WL. 2009. Comparing peripheral olfactory coding with host preference in the *Rhagoletis* species complex. *Chem Senses*. 34: 37-48.
82. Xie X, **Michel AP**, Schwarz D, Rull J, Velez S, Forbes AA, Aluja M, Feder JL. 2008. Radiation and divergence in the *Rhagoletis pomonella* species group: Inferences from DNA sequence data. *Journal of Evolutionary Biology*. 21: 900-913.

Published at previous institutions:

83. **Michel AP,** Rull J, Aluja M, Feder JL. 2007. The genetic structure of hawthorn-infesting *Rhagoletis pomonella* populations in Mexico: implications for sympatric host race formation. *Molecular Ecology*. 16: 2867-2878.

84. Xie X, Rull J, **Michel AP**, Velez S, Forbes AA, Lobo NF, Aluja M, Feder JL 2007. Hawthorn-infesting populations of *Rhagoletis pomonella* in Mexico and speciation mode plurality. *Evolution* 61:1091-1105.
85. **Michel AP,** Grushko O, Guelbeogo WM, Lobo NF, Sagnon N, Costantini C, Besansky NJ. 2006. Divergence with gene flow in *Anopheles funestus* from the Sudan Savanna of Burkina Faso, West Africa. *Genetics* 173: 1389-1395.
86. **Michel AP,** Grushko O, Guelbeogo WM, Lobo NF, Sagnon N, Costantini C, Besansky NJ. 2006. Effective population size of *Anopheles funestus* chromosomal forms in Burkina Faso. *Malaria Journal* 5:115-121.
87. Olsson SB, Linn Jr C, Feder JL**, Michel A,** Dambroski HR, Berlocher SH, Roelofs WL 2006. Receptor expression and sympatric speciation: aberrant olfactory receptor neuron responses in F_1 hybrid *Rhagoletis* populations. *Journal of Experimental Biology* 209: 3729-3741.
88. **Michel AP,** Ingrasci MJ, Schemerhorn BJ, Kern M, Le Goff G, Coetzee M, Elissa N, Fontenille D, Vulule J, Lehmann T, Sagnon N, Costantini C, Besansky NJ. 2005. Rangewide population genetic structure of the African malaria vector *Anopheles funestus*. *Molecular Ecology* 14: 4235-4248.
89. **Michel AP,** Guelbeogo WM, Grushko O, Schemerhorn BJ, Kern M, Willard MB, Sagnon N, Costantini C, Besansky NJ. 2005. Molecular differentiation between chromosomally defined incipient species of *Anopheles funestus*. *Insect Molecular Biology* 14: 375-387.
90. Kayondo JK, Mukwaya LG, Stump A, **Michel AP**, Coulibaly MB, Besansky NJ, Collins FH. 2005. Genetic structure of *Anopheles gambiae* populations on islands in Northwestern Lake Victoria, Uganda. *Malaria Journal* 4: 59.

APPENDIX 2—PAST FUNDED PROJECTS

1. 04/2018-12/2019. Mapping of Vip resistance in fall armyworm. Syngenta Corp. ($99,840). PI: A. Michel
2. 01/2019-02/2020. Optimizing successful RNA-interference in caterpillar pests using improved nanoparticles. The Center for Applied Plant Sciences. ($52,516, $42,516 to Michel). PI: G. Rajashekara. Co-PI: A. Michel, Y. Mohamed, and A. Trabanino.
3. 10/2018-09/2019. Research and management of soybean insects FY19. Ohio Soybean Council. ($60,000 total, $29,320 to Michel). PI: K. Tilmon, Co-PI: A. Michel.
4. 01/2017-03/2019. Fortenza effect on fall armyworm populations. Syngenta Corp. ($100,000). PI: A. Michel
5. 01/2018-02/2019. Epigenetic Basis for Virulence in the Soybean Aphid. The Center for Applied Plant Sciences. ($75,000). PI: K. Slotkin. Co-PI: A. Michel, J. Reynolds and A. Yates.
6. 08/2015-07/2019. Extending durability of aphid resistance by understanding the mechanisms of virulence to Rag-genes in soybeans. Monsanto Insect Knowledge Research Program. ($539,913). PI: M. O'Neal, co-PI: A. Michel and R. Bansal.
7. 09/2015-08/2019. Integrated area-wide management of soybean aphid with biological control introductions and host plant resistance. USDA-ARS. ($275,000). PI: K. Hopper, co-PI: G. Heimpel, M. O'Neal, and A. Michel.
8. 08/2014-07/2019. Collaborative research: Winter survival mechanisms and adaptive genetic variation in an Antarctic insect. NSF: Polar Programs. ($437,622) PI: R. Lee, co-PI: D. Denlinger, A. Michel.

