



# Chemigation and research towards branched broomrape management

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University of California  
Agriculture and Natural Resources

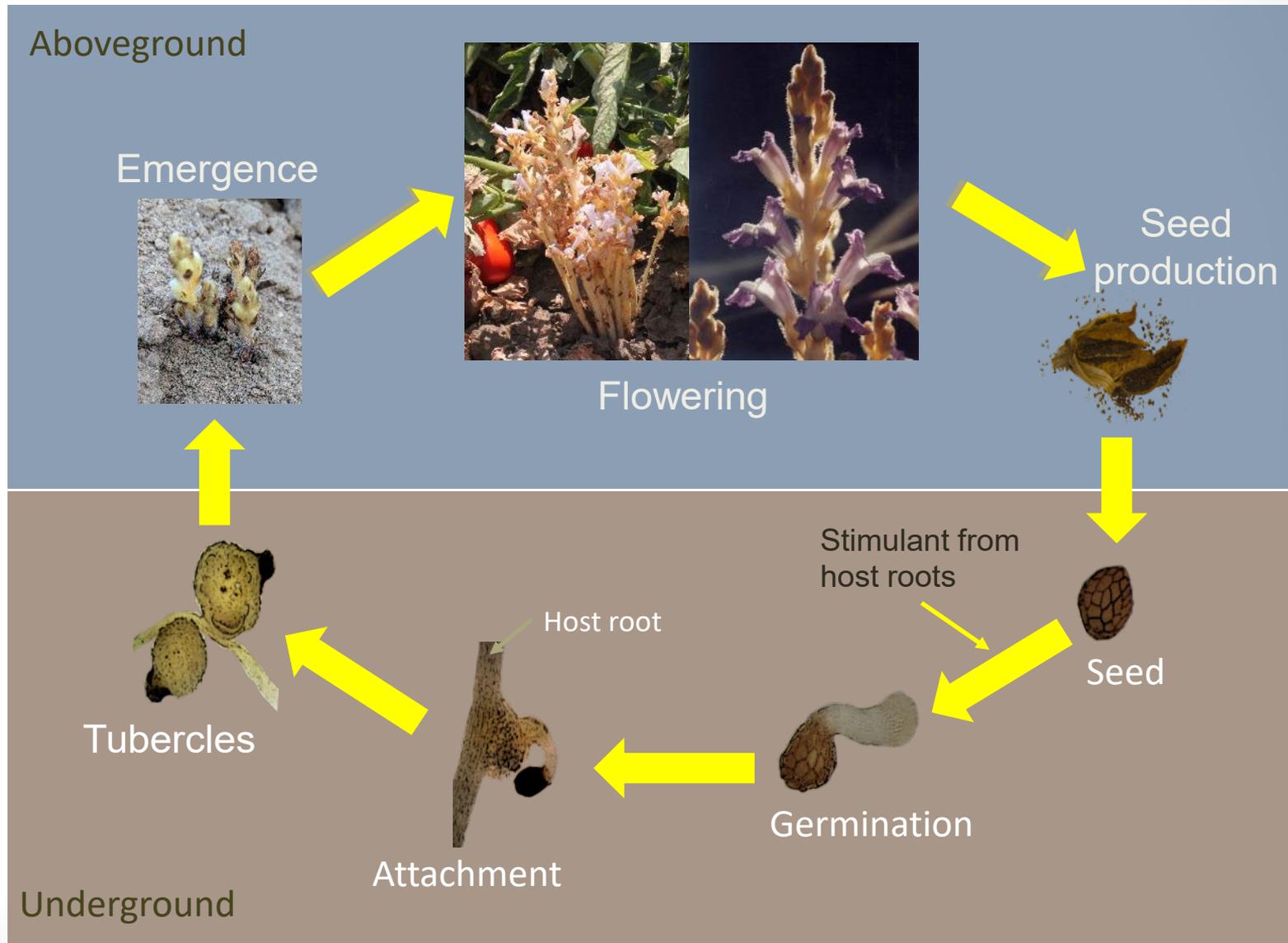
**UC DAVIS**  
DEPARTMENT OF PLANT SCIENCES  
College of Agricultural and Environmental Sciences

