

# Celery Fusarium race 4 and 2 germplasm field evaluation update

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# Celery Fusarium race 2

- Symptoms
  - Stunting
  - Yellowing
  - Root discoloration

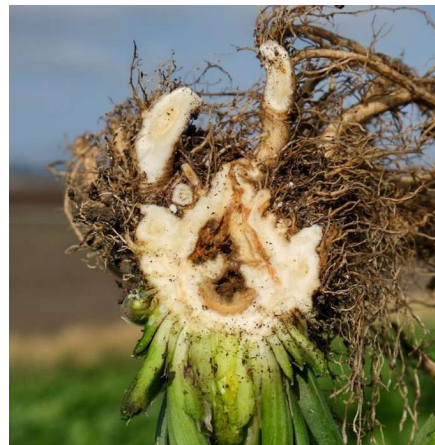


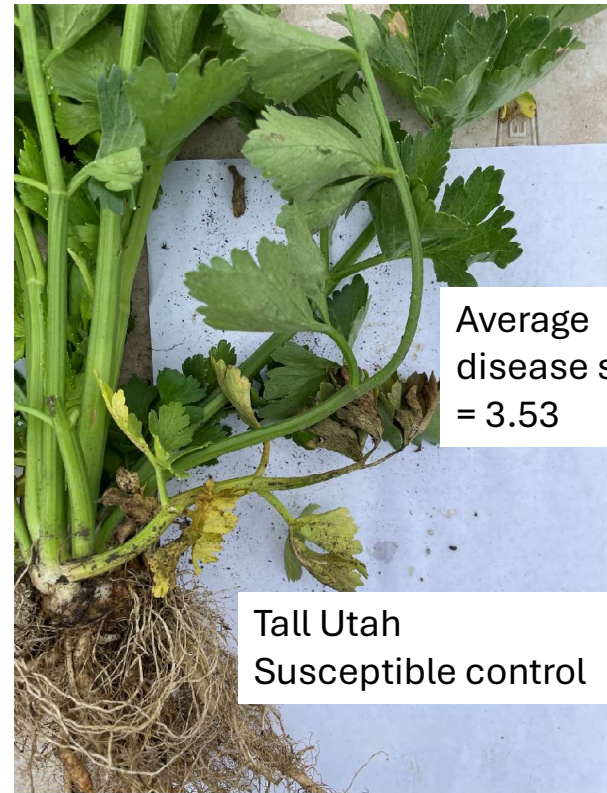
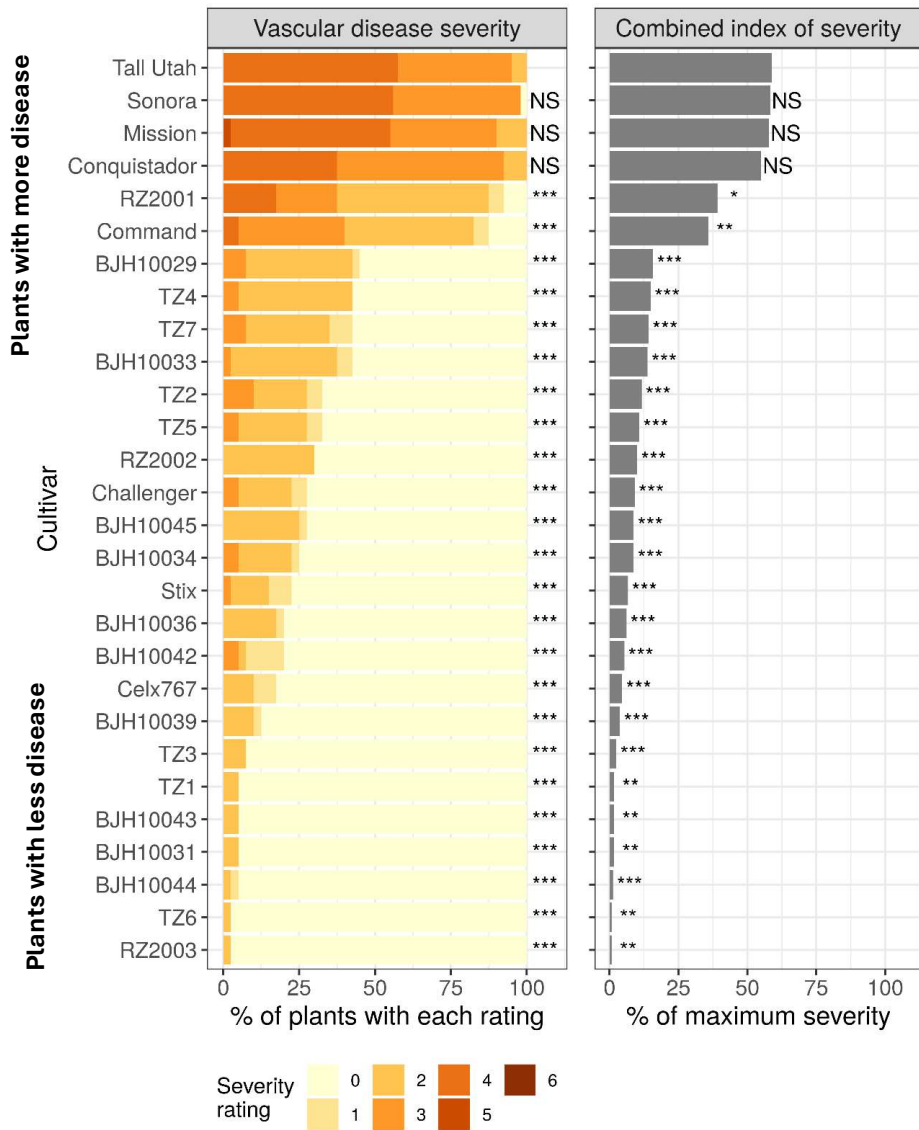
Photo by Chris Greer

