NICOLE C. HOEKSTRA

Research Associate I

Soil Fertility Lab and Rhizosphere Dynamics Lab
The Ohio State University
1680 Madison Avenue
Wooster, OH 44691

EDUCATION

Master of Science — Winthrop University, Rock Hill, SC
Department of Biology
Thesis: "Studying *Batrachochytrium dendrobatidis* (Bd) Prevalence in the Piedmont of South Carolina"
September 2010 – December 2013

Bachelor of Science — Queens University of Charlotte, Charlotte, NC
Department of Biology
Concentration: Physical Sciences
Thesis: "The detection of *Borrelis burdorferi* in *Peromyscus leucopus* using and comparing traditional and non-traditional methods"
January 2007 – May 2010

WORK EXPERIENCE

2017 – PRESENT

Research Associate I
Soil Fertility Lab and Rhizosphere Dynamics Lab (split appointment)
School of Environment and Natural Resources
The Ohio State University, Wooster, OH
PI: Steve Culman, Ph.D. (Soil Fertility Lab)
Role – Field operations and research manager
PI: Christine Sprunger, Ph.D. (Rhizosphere Dynamics Lab)
Role – Field operations and lab manager

Responsibilities include performing on-farm research; coordinating with cooperators to plan, implement, and conduct on-farm agronomic research trials; managing and tracking research sample analyses in the laboratory and field data in spreadsheets; the design and execution of laboratory and field research, including the testing and evaluation of protocols, and the ordering of supplies as needed.

Additional responsibilities include:

- Analysis and writing of research results
- Presentation of research results at appropriate venues
- Preparation of manuscript and grant submissions
- Development of outreach and extension materials
- Development and maintenance of lab website

2013 – 2016 Research Assistant II
The Ag-Urban Landscape Ecology Lab
Department of Entomology
The Ohio State University, Wooster, OH
PI: Mary M. Gardiner, Ph.D.

Main responsibilities included management of laboratory and assets; design and execution of laboratory and field research, including the testing and evaluation of protocols; processing and analysis of data; and development of methodologies.

Additional responsibilities included:

- Research current literature for methods appropriate to studies
- Writing: progress reports, manuscript, grant submissions
- Train students in methods and instrument operation
- Present research at scientific meetings, conferences, and workshops
- Maintenance of lab website and social media sites

2010 – 2013 Graduate Research Assistant
Department of Biology
Winthrop University, Rock Hill, SC
PI: Julian Smith III, Ph.D.

Responsibilities included management of thesis grant budget, ordering of materials and supplies needed for research, general laboratory duties, supervision of undergraduates conducting research in the lab, and the training and supervision of undergraduate and graduate students assisting in the field.

2000 – 2006 United States Navy, Active Duty

Watch Section Supervisor (2003 – 2006)
Rota, Spain

Main responsibilities included the management of a section of 21 personnel through daily operations and tasks in the protection of a naval base of approximately 4000 people and providing counseling and mentorship to crew in their personal, professional, and educational goals.

Work Center Supervisor (2000 – 2003)
La Maddalena, Italy

Accomplishments included the development and implementation of a training program to raise operational standards by increasing crew qualifications within the department and to assist the department by mastering the skills of another work center then subsequently teaching that work center's crew members to perform the tasks.

RESEARCH EXPERIENCE

2018 – 2020 Assessing Soil Fertility and Soil Health in Midwest Hop Production

Newly funded NCR-SARE project with the following objectives:

- Document relationships between soil fertility and soil health with hop cone quality and yield.
- Develop sufficiency level values for leaf petiole nitrate in hops specific to Midwest region.
- Develop educational materials and continue outreach efforts focused on soil health and nutrient management for Midwest hopyards.

2017 – 2018 Soil Health and Nutrient Management for Optimizing Quality of Processing Tomatoes

In preparation (factsheet)

- Investigated the efficacy of potassium fertilization to improve fruit quality yield of processing tomatoes using on-farm surveys (Ohio and Indiana).
- Measured standard soil nutrients and three soil health indicators (active carbon, respiration, and soil protein) and used results combined with fruit quality assessment (percent redness, L, Hue) in pairwise correlations to identify significant relationships.

2013 – 2016 Understanding Vacant Lot Stabilization via Gut Content Analysis

- Investigated the relationship between generalist arthropod predators and Biodiversity-ecosystem function (BEF) using molecular diet analysis of sheet-web spiders to determine niche breadth and resource partitioning in order to assess the ecological value of urban vacant lots.
- Measured comparative yield and biomass of standing stock vegetation, characterized vegetation and determined species dominance, collected spiders using vacuum sampling and hand aspiration, performed DNA extraction, cPCR, gel agarose electrophoresis, prepared samples for next generation sequencing (NGS), performed statistical analysis on returned sequences.

