

Benjamin N. Philip, Ph.D.

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EDUCATION

Miami University, Oxford, Ohio **2006-2010**
Doctor of Philosophy in Zoology

Eastern Michigan University, Ypsilanti, Michigan **2004-2006**
Master of Science in Biology

Miami University, Oxford, Ohio **1999-2003**
Bachelor of Arts in Zoology, *Magna Cum Laude*

ACADEMIC EMPLOYMENT

Lecturer
• The Ohio State University **2017-Present**

Extension Program Specialist
• The Ohio State University **2020**

Adjunct Professor
• Ohio Wesleyan University **2017, 2019**

Associate Professor
• Rivier University Department of Biology **2014-2016**

Assistant Professor
• Rivier University Department of Biology **2010-2014**

PROFESSIONAL PUBLICATIONS

Gantz, J.D., **B.N. Philip**, Y.D. Kawarasaki, L.J. Potts, D.E. Spacht, J.D. Benoit, D.L. Denlinger, R.E. Lee Jr., and N.M. Teets. 2022. Brief exposure to environmental stress enhances stress tolerance in the Antarctic midge, *Belgica antarctica*. *Journal of Experimental Biology*. Under Review.

Potts, L.J., J.D. Gantz, Y. Kawarasaki, **B.N. Philip**, D.J. Gonthier, A.D. Law, L. Moe, J.M. Unrine, R.L. McCulley, R.E. Lee Jr., D.L. Denlinger and N.M. Teets. 2020. Environmental Factors Influencing Fine-Scale Distribution of Antarctica's Only Endemic Insect. *Oecologia* 194 (4): 529–39.

B.N. Philip. 2020. Bed Bugs [Fact Sheet HYG-2105]. The Ohio State University. <https://ohioline.osu.edu/factsheet/hyg-2105>

- Teets, N.M., Y. Kawarasaki, L.J. Potts, **B.N. Philip**, J.D. Gantz, D.L. Denlinger, R.E. Lee Jr. 2019. Rapid cold hardening protects against sublethal freezing injury in an Antarctic insect. *Journal of Experimental Biology*. 222:206011.
- Kawarasaki, Y., N.M. Teets, **B.N. Philip**, L.J. Potts, J.D. Gantz, D.L. Denlinger, R.E. Lee Jr. 2019. Characterization of the drought-induced rapid cold-hardening response in the Antarctic midge, *Belgica antarctica*. *Polar Biology*. 42:1147-1156.
- Whitney, T., **B.N. Philip**, and J. Harwood. 2014. Tradeoff in two winter-active wolf spiders: increased mortality for increased growth. *Entomologia Experimentalis et Applicata*. 153:191-198.
- Pace, C., A. Nutt, A. Reutzel, V. Jones, A. DeSantis, B. Bailey, M. Droutman, S. Holmes, M. Jardin, H. Richardson, T. Wright, D. Barriga, and **B.N. Philip**. 2014. Putting Sustainability into Perspective for Students: A Biodigester Installation in Costa Rica. *InSight: Rivier Academic Journal*. 10:1-3.
- Rosendale, A., **B.N. Philip**, R.E. Lee Jr., and J.P. Costanzo. 2014. Cloning, characterization, and expression of glucose transporter-2 in the freeze-tolerant wood frog, *Rana sylvatica*. *Biochimica et Biophysica Acta*. 1840:1701-11.
- Goto, S.G., **B.N. Philip**, N.M. Teets, Y. Kawarasaki, R.E. Lee Jr., and D.L. Denlinger. 2011. Functional characterization of an aquaporin in the Antarctic midge, *Belgica Antarctica*. *Journal of Insect Physiology*. 57:1106-14.
- Philip, B.N.** and Y. Tomoyasu. 2011. Gene knockdown analysis by double-stranded RNA injection in the red flour beetle, *Tribolium castaneum*. Chapter published in: Methods in Molecular Biology: Molecular Methods for Evolutionary Genetics. 772:471-97.
- Philip, B.N.**, A.J. Kiss, and R.E. Lee Jr. 2011. The protective role of aquaporins in the freeze-tolerant insect *Eurosta solidaginis*: Functional characterization and tissue abundance of EsAQP1. *Journal of Experimental Biology*. 214:848-857.
- Philip, B.N.** and R.E. Lee Jr. 2010. Changes in abundance of aquaporin-like proteins occurs concomitantly with seasonal acquisition of freeze tolerance in the goldenrod gall fly, *Eurosta solidaginis*. *Journal of Insect Physiology*. 56:679-685.
- Philip, B.N.** and C. Shillington. 2010. The effect of prey availability on metabolism and activity in the tarantula *Phormictopus cancerides* (Araneae: Theraphosidae). *Canadian Journal of Zoology*. 88:90-98.
- Philip, B.N.**, S.-X. Yi, M.A. Elnitsky, and R.E. Lee Jr. 2008. Aquaporins play a role in desiccation and freeze tolerance in larvae of the goldenrod gall fly, *Eurosta solidaginis*. *Journal of Experimental Biology*. 211:1114-1119.
- Philip, B.N.** and C. Shillington. 2007. A novel technique of hair removal to examine the cuticle of arthropods. *Microscopy Today*. 15(2):22-25.

Alessio, H.M., A.E. Hagerman, S. Nagy, **B.N. Philip**, R.N. Byrnes, J.L. Woodward, P. Callahan, and R. Wiley. 2005. Exercise improves biomarkers of health and stress in animals fed *ad libitum*. *Physiology and Behavior*. 84:65-72.