9. 10/2017-09/2018. Research and management of soybean insects. Ohio Soybean Council. ($60,000 total, $29,479 to Michel). PI: K. Tilmon, Co-PI: A. Michel.
10. 09/2015-08/2018. Soybean Entomology in the North Central Region: Management and Outreach for New and Existing Pests. NSCRP. ($1,511,051). PI: K. Tilmon, co-PI:A. Michel, R. Koch, E. Hodsgon, B. Diers
11. 07/2016-06/2017. Improving management of Asiatic Garden Beetle: an emerging corn pest in Ohio. ($10,000). OARDC-SEEDS. PI: A. Michel
12. 09/2016-08/2017. Monitoring and management of soybean insects FY17. The Ohio Soybean Council. ($60,000). PI: K. Tilmon, co-PI: A. Michel and J. LaMantia.
13. 05/2015-06/2017. Targeting insect-vector effectors to manage maize viral diseases. OARDC-SEEDS. ($50,000). PI: R. Bansal, co-PI: P. Redinbaugh and A. Michel
14. 09/2015-08/2016. Improvement of strategies for soybean insect monitoring and control. Ohio Soybean Council. ($45,000). PI: A. Michel, co-PI: R. Bansal and J. LaMantia.
15. 05/2015-12/2017. Identifying the adaptive role of a bacterial symbiont for management prospects of an invasive, polyphagous insect pest. OARDC-SEEDS. ($100,000). PI: A. Michel, co-PI: Z. Sabree, T. Meulia, R.Bansal.
16. 01/2016-12/2016. Genetics of multi-soybean aphid biotype resistance and soybean aphid virulence on Rag genes. United Soybean Board. ($71,812) PI: G. Hartman, Co-PI: **A. Michel**, K. Tilmon, D. Wang and R. Mian.
17. 09/2014-08/2017. Ohio Extension Implementation Program FY 2014-17: Agronomic Crops Section. USDA-NIFA-eIPM. ($886,643 total/$130,508 Agronomic Crop section). PI: J. Jasinski, Co-PI: **A. Michel**, A. Dorrance and L. Lindsey
18. 09/2012 – 08/2015. Developing insect resistance management strategies for retaining soybean aphid susceptibility to host-plant resistant soybean. North Central Regional Integrated Pest Management. ($99,771) PI: **A. Michel**, Co-PI: M. M. Gardiner, M. A. R. Mian, M. O'Neal
19. 03/2012-08/2015. Soybean aphid management, biocontrol and host plant resistance. North Central Soybean Research Program. ($2,127,000). PI: K. Tilmon, Co-PI: B. Diers, **A. Michel**, G. Heimple, E. Hodsgon.
20. 01/2014-12/2015. Refining soil fertility recommendations for soybeans in Ohio. The Ohio Soybean Council. ($34,595). PI: S. Culman, Co-PI: A. Dorrance, L. Lindsey, G. LaBarge, and **A. Michel**.
21. 10/2014-09/2015. Monitoring, research & management of invasive soybean insect pests. The Ohio Soybean Council. ($50,000). PI: **A. Michel**, Co-PI: R. Mian and F. Qu.
22. 04/2014-03/2015. A novel method for rapid evaluation of soybean aphid resistance. The Ohio Soybean Council. ($41,225). PI: **A. Michel**, Co-PI: J. Finer and F. Qu.
23. 10/2014-12/2015. Genetics of multi-soybean aphid biotype resistance and soybean aphid virulence on Rag genes. United Soybean Board. ($140,395). PI: C. Hill, Co-PI: **A. Michel**, D. Wang and R. Mian.
24. 04/2012 – 12/2014. Understanding native lady beetle decline in North America. OARDC-SEEDS. ($49,934) PI: A. Michel and M. Gardiner
25. 09/2012-08/2015. Population genomics of insect pests. ($200,000). PI: A. Michel. Monsanto Corp.
26. 01/2014-09/2014. Monitoring and evaluating emerging insect threats in commodity and specialty soybean. The Ohio Soybean Council. ($60,000). PI: A Michel, Co-PI: MAR Mian.

