

LIU, Shu-Sheng**CRRICULUM VITAE****March 2018****Title:** Zhejiang University “Qiu-Shi” Distinguished Professor**Mailing address:** Institute of Insect Sciences, Zhejiang University, 866 Yuhangtang Road, Hangzhou 310058, China**Telephone:** (86-571) 88982505**E-Mail:** shshliu@zju.edu.cn**Current position and employment history**

Current: Zhejiang University “Qiu-Shi” Distinguished Professor; Deputy-President, Academic Committee of Zhejiang University; Discipline Leader of Plant Protection, Zhejiang University, China

1998-present: Professor of entomology, discipline leader of plant protection (2007-present), and director of the Institute of Insect Sciences (1998-2009), Zhejiang University.

1991-1998: Professor and Head in entomology, Zhejiang Agricultural University, China.

1986-1991: Associate professor in entomology, Zhejiang Agricultural University, China.

1984-1986: Lecturer in entomology, Zhejiang Agricultural University, China.

1977-1978: Teaching assistant in plant protection, Hunan Agricultural University, China.

Education

- ◆ Doctor of Philosophy – Zoology: Australian National University and CSIRO Division of Entomology, Canberra, Australia, 1984.
- ◆ Postgraduate study – Entomology: Zhejiang Agricultural University, 1978-1980.
- ◆ Undergraduate study – Plant Protection: Hunan Agricultural University, 1974-1977.

Major Research Interests

- ◆ Tripartite interactions between insect vectors, viruses and plants
- ◆ Biological invasion by alien insect pests
- ◆ Behavioural and chemical ecology
- ◆ Biological control and integrated pest management

Research Activities

In recent years, the major focus of research in our laboratory has been invasion biology of the whitefly *Bemisia tabaci* species complex and integrated pest management in vegetable crops. In particular, we have been investigating the behavioural, ecological, physiological and molecular mechanisms underlying the rapid invasion by alien species of the whitefly complex, including: (1) whitefly-begomovirus-plant interactions, (2) the systematics and species status of the whitefly *Bemisia tabaci* complex, and (3) the behavioural interactions between alien and native whitefly species.

While we have been conducting basic research in several areas, our laboratory has been strong in bridging basic and applied research. The major focus in applied research has been to develop and improve pest management systems in vegetable crops. We have close interactions

with the local vegetable industry, and our laboratory has been recognized as an important resource by the local industry as well as the nationwide extension service.

Teaching Activity

- ◆ Instructor for the following yearly courses:
 - a) Applied Entomology (Undergraduate students)
 - b) Plant Protection (Undergraduate students)
 - c) Insect Ecology (Master students)
 - d) Selected Topics on Pest Management (PhD Students)
- ◆ Supervision of Postgraduate Students:
 - a) Major supervisor for 41MSc Students from 1987 to 2018
 - b) Major supervisor for 37 PhD students from 1993 to 2018
- ◆ Supervision of internship projects of 55 undergraduates from 1986 to 2018

Societies and Professional Activities

- [1] Current editorial posts for science journals:
 - *Acta Entomologica Sinica*, Associate Editor-in-Chief
 - *Annual Review of Entomology*, Member of the Editorial Committee
 - *Chinese Journal of Biological Control*, Member of Editorial Board
 - *Insect Science*, Member of Editorial Board
 - *Journal of Biosafety*, Deputy Editor-in-Chief
 - *Journal of Integrative Agriculture*, Member of Editorial Board
 - *Journal of Zhejiang University SCIENCE B*, Member of Editorial Board
 - *Science China Life Sciences*, Member of Editorial Board
- [2] Council of International Congress of Entomology: Council Member, 2012-present
- [3] Entomology 2014 - The 62nd Annual Meeting of the Entomological Society of America:
- [4] XXIV International Congress of Entomology (www.ice2012.org), co-organizer and co-chair of the symposium “Biotic Interactions in the Context of Biological Invasions”, Daegu, Korea, August 2012.
- [5] International Congress on Biological Invasion (www.icbi2009.org/), Fuzhou, China, November 2009, invited plenary speaker and member of the International Scientific Committee.
- [6] XXII International Congress of Entomology (www.ice2004.org), Brisbane, Australia, August 2004: Invited Speaker of a Plenary Lecture on integrated pest management; Co-organizer for a symposium on Vegetable IPM.