# Celery Fusarium race 2

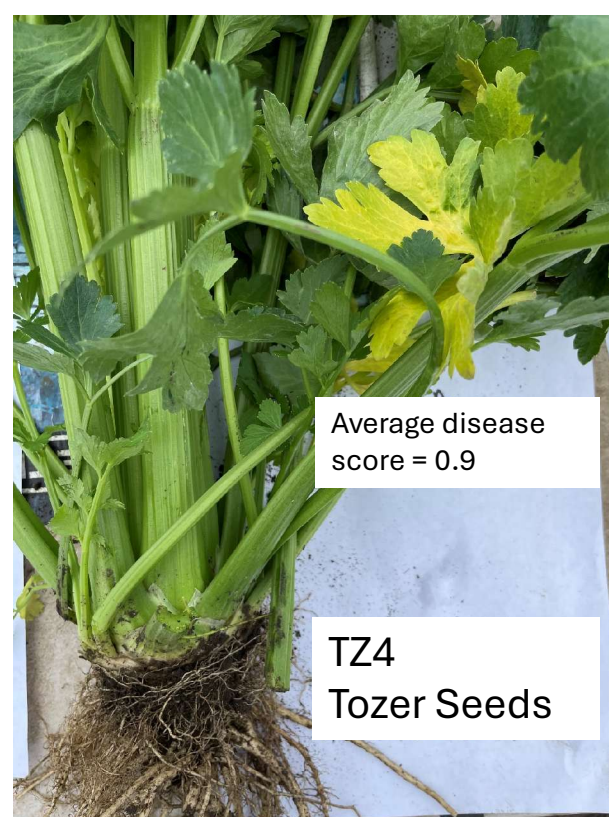
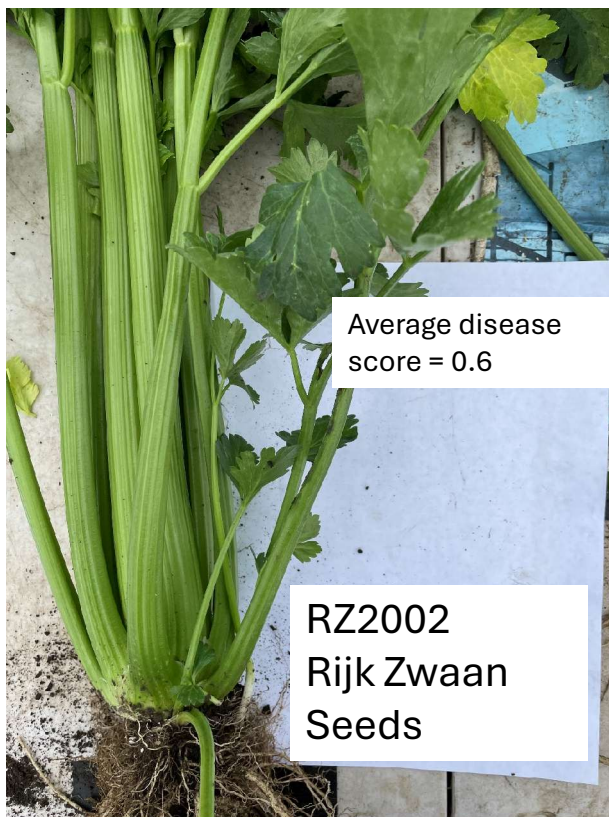
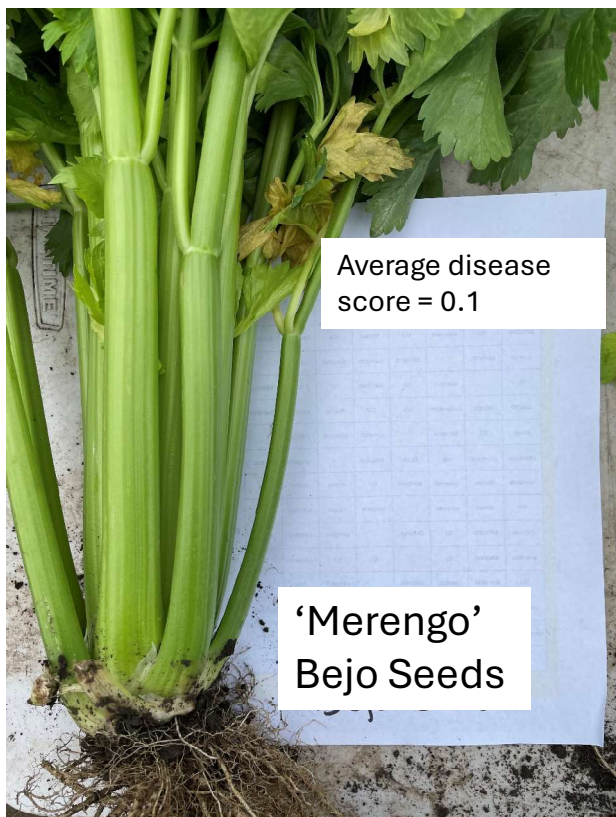
	2022	2023	2024	2025
Seed drop				~ April 7
Transplant	July 7	June 16	June 11	June 10
Harvest	Oct 13+14	Sept 18 + Oct 18	Sept 17+18	

