Matthew J. Grieshop Ph. D
Associate Professor of Organic Pest Management
Current Appointment: 50% Research — 20% Extension — 30% Teaching
Michigan State University
Department of Entomology
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Education

PhD, Kansas State University, 2005.
Major: Entomology
Supporting Areas of Emphasis: Landscape Ecology
Dissertation Title: Evaluation of *Trichogramma* spp. egg parasitoids for the biological control of the Indianmeal moth in retail stores and warehouses
Major Advisors: Dr. Paul Flinn, Dr. James Nechols

MS, Montana State University, 1999.
Major: Entomology
Thesis Title: Seed versus microsite limitation of Dalmatian toadflax, extension of biological control agents for yellow toadflax, and a conceptual Dalmatian toadflax life history model
Major Advisors: Dr. Robert Nowierski

BA, University of California at Santa Cruz, 1995.
Major: Environmental Studies
Supporting Areas of Emphasis: Agroecology
Thesis Title: Entomophagous nematodes as a biological control technology for organic apple production in Santa Cruz County
Undergraduate Advisors: Dr. Stephen Gliessman, Dr. Sean Swezey

Professional Positions

Associate Professor of Organic Pest Management, Michigan State University, Department of Entomology. (July 2013 - Present).

Assistant Professor of Organic Pest Management, Michigan State University, Department of Entomology. (October 15, 2007 - Present).

Post Doctoral Research Associate, Washington State University, Tree Fruit Research and Extension Center. (August 1, 2005 - September 30, 2007).

TEACHING and MENTORING

Courses Taught

Michigan State University

CSS 424 (3cr). Fall 2011-2013. Sustainable Agriculture and Food Systems: Integrated Synthesis 3 courses.

CSS 893 (2 cr) Fall 2019. Experiential, Interdisciplinary Approaches to Ecological Food and Farming Systems, 1 course

ENT 812 (1cr), Spring 2009-Spring 2014. Scientific Writing, Current Issues in Agroecology, 6 courses.

ENT 401 (1cr) Summer 2012-Present. Undergraduate Independent Study, 7 courses.

ENT 801 (1cr) Spring 2016-Present. Graduate Independent Study, 4 courses.

ENT 479 (3cr), Fall 2008-2014. Organic Pest Management, 7 courses.

ENT 479 (3cr), Spring 2016-present. Organic Pest Management, 4 courses.

ISB 201 (3cr), Spring 2018-present. Insects, Globalization, and Sustainability, 2 courses.

Kansas State University

ENTOM 313 (1cr). Fall 2002, Spring 2003. General Entomology Laboratory, 2 courses.

PhD Students (Total Graduated: 3, 2019 Graduated: 0)

Max Helmberger. Dissertation Title: TBD. Expected graduation Spring 2022. SMEP Scholar and UDF Recipient.

Jason Matlock. Dissertation Title: "Exploring Soil Arthropod Ecology And Management Tactics In Perennial Fruit Crop Systems During The Winter." Graduated Fall 2019. Currently employed by a Medical/Recreational Cannabis consortium in SW MI as lead product scientist and greenhouse designer.

Krista Buehrer. Dissertation Title: "Integration of Organic Hog and Apple Systems." Expected Graduation: Student dropped out of program Fall 2015.

Nathaniel Walton. Dissertation Title: "The contribution of natural enemies to the management of codling moth (*Cydia pomonella* [L.]) in Michigan apple orchards." Graduated Summer 2013. Currently employed as a consumer horticulture extension educator with MSUE.

MS Students (Total Graduated: 8, 2019 Graduated: 1)

Ariana Hernandez. Thesis Title: "TBD" Expected Graduation Spring 2021.

Ben Savage. Thesis Title: "TBD" Expected Graduation Spring 2020.

Holly Hooper. Thesis Title: "TBD" Graduated Spring 2019.

Paul Owen Smith. Thesis Title: "Evaluation of Solid Set Canopy Delivery Systems in high density apples." Graduated: Summer 2017.

Kristin Deroshia. Thesis Title: "Biological control of *Halyomorpha halys* (Hemiptera: Pentatomidae) using native natural enemies in Michigan". Graduated Spring 2017. Presently employed as a research director at the MI Corn Commitee.