Publications

(All author names have their Family Name first, followed by their given name or initials)

Ten highly cited papers published in recent years

- (1) Luan Jun-Bo, Yao Dan-Mei, Zhang Tong, Walling Linda L., Yang Mei, Wang Yu-Jun, Liu Shu-Sheng. 2013. Suppression of terpenoid synthesis in plants by a virus promotes its mutualism with vectors. *Ecology Letters* 16: 390-398. (51 citations, as recorded by [Google Scholar 20 October 2018](#))
- (2) Liu Shu-Sheng, John Colvin, Paul De Barro. 2012. Species concepts as applied to the whitefly *Bemisia tabaci* systematics: how many species are there? *Journal of Integrative Agriculture* 11: 176-186. (144 citations)
- (3) Luan Jun-Bo, Li Jun-Min, Varela Nélia, Wang Yong-Liang, Li Fang-Fang, Bao Yan-Yuan, Zhang Chuan-Xi, Liu Shu-Sheng, Wang Xiao-Wei. 2011. Global analysis of the transcriptional response of whitefly to *Tomato yellow leaf curl China virus* reveals their relationship of coevolved adaptations. *Journal of Virology* 85: 3330-3340. (74 citations)
- (4) Hu Jian, De Barro P.J., Zhao Hua, Wang Jia, Nardi F., Liu Shu-Sheng. 2011. An extensive field survey combined with a phylogenetic analysis reveals rapid and widespread invasion of two alien whiteflies in China. *PLoS ONE* 6(1): e16061. doi: 10.1371/journal.pone.0016061. (185 citations)
- (5) De Barro P.J., Liu Shu-Sheng, Boykin L.M., Dinsdale A. 2011. *Bemisia tabaci*: a statement of species status. *Annual Review of Entomology* 56: 1-19. (848 citations)
- (6) Wang Xiao-Wei, Luan Jun-Bo, Li Jun-Min, Bao Yan-Yuan, Zhang Chuan-Xi, Liu Shu-Sheng. 2010. De novo characterization of a whitefly transcriptome and analysis of its gene expression during development. *BMC Genomics* 11: 400; DOI: 10.1186/1471-2164-11-400. (305 citations)
- (7) Xu Jing, De Barro P.J., Liu Shu-Sheng. 2010. Reproductive incompatibility among genetic groups of *Bemisia tabaci* supports the proposition that the whitefly is a cryptic species complex. *Bulletin of Entomological Research* 100: 359-366. (161 citations)
- (8) Crowder D.W., Horowitz A.R., De Barro P.J., Liu Shu-Sheng, Showalter A.M., Kontsedalov S., Khasdan V., Shargal A., Liu Jian, Carrière Y. 2010. Mating behaviour, life-history, and adaptation to insecticides determine species exclusion between whiteflies. *Journal of Animal Ecology* 79: 563-570. (78 citations)
- (9) Liu Shu-Sheng, De Barro P. J., Xu Jing, Luan Jun-Bo, Zang Lian-Sheng, Ruan Yong-Ming, Wan Fang-Hao. 2007. Asymmetric mating interactions drive widespread invasion and displacement in a whitefly. *Science* 318: 1769-1772. (325 citations)
- (10) Jiu Min, Zhou Xue-Ping, Tong Lin, Xu Jing, Yang Xiao, Wan Fang-Hao, Liu Shu-Sheng. 2007. Vector-virus mutualism accelerates population increase of an invasive whitefly. *PLoS ONE* 2(1): e182. doi:10.1371/journal.pone.0000182. (220 citations)

