2025 Member Funded Research Projects

California Tomato Research Institute

BROOMRAPE CONTAINMENT, CONTROL & MANAGEMENT

Integrated Broomrape Management: Field, Lab, and Extension Strategies – *Brad Hanson*

CTRI's lead broomrape project continues to generate data for practical management of this high-risk pest. 2025 trials will refine herbicide strategies for broomrape and bindweed, evaluate tools like maleic hydrazide and germination stimulants, and test how flooding and nitrogen affect seed viability. The team also supports host and cultivar screening and field sanitation research.

Equipment sanitation for broomrape and soilborne disease prevention – *Cassandra Swett*

Supporting the development of science-based BMPs for cleaning equipment to slow broomrape spread; 2025 work includes risk assessments by machine type and timing, testing of on-board cleaning systems, and sanitizer trials under debris-heavy conditions. Outreach efforts include updated BMPs, grower and processor training tools, and video resources to support adoption.

Developing broomrape-resistant tomato lines – *Neelima Sinha*

This project uses advanced genetics to identify tomato genes that block broomrape infection. In 2025, researchers will apply single-cell sequencing to refine CRISPR targets. Building on earlier work with hairy root assays and natural resistance, the goal is to support future breeding of broomrape-resistant varieties without yield loss.

Using suberin to improve drought and pest resistance in tomato - *Siobhan Brady*

Researchers are evaluating gene-edited and hybrid lines with increased suberin in tomato roots to reduce broomrape susceptibility and improve drought tolerance. The goal is to identify lines with no yield penalty and enable new breeding strategies for more resilient tomatoes; in collaboration with commercial breeding partners.

Testing novel tomato rootstocks for resilience and broomrape resistance – *Iyris*

New rootstocks developed through wild relatives and polyploidy are being evaluated for broomrape resistance and agronomic performance. In 2025, grafted and ungrafted plants will be tested in California and Chilean fields with known broomrape pressure. Results will help determine whether these rootstocks can deliver yield and resilience benefits.

Genetic Tracking of Branched Broomrape Populations – *Adam Schneider*

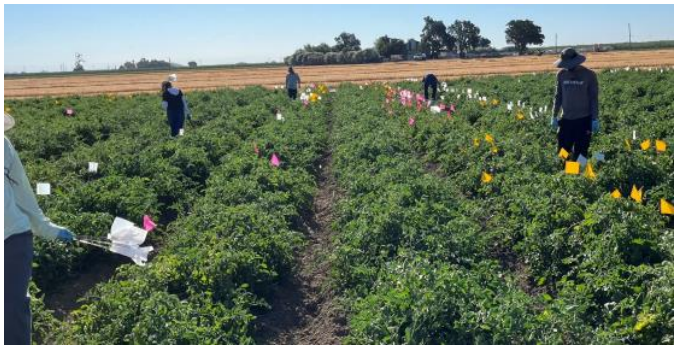
This project confirmed that California broomrape infestations trace back to a single introduction decades ago, genetically distinct from Chilean and European populations. The pest has since spread across multiple counties. Final work in 2025 wraps up CTRI's investment in understanding Branched broomrape origins and supports targeted containment efforts.

Satellite-Based Broomrape Detection Tool – *Alireza Pourezza*

Following successful double-blinded validation across 50+ fields, CTRI is supporting a final round of model development using data from known infested sites in California and Israel. A second double-blinded validation will precede rollout, with the project culminating in a practical, low-cost, and scalable detection tool for growers. This work aims to make broomrape monitoring accessible across the industry through remote sensing.

Hardware-Based Broomrape Detection for In-Field Use – *Laudando & Associates*

With co-funding from the CDFA Broomrape Board this project builds on successful proof-of-concept work to develop a field-ready broomrape detection system that can be mounted on equipment growers already use. The tool will identify infestations spatially during normal field operations, reducing the need for separate scouting efforts. 2025 work focuses on refining detection algorithms and field validation to ensure the system is accurate, scalable, and ready for commercial use.