- Seed drop at Plantel Nursery around April 7.
- If interested in contributing, please contact [renee.Eriksen@usda.gov](mailto:renee.Eriksen@usda.gov) or [aiputman@ucr.edu](mailto:aiputman@ucr.edu) or [cagreer@ucanr.edu](mailto:cagreer@ucanr.edu) ASAP
- Thanks for Jake Azevedo and Betteravia Farms for providing field space.





SCORE	CRITERIA
0	No browning
1	Browning visible, particularly in feeder roots
2	Browning visible, particularly in primary roots
3	Browning visible, particularly around the crown
4	Browning in and/or around the crown
5	Extensive browning in crown, decay in crown tissue
6	Plant dead or missing due to death

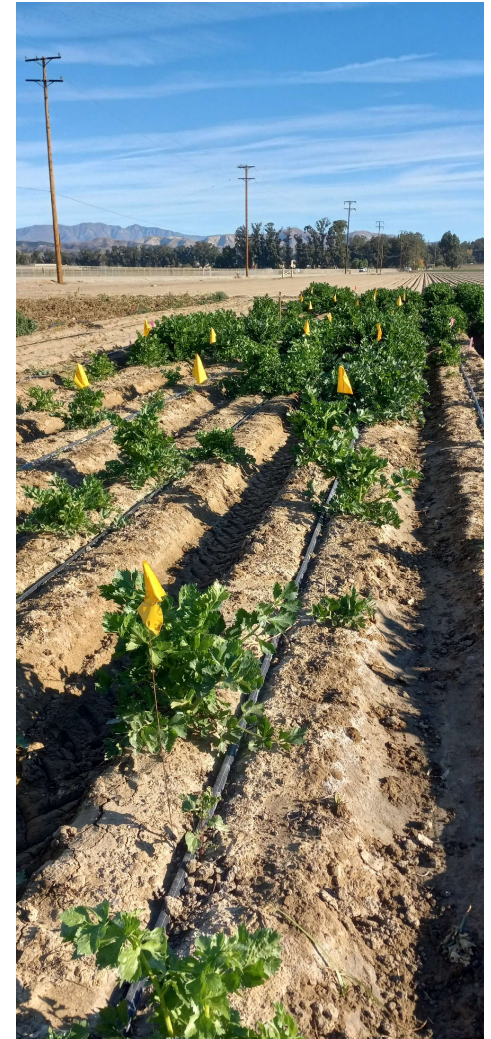
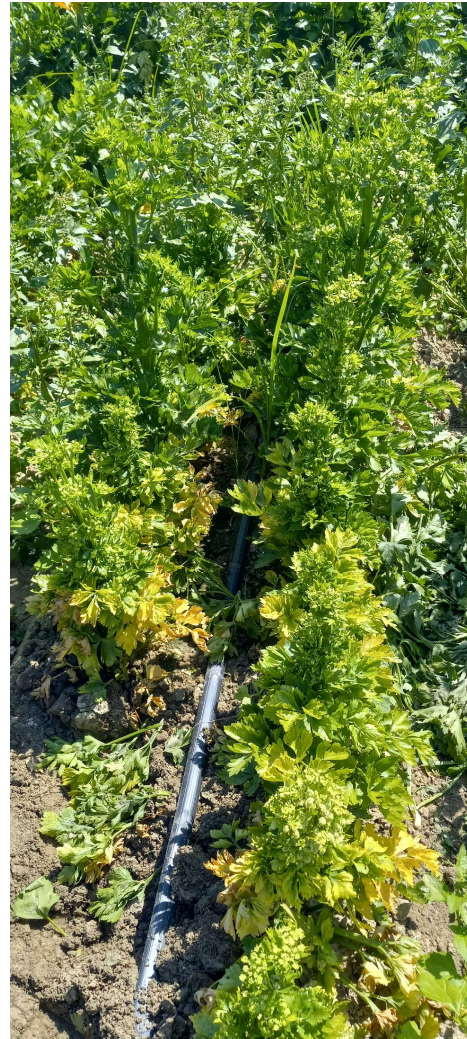