Joe Riddle/Tourtouis. Thesis Title: "On Entomopathogenic Nematodes (Rhabditida: Steinernematidae and Heterorhabditidae): A Potential Rearing Host, Black Soldier Fly *Hermetia illucens* (L.) (Diptera: Stratiomyidae) and Compatibility with a Predatory Beetle, *Dalotia coriaria* (Kraatz) (Coleoptera: Staphylinidae)". Graduated: Fall 2014. Presently employed as a Laboratory Manager with Vesteron in Kalamazoo, MI.

William Bradley Baughman. Thesis Title: "Effects of Strip Cultivation on Perennial Fruit Systems." Graduated: Spring 2014. Presently employed as an community organizer in Kalamazoo MI.

John Pote. Thesis Title: "Biology and Management of the Apple Flea Weevil" Expected Graduated: Summer 2013. Completed a PhD at Rutgers University.

Emily Anne Pochubay. Thesis Title: Factors Influencing *Neoseiulus cucumeris* Open Rearing in Greenhouses." Graduated: Spring 2012. Presently employed as an extension educator with MSUE.

Vianney Willot: Thesis Title: "Protection of Organic Cucumber Production Against Striped Cucumber Beetles Using Trap Crops." Graduated: Spring 2011. Went on to a PhD program at Purdue University.

Post Doctoral Research Associates/Visiting Scientists —2019 total: 2

Dr. Juan Huang. May 2012-Present. Working with Dr. Larry Gut and myself on mating disruption and attract and kill research.

Dr. Phillip Fanning. March 2016-January 2019. Working with Dr. Rufus Isaacs and myself on attract and kill, biological control and biopesticides management of the spotted wing Drosophila.

Dr. Sandeep Singh. May-August 2018. Visiting scientist from Punjab India. Completed a project evaluating spotted wing Drosophila trap competition from various fresh fruits and fruit wastes.

Dr. Harit Bal July 2016-2018. Working with Dr. Rufus Isaacs and myself on attract and kill, biological control and biopesticides management of the spotted wing Drosophila. Ecotoxicologist for Bayer Crop-Science.

Dr. Amanda Buchanan. June 2015-2018. Working with Dr. Zsofia Szendrei and myself on biological control in asparagus systems and attract and kill tactics for Japanese beetle. Development Scientist – Entomologist for ALK Pharmaceuticals.

Dr. Jason Schmidt. November 2013-December 2014. Worked with Dr. Zsofia Szendrei and myself on biological and cultural control research in cucurbit and apple systems. Presently employed as an assistant professor at UGA.

Dr. Anne Nielsen. August 2011-March 2012. Worked with Dr. Larry Gut and myself on apple flea weevil biology and control, organic hightunnel pest management, mating disruption, and brown marmorated stink bug monitoring. Presently employed in a tenure track position —Fruit Entomologist— at Rutgers University.

Dr. Luis Tiexiera. May 2009 – September 2010. Worked on lesser and greater peach tree borer mating disruption and attract and kill systems with Dr. Rufus Isaacs, Dr. Larry Gut and myself. Currently employed as a research scientist with DuPont.

RESEARCH

Published Intellectual Contributions (2019 Only)

Book Chapters/Proceedings (8 Total [6 first author, 2 junior author]) —2019 Total: 3

1. Sinha, R., R. Ranjan, L. R. Khot, G.-A. Hoheisel, **and M. Grieshop**. 2019. SOLID SET CANOPY DELIVERY SYSTEM for modified vertical shoot position trained vineyards, p. 79. *In* 15th Workshop on Spray Application and Precision Technology in Fruit Growing Programme and Abstracts. July 16-18, 2019, East Malling UK.
2. **Grieshop, M. J.,** M. Ledebuhr, K. Koonter, B. Savage, and L. Khot. 2019. Off-target deposition of a Solid Set Canopy Delivery System in high density apples, p. 81. *In* 15th Workshop on Spray Application and Precision Technology in Fruit Growing Programme and Abstracts. July 16-18, 2019, East Malling UK.
3. **Grieshop, M.J.** 2019. Cultural control/agronomic practices to prevent or manage fruit insect pests Book Chapter In: *Integrated management of diseases and insect pests of tree fruit* eds. Xu, X., M. Fountain. 748 p. Burleigh Dodds Science Publishing. Cambridge UK.