Flagging broomrape emergence over time in the Hanson Lab Field Site. *Photo credit – Matt Fatino.*

Searching for New Chemistries to Stop Broomrape – *Michael Burger*

A screen of 30,000 compounds will identify those that block broomrape germination or trigger suicidal germination before reaching tomato roots. Early research has identified unique receptors in the California strain. 2025 funding supports chemical library access to launch the screen and could lead to new preplant or in-season tools for broomrape control.

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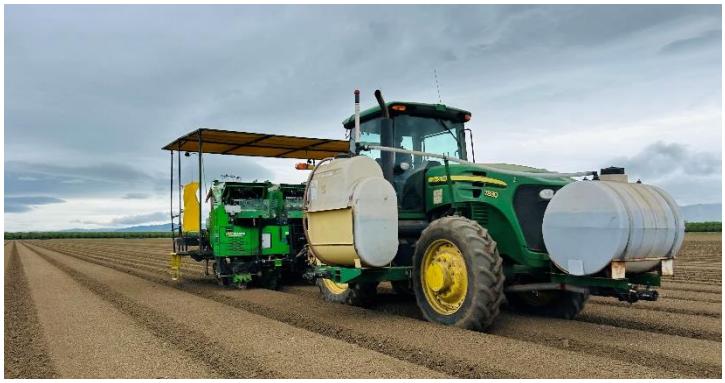
AGRONOMIC MANAGEMENT

Understanding Yield Gaps in Tomato Fields – *Patricia Lazicki*

Some new tomato fields, especially after orchards, are yielding far more than long-rotated fields. This project compares soil biology, structure, and fertility between new and old fields to uncover the cause. Results will help pinpoint manageable factors limiting yields in long-term tomato rotations, with the goal of helping growers restore productivity in older ground.



AgriPlanter in a 2024 side-by-side evaluation of automated planters.

GERMPLASM & VARIETY DEVELOPMENT

Tomato Genetics Resource Center (TGRC) – *Roger Chetelat*

CTRI continues to support this international seed bank of wild and cultivated tomato diversity. TGRC accessions have contributed to industry gains in yield, resilience, and quality—including current broomrape resistance efforts. In 2025, CTRI helped secure the program's future by supporting a successful push to hire a new Director and maintain this vital resource for the global tomato community.

Unlocking Salt Tolerance from Wild Tomato Genes – *Greg Vogel*

2024 work identified specific genomic regions from wild tomatoes that improve growth and fruit production under salt stress. In 2025, researchers will validate these findings in new trials, combine beneficial regions, and refine mapping to support breeding. As a pre-breeding initiative, the long-term goal is to deliver practical, salt-tolerance tools that commercial breeders can use to improve yields in saline soils.

Marker-Assisted Breeding for TSWV Resistance – *Reza Shekasteband*

After identifying resistance to both traditional and resistance-breaking strains of TSWV, this team is now mapping the genes and developing DNA markers to speed up breeding. 2025 work includes field trials in California and selection of improved lines compatible with processing types. These will be shared with commercial breeders to support durable resistance across the industry.

New Strategy to Combat Fusarium Using Gene Editing – *Daniel Rodriguez-Leal*

This early-stage effort uses CRISPR to dial down a tomato gene (DMR6) that helps fungal pathogens infect the plant. By fine-tuning, not removing, this gene, the team aims to create broad resistance across all known races without harming yield. Initial work is underway, with future plans to test in commercial material through a Syngenta collaboration.

INSECT & INVERTEBRATE MANAGEMENT

Evaluation of alternative nematicides for the control of Root-Knot Nematodes - ***Jaspreet Sidhu***

Performing field trials at the Kern County UCCE Research Station, this team has previously alerted the industry to the significance of, and been crucial for registration data package development, for Nimitz®, Velum®, and Salibro®. Cost sharing with manufacturers and other commodity boards allows this project to continue in 2025 at no cost to the CTRI.