# Broomrape

- A genus of >200 parasitic herbaceous plants
  - *Orobanche* spp (aka *Phelipanche* spp).
- Broomrapes are root parasites (attach below ground)
- Holoparasites = derives all carbon from a host plant
- Plants lack chlorophyll
  - Usually yellow- or straw-colored
- Some broomrapes have narrow host range, but others have a much wider host range
- At high density, can greatly reduce yield or even result in crop failure



# Lifecycle









# Recent progress

- 2021/22
  - Field trials completed successfully in Chile
    - Planting date experiment, imazamox chemigation experiment
  - 2022 California field experiments
    - Two on-campus imazamox safety experiments
    - 2021-22 rotational imazamox crop study completed
    - Broomrape control experiment in Woodland
      - Included small variety/rootstock initial evaluation
      - Planting date objective partially completed
      - Coordinated industry variety side-by-side demo
    - Support for harvester sanitation work (Swett and Hanson)
  - 2022 Contained Research Facility
    - Quaternary ammonia sanitizer dose response work (ongoing)
      - Related to harvester sanitizer project
    - Generated new branched and Egyptian broomrape seed for research
    - Supported collaborators with broomrape tissues and other samples
    - Initiated method development project to facilitate future projects

# UC Davis Chile 2022

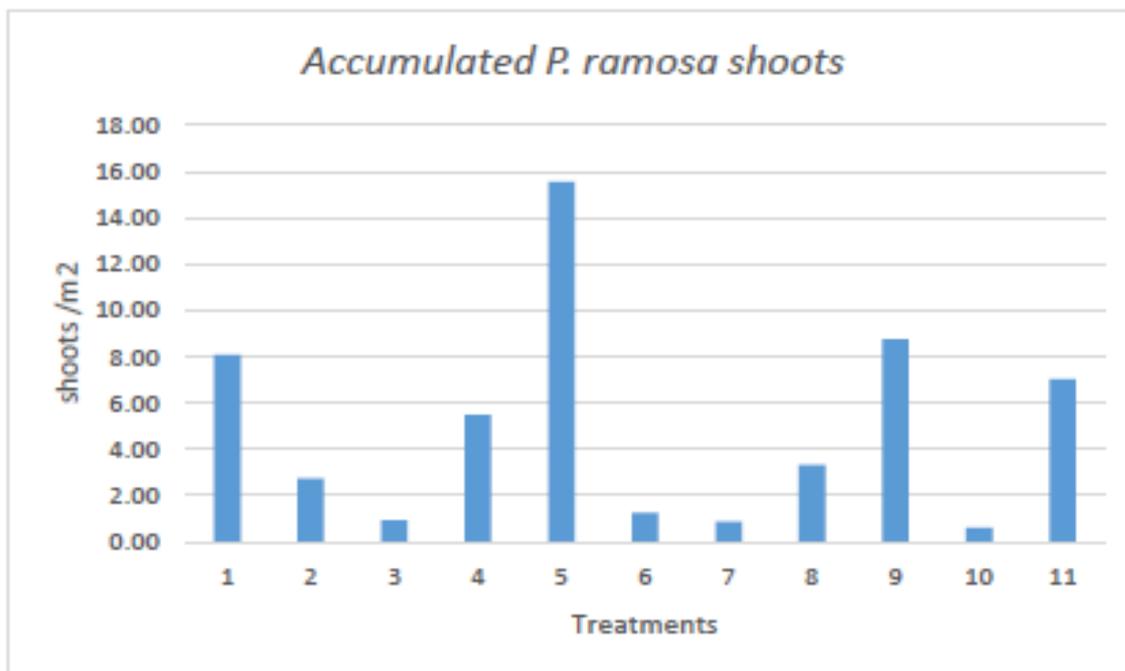


Figure 6. Accumulated *P. ramosa* shoots/m<sup>2</sup>



Figure 10. Broomrape shoots on 3 planting dates. (T1:Oct 11<sup>th</sup>,

- #3, 6, 7 included imazamox at 9.6 or 19.2 g/ha
- # 4, 8 included chemigated rimsulfuron
- # 10 included imazapic

