

## **Qingwu Xue, Ph.D.**

Professor, Regents Fellow and Faculty Fellow  
Texas A&M AgriLife Research at Amarillo  
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### **Education**

Ph.D. University of Nebraska, 2000, Agronomy (Agricultural Meteorology)  
M.S. West Texas A&M University, 1995, Agriculture  
M.S. The Chinese Academy of Sciences, 1988, Plant Eco-physiology  
B.S. Shaanxi Normal University, 1985, Biology

### **Positions and Employment**

2009-present, Assistant/Associate Professor/Professor, Texas A&M AgriLife Research-Amarillo  
2008-2009, Research Scientist, North Dakota State University  
2000-2008, Postdoctoral Research Scientist/Research Associate, Montana State University  
1996-2000, Research Assistant, University of Nebraska  
1994-1995, Research Assistant, West Texas A&M University  
1992-1994, Visiting Scientist, USDA-ARS, Bushland, TX  
1988-1992, Assistant Professor, Institute of Soil & Water Conservation, The Chinese Academy of Sciences

### **Program Overview**

My research has been focused on improving yield, water use, WUE and stress resistance/tolerance in major crops in the Texas High Plains. The Texas High Plains is one of the most productive agricultural regions in the U.S. Because of the semi-arid climate, drought is the most common factor limiting yield and WUE in crop production, even under irrigation conditions. In addition to drought, other abiotic (e.g., heat, cold) and biotic (e.g., disease, insects) stresses frequently interact with drought for reducing crop yields and WUE in the region. Based on the above background, we have conducted experiments to address the following research objectives: (1) understand physiological mechanisms for improved abiotic stress tolerance and increased WUE; (2) identify plant traits conferring stress tolerance; (3) develop phenotyping tools for screening stress tolerance and WUE; (4) optimize crop water use and WUE through the identification of new and improved cultivars/species, best management practices, and cropping systems. In most cases, my research is conducted as a part of multidisciplinary team that includes crop physiologists, breeders, geneticists, agronomists, irrigation engineers, soil scientists, plant pathologists and entomologists.

### **Significant 5-Year Accomplishments**

**Corn:** Multi-year field study indicated that it is possible to maintain 200 bu/ac of yield at irrigation level of 75% ET requirement with some new drought tolerant hybrids. This irrigation level can allow irrigation water savings over 20% or 5 inches. Also, WUE is generally maximized as well. Our recent field studies demonstrated that relatively delaying planting from mid-May to late June can result in irrigation water savings and increased WUE. These findings could lead to reducing water withdrawals from the Ogallala Aquifer while maintaining sustainable irrigated crop production. **Wheat:** Field studies indicated that biomass at anthesis is important to maintain high yield under drought in the Southern High Plains. Selecting cultivars with higher biomass and greater early vigor may be beneficial to wheat management in the area. We further found that newer cultivars such as TAM 111 and TAM 112 use soil water more efficiently than a relative older cultivar, TAM 105. Apparently, the breeding advancement has improved effective use of soil water under water limited conditions. In a greenhouse study, we are able to better understand the differences in physiological mechanisms to respond to drought between TAM 111 and TAM 112. For field phenotyping evaluation, we found that cooler canopy contributed to higher yield in new drought tolerant cultivars, and spectral reflectance data can be used to characterize genotypic variation in wheat genotypes. **Sorghum:** High biomass and photoperiod-sensitive sorghum (PSS) has been identified as a potential bioenergy crop. Although high biomass yield required full irrigation, the biomass sorghum still could achieve high yields (up to 8 t/ac) under limited irrigation. The biomass sorghum may produce biomass yields up to 6 t/ac under dryland conditions with about 8-in seasonal

rainfall. Although PSS can be grown under both limited irrigation and dryland conditions, limited irrigation may be more attractive for sustaining higher biomass yield and supplies in PSS given the large variation of seasonal rainfall in the Texas High Plains.

**Teaching:** Supervised 3 research scientists, 4 visiting scientists, 5 postdoctoral scientists, 6 research assistants/associates; chaired/co-chaired 8 graduate students (2 Ph.D., 6 MS); served committees for 13 graduate students (5 Ph.D., 8 MS); supervised 19 undergraduate student workers since 2010.