27. 10/2011 – 08/2014. Use of soybean hairy roots for aphid resistance studies. United Soybean Board. ($217,199) PI: A. Michel, Co-PI: J. J. Finer, M. A. R. Mian, P. L. Phelan
28. 09/2011-09/2014. A multi-scale approach to forecasting plant disease epidemics by identifying vector sources and virus reservoirs. ($99,000) NC-RIPM. PI: I. Kaplan. Co-PI: J. Holland and A. Michel.
29. 01/2010-01/2014. Common buckthorn (*Rhamnus cathartica*) as a keystone invader in agricultural landscapes. USDA-NIFA ($494,000). PI. M. Gardiner. Co-PI: A. Michel, D. Landis, M. O'Neal and D. Lusch
30. 09/2012 – 12/2013. Monitoring, understanding and managing insect threats to Ohio soybean production. The Ohio Soybean Council. ($56,000) PI: A. Michel. Co-PI: M. A. R. Mian, G. LaBarge, H. Watters, S. Prochaska
31. 09/2009-08/2013. Molecular characterization of indirect selection for increased susceptibility to insecticides. USDA-NIFA ($349,865). PI: O. Mittapalli. Co-PI: C. Hoy and A. Michel.
32. 10/2011-09/2012. Monitoring, understanding and managing insect threats to Ohio soybean production. Ohio Soybean Council ($60,000). PI: A. P. Michel. Co-PI: M. A. R. Mian, P. L. Phelan.
33. 10/2011 - 09/2012. Monitoring, understanding and managing insect threats to Ohio soybean production. OARDC SEEDS- Agency Grant. ($8,011). PI: A. Michel
34. 03/2010-11/2012. Molecular dissection of soybean aphid biotypes and aphid resistant soybean genes for controlling soybean aphids. North Central Soybean Research Program. ($204,531). PI: A. Michel, Co-PI: M. Mian and O. Mittapalli
35. 10/2010-09/2011. Integrating soybean aphid biotype distribution and host plant resistance research to manage soybean aphids in Ohio. Ohio Soybean Council ($60,000). PI: A. P. Michel, Co-PI: M. A. R. Mian.
36. 10/2011-08/2012. Determining the distribution and pest status of the trochanter mealybug, *Pseudococcus sorghiellus* (Forbes) on soybean. USDA-NIFA ($90,000). PI: R. B. Hammond, Co-PI: A. P. Michel and E. Hodsgon.
37. 03/2010. Eastern Great Lakes Western Bean Cutworm Summit: Identifying Research and Extension Needs. NC-IPM minigrants ($10,000) PI: A. P. Michel.
38. 10/2009-09/2010. Combating Ohio's soybean aphid biotypes. Ohio Soybean Council ($60,852). PI: A. P. Michel, Co-PI: M. A. R. Mian.
39. 03/2009-02-2012. Soybean aphid: management, biocontrol, and host plant resistance. NCSRP ($1,364,903). PI: Ragsdale, D. W. and 12 others.
40. 06/2010-05/2010. Effects of imidacloprid-based insecticides on the native cucurbit pollinator, *Peponapis pruinosa*. NC-IPM minigrant ($9,872). PI: R. N. Williams, Co-PI: A. P Michel and K. Goodell.
41. 04/2009-10/2010. Genetics, age, and spatial structure to improve invasive plant management strategies. OARDC-SEEDS Interdisciplinary ($100,000). PI: J. Cardina, Co-PI:C. Goeble and A. P. Michel.
42. 10/2008-09/2009. Impacts, diagnostics, distribution and migration of Ohio's soybean aphid biotypes. Ohio Soybean Council ($75,745). PI: A.P Michel, Co-PI M. A. R. Mian.
43. 06/2008-06/2009. Eastern expansion of two migrating corn pests: first-year western corn rootworm and western bean cutworm. NC-IPM Minigrants ($9,914). PI: A. P. Michel, Co-PI: R. B. Hammond, C. E. Young, and J. B. Eisley.