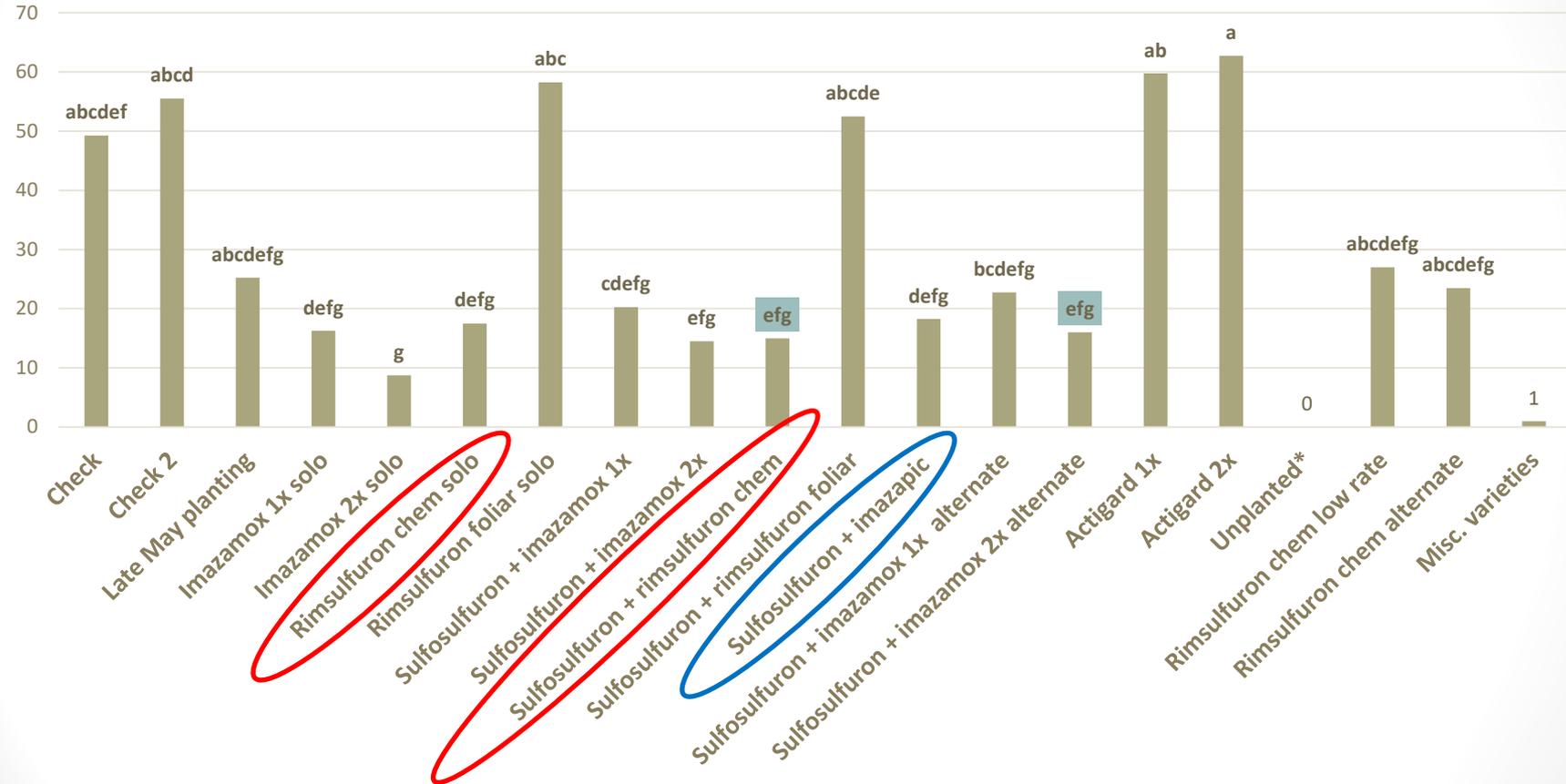
# CA field trials 2022



Matt Fatino

# Broomrape suppression in CA

Average Cluster



- Helpful Matrix label change in time for 2023

## UC WEED SCIENCE

Weed control, management, ecology, and minutia



UCANR: Safeguarding abundant and healthy food for all Californians

### Rimsulfuron 24c registration for broomrape management in tomato



Author: Bradley Hanson

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One of the largest weed issues affecting the California processing tomato industry is the parasitic plant, branched broomrape (*Phelipanche ramosa*; *Orobanchaceae*).

- <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=50241>
- <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=47701>
- <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=43342>

Last week, CDPR issued a positive decision on a 24c "Special Local Needs" label request to allow application of rimsulfuron (Matrix SG) via chemigation through subsurface drip irrigation systems. This newly-allowed use pattern should be helpful for suppression of broomrape in tomato.

The CDPR decision was posted here: <https://www.cdpr.ca.gov/docs/registration/nod/nodmenu.htm> and is in Report 2022-39 for the Week of September 30, 2022. I've also attached it to the bottom of this blog post.

Rimsulfuron is widely used in tomato in California both as PRE and early POST herbicide for control of many weeds. The 24c label simply adds a new application method that is targeted specifically at the broomraps which are parasites that attached to the root of tomatoes and other host plants. The new use pattern puts the herbicide right in the rootzone of the tomato plant at the time when broomrape seeds are germinating and the seedlings just attaching to the host.