**External Research Grants (since 2010):** Total \$15.8 million, \$2.3 million to my program.

### **Publications (10 most recent journal articles) (117-career; 87-since 2010)**

[Note: For publications below, underlined names are post-doctoral scientists, visiting scientists and research staff under Xue's supervision; underlined italic names are graduate students co-chaired and committed by Xue]

1. Bhandari, M., A. M. H. Ibrahim, Q. Xue, J. Jung, A. Chang, J. C. Rudd, M. Maeda, N. Rajan, H. Neely, and J. Landivar. 2020. Assessing winter wheat foliage disease severity using aerial imagery acquired from small Unmanned Aerial Vehicle (UAV). *Computers and Electronics in Agriculture* 176: 105665.
2. Jiang, W., S. Thapa, K. Jessup, B. Hao, X. Hou, T. Marek, J. Becker, J. Bell, and Q. Xue. 2020. Corn response to later than traditional planting dates in the Texas High Plains. *Crop Sci.* 60: 1004-1020. DOI: 10.1002/csc2.20042
3. Rho, H., P. Colaizzi, J. Gray, L. Paetzold, Q. Xue, B. Patil, and C. Rush. 2020. Yields, Fruit Quality, and Water Use in a Jalapeno Pepper and Tomatoes under Open Field and High-tunnel Production Systems in the Texas High Plains. *HortScience* 1 (aop), 1-10.
4. Shrestha, R., S. Thapa, Q. Xue, B. A. Stewart, B. C. Blaser, E. K. Ashiadey, J. C. Rudd, and R. N. Devkota. 2020. Winter wheat response to climate change under irrigated and dryland conditions in the US southern High Plains. *J. Soil and Water Conservation* 75: 112-122.
5. Thapa, S., Q. Xue, and B. A. Stewart. 2020. Alternative planting geometries reduce production risk in corn and sorghum in water-limited environments. *Agronomy J.* 112: 3322–3334. DOI: 10.1002/agj2.20347.
6. Thapa, S., Q. Xue, K. E. Jessup, J. C. Rudd, S. Liu, R. N. Devkota, and J. A. Baker. 2020. Soil water extraction and use by winter wheat cultivars under limited irrigation in a semi-arid environment. *Journal of Arid Environments* 174: 104046
7. Thapa, S., Q. Xue, T. H. Marek, W. Xu, D. Porter, and K. E. Jessup. 2020. Corn production under restricted irrigation in the Texas High Plains. *Agronomy J.* 112:1190–1200.
8. Yang, Y., S. Dhakal, C. Chu, S. Wang, Q. Xue, J. C. Rudd, A. M. H. Ibrahim, K. Jessup, J. Baker, M. P. Fuentealba, R. Devkota, S. Baker, C. D. Johnson, R. Metz, S. Liu. 2020. Genome wide identification of QTL associated with yield and yield components in two popular wheat cultivars TAM 111 and TAM 112. *Plos One* 15 (12), e0237293
9. Olanrewaju, S. A., N. Rajan, A. M. H. Ibrahim, J. C. Rudd, S. Liu, R. Sui, K. E. Jessup, and Q. Xue\*. 2019. Using aerial imagery and digital photography to monitor growth and yield in winter wheat. *International J. Remote Sensing* 40: 6905-6929.
10. Thapa, S., Q. Xue\*, K. Jessup, J.C. Rudd, S.-Y. Liu, T. H. Marek, R.N. Devkota, J. Baker, and S. Baker. 2019. Yield determination in winter wheat under different water regimes. *Field Crops Research* 233: 80-87.

### **Awards**

2020 – **Distinguished Career Award**, Association of Chinese Soil & Plant Scientists in North America.

2020 – **Director's Award -Collaboration (2019)**, Texas A&M AgriLife Research.

2019 - **Regents Fellow Service Award (2017-2018)**, The Texas A&M University System.

2018 - **Faculty Fellow Award (2017)**, Texas A&M AgriLife Research.

2017 - **Research Faculty Award (2016)**, Department of Soil and Crop Sciences, Texas A&M University.

2015 - **Dean's Outstanding Achievement Award – Interdisciplinary Research Team**, TAM Wheat

### **Membership**

Alpha Zeta, Agricultural Honor Society

Association of Chinese Soil & Plant Scientists in North America

American Society of Agronomy-Crop Science Society of America-Soil Science Society of America