Peer Reviewed Publications (2016-2019) (47 total [9 first author, 26 senior author, 14 contri. author])
—2019 Total: 6 + 2 in press

1. Helmberger, M. S., L. K. Tiemann, and **M. J. Grieshop**. **(in press)** Towards an ecology of soil microplastics. Functional Ecology. n/a.
2. Hooper, H., and **M. J. Grieshop**. **(in press)** Postharvest Burial of Drosophila suzukii (Diptera: Drosophilidae) Infested Fruit Waste Reduces Adult Emergence. Environ Entomol.
3. Owen-Smith, P., R. Perry, J. Wise, R. Z. R. Jamil, L. Gut, G. Sundin, and **M.J Grieshop**. **(2019)** Spray coverage and pest management efficacy of a solid set canopy delivery system in high density apples. Pest Management Science. 75: 3050–3059.
4. Owen-Smith, P., J. Wise, and **M. J. Grieshop.** (2019) Season Long Pest Management Efficacy and Spray Characteristics of a Solid Set Canopy Delivery System in High Density Apples. Insects. 10: 193.
5. Ranjan, R., G. Shi, R. Sinha, L. R. Khot, G.-A. Hoheisel, and **M. J. Grieshop.** (2019) Automated Solid Set Canopy Delivery System for Large-Scale Spray Applications in Perennial Specialty Crops. Transactions of the ASABE. 62: 585–592.
6. Sinha, R., L. R. Khot, G.-A. Hoheisel, **M. J. Grieshop,** and H. Bahlol. (2019) Feasibility of a Solid set canopy delivery system for efficient agrochemical delivery in vertical shoot position trained vineyards. Biosystems Engineering. 179: 59–70.
7. Sinha, R., R. Ranjan, L. R. Khot, G. Hoheisel, and **M. J. Grieshop**. (2019) Drift potential from a solid set canopy delivery system and an axial–fan air–assisted sprayer during applications in grapevines. Biosystems Engineering. 188: 207–216.
8. Slack, S. M., C. A. Outwater, **M. J. Grieshop,** and G. W. Sundin. (2019) Evaluation of a contact sterilant as a niche-clearing method to enhance the colonization of apple flowers and

efficacy of Aureobasidium pullulans in the biological control of fire blight. Biological Control. 139: 104073.

9. Buchanan A, **Grieshop M,** Szendrei Z. (2018) Assessing annual and perennial flowering plants for biological control in asparagus. *Biological Control.* 127:1–8. Impact Factor: 2.311.
10. Jaffe BD, Avanesyan A, Bal HK, Feng Y, Grant J, **Grieshop MJ,** et al. (2018) Multistate Comparison of Attractants and the Impact of Fruit Development Stage on Trapping *Drosophila suzukii* (Diptera: Drosophilidae) in Raspberry and Blueberry. *Environmental Entomology.* 47(4):935–45. Impact Factor 1.709.
11. Poley K, Bahlai C, **Grieshop M.** (2018). Functional Response of Generalist Predators to Halyomorpha halys (Hemiptera: Pentatomidae) Eggs. *Environmental Entomology.* 3;47(5):1117–27. Impact Factor 1.709.
12. Fanning, P., **Grieshop, M.J.** and Isaacs, R. (2018) Efficacy of biopesticides on spotted wing Drosophila, Drosophila suzukii Matsumura, in fall red raspberries. *Journal of Applied Entomology.* 132: 26-32. Impact Factor: 1.641
13. Tourtois, J., Ali, J.G. and **Grieshop M.J.** (2017) Susceptibility of wounded and intact black soldier fly *Hermetia illucens* (L.) (Diptera: Stratiomyidae) to entomopathogenic nematodes. *Journal of Invertebrate Pathology*. 150: 121-129. Impact Factor: 2.379.
14. Bal, H, Adams, C. and **Grieshop M.J.** (2017) Evaluation of Off-season Potential Breeding Sources for Spotted Wing Drosophila (*Drosophila suzukii* Matsumura) in Michigan. *Journal of Economic Entomology*. 110(6): 2466-2470. Impact Factor: 1.699
15. Schmidt, J. M., Pochubay, E.A., Tourtois, J., and **Grieshop, M.J.** (2017) The Inherent Complexity of Soil and Foliar Predators for Greenhouse Biological Control. Biological Control, 115, 46-54. Impact Factor: 2.311
16. Huang, J., Gut, L. J., & **Grieshop, M. J.** (2017). Evaluation of Food-Based Attractants for Drosophila suzukii (Diptera: Drosophilidae). *Environmental Entomology*. 110 (6), 2466-2470 Impact Factor 1.709.
17. Abram, P. K., Hoelmer, K. A., Acebes-Doria, A., Andrews, H., Beers, E. H., Bergh, J. C., Bessin, R., Biddinger, D., Botch, P. S., Buffington, M. L., Cornelius, M. L., Costi, E., Delfosse, E. S., Dieckhoff, C., Dobson, R., Donais, Z., **Grieshop, M. J.,** et al. (2017). Indigenous arthropod natural enemies of the invasive brown marmorated stink bug in North America and Europe. *Journal of Pest Science*, 1–12. Available from: https://link-springer-com.proxy2.cl.msu.edu/article/10.1007/s10340-017-0891-7 doi: 10.1007/s10340-017-0891-7, ISSN: 1612-4758, 1612-4766 Impact Factor: 3.72.
18. Matlock, J.M., Isaacs, R., **Grieshop, M**., 2017. Tillage Reduces Survival of Grape Berry Moth (Lepidoptera: Tortricidae), via Burial Rather Than Mechanical Injury. *Environmental Entomology* 46, 100–106. Impact Factor 1.709.
19. McArt, S. H., Miles, T. D., Rodriguez-Saona, C., Schilder, A. M., Adler, L. S., & **Grieshop, M. J.** (2016). Floral Scent Mimicry and Vector-Pathogen Associations in a Pseudoflower-Inducing Plant Pathogen System. *PLOS ONE*, 11(11). Impact Factor: 3.234
20. Ogburn, E. C., Bessin, R., Dieckhoff, C., Dobson, R., **Grieshop, M. J.,** Hoelmer, K. A., Mathews, C., Moore, J., Nielsen, A. L., Poley, K., Pote, J. M., Rogers, M., Welty, C., &

