ARS Small Grain Pathology Program
Plant Science Research Unit (PSRU)
Raleigh, North Carolina

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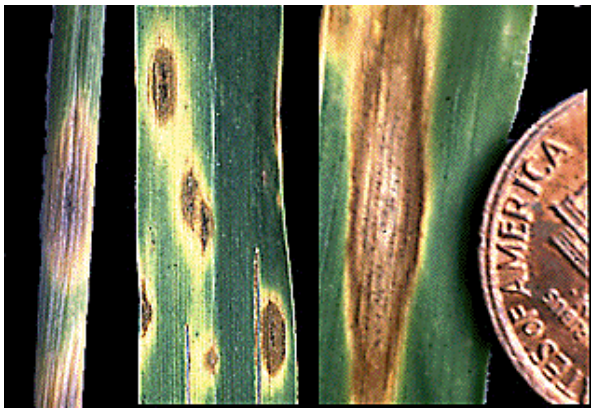
Focus: Epidemiology and management of economically important small grain diseases of eastern USA

Powdery mildew

Fusarium head blight

Leaf rust



Stagonospora nodorum blotch

Pythium root and crown rot

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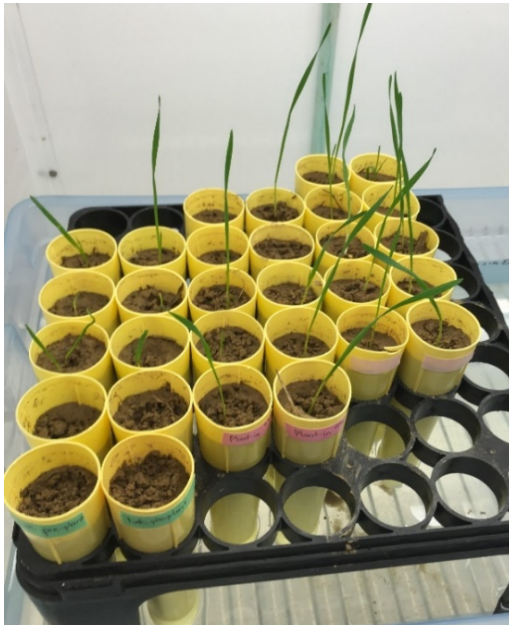
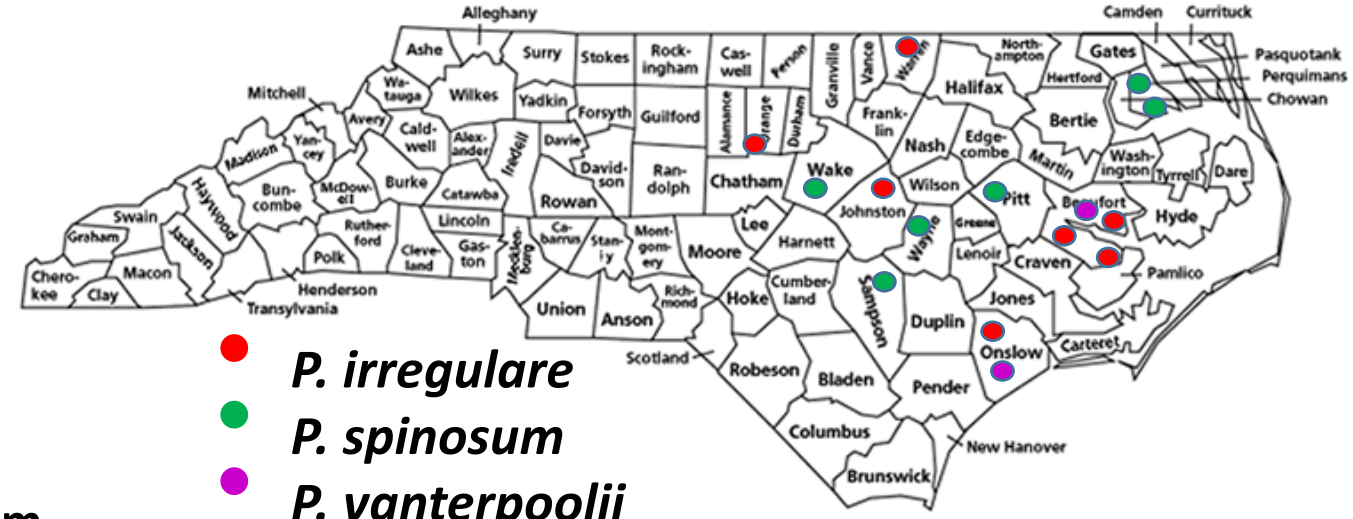
Pythium root/crown rot

