YUAN CHAI

Department of Applied Economics
University of Minnesota, Twin Cities
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EDUCATION

University of Minnesota, Twin Cities

Ph.D. in Applied Economics 2018
Dissertation: "Managing Risk in Agriculture: A Spatial Bio-Economic Perspective"
Committee: Phil Pardey, Terry Hurley, Stephen Polasky, Brian Steffenson

M.S. in Plant Pathology 2011
Thesis: "Investigations on Stem Rust Resistance Genes in Barley"
Committee: Brian Steffenson, Yue Jin, Jane Glazebrook

Tsinghua University, Beijing, China

B.S. in Biological Science and Biotechnology 2008

RESEARCH INTERESTS

Agricultural risk management
Production economics
Bio-economic modeling
Agricultural R&D
Food security

RESEARCH EXPERIENCE

University of Minnesota, Twin Cities

GEMS Agro-Informatics Initiative

Postdoctoral Research Fellow Since 2018
Conducted literature review and data collection on brown marmorated stink bug damages; developed data and analytical tools for bio-economic assessments of biotic and abiotic risks in US agriculture; collected data and developed models for nitrogen use in US corn production to address agricultural water pollution; contributed to the development and maintenance of GEMS/IAA datasets, ontologies and analytical tools.

International Science and Technology Policy and Practice Center, Department of Applied Economics

Graduate Student Research Assistant 2012-2018
Collected crop production, pests and diseases, and crop insurance data; developed bio-economic models for crop production and risk management; applied probabilistic method for economic impact analysis on wheat rust diseases; published peer-reviewed journal articles and online policy outreach materials.

Steffenson Laboratory, Department of Plant Pathology

Lab Technician 2010-2012
Designed and conducted greenhouse and field experiments; performed phenotyping and molecular analysis on barley and wheat disease resistance.

Graduate Student Research Assistant 2008-2010
Investigated stem rust disease resistance in barley.

Tsinghua University, Beijing, China
Department of Biological Science and Biotechnology
Undergraduate Research Assistant 2007-2008
Screened tobacco genetic library for Tobacco Mosaic Virus resistance.

PUBLICATIONS:

Chai, Y., P.G. Pardey, C. Chan-Kang, J. Huang, K. Lee, and W. Dong. 2019. "Passing the Food and Agricultural R&D Buck? The United States and China." *Food Policy*, accepted, forthcoming.

Dehmer, S.P., Pardey, P.G., Beddow, J.M. and **Chai, Y.** 2019. "Reshuffling the Global R&D Deck, 1980-2050". PloS One, 14(3), p.e0213801.

Cheng, A., **Chai, Y.**, and Wang, J. 2017. "Spillover Effect of Oil Price Volatility on China's Commodities Futures Market". Journal of Northwestern Polytechnical University, Xi'an. (2). (in Chinese)

Steffenson, B.J., A.J. Case, Z.A. Pretorius, V. Coetzee, F.J. Kloppers, H. Zhou, **Y. Chai**, R. Wanyera, G. Macharia, S. Bhavani, and S. Grando. 2017. "Vulnerability of Barley to African Pathotypes of *Puccinia graminis* f. sp. *tritici* and Sources of Resistance." *Phytopathology* 107(8):950–962.

Chai, Y., D.J. Kriticos, J.M. Beddow, N. Ota, T. Yonow, and W.S. Cuddy. 2016. "*Puccinia triticina* (Wheat Leaf Rust)." St. Paul, MN: InSTePP-HarvestChoice.

Gill, U., R. Brueggeman, J. Nirmala, **Y. Chai**, B. Steffenson, and A. Kleinhofs. 2016. "Molecular and genetic characterization of barley mutants and genetic mapping of mutant *rpr2* required for *Rpg1*-mediated resistance against stem rust." *Theoretical and Applied Genetics* 129(8):1519–1529.

Beddow, J.M., P.G. Pardey, **Y. Chai**, T.M. Hurley, D.J. Kriticos, H.-J. Braun, R.F. Park, W.S. Cuddy, and T. Yonow. 2015. "Research investment implications of shifts in the global geography of wheat stripe rust." *Nature Plants* 1(10):15132.

Beddow, J.M., R.W. Sutherst, D.J. Kriticos, E. Duveiller, and **Y. Chai**. 2015. "*Puccinia graminis* (Wheat Stem Rust)." St. Paul, MN: InSTePP-HarvestChoice.

Chai, Y., D.J. Kriticos, J.M. Beddow, E. Duveiller, W.S. Cuddy, T. Yonow, and R.W. Sutherst. 2015. "Puccinia striiformis (Wheat Stripe Rust)." St. Paul, MN: InSTePP-HarvestChoice.

Chai, Y., and J. Beddow. 2014. "Wheat Stem Rust Vulnerability." In K. Sebastian, ed. *Atlas of African Agriculture Research and Development: Revealing Agriculture's Place in Africa*. Washington, D.C.: International Food Policy Research Institute (IFPRI), pp. 60–61.

