Margaret (Maggie) Rose Douglas
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EDUCATION

Aug. 2016	Ph.D. Entomology/International Agriculture & Development Pennsylvania State University, University Park, PA Dissertation: Ecological trade-offs associated with insecticide use, from Pennsylvania to Bangladesh.
Aug. 2012	M.S. Entomology Pennsylvania State University, University Park, PA Thesis: The influence of farming practices on slugs and their predators in reduced-tillage field crops in Pennsylvania.
May 2004	B.A. Biology (minor Philosophy) Oberlin College, Oberlin, OH

PROFESSIONAL EXPERIENCE

2025-*present*	Associate Professor, Department of Environmental Studies & Environmental Science, Dickinson College, Carlisle, PA
2018-2025	Assistant Professor, Department of Environmental Studies & Environmental Science, Dickinson College, Carlisle, PA
2016-2017	Postdoctoral Scholar, Center for Pollinator Research, Pennsylvania State University, University Park, PA
2012-2016	Graduate Research Assistant (Ph.D.), Department of Entomology, Pennsylvania State University, University Park, PA
2014-2015 (Nov-Apr)	U.S. Borlaug Fellow (Ph.D.), AVRDC – The World Vegetable Center, Shanhua, Taiwan and Bangladesh Agricultural Research Institute, Gazipur, Bangladesh
2010-2012	Graduate Research Assistant (M.S.), Sustainable Dairy Cropping Systems Project, Pennsylvania State University, University Park, PA
2007-2009	Research Technician, Department of Biology, Georgetown University, Washington, DC
2006-2007	After-school Teacher/Classroom Assistant, EL Haynes Public Charter School, Washington, DC
Summer/Fall 2006	Research Assistant, Department of Entomology, University of Maryland, College Park, MD
2004-2005	Intern, then Executive Assistant, Center for Food Safety, Washington, DC

EXTERNAL GRANTS (PI OR CO-PI)

2025-2027	$200,000 (Dickinson subaward: $38,752)	EPA, Great Lakes Restoration Initiative Warner, S., Gefell, D., Centrella, M., Thogmartin, W., Douglas, M., and Lonsdorf, E. "Mapping and mitigating pesticide hazard for pollinators in the Great Lakes Basin using native bees as focal species." (renewal)
2024-2026	$200,000 (Dickinson subaward: $56,434)	EPA, Great Lakes Restoration Initiative Warner, S., Gefell, D., Centrella, M., Thogmartin, W., Douglas, M., and Lonsdorf, E. "Mapping and mitigating pesticide hazard for pollinators in the Great Lakes Basin using native bees as focal species." (renewal)
2022-2024	$185,840 (Dickinson subaward: $19,033)	EPA, Great Lakes Restoration Initiative Warner, S., Gefell, D., Thogmartin, W., Douglas, M., Grozinger, C., and Lonsdorf, E. "Mapping and mitigating pesticide hazard for pollinators in the Great Lakes Basin using native bees as focal species."
2022-2023	$6,000	American Association of University Women Douglas, M. Short-term Research Publication Grant Fellowship. "The American toad (*Anaxyrus americanus*): Friend or foe to crop production?"
2018-2020	$969,153 (Dickinson subaward: $38,610)	USDA, Agriculture and Food Research Initiative Grozinger, C., Miller, D., Patch, H., Lonsdorf, E., and Douglas, M. "Context is key: Tools for adapting beekeeping practices to diverse landscapes."
2018-2020	$1,220,977 (Dickinson subaward: $12,345)	Foundation for Food & Agriculture Research Grozinger, C., Cariveau, D., Douglas, M., Lonsdorf, E., Lopez-Uribe, M., Nino, E., Patch, H., Ward, K., and Williams, N. "Location, location, location: Developing tools for selection and management of landscapes to promote healthy bee populations."
2017-2019	~$130,000	NSF, National Socio-Environmental Synthesis Center Douglas, M., Lonsdorf, E., Thogmartin, W., Sponsler, D., and Grozinger, C. "Putting pesticides on the map to guide conservation of pollinators and their ecosystem services"
2017	$9,777	North American Pollinator Protection Campaign Jones, T., Lonsdorf, E., Douglas, M., Grozinger, C., Patch, H. and Sponsler, D. "Location, location, location: developing tools for selection and management of landscapes to promote healthy bee populations"
2014-2015	$17,336	USAID, U.S. Borlaug Fellowship in Global Food Security Douglas, M., Ramasamy, S., and Tooker, J. "Reversing the pesticide treadmill: Safe and effective management of key insect pests of lablab bean (*Lablab purpureus*) in Bangladesh using biopesticides and natural enemies."

2014	$15,000	Pennsylvania State University Sustainability Institute, Reinvention Fund Ayers, K., Dempsey, M., Diehl, J., Douglas, M., Easterling, H., Engle, E., Freehauf, T., Morrison, G., Mortensen, D., and Salesky, S. "People, plants, and pollinators: Enhancing the innovative living laboratory at the CfS Community Garden."
2012	$19,935	Pennsylvania Department of Agriculture 2012 Tooker, J. and Douglas, M. "Investigating the consequences of neonicotinoid seed treatments for slugs, their predators, and integrated pest management in no-till cropping systems."
2012	$14,494	USDA, Northeast SARE Graduate Student Grant Douglas, M. and Tooker, J. "Striving for sustainable pest management in no-till, field-crop systems: Understanding the role of insecticidal seed treatments."
2010	$400	Sigma Xi Grant in Aid Douglas, M. "Testing the Enemy Release Hypothesis with native and invasive slugs."

INTERNAL GRANTS - DICKINSON COLLEGE (PI OR CO-PI, * = UNDERGRADUATE STUDENT)

Summer 2025	$5,723	Dana Research Assistantship Douglas, M. "Bees and trees: Are public forests a refuge for pollinators from insecticide exposure?"
Summer 2024	$2,700	Professional Development Grant (shared by R&D, CSE) Douglas, M. "Attending the Bee Course"
Summer 2023	$5,550	Center for Civic Learning & Action, Engaged Pedagogy Funds Douglas, M. "Implementing engaged pedagogy in Environmental Data Analysis in Practice"
Fall 2022 & Spring 2023	$1,208	Dana Research Assistantship Douglas, M. "The American toad: Can this native generalist predator contribute to pest control?"
Summer 2022	$1,448	Scholarly-Creative Grant Douglas, M. and Boback, S. "Foraging behavior of the American toad toward pest and non-pest invertebrates."
Summer 2021	$11,073	Student-Faculty Research Grant Douglas, M. and Truong, N.* "Cover crops in a changing climate: Can mixtures reduce water stress?"
Spring 2021	$785	Dana Research Assistantship Douglas, M. "Influence of the American toad on the insect community at Dickinson College Farm."