44. 07/2008-12/2009. Virus transmission efficiency among soybean aphid biotypes. Ohio Plant Biotechnology Consortium ($10,000). PI: A. P. Michel, Co-PI: P. G. Redinbaugh, M. A. R. Mian, R. B. Hammond.
45. 04/2008-12-2009. Genome scanning and the genetics of adaptation within the apple maggot fly, *Rhagoletis pomonella.* OARDC-SEEDS ($48,500). PI: A. P. Michel.

Research Contracts: $457,586 Total

1. DuPont Corp Field Trials 2017, $38,400
2. Agronomic Crop Field Trials, Summer 2016: 7 projects = $49,750 (details available upon request)
3. Agronomic Crop Field Trials, Summer 2015: 19 projects = $106,000 (details available upon request)
4. Seedcorn maggot and Grub Trial. Dupont Corporation. $27,000. *May 2014-May 2015.*
5. Seedcorn maggot trial. Valent Corporation. $15,000. *May 2014-May 2015*.
6. Seedcorn maggot trial. FMC Corporation. $12,000. *May 2014-May 2015*.
7. SNP Genotyping of Aphids from Monsanto Soybean Breeding Lines. Monsanto Company. $25,195. *Oct 2011-Apr 2012.*
8. Pioneer Field Trial, WBC-OAMII Pioneer Company. $32,421. *Apr 2011-Oct 2011*
9. Soybean Aphid Yield Trial Monsanto Company. $17,640. *Jun 2009-Oct 2010*
10. Development and application of molecular markers for insect resistance genes of soybean. USDA-ARS. $44,360. *Apr 2009-Feb 2011.*
11. Molecular dissection of new soybean aphid resistant genes and SNP markers for marker assisted breeding-OSU. USDA-ARS. $45,000. *Oct 2009-Sep 2010.*
12. Soybean aphid resistance genes: Fine mapping, transcriptomics, proteomics and metabolomics-Ohio State University. USDA-ARS. $45,000. *Sep 2013-Jan 2014.*

APPENDIX 3—EXTENSION PRESENTATIONS

2019:

1. Stink bugs and defoliators in soybean. OSU Western Ag Research Station Field Day. South Charleston, OH. *Jul 17* 75 Participants.
2. Insect Update for 2017/2018. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Feb 22* 100 Participants
3. Insect Management in Soybean. Carroll County Agronomy School. Carrollton, OH. *Feb 21*. 50 Participants
4. Insect Management in Soybean. NE Ohio Agronomy School. Bristolville, OH. *Feb 20*. 100 Participants
5. Testing for Bt using test strips. OARDC Agronomy School. Wooster, OH. *Feb 8*. 20 Participants
6. Managing insects without Bt. Ohio Ag Business Association. Columbus, OH. *Jan 31*. 80 Participants
7. Insect Update for 2017/2018. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Jan 15.* 25 Participants

2018:

5. Scouting for Insects in Corn. IPM Scouting School. Ashtabula, OH. *Jul 18* 50 participants

6. Scouting for Insects in Corn. IPM Scouting School-Western Agricultural Research Station. *Jul 18* 30 participants
7. Insect Update for 2017/2018. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Feb 15* 100 Participants
8. Insect Update for 2017/2018. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Dayton, OH. *Jan 11* 100 Participants

2017:

8. Insect Concerns for Wheat and Soybean. Ohio Seed Improvement Association Seed School. Wooster, OH. *Jan 19*. 60 participants.
9. How to manage European Corn Borer and Western Corn Rootworms without Bt traits. Stewart Seeds. Celina, OH. *Feb 9*. 50 participants
10. Insect Update for 2016/2017. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Dayton, OH. *Feb 10* 100 Participants
11. Insect Update for 2016/2017. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Feb 15* 30 Participants
12. Agronomic Crop Insect Management for 2016/2017. 2017 Agronomy Workshop Delaware County. Waldo, OH. *Feb 23*. 50 Participants
13. Western Bean Cutworm Management Update. Northeast Ohio Agronomy Day. Williamsfield, OH. *Mar 15*. 100 Participants
14. Insect Update for Corn and Soybean. Western Agricultural Research Station Agronomy Day. South Charleston, OH. *Jul 19*. 100 Participants

2016:

