2024 Broomrape Research Trials

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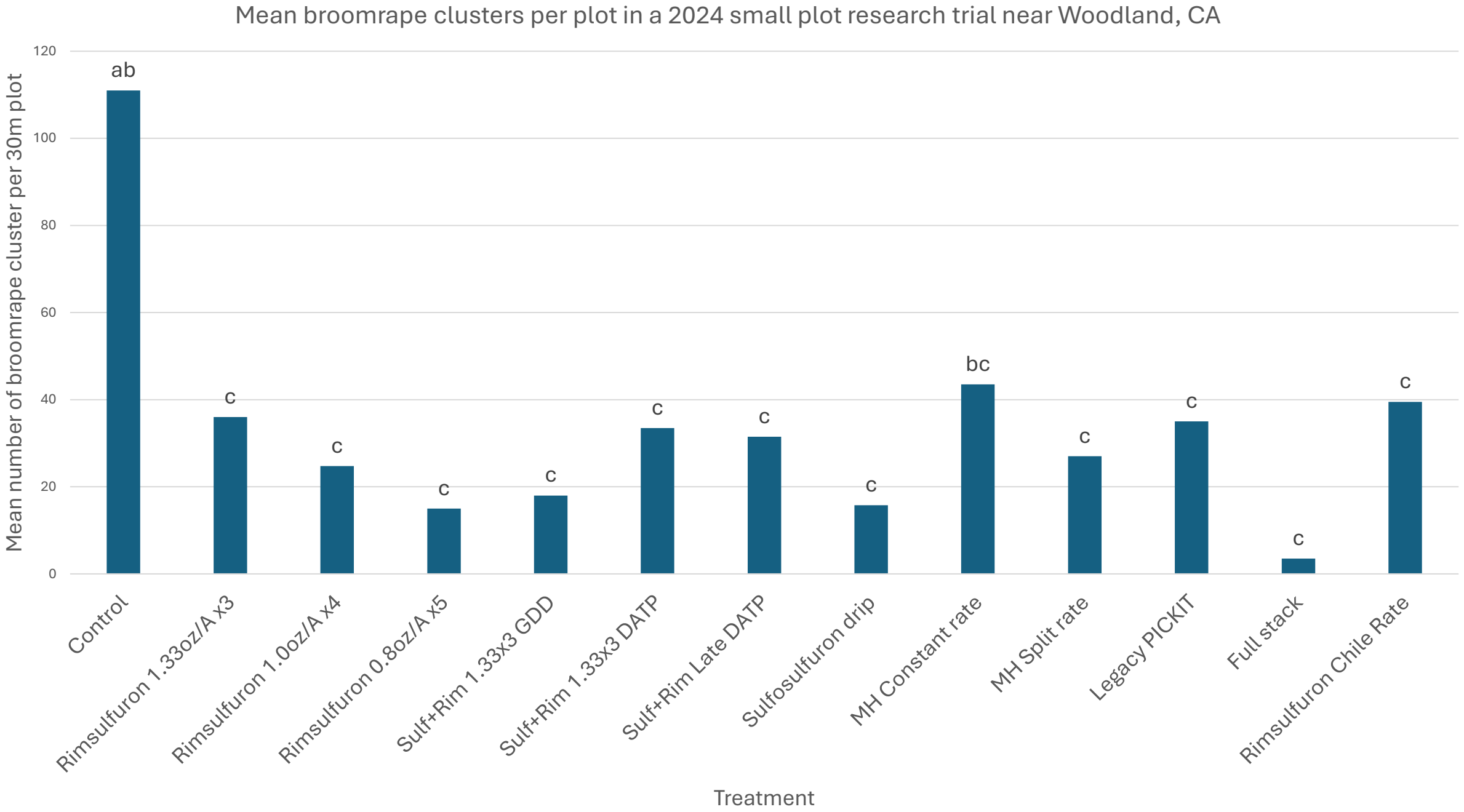
Branched Broomrape *Phelipanche ramosa* syn. *Orobanche ramosa*

- Native to Eurasia and North Africa- Mediterranean countries
- Obligate root parasite
- Haustorium– modified root that parasitizes host plant
- Wide range of agricultural host species
  - Brassicaceae, Solanaceae, Fabaceae, Cucurbitaceae, Asteraceae
- “A-Listed” noxious weed in California
  - Requires crop destruct and hold order barring host species

