

CURRICULUM VITAE

Shengming Yang
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EDUCATION

- Ph.D., Department of Plant and Soil Science, University of Kentucky, Lexington. August, 2008. Dissertation: Map-based cloning of an anthracnose resistance gene in *Medicago truncatula*
- M.S., Plant Physiology, Shandong Agricultural University, China. July, 2001. Thesis: Changes in photochemical efficiency of corn leaves during senescence
- B.S., Agriculture, Shandong Agricultural University, China, July, 1998.

RESEARCH INTERESTS

- Plant-microbe interactions including disease resistance, disease susceptibility and symbiosis
- Comparative structural and functional genomics
- Genome-wide association mapping and map-based cloning
- Genome structure and evolution
- QTL mapping and cloning
- Marker-assisted selection in plant breeding
- Bioinformatics tools for comparative and functional genomics

RESEARCH EXPERIENCE AND TRAINING

Scientist II, Kentucky tobacco research & development center, 05/2012-present, research interests focused on comparative, functional and structural genomics in legume and tobacco plants.

- Functional characterization of resistance to powdery mildew caused by *Erysiphe pisi* in *Medicago truncatula*
- Development of gene specific marker for black shank, blue mold, and novel chemical characteristics in Burley Tobacco
- Utilization of mutation populations to facilitate the development of conventional tobacco varieties having novel chemical characteristics

Postdoc, University of Kentucky 06/2010-05/2012 to present, focused on studying the variation of nitrogen fixation efficiency in *Medicago truncatula*-*Sinorhizobium meliloti* symbiosis

- Elucidating the molecular mechanisms controlling nitrogen fixation efficiency of nodules with different host-rhizobia combinations

- Investigation on the epigenetic inheritance of gene locus including paramutation of dominant alleles and reversion of recessive alleles to be dominant and functional
- Genome-wide association mapping of host genes involved in regulating symbiotic efficiency of nitrogen-fixing rhizobia

Postdoc, University of Kentucky 08/2008 to 06/2010, focused on soybean nodulation specificity and follow up studies of previous projects

- Genetic unveiling a common recognition mechanism underlying symbiotic and pathogenic host-bacteria interactions
- Map-based cloning of two nodulation restriction genes of *Rj2* and *Rfg1* in Soybean
- Anatomical analysis of soybean nodule paraffin sections with optical microscopy and electron microscopy
- Transformation of *Bradyrhizobium japonicum* USDA122 and *Sinorhizobium fredii* USDA257 by electroporation
- Confocal microscopy imaging of GFP marked rhizobia
- Virus-induced gene silencing and gene transformation using particle bombardment in soybean
- Soybean hairy root transformation and RNAi-mediated gene silencing
- Exploration of the functional role of alternative splicing of *RCT1* in resistance to anthracnose caused by *Colletotrichum trifolii* in alfalfa

Graduate Research Assistant, University of Kentucky 01/2005 to 07/2008, focused on map-based cloning of and anthracnose resistance gene in *M. t*

- Map-based cloning of an anthracnose resistance gene *RCT1* in *M. truncatula*
- Gene sequencing and sequence analysis
- Tissue culture and gene transformation in alfalfa
- Comparative analysis the orthologous genes of *RCT1* in alfalfa

Graduate Research Assistant, University of Kentucky 09/2002 to 01/2005

- Tall fescue breeding
- Quantitative inheritance in semi-hybrid populations
- Basic statistical Analysis
- Regression and correlation analysis
- Design and analysis of experiment
- Multivariate analysis

Master Research, Shandong Agricultural University 09/1998 to 07/2001

- Characterization of changes in photochemistry efficiency of corn leaf in response to different hormones including ethylene, ABA and GA
- Analysis of light energy transfer efficiency, photoinhibition and photoprotection in corn leaves through chlorophyll fluorescence quenching
- Investigation of changes in photochemistry efficiency during corn cultivar evolution

PRESENTATIONS

- *R* gene-controlled host specificity in the legume-rhizobia symbiosis. Kentucky Tobacco Research & Development Center. July 2011. Lexington, KY.
- Translational Genomics in *Medicago truncatula*. Kentucky Tobacco Research & Development Center. July 2009. Lexington, KY.
- Map-based Cloning of an Anthracnose Resistance Gene in *Medicago truncatula*. Plant and Soil Science Seminar, University of Kentucky, Department of Plant and Soil Science. May 2008. Lexington, KY.
- Changes in Photosystems and Light Energy Distribution during Corn Senescence Induced by Ethylene. The National Photosynthesis, Photobiology and Photosynthesis-related Molecular Biology Conference. June 2001. Guilin, China.
- Differences in Light Energy Conversion during Corn Cultivar Evolution. The National Photosynthesis, Photobiology and Photosynthesis-related Molecular Biology Conference. June 2001. Guilin, China.
- Changes in Light Energy Distribution and Photochemistry Efficiency during Corn Senescence. Plant Physiology Seminar, Shandong Agricultural University, Department of Crop Science. July 2000. Taian, China.