Summer 2019	$10,686	Student-Faculty Research Grant Boback, S. and Douglas, M. "Impact of American toads on crops and dietary preferences of American toads."
Spring 2019	$656	Center for Sustainability Education, Student Research Assistantship Douglas, M. and Soba, S.* "Code for communication: Visualizing trends in insecticide use and bee toxicity."
Summer 2018	$900	Center for Sustainability Education, Sustainability Education Fund Grant. Strock, K., Douglas, M., and Arashiro, M. "Developing pedagogy for ENST 162: Integrative Environmental Science, a new introductory, gateway course for environmental science and studies majors."

EXTERNAL GRANTS (CONTRIBUTOR)

2013	$60,000	USDA, Northeastern IPM Center Tooker, J. "Overcoming slugs in no-till crop fields with cover crops and arthropod predators."
2013	$159,632	US EPA, Regional IPM Grant Tooker, J. "Developing an IPM program against slug populations in Mid-Atlantic no-till grain fields."

PEER-REVIEWED PUBLICATIONS (* = UNDERGRADUATE STUDENT CO-AUTHOR)

Dittemore, C., Anderson, A., Code, A., Douglas, M., Halsch, C., Lenard, A., Forister, M. Pesticides detected in two urban areas have implications for local butterfly conservation. (in press at *Environmental Toxicology & Chemistry*)

Tooker, J. F., Boucher, M.T., Wallace, J., Douglas, M.R. Feeding by slugs on maize imposes variable productivity costs but can induct compensatory growth under some conditions (in press at *Pest Management Science*)

Edwards, C., Zipkin, E., Henry, E., Haddad, N., Forister, M., Burls, K., Campbell, S., Crone, E., Diffendorfer, J., Douglas, M., Drum, R., Fallon, C., Glassberg, J., Grames, E., Hatfield, R., Hershcovich, S., Hoffman-Black, S., Larsen, E., Leuenberger, W., Linders, M., Longcore, T., Marschalek. D., Michielini, J., Neupane, N., Ries, L., Shapiro, A., Swengel, A., Swengel, S., Taron, D., Van Deynze, B., Wiedmann, J., Thogmartin, W., Schultz, C. Butterflies are declining rapidly in the United States during the 21st century. *Science*. https://www.science.org/doi/10.1126/science.adp4671

Truong, N.Q.*, York, L., Decker, A., and Douglas, M. A mixture of grass-legume cover crop species may ameliorate water stress in a changing climate. *AoB PLANTS*. https://doi.org/10.1093/aobpla/plae039

Janousek, W., Douglas, M., Cannings, S., Clement, M., Delphia, C., Everett, J., Hatfield, R., Keinath, D. Koch, J., McCabe, L., Mola, J., Ogilvie, J., Rangwala, I., Richardson, L., Rohde, A., Strange, J., Tronstad, L., Graves, T. 2023. Recent and future declines of a historically widespread pollinator linked to climate, land cover, and pesticides. *PNAS* 120(5): e2211223120. https://www.pnas.org/doi/10.1073/pnas.2211223120

Douglas, M., Soba, S.*, Baisley, P.*, Kammerer, M., Lonsdorf, E., and Grozinger, C. 2022. Putting pesticides on the map for pollinator research and conservation. *Scientific Data* 9: 571. https://doi.org/10.1038/s41597-022-01584-z

Kammerer, M., Goslee, S., Douglas, M., Tooker, J. and Grozinger, C. 2021. Wild bees as winners and losers: relative impacts of landscape composition, quality, and climate. *Global Change Biology* 27(6): 1250-1265. https://doi.org/10.1111/gcb.15485

McNeil, D., McCormick, E., Heimann, E., Kammerer, M., Douglas, M., Goslee, S., Grozinger, C. and Hines, H. 2020. Bumble bees in landscapes with abundant floral resources have lower pathogen loads. *Scientific Reports* 10: 22306. https://doi.org/10.1038/s41598-020-78119-2

Hitaj, C., Smith, D., Code, A., Wechsler, S., Esker, P., Douglas, M. 2020. Sowing uncertainty: What we do and don't know about the planting of pesticide-treated seed. *BioScience* 70(5): 390-403.

Douglas, M., Sponsler, D., Lonsdorf, E., and Grozinger, C. 2020. County-level analysis reveals a rapidly shifting landscape of insecticide hazard to honey bees (*Apis mellifera*) on US farmland. *Scientific Reports* 10: 797. https://doi.org/10.1038/s41598-019-57225-w **[Editor's choice: bees & Top 100 in Ecology for 2020]**

Busch, A., Douglas, M., Malcolm, G., Karsten, H. and Tooker, J. 2020. A high-diversity/IPM cropping system fosters beneficial arthropod populations, limits invertebrate pests, and produces competitive maize yields. *Agriculture, Ecosystems & Environment* 292: 106812.

Sponsler, D., Grozinger, C., Hitaj, C., Rundlof, M., Botias, C., Code, A., Lonsdorf, E., Melathopoulos, A., Smith, D., Suryanarayanan, S., Thogmartin, W., Williams, N., Zhang, M., and Douglas, M. 2019. Pesticides and pollinators: a socioecological synthesis. *Science of the Total Environment* https://doi.org/10.1016/j.scitotenv.2019.01.016

Douglas, M., Chang, J., Begum, K., Subramanian, S., Tooker, J., Alam, S. N., and Ramasamy, S. 2018. Biopesticides and DNA barcoding as tools to improve insect pest management in lablab bean (*Lablab purpureus*) in Bangladesh. *Journal of Asia-Pacific Entomology* 21(4): 1326-1336.

Tooker, J., Douglas, M., and Krupke, C. 2017. Neonicotinoid seed treatments: limitations and compatibility with Integrated Pest Management. *Agricultural & Environmental Letters* 2: 170026.

Douglas, M. and Tooker, J. 2016. Meta-analysis reveals that neonicotinoid seed treatments and pyrethroids have similar negative effects on abundance of arthropod natural enemies. *PeerJ* 4:e2776; DOI 10.7717/peerj.2776

Douglas, M. and Tooker, J. 2015. Large-scale deployment of seed treatments has driven rapid increase in use of neonicotinoid insecticides and preemptive pest management in U.S. field crops. *Environmental Science & Technology* 49(8): 5088-5097.