List of selected papers in refereed English journals from 2007 to present

- Guo Tao, Zhao Jing, Pan Li-Long, Geng Liang, Chi Yao, Wang Xiao-Wei, **Liu Shu-Sheng**. 2018. The level of midgut penetration of two begomoviruses affects their acquisition and transmission by two species of *Bemisia tabaci*. *Virology* 515: 66-73.
- Shan Hong-Wei, Deng Wen-Hao, Luan Jun-Bo, Zhang Min-Jing, Zhang Zhen, **Liu Shu-Sheng**, Liu Yin-Quan. 2017. Thermal sensitivity of bacteriocytes constrains the persistence of intracellular bacteria in whitefly symbiosis under heat stress. *Environmental Microbiology Reports* 9(6): 706-716.
- Wei Jing, He Ya-Zhou, Guo Qi, Guo Tao, Liu Yin-Quan, Zhou Xue-Ping, Liu Shu-Sheng, Wang

- Xiao-Wei. 2017. Vector development and vitellogenin determine transovarial transmission of a begomovirus. *Proceedings of the National Academy of Sciences of the United States of America* 114(26): 6746-6751.
- Li Ping, Shu Yan-Ni, Fu Shuai, Liu Yin-Quan, Zhou Xue-Ping, **Liu Shu-Sheng**, Wang Xiao-Wei. 2017. Vector and non-vector insect feeding reduces subsequent plant susceptibility to virus transmission. *New Phytologist* 215(2): 699-710,
- Sun Yan-Chun, Pan Li-Long, Ying Feng-Ze, Li Ping, Wang Xiao-Wei, **Liu Shu-Sheng**. 2017. Jasmonic acid-related resistance in tomato mediates interactions between whitefly and whitefly-transmitted virus. *Scientific Reports* 7: 566.
- Wang Xiao-Wei, Li Ping, **Liu Shu-Sheng**. 2017. Whitefly interactions with plants. *Current Opinion in Insect Science* 19:70-75.
- Luan Jun-Bo, Shan Hong-Wei, Isermann P., Huang Jia-Hsin, Lammerding J., Liu Shu-Sheng, Douglas A.E. 2016. Cellular and molecular remodeling of a host cell for vertical transmission of bacterial symbionts. *Proceedings of the Royal Society B: Biological Sciences* 283: 20160580.
- Wang Lan-Lan, Wang Xin-Ru, Wei Xue-Mei, Huang Huang, Wu Jian-Xiang, Chen Xue-Xin, Liu Shu-Sheng, Wang Xiao-Wei. 2016. The autophagy pathway participates in resistance to Tomato yellow leaf curl virus infection in whiteflies. *Autophagy* 12(9): 1560-1574.
- Wang Hua-Ling, Cui Xi-Yun, Wang Xiao-Wei, Liu Shu-Sheng, Zhang Zheng-Hua, Zhou Xue-Ping. 2016. First report of Sri Lankan cassava mosaic virus infecting cassava in Cambodia. *Plant Disease* 100(5): 1029