Walgenbach, J. F. (2016). Natural enemy impact on eggs of the invasive brown marmorated stink bug, *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae), in organic agroecosystems: A regional assessment. *Biological Control*, 101, 39–51. Impact Factor: 2.178.

21. Pote, J. M., Nielsen, A. L., & **Grieshop, M. J.** (2016). Biology and Seasonality of the Reemergent Pest *Rhynchaenus pallicornis* (Coleoptera: Curculionidae) and Methods for Monitoring Its Abundance. *Environmental Entomology*, 45(4), 772–780. Impact Factor 1.315.
22. Schmidt, J. M., Szendrei, Z. I., & **Grieshop, M. J.** (2016). Elucidating the Common Generalist Predators of *Conotrachelus nenuphar* (Herbst) (Coleoptera: Curculionidae) in an Organic Apple Orchard Using Molecular Gut-Content Analysis. *Insects*, 7(3), 29. TBD (New Journal).
23. Walton, N. J., & **Grieshop, M. J.** (2016). Video observations of the natural enemies of eggs of codling moth, *Cydia pomonella*, in apple orchards in Michigan, USA. *Entomologia Experimentalis et Applicata*, 159(3), 375–377. Impact Factor: 1.711

Invited Professional/Scholarly/Extension Presentations (2019 and International only) . 29 total —2019 Total: 4
** = International

1. **Grieshop M.J.** (November 14, 2020) Impacts of a Changing Climate on Crops, Weeds and Pests. Paper Presented at: Sustainable Michigan Endowed Scholars Seminar Series. East Lansing MI (November 24, 2020)

2. **Grieshop M.J.** (October 24, 2020) Development and Application of IPM for Organic Farming Systems. Paper Presented at: Michigan State University Department of Plant and Soil Sciences Seminar Series. East Lansing MI (October 24, 2020)

3. **Grieshop M.J.** (January 25, 2019) Reimagining Pesticide Delivery Systems for 21st Century Orchards. Paper Presented at: 2019 Utah State Horticulture Association Annual Field Day, Convention and Banquet. Spanish Fork UT (January 23-25, 2019)

4. **Grieshop M.J.** Ledebuhr, M. and Hoheisel, G. (January 25, 2019) Getting the best results from your airblast sprayer. Paper Presented at: 2019 Utah State Horticulture Association Annual Field Day, Convention and Banquet. Spanish Fork UT (January 23-25, 2019)

5. **Grieshop, M.J.** (October 23, 2017). The Organic Movement, USDA National Organic Program and Genetically Modified Crops. Dow Agrosciences Seminar Series, Indianapolis IN.