Douglas, M., Rohr, J., and Tooker, J. 2015. Neonicotinoid insecticide travels through a soil food chain, disrupting biological control of non-target pests and decreasing soya bean yield. *Journal of Applied Ecology* 52(1): 250-260. **[Editor's Choice/Cover]**

Schipanski, M., Bailey, S., Barbercheck, M., Douglas, M., Finney, D., Haider, K., Kaye, J., Kemanian, A., Mortensen, D., Ryan, M., Tooker, J. and White, C. 2014. A conceptual framework for evaluating multifunctionality of cover crops in agroecosystems. *Agricultural Systems* 125: 12-22.

Wimp, G., Murphy, S., Lewis, D., Douglas, M., Ambikapathi, R., Van Tull, L., Gratton, C. and Denno, R. 2013. Predator hunting mode influences patterns of prey use from grazing and detrital food webs. *Oecologia* 171(2): 505-515.

Douglas, M. and Tooker, J. 2012. Slug (Mollusca: Agriolimacidae, Arionidae) ecology and management in no-till field crops, with an emphasis on the mid-Atlantic region. *Journal of Integrated Pest Management* 3(1): C1-C9.

Bentley, T., Douglas, M., Grettenberger, I., Lastro, E., Sidhu, C., and Smith, J. 2012. Student Debate: Global climate change will have substantial long-term negative effects on arthropod diversity: Pro Position. *American Entomologist* 58(2): 99 - 100.

Allainguillaume, J., et al. 2011. Permanent genetic resources added to Molecular Ecology resources database 1 August 2010 – September 2010. *Molecular Ecology Resources 11:* 219-222. [Bulk publication including details on the development of microsatellite primers for two planthopper species, contributed by Sheridan, C., M. Douglas, L. Power, G. Wimp, and M. Hamilton.]

PUBLICATIONS *IN REVIEW* (* = UNDERGRADUATE STUDENT CO-AUTHOR)

Douglas, M., DuBoyce, M.*, Kuppek, V.*, Marich, A.*, Poisson, M.*, Spiro, A.*, Boback, S. Potential for the American toad (*Anaxyrus americanus*) to contribute to biological control in a vegetable agroecosystem (submitted to *Agrosystems, Geosciences & Environment*)

Grames, E., Forister, M., Van Deynze, B., Thogmartin, W., Diffendorfer, J., Schultz, S., Crone, E., Fallon, C., Burls, K., Henry, E., Leuenberger, W., Bekris, Y., Edwards, C., Singh, D., Douglas, M. Implications of sampling biases in participatory science programs for detecting drivers of biodiversity loss. (for *Conservation Science and Practice*)

RESEARCH-RELATED WEBSITES & DATA RELEASES (* = UNDERGRADUATE STUDENT CO-AUTHOR)

BeeSpatial (released 2025): https://beesuite.psu.edu/beespatial/

Truong, N.*, York, L., Decker, A. and Douglas, M. 2024. Data and code from: A mixture of grass-legume cover crop species may ameliorate water stress in a changing climate, a greenhouse experiment at Dickinson College in Carlisle, PA, USA, 2021. ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/6354923aa088664394193519b5d93035

Janousek, J., Douglas, M., and Graves, T. 2022. Neonicotinoid nitroguanidine group insecticide application rates estimated across the western conterminous United States, 2008 to 2014: U.S. Geological Survey data release, https://doi.org/10.5066/P9H45NUG.

Douglas, M., Soba, S.*, Baisley, P.*, Kammerer, M., Lonsdorf, E. and Grozinger, C. 2022. Putting pesticides on the map for pollinator research and conservation. *Figshare*. Collection. https://doi.org/10.6084/m9.figshare.c.5756747.v1.

Soba, S.* and Douglas, M. 2022. Insecticide Explorer (released fall 2022): https://insecticideexplorer.shinyapps.io/insecticideexplorer/

Beescape (released March 2019, updated summer 2023): https://beescape.psu.edu/

POLICY & MANAGEMENT RELATED PUBLICATIONS (* = UNDERGRADUATE STUDENT)

Janousek, W., Douglas, M., and Graves, T. Western and McKay's bumble bees occupancy trends and future projections. U.S. Geological Survey, Northern Rocky Mountain Science Center. (in preparation for the U.S. Fish & Wildlife Service)

Douglas, M., Ballard, I.*, Baltier-Moreno, M.*, Beach, K.*, Brown, Z.*, DiCarlo, J.D.*, Earl, L.*, Graff, J.*, Johnson, M.*, Jones, A.*, Kratovil-Lavelle, C.*, Marsh, D.*, Mirani, A.*, Ochlis, E.*, Timsina, D.*, Washington, M.*, Wilkin, C.*, Wolcott, E.*, Nawa, S.B., and Isbell, S. What makes food healthy? Exploring the Pasa-bility to increase crop nutritional content through crop management. (in preparation for Pasa Sustainable Agriculture) Available at: https://maggiedouglas.github.io/crop_nutrient_density/

Douglas, M., Krupke, C., and Tooker, J. 2024. Comments re: Rulemaking for Registration of Neonicotinoid Insecticides and Other Systemic Insecticides (EPA-HQ-OPP-2023-0428). Submitted to the US EPA, March 23, 2024.

Douglas, M., Krupke, C., and Tooker, J. 2024. Comments re: Requirements Applicable to Treated Seed (EPA-HQ-OPP-2023-0420). Submitted to the US EPA, February 9, 2024.

Douglas, M., Freese, B., Grzywacz, J., and Donley, N. 2023. An essential resource at risk: Stakeholder perspectives on the USGS Pesticide National Synthesis Project. July 2023. Available at: https://www.biologicaldiversity.org/campaigns/pesticides_reduction/pdfs/USGS-pesticide-stakeholder-summary.pdf

Douglas, M. 2023. An essential U.S. pesticide database is disappearing. Entomology Today. June 2023. Available at: https://entomologytoday.org/2023/06/29/pesticide-national-synthesis-project-essential-database-disappearing/

USDA-NRCS. 2021. Conservation Enhancement Activity E595F: Improving soil organism habitat on agricultural land. April 2021. Available at: https://www.nrcs.usda.gov/sites/default/files/2022-09/E595F%20April%202021.pdf [informed by Douglas et al. 2015 *Journal of Applied Ecology*]

Douglas, M. 2011. Organic no-till gains momentum in Pennsylvania. Penn State Sustainable Ag News. September 1, 2011. Available at: http://extension.psu.edu/susag/news/2011/Sept-2011/4-org-no-till

Douglas, M. and J. Tooker. 2010. Slugs as pests of field crops. Entomological Notes - Penn State Cooperative Extension. Available at: https://extension.psu.edu/slugs-as-pests-of-field-crops

INVITED PRESENTATIONS (SCHOLARLY/ACADEMIC)

Douglas, M. 2024. Putting pesticides on the map for pollinator research and conservation. Presented at the EcoSpatial Summit: Spatial Data Analysis and Visualization for Bees and Beyond. October 2024, Penn State University, State College, PA.