Schweitzer, N.B., H.M. Alessio, A.E. Hagerman, S. Roy, C.K. Sen, S. Nagy, R.N. Byrnes, **B.N. Philip**, J.L. Woodward, and R.L. Wiley. 2005. Access to exercise and its relation to cardiovascular health and gene expression in laboratory animals. *Life Sciences*. 77(18):2246-2261.

SELECTED TEACHING EXPERIENCE

- Evaluating Evidence in Biology & Medicine (The Ohio State University ENT 2400H) **2023**
- Capstone Course: Problem-Based Studies in Plant Health (The Ohio State University ENT 5604) **2023**
- Insects of Ohio (The Ohio State University ENT 3300) **2022**
- Turfgrass Insect and Mite Pests - Identification, Biology, and Management (The Ohio State University ENT 5608) **2021-2023**
- Landscape Ornamental Plant Insect and Mite Pests - Identification, Biology and Management (The Ohio State University ENT 5609) **2021-2023**
- Biology of Insects, Animals, and Fungi Affecting Buildings (The Ohio State University ENT 1111) **2019-2022**
- Insects and Human Affairs: Pests, Plagues, Poisons and Politics (The Ohio State University ENT 2101) **2021-2022**
- Human Anatomy (The Ohio State University BIO 2300) **2017, 2018**
- Human Physiology (The Ohio State University EEOB 2520) **2017, 2018**
- Human Anatomy & Physiology (Ohio Wesleyan University ZOO 251) **2017, 2019**
- Anatomy and Physiology I and II Online (Rivier University BIO 105, 106) **2014-2023**
- General Biology I (Rivier University BIO 103) **2012, 2014**
- Animal Physiology (Rivier University BIO 301) **2011, 2013, 2015**
- Field Experiences in Biology: Costa Rica (Rivier University BIO 120) **2014, 2016**
- Teaching of Biology in Secondary Schools (Rivier University BIO 322/ED 507) **2013**
- Problems in Biology (Rivier University BIO 426) **2011-2016**
- Animal Behavior (Rivier University BIO 305) **2011, 2013**

RESEARCH PROJECTS

“Winter Survival Mechanisms In An Antarctic Insect”

2017-2018

- Field studies were conducted at Palmer Station in Antarctica, examining the only endemic free-living terrestrial insect on the continent, *Belgica antarctica*. The Antarctic midge survives in this environment via unique mechanisms that include the ability to tolerate freezing and extensive dehydration. Research focused on understanding seasonal adaptations of this insect and how they might respond to climate change.

“Cold tolerance in winter-active wolf spiders”

2012-2014

- Research focused on seasonal changes in cold tolerance of wolf spiders that remain active in the winter. Both supercooling points and cold tolerance were measured throughout the fall and winter. Research conducted with collaborators at the University of Kentucky.

“The characterization of glucose transporters in freeze-tolerant wood frogs”

2012-2014

- Using a *Xenopus laevis* oocyte expression assay, glucose transporter activity was characterized in wood frogs. Research conducted with collaborators at Miami University.

“Latitudinal variations in winter cold-hardiness”

2011

- Established field sites for collecting the freeze-tolerant gall fly, *Eurosta solidaginis*, throughout New Hampshire. Additionally, seasonal baseline cryoprotectant levels were measured.

“The characterization and physiological role of aquaporins during desiccation and freezing in insects” (*Dissertation Research*)

2006-2010

- Research focused on the role of aquaporins during osmotic stress. Studies not only examined aquaporin expression from insects in the field but also used molecular techniques to characterize the structure and function of these proteins in a freeze-tolerant insect.

“The effect of prey availability on metabolism and strike response in tarantulas” (*Master’s Thesis Research*)

2004-2006

- Through both physiological and behavioral experiments, the effect of limited feeding was measured in the tarantula, *Phormictopus cancerides*.

“An innovative method for examining the cuticle using scanning electron microscopy” (*Independent Research as a Graduate Student*)

2005-2006

- Developed a technique of removing hairs from specimens so that cuticular surfaces could be examined using scanning electron microscopy. This technique was used to examine the cuticle of different species of tarantulas.

“Investigating oxidative stress using rat models” (*Undergraduate Research*)

2000-2003

- Experiments included taking rat body weights, blood pressures, heart rates,

blood collection, monitoring exercise (swimming and running) as well as sacrifice, dissection, organ harvesting, and assays on tissues.

“Effects of isometric exercise in hypertensive humans” (*Undergraduate Research*) **2000**

- Responsible for measuring blood pressures and assisting in blood collection. In addition, performed blood assays, including lipid analysis.

FUNDED GRANTS

- USDA-NIFA Ohio Extension Implementation Program, Co-PI (\$372,883) **2021-2023**
- NSF S-STEM Scholarship Program Grant, Co-PI (\$650,000) **2016**
- Rivier University Faculty Development Grant (\$1000) **2011, 2012**
- Miami University Department of Zoology Doctoral Student Research Award **2010**
- Miami University Zoology Department Dissertation Research Fellowship **2009**
- Eastern Michigan University Meta Hellwig Graduate Research Fellowship **2005**

AD HOC REVIEWER

- African Journal of Biotechnology
- American Midland Naturalist
- Comparative Biochemistry and Physiology
- Insect Molecular Biology
- *Insight*: Rivier University Academic Journal
- International Journal of Molecular Science
- Journal of Comparative Physiology- B
- Journal of Experimental Biology
- Journal of Insect Physiology
- Oikos
- Physiological Entomology

PAST AND PRESENT PROFESSIONAL ORGANIZATIONS

- American Arachnological Society
- American College of Sports Medicine
- Beta Beta Beta Biological Society
- Entomological Society of America
- National Society of Collegiate Scholars
- Sigma Xi Scientific Research Society
- Society for Integrative and Comparative Biology