

Stop the Rot: Rot-Free Onions in the Making

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Empire State Producer's Expo – Onion Bulb Rot Session
Virtual: January 14, 2021

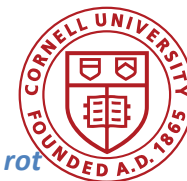
Challenges of Identifying True Genetic Resistance

Stop the Rot: Combating onion bacterial diseases with pathogenomic tools and enhanced management strategies

Inconsistent performance among varieties in rot trials

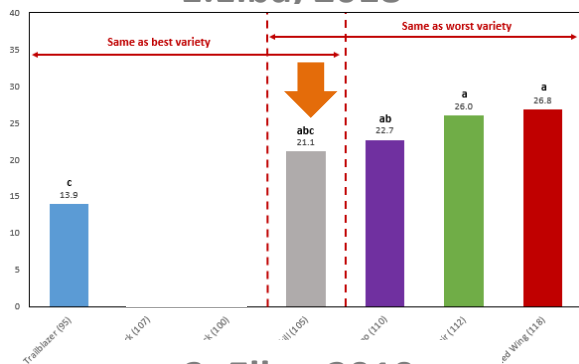
Onion Variety Rot Project: 2018 -2020 (Hoepting)

- Natural Bulb Rot (%)

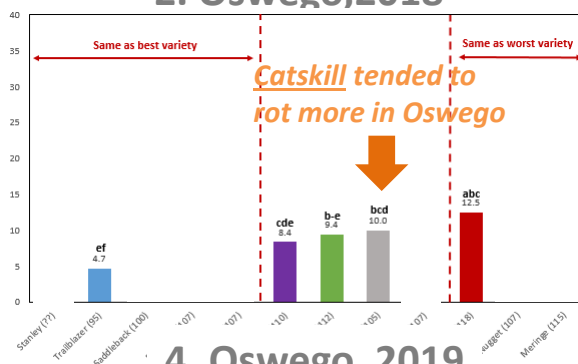


Trailblazer had comparatively more bulb rot in Elba 2020 compared to all other trials.