Douglas, M. 2023. Putting the 'eco' into ecotoxicology: Effects of neonicotinoids on non-target insects from field to landscape. Seminar for St. Cloud State University, Department of Biology. August 2023, Online.

Douglas, M., Janousek, W., Baisley, P., Soba, S., Kammerer, M., Lonsdorf, E., Grozinger, C., and Graves, T. 2023. Zooming out: Integrating pesticides into landscape studies of pollinator decline. Presented at the American Chemistry Society Fall Meeting as part of

the symposium, Transitioning from the laboratory to the landscape in pollinator risk assessment: Challenges and opportunities. August 2023, San Francisco, CA & Online.

Douglas, M. 2023. Pollinators, pesticides, and people: The socioecology of insect declines. Seminar for Ursinus College, Department of Biology. March 2023, Collegeville, PA.

Douglas, M. 2022. Putting the 'eco' into ecotoxicology: Effects of neonicotinoids on non-target insects from field to landscape. Seminar for the Environmental Contamination and Toxicology Master's program, ECT+ Consortium of the European Union. November 2022, Online.

Douglas, M. 2021. Active learning in a pandemic: an online experiment in agroecology. Presented virtually at the annual meeting of the Entomological Society of America as part of the symposium: Advancing Undergraduate-focused Teaching and Mentorship in Transformative Times. November 2021, Online.

Douglas, M. 2021. Pollinators, pesticides, and people: The socioecology of insect declines. Seminar for UC Riverside, California Agriculture and Food Enterprise – an initiative facilitating integrative, multidisciplinary study of complex issues associated with agriculture and food. May 2021, Online.

Douglas, M. 2021. Life as an entomologist in the liberal arts. Presented at the Eastern Branch Meeting of the Entomological Society of America as part of the symposium: Exploring the Diversity of Entomologists' Careers. March 2021, Online.

Douglas, M. 2020. Putting pesticides on the map for pollinator conservation. Presented at the North American Congress for Conservation Biology as part of the symposium: Insect Declines: Case Studies, Probable Causes, and Solutions. July 2020, Online.

Douglas, M. 2019. Untangling patterns of pesticide use in U.S. agriculture and their effects on beneficial insects. Seminar for the Department of Entomology, University of Maryland, November 2019, College Park, MD.

Douglas, M. 2019. County-level analysis reveals a rapidly shifting landscape of bee toxic load on U.S. farmland. Presented at the annual meeting of the Entomological Society of Pennsylvania, October 2019, Carlisle, PA.

Douglas, M. 2019. Potency paradox: Patterns and drivers of insecticide use in U.S. agriculture. Presented at the International Conference on Pollinator Biology, Health, and Policy, July 2019, Davis, CA.

Douglas, M. 2018. Potency paradox: Changing patterns of insecticide use in U.S. corn production. Presented at the joint meeting of the Entomological Society of America and Entomological Society of Canada, November 2018, Vancouver, BC, Canada.

Douglas, M. 2017. Untangling the effects of changing patterns of insecticide use on beneficial insects. Seminar for the Department of Entomology, Purdue University, March 2017, West Lafayette, IN.

Douglas, M. & J. Tooker. 2016. Neonicotinoid seed treatments and natural enemies in perspective: Insights from a meta-analysis. Presented at the International Congress of Entomology as part of the symposium: Population Consequences of Pest Management Tactics on Non-target Species. September 2016, Orlando, FL.

Douglas, M. & J. Tooker. 2016. Unexpected consequences of neonicotinoid seed treatments reveal opportunities for IPM. Presented at the International Conference on Pollinator Biology, Health & Policy as part of the symposium: Integrated Pest and Pollinator Management. July 2016, University Park, PA.

Douglas, M. 2016. Toxic slugs and other adventures in applied ecology. Seminar for the Department of Biology, Muhlenberg College. March 2016, Allentown, PA.

Douglas, M. 2016. Applying ecological principles to improve slug management in diverse cropping systems. Seminar for the Department of Crop & Soil Science, Oregon State University, February 2016, Corvallis, OR.

Douglas, M. and J. Tooker. 2015. A slug in the system: Unintended effects of neonicotinoid seed treatments in no-till corn and soybeans. Presented at the Entomological Society of America Annual Meeting as part of the symposium: Applying a systems approach – emergent outcomes of multidimensional interactions in agroecosystems. November 2015, Minneapolis, MN.

Douglas, M. and S. Ramasamy. 2015. Challenges and opportunities for improving pest management of lablab bean in Bangladesh. Presented at the World Vegetable Center (AVRDC). April 2015, Shanhua, Taiwan.

Douglas, M. and J. Tooker. 2013. Trophic transfer of insecticidal seed treatments: A threat to slug predators? Presented at the 4th International Symposium on Biological Control of Arthropods. March 2013, Pucón, Chile.

Douglas, M. and J. Tooker. 2012. Prey-mediated effects on predators of seed-applied insecticides in no-till agroecosystems. Presented at the Entomological Society of America Annual Meeting as part of the symposium: Ecological considerations of the rising use of systemic insecticides. November 2012, Knoxville, TN.

Douglas, M. and J. Tooker. 2012. Insights into the ecology and management of slugs in Pennsylvania no-till crop fields. Presented at the Annual Meeting of the American Malacological Society, as part of the symposium: Status, impacts, and management of invasive slugs and snails in North America. June 2012, Cherry Hill, NJ.

Karsten, H., M. Douglas, and V. Ischler. 2012. Dairy cropping systems research: Diverse strategies for sustainability. Seminar for the Department of Crop & Soil Sciences, Pennsylvania State University. April 2012, University Park, PA.

Douglas, M. and J. Tooker. 2012. Bottom-up and top-down influences on slugs in no-till field crops. Presented at the Annual Meeting of the Eastern Branch of the Entomological Society of America. March 2012, Hartford, CT.

Douglas, M. and J. Tooker. 2011. Insights into slug ecology from Pennsylvania. Presented to the Northeastern IPM Center's High Residue Cropping Systems IPM Working Group. August 2011, Newark, DE.

INVITED PRESENTATIONS (POLICY & MANAGEMENT)

Douglas, M. 2025. Bees and Trees: Describing insecticide use in forestland to support pollinator conservation planning. Great Lakes Pollinator Task Force. Organized by the U.S. Fish & Wildlife Service. June 2025, Online.