- Zhang Chang-Rong, Shan Hong-Wei, Xiao Na, Zhang Fan-Di, Wang Xiao-Wei, Liu Yin-Quan, Liu Shu-Sheng. 2015. Differential temporal changes of primary and secondary symbionts and whitefly host fitness following antibiotic treatments. *Scientific Reports* 5:15898.
- Guo Tao, Guo Qi, Cui Xi-Yun, Liu Yin-Quan, Hu Jian, Liu Shu-Sheng. 2015. Comparison of transmission of Papaya leaf curl China virus among four cryptic species of the whitefly *Bemisia tabaci* complex. *Scientific Reports* 5:15432.
- Luan Jun-Bo, Chen Wenbo, Hasegawa DK, Simmons AM, Wintermantel WM, Ling Kai-Shu, Fei Zhangjun, Liu Shu-Sheng, Douglas AE. 2015. Metabolic coevolution in the bacterial symbiosis of whiteflies and related plant sap-feeding insects. *Genome Biology and Evolution* 7: 2635-2647.
- He Wen-Bo, Li Jie, Liu Shu-Sheng. 2015. Differential profiles of direct and indirect modification of vector feeding behaviour by a plant virus. *Scientific Reports* 5:7682
- Li Ran, Weldegergis BT, Li Jie, Jung Choonkyun, Qu Jing, Sun Yanwei, Qin Hong-Mei, Tee ChuanSia, van Loon JJA, Dicke M, Chua Nam-Hai, Liu Shu-Sheng, Ye Jian. 2014. Virulence factors of geminivirus interact with MYC2 to subvert plant resistance and promote vector performance. *The Plant Cell* 26(12): 4991-5008.
- Wei Jing, Zhao Juan-Juan, Zhang Tong, Li Fang-Fang, Ghanim Murad, Zhou Xue-Ping, Ye Gong-Yin, Liu Shu-Sheng, Wang Xiao-Wei. 2014. Specific cells in the primary salivary glands of the whitefly *Bemisia tabaci* control retention and transmission of begomoviruses. *Journal of Virology* 88: 13460-13468.
- Shan Hong-Wei, Lu Yu-Hong, Bing Xiao-Li, Liu Shu-Sheng, Liu Yin-Quan. 2014. Differential responses of the whitefly *Bemisia tabaci* endosymbionts to unfavourable low and high temperatures. *Microbial Ecology* 68: 472-482.
- Luan Jun-Bo, Wang Xiao-Wei, Colvin John, Liu Shu-Sheng. 2014. Plant-mediated whitefly-begomovirus interactions: research progress and future prospects. *Bulletin of Entomological Research* 104: 267-276.
- Liu Shu-Sheng, Rao A, Vinson S.B. 2014. Biological Control in China: past, present and future - An introduction to this special issue. *Biological Control* 68: 1-5.