2014 – 2016 Vacant lot soil invertebrate fauna exhibit resiliency to local and landscape-scale environmental disturbance within a shrinking city

In preparation (manuscript)

- Investigated the influence of vacant lot management strategies and landscape legacy on soil arthropod abundance. Arthropods used a measure of ecosystem services provided by site.
- Measured comparative yield and biomass of standing stock vegetation, characterized vegetation and determined dominant species and ground cover; collected soil cores for fauna extraction using Burlese funnels, identified and counted fauna using a dissecting scope; performed GLMs in R 3.2 (R Core Team) using the program AICcmodavg (Mazerolle 2016); performed PCAs and regressions in JMP 11.1 (SAS Institute Inc).

2014 Vacant Lot Seed Banks

- A smaller study done to evaluate seed bank composition in vacant lots in Cleveland, OH as part of a larger study investigating the ecological value of vacant lots. Study created to determine if any rare or endangered vegetation existed in lots before subjecting lots to manipulation as part of experimental design for larger study.

- Collected soil cores, greenhouse germinated after sifting samples through 2mm mesh, and identified seedlings.

2010 – 2013 Studying *Batrachochytrium dendrobatidis* (Bd) Prevalence in the Piedmont of South Carolina
Master's thesis research (Winthrop University)
IBC: B12003.R2; IACUC: 12005; Scientific Research and Collecting Permit Number: N-9-12

- Anuran populations surveyed in Landsford Canal State Park, SC to investigate Bd in regard to prevalence, strain identification, and to determine if correlations among infection status (of anurans) and immunological and/or ecological factors existed.
- Used area constrained surveys to collect anurans, which were then swabbed and released on site. Swabs analyzed using DNA extraction, cPCR, agarose gel electrophoresis to visualize amplification results, PCR clean-up, samples sent for Sanger sequencing, bioinformatics performed on returned sequences and basic statistics used to analyze data.

2009 – 2010 The Detection of *Borrelis burdorferi* in *Peromyscus Leucopus* using and comparing traditional and non-traditional methods
Senior undergraduate research (Queens University of Charlotte)

- Project designed to compare an invasive tissue sampling method, ear clipping, versus a non-invasive technique, fecal sampling, to detect *B. burdorferi* in wild-caught white footed mice (*P. leucopus*) to determine differences in efficacy of sampling techniques.
- Sherman box traps set in Redlair Preserve, NC, in an open field bordered by wooded patches. Captured mice were sampled and released on site. Ear clippings and fecal samples were processed and stained on a slide for examination via a compound microscope to identify the presence of the bacteria.

2009 Adsorption of Tetracycline in Varying Soil Compositions
Analytical Techniques undergraduate course research project

- Research conducted as part of a year-long course teaching analytical techniques. Study investigated adsorption levels of tetracycline in soils of varying composition utilizing batch equilibrium tests.
- Soil cores collected from Redlair Preserve, NC from woodlots, pastures, and corridors. Soil samples were subjected to known concentrations of tetracycline solutions, placed on a shaker, and absorbance was measured using a spectrophotometer.

GRANT FUNDING

2018 Culman, S.C., Bergefurd, B., and **Hoekstra, N.C.** 2018 – 2020. Assessing Soil Fertility and Soil Health in Midwest Hop Production. NCR-SARE Research and Education Grant Program ($98,561). *Fully funded* (major contributor).

2013 **Hoekstra, N.C.** and Smith, J. III. 2013 – 2014. Studying Bd in Amphibian Populations at Landsford Canal State Park. Winthrop University Research Council Grant Program ($5,105.00). *Fully funded*

AWARDS

2018	3RD place in Research Staff category for poster competition. College of Food, Agricultural, and Environmental Sciences (CFAES) Annual Meeting ($150).
2017	3RD place in Research Staff category for poster competition. Ohio Agricultural Research and Development Center Annual Meeting ($150).
2016	3RD place in Research Staff category for poster competition. Ohio Agricultural Research and Development Center Annual Meeting ($150).
2015	Professional Growth Scholarship. The Ohio State University ($500).
2013	Winthrop University Graduate School Travel Award ($350).