Douglas, M. 2024. Characterizing the pesticide landscape that bees experience in the Great Lakes region. Pesticide Risk Modeling and Pollinator Science Workshop. Organized by the U.S. Fish & Wildlife Service. July 2024, Madison, WI. [presented virtually]

Janousek, W., Douglas, M., and Graves, T. 2023. Stressors and trends of a once common pollinator. Seminar for the U.S. Environmental Protection Agency, Office of Pesticide Programs. May 2023, Online.

Douglas, M. 2018. Clues to bee health from reading the landscape and beekeeper data. York County Beekeepers Association. York, PA. August 2018.

Douglas, M. 2018. Putting pesticides on the map for honey bee health. Lancaster County Beekeepers Society. Lancaster, PA. May 2018.

Douglas, M. Research Update: Pollinators and Pesticides. Pennsylvania Farm Bureau, Camp Hill, PA. March 2017.

Beatty, T., Douglas, M., and Hughes, D. 2017. A panel discussion on science and community. Hosted by Penn State Science Policy Society and the Union of Concerned Scientists. State College, PA, September 2017.

Douglas, M. 2017. Neonicotinoid seed treatments and natural enemies in ecological perspective. Presentation for the National Pesticide Forum, University of Minnesota, Minneapolis, MN, April 2017.

Douglas, M. and P. Moore. Neonics & Bees: The State of the Science. Central Counties Beekeepers' Association. Huntington, PA. June 2016.

Douglas, M. and J. Tooker. 2015. Neonicotinoid seed treatments in American agriculture. Congressional briefing hosted by Congressmen Conyers and Blumenauer. July 2015, Washington, DC.

CONTRIBUTED PRESENTATIONS (* = UNDERGRADUATE STUDENT)

Cao, M.* and Douglas, M. 2025. Spatiotemporal patterns of insecticide usage in Pennsylvania forests. Eastern Branch Meeting of the Entomological Society of America. March 2025, Harrisburg, PA.

Douglas, M., Baisley, P.*, Soba, S.*, Kammerer, M., Lonsdorf, E. and Grozinger, C. 2022. A pesticide data and mapping toolkit for pollinator research and conservation. Submitted to the Joint Annual Meeting of the Entomological Society of America & Entomology Society of Canada. November 2022, Vancouver, Canada.

Douglas, M. and Boback, S. 2022. The American toad (*Anaxyrus americanus*): Friend or foe to crop production? Presented at the Joint Annual Meeting of the Ecological Society of America & Ecology Society of Canada. August 2022, Montreal, Canada.

Lonsdorf, E., Gerber, J. Douglas, M. and Thogmartin, W. 2022. Use of a hybrid Circuitscape/Agent model to identify restoration and protection priorities for Monarch butterfly preservation. Presented at the Annual Meeting of the Ecological Society of America. August 2022, Montreal, Canada.

Truong, N.*, L. York, A. Decker, and M. Douglas. 2022. Cover crops in a changing climate: Can mixtures reduce water stress? Presented at the Lehigh Valley Ecology and Evolution Symposium. April 2022, Online.

Kuppek, V.,* DuBoyce, M.*, Marich, A.*, Boback, S., and M. Douglas. 2021. Influence of the American toad (*Anaxyrus americanus)* on the insect community at Dickinson College Farm. Presented at the Lehigh Valley Ecology and Evolution Symposium. April 2021, Online.

Kammerer, M., E. Lonsdorf, M. Douglas, J. Tooker, and C. Grozinger. 2019. Landscape resources and risks mediate wild bee richness and abundance. Presented at the Annual Meeting of the North American Regional Association of the International Association of Landscape Ecology. April 2019, Fort Collins, CO.

Shakya, K.*, W. Thogmartin, E. Lonsdorf, and M. Douglas. 2018. Threats to monarch migration: A look into changes in herbicide use and land cover. Presented at the Annual Meeting of the Entomological Society of Pennsylvania. November 2018, Millersville, PA. **[First Place, Undergraduate Presentation Competition]**

Douglas, M., T. Jones, H. Patch, E. Lonsdorf, A. Davis, D. Hellerstein, and C. Grozinger. 2017. Putting pesticides on the map for pollinator conservation. Presented at the Center for Pollinator Research Symposium. May 2017, University Park, PA.

Douglas, M. and J. Tooker. 2013. Are neonicotinoid seed treatments friendly to natural enemies? A meta-analysis. Presented at the Entomological Society of America Annual Meeting. November 2013, Austin, TX.

Douglas, M. and J. Tooker. 2011. Toxic slugs? Neonicotinoid seed treatments in tri-trophic perspective. Presented at the Entomological Society of America Annual Meeting. November 2011, Reno, NV.

Douglas M. and G. Wimp. 2009. Refugia and spiders on a Virginia vegetable farm: If you build it, will they come? Presented at the Georgetown University Work in Progress Symposium. February 2009, Washington, D.C.

CONTRIBUTED POSTERS (* = UNDERGRADUATE STUDENT)

Douglas, M., Janousek, W., Baisley, P.*, Soba, S.*, Kammerer, M., Lonsdorf, E., Grozinger, C., and Graves, T. 2023. Mapping pesticide use to understand its contribution to pollinator decline. Submitted to the International Conference on Pollinator Biology, Health, and Policy, June 2023, University Park, PA.

Truong, N.*, L. York, A. Decker, and M. Douglas. 2022. Cover crops in a changing climate: Can mixtures reduce water stress? Presented at the Dickinson College All-Science Symposium, April 2022, Carlisle, PA. **[Winner, Outstanding Poster Award]**

Seburn, H.*, A. Moczulski*, M. Douglas, and S. Boback. 2022. What good is a toad? The diet of the American toad in an agroecosystem. Presented at the Dickinson College All-Science Symposium, April 2022, Carlisle, PA.

Baisley, P.* and M. Douglas. 2021. Earthworm cover crop habitat preference. Presented at the Eastern Branch Meeting of the Entomological Society of America. March 2021, Online.

Soba, S.* and M. Douglas. 2018. Code for communication: Visualizing trends in insecticide use and bee toxicity. Presented at the Annual Meeting of the Entomological Society of Pennsylvania. November 2018, Millersville, PA. **[First Place, Undergraduate Poster Competition]**

Jones, T., M. Douglas, E. Lonsdorf, D. Miller, M. Frazier, H. Patch, and C. Grozinger. Landscapes for honey bees: Identifying landscape features that promote honey bee health through a citizen science partnership. Presented at the Entomological Society of America Annual Meeting, November 2017, Denver, CO.

Douglas, M. and J. Tooker. 2014. Are neonicotinoid seed treatments friendly to natural enemies? A meta-analysis. Presented at the Triad Symposium for Sustainable Agriculture, Pennsylvania State University. March 2014, University Park, PA.

