

Xu ZhiSheng



Areas of Research

Carrot Color Variation (Anthocyanins and Carotenoids), Carrot Genetics & Enhancement

Contact Information

Office location: Room C602, State Key Laboratory of Crop Genetics and Germplasm Enhancement Building, Nanjing Agricultural University

Office phone: 025-84396790

Email address: xuzhisheng@njau.edu.cn

Research Interests

Carrot Color Variation

Carrots with purple or yellow root were first cultivated as a root crop in Central Asia 1,100 years ago and spread to the East and West (Iorizzo et al., 2013). The yellow carrot was concluded to be a color mutant of the purple carrot (Banga, 1963). The color of carrot roots has significantly changed during the domestication process. White and red carrots originated in Europe and China, respectively, between the 11th and 15th centuries (Arcscott and Tanumihardjo, 2010). The Europeans preferred yellow carrot over purple and white carrot until orange carrot arrived in the 16th century (Simon, 2000). Then, the latter gradually spread throughout Europe and other continents worldwide. Nowadays, cultivated carrot roots are purple, orange, yellow, red, and white, resulting from anthocyanin, carotene, lutein, and lycopene accumulations and the lack of pigments, respectively.

I unraveled the molecular basis of the mutation leading to anthocyanin pigment loss in non-purple carrot (Xu, 2019, *Plant Physiology*; Xu, 2020, *Plant biotechnology Journal*). In future work, I will focus on revealing the genetic factors contributing to orange, yellow, red, and white color of carrot roots.

Education Background

Bachelor: Zhejiang Normal University

Master: Nanjing Agricultural University

Doctor: Nanjing Agricultural University

Work experience

Lecturer, Nanjing Agricultural University, 2014-2016

Associate Professor, Nanjing Agricultural University, 2017-

Selected Publication

(1) **Zhi-Sheng Xu**, Qing-Qing Yang, Kai Feng, Xiao Yu, Ai-Sheng Xiong*, DcMYB113, a root-specific R2R3-MYB, conditions anthocyanin biosynthesis and modification in carrot, *Plant Biotechnology Journal*, 2020, 18:1585-1597.

(2) **Zhi-Sheng Xu**, Qing-Qing Yang, Kai Feng, Ai-Sheng Xiong*, Changing Carrot Color: Insertions in *DcMYB7* Alter the Regulation of Anthocyanin Biosynthesis and Modification, *Plant Physiology*, 2019, 181: 195-207.

(3) **Zhi-Sheng Xu**, Kai Feng, Ai-Sheng Xiong*, CRISPR/Cas9-mediated multiply targeted mutagenesis in orange and purple carrot plants, *Molecular Biotechnology*, 2019, 61:191-199.

(4) **Zhi-Sheng Xu**, Kai Feng, Feng Que, Feng Wang, Ai-Sheng Xiong*, A MYB transcription factor, DcMYB6, is involved in regulating anthocyanin biosynthesis in purple carrot taproots, *Scientific Reports*, 2017, 7:45324.

(5) **Zhi-Sheng Xu**, Jing Ma, Feng Wang, Hong-Yu Ma, Qiu-Xia Wang, Ai-Sheng Xiong*, Identification and characterization of DcUCGalT1, a galactosyltransferase responsible for anthocyanin galactosylation in purple carrot (*Daucus carota* L.) taproots, *Scientific Reports*, 2016, 6:27356.

(6) **Zhi-Sheng Xu**, Ying Huang, Feng Wang, Xiong Song, Guang-Long Wang, Ai-Sheng Xiong*, Transcript profiling of structural genes involved in cyanidin-based anthocyanin biosynthesis between purple and non-purple carrot (*Daucus carota* L.) cultivars reveals distinct patterns, *BMC Plant Biology*, 2014, 14(1):262.

(7) **Zhi-Sheng Xu**[#], Hua-Wei Tan[#], Feng Wang[#], Xi-Lin Hou, Ai-Sheng Xiong*, CarrotDB: a genomic and transcriptomic database for carrot, *Database*, 2014, 2014:bau096.