PUBLICATIONS

Kleinke, B., Prajzner, S.P., Gordon, C.A., Hoekstra, N.C., Kautz, A.R., and M.M. Gardiner. 2018. Identifying barriers to citizen scientist retention when measuring pollination services. Citizen Science: Theory and Practice 3(1): 2, pp. 1–10, DOI: https://doi.org/10.5334/cstp.99

In Preparation:
Hoekstra, N.C., Perry, K.I., and M.M. Gardiner. Vacant lot soil invertebrate fauna exhibit resiliency to local and landscape-scale environmental disturbance within a shrinking city

CONFERENCE PRESENTATIONS

First listed author presented

INVITED PRESENTATIONS

1. Gardiner, M.M. and N.C. Hoekstra. Arachnids in a shrinking city: How spider richness and dietary niche breadth shift with vacant lot plant community structure. The Ecological Society of America Meeting. Fort Lauderdale, FL (08/11/2016).
2. Prajzner, S., Hoekstra, N.C., Kautz, A., and A. Vossbrinck. Pollination Investigators: Measuring pollination services in backyard gardens. Poster Presentation. Member Symposia: Grand Challenge: Effective Science Education with Communication. The Entomological Society of America Meeting. Portland, OR (11/19/14).
3. Hoekstra, N.C. and M.M. Gardiner. Estimating Biodiveristy for Food Production in an Urban Setting. Ohio Agricultural Research and Development Center, The Ohio State University. Wooster, OH. Presentation to Office of U.S. Representative Marcia L. Fudge (09/19/14).
4. Hoekstra, N. Studying *Batrachochytrium dendrobatidis* (Bd) Prevalence in the Piedmont of South Carolina. Queens University of Charlotte, Department Seminar. Charlotte, NC (11/2013).

SUBMITTED PRESENTATIONS

1. Perry, KI, NC Hoekstra, YA Delgado de la Flor, and MM Gardiner. Mechanisms of ground-dwelling beetle community assembly in an urban ecosystem. Biological Control Webinar Series, Midwest Biocontrol Working Group (NCERA 220) (05/16/19).
2. Perry, KI, NC Hoekstra, YA Delgado de la Flor, and MM Gardiner. Urban landscapes are a strong dispersal filter for the assembly of beetle communities. Annual Research Conference, College of Food, Agriculture, and Environmental Sciences, The Ohio State University. Columbus, OH (04/22/19).
3. Hoekstra, NC, CD Sprunger, MM Gardiner, and SW Culman. The effect of vegetation management strategies on soil health in urban vacant lots. SENR Soil Science Research Day. The Ohio State University. Columbus, OH (03/28/19).