6. ****Grieshop, M. J.**, Leach, H., Fanning, P. D., Bal, H. K., Huang, J., Isaacs, R "Experiencias en manejo integrado de *Drosophila Suzukii* en USA" V Simposio de Berries Arysta 2017, Zamora, Michoacon, Mexico July 27, 2017.

7. ****Grieshop, M. J.**, Leach, H., Fanning, P. D., Bal, H. K., Huang, J., Isaacs, R. (October 14, 2016) Ecological Management of Spotted Wing Drosophila: Impossible Dream or

Unavoidable Reality? Presented paper at Entomology Seminar Series, University College at Dublin, Dublin, Ireland.

8. ****Grieshop, M. J**., Leach, H., Fanning, P. D., Bal, H. K., Huang, J., Isaacs, R. (October 14, 2016) Progress towards Ecological Management of Spotted Wing Drosophila. Presented paper at Teagasc Seminar Series, Teagasc, Carlow, Ireland.

9. ****Grieshop, M. J.**, Smith, P. O., Wise, J. C., Perry, R. L. (October 11, 2016) Progress towards the Development of Solid Set Canopy Delivery Systems for High Density Tree Fruit. Presented paper at Fixed Canopy Spray Systems Meeting, CTIFL, Centre de Lanxade, Prigonrieux, France.

Submitted Professional/Scholarly Presentations (2019 only). Total: 116 —2019 Total: 12
** = International

1. Savage, B., Wang, Z., Chung, H., and **Grieshop, M.J.** (November 20, 2019). Ozonolysis of *Drosophila* cuticular hydrocarbons. Paper presented at: 2020 Entomological Society of America Annual Meeting. St. Louis, MO. (November 17-20, 2019)
2. Sial, A, **Grieshop, M.J.,** et al. ((November 19, 2019. OREI Update: Development and implementation of systems-based organic management strategies for spotted wing Drosophila. Paper presented at: 2020 Entomological Society of America Annual Meeting. St. Louis, MO. ((November 17-20, 2019)
3. Savage, B., Koonter, K., and **Grieshop, M.J.** (November 19, 2019) Exploring optimal microsprayer placement in a solid set canopy delivery system for high density apples. Poster presented at: 2020 Entomological Society of America Annual Meeting. St. Louis, MO. ((Novermber 17-20, 2019)
4. Helmberger, M. and **Grieshop, M.J.** ((November 18, 2019. A method for detecting microplastic ingestion by terrestrial arthropods. Paper presented at: 2020 Entomological Society of America Annual Meeting. St. Louis, MO. ((November 17-20, 2019)
5. **Sinha, R., R. Ranjan, L. R. Khot, G.-A. Hoheisel, **and M. Grieshop**. (July 18, 2019) SOLID SET CANOPY DELIVERY SYSTEM for modified vertical shoot position trained vineyards, Paper Presented at: 15th Workshop on Spray Application and Precision Technology in Fruit, East Malling UK (July 16-18, 2019).
6. ****Grieshop, M. J.,** M. Ledebuhr, K. Koonter, B. Savage, and L. Khot (July 18, 2019) Off-target deposition of a Solid Set Canopy Delivery System in high density apples, Paper Presented at: 15th Workshop on Spray Application and Precision Technology in Fruit, East Malling UK (July 16-18, 2019).
7. Sinha, R., Khot, L., Hoheisel, G, Ranjan, R. and **Grieshop M.J**. (July 10, 2019) On and off-target spray deposition from a solid set canopy delivery system and an axial-fan airblast sprayer tested for vineyard spray applications. Paper presented at: 2019 American Society of Agricultural and Biological Engineers Annual Meeting. Boston MA (July 7-10, 2019)
8. Sinha, R., Khot, L., Hoheisel, G, Ranjan, R. and **Grieshop M.J**. (July 10, 2019) Design modifications to an automated solid set canopy delivery system (SSCDS) for scale-up and

improved uniformity. Paper presented at: 2019 American Society of Agricultural and Biological Engineers Annual Meeting. Boston MA (July 7-10, 2019)