15. Insect Concerns for Wheat and Soybean. Ohio Seed Improvement Association Seed School. Wooster, OH. *Jan 15*. 60 participants
16. Corn and Soybean Insect Update. Ohio Top Farmers. Columbus, OH. 80 Participants. *Jan 23*. 80 Participants
17. Agronomic Crop Insect Update. Muskingum Valley Agronomy Day, Coshocton, OH. *Jan 27*. 30 Participants.
18. Insect Update—2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Jan 28* 100 Participants
19. Seed Treatment Update 2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Jan 28*. 100 Participants
20. Insect Update—2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Feb 3* 20 Participants
21. RNA Interference Based Insect Control. Ohio Agriculture Business Association. Columbus, OH. *Feb 4*. 100 Participants
22. Soybean Insect Update. Soybean Workshop-Clinton County. Wilmington, OH. *Feb 8*. 35 Participants.
23. Insect Pressure on Today's Genetics and Future Control. Darke County Corn College. Greenville, OH. *Feb 9,* 90 Participants
24. Monitoring for Bt Resistant Rootworms. OARDC Agronomy Workshops. Wooster OH. *Feb 15 and 16*. 60 Participants
25. Insect Update for Corn and Soybean. Williamsfield, OH. *Feb 23*. 80 Participants.
26. No more Bt? New molecular methods for insect control. Conservation Tillage Conference. Ada, OH. *Mar 2*, 100 Participants

27. Managing Soybean Pests. Ada, OH. Conservation Tillage Conference. *Mar 3.* 100 Participants
28. Is it time to Cry over Cry1F Control of WBC. Indianapolis, IN. Indiana CCA conference. *Dec 13*. 100 Participants

2015:

16. Agronomic Crop Insect Update. OSU Extension Educator Inservice. Columbus, OH. *Dec 15*. 100 Participants.
17. Late season soybean insects to watch for. CCA @ Farm Science Review. London, OH. *Sep 15*. 100 Participants.
18. Late season soybean insects to watch for. Western Ohio Field Day. Woodstock, OH. *Jul 31*. 100 Participants
19. Insect Update – 2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Columbus, OH. *Mar 22*. 75 Participants
20. Insect Update – 2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Feb 18*. 20 Participants
21. Soybean Insect Pests – why late season leaf & pod feeders are eating our lunch. Intensive Soybean Workshop. Wauseon, OH. 50 Participants. *Feb 17*.
22. The Good and the Bad of Insecticidal Seed Treatments. Ohio AgriBusiness Association Industry Conference. Columbus, OH. 75 Participants. *Feb 5*.
23. Insect Issues in Soybean. Intensive Soybean Workshop. Xenia, OH. 22 Participants. *Feb 4*.
24. Late Season Insect Issues in Soybean OSU Agronomy Extension Program Webinar. *Feb 3.*
25. Promoting Effective and Safe Insect Pest Management through Seed Treatments and RNAi. Bug University-Univar Corp. Austin, TX. 50 Participants. *Jan 29*.
26. Insect Update—2015. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Feb 22*. 50 Participants
27. Soybean Insect Pests – why late season leaf & pod feeders are eating our lunch. Intensive Soybean Workshop. Paulding, OH. 20 Participants. *Jan 20*.
28. Corn and Soybean Insect Update. Ohio Top Farmers. Columbus, OH. 80 Participants. *Jan 17*.
29. Insect Concerns for Wheat and Soybean. Ohio Seed Improvement Association Seed School. Columbus, OH. *Jan 15*. 80 participants
30. Corn and Soybean Insect Update. Western Ohio Agronomy Day. Ft. Loramie, OH. *Jan 12*. 250 participants

2014:

1. Field Crop Insect Update. OSU Extension Educator Inservice. Columbus, OH. *Dec 16*. 60 participants.
2. What we know about virulence in the soybean aphid. North Central Soybean Research Program—Soybean Aphid Field Day. *Aug 14*. 50 participants
3. Late Season Insect Issues in Soybean. CCA College @ Farm Science Review. London, OH. *Sep 9.* 50 participants.
4. Cutworms in Corn Webinar. Plant Management Network. *Oct 1*. online Available at: http://www.plantmanagementnetwork.org/edcenter/seminars/corn/Cutworms/
5. Soybean Insect Research. Soybean Team Field Day. Wooster, OH. Wayne County. *Aug 22.* 50 Participants.

