Richard Tegtmeier

Cornell University Plant Breeding and Genetics

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Academic Experience

2019-*Present* Ph.D. Cornell University Plant Breeding, minor Plant Pathology (GPA: 3.70)

2015-2019 B.S. Salve Regina University Biology, minor Music (GPA: 3.63)

Work Experience

2016-2019 Salve Regina University Hydroponics Lab; Student Lab Manager

Sum. 2018 Cornell AgriTech Summer Research Scholar (Lab: Awais Khan)

Sum. 2017 Fable: From Farm to Table, Ossining, NY; Hydroponic Greenhouse Manager/Grower

Sum. 2016 Cabbage Hill Farm, Mt Kisco, NY; Aquaponic Greenhouse Assistant

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Publications:

Tegtmeier R, Švara A, Gritsenko D., Khan A. (2024) *Malus sieversii*: A historical, genetic, and conservational perspective of the primary progenitor species of domesticated apples. Horticulture Research.

Tegtmeier R, Cobb-Smith D, Zhong G-Y, Khan A. (2023) Identification and marker development of a moderate-effect fire blight resistance QTL in *M. sieversii*, the primary progenitor of domesticated apples. Tree Genetics & Genomes 19, 50. https://doi.org/10.1007/s11295-023-01626-6

Tegtmeier, R., Hickok, D., Robbins, K., & Khan, A. (2023). Image-based leaf disc assay for rapid evaluation of genetic resistance to fire blight in apples. European Journal of Plant Pathology. European Journal of Plant Pathology. https://doi.org/10.1007/s10658-023-02750-8

Tegtmeier, R., Pompili, V., Singh, J., Micheletti, D., Silva, K. J. P., Malnoy, M., and Khan, A. (2020) Candidate gene mapping identifies genomic variations in the fire blight susceptibility genes *HIPM* and *DIPM* across the Malus germplasm. Scientific Reports, Rep 10, 16317. https://doi.org/10.1038/s41598-020-73284-w

Jiaming Li, Mingyue Zhang, Xiaolong Li, Awais Khan, Satish Kumar, Andrew Charles Allan, Kui Lin-Wang, Richard Victor Espley, Caihong Wang, Runze Wang, Cheng Xue, Gaifang Yao, Mengfan Qin, Manyi Sun, **Richard Tegtmeier**, Hainan Liu, Weilin Wei, Meiling Ming, Shaoling Zhang, Kejiao Zhao, Bobo Song, Jiangping Ni, Jianping An, Schuyler S Korban, Jun Wu. (2022) Pear genetics: Recent advances, new prospects, and a roadmap for the future, Horticulture Research, Volume 9, https://doi.org/10.1093/hr/uhab040

Extension Articles:

Hana Feulner, **Richard Tegtmeier**, Awais Khan, Janet van Zoeren (2024) Genome-Wide Association Mapping: What is it and Why is it Important for the Development of Fruit Cultivars? Cornell Cooperative Extension Fruit Notes, Volume 24, Issue 5 https://rvpadmin.cce.cornell.edu/pdf/lof_newsletter/pdf326_pdf.pdf

Select Presentations:

Tegtmeier, R., Cobb-Smith D., Zhong G., Khan, M.A., (2023). Identification and development of markers for a moderate-effect fire blight resistance QTL in *M. sieversii*, the primary progenitor of domesticated apples, NAPB 2023 Annual Meeting, [Poster]

Tegtmeier, R., Villwock, S., Kunze, K., Lukach, M., (2023). Everything home gardeners want to ask about plant breeding, Cornell Cooperative Extension Master Gardeners Program, Online [Oral]

Tegtmeier, R., Khan, M.A., (2022). Mapping novel QTL for fire blight resistance in the primary progenitor species of domesticated apples (*M.* × *domestica*), 3rd International Symposium on Fire Blight of Rosaceous Plants, Dresden, Germany [Oral]

Tegtmeier, R., Pompili V., Singh J., Micheletti D., Silva K.J.P, Malnoy M., Khan, M.A., (2022). Utilizing susceptibility and resistance genes to develop fire blight resistant apples via breeding and genome-editing", 2022 Cornell NYS Tree Fruit Conference, Online [Oral], https://www.youtube.com/watch?v=M6qzCJ4uk9E

Tegtmeier, R., Pompili V., Singh J., Micheletti D., Silva K.J.P, Malnoy M., Khan, M.A., **(**2021). Genetics and Genome Editing of Fire Blight Susceptibility Genes as a Robust Strategy to Develop Improved Apple Cultivars, NAPB 2021 Annual Meeting, Online [Poster]

Tegtmeier, R., Pompili V., Singh J., Micheletti D., Silva K.J.P, Malnoy M., Khan, M.A., **(**2020). Genomic Variation in the Genes Responsible for Fire Blight Susceptibility in Apples", Cornell Agriculture, Food & Environmental Systems In-Service Survey, Online [Oral]