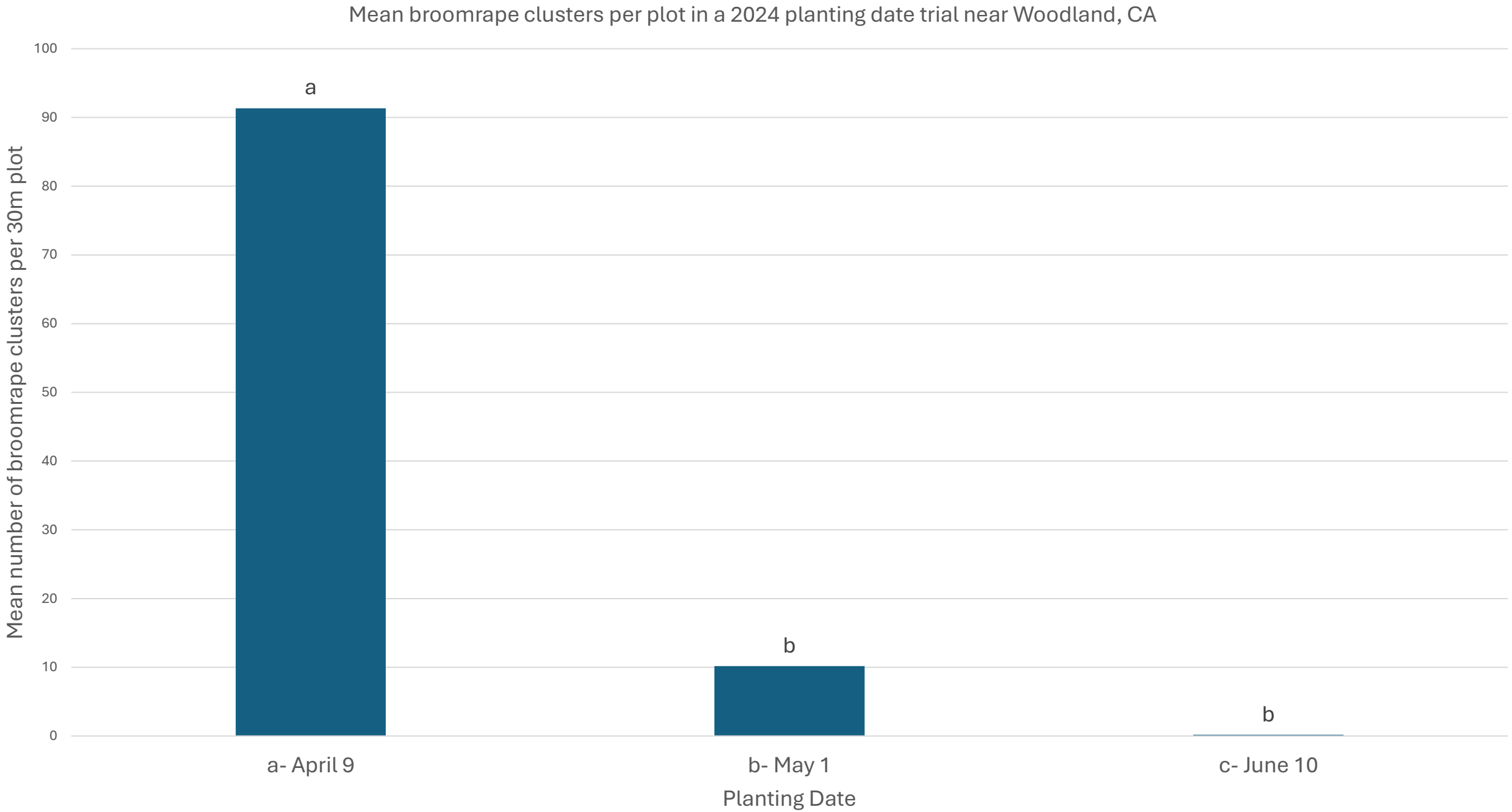
2024 small plot trial

- Transplanted on April 9, 2024, with single-line ‘HM58841’
- 30m (120’) full row plots with 4 replications
- Treatments:
  - Rimsulfuron alone: 1.33oz/Ax3; 1.0oz/Ax4; 0.8oz/Ax5; 0.57oz/Ax3 Chile max
  - Sulfosulfuron alone: chemigated
  - Sulfosulfuron + rimsulfuron: GDD (400, 600, 800) and DATP (30, 50, 70; 20, 30, 40)
  - Maleic hydrazide: foliar split rate and constant rate
  - Legacy PICKIT: PPI sulfosulfuron and chemigated imazapic
  - Full stack: PPI sulfosulfuron, chemigated rimsulfuron, foliar maleic hydrazide


Mean broomrape clusters per plot in a 2024 small plot research trial near Woodland, CA
Mean number of broomrape cluster per 30m plot
120
100
80
60
40
20
0
ab
c
c
c
c
c
c
c
bc
c
c
c
c
Control
Rimsulfuron 1.33oz/A x3
Rimsulfuron 1.0oz/A x4
Rimsulfuron 0.8oz/A x5
Sulf+Rim 1.33x3 GDD
Sulf+Rim 1.33x3 DATP
Sulf+Rim Late DATP
Sulfosulfuron drip
MH Constant rate
MH Split rate
Legacy PICKIT
Full stack
Rimsulfuron Chile Rate
Treatment