- Liu Yin-Quan, Shi Zu-Hua, Zalucki M.P., Liu Shu-Sheng. 2014. Conservation biological control in Brassica vegetable crops in China. *Biological Control* 68: 37-46.
- Liu Yong-Jie, Liu Jing, Ying Sheng-Hua, Liu Shu-Sheng, Feng Ming-Guang. 2013. A fungal insecticide engineered for fast *per os* kill of caterpillars has high field efficacy and safety in full-season control of cabbage insect pests. *Applied and Environmental Microbiology* 79(20): 6452-6458.
- Luan Jun-Bo, Wang Yong-Liang, Wang Jia, Wang Xiao-Wei, Liu Shu-Sheng. 2013. Detoxification activity and energy cost is attenuated in the whiteflies feeding on begomovirus-infected tobacco plants. *Insect Molecular Biology* 22(5): 597-607.
- Luan Jun-Bo, Ghanim, M., Liu Shu-Sheng, Czosnek, H. 2013. Silencing the ecdysone synthesis and signaling pathway genes disrupts nymphal development in the whitefly. *Insect Biochemistry and Molecular Biology* 43(8):740-746.
- Sun Di-Bing, Liu Yin-Quan, Qin Li, Xu Jing, Li Fang-Fang, Liu Shu-Sheng. 2013. Competitive displacement between two invasive whiteflies: insecticide application and host plant effects. *Bulletin of Entomological Research* 103: 344-353.
- Luan Jun-Bo, Yao Dan-Mei, Zhang Tong, Walling Linda L., Yang Mei, Wang Yu-Jun, Liu Shu-Sheng. 2013. Suppression of terpenoid synthesis in plants by a virus promotes its mutualism with vectors. *Ecology Letters* 16: 390-398.
- Bing Xiao-Li, Yang Jiao, Zchori-Fein E., Wang Xiao-Wei, Liu Shu-Sheng. 2013. Characterization of a newly discovered symbiont in the whitefly *Bemisia tabaci* (Hemiptera: Aleyrodidae). *Applied and Environmental Microbiology* 79(2): 569-575.
- Luan Jun-Bo, Paul De Barro, Ruan Yong-Ming, Liu Shu-Sheng. 2013. Distinct behavioural strategies underlying asymmetric mating interactions between invasive and indigenous whiteflies. *Entomologia Experimentalis et Applicata* 146(1): 186-194.
- Wang Xiao-Wei, Zhao Qiong-Yi, Luan Jun-Bo, Wang Yu-Jun, Yan Gen-Hong, Liu Shu-Sheng. 2012. Analysis of a native whitefly transcriptome and its sequence divergence with two invasive whitefly species. *BMC Genomics* 13: 529. .
- Wang Peng, Crowder David W., Liu Shu-Sheng. 2012. Roles of mating behavioural interactions and life history traits in the competition between alien and indigenous whiteflies. *Bulletin of Entomological Research* 102: 395-405.
- Wang Jia, Bing Xiao-Li, Ye Gong-Yin, Liu Shu-Sheng. 2012. Infection of tobacco plants by a begomovirus improves nutritional assimilation by a whitefly. *Entomologia Experimentalis et Applicata*, 144: 191-201.
- Luan Jun-Bo, Xu Jing, Lin Ke-Ke, Zalucki M. P., Liu Shu-Sheng. 2012. Species exclusion between an invasive and an indigenous whitefly on host plants with differential levels of suitability. *Journal of Integrative Agriculture* 11: 215-224.
- Liu Shu-Sheng, John Colvin, Paul De Barro. 2012. Species concepts as applied to the whitefly *Bemisia tabaci* systematics: how many species are there? *Journal of Integrative Agriculture* 11: 176-186.
- Zhang Tong, Luan Jun-Bo, Qi Jin-Feng, Huang Chang-Jun, Li Meng, Zhou Xue-Ping, Liu Shu-Sheng. 2012. Begomovirus-whitefly mutualism is achieved through repression of plant defenses by a virus pathogenicity factor. *Molecular Ecology* 21: 1294-1304.
- Xu Jing, Lin Ke-Ke, Liu Shu-Sheng. 2011. Performance on different host plants of an alien and an indigenous *Bemisia tabaci* from China. *Journal of Applied Entomology* 135: 771-779.
- Wang Xiao-Wei, Luan Jun-Bo, Li Jun-Min, Su Yun-Lin, Xia Jun, Liu Shu-Sheng. 2011. Transcriptome analysis and comparison reveal divergence between two invasive whitefly cryptic species. *BMC Genomics* 12: 458.
- Luan Jun-Bo, Li Jun-Min, Varela Nélia, Wang Yong-Liang, Li Fang-Fang, Bao Yan-Yuan, Zhang Chuan-Xi, Liu Shu-Sheng, Wang Xiao-Wei. 2011. Global analysis of the