4. Perry, KI, NC Hoekstra, YA Delgado de la Flor, and MM Gardiner. Mechanisms of ground-dwelling beetle community assembly in an urban ecosystem. North Central Branch Entomological Society of America. Cincinnati, OH (03/19).
5. Hoekstra, N.C., Sprunger, C., Basta, N., Gardiner, M., and Culman, S. The impact of vegetation management strategies on soil health in urban vacant lots. Soil Science Society of America International Meeting. San Diego, CA (01/08/19).
6. Perry, KI, NC Hoekstra, Y Delgado de la Flor, and MM Gardiner. 2018. Dispersal limitations constrain ground-dwelling beetle assemblages in an urban ecosystem. Entomological Society of America. Vancouver, BC, Canada (11/12/18).
7. Hoekstra, N.C., Culman, S., and Francis, D. Soil Health and Nutrient Management for Optimizing Quality and Yield of Processing Tomatoes. College of Food, Agricultural, and Environmental Sciences Annual Research Conference. Wooster, OH (04/27/18).
8. Hoekstra, N.C., Culman, S., and Francis, D. Soil Health and Potassium Fertilization for Quality and Yield. Great Lakes Vegetable Working Group Annual Meeting. Grand Rapids, MI (02/27/18).
9. Hoekstra, N.C. and M.M. Gardiner. The influence of soil heavy metals burdens on community composition in urban vacant lots. The Ecological Society of America meeting. Fort Lauderdale, FL (08/10/16).
10. Hoekstra, N.C. and M.M. Gardiner. The influence of soil nutrients and metal burdens on community composition in urban vacant lots. Poster Presentation. The North Central Branch of the Entomological Society of America Annual Research Conference. Cleveland, OH (06/17/16).
11. Hoekstra, N.C. and M.M. Gardiner. The influence of soil nutrients and metal burdens on community composition in urban vacant lots. Poster Presentation. The Ohio Agricultural Research and Development Center Annual Research Conference. Wooster, OH (04/21/16).
12. Hoekstra, N.C. and M.M. Gardiner. Heavy Metal Soil Burdens in Cleveland, OH: Implications for Urban Agriculture. Great Lakes Vegetable Working Group Meeting. London, ON, Canada (03/03/16).
13. Hoekstra, N.C. and M.M. Gardiner. Does greenspace design influence urban vacant lot soil biodiversity and ecosystem functioning? Poster Presentation. Ohio Natural History Conference. Columbus, OH (02/27/16).
14. Hoekstra, N.C. and M.M. Gardiner. Does greenspace design influence urban vacant lot soil biodiversity and ecosystem functioning? Poster Presentation. Section P-IE, The Entomological Society of America Meeting. Minneapolis, MN (11/17/15).
15. Hoekstra, N.C. and M.M. Gardiner. Biodiversity beyond parks: Do urban vacant lots hold promise for conservation and restoration? Poster Presentation. The Ohio Agricultural Research and Development Center Annual Research Conference. Columbus, OH (04/16/15).
16. Hoekstra, N.C., Herms, C., Cardina, J., and M.M. Gardiner. Biodiversity beyond parks: Do urban vacant lots hold promise for conservation and restoration? Poster Presentation. Ohio Natural History Conference. Columbus, OH (02/28/15).
17. Hoekstra, N.C., Herms, C., Cardina, J., and M.M. Gardiner. Biodiversity beyond parks: Do urban vacant lots hold promise for conservation and restoration? Poster Presentation. Section P-IE, The Entomological Society of America Meeting. Portland, OR (11/25/14).
18. Hoekstra, N.C., Herms, C., Cardina, J., and M.M. Gardiner. Investigating Community Structure in Vacant Lots in Cleveland, Ohio. Natural Areas Conference. Dayton, OH (10/16/14).
19. Hoekstra, N.C. Studying *Batrachochytrium dendrobatidis* (Bd) Prevalence in the Piedmont of South Carolina. Exit Seminar Presentation. Winthrop University, Rock Hill, SC (11/20/13).
20. Hoekstra, N.C. Studying *Batrachochytrium dendrobatidis* (Bd) Prevalence and Haplotype Variability in the Piedmont of SC. Poster Presentation. 1st North Carolina Congress of Herpetology Meeting. Asheboro, NC (04/19/13).
21. Hoekstra, N.C. Determining Prevalence and Strain of Bd from Amphibian Populations at Landsford Canal State Park, SC. Poster Presentation. Southeast Partners in Amphibian and Reptile Conservation Annual Meeting. Hickory Knob State Park, SC (02/21/13).

EXTENSION AND OUTREACH

1. Cleveland Urban Farms Tour
   Presentation given to USDA group on soil study research being conducted as part of urban vacant lot project in Cleveland, Ohio (09/15/15).

2. The Buckeye Lady Beetle Blitz
   The Buckeye Lady Beetle Blitz is a Citizen Science program used to track native and exotic lady beetle populations in backyard gardens across Ohio (Spring of 2014 and 2015).

3. Pollination Investigators
   Pollination Investigators is a Citizen Science program investigating the pollination services that bees provide to backyard vegetable gardens in the cities of Cleveland, Cincinnati, and Wooster, Ohio (04/14).

WORKSHOPS

1. A Bug's World (03/09/16 and 04/10/14)
   Ohio Agricultural Research and Development Center. Wooster, OH
   A Bug's World is an interactive learning experience for elementary school students. Our session focused on lady beetle lifecycles, which students drew onto abdomens of paper beetles they assembled (with help) and decorated.

2. The Secret Lives of Good Garden Bugs & Buckeye Lady Beetle Blitz Volunteer Round-up (05/14 – 05/16/14)
   Wooster, Cleveland, and Cincinnati, Ohio.
   Full day workshops focused on the "secret lives" of beneficial garden arthropods, which examined foraging strategies, courtship, parental care of young, shelter and nest building for several groups of arthropod natural enemies. Participants also had the opportunity to become involved in our Citizen Science programs.

MILITARY ACHIEVEMENTS

- Twice awarded the Navy Achievement medal (NAM) for performance on active duty.
- Qualified as Enlisted Surface Warfare Specialist in first year of active duty service.
- Achieved E1 – E6 ranking in less than four years of service through accelerated advancement and early promotion programs on evaluations, which allowed for early advancement testing.