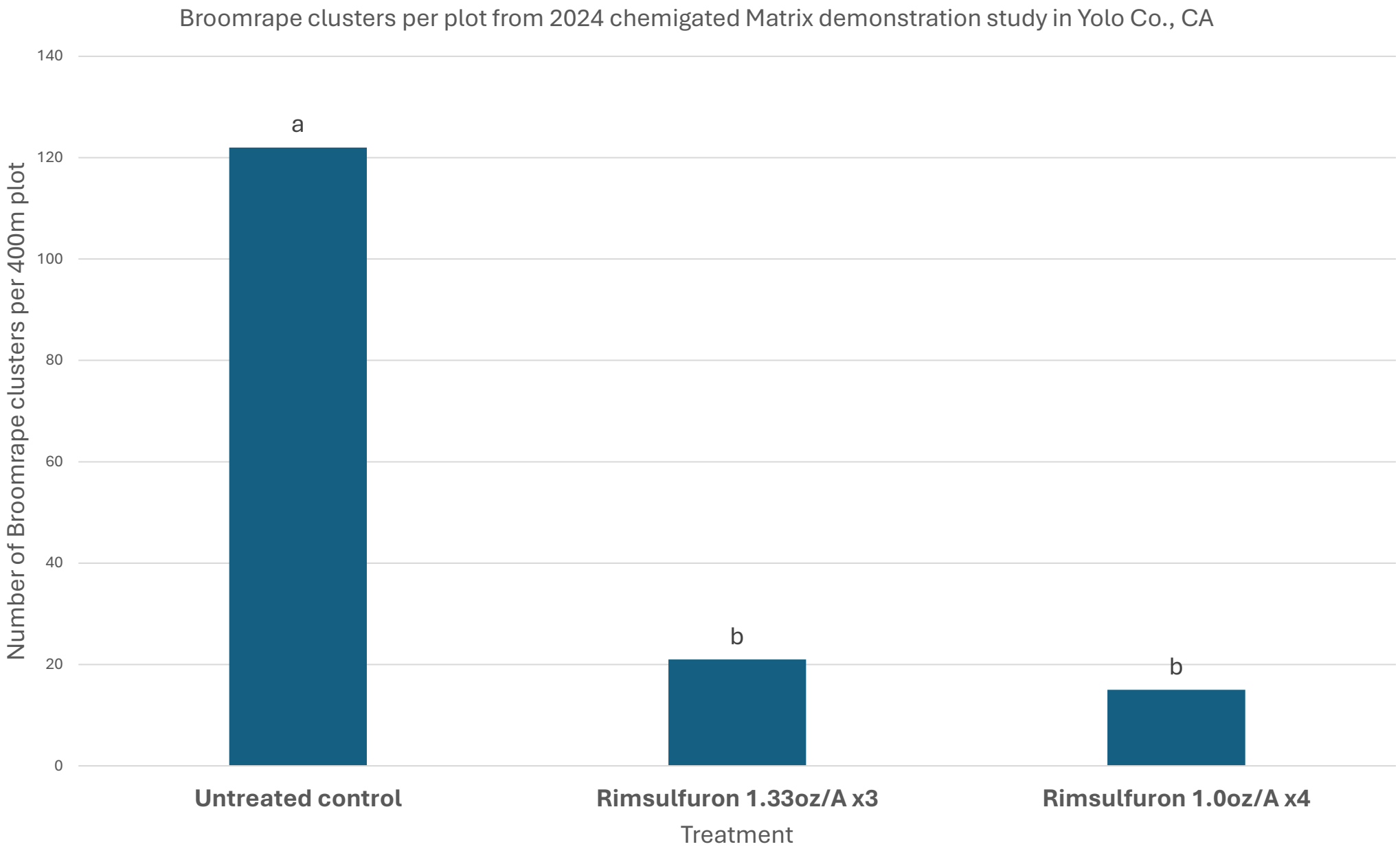
2024 planting date trial

- Single-line ‘H58841’
- 30m (120’) full row plots with 6 replications
- Transplant dates:
  - April 9
  - May 1
  - June 10


Mean broomrape clusters per plot in a 2024 planting date trial near Woodland, CA
Mean number of broomrape clusters per 30m plot
100
90
80
70
60
50
40
30
20
10
0
a
b
b
a- April 9
b- May 1
c- June 10
Planting Date

2024 Chemigated Matrix demonstration trial

- Transplanted May 24, 2024, with double-line ‘H 8237’
- 400m (1275’) full-row plots with 3 replications
- Treatments:
  - Control
  - Rimsulfuron 1.33oz/A x3 (20, 30, 40 DATP)
  - Rimsulfuron 1.0oz/A x4 (20, 30, 40 50 DATP)
- Harvested on October 2, 2024 (full plot harvest)


Broomrape clusters per plot from 2024 chemigated Matrix demonstration study in Yolo Co., CA
Number of Broomrape clusters per 400m plot
140
120
100
80
60
40
20
0
a
b
b
Untreated control
Rimsulfuron 1.33oz/A x3
Rimsulfuron 1.0oz/A x4
Treatment

Mean yield and number of broomrape clusters per 400m plot

Treatment	Broomrape clusters/plot	Yield (kg)/plot
Untreated control	122 a	9306 a
Rimsulfuron 1.33oz/A x3	21 b	9143 a
Rimsulfuron 1.0oz/A x4	15 b	9158 a

Acknowledgments

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- We would like to acknowledge and thank Eric Schreiner and Schreiner Bros Farms, our additional grower cooperator, and Ross Lopez and AgSeeds Unlimited for farming and material support.
- I would like to thank all members of the Hanson lab for their field work
- This work could not happen without their help.

