DANIEL IVAN LESKOVAR

Title Professor, Vegetable Stress Physiology – Horticultural Sciences
Institution Texas A&M AgriLife Research & Extension Center at Uvalde & Dallas
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EDUCATION/TRAINING

Universidad del Comahue, Argentina, Ing. Agr. (B.S.), Horticulture
University of Wageningen, The Netherlands, Graduate Training, Vegetable Crops, 1983
University of California, Davis, MS., Vegetable Crops, 1986
University of Florida, Ph.D., Vegetable Crop Physiology, 1991

RESEARCH & PROFESSIONAL EXPERIENCE

1991-1996 Assistant Professor, Vegetable Physiology, Texas A&M University
1997-2003 Associate Professor, Vegetable Physiology, Texas A&M University
2004- Professor, Vegetable Physiology, Texas A&M University
2006-2016 Assistant Director- Vegetable and Fruit Improvement Center
2011- Center Director, Texas A&M AgriLife Research, Uvalde
2014- Faculty in Molecular & Environmental Plant Sciences (MEPS), TAMU
2020- Center Director, Texas A&M AgriLife Research, Dallas

COLLABORATORS AND AFFILIATIONS

Vijay Joshi and Xuen Dong (Texas AgriLife Research, Uvalde); Genhua Niu (Texas AgriLife Research, Dallas); Kevin Crosby, Bhimu Patil, and Marco Palma (TAMU, College Station); John Jifon and Carlos Avila (Texas AgriLife Research, Weslaco); Bing Guo (TAMU, Qatar); Mark Tester (KAUST, Saudi Arabia); Smiljana Goreta (Croatia), J.A. Franco (UPCT, Spain).

SYNERGISTIC ACTIVITIES

Dr. Leskovar's program is focused on the understanding of plant morphological, physiological, and biochemical adaptation mechanisms to environmental stresses and the development of sustainable vegetable cropping systems. His specific research emphasis is on: 1) seed-transplant-grafting production and physiology to increase plant survival under drought, nitrogen deficit and heat stress, 2) PGRs, bio-stimulants and soil amendments to enhance soil and plant health, 3) root and shoot trait responses to water and nutrient conservation strategies, 4) cultivar, fertility and cover crop management for conventional and organic production, 5) protected cultivation, greenhouse hydroponics and controlled environment horticulture (CEH) systems for tomato, pepper, spinach, lettuce and other leafy greens, and 6) G×E×M - genotype selection for drought and heat tolerance, water and nitrogen use efficiency, disease resistance, yield and nutritional quality. Together with graduate students and team members, his program generated 235 papers (including 140 peer reviewed journals, 39 editorial-reviewed, 14 book chapters) and 293 published abstracts. His research has been supported by federal, state, industry, and foundations and involved collaborations with Spain, Italy, Croatia, Israel, Germany, South Africa, Argentina, Brazil, Mexico, and Qatar. Within the last 5 years he has received $3 million as PI and $106 million as Co-PI. He has provided graduate training to 23 students including 6 from Brazil, Spain, and South Africa, and 67 undergraduates. Below are significant impacts from his program:

- Using physiological approaches, he developed alternative nursery production methods to control root and shoot growth traits to improve the overall transplant quality and mitigate the negative effects of transplant

shock that lead to poor stand establishment. This research has been widely documented in high-value horticultural crops including tomato, pepper, watermelon, melon, artichoke, onions, and olives.

- He developed multiple crop production systems that resulted in higher resource use efficiency, abiotic stress tolerance, yield, and quality, including health-promoting phytonutrients.
- Studies in hydroponic nutrition demonstrated that by adopting optimum pre- and post-transplant N management hydroponic farmers could maximize crop productivity of lettuce and improve water use efficiency by 90%.
- Research on tomato grafting resulted in a 40% yield increase under high tunnels and with improved abiotic stress tolerance. His team described a possible mechanism by which grafting positively influences grafted plant thermotolerance and provide new insights into the future screening and breeding avenues for elite rootstocks and scion-rootstock combinations.

RECENT SELECTED PUBLICATIONS (Leskovar lab: §postdoc, *graduate student)

§Dash, P.K., Guo, B. and D.I. Leskovar. 2024. Enhancing hydroponic organic tomato resilience through grafting and bioprotection strategies. HortScience (in Press).

*Lee, C., Harvey, J.T., *Qin, K., V. Joshi, and D.I. Leskovar. 2024. Exploring the potential of Solanum pennellii and Solanum peruvianum as rootstocks for enhancing thermotolerance of tomato plants. Environmental and Experimental Botany, Volume 221, May 2024, 105741. https://doi.org/10.1016/j.envexpbot.2024.105741

*Bhattarai, S.; Harvey, J.T.; *Lee, C.; Joshi, V. and D.I. Leskovar. 2024. Assessment of physiological and biochemical thermotolerance traits in tomato genotypes. Scientia Horticulturae, Vol 324, 112561. https://doi.org/10.1016/j.scienta.2023.112561

§Dash, P.K., Guo, B. and D.I. Leskovar. 2024. Assessing tomato genotypes for organic hydroponic production in stressful environmental conditions. HortScience, 59(2):188-200. https://doi.org/10.21273/HORTSCI17481-23

*Lee, C., Harvey, J.T., *Nagila, A., *Qin, K., and D.I. Leskovar. 2023. Thermotolerance of tomato plants grafted onto wild relative rootstocks. Front. Plant Sci., Sec. Plant Abiotic Stress. Volume 14 - 2023 https://doi.org/10.3389/fpls.2023.1252456

§Dash, P.K., Guo, B. and D.I. Leskovar. 2023. Optimizing hydroponic management practices for organically grown greenhouse tomato under abiotic stress conditions. HortScience. 58(10):1129-1138. https://doi.org/10.21273/HORTSCI17249-23

*Qin., K., Harvey, J.T., *Lee, C., and **D.I. Leskovar**. 2023. Substrate amended with solid humic substances improved Micro-Tom tomato growth. European Journal of Horticultural Science, 88(5) https://doi.org/10.17660/eJHS.2023/030

*Qin., K., Dong, X., and D.I. Leskovar. Improving tomato nitrogen use efficiency with lignite-derived humic substances. Scientia Horticulturae, Vol 321, 112243 https://doi.org/10.1016/j.scienta.2023.112243

*Lee, C., Harvey, J.T., *Qin, K., and **D.I. Leskovar**. 2023. Physio-biochemical responses of grafted tomatoes differing in thermotolerance to heat stress and recovery. Scientia Horticulturae, Vol 308, 1111546 https://doi.org/10.1016/j.scienta.2022.111546

§Joshi, M, **Leskovar, D**, §Djidonou, D, Jifon, J, Avila, C, Masabni, J and K Crosby. Production systems and growing environments had stronger effects than grafting on the nutritional quality of tomato. ACS Food Science & Technology. 2021. 1 *(8), 1399-1411 DOI: 10.1021/acsfoodscitech.1c00051*

*Alves, FM, Joshi, M, §Djidonou, D, Joshi, V, Gomes, NI and **DI Leskovar**. Physiological and biochemical responses of tomato plants grafted onto solanum pennellii and solanum peruvianum under water-deficit conditions *Plants* 2021, *10*(11), 2236; https://doi.org/10.3390/plants10112236