ABSTRACTS

- Shengming Yang, Hongyan Zhu. Defense vs. Symbiosis: R gene-controlled host specificity in the legume-rhizobia symbiosis. Model Legume Conference 2011. March 2011. Sainte Maxime, France.
- Shengming Yang, Muqiang Gao, Chenwu Xu, Jianchang Gao, Shweta Deshpande, Shaoping Lin, Bruce Roe, and Hongyan Zhu. Translational genomics from *Medicago truncatula* to alfalfa: The *RCT1* gene from *M. truncatula* confers broad-spectrum resistance to anthracnose in alfalfa. IV International Conference on legume Genomics and Genetics. December 2008. Puerto Vallarta, Mexico.
- Shengming Yang, Muqiang Gao, Hongyan Zhu. *RCT1* gene from *Medicago truncatula* confers broad-spectrum resistance to anthracnose in Alfalfa. Joint Annual Meeting. October 2008. Houston, Texas.
- Shengming Yang, Muqiang Gao, Hongyan Zhu. *RCT1* cloned from *Medicago truncatula* facilitate Alfalfa (*Medicago Sativa*) broad spectrum resistance to anthracnose induced by *Colletotrichum trifolii*. 2nd University of Kentucky Graduated Student Interdisciplinary Conference. April 2008. Lexington, Kentucky.
- Shengming Yang, Muqiang Gao, Hongyan Zhu. Positional cloning and characterization of *RCT1*, and anthracnose resistance gene in *Medicago*. 1st University of Kentucky Graduated Student Interdisciplinary Conference. April 2007. Lexington, Kentucky.

RESEARCH PUBLICATIONS

- Dong Wang, **Shengming Yang**, Fang Tang and Hongyan Zhu. (2011) Symbiosis specificity in the legume-rhizobial mutualism. **Cellular Microbiology**. (Accepted).
- **Shengming Yang**, Fang Tang, Muqiang Gao, Hari B. Krishnan and Hongyan Zhu. (2010) *R* gene-controlled host specificity in the legume-rhizobia symbiosis. **Proceedings of the National Academy of Sciences, USA**, 107:18735-18740.

This paper was featured in **Nature Reviews Microbiology** 8, 840 (2010), doi:10.1038/nrmicro2487; It is also highlighted by **Faculty 1000**, Oldroyd Gile: 2010. F1000.com/6079956. A science news covering this paper was published in Microbe in 2011 (<http://www.microbemagazine.org/index.php/01-2011-current-topics/3181-r-genes-help-legumes-choose-their-symbionts>).

- **Shengming Yang**, Fang Tang, and Eveline Caixeta and Hongyan Zhu. (2012) A gene encoding CC-NBS-LRR *R* protein confers resistance to powdery mildew in *Medicago* species. (submitted).
- **Shengming Yang**, Fang Tang, Hongyan Zhu. (2012) Regular and alternative *RCT1* transcripts are both required by complete anthracnose resistance in *Medicago truncatula*. In Preparation.
- **Shengming Yang**, Muqiang Gao, Chenwu Xu, Jianchang Gao, Shweta Deshpande, Shaoping Lin, Bruce Roe and Hongyan Zhu. (2008) Alfalfa benefits from *Medicago truncatula*: The *RCT1* gene from *M. truncatula* confers broad-spectrum resistance to anthracnose in *alfalfa*. **Proceedings of the National Academy of Sciences, USA**, 105:12164-12169.

This paper was awarded the **Prestigious Research Paper** by the College of Agriculture at the University of Kentucky in 2010.

- **Shengming Yang**, Muqiang Gao, Shweta Deshpande, Shaoping Lin, Bruce A. Roe and Hongyan Zhu, (2007) Genetic and physical localization of an anthracnose resistance gene in *Medicago truncatula*. **Theoretical and Applied Genetics**, 116:45-52.
- **Shengming Yang**, Huiyuan Gao and Qi Zou. (2001) The regulation of the distribution of excitation energy by state transitions in photosynthesis and the relationship between state transitions and photoprotection. **Plant Physiology Communications**, 37: 89-94.

MEMBERSHIPS and HONORS

- Golden Key International Honour Society
- Delta Epsilon Iota Academic Honor Society
- Travel Grant from 2005 Model Legume Congress, 2005.

Research Funding

- 2012-2015. Development of gene specific marker for black shank, blue mold, and novel chemical characteristics in Burley Tobacco. 204,000\$, from British-American Tobacco. PI, **Shengming Yang**. Co-PI, Robert Miller, Dandan Li.

- 2012-2015. Utilization of mutation populations to facilitate the development of conventional tobacco varieties having novel chemical characteristics. 195,000\$, from British-American Tobacco. PI, Robert Miller. Co-PI, **Shengming Yang**, Ling Yuan, David Zaitlin, Dandan Li.