Rimsulfuron efficacy at different stages

Host: Tomato

Herbicide: Matrix (Rimsulfuron)

Herbicide rate: 7mg/L; 100 ml/pot

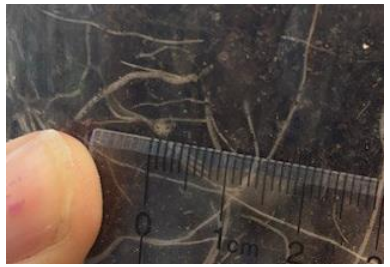
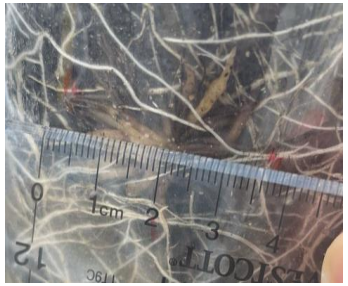
Pot size: 32 oz

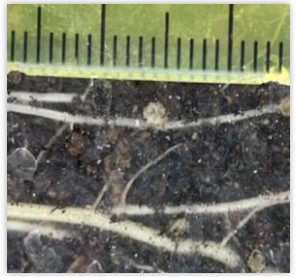
Herbicide applications: Started 5 weeks after transplanting and applied 3 times

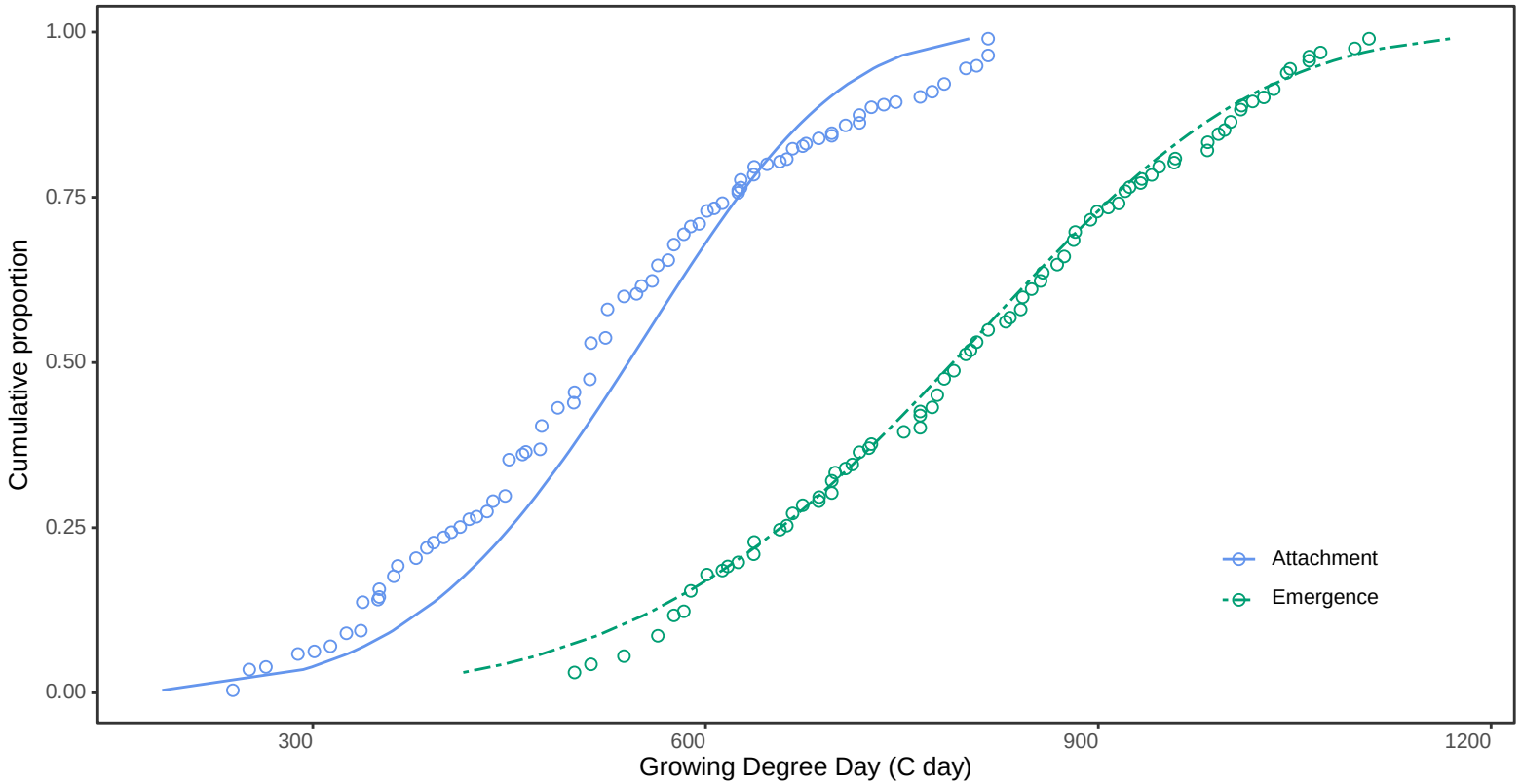
Herbicide application interval: A week

First application: 12/19/2023

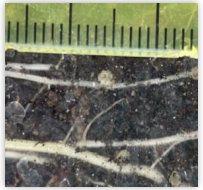
