

# JENNIFER BONNA NOSEWORTHY

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MARION, INDIANA 46953-4974

JENNIFER.NOSEWORTHY@indwes.edu

## EDUCATION

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### **Doctor of Philosophy in Plant Biology**, December 2012

Department of Plant Biology, The University of New Hampshire at Durham

Dissertation: Eating quality and variability in carotenoid content in winter squash and sweet potato

### **Masters of Science in Horticultural Science**, May 2005

Department of Horticultural Science, The University of Florida at Gainesville

Thesis: A rapid, simple, inexpensive and reproducible endo- $\beta$ -mannanase assay test for determining optimal hydrothermal timing of commercial seed priming of lettuce (*Lactuca sativa*) seed

### **Bachelor of Science in Biology**, May 2002

Department of Biology, Gordon College, Wenham MA

Senior Project: Antibacterial activity of isolated compounds extracted from *Moringa oleifera* seeds

## PROFESSIONAL EXPERIENCE

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### **Assistant Professor of Biology**, July 2018-present

Biology Department, Indiana Wesleyan University, Marion Indiana

### **Assistant Professor of Biology**, Aug 2014 – July 2018

Biology Department, Gordon College, Wenham, MA

### **Adjunct Professor of Chemistry**, 2013-2014

Salem State University, Salem, MA

### **Adjunct Professor of Biology**, 2012- 2014

Gordon College, Wenham, MA

### **Research Assistant of Plant Biology**, 2011-2012

University of New Hampshire, Durham, NH

### **Lecturer of Plant Biology**, 2006-2010

University of New Hampshire, Durham, NH

### **Lecturer of Biology**, 2005-2006

Gordon College, Wenham, MA

## PROFESSIONAL MEMBERSHIPS AND AFFILIATIONS

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American Society of Plant Biology, 2016

American Society of Horticultural Science 2015

American Chemical Society, 2012

Gamma Sigma Delta Honor Society of Agriculture, since 2005

## FUNDING AND AWARDS

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Whole Foods-Whole Kids Bee Keeping Grant December 2019	\$1500
NSF PUI Faculty Travel Grant June 2019	\$1000
Discovered Opportunity Lily Grant- Lily Foundation April 2019	\$1000
Emerging Lily Scholar- Lily Foundation March 2019	\$3800
Massachusetts Compact Grant 'Service Learning in our New England Backyard' May 2017	\$4500

## **EVALUATING LYCOPENE ACCUMULATION IN GREENHOUSE TOMATOES**

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My current research is focused on evaluating antioxidant variability in fruits and vegetables, particularly lycopene in tomatoes grown under greenhouse and field conditions. Lycopene content and profiles are determined using spectrophotometric and high-performance liquid chromatography analysis. This often requires use of hazardous chemicals that are not environmentally friendly; we are developing methods of analysis that utilize greener solvents. LED (light emitting diode) lights are now used for supplemental greenhouse lighting yet little is known about their impact on carotenoid accumulation in tomatoes. Additionally, I participated in a tomato breeding project that led to the release of pink cherry tomato variety that grows in a hanging basket.

### **Publications**

Hodgdon, E., Noseworthy, J., Sideman, B. 2015 'Rambling Rose': A Pink-fruited Cherry Tomato for Hanging Basket Production. HortSci 50(8): 1255-1256

### **Conference and Symposium Abstracts:**

Noseworthy, J. Antonelli, A., and Silvius, K. 2019. Impact of LED supplemental lighting on accumulation of carotenoids on greenhouse grown tomatoes. ASPB National Meeting. San Jose, California. August 3-7, 2019.

Noseworthy, J. 2018. "Extraction and quantification of lycopene content for high performance liquid chromatography analysis using alternative solvents" ACS National Meeting & Expo, New Orleans, United States, March 18-22, 2018.

Enright, M., Noseworthy, J. 2015. "Greener' sample preparation of lycopene from tomato (*Lycopersicon esculentum*) for quantification by UV/Vis spectrophotometry and high performance liquid chromatography". Green Chemistry & Engineering Conference, Bethesda, MD, United States June 12, 2015.

Enright, M, Noseworthy, J. 2015. "Green extraction of lycopene from tomato (*Lycopersicon esculentum*) using 2-methyltetrahydrofuran". ACS National Meeting & Expo, Denver, CO, United States, March 22-26, 2015.