Steffenson, B.J., H. Zhou, **Y. Chai**, and S. Grando. 2013. "Vulnerability of Cultivated and Wild Barley to African Stem Rust Race TTKSK." In G. Zhang, C. Li, and X. Liu, eds. *Advance in Barley Sciences*. Dordrecht, Netherlands: Springer, pp. 243–255

Chai, Y., J. Nirmala, A. Kleinhofs, and B. Steffenson. 2012. "Failure of RPG1

protein to degrade in high-copy Rpg1 transgenic barley lines results in susceptibility to stem rust." *Physiological and Molecular Plant Pathology* 80:10–18.

UNDER REVIEW & WORKING PAPERS

Chai, Y., J.M. Beddow, T.M. Hurley, and P.G. Pardey. 2019. "A Bio-economic Assessment of the Global Occurrence and Consequences of Wheat Leaf Rust." Revise and Re-submit to *Plant diseases*

Chai, Y., P.G. Pardey, T.M. Hurley, S. Senay, and A. Joglekar. "Spatio-temporal, multi-peril perspective on wheat rust losses." (Working paper).

Chai, Y., P.G. Pardey, and K. Silverstein. "Agroecosystem Biodiversity: Spatial and Temporal Dynamics of U.S. Wheat Varieties." (Working paper).

Senay, S., T.M. Hurley, P.G. Pardey and **Y. Chai**. "Global Multi-Peril Pest Risk Assessment for Maize and Wheat." (Working paper)

Chai, Y., Pannell, D., Pardey, P. "Harnessing Flat Payoff Functions for Nitrogen Fertilizer to Address Water Pollution". (Working paper)

PRESENTATIONS

Chai, Y., Pannell, D., Pardey, P., Hurley, T. Harnessing Flat Payoff Functions for Nitrogen Fertilizer to Address Water Pollution. *AARES (Australasian Agricultural & Resource Economics Society) Annual Meeting, February 15, 2019*

Chai, Y., Pardey, P., Huang, J. Passing the Food and Agricultural R&D Buck? The United States and China. *22nd ICABR Conference - Disruptive Innovations, Value Chains, and Rural Development, Washington DC, USA, June 15, 2018*

Chai, Y., The Impacts of Biotic and Abiotic Risks on the Demand for Crop Insurance. *Doctoral Dissertation Fellowship Showcase, University of Minnesota, April 11, 2017*

Chai, Y., Microbe Effects on Global Food Security: A Spatio-Temporal Perspective on Wheat Rust Diseases. *Healthy Foods, Heathy Lives Summit, Minneapolis, October 27, 2016*

Chai, Y., Modeling Economics of Pest and Disease Damage and Management. *Advancing Pest and Disease Modeling Workshop, February 23-25, Gaineville, FL, 2015*

Chai, Y., The Global Occurrence and Economic Consequences of Stripe Rust in Wheat. *Department of Plant Pathology, University of Minnesota, February 16, St. Paul, MN,* 2015

Chai, Y., Crop Risk Management: R&D investment & Crop Insurance. *China Agricultural University, August 4, Beijing, China;* and *Inner Mongolia University, August 5, Hohhot, China,* 2014

Chai, Y., Steffenson, B., Nirmala, J., and Kleinhofs, A. Highly expressed RPG1 protein in a five-copy *Rpg1*-transgenic barley line results in susceptibility to stem rust. *Borlaug Global Rust Initiative 2011 Technical Workshop, Saint Paul, Minnesota*, 2011

TEACHING EXPERIENCE

University of Minnesota, Twin Cities

Department of Applied Economics

APEC 8601 Natural Resource Economics, **TA** Fall 2016

Assisted in preparing and grading homework. Independently prepared and lectured two classes on optimal control theory and numerical methods

Introduction to Numerical Analysis Software, **Instructor** Summer 2016

Instructor for summer short course on MATLAB software. Independently developed the syllabus, conducted lectures, led computer lab sessions and prepared and graded homework.

Department of Plant Pathology

CFANS 3001 Pests and Crop Protection, **TA** Spring 2010

Led lab sections on identifying plant diseases; assisted all lab preparations; graded assignments. Also lectured one class on crop disease management strategies.

GRANDS/AWARDS

Doctoral Dissertation Fellowship	2016-2017
Hueg Harrison Fellowship, CFANS, University of Minnesota	2014
HarvestChoice Research assistantship, University of Minnesota	2012-2015
MN Agricultural Experiment Station (MAES) Research Assistant	2008-2010
Winner of Competitive Graduate Student Symposium at Borlaug Global Rust Initiative (BGRI) Technical Workshop, St. Paul, MN	2011
Scholarship in recognition of Academic Excellence, Tsinghua University, Beijing	2006
Freshman scholarship, Tsinghua University, Beijing	2004

COMPUTER SKILLS

R; STATA; MATLAB; Mathematica; ArcGIS; LaTeX; CLIMEX; Palisade's @Risk Software

LANGUAGE SKILLS

Mandarin Chinese (Native); English (Fluent)

(Last updated June 18, 2019)