End of experiment: 01/17/2023

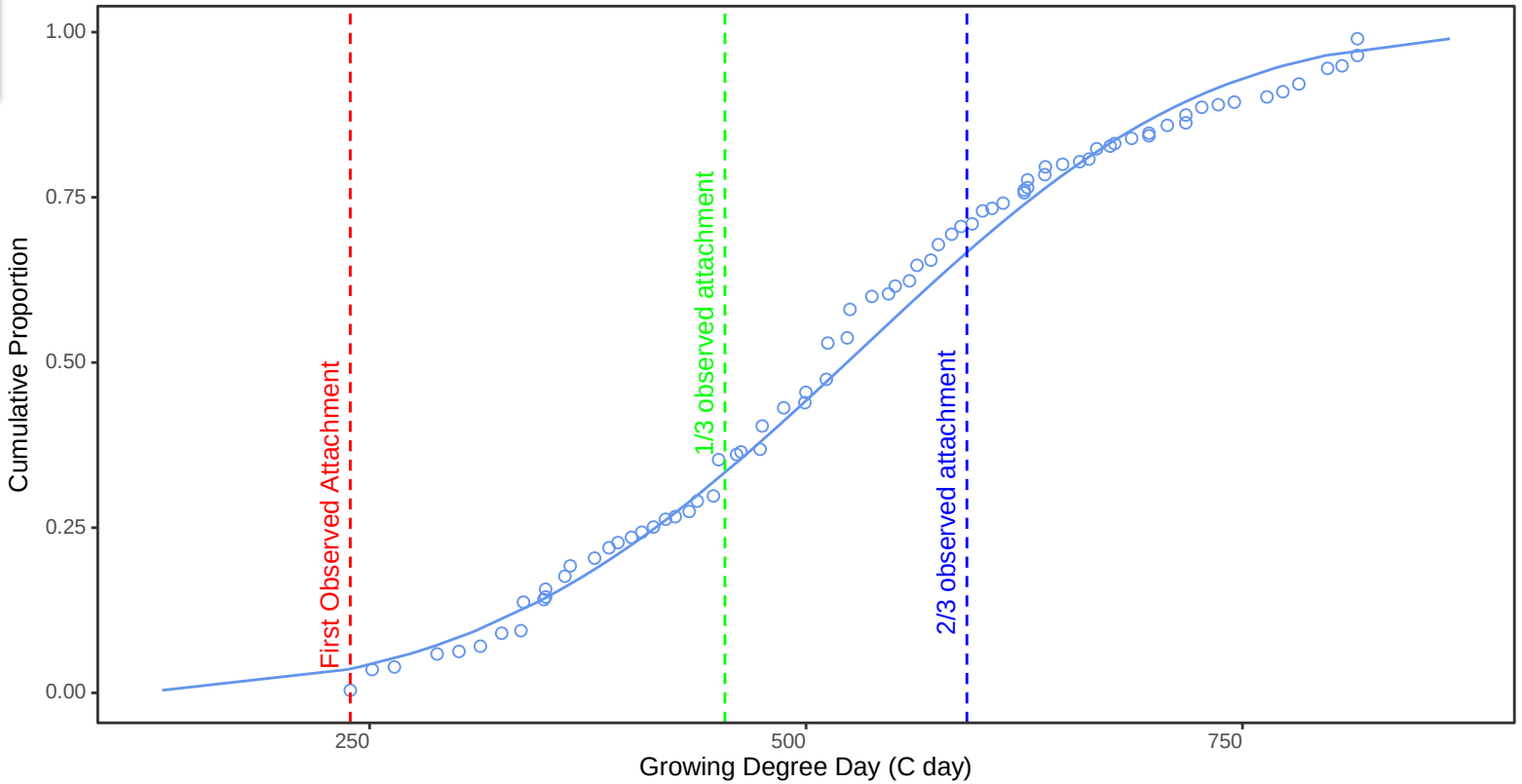
	Day 1 First herbicide application	**Day 7** Second herbicide application	**Day 14** Third herbicide application	**Day 29**
Matrix drench applied 3x, beginning early attachment (visible small turbucle)				
Matrix drench applied 3x, beginning later attachment (turbucle dia up to1 inch but but no shoot elongation)				
Matrix drench applied 3x, beginning at early shoot elongation)				