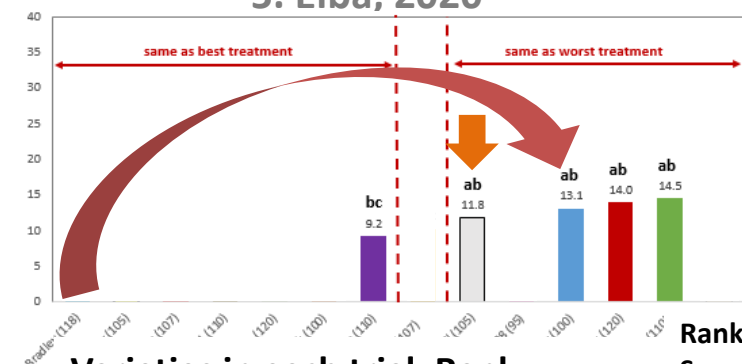
1. Elba, 2018



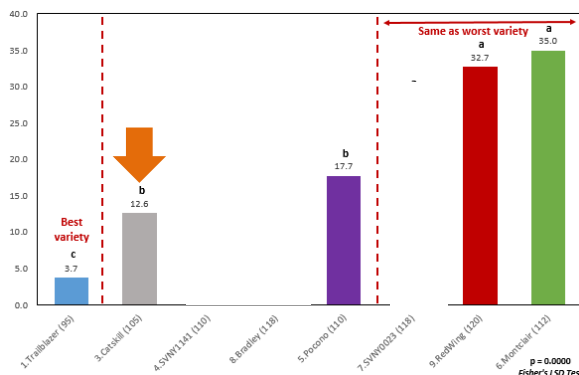
2. Oswego, 2018



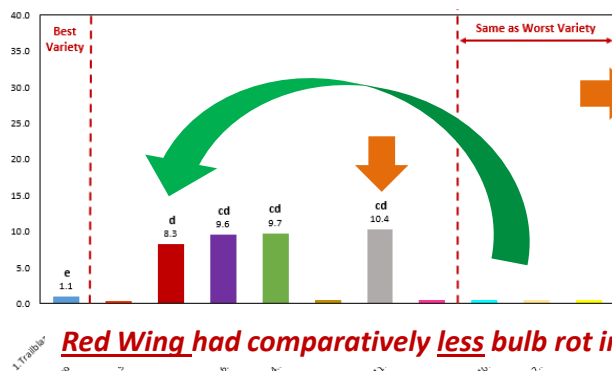
5. Elba, 2020



3. Elba, 2019



4. Oswego, 2019



Varieties in each trial: Rank

Variety	Trailblazer (100)	Catskill (105)	Pocono (110)	Montclair (110)	Red Wing (120)	Rank Score
Trailblazer (100)	1	1	1	1	3	7
Catskill (105)	2	4	2	5	2	15
Pocono (110)	3	2	3	3	1	12
Montclair (110)	4	3	5	4	5	21
Red Wing (120)	5	5	4	2	4	20

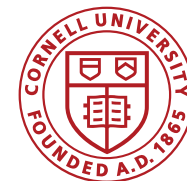
Red Wing had comparatively less bulb rot in Oswego 2019 than all other trials.

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Onion Variety Rot Project: 2018 -2020 (*Hoepting*)

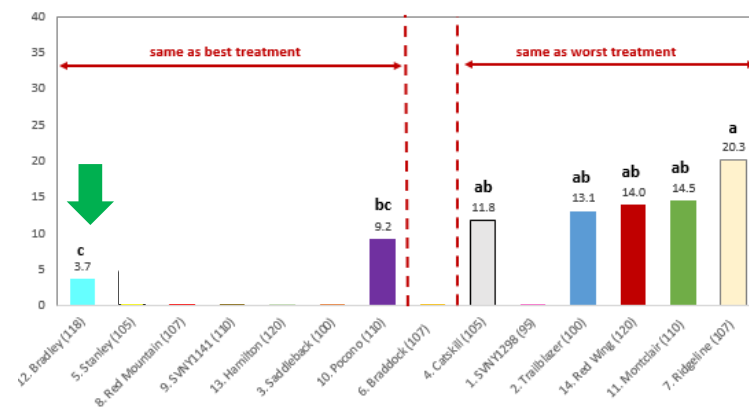
- Natural Bulb Rot (%)



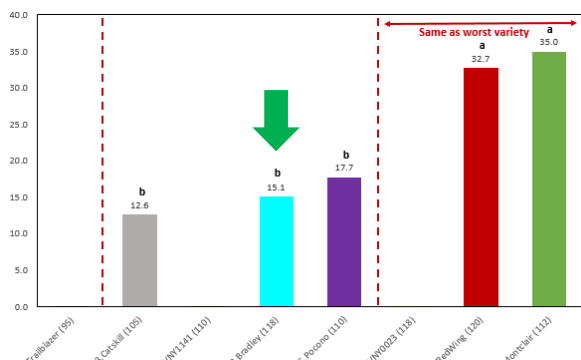
• Catskill (105)
• Ridgeline (107)
• Pocono (110)
• Montclair (110)
• Bradley (118)
• Red Wing (120)

Bradley is a long days to maturity variety that had less rot for its maturity class in Elba (especially in 2020).

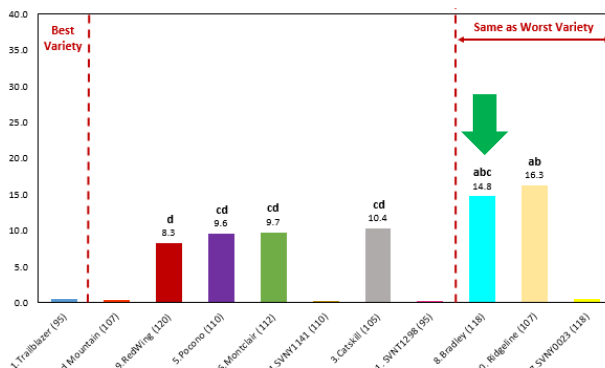
5. Elba, 2020



3. Elba, 2019



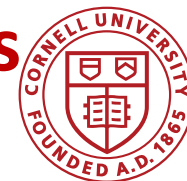
4. Oswego, 2019



Why did Bradley rot in Oswego and not in Elba?