The protocol for this specific use is three applications of rimsulfuron; one at early bloom and two more at 10-15 d intervals thereafter. Each of the three applications should be 1.33 oz product (25% WDG) which equates to the yearly max allowed on the Section 3 label.

In our field trials, chemigated rimsulfuron provided significant reductions (about 4-fold) in broomrape clusters in a highly-infested field; however, no herbicide treatments were 100% effective for this A-listed quarantine pest. This may be of interest and utility to processing tomato growers who have light infestations or fields near infested fields that may be at some risk but should be combined with other sanitation practices.

One important note is that this SLN cannot be used with other



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POSTED PROPOSED TO REGISTER IN VOLUME 2022-32

PUBLIC REPORT IN SUPPORT OF PROPOSED DECISION  
(Special Local Need Registration)

#### Description of the Project

Tracking ID No.:	303093
Product Name:	Matrix SG
Applicant:	California Tomato Research Institute
EPA Reg. No.:	352-768
Active Ingredient (with Percent):	Rimsulfuron (25%)
DPR Chemical Code:	3835

Product Use Information (see current product label below for full description):  
Herbicide used to control weeds such as green foxtail, quackgrass, barnyardgrass, common chickweed, annual sowthistle, and spotted spurge on grapes, citrus fruits (Crop Group 10-10), pome fruits (Crop Group 11-10), stone fruits (Crop Group 12-12), and tree nuts (Crop Group 14-12); giant foxtail, henbit, wild oat, cocklebur, and fall panicum on potatoes; and stinkgrass, wild radish, and velvetleaf on tomatoes. This product is also used to control or suppress weeds such as volunteer wheat, yellow nutsedge, dandelion, jimsonweed, and seeding Russian thistle on field corn.

