

## JOE-ANN H. MCCOY

Director – Bent Creek Medicinal Germplasm Repository - The North Carolina Arboretum  
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### EDUCATION

#### CLEMSON UNIVERSITY - CLEMSON, SC

Ph.D. - Plant Physiology - 12/2004

Dissertation – Development of Seed and Rhizome Propagation Protocols for  
*Actaea racemosa* L.(black cohosh) and Analysis of Associated Triterpene Glycosides

#### CLEMSON UNIVERSITY - CLEMSON, SC

M.S. - Plant Pathology - 12/1998

Thesis - In Vitro Culture of *Hypericum perforatum* L. (St. John's wort) and HPLC Analysis of Hypericins

#### UNIVERSITY OF NORTH CAROLINA - ASHEVILLE, NC

B.S. - Environmental Studies - 12/1994

Research - Distribution and Identification of Lichen Flora of the Southern Appalachians

### EXPERIENCE

**12/2007 – Current.** Director, Bent Creek Germplasm Repository (BCGR) at the NC Arboretum  
BCI – Bent Creek Institute / Asheville, NC.

Full-time Duties:

- ◆ Development and management of a germplasm repository for medicinal and native plant genera for conservation and research
- ◆ Identification and acquisition of new germplasm, both domestic and foreign, from native populations via plant exploration and research collaboration
- ◆ Development and management of extensive extract collections for collaborative research for product development
- ◆ Development and maintenance of a living endophytic fungi collection for the production of extracts for research and product development
- ◆ Development of research collaborations with national and international research institutions to promote economic development

**4/2004 – 12/2007.** Curator / Medicinal Plants. USDA / NIH / NCCAM

Center for Research on Botanical Dietary Supplements

NCRPIS – North Central Regional Plant Introduction Station. Ames, Iowa

Full-time Duties:

- ◆ Development of germplasm management protocols for medicinal plant genera
- ◆ Identification and acquisition of new germplasm, both domestic and foreign, from native populations via plant exploration and research collaboration. Collection in NC, SC, GA, AR, MO, WA, OR, IA, AK, Republic of Georgia

**10/1998- 2/2004:** Research Associate – NCSU - Fletcher, North Carolina

Duties:

- ◆ Development of in vitro seed and field rhizome propagation protocols for native medicinal plants and HPLC analysis of marker compounds
- ◆ Development of a tissue culture research laboratory; staff training in aseptic technique

**5/1997 - 5/1998:** Analytical Lab Technician / Plant Pathologist - Gaia Herbs Inc. - Brevard, NC

Duties: Extraction and HPLC analysis of phytopharmaceuticals for quality control and medicinal research; Plant pathologist for commercial organic production facility

### PUBLICATIONS

- ◆ Pate, S., Lance, S., McCoy, J., Mathews, K. 2011. (submitted). Development and characterization of microsatellite markers for *Actaea racemosa* L. (black cohosh). *American Journal of Botany*.
- ◆ ChoonSeok, O., Price, J., Brindley, M., Widrlechner, M., Luping Q., McCoy, J., Murphy, P., Hauck, C., Maury, W. 2011 Inhibition of HIV-1 infection by aqueous extracts of *Prunella vulgaris* L. *Virology Journal*. 8:188.
- ◆ Qiang, Z., Zhong, Y., Hauck, C., Murphy, P., McCoy, J., Widrlechner, M., Reddy, M., Hendrich, S. 2011. Permeability of Rosmarinic Acid from *Prunella vulgaris* and Ursolic Acid from *Salvia officinalis* Extracts Across Caco-2 Cell Monolayers. *Journal of Ethnopharmacology*. 137(3):1107-12.
- ◆ Zhiyi, Q., Rizshsky, L., Hauck, C., McCoy, J., Widrlechner, M., Nikolau, B., Reddy, M., Murphy, P., Hendrich, S. 2011 (submitted) Glucuronidation of Alkamide and Ketones in *Echinacea sanguinea* and *Echinacea pallida* extracts by CACO-2 cells and their modulation of P-glycoprotein transporter. *Planta Medica*.
- ◆ Huang, N., Hauck, C., Yum, M., Rizshsky, L., Widrlechner, M., McCoy, J., Murphy, P., Dixon, P., Nikolau, B., Birt, D. 2009. Rosmarinic acid in *Prunella vulgaris* ethanol extract inhibits lipopolysaccharide-

