Stop the Rot
SCRI grant proposal

Nature’s Ninja graphic courtesy of National Onion Association

Courtesy: Lindsey du Toit

USDA NIFA SCRI Project No. 2019-51181-30013
Columbia Basin
1,000 A sweet;
24,000 A storage

Treasure Valley
23,000 A storage

Midwest
2,500 A storage

Rockies
4,000 A storage

Northeast
7,800 A storage

Southeast
11,200 A sweet

Southwest
31,200 A storage;
28,700 A non-storage

UP

Courtesy: Lindsey du Toit
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

Courtesy: Lindsey du Toit
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

Courtesy: Lindsey du Toit
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 the 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.

• 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%

Lindsey du toit, WSU
Possible bacterial diseases in Utah

- Pseudomonas sp.
  - 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

Ron Gitaitis, UGA
Possible bacterial diseases in Utah

- **Burkholderia gladioli**

- 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

Howard Schwartz, CSU

[Plantdisease.org](http://Plantdisease.org)
Possible bacterial diseases in Utah

• Xanthomonas axonopodis pv allii

- 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

Howard Schwartz, CSU
Thank you for listening! Questions?