California Tomato Research Institute submitted an application to the Department of Pesticide Regulation (DPR) to request a special local need (SLN) registration (the project) for Matrix SG. Specifically, this SLN registration is being requested to control broomrape (*Phelipanche ramosa* and *aegyptiaca*) on tomatoes through subsurface drip chemigation. Section 24(c) of the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) authorizes DPR to register a new end-use

September 20, 2022

FIFRA 24(c) Special Local Need Label (SLN)  
For distribution and use only in the state of California

For use on Tomatoes for control of Broomrape (*Phelipanche ramosa* and *aegyptiaca*) through

**Location:** Statewide

**Crop/Site/Commodity:** Tomatoes

EPA )  
Targe

Manu )  
Dosag

Diluti

Metho

**Frequency/Timing of Application:**

A total of 3 applications must be used for weed control. Make the first application at early bloom and repeat at 10 to 15 day intervals for a maximum of 3 applications.

**Restricted**

**Specific Use Restrictions:**

1. Do not make more than 3 applications per acre per year.
2. Do not apply more than 4.0 ounces of product per acre per year.
3. Tomatoes treated under this SLN cannot be combined with treatments allowed under the Section 3 product label for this product on tomatoes.
4. Do not apply to tomatoes grown in greenhouses.
5. This SLN can only be used for control of broomrape (*Phelipanche ramosa* and *aegyptiaca*).

**Preharvest**

**Other Requ**

**Chemigat**

- Appl  
prod

# 2023 objectives

## 1. Field:

1. Further evaluation of sulfosulfuron PPI treatments supplemented limited number of with imazamox and rimsulfuron treatments (validation)
  1. Broomrape and also other weed evaluations
2. Systematic evaluation of sulfosulfuron and rimsulfuron timing (supporting new 24c label uses)
3. Large-plot demos of 2-3 chemigation trts at an additional grower site
4. Planting date evaluation repeats prev Chile and Calif work
5. Develop research plan for trap/alternate/non-host testing in field

## 2. CRF:

1. Systematic screening of tomato cultivar sensitivity (builds on pilot studies and include some new materials)
2. Develop methods for seedling bioassay
3. Pot assays with rootstocks/cultivars with reported resistance
4. Pilot studies with synthetic strigolactone compound as germination stimulant [KAUST collaborators]

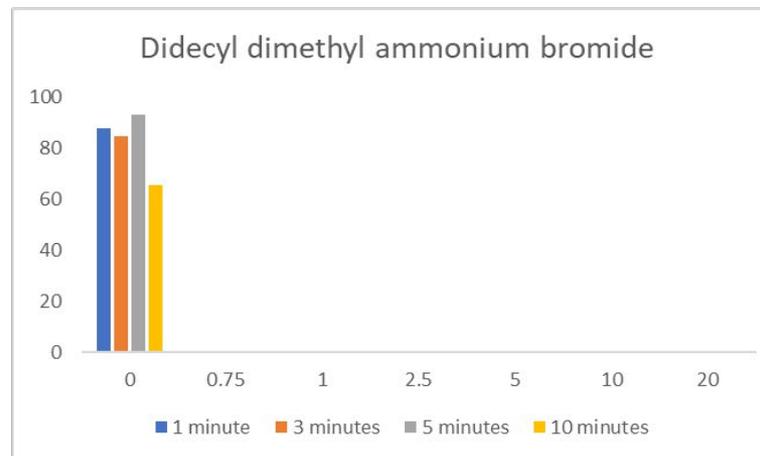
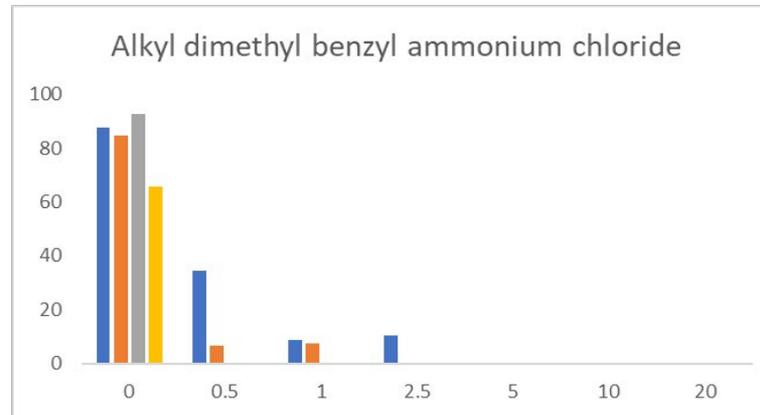
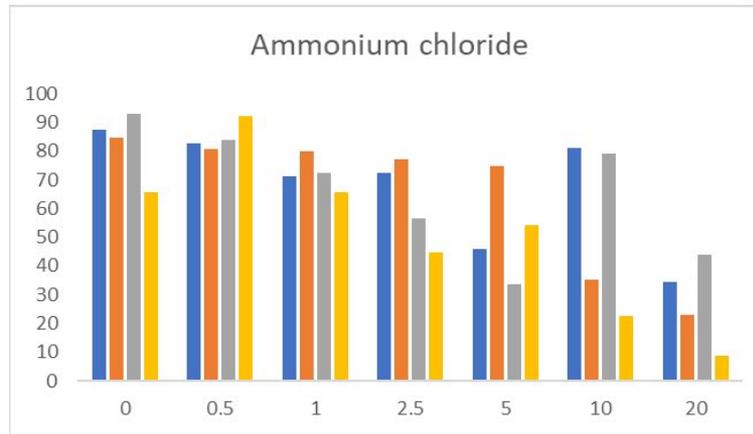
## 3. Coordinated Chilean objectives will be funded by Chilean sources for 22/23