6. Insect Issues in Soybean. NE-Ohio Agronomy Night. Kinsman, OH. Ashtabula County. *Aug 11.* 50 participants.
7. Current Insect Issues in Corn and Soybean. NW Ag Research Station Field Day. Hoytville, OH, Wood Co. *Aug 7.* 70 participants.
8. Scouting for insect issues in soybean. Urbana, OH, Champaign County. *Jul 8.* 20 participants.
9. Scouting for insect issues in soybean. Marysville, OH, Union County. *Jul 8*. 20 participants
10. Assessing the risk of Bt resistance in western corn rootworm. Kenton, OH. Hardin County *Jul 2.* 15 participants.
11. Asiatic Garden Beetle Field Day. Wauseon, OH. Fulton County. *Jun* 2. 50 participants.
12. Use of Genetically Modified Organisms in Field Crops. Ohio Agricultural Council Luncheon. Columbus, OH. *Apr 24.* 60 participants.
13. Insect management in field crops. Southwest Ohio Agronomy Day. Hillsboro, OH. *Mar 27*. 15 participants.
14. GMOs: Great Myths Operating about Genetically Modified Organisms. Wooster, OH. *Feb 27.* 60 participants.
15. Pesticide Applicator Training. Akron, OH. *Feb 19.* 25 participants.
16. Field Crop Insect Update. Union County Agronomy Day. Marysville, OH. *Feb 18.* 35 participants**.**
17. Insect management in corn. Northeast Ohio Agronomy Day. Williamsfield, OH. *Feb. 10*. 50 participants.
18. Invasive insects on the move. Ohio Agribusiness Association. *Feb 5.* 60 participants.
19. Insect ID and Management in Soybean. Knox County Soybean Workshop, Mt. Vernon, OH. *Feb 3*. 30 participants
20. Current & Future Corn and Soybean Insect Concerns. Wyandot County Agronomy Day. *Jan 23*. 50 participants.
21. Current & Future Corn and Soybean Insect Concerns. Corn and Soybean Day. Archbold, OH. *Jan 23.* 150 participants
22. Current & Future Corn and Soybean Insect Concerns. Putnam County Agronomy Night. *Jan 23.* 80 participants
23. Seed Treatments in Corn: Impacts on Pests and Pollinators. OSU Extension Webinars. (presented with Dr. Reed Johnson). *Jan 14.* online
24. Insect Management in Field Crops: What to look for in 2014. Western Ohio Agronomy Day. Ft. Loramie, OH. *Jan 13*. 200 participants.
25. Update on Corn Insect Management. OSU Extension Educator In-service. Columbus, OH. *Jan 8*. 70 participants
26. Insect Concerns for Wheat and Soybean. Ohio Seed Improvement Association Seed School. Columbus, OH. *Jan 9*. 80 participants

<u>2013:</u>

1. Insect Concerns for Wheat and Soybean. Ohio Seed Improvement Association Seed School. . Columbus, OH. *Jan 10.* 80 Participants
2. New and Future Insects for Field Crops. Crop Production Conference. Columbus, OH. *Jan 30*. 120 Participants
3. Insect ID and Management in Soybean. Northeast Ohio Soybean Workshop. Williamsfield, OH. *Feb 5*. ~30 Participants

4. Insect ID and Management in Soybean. Shelby County Soybean Workshop. Sidney, OH. *Feb 7*. ~30 Participants
5. Insect Update – 2013. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Feb 13*. 50 Participants
6. Insect Resistance & Adaptation. OARDC Agronomy Workshop. *Feb 20*. 50 Participants.
7. Insect Update – 2013. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Mar 21*. 100 Participants
8. Summer Update for Corn and Soybean Insects. Northeast Purdue Ag Center Field Day. Waterloo, IN. *Jul 24*. ~150 Participants.
9. Western Bean Cutworm, a New Corn Ear Pest for New England. North East Fruit and Vegetable Conference. Manchester, NH. *Dec 15.* ~100 Participants.