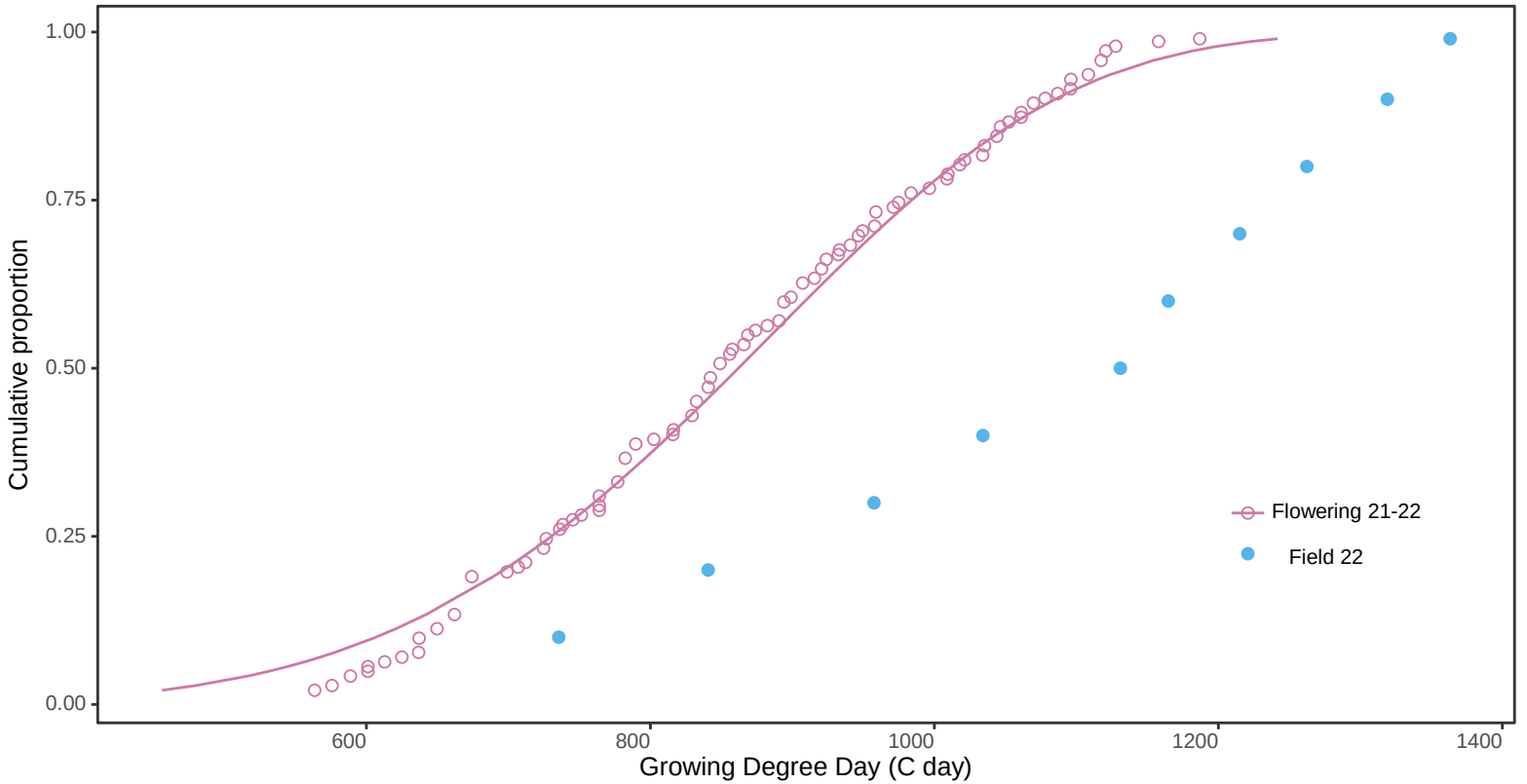


Branched broomrape attachment and emergence stages in a greenhouse experiment (data from 2021-22).