# Celery Fusarium race 4

- Symptoms
  - Severe Stunting
  - Root discoloration
  - Plant death

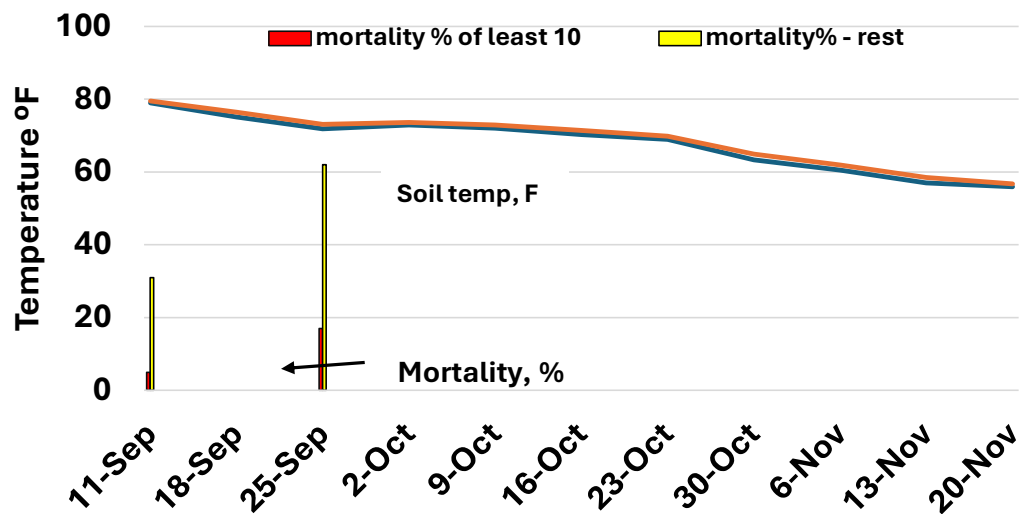


Photo by Daugovish and Valdes-Berriz



# Celery Fusarium race 4

- Disease is more virulent when soil temperatures are warm



2022 data courtesy of Daugovich and Valdes-Berriz



# Celery Fusarium race 4

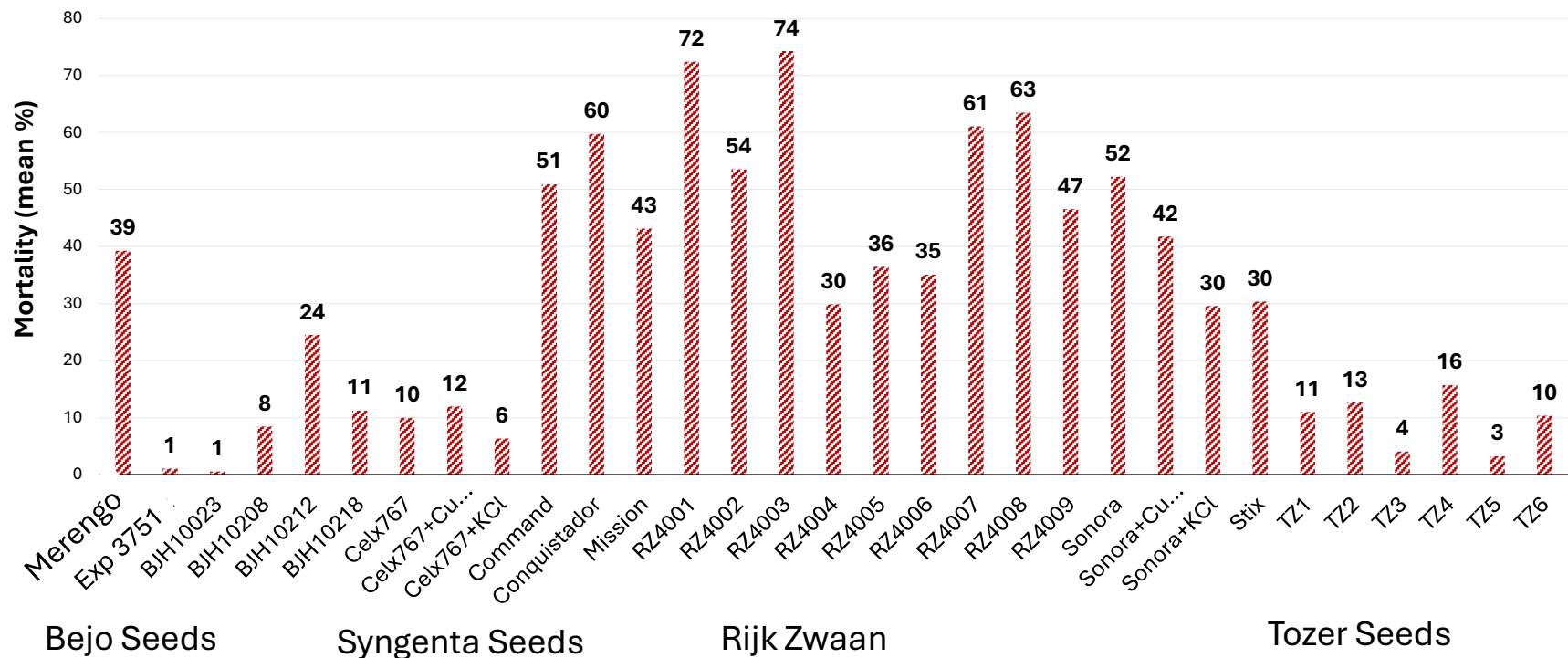
	2022	2023	2024	2025
Seed drop				~ June 9
Transplant	Aug 16	Aug 25	Aug 13	Aug 12
Harvest	Nov 21 + 22	Dec 13 + 15	Dec 5 + 6	

- Seed drop at Plantel Nursery around June 9.
- If interested in contributing, please contact [renee.Eriksen@usda.gov](mailto:renee.Eriksen@usda.gov) or [aiputman@ucr.edu](mailto:aiputman@ucr.edu) or [cagreer@ucanr.edu](mailto:cagreer@ucanr.edu) ASAP
- Thanks to Danny Pereira and Rio Farms for providing field space.