Inconsistent performance among varieties in rot trials

% Natural Bulb Rot vs. % Bulb Rot from Prick Inoculation (*P. agglomerans*), Elba, 2019



Toothpicks embedded
in wounded leaves

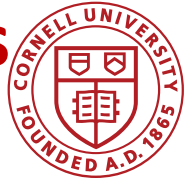


Pricked leaves exhibiting
symptoms of rot
(complete leaf dieback)



Inoculated plants showing
advanced leaf dieback
(several leaves dead)

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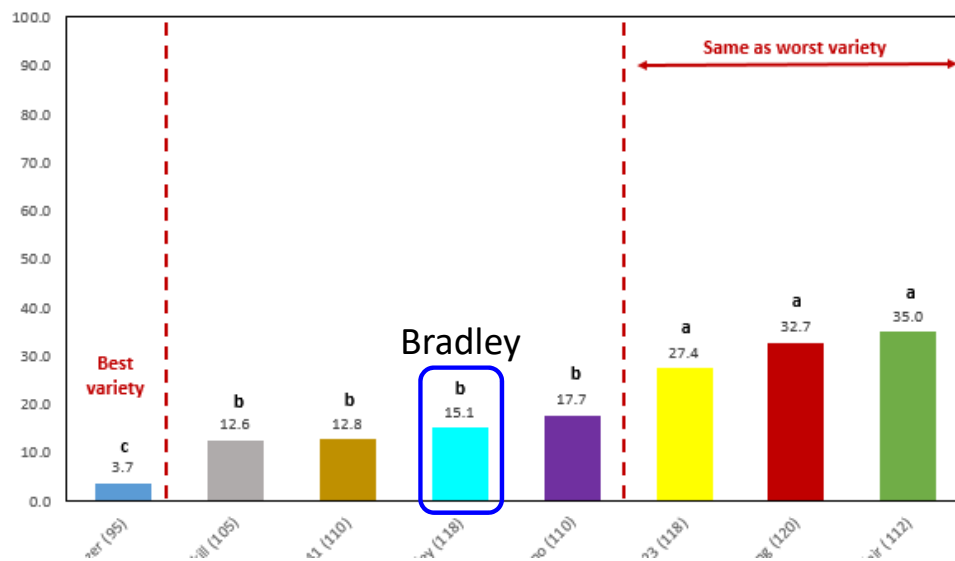


Inconsistent performance among varieties in rot trials

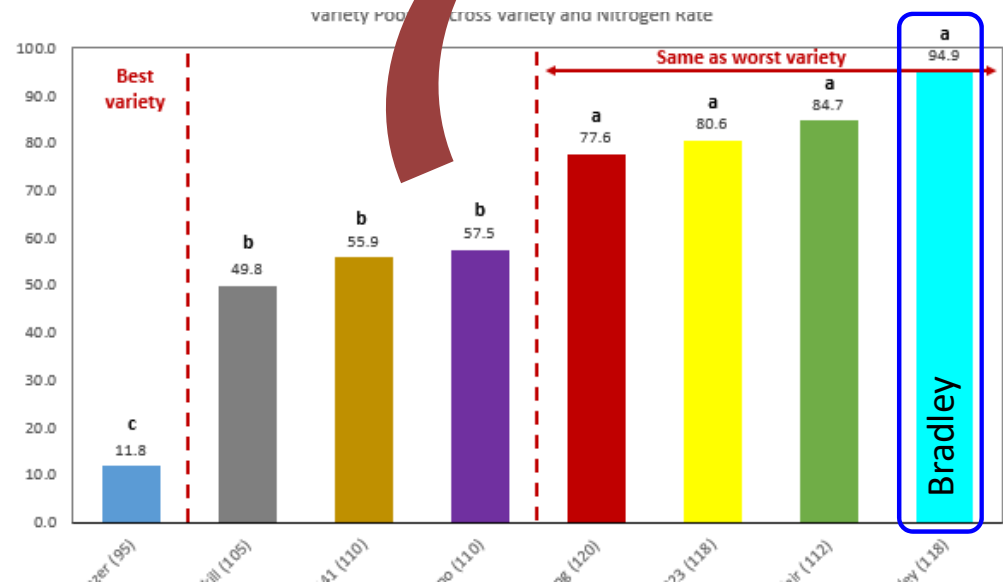
% Natural Bulb Rot vs. % Bulb Rot from Prick Inoculation (*P. agglomerans*), Elba, 2019

Bradley had more bulb rot with artificial prick inoculation.