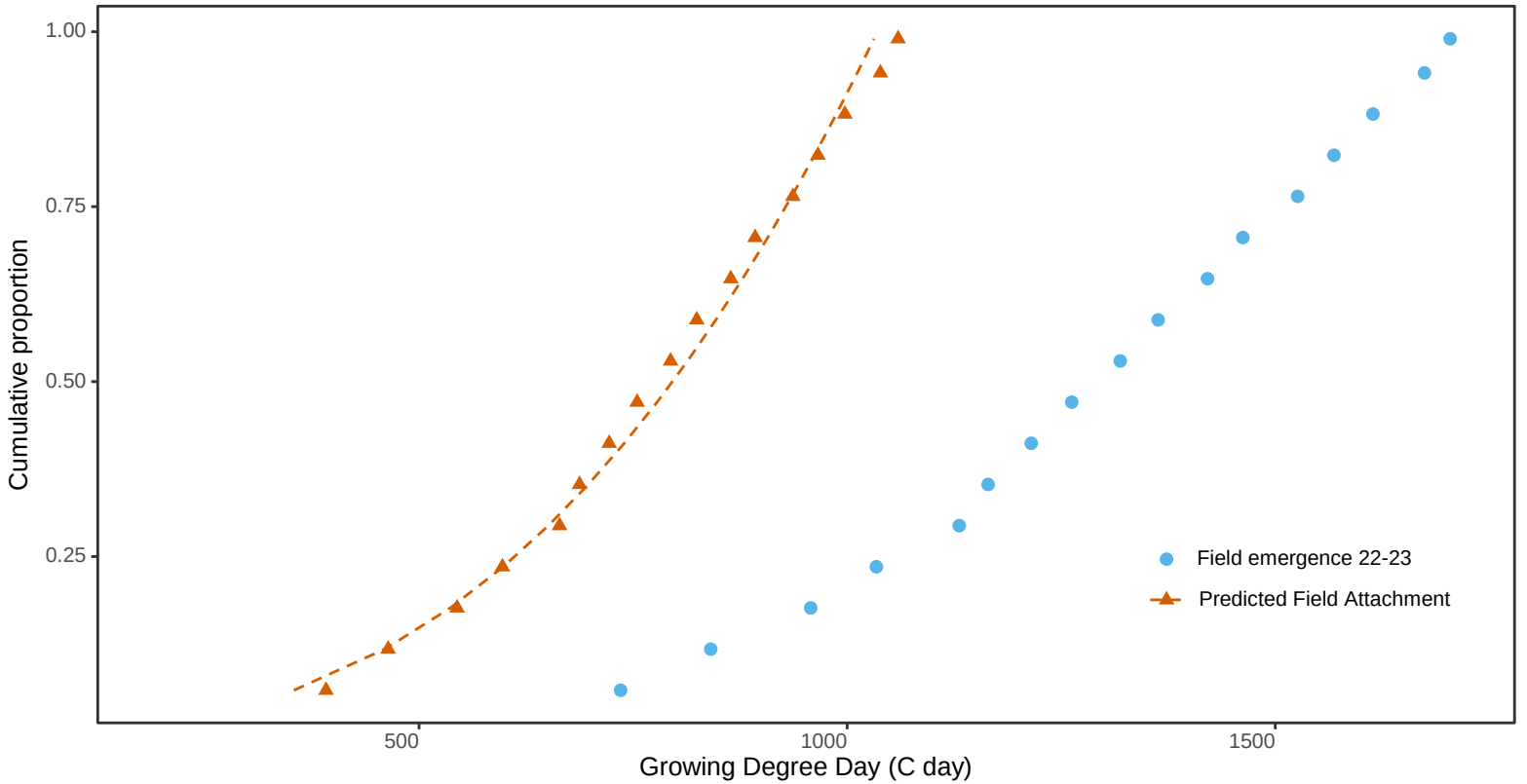


Branched broomrape attachment (>2mm) stage at greenhouse experiment



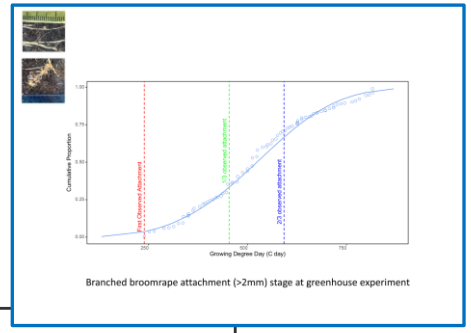
Branched broomrape early flowering stage in the greenhouse and observation in a field trial (data from 22).