Baluch, K.*, P. Patterson, A. Mayer, M. Alp, H. Burley, J. Tooker, and M. Douglas. 2014. Feed intake and performance of pastured laying hens. Presented at the Poultry Science Association Annual Meeting. July 2014, Corpus Christi, Texas.

Speicher, K.*, I. Grettenberger, M. Douglas, A. Aschwanden, and J. Tooker. 2014. Ant diversity, abundance, and predation in the NESARE Rock Springs Research Site. Presented at the Penn State Undergraduate Research Expo. Pennsylvania State University, University Park, PA.

Douglas, M. and J. Tooker. 2013. Toxic slugs update: Exploring trophic transfer of insecticidal seed treatments in the field. Presented at the Triad Symposium for Sustainable Agriculture. Pennsylvania State University, March 2013, University Park, PA.

Douglas, M. and J. Tooker. 2012. Trophic transfer of insecticidal seed treatments poses a risk to slug natural enemies. Presented at the Gamma Sigma Delta Research Expo, Pennsylvania State University. March 2012, University Park, PA.

Douglas, M. and J. Tooker. 2011. Slugs and bugs in the Sustainable Dairy Cropping Systems Project. Presented at the Triad Symposium for Sustainable Agriculture, Pennsylvania State University. February 2011, University Park, PA.

Douglas M. and G. Wimp. 2009. Spiders in crop and refuge habitats on a Virginia vegetable farm. Presented at the Ecological Society of America Meeting. August 2010, Pittsburgh, PA.

EDUCATIONAL/OUTREACH PRESENTATIONS (* = UNDERGRADUATE STUDENT)

Douglas, M. 2025. Crash course in insect identification. Appalachian Headwaters: Wood Thrush Park. Lewisburg, WV. June 2025. [6 college interns]

Douglas, M. 2025. Life in the soil: Biodiversity and field methods. Appalachian Headwaters: Wood Thrush Park. Lewisburg, WV. June 2025. [6 high school + 6 college interns]

Douglas, M. 2025. Little things matter: Insect decline & what we can do about it. Appalachian Headwaters: Green Drinks series. Greenbrier Valley Brewing Company, Maxwelton, WV. June 2025. [open community seminar]

Douglas, M. 2025. Is the insect apocalypse upon us? Craighead House. Boiling Springs, PA. June 2025. [open community seminar]

Douglas, M. 2024. The role of biodiversity in soil health across an agricultural management gradient. NSF Water-Energy-Food Nexus Collaborative Learning School. Boiling Springs, PA. June 2024. https://sustainfood.psu.edu/cls2024/

Douglas, M. 2023. Sustainability of beekeeping. Dickinson College Center for Sustainability event. Carlisle, PA. November 2023.

Douglas, M. and Halpin, J. 2023. Developing a farm-scale biodiversity benchmarking system. Pasa Sustainable Agriculture Annual Conference. Lancaster, PA. February 2023.

Douglas M., Priya, S., Rodriguez, P., and Rosenbaum, D. 2023. Panel on American Association of University Women Fellowship Programs. AAUW North Hills Pittsburgh Branch Meeting. Online. January 2023. [all presenters contributed equally]

Douglas, M., Berman, L.*, Bufferd, T.*, Calvert, M.*, Heenehan, J.*, Pham, V.*, Rodriguez, A.*, Truong, N*. 2022. Food Waste @ Dickinson: Status, implications, and solutions. Dickinson College Climate Justice Teach-in. Carlisle, PA. March 2022.

Douglas, M. 2021. The cicadas are coming! Get to know Brood X. Webinar for Dickinson College Alumni. Online. May 2021.

Douglas, M. 2019. Adventures in sustainability-related careers, growing food, and car-free living. 'Soup & Bread' event, organized by students at the Dickinson College Treehouse (Center for Sustainable Living). Carlisle, PA. October 2019.

Douglas, M. 2019. What does it mean for food to be sustainable? Dickinson College 'Sustain-IT' event on sustainable food. Carlisle, PA. February 2019.

Douglas, M. 2018. GE crops and pesticide use: What is the relationship? Dickinson College 'Rush Hour' seminar series. Carlisle, PA. October 2018.

Douglas, M. 2018. An introduction to insect identification. Dickinson College Farm. Boiling Springs, PA, July 2018.

Douglas, M. and J. Tooker. Neonicotinoids: Fact & Fiction. Pennsylvania Association for Sustainable Agriculture Annual Conference, University Park, PA. February 2016.

Douglas, M. Gardening for pollinators. Penn State Community Garden, University Park, PA. September 2015.

Douglas, M. and J. Lilley. Introduction to organic pest management. Penn State Community Garden, University Park, PA. May 2014.

Mortensen, D., M. Douglas, J. Hinds, M. Kammerer, and J. Tooker. Habitat is home: Creating spaces for pollinators, predators, & parasitoids. Pennsylvania Association for Sustainable Agriculture Annual Conference, University Park, PA. February 2014.

Hooks, C. R. R., M. Douglas, J. Tooker, J. Whalen, and B. Cissel. Slimy thugs research update. Maryland Agricultural Pesticide Conference. Frederick, MD. February 2013.

Tooker, J. and M. Douglas. Slugs and their predators in no-till cropping systems. Pennsylvania No-till Alliance: Maintaining Soil Health Field Day, Loganton, PA. October 2012.

Douglas, M. and J. Tooker. Slugs and bugs in the Sustainable Dairy Cropping Systems Project. USDA-Northeast SARE Coordinating Committee visit, Russell E. Larson Agricultural Research Farm, July 2012.

Douglas, M. Understanding slug-predator interactions in Pennsylvania crop fields. Penn State Agronomic Weed and Entomology Field Day, Russell E. Larson Agricultural Research Farm, July 2012.

Barbercheck, M., M. Douglas, A. Rivers, and J. Tooker. The power of predators. Strategies for Soil Health & Nutrient Conservation Research Tour, Russell E. Larson Agricultural Research Farm, June 2012.

Douglas, M. Understanding slugs and their natural enemies. Ag Progress Days, Russell E. Larson Agricultural Research Farm, August 2011.

Douglas, M. and J. Tooker. Using crop diversity to conserve beneficial insects and manage pests. Sustainable Dairy Cropping Systems Field Day, Russell E. Larson Agricultural Research Farm, June 2011.

