FANGMING XIAO

Assistant Professor
Department of Plant, Soil, and Entomological Sciences
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Education

Sichuan University	B.S.	1990	Genetics
Sichuan University	M.S.	1995	Molecular Genetics
Kansas State University	Ph.D.	2002	Plant Molecular Biology/Plant Pathology

Professional Experience

09/08 - Present **Assistant Professor**, University of Idaho
01/03 - 08/08 **Postdoctoral Associate**, Boyce Thompson Institute, Cornell University
09/98 - 05/02 **Graduate Research Assistant**, Kansas State University

Synergistic Activities

Courses Developed: Advanced Laboratory Technique; Introduction to Biotechnology
Reviewer of Professional Journals: Molecular Plant; Phytopathology; Plant Cell Tissue and Organ Culture; Frontiers in Biology; Plant Physiology.
Reviewer for Grant Proposals: National Science Foundation
Invited Speaker: Department of Plant Pathology, Washington State University (2010); Department of Entomology and Plant Pathology, Auburn University (2008).

Publications

Huang W., Miao M., Kud J., Niu X., Ouyang B., Zhang J., Ye Z., Kuhl J., Liu Y. and **Xiao, F.*** (*: corresponding author). *Sl*NAC1, a Stress-Related Transcription Factor, Is Fine-Tuned on Both Transcriptional and Post-Translational Levels. *New Phytologist*. In press.

Cao Y., Tang X., Giovanoni, J., **Xiao, F.** and Liu, Y. (2012). Functional Characterization of a COBRA-like Gene in Fruit Development and Ripening in Tomato. *BMC Plant Biology*. In press.

Tang X, Liu J, Huang S, Shi W, Tang D, Niu X, Miao M, Xiao F, Liu Y., Liu, J., Miao, M., Giovanoni, J., **Xiao, F.*** and Liu, Y* (*: corresponding authors) 2012. Roles of UV-damaged DNA binding protein 1 (DDB1) in epigenetically modifying multiple traits of agronomic importance in tomato. *Plant Signaling and Behavior*. 2012 Oct 16;7(12)

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Du, X., Miao, M., Ma, X., Liu, Y., Kuhl, J.C., Martin, G.B. and **Xiao, F.*** (*: corresponding author) (2012). Plant programmed cell death caused by an autoactive form of Prf is suppressed by co-expression of the Prf LRR domain. *Molecular Plant*. 5(5):1058-67.

Liu, J., Li, H., Miao, M., Tang, X., Giovannoni, J., **Xiao, F.***, and Liu, Y* (corresponding author) (2012). The tomato DNA damaged binding protein 1 (DDB1) is implicated in *PR* gene expression and resistance to *Agrobacterium tumefaciens. Molecular Plant Pathology* (13) 123-134.

Zhang, X., Zou Z., Gong P., Zhang J., Ziaf K., Li H., **Xiao F.** and Ye Z. (2011). Over-expression of microRNA169 confers enhanced drought tolerance to tomato. *Biotechnology Letters*, (33) 4-3-409.

Zhang, X., Li, H., Zhang, J., Zhang, C., Gong, P., Ziaf, K., **Xiao F.** and Ye Z. (2010). Expression of artificial microRNAs in tomato confers efficient and stable virus resistance in a cell-autonomous manner. *Transgenic Research*. 10.1007/s11248-010-9440-3

Dong, J.*, **Xiao, F**.*, Fan, F.* (co-first author), Gu, L., Cang, H., Martin, G. B. and Chai J. (2009). Crystal structure of the complex between *Pseudomonas* AvrPtoB and the Pto tomato kinase reveals it has both a shared and a unique interface compared with AvrPto-Pto. *The Plant Cell.* (21) 1846-1859.

Xiao, F., Giavalisco, P. and Martin G. B. (2007) *Pseudomonas syringae* type III effector AvrPtoB is phosphorylated in plant cells on serine 258 promoting its virulence activity. *J Biol Chem* (282) 30737-30744.

