



Stop the Rot

SCRI grant proposal

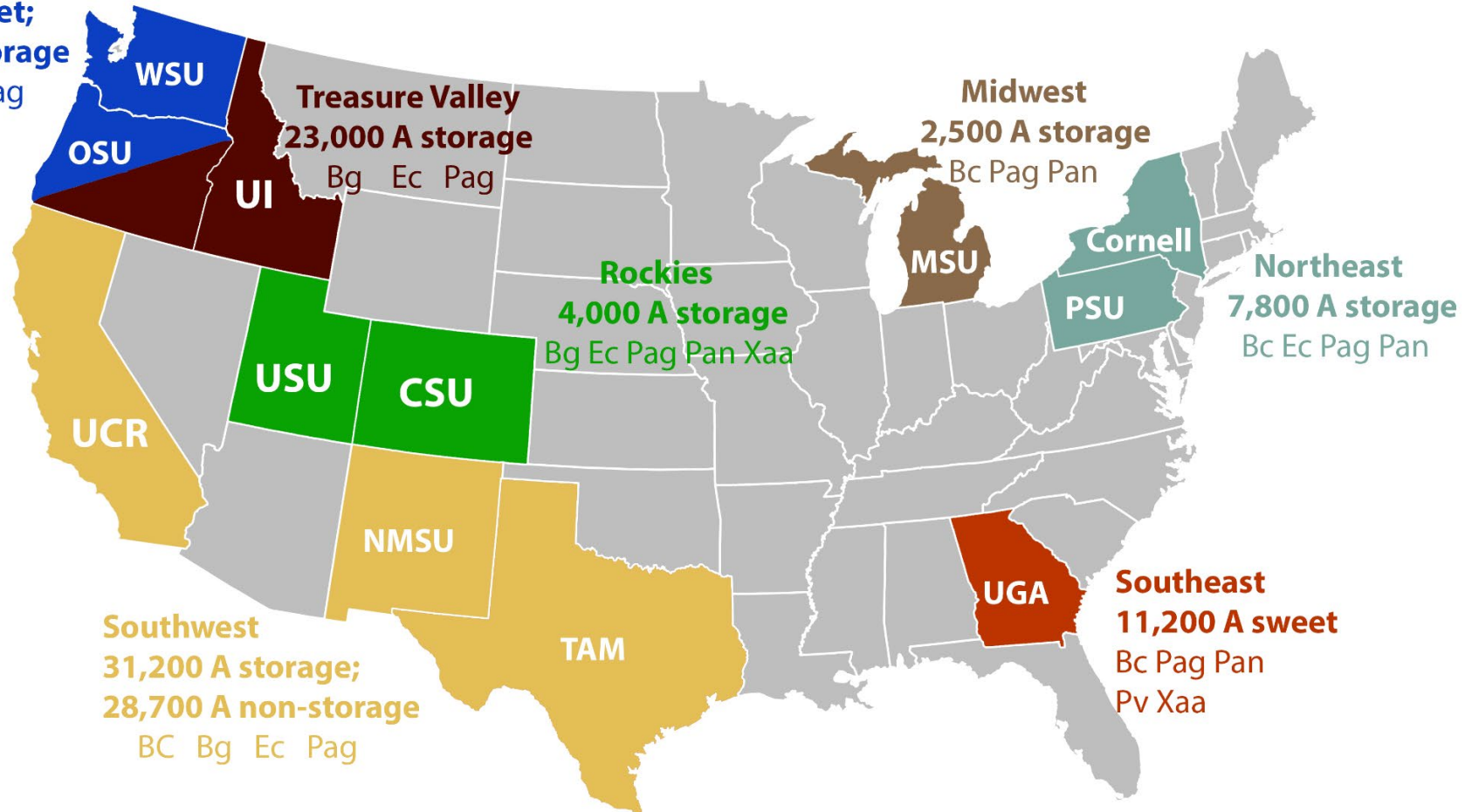
USDA NIFA SCRI Project No. 2019-51181-30013



United States
Department of
Agriculture

National Institute
of Food and
Agriculture

Columbia Basin
1,000 A sweet;
24,000 A storage
Bg Ec Pag



Stop the Rot

USDA NIFA SCRI Project No. 2019-51181-30013

- \$4,044,300 + \$4,200,000 match (universities, stakeholders)
- 4-year project Sep 2019 – Sep 2023
- 24 collaborators
- 14-member Stakeholder Advisory Panel

Rationale for the project

- Worldwide production 58 million tons of bulbs from 7.4 million acres
- US onion production in 2017:
~140,000 acres, farmgate value ~ \$925 million
- Bacterial pathogens cause >\$60 million/year in damages in the US
- Bacterial bulb rots primarily develop after harvest and in storage
- Losses range from 5% to 100% for individual fields
- Limited ability to manage bacterial diseases compared to fungal diseases

