# DISEASE OF INTERMEDIATE WHEATGRASS

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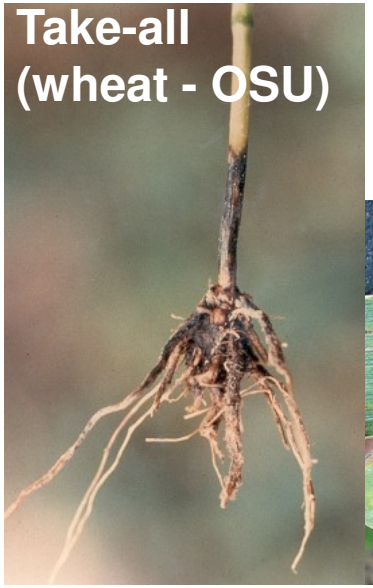
# Damage

- Lower grain/biomass yield
- Lower grazing quality
  - Karn et al. 1983
- Produce toxic compounds in grain

# Diseases of intermediate wheatgrass










# Host resistance: *Thinopyrum* genes used in wheat improvement

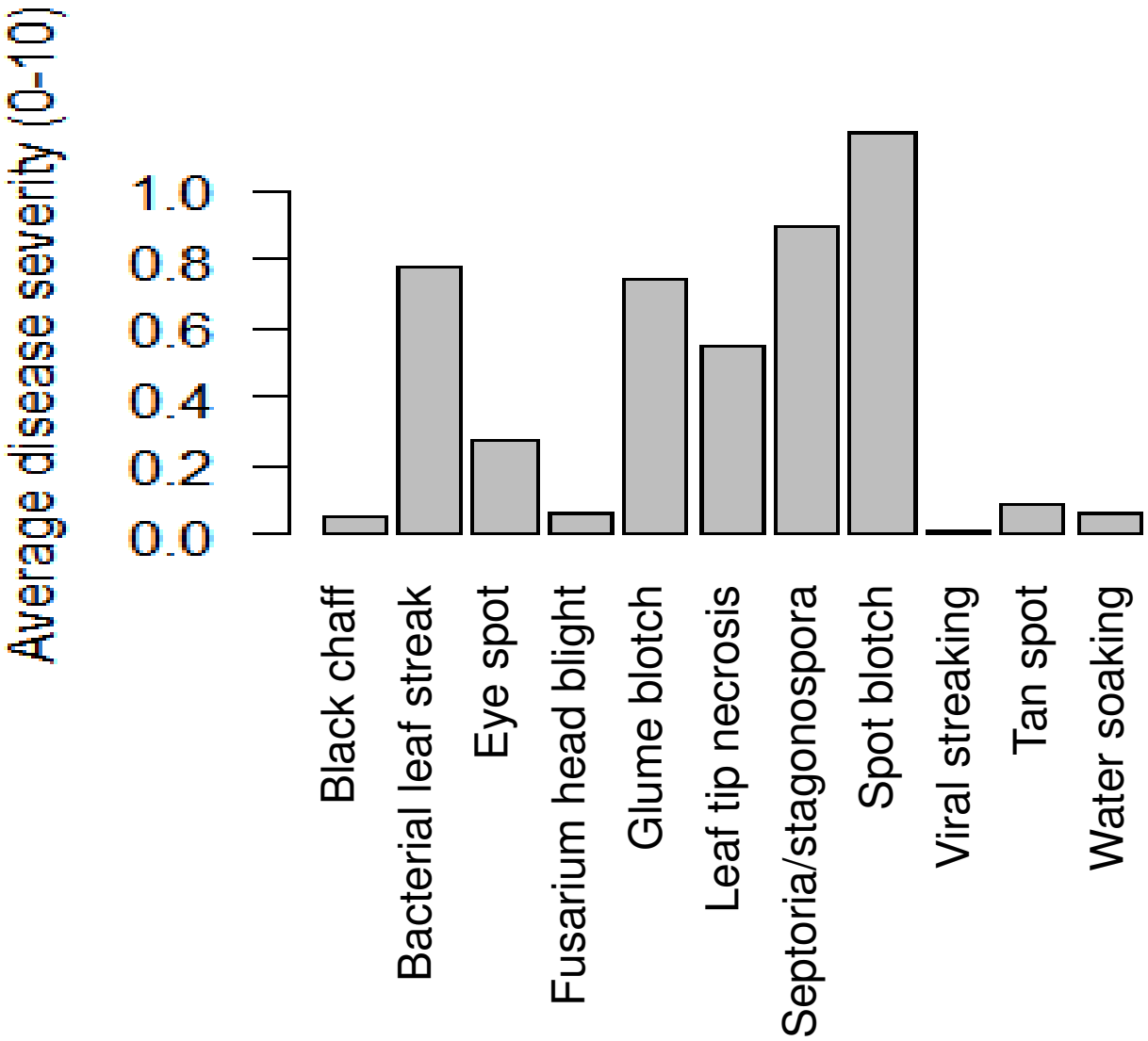
- *Th. ponticum: Sr24, Sr25,Sr26, Sr43* and *leaf rust Lr24*
- *Th. intermedium: Sr44,* eyespot, *BYDV*
- *Thinopyrum elongatum: Lr19*
- *Th. junceum*: powdery mildew




# Control strategies in perennial systems

- Genetic resistance
- Maintaining host and interspecific diversity (competition)
  - Planting in mixtures
  - Polyculture
  - Biocontrol
- Removing pest/residue (disturbance)
  - Burning
    - Stripe rust in KY bluegrass
  - Grazing, mowing
  - Rogueing (Sisterton 2013)
- Limiting spread
  - Row spacing
  - Cleaning or reducing use of equipment