- transcriptional response of whitefly to *Tomato yellow leaf curl China virus* reveals their relationship of coevolved adaptations. *Journal of Virology* 85: 3330-3340.
- Sun Di-Bing, Xu Jing, Luan Jun-Bo, Liu Shu-Sheng. 2011. Reproductive incompatibility between the B and Q biotypes of the whitefly *Bemisia tabaci* in China: genetic and behavioural evidence. *Bulletin of Entomological Research* 101: 211-220.
- Wang Peng, Sun Di-Bing, Qiu Bao-Li, Liu Shu-Sheng. 2011. The presence of six cryptic species of the whitefly *Bemisia tabaci* complex in China as revealed by crossing experiments. *Insect Science* 18: 67-77.
- Hu Jian, De Barro P.J., Zhao Hua, Wang Jia, Nardi F., Liu Shu-Sheng. 2011. An extensive field survey combined with a phylogenetic analysis reveals rapid and widespread invasion of two alien whiteflies in China. *PLoS ONE* 6(1): e16061. doi: 10.1371/journal.pone.0016061.
- De Barro P.J., Liu Shu-Sheng, Boykin L.M., Dinsdale A. 2011. *Bemisia tabaci*: a statement of species status. *Annual Review of Entomology* 56: 1-19.
- Wang Xiao-Wei, Luan Jun-Bo, Li Jun-Min, Bao Yan-Yuan, Zhang Chuan-Xi, Liu Shu-Sheng. 2010. De novo characterization of a whitefly transcriptome and analysis of its gene expression during development. *BMC Genomics* 11: 400; DOI: 10.1186/1471-2164-11-400.
- Crowder D.W., Horowitz A.R., De Barro P.J., Liu Shu-Sheng, Showalter A.M., Kontsedalov S., Khasdan V., Shargal A., Liu Jian, Carrière Y. 2010. Mating behaviour, life-history, and adaptation to insecticides determine species exclusion between whiteflies. *Journal of Animal Ecology* 79: 563-570.
- Liu Jian, Zhao Hua, Jiang Kai, Zhou Xue-Ping, Liu Shu-Sheng. 2009. Differential indirect effects of two plant viruses on an invasive and an indigenous whitefly vector: implications for competitive displacement. *Annals of Applied Biology* 155: 439-448.
- Zhang Peng-Jun, Shu Jin-Ping, Wu Zhi-Yi, Dicke Marcel, Liu Shu-Sheng. 2009. Lack of correlation between constitutive and induced resistance to a herbivore in crucifer plants: real or flawed by experimental methods? *Entomologia Experimentalis et Applicata* 131: 58-66.
- Zhang Peng-Jun, Shu Jin-Ping, Fu Cheng-Xin, Zhou Yun, Hu Ying, Zalucki M. P., Liu Shu-Sheng. 2008. Tradeoffs between constitutive and induced resistance in wild crucifers shown by a natural, but not an artificial, elicitor. *Oecologia* 157: 83-92.
- Wang Hua, Guo Wen-Fei, Zhang Peng-Jun, Wu Zhi-Yi, Liu Shu-Sheng. 2008. Experience-induced habituation and preference towards non-host plant odors in ovipositing females of a moth. *Journal of Chemical Ecology* 34: 330-338.
- Liu Shu-Sheng, De Barro P. J., Xu Jing, Luan Jun-Bo, Zang Lian-Sheng, Ruan Yong-Ming, Wan Fang-Hao. 2007. Asymmetric mating interactions drive widespread invasion and displacement in a whitefly. *Science* 318: 1769-1772.
- Li Zeng-Mei, Liu Shu-Sheng, Liu Yin-Quan, Ye Gong-Yin. 2007. Temperature-related fitness costs of resistance to spinosad in the diamondback moth *Plutella xylostella* (Lepidoptera: Plutellidae). *Bulletin of Entomological Research* 97: 627-635.
- Zhang Peng-Jun, Liu Shu-Sheng, Wang Hua, Zalucki M. P. 2007. The influence of early adult experience and larval food restriction on responses towards non-host plants in moths. *Journal of Chemical Ecology* 33: 1528-1541.
- Jiu Min, Zhou Xue-Ping, Tong Lin, Xu Jing, Yang Xiao, Wan Fang-Hao, Liu Shu-Sheng. 2007. Vector-virus mutualism accelerates population increase of an invasive whitefly. *PLoS ONE* 2(1): e182. doi:10.1371/journal.pone.0000182.

2006 and earlier

Publications by LIU Shu-Sheng from 1982-2006 may be found from:

http://scholar.google.com/citations?hl=en&user=Rjow20gAAAAJ&view_op=list_works&is_public_preview=1

Honours and Awards

- ◆ Outstanding Teacher of the Province, Zhejiang Education Council, 2015.
- ◆ Scientist of Excellence of China, awarded by the China Association of Science and Technology, 2015
- ◆ University of California Davis Storer Lecturship, 2014
- ◆ Award of top 10 Outstanding Scientists in Zhejiang Province, China, Zhejiang Association of Science and Technology and Zhejiang Provincial Government, China, 2013.
- ◆ Award of outstanding contribution to Zhejiang agriculture, Zhejiang Provincial Government, China, 2011.
- ◆ Special-accredited Outstanding Scientist of Zhejiang Province, China, Zhejiang Provincial Government, China, 2008.
- ◆ Certificate of Distinction in Recognition of Outstanding Achievements in Entomology, Council of International Congress of Entomology, 2004.