Current situation

- Bacterial diseases of onion occur across the U.S.
- They are difficult to manage due to
 - lack of effective, rapid detection methods
 - poor understanding of the genetic basis of pathogenicity and epidemiology of the complex of bacterial pathogens of onion
 - Few/no resistant commercial cultivars



Utah involvement

- Survey of onion fields and collection of onions in storage to determine what bacterial onion pathogens are present
 - Field survey will take place three times throughout growing season
 - Interested in fields with flood, drip and overhead irrigation
 - Soil samples
 - Collect symptomatic leaves
 - Storage onions will be sampled once
 - Growers will be notified of findings in their fields
- Trial in Kaysville for chemical management of bacterial onion pathogens
 - Twelve treatments will be selected
 - Your suggestions for treatments are welcome

Bacterial diseases in Utah

- Enterobacter sp.



- Disease occurs in storage
- Bacteria are found in soil, insect gut and water, can be on seed
- Little known about disease cycle

Bacterial diseases in Utah

- *Pectobacterium carotovorum*, *Serratia* sp.



Lindsey du toit, WS

- Affects foliage and bulbs
- Cause soft rot of bulbs
- Enter bulbs through leaves, mechanical injury and onion maggot injury
- Bacteria are in plant residue, soil and irrigation water
- Incidence is increased by high rates of N fertilizer late in season
- Damaged bulbs more susceptible when stored at 68-86F
- Rot stops below 37F
- Management:
 - Mature onion tops
 - Cure onions to dry necks
 - Storage and low temp. and less than 70% humidity with ventilation

Possible bacterial diseases in Utah

- *Pantoea ananatis*



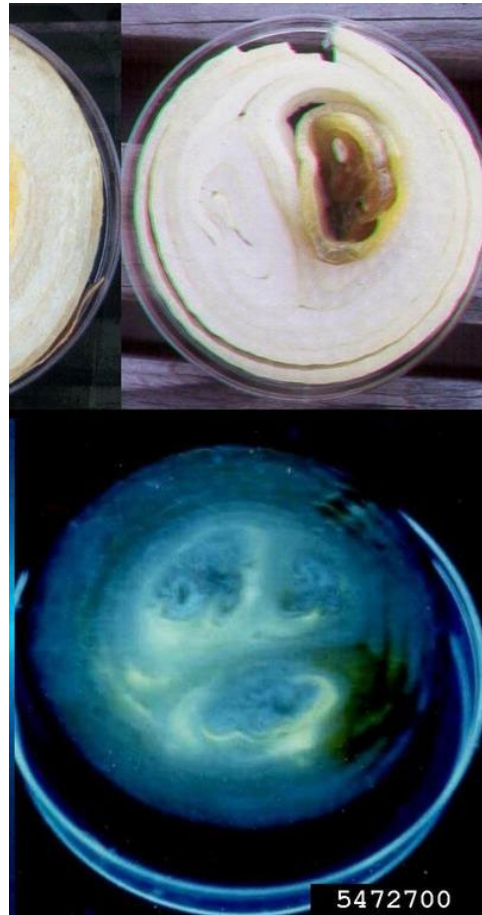
- Transmitted by thrips and seed
- Causes a dry rot
- First symptom in field: The center leaf dries up and gets bleached
- Bacteria move through the leaf to bulb
- Disease develops at temp of 82-95F
- Seems to be more severe when weather is dry earlier in the season (thrips more active)
- Yield loss up to 100%

Possible bacterial diseases in Utah

- *Pseudomonas* sp.



Ron Gitaitis, UGA



- Affects leaves and bulbs
- Leaf symptoms: Oval lesions, streaks. Water-soaked and dark green; late stage lesions almost black
- Bulbs: reddish brown discoloration of inner scales
- Rot develops in ring pattern
- Under UV light infected scales will glow
- Inoculum on weeds; moved short distance by water
- Management: Good weed control, Cu sprays may help

Possible bacterial diseases in Utah

- *Burkholderia gladioli*



Howard Schwartz, CSU



Plantdisease.org

- Infected bulbs have soft necks
- Individual scales have yellow-brown discoloration
- Disease moves from neck downward
- Does not spread to adjacent scales
- Infects through wounds like hail damage and insect feeding
- Management: harvest at maturity (tops lodge), store at low temperatures

Possible bacterial diseases in Utah

- *Xanthomonas axonopodis* pv *allii*



Howard Schwartz, CSU



- Leaf infections only
- Symptoms mostly develop during or after bulb initiation
- Initial lesion enlarge quickly and become tan to brown
- Under favorable conditions leaves senesce early
- Found on seed, weeds and crop debris
- Spreads by surface irrigation water and on equipment
- Some strains infect legumes.
- Management: Rotation for at least 2 years, weed control, incorporating crop debris, avoid overhead irrigation



Thank you for listening!
Questions?