Enright, M., Noseworthy, J. 2014. "Effect of high tunnel use on lycopene content in "Brandywine" and "Jet Star" tomatoes (*Lycopersicon esculentum* Mill.)" ACS National Meeting & Expo, Dallas, TX, United States, March 16-20, 2014.

## **EMBRYOGENESIS AND REGENERATION OF *MORINGA OLEIFERA***

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We are developing a protocol that exemplifies our capacity to induce embryogenesis and even regeneration of *Moringa oleifera*. This was done through a callus tissue culture method which is essential in the modification of the plants genetics. Successful embryogenesis and regeneration allows for mass production of cells needed for biochemical analysis and characterization of compounds. It will also allow for genetic clones to be developed for Moringa plants that display valuable traits. An implication of this research is that genetic modification would enable *Moringa* to be grown in colder climates. This has commercial value and would be beneficial to nutritional feeding programs.

### **Conference and Symposium Abstracts**

Blanchard, H. 2020. Somatic Embryogenesis and Regeneration of *Moringa oleifera*. John Wesley Honor College Spring Colloquium. Indiana Wesleyan University. April 16, 2020.

Buck, J., Miller, G., Bennett, C., Embalabala, E., Blanchard, H., Miller, G., Noseworthy, J. 2019. Embryogenesis and regeneration of *Moringa oleifera*. ASPB National Meeting. San Jose, California. August 3-7, 2019.

## **ANTIOXIDANT EFFECTS OF LUTEIN AND DHA ON INFLAMMATION IN THE BRAIN**

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In an effort to expand my research program to include work on the impact of plant-derived antioxidant effects on human health, I have another project in the initial stages of preliminary work which is in collaboration with Dr. Elizabeth Johnson at the Jean Mayer USDA Human Nutrition Research Center on Aging. We seek to understand the mechanisms in which antioxidant and anti-inflammatory nutrients may slow the onset of

Alzheimer's Disease and age-related cognitive decline by studying the effect of (DHA) and lutein on antioxidant capacity and inflammatory signaling in neuronal cell culture.

### Conference and Symposium Abstracts

Gabrielle Capone, 2017 "Response to H<sub>2</sub>O<sub>2</sub>-induced oxidative stress on human glial cells" Gordon College Symposium, May 2017

Bailey Grinnel, 2016 "Determination of concentration of H<sub>2</sub>O<sub>2</sub> to induce oxidative damage in human glial cells" Gordon College Symposium, May 2016.

### IMPROVING BIOACCUMULATION OF CAROTENOIDS IN WINTER SQUASH AND SWEET POTATO USING PLANT BREEDING AND POSTHARVEST TECHNIQUES

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One aspect of the cucurbit breeding program at University of New Hampshire was to select for deep orange flesh color in squash and pumpkin. Increased color intensity is linked to higher carotenoid content and my project evaluated carotenoid profiles and content of winter squash for enhanced human nutrition. Additionally, we investigated the influence of post-harvest practices such as storage on sugar and starch profiles and I was able to develop breeding lines and cultivars of winter squash with higher carotenoid profiles and improved eating quality.

#### Publications:

Noseworthy, J., J.B., Loy, Curran-Celentano, J., Sideman, R, Kopsell, D. 2016. Carotenoid Concentration and Composition in Winter Squash: Variability Associated with Different Cultigens, Harvest Maturities, and Storage Times. HortScience May 2016 vol. 51 no. 5 472-480

Noseworthy J. and J.B. Loy. 2010. Variability in carotenoid content and profiles in *Cucurbita maxima* and *Cucurbita moschata* squash. HortScience. 45:480-485

Noseworthy, J. B. and Loy, B. 2008. Improving eating quality and carotenoid content of squash. Cucurbitaceae 2008, Proceedings of the IXth EUCARPIA meeting on genetics and breeding of Cucurbitaceae (Pitrat M, ed), INRA, Avignon (France).

### Conference and Symposium Abstracts

Noseworthy, J. 2015. Carotenoid Content and Composition in Winter Squash, (*Cucurbita maxima* Duch.) and (*Cucurbita moschata* Duch.): Variability Associated with Harvest and Storage. ACS National Meeting & Expo, Denver, CO, United States, March 22-26, 2015.

Noseworthy J. and J.B. Loy. 2011. Variability in Carotenoid Content and Profiles in *Cucurbita maxima* and *Cucurbita moschata* Squash. American Society of Horticulture. Hawaii. September 25–28, 2011.