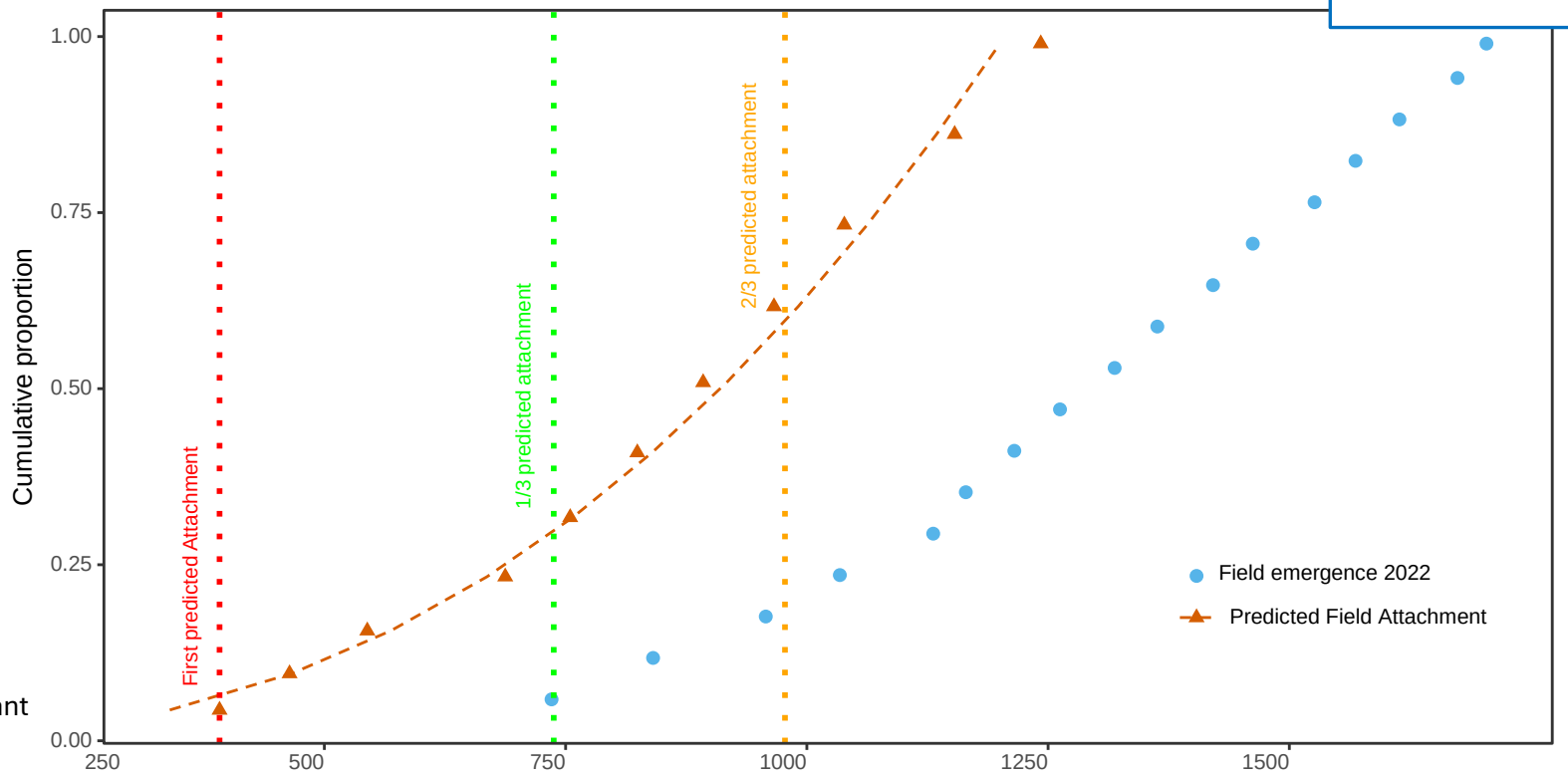
Notes:
- detection-related lag in field vs GH
- GH plugs inoculated w/ seed
- field includes ALL treatments



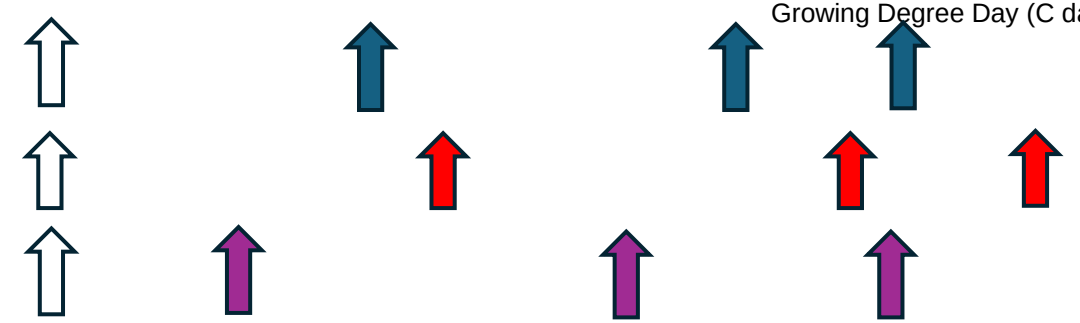
Branched broomrape emergence at field (data from 22-23) and predicted attachments (calculated based on GH relationship).

Branched broomrape emergence in field (data from 2022)
and predicted attachments (calculated based on GH relationship).





Transplant
(0 GDD)



Blue = Apr 1, 2024 transplant
30/50/70 DATP chem

Red = May 1, 2024 transplant
30/50/70 DATP chem

Purple = start treatments earlier and
adjust interval based on GDD

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- CTRI funding
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California Tomato Research Institute