# Celery Fusarium race 4

## Mortality 2024



Data courtesy of Daugovish and Valdes-Berriz

**BJH10022 Exp 3751 Bejo Seeds**



**Celx767 Syngenta Seeds**



- Mortality after a heat event

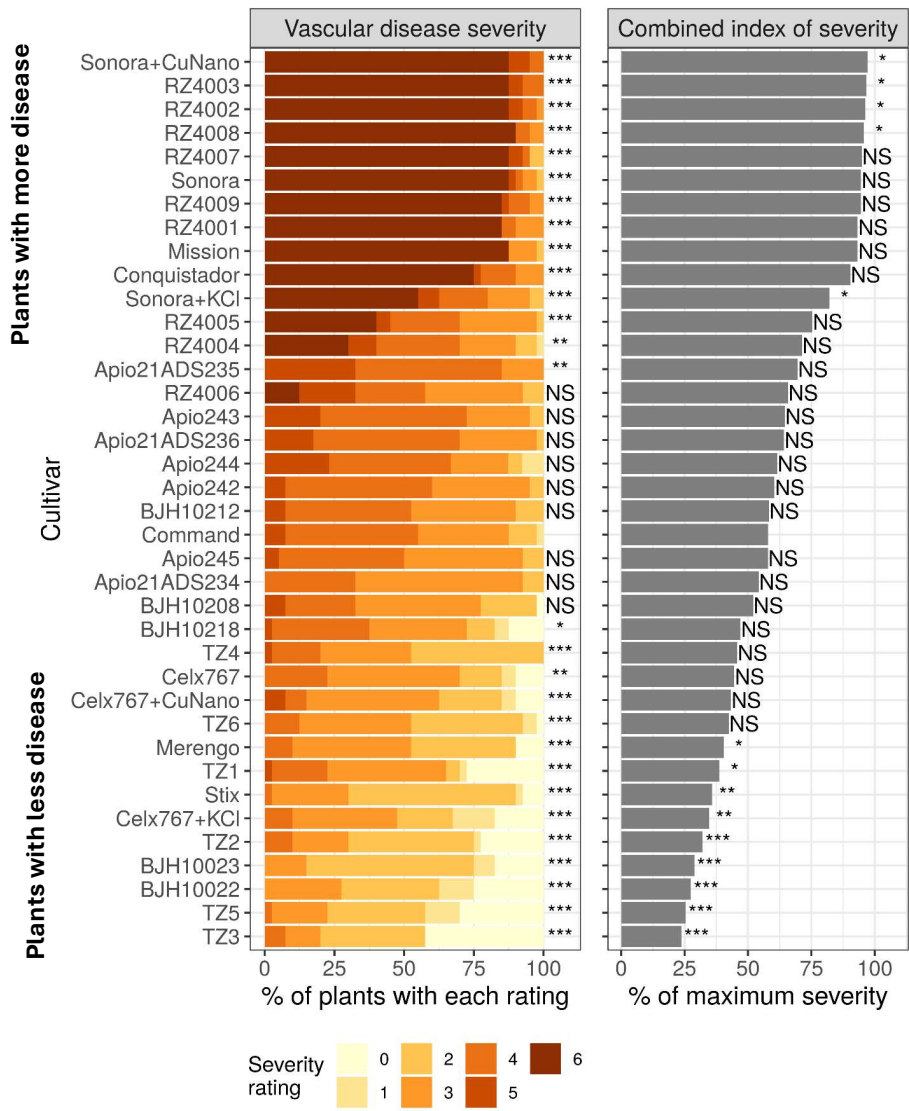
- Photos by Daugovish 9/30/24



**TZ1 Tozer Seeds**



**Mission Syngenta Seeds**

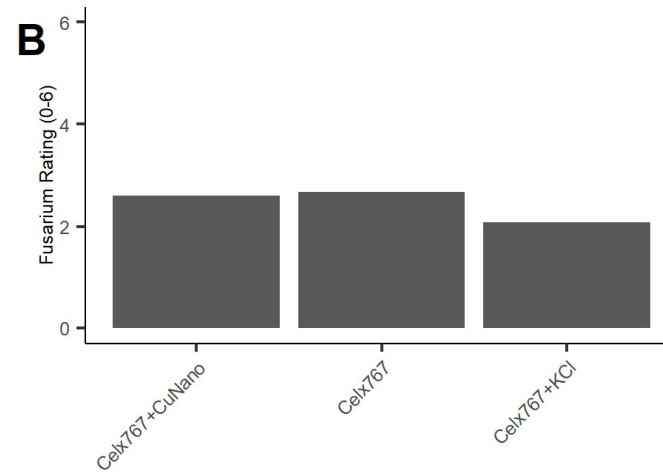
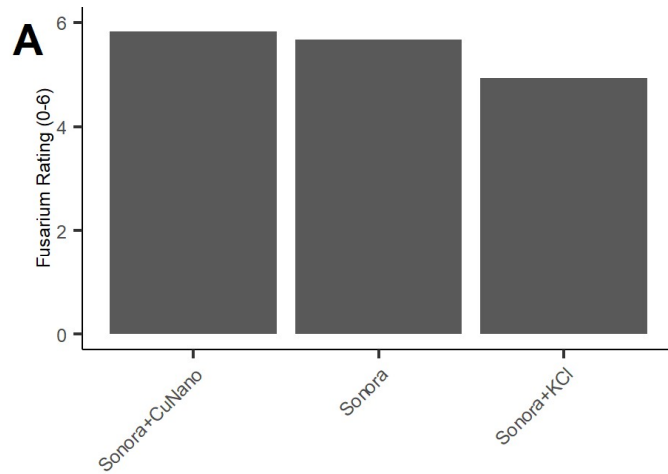


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Germplasm/ Cultivar	Disease Score Less than 2	Mortality Less than 10%	Petiole Length > 10 in	Average Plant Weight >1 lbs	Ribbiness Score < 2	Pithiness Score < 2	Suckering Score < 2
BJH10021/Merengo			X	X	X	X	
BJH10022/Exp 3571	X	X	X	X			
BJH10023	X	X	X	X		X	
BJH10208		X				X	X
BJH10212						X	
BJH10218				X	X	X	X
Celx767		X	X	X		X	
Command						X	
Stix			X	X		X	X
TZ1			X	X		X	X
TZ2	X		X	X		X	X
TZ3	X	X	X	X	X	X	X
TZ4						X	X
TZ5	X	X	X	X		X	X
TZ6		X				X	X

# Micronutrient effects

- Copper nanoparticles
- Potassium chloride
- Effect = none



# Breeding for Celery Fusarium race 4

- UC Davis release 2022
  - ‘Challenger’ x PI181714
  - PI181714 is available from the USDA Grin Global Germplasm Repository
  - UCDavis lines will soon be available from USDA Grin Global Germplasm
    - 50 seeds each of F1S2 lines 76-8-4, 76-8-27, 76-8-36
    - ~200 seeds of F1S3 line with fixed resistance