- induced prostaglandin E2 and nitric oxide in RAW 264.7 mouse macrophages. *Journal of Agricultural and Food Chemistry*. 57(22):10579–10589.
- ◆ Birt, D., Widrlechner, M., Hammer, K., Hillwig, M., Wei, J., Kraus, G., Murphy, P., McCoy, J.A., Wurtele, E., Neighbors, J., Wiemer, D., Maury, W., and Price, J. 2009. *Hypericum* in Infection: Identification of antiviral and anti-inflammatory constituents. *Pharmaceutical Biology*. 47(8): 774-782.
  - ◆ Brindley, M., Widrlechner, M., McCoy, J., Murphy, P., Hauck, C., and Maury, W. 2009. Inhibition of Lentivirus Replication by Aqueous Extracts of *Prunella vulgaris*. *Virology Journal*. 6(8):1-30.
  - ◆ Percifield, R., Hawkins, J., McCoy, J., and Wendel, J. 2007. Genetic Diversity in *Hypericum* and AFLP Markers for Species-specific Identification of *H. perforatum* L. *Planta Medica*. 73:1614-1621.
  - ◆ Haidet, M., Byrne, M., and McCoy, J. 2007. Safeguarding the Seeds of Native Plants. A review of Germplasm Collection Efforts and Conservation Potential. *HerbalGram. The Journal of the American Botanical Council*. 75:30-37.
  - ◆ McCoy, J. 2007. Medicinal Plant Curation for Conservation and New Crop Development Research. In: *Medicinal and Aromatic Plants: Plants and Plant Systems for Small Farm Product Diversification*. 5:65-68.
  - ◆ McCoy, J. 2007. Propagation Research Results for *Actaea racemosa* and Analysis of Associated Triterpene Glycosides. In: *Medicinal and Aromatic Plants: Plants and Plant Systems for Small Farm Product Diversification*. 5:87-89.
  - ◆ Utilizing the National Plant Germplasm System (NPGS) for Medicinal Plant Research. McCoy, J. 2007. In: *Issues in New Crops and New Uses*. (Jules Janick, Editor) 258-260.
  - ◆ McCoy, J. 2007. Lavender – A Review. *The Lavender Journal*. Australia. 44:6-9.
  - ◆ Senchina, D., Wu L., Flinn, G., Konopka, D., McCoy, J., Widrlechner, M., Wurtele, E., Kohut, M. 2006. Dried *Echinacea* sp. roots retain cytokine-modulating capabilities in an *in vitro* human adult model of influenza vaccination. *Planta Medica*. 72: 1207-1215.
  - ◆ McCoy, J., Davis, J., Camper, N., Kahn, I. and Bharathi, A. 2006. Influence of Rhizome Propagule Size on Yields and Triterpene Glycoside Concentrations of *Actaea racemosa*. *Hortscience*. 42(1):61-64.
  - ◆ McCoy, J. H. 2005. Medicinal Plant Pathogens. In: *Persons, W.S. and J.M. Davis. Growing and Marketing Ginseng, Goldenseal & Other Woodland Medicinals*. Bright Mountain Books. p. 423-432. Fairview, NC, 466 p.
  - ◆ McCoy, J. 2005. Disease and Pest Management of Medicinal Crops. In: *Morales, M.R., Foster, J., Editors. Proceedings of the Third Annual Symposium Medicinal and Aromatic Plants*. September 25, 2004, Beaver, West Virginia. P. 27-35.
  - ◆ McCoy, J. 2004. Noteworthy Collections – *Actaea racemosa* var. *dissecta*. *Castanea*. 69(4).
  - ◆ McCoy, J., Camper, N. 2002. Development of a Micropropagation Protocol for St. John's Wort, *Hypericum perforatum* L. *Hortscience*. 37(6):978-980.

#### ***Published Abstracts (select)***

- ◆ McCoy, J. 2011. Utilizing National and State Germplasm Repositories as a Valuable Tool for Collaborative Biobased Research. *Planta Medica*. 77:510.
- ◆ Clement, J., Looney, P., Mathews, K., McCoy, J. 2011. Phytochemical Analysis of *Actaea racemosa* L. (black cohosh) for Identification of Plant Accessions with Desirable Properties for Development of a Regional Cultivar. *Planta Medica*. 77:9.
- ◆ Mathews, K., Pate, S., Clement, J., Looney, P., McCoy, J. 2011. Use of Genetic Markers and Chemical Quantification to Identify Populations of *Actaea racemosa* (Black Cohosh) With Desirable Properties for Breeding a Regional Cultivar. *Economic Botany*. PPG008 759.
- ◆ Diggins, N., McCoy, J., Hou, G., Okun, J., Subrina, J., Mowa, N. 2011. *Actaea racemosa* L. (black cohosh) Hydroethanolic Extract Alters LPS-Induced Expression of Pro- and Anti-Inflammatory Factors in the Cervix of Ovariectomized Mice. *Science in The Mountains, NC Biotech Center*. 4/18/2011.
- ◆ Qiang Z, Ye Z, Hauck C, Murphy PA, McCoy JA, Widrlechner MP, Reddy MB, Hendrich S. 2011. Permeability of rosmarinic acid from *Prunella vulgaris* and ursolic acid from *Salvia officinalis* extracts across Caco-2 cell monolayers. *The Annual Experimental Biology Meeting*, April 24-28, 2010. Anaheim, CA. *FASEB J*. 24:209.7; *Central States Society of Toxicology Annual Meeting*, November 4-5, 2010. Iowa City, IA.