2012:

1. Insect Concerns and Updates for Soybean and Wheat Production. Ohio Seed Improvement Association Seed School. Columbus, OH. *Jan 10.* 80 Participants. Insect Update for 2012. Ohio Top Farmer's Meeting. *Jan 11*. ~50 participants.
2. Rootworm Apocalypse? Implications of Insect Resistance to Bt Corn and Aphid Resistant Soybeans. OABA-Crop Production Conference. *Jan 15*. ~150 Participants.
3. Soybean Bugs, Corn Critters and More. West Ohio Agronomy Day. Ft. Loramie, OH. ~150 Participants. Jan 24. ~100 Participants
4. Soybean Bugs, Corn Critters and More. Northern Ohio Crops Day. Archbold, OH ~100 participants.
5. Western Bean Cutworm and Other Insects Issues Ohio is Dealing With. Putnam County Agronomy Night. *Jan 27*. ~120 Participants.
6. Western Bean Cutworm and Other Insects Issues Ohio is Dealing With. Paulding County Agronomy Day. *Jan 28*. ~150 Participants.
7. Field Crop Insect Update. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Akron, OH. *Feb 18*. ~50 people
8. Future soybean insect pests. Soybean Production Workshop. Hoytville, OH. *Feb 19*. ~35 people.
9. Field Crop Insect Update Part I and II. Pesticide Applicators Training (PAT) Recertification Field Crop Conference. Sandusky, OH. *Feb 25*. ~100 people.
10. Insect issues in drought stressed field crops. Western Ag Station Field Day. South Charleston, OH. *Jul 25*. 70 people
11. Update on Field Crop Insect Management. 2012-2013 OSU Extension Educator In-service. Columbus, OH. *Dec 9*. 70 people

2011:

1. Organic Soybean Pest Management. "Insect pests of soybeans – how to identify, trapping and scouting." *17 Aug.*
2. West Ohio Agronomy Field Day. "Insect Threats to Soybean Production". ~65 Participants. *3 Aug*
3. Northwestern Agricultural Research Branch Field Crops Day. "Field Crop Insect Update for 2011." ~75 Participants. *28 July*
4. Western Agronomy Field Day. "Western bean cutworm, soybean aphid, seed treatments." ~75 Particpants. *20 July*

5. Wheat Production Workshop."Wheat insect pest scouting, thresholds, controls. How to ID cereal leaf beetle, bird cherry oat aphid, armyworm. ~50 participants. *31 Mar*
6. Southwest Ohio Agronomy Day. "Corn and Soybean Insect Concerns.". ~50 Participants. *23 Mar*
7. Pesticide Applicator Training. "Field Crop Insect Update" Akron, OH. ~100 Participants. *9 Mar*
8. Northeast Ohio Agronomy School. "Soybean Aphid, Western Bean Cutworm, and New Traits of Corn Hybrids." ~100 Participants *9 Feb*
9. Entomology/Plant Pathology/Fertility Agronomic Workshop. Wooster, OH. "Insect Host Plant Resistance," and "Insect Resistant Management with Transgenic Crops." 4 Participants. *3 Feb (Extension Educators),* 30 Participants *4 Feb (Producers)*.
10. Ohio Top Farmer's Annual Meeting. "Insect Update for 2011." Columbus, OH. ~50 Participants. *15 Jan*
11. Ohio Seed Improvement Association 2010 Seed School." Insect Concerns and Updates for Soybean and Wheat Production." Columbus, OH. ~75 Participants. *13 Jan*
12. Crop Production Conference, "Pros and Cons of Newer Insect Management Tactics." Columbus, OH. ~100 Participants. *7 Dec*

<u>2010</u>:

