

Ann M. Callahan

Educational Background

- 1970-1974 Indiana University (Bloomington): AB in Biology, 1974
1974-1980 University of Virginia (Charlottesville): PhD in Developmental Genetics, 1980

Research Experience

- 1980-1984 Postdoctoral Associate, Biology Department, University of Utah (Salt Lake City) with John Parkinson on bacterial chemotaxis
1984-1987 Research Associate, Plant Science Department, West Virginia University, Appalachian Fruit Research Station (Kearneysville) on fruit ripening of tomato
1987-present Research Geneticist, ARS-USDA, Appalachian Fruit Research Station (Kearneysville, WV)

Major Accomplishments – Past 10 Years

Isolated, identified and characterized peach genes that can affect horticultural traits. Genes have been found that affect ethylene (ripening hormone) biosynthesis pathway, fruit color, allergenic proteins, sugar transportation as well as genes affecting the plants response to environmental stress. Contributed ripe cDNA for sequencing generating ~10,000 ESTs for peach.

Participated in a group effort to create a plum pox potyvirus resistant plum tree, ‘HoneySweet’, through genetic engineering. Provided information for deregulating the transgenic plum.

Characterized transgenic lines of tomato with a peach ACC oxidase promoter and a peach small heat shock protein, transgenic lines of tobacco with an antisense construct of ACC oxidase and transgenic lines of plum with a peach antisense ACO. Characterized antisense ACO plum fruit through three seasons and determined that several were arrested in ethylene production.

Characterized the stoneless mutation of plum as reducing the number of endocarp cells formed hence reducing the amount of stone formed.

Characterized the genes involved in forming the stone through microarray analyses of developing fruit from early stage to stone hardening. Identified genes specific to the endocarp.

Characterized plum lines transformed with an early flowering gene and used information with our CRIS to develop rapid breeding program, FasTrack, using these lines.

Contributed to the development of pnome technology (pooled whole genome sequences) to identify the gene responsible for the pillar phenotype of peach utilizing next generation sequencing.

Relevant Publications

Callahan, A.M., Morgens, P.H., Wright, P. and Nichols, K.A. Comparison of pch313 (pTOM13 homolog) RNA accumulation during fruit softening and wounding of two phenotypically different peach cultivars. *Plant Physiol.* 100:482-488. 1992.

Callahan, A.M., Morgens, P.H. and Cohen, R.A. Isolation and initial characterization of cDNAs for mRNAs regulated during peach fruit development. *American Journal of Horticultural Science.* 118:531-537. 1993.

- Scorza, R., Callahan, A., Levy, L., Damsteegt, V., Webb, K. and Ravelonandro, M. Post-translational gene silencing in plum pox virus resistant transgenic European plum containing the plum pox potyvirus coat protein gene. *Transgenic Research*. 10:201-209. 2001.
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- Callahan, A., Scorza, R., Bassett, C., Nickerson, M. and Abeles, F. Endopolygalacturonase genes in melting and nonmelting peach cultivars. *Functional Plant Biology*. 31:159-168. 2004.
- Moon, H. and Callahan, A. Developmental regulation of peach ACC Oxidase promoter-GUS fusions in transgenic tomato fruits. *Journal of Experimental Botany*. 55:1519-1528. 2004.
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- Callahan, A., Dardick, C. and Scorza, R. Characterization of ‘Stoneless’” A naturally occurring, partially stoneless plum cultivar. *J. Amer. Soc. Hort. Sci.* 134:120-125. 2009.
- Callahan, A. Plums. In: *A Compendium of Transgenic Crop Plants, Volume: 4: Temperate Fruits & Nuts*. Ed: Kole C. and Hall TC. Blackwell Publishing, Oxford, UK. pp. 93-120. 2009.
- Dardick, C., Callahan, A., Chiozzotto, R., Schaffer, R., Piagnani, C. and Scorza, R. Stone formation in peach fruit exhibits spatial coordination of the lignin and flavonoid pathways and similarity to *Arabidopsis* dehiscence. *BMC Biology*. 8:13. 2010.
- Callahan, A.M., Dardick, C.D., Scorza, R. 2011. Pitless plum: reality or fantasy. *Chronica Horticulturae*. 51:18-22.
- Srinivasan, C. Dardick, C. Callahan, A. and R. Scorza, R. Plum (*Prunus domestica*) trees transformed with poplar FT1 result in altered architecture, dormancy requirement, and continuous flowering. *PLoS ONE*, <http://dx.plos.org/10.1371/journal.pone.0040715> 2012
- Zhu, H., Xia, R., Dardick, C.D., Callahan, A.M., An, Y., Liu, Z. 2012. Identification of peach (*Prunus persica*) miRNAs and their targets by deep sequencing and degradome analysis. *Biomed Central (BMC) Plant Biology*. DOI:10.1186/1471-2229-12-149.
- Scorza, R., Callahan, A.M., Dardick, C.D., Ravelonandro, M., Polak, J., Malinowski, T., Zagrai, I., Cambra, M., Kamenova, I. 2013. Protecting trees against virus diseases in the 21st century: genetic engineering of Plum pox virus resistance - from concept to product. *Plant Cell Tissue And Organ Culture*. 115:1-12.
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- Srinivasan, Chinnathambi, Ralph Scorza, Ann Callahan, and Chris Dardick. "Development of very early flowering and normal fruiting plum with fertile seeds." U.S. Patent 8,633,354, issued January 21, 2014.
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