Managing Consperse Stink Bug in Processing Tomatoes – *Tom Turini*

Following major crop losses in 2024, this project tests real-world tools for Consperse stink bug control. Trials in commercial fields and at UC West Side Research Station to evaluate spray timing, sprayer tech, and trap crops. With more fallow ground creating ideal habitat, this pest is expected to worsen—making effective, field-tested strategies critical for future seasons.

Not Yet a Member? Now's the Time.

If you're a grower benefiting from this work - or an industry partner who wants to support it - consider joining CTRI as a:

Member Grower – click here: https://bit.ly/CTRIMembership

Allied Industry Sponsor – https://bit.ly/CTRIAlliedIndustry

The support of you and your neighbors helps bring real tools into the hands of California processing tomato growers.

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Varietal ratings against soil-borne pathogens. *Photo Credit – Patricia Lazicki*

PATHOGEN MANAGEMENT

Fungal Diseases

Diagnostics Lab, Pathogen Monitoring and Outreach Services – *Cassandra Swett*

This is THE diagnostics lab for the industry, whose services are freely available to growers because of CTRI support. Because of their work, turnaround time for race ID has improved from months to weeks. 2025 work expands improved testing capabilities, maps pathogen distribution, and continues to extend diagnostics knowledge. Samples submitted to this lab and analyzed here build the foundation for future risk models and smarter future plantings decisions across tomato regions.

Managing Fusarium Stem Rot and Decline (FRD) – *Cassandra Swett and Farm Advisors*

FRD is widespread and hard to manage, driven by heat, water stress, and rotation. This project tests cultivar tolerance/resistance, studies rotation risk, and supports chemical trials. 2025 work will continue to build on the successful collaboration between these scientists and AgSeeds in the review and publishing of commercial variety susceptibility to FRD at scale and in commercial fields. This table, updated after the 2024 trial results were analyzed, can be found here: https://bit.ly/FRDVarieties2024. Taken together, these efforts gives growers practical, field-tested tools for managing FRD.

Evaluating Biofungicides for Vine Decline – *Zheng Wang*

With no known resistance genes and rising costs of fumigation, new solutions are needed for Fusarium stem rot and vine decline (FRD). This project will test three biofungicides—applied in the nursery before transplanting—across multiple varieties. Conducted in a commercial field with support from UC researchers and industry, this work could provide growers with safer, soil-applied options for FRD protection and improved plant health.

Vectored Viruses

Evaluating Alternatives for BCTV and TSWV Insect Management – *Tom Turini*

With neonicotinoid use severely limited under recent California DPR regulations, this project explores alternative insecticide programs to protect processing tomatoes from beet curly top virus (BCTV) and tomato spotted wilt virus (TSWV). CTRI-supported research has shown neonicotinoids' effectiveness, but regulatory changes now restrict their timing and rates. New combinations will be tested - including Verimark®, Exirel®, Beleaf®, and others - to bridge the protection gap and guide future recommendations.

Virus Surveillance and Risk Reduction in Processing Tomatoes - *Bob Gilbertson*

This co-funded project with the CDFA BCTV Board provides statewide virus monitoring through sticky cards, scouting, and viral diagnostics. Gilbertson's team supports breeders testing genetic resistance to local virus strains and previously characterized resistance-breaking TSWV strains. For the industry, they continue to track both TSWV and BCTV variants across production regions. The team runs the thrips degree-day model, extending the information and helping growers time control measures – the goal of which is to provide early warnings and reduce virus impacts in the field.

WEED CONTROL & MANAGEMENT

Field Bindweed Suppression with Chemigated Rimsulfuron – *Scott Stoddard*

No tools reliably control bindweed. This project tests whether broomrape chemigation treatments using rimsulfuron, already showing anecdotal bindweed control, can deliver consistent results. Trials in commercial fields will compare treated and untreated blocks using field surveys, drone imagery, and hand-weeding data. If successful, this single treatment could offer dual-purpose control for two persistent tomato weeds.

Looking for more? Full 2024 research reports, project updates, and practical tools are available at **www.tomatonet.org** - your hub for the latest in processing tomato research.