TEACHING EXPERIENCE

Assistant Professor, Dickinson College (2018 – present)

Instructor of record

Spring 2018-2021, 2025	ENST 162: Integrative Environmental Science
Fall 2018-2021, 2023	ENST 345: Agroecology
Fall 2020	FYS 100 (first-year seminar): How much is enough?
Fall 2021, Spring 2024	ENST 406 (senior seminar): What does the Earth ask of us?
Spring 2025	ENST 406 (senior seminar): Pollinators and People
Spring 2022, 2024	ENST 305/250: Environmental Data Analysis in Practice
Fall 2024	ENST 305: Applied Entomology

Guest lectures

Fall 2018, 2019	FDST 201: Introduction to Food Studies "Introduction to agroecology as a science" (with lab)
Spring 2022	HEST 201: Introduction to Health Studies

	"An introduction to environmental health with a focus on pesticides + cancer"
Fall 2023	ENST 305: Environmental Health "Comparative toxicity and its implications for agriculture and society"

Mentorship of undergraduate researchers (= senior honors student)*

Summer 2025	Iris Ballard ('26, Environmental Science & Biology)
	Liv Kacar ('26, Biology)
Fall 2023-Spring 2025	Michelle Cao* ('25, Environmental Science & Data Analytics)
Fall 2022-Spring 2023	Aleah Spiro ('23, Environmental Studies)
Spring 2022	Hannah Seburn ('22, Environmental Science, w/ Scott Boback)
	Arek Moczulski ('22, Environmental Science, w/ Scott Boback)
Summer 2021-Spring 2022	Nhu Truong* ('22, Environmental Science & Biology)
Spring 2021	Valerie Kuppek ('21, Biology)
Summer 2020	Zoe Muller ('22, Environmental Science & Biology)
Fall 2019-Spring 2020	Paige Baisley* ('20, Environmental Science)
Fall 2019	Abby Marich ('20, Environmental Studies, w/ Scott Boback)
	Maddie DuBoyce ('20, Environmental Science)
Summer 2019	Paige Baisley ('20, Environmental Science)
	Abby Marich ('20, Environmental Studies, w/ Scott Boback)
Spring 2019	Sara Soba ('21, Environmental Science)
Summer 2018	Sara Soba ('21, Environmental Science)
	Karan Shakya ('20, Environmental Studies)

Service on undergraduate honors committees (not primary mentor)

Spring 2024	Prerana Patil ('24, Environmental Science)
	Charlotte Kratovil-Lavelle ('24, Environmental Science)
Spring 2022	Kathryn Stonesmyth ('22, Environmental Studies)
Spring 2021	Isabell Ruff ('21, Environmental Science)
Spring 2020	Rachel Krewson ('20, Environmental Science)
Spring 2019	Josie Verter ('19, Environmental Science)
	Madie Ritter ('19, Environmental Science)

Graduate Teaching Assistant, Pennsylvania State University (2010 – 2016)

Teaching Assistant

Spring 2014	AGECO 201: Introductory Agroecology
Spring 2011, 2013	ENT 313: Introduction to Entomology
Spring 2013	ENT 314: Management of Insect Pests of Ornamentals
Spring 2011	ENT 316: Field Crops Entomology

Guest lectures

2017	PLANT 461: Emerging Issues in Plant Science "Neonicotinoid seed treatments: Trends & controversies"
2016	AGECO 134: Sustainable Agriculture Science & Policy "Sustainability of Genetically Engineered Crops"

2016 ENT 457: Principles of IPM
"Biological Control"
2015 HORT 445: Plant Ecology
"Insect sampling methods"

Mentorship of undergraduate researchers

Spring 2017 Sara McTish ('17, Agricultural Sciences)
2013/2014 Katie Speicher ('14, Env. Resource Mgmt., w/ Ian Grettenberger)
Katie Baluch (Poultry Science, '14, w/ Paul Patterson)
2012/2013 Sherry Zhao ('13, Biology, w/ John Tooker)

PEDAGOGICAL TRAINING

Summer 2024	Faculty study group: Dialogues Across Differences Center for Teaching, Learning & Scholarship, Dickinson College
Summer 2023	Valley & Ridge: A Faculty Workshop for Sustainability Center for Sustainability Education, Dickinson College
Summer 2020	Camp Operation Online Learning (6 weeks) Online Learning Toolkit
Summer 2019	Faculty study group: Ethics Across Campus & the Curriculum Dickinson College
Fall 2016	Essentials of Online Teaching (5 weeks) Penn State, World Campus (online)
Fall 2011	Course in College Teaching (8 weeks) Penn State, Schreyer Institute for Teaching Excellence

PROFESSIONAL SERVICE (DICKINSON COLLEGE)

2023-present	Environmental Studies representative to the Science Executive Committee
2023-present	Faculty panelist for Hearing Board for Student Violations
2025	Search Committee Member, Visiting Asst. Professor of Environmental GIS
2024-2025	Search Committee Member, Director of ALLARM
2023-2024	Member, Northside Ride Planning Committee
2018-2022	Member, Campus Pollinator Committee
2020-2022	Member, Research & Development Committee
2021-2022	Search Committee Member, Assistant Professor of Environmental Health
2020-2021	Search Committee Member, Assistant Professor of Environmental Health
2020	Revolutionary Challenge Team: FARM Lab
2020	Revolutionary Challenge Team: Data Science Initiative
2019-2020	Search Committee Member, Assistant Professor of Environmental Science
Spring 2019	Participant, 10-year external review for ALLARM
	Participant, 10-year external review for the Center for Sustainability Education
	Participant, 10-year external review for the Dickinson College Farm
Fall 2018	Search Committee Member, Vegetable Farm Manager, Dickinson College Farm

PROFESSIONAL SERVICE (OTHER)

2014-Present	Journal reviewer: Trends in Ecology & Evolution, PNAS, Nature Communications, PLoS One, PeerJ, Science of the Total Environment, Ecological Applications, Trends in Plant Science, Journal of Applied Ecology, Global Ecology & Biogeography, Environmental Entomology, Current Opinion in Insect Science, Journal of Agricultural & Food Chemistry, Journal of Chemical Ecology, Pest Management Science, Crop Protection, Environmental Toxicology & Chemistry, Dendrobiology
2025-Present	Advisory Council representative for Integrated Pest Management, USDA Northeast Sustainable Agriculture Research & Education program
2024	Grant reviewer: Graduate Women in Science
2023-2024	Advocacy to restore the USGS Pesticide National Synthesis Project. Member of an ad-hoc group of scientists and health/environmental advocates. The effort ultimately resulted in full reinstatement of the program (as detailed here).
2019	Co-organized session entitled, "Causes and consequences of pesticide use: from use patterns to pollination services" (International Conference on Pollinator Biology, Health, and Policy, July 17-20, Davis, CA)
2019	Presented at a career day for graduate students in entomology and related sciences (Pennsylvania State University, April 26, University Park, PA)
2015-2016	Instruction Committee, Penn. State University, Dept. of Entomology
2013-2014	Outreach Coordinator, Penn. State University, Entomology Grad Students
2012-2014	Outreach Committee, Penn. State University, Dept. of Entomology
2011-2012	Outreach Committee, Northeast Sustainable Dairy Cropping Systems Project
2011-2012	Libraries Committee, Penn. State University Graduate Student Association