Tegtmeier, R., Singh J., Silva K.J.P., Khan, M.A., (2020). Identification of Fire Blight Resistant Malus Germplasm for Apple Breeding and Genetics Research", NAPB 2020 Annual Meeting, Online [Poster]

Tegtmeier, R., Singh J., Silva K.J.P., Khan, M.A., **(**2020). Identification of Fire Blight Resistant Malus Germplasm for Apple Breeding and Genetics Research", 7th International Horticulture Research Conference, Online [Poster]

Tegtmeier, R., Singh J., Fabrizio J., Desnoues E.,Silva K.J.P., Busch W.,Khan, M.A., **(**2019). Rootstock Genotypes Influence Response to Fire Blight in Grafted Apple Scion Cultivars, 2nd International Symposium on Fire Blight of Rosaceous Plants, Traverse City, MI [Oral]

Tegtmeier, R., Singh J., Silva K.J.P., Khan, M.A., **(**2018). Exploring Global Apple Diversity to Mine for Fire Blight Resistance Alleles, Summer Scholars Symposium, Cornell AgriTech, Geneva, NY [Poster]

Reviewer Experience:

2019-2024 **1)** The American Phytopathological Society - Phytopathology, **2)** BMC Plant Biology, **3)** The American Phytopathological Society - Plant Disease, **4)** Cornell Schmittau-Novak Collaborative Grant Funding, **5)** Nature- Horticulture Research, **6)** Springer-Tropical Plant Biology, **7)** Agronomy Journal

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Teaching and Mentoring Experience:

2023, 2024 Designed and led a 5-part R Workshop for Cornell AgriTech Summer Scholars
2022 Teaching Assistantship, PLBRG2250, Plant Genetics, Cornell University

2019-2022 Project Mentor for 3 Cornell Summer Scholar Undergraduate Researchers
- *My 2022 Summer Scholar mentee has started a PhD in the Cornell Plant Breeding and Genetics section in Lance Caddle-Davidson's lab*

Awards and Distinctions:

2024 Nation Association of Plant Breeders - Borlaug Scholar Award

2023 Cornell Plant Breeding and Genetics - Murphy Munger Award ($500 awarded)
"Outstanding performance in the areas of scientific achievement, contributions to teaching or departmental activities, service to the community or profession, and other relevant areas"

2023 USDA NIFA Predoctoral Fellowship ($120,000 awarded; 2 years funding)
"Mapping the genetic basis of fire blight resistance in Malus sieversii, the primary progenitor species of apples"

2021 NAPB Poster Competition Winner (2nd of 50 PhD students, $250 awarded)

2020 Cornell Schmittau-Novak Collaborative Grant Funding ($10,000 awarded)

2019 Science Research Award, Salve Regina University Department of Biology

2019 Graduating with Honors, Cum Laude, Salve Regina University

2018 "Who's Who" Leadership Award, Salve Regina University

Professional Activities:

2023-2024 Member of the Cornell Plant Pathology faculty search committee
- *Moonshot initiative: Revolutionizing Controlled Environment Agriculture*

2021-2022 Synapsis, Co-President (Cornell Plant Breeding Graduate Student Organization)
- *Led initiative to have faculty provide need-based relocation funding to incoming graduate students to reduce inequities related to travel costs*

2021-2023 SAGES, Symposium Co-Chair (Cornell AgriTech Graduate Student Organization)

2020-2021 Synapsis & SAGES, Graduate and Professional Studies Assembly Representative

2019-2023 Member of the National Association of Plant Breeders (NAPB)

2019-2021 Synapsis, Chair of Seed Sales Fundraiser

2019 Synapsis, Graduate Student Symposium Organizer

Extension Experience:

2023 Led seminar to 70 Cornell Master Gardeners on plant breeding concepts in gardening
- *Topics ranged from basic terminology (i.e. hybrid, open pollinated) to complex issues of genetically engineered crops in the food system*

2022 Conducted an apple breeding/pollination workshop for plant breeding graduate students

2021 Assisted in conducting a workshop on *Malus* genetic diversity and disease identification

2020 Extension Assistantship: Improvement of the Apple Disease Info Database
https://blogs.cornell.edu/applevarietydatabase/

2019 Assisted in leading a grower workshop in drone disease diagnostics

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Skills:

Programming - R | Python | Unix | LaTeX | Git | Conda Env. Management | Reproducible Analysis

Bioinformatics - Comparative genomics | Variant calling and QC | Gene Annotation

Genetic Mapping - Linkage map construction | QTL analysis | GWAS

Image Analysis - ImageJ (Fiji) | ImageJ Macro Language | PlantCV | OpenCV | Hyperspectral Analysis

Drone Imaging - Data acquisition and processing | Object segmentation | Feature extraction

Molecular Biology - Marker design and genotyping (SSR) | CRISPR/Cas9 gRNA design

Plant Pathology - Bacterial inoculations | Inoculation assay design (leaf disc assay)

Plant Propagation - Tissue Culture | Greenhouse cultivation | Pollination (apple) | Grafting