- Identify main species attacking wheat
- Develop screening methods to breed for resistance / tolerance



Infecting wheat with Pythium



- ***P. irregulare***
- ***P. spinosum***
- ***P. vanterpoolii***

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Fusarium head blight

- Fungicide efficacy and timing in wheat, barley
- Occurrence and importance of “emerging” populations of FHB-causing spp. (non-tricothecene producers)
- Screen and rate in misted, inoculated nurseries:
  - Wheat double-haploid populations
  - Advanced barley experimental lines
  - Commercial wheat varieties
- Measuring and increasing grower adoption of FHB best management practices

Misted, inoculated FHB nursery in Raleigh

Malting barley with FHB symptoms

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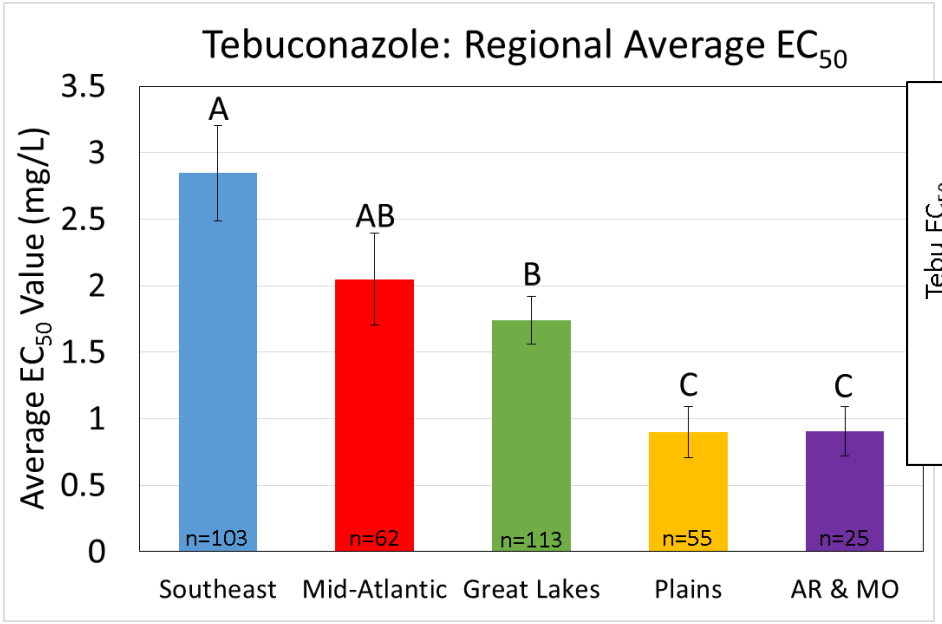
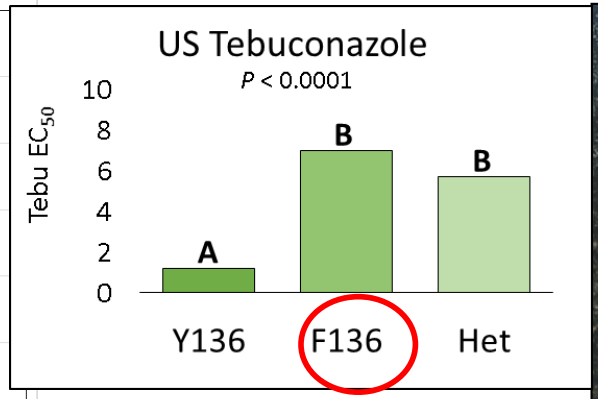
Powdery mildew

- Help breeders identify & characterize new sources of resistance for wheat
- Test efficacy of fungicides against wheat powdery mildew populations
- Population genetics and migration of *Blumeria graminis*





Mildew on detached wheat leaves

Mildew has become less sensitive to DMIs in the eastern US (shown here by higher EC50s), due in part to F136 mutation in CYP51

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Septoria nodorum blotch (SNB)

- Screen over 300 advanced experimental lines every year for 15 breeding programs in eastern US
- Identified new QTL for resistance to glume symptoms on wheat chromosome 1B (with Gina Brown-Guedira)

SNB glume symptoms

Screening plots inoculated with wheat straw

SNB susceptibility and resistance

Look forward to collaborating on genotyping and monitoring high-risk pathogens!

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