PROFESSIONAL MEMBERSHIPS

2021-Present	Sustainable Agriculture Education Association
2018-Present	Entomological Society of Pennsylvania
2012-Present	International Organization for Biological Control
2010-Present	Pasa Sustainable Agriculture
2010-Present	Entomological Society of America
2009-Present	Ecological Society of America

AWARDS & HONORS

2015	Ralph O. Mumma Award for Outstanding Achievement *Department of Entomology, Pennsylvania State University*
2013	Evans Family Award for Graduate Student Extension Achievement *College of Agricultural Sciences, Pennsylvania State University*
2012	USDA/AFRI Student Travel Grant

2012	Legends of Entomology Award for M.S. Student Achievement *Plant-Insect Ecosystems Section, Entomological Society of America*
2012	Outstanding M.S. Student in Biological Control *Nearctic Section, International Organization for Biological Control*
2012	Asa Fitch Memorial Award for an Outstanding M.S. Student *Eastern Branch, Entomological Society of America*
2012	Michael E. Duke Memorial Award *Department of Entomology, Pennsylvania State University*
2012	Third place, Student competition for best poster *Pennsylvania State University, Gamma Sigma Delta Research Expo, Environment & Natural Resources Division*
2011	First place, Student competition for best oral presentation *Entomology Society of American Annual Meeting – Plant-Insect Ecosystems section 2*
2003	NSF Research Experiences for Undergraduates participant
2000-2004	John Frederick Oberlin Scholarship

INTENSIVE RESEARCH TRAINING

2024	The Bee Course, American Museum of Natural History, Southwestern Research Station, Portal, AZ, 10 days. (planned)
2018	Summer Institute on Cyberinfrastructure for Socio-Environmental Synthesis, National Socio-Environmental Synthesis Center, Annapolis, MD, 1 wk.
2014	The HYM Course (parasitoid identification), Eagle Hill Institute, Steuben, ME, 1 wk.
2010	Multivariate Data Analysis/PC-ORD, Pennsylvania State University, University Park, PA. October, 1 wk.

MEDIA COVERAGE OF RESEARCH ACTIVITY (* = FEATURES UNDERGRADUATE STUDENT)

Cotsirilos, T. (4 Feb 2025) Buzzkill Episode 2: The mystery of the dead bees. *Food & Environment Reporting Network*.

Held, L. "Why farmers use harmful insecticides they may not need." (30 Oct 2024) *Civil Eats*.

Toomey, A. H. (2024) Science with Impact: How to Engage People, Change Practice, and Influence Policy. Island Press: Washington, DC.

*Layne, C. "Dickinson student-faculty research at forefront of fight to save bees." (9 Apr 2024) *Dickinson News*

Gewin, V. "After protests, U.S. agency drops plan to limit pesticide use report." (1 Mar 2024) *Science*.

Talpos, S. "Amid pushback, the USGS decides to restore its pesticide database." (29 Feb 2024) *Undark*.

Charles, D. “Buzzkill: A bee researcher’s colonies kept dying, and she couldn’t figure out why. Then, she looked at the ethanol factory down the road.” (18 Dec 2023) *Food & Environment Reporting Network*.

Hilborn, E. D. (2023) Restoring Eden: Unearthing the Agribusiness Secret that Poisoned My Farming Community. Chicago Review Press: Chicago, IL.

Hettinger, J. “EPA says three widely used pesticides driving hundreds of endangered species toward extinction” (27 Jul 2023) *Investigative Midwest*

Gewin, V. “Move to change how U.S. tracks pesticide use sparks protest.” (30 May 2023) *Science.*

Unglesbee, E. “Seed treatment overload: The unintended consequences of a popular practice.” (13 Jul 2021) *The Progressive Farmer*

LaJeunesse, S. “Climate change reduces abundance, diversity of wild bees, study finds.” (13 Jan 2021) *PA Environment Digest Blog*

“Dickinson College professor publishes study on pesticide-coated seeds.” (16 Mar 2020) *Dickinson News*

McCall, R. “Insecticides have become more toxic to bees over the last 20 years.” (22 Jan 2020) *Newsweek* (online)

Gitt, T. “5 questions: Helping manage the Beescape in Carlisle.” (29 Apr 2019) *The Sentinel*

Smith, D. and Hitaj, C. (1 Jul 2019) Patterns of pesticide use, exposure, and toxicity jointly determine impacts on honeybees and other pollinators. US Department of Agriculture. *Amber Waves*.

McArt, S. (2019) A roadmap for how to minimize pesticide risk to bees. *American Bee Journal*.

*Kohr, K. “Dickinson College faculty research reveals surprising information about pesticide use.” (9 Nov 2018) *Dickinson News*

*Ruiz, M. “Dickinson College using grant to save bees.” (12 Jul 2018) *ABC27*

Johnson, N. “Slugging it out with a new contender in the GMO debate.” (6 Jun 2017) *Grist*

Aubrey, A. “As beekeepers lose more hives, time for new rules on pesticides?” (24 Nov 2015) *NPR*

Eisenstein, M. “Pesticides: Seeking answers amid a toxic debate.” (21 May 2015) *Nature* 521: S52-S55.

Mole, B. “Controversial insecticide use rises as farmers douse seeds.” (7 Apr 2015) *Science News*

Collins, N. “Bee-harming pesticides are more common than anyone thought” (2 Apr 2015) *Pacific Standard*

“Neonicotinoid moves sluggishly but surely through a food chain.” *CABI Biocontrol News and Information* 36(1): 10N-11N.

“Neonicotinoids: may reduce crop yields by poisoning insects that eat slug pests” (12 Mar 2015) *Science for Environmental Policy: European Commission DG Environment News Alert Service*

Unglesbee, E. “Rise of a slimy thief: Slugs thrive among treated soybean seed” (5 Feb 2015) *The Progressive Farmer*
Akpan, N. “Slugs are eating America’s farms” (30 Jan 2015) *Newsweek*
Carter, J. “Farmers need an integrated pest plan” (15 Jan 2015) *The Western Producer*
“Pesticide moves up food chain” (18 Dec 2014) *Nature* 516: 291.
Kaplan, I. “Silent Spring redux? Insecticides cascade up a food chain to poison carnivores” (3 Dec 2014) *The Applied Ecologist’s Blog*
Ischler, V. “Slugs can be a curse to no-till” (20 Apr 2013) *Lancaster Farming* A12