# Disease survey Salina, 2018




- viral, below-ground disease evaluation

# Most diseases are minor





# Fusarium head blight

- Caused by *Fusarium graminearum,* etc.
- Toxin accumulation (DON, etc.)
- Management
  - Resistant lines
  - Stubble
  - Triazole fungicides (wheat) 6→4ppm at optimal timing
  - Swathing (lodging)
  - Harvest
  - Store grain <22% moisture

Genomic selection

# Ergot

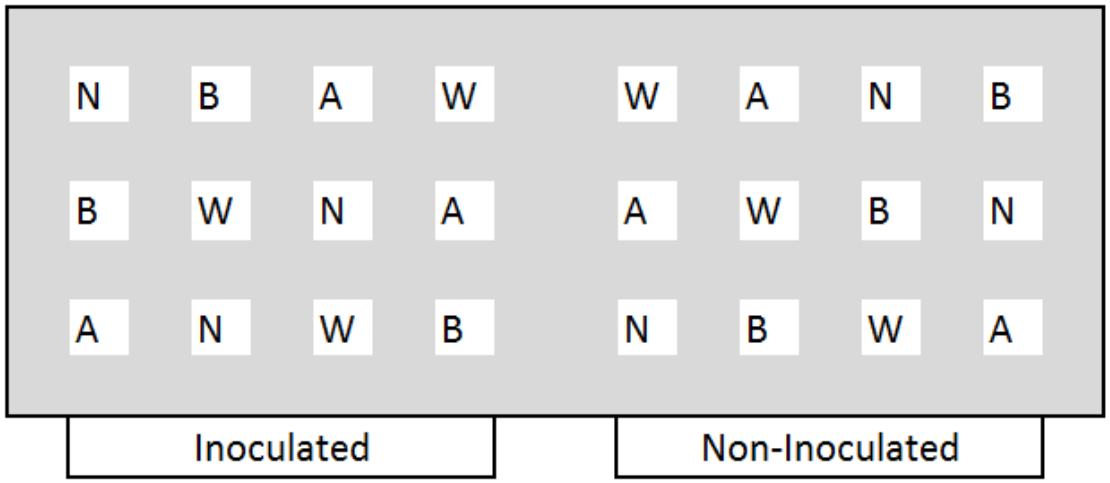
- Caused by *Claviceps purpurea*
- Ergotism – gangrene, hallucinations
- Breeding
  - Uniform maturity, avoidance
- Management
  - Seed
  - Mow borders during flowering
  - Burn
  - Swathing

# Bacterial leaf streak

- Caused by *Xanthomonas translucens*
- Leaf streaking, glume blotch

- Management
  - Genetic resistance, uninfected seed (soil)
  - No pesticides effective
  - Treat seed at 72C?
  - Tillage, rotation help some
  - Spread by rain splash
  - Enters plant from injury

# Long term disease accumulation trial




N - Narrow row Kernza
W - Wide row Kernza
AK - Alfalfa/Kernza
B - Burn treatment Kernza

- Replant every 3 years
- Maintain 1 non-inoculated rep
- Interest in integrating studies in polyculture

# Disease management questions

- Fusarium head blight
  - DON in resistant populations
  - Lodging, harvest
- Kernza
  - Row spacing
  - Planting time
  - Burning
  - Polyculture
- Economic thresholds for fungicide application

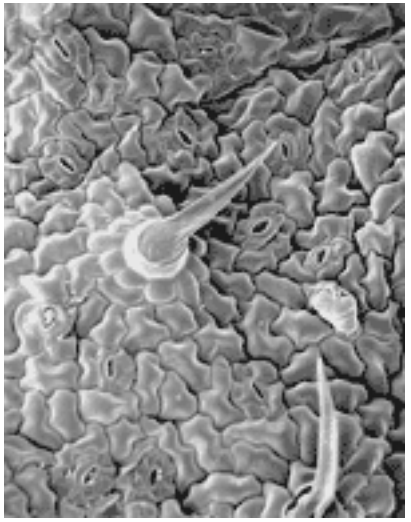
# Spot blotch

- Caused by *Bipolaris sorokiniana*
- Leaf blotch, seedling blight, root rot

- Management (wheat)
  - Seedlings
    - Plant later to avoid 68-77F
    - Shallow
  - Rotate for ≥ 2 years
  - Fungicides available

# Host defenses

- Constitutive (cell walls, waxy cuticles, bark)
- Induced (recognition of pathogen→ response)
  - Toxic chemicals
  - Pathogen-degrading enzymes
  - Cell suicide



# Reducing disease in intermediate wheatgrass




- Genomic selection accuracies: .7-.9 for Fusarium head blight severity and incidence, low heritability

# Diseases of intermediate wheatgrass

- *Bipolaris sorokiniana* (telomorph: *Cochliobolus sativus*) causes spot blotch and root rot
- *Pyrenophora tritici-repentis* causes tan spot
- *Fusarium graminearum* causes head blight and has potential to cause root rot
- *Leptosphaeria nodorum* (anamorph *Septoria nodorum*) causes septoria nodorum blotch
- *Phaeosphaeria nodorum* causes Stagonospora glume blotch
- *Cephalosporium gramineum* causes cephalosporium stripe
- *Pyrenophora terens* causes net blotch
- *Gaeumannomyces graminis* causes take all
- *Oculimacula yallundae* and *O. acuformis* cause eye spot