- ◆ Qiang Z, Murphy PA, McCoy JA, Widrlechner MP, Reddy MB, Hendrich S. 2011. Permeability of *Echinacea* alkylamides and ketones across Caco-2 cell monolayers and their inhibitory effects on P-glycoprotein transporter. The Annual Experimental Biology Meeting, April 9-13, 2011. Washington DC.
- ◆ Simon, J., Acquaye, D., Asante-Dartes, J., Quansato, C., Juliani, H., Govindasamay, R., Akua, N., Amekuse, L., Anim, S., McCoy, J. 2010. Sustainable Production of Specialty Horticultural Crops in Ghana for Income Generation and Increased Export Value. In: ACMAP- American Council for Medicinally Active Plants. 1:45-46.
- ◆ McCoy, J. 2009. A New Research Resource, The Bent Creek Medicinal Germplasm Facility at the NC Arboretum in Asheville, NC. American Society of Pharmacognosy. O-023
- ◆ McCoy, J. 2009. Seed and Rhizome Propagation Studies with Black Cohosh (*Actaea racemosa*) and Analysis of Associated Triterpene Glycosides. Appalachian Center for Ethnobotanical Studies Conference.
- ◆ McCoy, J. 2009. Establishing a new Southeastern Medicinal Germplasm Repository at the NC Arboretum. Economic Botany. 67.
- ◆ Clement, J., Willis, T., Kelly, R., McCoy, J., Schmitt, J. 2009. Antitumor Activity of *Aralia racemosa*. Planta Medica. 75:P-97.
- ◆ McCoy, J. 2009. Development of the Bent Creek Medicinal Plant Germplasm Repository at the NC Arboretum for Collaborative Research and Conservation. Planta Medica. 75:P-19.
- ◆ McCoy, J. 2006. Preservation of Medicinal and Aromatic Crops. The 6<sup>th</sup> National Symposium – Creating Markets for Economic Development of New Crops and New Uses. San Diego, CA. 10/14-18/2006. 6:5.
- ◆ Hillwig, M., Wurtele, E., Hammer, K., Birt, D., Maury, W., Price, J., McCoy, J. 2006. Understanding Bioactivity and Metabolite Diversity in St. John's Wort and Related Species. The 2nd Scientific Meeting of the Metabolomics Society. Harvard Medical School. Boston, MA. 6/24-28/2006.
- ◆ McCoy, J. and Widrlechner, M. 2006. Utilizing the NPGS (National Plant Germplasm System) via GRIN for Medicinal Plant Research. In Proc. of 2006 American Society of Horticultural Science. New Orleans, LA. ASHS. 41(4): 961.
- ◆ McCoy, J., Widrlechner M., and Carstens, J. 2005. A Comprehensive *Echinacea* Germplasm Collection Located at the NCRPIS, Ames, IA. In Proceedings of the 2005 American Society of Horticultural Science. Las Vegas, NV. 40(4): 406.
- ◆ Marek, L.F., Brenner, D.M., McCoy, J.H., Gardner, C.A. 2005. Germplasm Resources for New Crops Research: North Central Regional Plant Introduction Station, Ames, IA. In Proceedings Association for Advancement of Industrial Crops (AAIC) Annual Meeting.

### **GRANTS/ FELLOWSHIP/ AWARDS**

- ◆ NIH / ODS /NCCAM - Wake Forest Center for Botanical Lipids– 2010-2015
- ◆ The NC Biotech Center (3), Golden Leaf Foundation (2), The Mission Healthcare Foundation, Buncombe County Administrative Fund, UNC Research, RTCAR - Cherokee Preservation Society (2), USDA / CRSP - 2008-11, USDA-ARS - 2011
- ◆ NIH / ODS /NCCAM – ISU Center for Research on Botanical Dietary Supplements – 2005-2008
- ◆ Plant Exploration in the Republic of Georgia to Collect Medicinal Germplasm – USDA/ARS- 2007
- ◆ USDA Superior Performance Award - 2007
- ◆ McKinny Fellowship - 2003;
- ◆ USFWS - Ecology and Population Biology of *Actaea racemosa* - 2002
- ◆ Virginia Crouch Memorial Fund Fellowship – 2002; Alcoa Foundation Fellowship - 2000

### **PROFESSIONAL AFFILIATIONS**

- ◆ NPGS-PGOC (National Plant Germplasm System, Plant Germplasm Operations Committee) , The American Society of Pharmacognosy, American Chemical Society, The Society for Economic Botany, American Botanical Council, American Herbal Pharmacopia, Sigma Xi - Science Honor Society
- ◆ Reviewer- The American Society of Pharmacognosy, Castanea, CRC Press, American Herbal Pharmacopia, Environmental and Experimental Botany, Hortscience, International Journal of Biodiversity Science and Management, Journal of Agricultural and Food Chemistry, Industrial Crops

and Products, Natural Products Communication, Agronomy Journal, World Health Organization, American Botanical Council.

- ◆ USDA-NPGS-PGOC – Chair (2010-12) - Medicinal and Aromatic Plants
- ◆ North Carolina Agricultural Biotechnology Advisory Council AgBiotech Crops Workgroup (2011-12)
- ◆ American Botanical Council (ABC)– Advisory Board (2011-12)
- ◆ American Herbal Pharmacopoeia (AHP) – Advisory Committee (2011-12)
- ◆ Complimentary Appointment, The University of Iowa, Research Scientist, The Department of Epidemiology- 2004–2005