PROFESSIONAL DEVELOPMENT

2019

- ARM Software Training. The Ohio State University. Workshop (03/05/19)
- Great Lakes Hop & Barley Conference. (02/28 – 03/02/19)

2018

- Shooting and Editing Videos. The Ohio State University. Workshop (05/02/18)
- LabArchives Professional Edition. The Ohio State University. Workshop (02/14/18)
- Data Management Basics for Agriculture. The Ohio State University. Workshop (02/13/18)

2017

- Writing in the Sciences. Stanford University, Online course (completion: 10/30/17)
- GIS for Research I: An Introduction to GIS Concepts and Data. The Ohio State University. Online workshop (10/19/2017)
- Securing the Human. College of Food, Agricultural, and Environmental Sciences, Office of the Chief Information Officer. Online course (05/23/17)
- Grant Writing: An Introduction. The Ohio State University, OARDC. One-day workshop (04/27/2017).

2016

- Introduction to Genomic Technologies. John Hopkins University via Coursera (07/16/16)
- Soil Health Workshop. Ohio Agricultural and Development Center, Wooster, OH (04/27/16)

2015

- The Data Scientist's Toolbox. John Hopkins University course taught online via Coursera (06/15/15)

2014

- Learning to use ELISAs in diet analysis studies. Department of Entomology. The Ohio State University. Columbus, OH. (05/08/14)
- Using Drupal 7 to build a website. The College of Food, Agriculture, and Environmental Science. The Ohio State University. Columbus, OH. (01/07/14).

COMMITTEES

2016 Faculty search committee. The Ohio State University. Department of Entomology. Staff representative.

2009 Faculty search committee. Queens University of Charlotte. Department of Biology. Undergraduate student representative.

PROFESSIONAL SERVICE

2016 Moderator. The Ecological Society of America Meeting. COS 25: Urban Ecosystems I. Fort Lauderdale, FL (08/09/16).

Moderator. Ohio Hops and Malting Barley Conference and Trade Show. The Ohio State University. Wooster, OH (02/25/16).

2015 Moderator. Ohio Hops and Malting Barley Conference and Trade Show. The Ohio State University. Wooster, OH (02/06/15)

2012 Moderator and Student Competition Judge. Big SURS (South Undergraduate Research Symposium) Conference. Winthrop University, Rock Hill, SC (04/14/12).

MEMBERSHIPS AND PROFESSIONAL AFFILIATIONS

2018 – Present	Soil Science Society of America
2016 – 2017	Ecological Society of America
2014 – 2016	Entomological Society of America
2014 – 2015	Natural Areas Association
2013 – 2014	The North Carolina Herpetological Society South Eastern Partners in Amphibian and Reptile Conservation
2013 – 2014	Wildlife Disease Association
2011 – 2013	Mecklenburg Audubon Society, North Carolina
2008 – Present	Beta Beta Beta, National Biological Honors Society

VOLUNTEER WORK

2016 – Present	Wooster Blades Hockey Coach volunteer. Wooster, OH. Coached children ages 6 – 8 for two years and am now working with children ages 8 – 10. Coaching focuses on skill development (skating, passing, shooting, etc.), game awareness, sportsmanship, and being a team player.
2019	The Biggest Week in American Birding. Black Swamp Bird Observatory. Day trip driver and guide (05/09 – 05/13).
2017 – 2018	OARDC Community Gardens Committee. Assist in maintenance and organization of community gardens on OARDC campus.
2018	The Biggest Week in American Birding. Black Swamp Bird Observatory. Day trip driver and guide, workshop host (05/09 – 05/13).
2017 – 2018	Citizen Scientist for Project Feederwatch. Cornell University.
2017	Wayne County Fair. OARDC demonstration table. Explained and taught fair attendees about research being conducted at OARDC (09/11).
2017	The Biggest Week in American Birding. Black Swamp Bird Observatory. Hosted workshops and worked at the registration table (05/11, 05/13).
2016	Flora-Quest and Rally for Rails. Lakeside, OH. Worked as an assistant to the meeting organizer and managed the interns (09/30 – 10/02).
	Wayne County Fair. OARDC demonstration table. Explained and taught fair attendees about research being conducted at OARDC (09/12).

The Biggest Week in American Birding. Black Swamp Bird Observatory. Hosted book signing events and worked at the sales table (05/09 – 05/12).

2015

Flora-Quest. Mohican, OH. Worked as an intern helping to organize equipment and assist guides on field trips; assisted vendors and presenters as needed; and answered questions and assisted participants as needed (08/27 – 08/29).

Tough Mudder. Lexington, OH. Worked as part of a six person team to help construct course components and courtyard activities and worked as part of a four person team to help check-in runners, answer questions, and give directions to participants and spectators (05/07, 05/10).