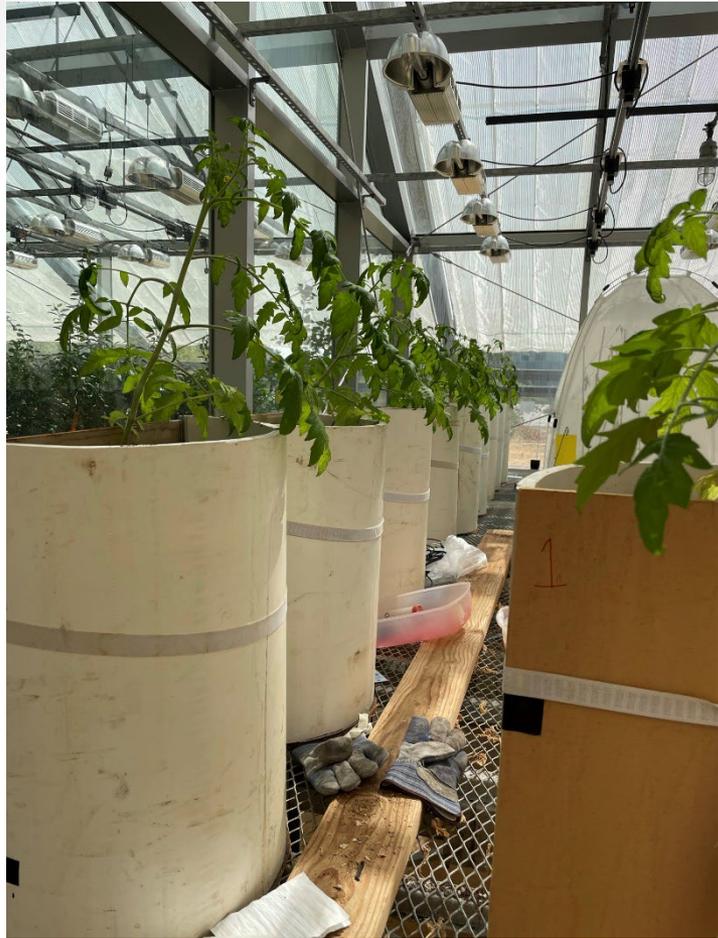
# CRF projects

Research poster available



Pershang Hosseini





Glass-front rhizotrons for evaluating broomrape germination, attachment, turbucle formation, emergence.



Glass-front rhizotrons for evaluating broomrape germination, attachment, turbucle formation, emergence.

## Acknowledgements:

- CTRI funding
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