Epstein, L. and Kaur, S., 2023. *Apium graveolens* PI 181714 Is a Source of Resistance to *Fusarium oxysporum* f. sp. *apii* Race 4 in Celery (*A. graveolens* Var. *dulce*). *Plant Breeding*, 142(1), pp.109-117.



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# USDA Celery Breeding program

- Began 2021
- 2023 – Included UCD lines in in Camarillo FOA4 field trial
  - Disease scores were 0-1, very low
  - Selections taken for celery morphology
- 2024 - Selections were self-pollinated or backcrossed
- 2025 – Selections will be grown in the Santa Maria and Camarillo field trials



# Acknowledgements

- Funding and Support
  - California Celery Research Advisory Board
- Field and Harvest Help
  - Maripaula Valdes-Berriz, Xiomara Zendejas, and Gina Ferrari (UC ANR); Michelle Soule (USDA-ARS)
- Trial Entry Contributions
  - Pete Compton (Bejo Seeds), Merek Dorf (Rijk Zwaan), Seed Savers Exchange, Alex Quiroz (Syngenta Seeds); and Rick Gracia, Kraig Kuykendall, and Sara Jennings (Tozer Seeds)
  - Transplant production and provided a crew and transplanter for Santa Maria trial - Chris Waldron (Plantel Nursery)
  - Betteravia Farms and Jake Azevedo for hosting and managing Santa Maria trial
  - Rio Farms and Danny Pereira for hosting and managing Camarillo trial and providing planting crew
  - Pete Compton and Josue Mejia for coordinating the transplanting crew in Santa Maria
  - Richard Hurstak - advice and protocols