1. Extension Educator Workshop. "Insect Update 2010." Columbus, OH. ~100 Participants. *8 Dec*
2. Wyandot County Agronomy Day. "Insect Update 2010." Upper Sandusky, OH. ~70 Participants. *7 Dec*
3. Ohio Agribusiness Association. "What's Bugging Ohio—Insect update for 2010" Hilliard, OH. ~100 Participants. *18 Nov*
4. Pesticide Applicator Training. "Field Crop Insect Update" "Seed Treatment Update." Columbus, OH. ~100 Participants. *9 Mar*
5. Northern Ohio Crops Day. "Soybean Aphid, Smartstax, and other Insect Update." Gibsonburg, OH. ~100 participants. *18 Feb*
6. Western Reserve Region Agronomy Day. "Soybean Aphid, Smartstax, and other Insect Update." Williamsfield, OH. ~100 participants. *4 Feb*
7. Clark County Agronomy Day. "Current and Future Transgenic Insect Control Options with the Highest Payback." Springfield, OH. ~100 participants. *28 Jan*
8. Fulton County Corn and Soybean Day. "Current and Future Transgenic Insect Control Options with the Highest Payback." Archbold, OH. ~200 participants. *21 Jan*
9. Putnam County Agronomy Night. "Current and Future Transgenic Insect Control Options with the Highest Payback" Kalida, OH ~120 participants. *21 Jan*
10. Pesticide Applicator Training. "Field Crop Insect Update" "Seed Treatment Update." Dayton, OH. ~100 Participants. *13 Jan*
11. West Ohio Agronomy Day. "IPM Control Strategies for Field Crop Insects...Moving Targets." Sidney, OH. ~200 Participants. *11 Jan*
12. Crop Production Conference. "Current and Future Transgenic Insect Control Options—Where and How to Get Bang for Your Bucks." Columbus, OH. ~100 participants. *8 Jan*

<u>2009</u>:

1. Central Ohio Agronomy Day "BioTech Insect Events in Corn -What Ohio Research Reveals." Newark, OH. ~75 Participants. *18 Dec*
2. Extension Educator Workshop. "Current and Future Issues in Transgenic Crops." Columbus, OH. ~100 Participants. *9 Dec*
3. Western Ohio Research Station Field Day. "Field Crop Insect Update" South Charleston, OH. ~100 Participants. *22 Jul*
4. Hardin County Nightwalk. "Western Bean Cutworm Surveillance." Kenton, OH. 35 Participants. *14 Jul*
5. Pesticide Applicator Training. "Field Crop Insect Update" "Seed Treatment Update." Columbus, OH. ~100 Participants. *25 Feb*
6. Coshocton Co. & Muskingum Co. Agronomy School. "Field Crop Insect Update." Conesville, OH. ~30 Participants. *17 Feb*
7. Northern Ohio Crops Day. "Field Crop Insect Update" Gibsonburg, OH. ~100 Participants *5 Feb*
8. OARDC Plant Pathology and Entomology Workshop. Wooster, OH. 29 Participants. *3 Feb (Extension Educators),* 30 Participants *4 Feb (Producers)*
9. Topics: "IPM: back to the basics", "How much damage are those insects actually doing?", "Soybean aphid and population genetics: applications for management", "IRM and refuge: what's the biology"
10. Northeast Ohio Agronomy Day. "Field Crop Insect Update" Williamsfield, OH. 30 Participants. *22 Jan*
11. Crop Production Conference. "Field Crop Insect Update," "Seed Treatment Update," "Insect Adaptation." Columbus, OH. ~100 Participants. *8, 9 Jan*
12. Ohio Seed Improvement Association 2009 Seed School."Soybean Insect Update." Columbus, OH. ~50 Participants. *14 Jan*

<u>2008</u>:

1. Pesticide Applicator Training. "Field Crop Insect Update" "Seed Treatment Update." Lima, OH. ~100 Participants *17 Dec*
2. Crawford, Seneca, Huron Counties Agronomy Day. "What Insects Should You Control for in 2009." New Washington, OH. ~75 Participants. *16 Dec*
3. Extension Educator Workshop. "Current and Future Issues in Transgenic Crops." Columbus, OH. ~100 Participants. *3 Dec*
4. OFFER Field Day."Insect Pests in Organic Soybeans and Other Crops." Wooster, OH. ~50 Participants. *8 Aug*
5. Beneficial Insect Field Day. "Beneficial Insects in Soybean Pest Management" Bowling Green, OH. ~20 Participants. *31 Jul*
6. Northwestern Agricultural Research Center Field Day. "Field Crop Insect Update" Custar, OH. ~50 Participants. *24 Jul*
7. Western Ohio Research Station Field Day. "Field Crop Insect Update" South Charleston, OH. ~30 Participants. *8 Jul*
8. Pesticide Applicator Training. "Field Crop Insect Update," "Seed Treatment Update." Columbus, OH. ~100 Participants. *5 Mar*
9. Northern Ohio Crops Day. "Field Crop Insect Update" Gibsonburg, OH. ~100 Participants. *14 Feb*