Wang Yuhua

Areas of Research
Tea science, Tea breeding, Tea cultivation, Tea culture.

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Research Interests

Plant resistant to cold stress; Mechanism of Aluminum accumulation in tea (*Camellia sinensis*); Mechanism of Fluoride accumulation and transports in tea (*Camellia sinesis*)

1. Plant resistant to cold stress

Nitric oxide (NO) as a signaling molecule plays crucial roles in many abiotic stresses in plant development processes, including pollen tube growth. We investigated the signaling networks dominated by NO during cold stress that inhibited *Camellia sinensis* pollen tube growth in vitro. We found that a complex signaling network, including Ca^{2+}, ROS, pH, RACs signaling and the crosstalk among them, is stimulated in the *C. sinensis* pollen tube in response to cold stress, which further causes secondary and tertiary alterations, such as ultrastructural abnormalities in organelles and cell wall construction, ultimately resulting in perturbed pollen tube extension. Our study provides new insights into the multifaceted mechanistic framework for the functions of NO in cold-inhibited *C. sinensis* pollen tube growth.

2. Mechanism of Aluminum accumulation in tea (*Camellia sinensis*)

Tea plant (*Camellia sinensis*) can survive from high levels of aluminum (Al) in strongly acidic soils. However, the mechanism driving its tolerance to Al, the predominant factor limiting plant growth in acid condition, is still not fully understood. We found that both pectin methylesterases and organic acids contribute to Al tolerance in *C. sinensis*.

3. Mechanism of Fluoride accumulation and transports in tea (*Camellia sinesis*)

Tea seedlings accumulate large amounts of F without exhibiting any toxic symptoms, indicating that *C. sinensis* is a hyper-accumulator with high tolerance to F and has specific mechanisms driving F accumulation/detoxification. We are the first to identify and clone the F-specific export gene *CsFEX* and *CsCLC* from *C. sinensis*. We confirmed that CsFEX works in F accumulation/detoxification by alleviates Fluoride Toxicity in Transgenic *Escherichia coli* and *Arabidopsis thaliana*.

Education Background

Bachelor：Department of Biology, Qufu Normal University, Shandong Province
Doctor：Institute of botany, Chinese Academy of Sciences

Work experience

Lecturer, Nanjing Agricultural University, 2009.04- 2011.12
Associate Professor, Nanjing Agricultural University, 2012.01- 2017.12
Visiting Scholar, University of Maryland, 2016.03-2017.03
Professor, Nanjing Agricultural University, 2018.01-

Honors and Awards

Youth Science and Technology Award, ChinaTea Science Society

Selected Publication

1. Anqi Xing, Yuanchun Ma, Zichen Wu, Shouhua Nong, Jiaojiao Zhu, Hua Sun, Jing Tao, Bo Wen, Xujun Zhu, Wanping Fang, Xiaocheng Li, **Yuhua Wang* (corresponding author) 2020** Genome-wide identification and expression analysis of the CLC superfamily genes in tea plants (*Camellia sinensis*). **Functional & Integrative Genomics** 20:497-508
2. Junting Pan, Dongqin Li, Jiaojiao Zhu, Zaifa Shu, Xiaoli Ye, Anqi Xing, Bo Wen, Yuanchun Ma, Xujun Zhu, Wanping Fang, **Yuhua Wang* (corresponding author) 2020** Aluminum relieves fluoride stress through stimulation of organic acid production in *Camellia sinensis.* **Physiology and Molecular Biology of Plants**, 26(6):1127–1137
3. Jiaojiao Zhu,Anqi Xing, Zichen Wu, Jing Tao, Yuanchun Ma, Bo Wen, Xujun Zhu, Wanping Fang, **Yuhua Wang* (corresponding author). 2019** *CsFEX*, a fluoride export protein gene from *Camellia sinensis*, alleviates fluoride toxicity in transgenic *Escherichia coli* and *Arabidopsis thaliana.* **Journal of Agricultural and Food Chemistry**, 67, 5997-6006
4. Jiaojiao Zhu, Junting Pan, Shouhua Nong, Yuanchun Ma, Anqi Xing, Xujun Zhu, Bo Wen, Wanping Fang, **Yuhua Wang* (corresponding author). 2019** Transcriptome Analysis Reveals the Mechanism of Fluoride Treatment Affecting Biochemical Components in

Camellia sinensis. **International Journal of Molecular Sciences**, 20, 237 doi:10.3390/ijms20020237