Natural Infection



Prick Inoculation (*P. agg*)

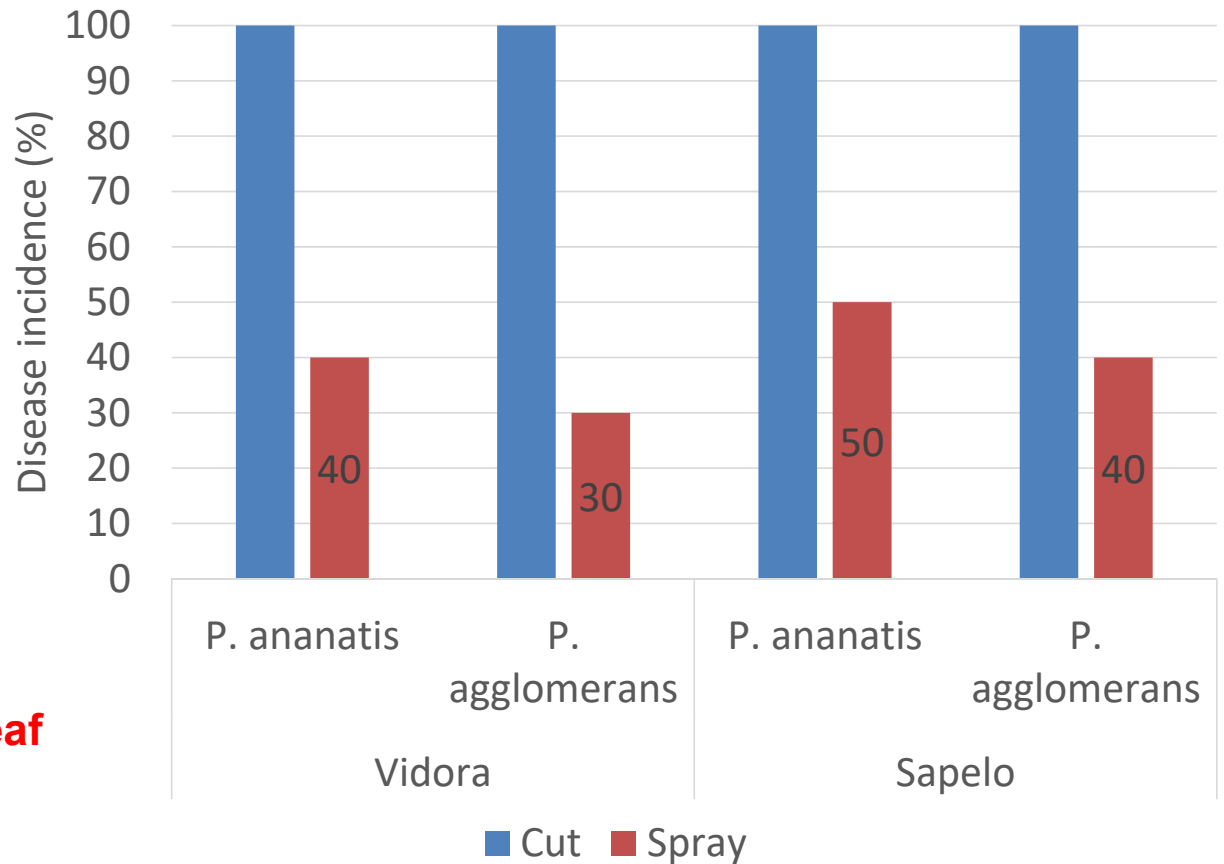


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Complexities of accurate bulb phenotypic screening

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Method of inoculation affects disease incidence in seedlings (greenhouse)



- **Spray until run-off: 10^6 CFU/leaf**
- **Cut-tip: 10^6 CFU/leaf**

The Holy Grail for Onion Breeders/Seed Companies

- Develop inoculation method(s) that are day-length independent to achieve reliable, robust resistance screening results for multiple bacterial pathogens of onion
- Avoid factors that confound measuring genetic susceptibility to bacterial pathogens
- Screening methods used by breeders to develop more resistant cultivars



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<https://alliumnet.com/projects/stop-the-rot/>

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- Project team, technical staff, students
- Stakeholder Advisory Panel

More information about the project:

- <https://alliumnet.com/projects/stop-the-rot/>
- Lindsey du Toit dutoit@wsu.edu