9. Sinha, R., Khot, L., Hoheisel, G, and **Grieshop M.J**. (July 10, 2019) Effect of emitter modifications on spraying attributes of a solid set canopy delivery system (SSCDS) configured for a high-density apple orchard. Paper presented at: 2019 American Society of Agricultural and Biological Engineers Annual Meeting. Boston MA (July 7-10, 2019)

10. **Grieshop M.J.**, Koonter, K. and Ledebuhr, M. (July 9, 2019) Solid set canopy delivery spray systems for high density fruit production: Comparison of off-target deposition using various strategies over 2 filed seasons.Paper presented at: 2019 American Society of Agricultural and Biological Engineers Annual Meeting. Boston MA (July 7-10, 2019)

11. Andrews, M. Huang, J., Koonter, K. and **Grieshop M.J.** (March 18, 2019) Olfactory associative learning in *Drosophila suzukii* (Matsumura) (Diptera: Drosophilidae). Paper presented at: North Central Branch Entomological Society of America Annual Meeting. St. Louis MO (March 17-20, 2019)

12. Savage, B. and **Grieshop M.J.** (March 18, 2019) Determination of ozone's potential as an insecticide and other deleterious effects on spotted wing drosophila, Drosophila suzukii (Matsumura) (Diptera: Drosophilidae). Poster presented at: 2019 North Central Branch Entomological Society of America Annual Meeting. St. Louis MO (March 17-20, 2019)

Contracts, Grants and Sponsored Research (2019 only)

2019 grant totals for both Indirect Cost (IDC) bearing and non-IDC bearing projects.

Total w/IDC (2 Grants)*	*Total* Non-IDC (3 Grants)*	*Grieshop w/IDC*	*Grieshop Non-IDC*	***MSU Career Total* (83 Grants)***	***MSU Career Total Grieshop***
$440,441	$95,000	$342,753	$95,000	$12,948,785	$5,271,555

*Includes collaborator budgets

1. **Grieshop M.J.** (80%), Dorgan, J.(20%). "Biopesticides from Catalytic Fast Pyrolysis Oils" National Renewable Energy Laboratory. Type: Grant; Focus: Research & Creative Activity; Total Funding Requested: $392,441, Amount Awarded during report period: $150,000; Amount Awarded to-date: $150,000. (June 22, 2019), APP# NA

2. **Grieshop, M.J.** (100%), Huang J. Gut, L., "Identifying efficient attractants for winter morph spotted wing Drosophila" Michigan Cherry Committee. Type: Grant; Focus: Research & Creative Activity; Total Funding Requested: $9,000, Amount Awarded during report period: $9,000; Amount Awarded to-date: $9,000. (April 30, 2019), APP# NA

3. **Grieshop, M. J. (**100%), Huang, J., Gut, L., "Understanding winter morph spotted wing Drosophila to provide sustainable early season management strategies." MSU-Project GREEEN. Type: Grant; Focus: Research & Creative Activity; Total Funding Requested: $80,000, Amount Awarded during report period: $40,000; Amount Awarded to-date: $80,000. (April 30, 2019), APP# 154343

4. **Grieshop, M.J.** (100%), Huang J. Gut, L., "Effect of temperature and day length on reproductive maturity of winter morph, spotted wing Drosophila" Michigan State Horticultural Society. Type: Grant; Focus: Research & Creative Activity; Total Funding Requested: $6,000, Amount Awarded during report period: $6,000; Amount Awarded to-date: $6,000. (April 30, 2019), APP# NA

5. **Grieshop M.J.** (60%), Isaacs R. (20%), Gut, L. (20%). "Biopesticides from Catalytic Fast Pyrolysis Oils" National Renewable Energy Laboratory. Type: Grant; Focus: Research & Creative Activity; Total Funding Requested: $48,000, Amount Awarded during report period: $48,000; Amount Awarded to-date: $48,000. (March 30, 2019), APP# NA

EXTENSION/OUTREACH

Extension/Outreach Publications (2018-2019) Total: 18 —2019 Total: 2

1. **Grieshop, M.J.,** Koonter, B. Savage, and S. Singh. 2019. Field Scale Evaluation of an Ozone Airblast Sprayer for Management of Apple Insect and Disease Pests. Fruit Quarterly. 27: 5–14. New York State Horticultural Society and Michigan Apple Committee.