Xiao, F., He, P., Abramovitch, R. B., Dawson, J. E., Nicholson, L. K., Sheen, J. and (2007) The N-terminal region of *Pseudomonas* type III effector AvrPtoB elicits Pto-dependent immunity and has two distinct virulence determinants. *The Plant Journal*, (52) 595-614.

Rosebrock, T. R., Zeng, L., Brady, J. J., Abramovitch, R. B., **Xiao, F**., and Martin, G. B. (2007) A bacterial E3 ligase targets a host protein kinase to promote plant disease. *Nature* (448) 370-374.

Anderson, J. C., Pascuzzi, P. E., **Xiao, F.**, Sessa, G., and Martin, G. B. (2006) Host-mediated phosphorylation of type III effector AvrPto promotes *Pseudomonas* virulence in tomato. *The Plant Cell* (18) 502-514.

Xiao, F., Goodwin, M. S., Xiao, Y., Sun, Z., Baker, D., Tang, X., Jenks M. A. and Zhou J.-M. (2004) Arabidopsis CYP86A2 represses *Pseudomonas syringae* type III genes and is required for cuticle development. *EMBO J*. (23) 2903-2913.

Kang, K., Li, J., Zhao, T., **Xiao, F.**, Tang, X., Thilmony, R., He, S. Y., and Zhou, J.-M. (2003) Interplay of the *Arabidopsis* nonhost resistance gene *NHO1* with bacterial virulence. *Proc. Natl. Acad. Sci. USA* (100) 3519-3524.

Xiao, F., Lu, M., Li, J., Zhao, T., Yi, S. Y., Thara, V. K, Tang, X., and Zhou J.-M. (2003) *Pto* mutants differentially activate *Prf*-dependent, *avrPto*-independent resistance and Gene-for-Gene resistance. *Plant Physiology* (131) 1239-1249.

Xiao, F., Tang, X., and Zhou J.-M. (2001) Expression of 35S::*Pto* globally activates defense-related genes in tomato plants. *Plant Physiology* (126) 1637-1645.

Research Interest

My lab studies the molecular basis of plant-pathogen interactions, focusing on the defense signal recognition and transduction in plants. Unlike animals, which have the circulating immune system that produces specialized mobile cells, plants have evolved two branches of the immune system to defend themselves against pathogens. The first, usually occurring at the cell surface, is mediated by perception of pathogen-associated molecular patterns (PAMPs) by plasma membrane-associated pattern recognition receptors (PRRs) in plants. The PAMP-trigged immunity (PTI) is a basal level defense and is relatively weak but effective to limit pathogen invasion. The second, largely taking place inside the cell, is determined by recognition of effector proteins from pathogens by plant resistance (R) proteins. The R-mediated resistance is a strong defense response, usually coupled with a localized cell death, termed hypersensitive response (HR). Despite the distinct signaling pathways for PAMP-triggered immunity and R protein-mediated resistance, there is considerable evidence suggesting that signaling cross-talk exists between two branches of plant immune system.

In tomato plants, resistance to bacterial speck disease is initiated by a physical interaction of the host Pto kinase with either of the sequence dissimilar Pseudomonas effector proteins AvrPto or AvrPtoB that are delivered into the host cell cytoplasm via bacterial type III secretion system. Pto-mediated immunity requires Prf, a host resistance protein with a nucleotide-binding site and a region of leucine-rich repeats. Pto and Prf form a recognition complex in the plant cell

and function coordinately in defense signaling. However, how the recognition signal is transduced into downstream cellular responses is largely unknown. We are currently using a combination of molecular, genetic, biochemical and cellular approaches to identify the virulence targets of the type III effectors and host factors involved in the Pto/Prf-mediated defense signaling in tomato. We are particularly interested in proteins interacting with the AvrPtoB effector and proteins associated with Pto/Prf complex in the plant cell and their role in R-mediated or/and PAMP-triggered defense signalings.