Noseworthy J. and J.B. Loy. 2009. Harvest Date and Storage Time Affect Eating Quality and Carotenoid Content in Squash. American Society of Horticulture Regional Meeting. Boston, MA. January 4-5, 2009.

Noseworthy J. and J.B. Loy. 2009. Storage time affects postharvest quality and carotenoid levels of squash. (*C. maxima* and *C. moschata*). American Society of Horticulture Regional Meeting. Rutgers University, NJ. January 10-12, 2009.

### STUDENT MENTORING IN RESEARCH

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Providing research opportunities for undergraduates is my main focus. Often, students join my lab to gain experience in a skill set, including HPLC, spectrophotometry, plant production or cell culture but more often they work alongside me in my research projects. I serve as mentor to the student and train them in the lab but also teach them how to prepare abstracts, literature reviews and symposium posters or presentations. Whenever possible, my students accompany me to regional or national conference meetings.

### **Gordon College:**

Liza Antonelli, Quincy Dougherty and Daniel Yu, 2018 "Accumulation of lycopene in greenhouse grown tomato and winter greens using LED lighting"

Gabrielle Capone, 2017 "Response to H<sub>2</sub>O<sub>2</sub>-induced oxidative stress on human glial cells" Gordon College Symposium, May 2017.

Bailey Grinnell, 2016 "Determination of concentration of H<sub>2</sub>O<sub>2</sub> to induce oxidative damage in human glial cells" Gordon College Symposium, May 2016.

Logan Walsh and Courtney Olbrich, 2016 "Genetic diversity of the newly invasive species *Colpomenia peregrina* along coast of Massachusetts". ACS National meeting, San Diego, CA March 16-20<sup>th</sup> 2016.

Mollie Enright, 2013-2015 "Greening an antioxidant analysis: a new method of lycopene extraction using 2-methyltetrahydrofuran". Honors thesis, Gordon College, May 2015.

Will Heffern and Lauren Purdy, 2015 A Study of Populations of the Species *Colpomenia peregrina* on Cape Ann

Logan Walsh, Christeena Joel, Gabrielle Capone, Michele Yao, Addison Tarr, YanJun Yang, 2015 "Using greener solvents to extract carotenoids from spinach using thin-layer chromatography" General Chemistry Honors Project Gordon College Symposium, May 2015.

### **Indiana Wesleyan University:**

Blanchard, H. 2020. Somatic Embryogenesis and Regeneration of *Moringa oleifera*. John Wesley Honor College Spring Colloquium. Indiana Wesleyan University. April 16, 2020.

Biddle, Z. and Noseworthy, J. 2019. Use of vegetative grafting to improve cold tolerance in cucumber. Hodson Research Institute. Indiana Wesleyan University.

Silvius, K and Noseworthy, J. 2019. Effect of vegetative grafting in greenhouse grown tomato on carotenoid accumulation. Hodson Research Institute. Indiana Wesleyan University.

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### **COMMUNITY OUTREACH**

#### **Alliance Garden Director, Marion, IN 2019**

Oversees the small-scale farm/campus garden at Indiana Wesleyan University. Managed the garden interns and farmers markets. Hosted events at the garden open to the community including field trips, demonstrations and field days. Integrating pollinator gardening and bee keeping. Whole Foods/Whole Kids Bee grant recipient 2019.

#### **Supportive Living, Rockport, MA 2018**

Developing a horticulture therapy curriculum that includes Gordon College students and establishing a community garden internship at Supportive Living, a residential program for the traumatically brain injured.

#### **Gordon College Service Learning, Wenham, MA 2016**

MACC Grant recipient (\$4,000) conducted a community-based service learning opportunity for Gordon College students to remove invasive plant species and restoration of the Gordon College woods.

**Backyard Grower Volunteer, Gloucester, MA, 2014** Volunteered to help water the elementary school gardens weekly in the summer.

**Food Project Volunteer, Lynn, MA, 2012** Volunteer with Gordon College students at the Food Project helping with planting, weeding and harvest.

**ECHO, Educational Concerns for Hunger Organization, Fort Myers, FL. 2000-2020** Volunteer at the ECHO farm, volunteering and leading work teams.

### **Board Affiliations**

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Thriving Grant County Community Council-May 2019	Marion, IN
Marion Community Gardens Association Board- June 2019	Marion, IN
Lakeview Christian School Board of Directors- Fall 2019	Marion, IN

**J.B. Noseworthy**