2. Khot, L., Sinha, R., Hoheisel, G., **Grieshop, M.** 2019. Solid Set Canopy Delivery System for WA Vineyards. Washington State University – Viticulture and Enology Extension News. Spring 2019. 3-6.

3. Bal, H., Hooper, H. and **Grieshop, M.J.** 2018. Evaluation of Fruit Wastes as Off-Season Potential Breeding Sources for Spotted-Wing Drosophila in Michigan. Fruit Quarterly, 26(1): 13-17. New York State Horticultural Society and Michigan Apple Committee.

4. Leach, H., **M. J. Grieshop**, and Rufus Isaacs. 2016. Integrated Strategies for Management of Spotted Wing Drosophila in Organic Small Fruit Production. Fact Sheet.

Extension/Outreach Presentations (2019 only). Total: 222 **—**2019 total: 12

1. **Grieshop, M. J.** (December 12, 2019) *Current issues in organic fruit production*. Workshop organized for: Great Lakes Fruit and Vegetable Expo, Grand Rapids, MI.

2. **Grieshop, M. J.**, Koan, J., Tennes, T., Adsit, M., Nyblad, G. (December 12, 2019) *Developing research priorities for the North Central organic apple industry: grower panel and audience discussion*. Workshop organized for: Great Lakes Fruit and Vegetable Expo, Grand Rapids, MI.

3. Koonter, K.Akred, K.., and **Grieshop, M.J.**, (December 10, 2019) *Optimizing Coverage and Pest Control in a solid set equipped high density orchard via placement of differing micro-emitters.* Presented Poster at the 2019 Great Lakes Fruit and Vegetable Expo. Grand Rapids, MI.

4. Schuttler, C., Fisher, A., and **Grieshop, M.J.**, (December 10, 2019) *Waste Today = Infestation Tomorrow? Even more off-season spotted wing Drosophila Reproductive Resources.* Presented Poster at the 2019 Great Lakes Fruit and Vegetable Expo. Grand Rapids, MI.

5. Hernandez, H., Huang, J., Gut, L., and **Grieshop, M.J.**, (December 10, 2019) *Improving trap design and placement to increase capture of overwintering spotted wing Drosophila.* Presented Poster at the 2019 Great Lakes Fruit and Vegetable Expo. Grand Rapids, MI.

6. **Grieshop, M.J.**, Hernandez, H., Huang, J. and Gut, L. (December 10, 2019) *Identifying efficient attractants for winter morph spotted wing Drosophila.* Presented Poster at the 2019 Great Lakes Fruit and Vegetable Expo. Grand Rapids, MI.

7. Sinha, R., Ranjan, R., Khot, L.R., Hoheisel, G.A., **Grieshop, M.J.** (December 9-11, 2019). Solid set canopy delivery system: An efficient way to deliver agrochemicals in orchards and vineyards. Paper Presented at 115th Annual Meeting of Washington State Tree Fruit Association, Wenatchee, WA, USA

8. **Grieshop, M.J.,** Koan, J.K, Adsit, M., (August 29, 2019) *Organic Apple Grower Panel*. Presented at the 2019 MOFFA field day at Plymouth Orchards. Plymouht, MI.

9. Koonter K. and **Grieshop, M.J.** (August 19, 2019) *Demonstration and discussion of a simplified solid set canopy delivery system for high-density apples.* Presented talk at the 2019 Clarksville Research Center Field Day. Clarksville, MI.

10. **Grieshop, M.J.** (May 18, 2019) *Organic Apple Pest Management.* Presented talk at 2019 Michigan Pomster Annual Meeting Tree Fruit IPM School. Grand Rapids, MI.

11. **Grieshop, M.J.** (March 6, 2019) *Organic Management of Insect Pests for the Small Farm or Garden.* Presented as part of the 2019 Allen Neighborhood Garden Workshop Series. Lansing, MI.

12. **Grieshop, M.J.** and Wise, J. (February 14, 2019) *Sprayer optimization and alternative pesticide delivery systems.* Presented talk at MSU Tree Fruit IPM School. Traverse City, MI.

SERVICE (In 2019)

Department Service

Departmental Graduate Committee (August 1, 2019 – Present)

Insectary Planning Committee, Member, (January 1, 2014 - Present).

College Service

Director Sustainable Food Systems and Ecological Farming and Food Systems Program

University Service (0 new committee in 2013)

Michigan State University Academic Appeals Board. (September 2013 – Present).