5. Xu Li, Qiuping Zhang, Xi Peng, Jia Xu, Yuan Zhang, Jiaojiao Zhu, **Yuhua Wang***, Yunhe An*, Dongyan Chen* **2019** The effects of five types of tea solutions on epiboly process, neural and cardiovascular development, and locomotor capacity of zebrafish. Cell Biology and Toxicology, 35:205–217
6. **Wang Y**., Chang P., Pan J, Zhu J., Cui C., Ye X., Ma Y., Zhu X., Fang W.*, Jiang C.* **2019** Effect of aluminum and fluoride on R2R3-MYB transcription factor characterization and expression in *Camellia sinensis*. **Biologia Plantarum** 63: 298-307
7. Pan J., Chang P., Ye X., Zhu J., Li D., Cui C., Wen B., Ma Y., Zhu X., Fang W., **Wang Y* (corresponding author)** Transcriptome-wide analysis of MADS-box family genes involved in aluminum and fluoride assimilation in *Camellia sinensis*. **Plant Biotechnology** 2018, 35(4), 313–324
8. Junting Pan†, Dongqin Li†, Zaifa Shu, Xin Jiang, Wenwen Ma, Weidong Wang, Jiaojiao Zhu, **Yuhua Wang* (corresponding author)**. **2018** *CsPDC-E1α*, a novel pyruvate dehydrogenase complex E1α subunit gene from *Camellia sinensis*, is induced during cadmium inhibiting pollen tube growth. **Canadian Journal of Plant Science** 98: 62-70
9. Dongqin Li, Zaifa Shu, Xiaoli Ye, Jiaojiao Zhu, Junting Pan, Weidong Wang, Pinpin Chang, Chuanlei Cui, Jiazhi Shen, Wanping Fang, Xujun Zhu, **Yuhua Wang* (corresponding author)**. 2017 Cell wall pectin methyl-esterification and organic acids of root tips involve in aluminum tolerance in *Camellia sinensis*. **Plant Physiology and Biochemistry** 119:265-274
10. Junting Pan, Weidong Wang, Dongqin Li, Zaifa Shu, Xiaoli Ye, Pinpin Chang, **Yuhua Wang* (corresponding author)**. **2016** Gene expression profile indicates involvement of NO in *Camella sinensis* pollen tube growth at low temperature. **BMC Genomics** 17:809
11. **Yuhua Wang**, Zaifa Shu, Weidong Wang, Xin Jiang, Junting Pan, Dongqin Li, Xinghui Li*. **2016** *CsWRKY2*, a novel *WRKY* gene from *Camellia sinensis*, is involved in cold and drought stress responses. **Biologia Plantarum** 60 (3): 443-451
12. Weidong Wang, Xianyong Sheng, Zaifa Shu, Dongqin Li, Junting Pan, Xiaoli Ye, Pinpin Chang, Xinghui Li, **Yuhua Wang* (corresponding author)**. **2016** Combined cytological and transcriptomic analysis reveals a nitric oxide signaling pathway involved in cold-inhibited *Camellia sinensis* pollen tube growth. **Frontiers in Plant Science** 7 (342): 456
13. Weidong Wang, Huahong Xin, Mingle Wang, Qingping Ma, Le Wang, Najeeb A. Kaleri, **Yuhua Wang* (corresponding author)**, Xinghui Li*. **2016** Transcriptomic analysis reveals the molecular mechanisms of drought-stress-induced decrease in *Camellia sinensis* leaf quality. **Frontiers in Plant Science** 7 (795): 385
14. Weidong Wang, **Yuhua Wang (Co-first author)**, Yulin Du, Zhen Zhao, Xujun Zhu, Xin Jiang, Zaifa Shu, Ying Yin, Xinghui Li*. **2014** Over expression of *Camellia sinensis* H1 histone gene confers abiotic stress tolerance in transgenic tobacco. **Plant Cell Reports** 33(11): 1829-41
15. **Wang Y-H**, Li X-C, Zhu-Ge Q, Jiang X, Wang W-D, Fang W-P, Chen X, Li X-H. (**2012**) Nitric Oxide Participates in Cold-Inhibited *Camellia sinensis* Pollen Germination and Tube Growth Partly via cGMP In Vitro. **PLoS ONE** 7(12): e52436.

16. Xu Ruan, Weiying Feng, **Yuhua Wang* (corresponding author)**, Xuan Chen, Wanping Fang, Xinghui Li*, Runlin Xiao. Diurnal variations of photosynthetic characteristic parameters in strains of tea plants under fruit-tea intercropping models. Advances in Biomedical Engineering-Selected, peer reviewed paper from **2011** International Conference on Agricultural and Biosystems Engineering (ICABE **2011**), Hong Kong, February 20-21, 2011: 488-490
17. **Yuhua Wang**, Tong Chen, Chunyang Zhang, Huaiqing Hao, Peng Liu, Maozhong Zheng, František Baluška, Jozef Šamaj, Jinxing Lin*. **2009**. Nitric oxide modulates the influx of extracellular Ca^{2+} and actin filament organization during cell wall construction in *Pinus bungeana* pollen tubes. **New Phytologist**, 182 (4): 851-862