U.S. Wheat & Barley
Scab Initiative

2018 Forum

Nuts and Bolts Session
Monday December 3rd, 2018

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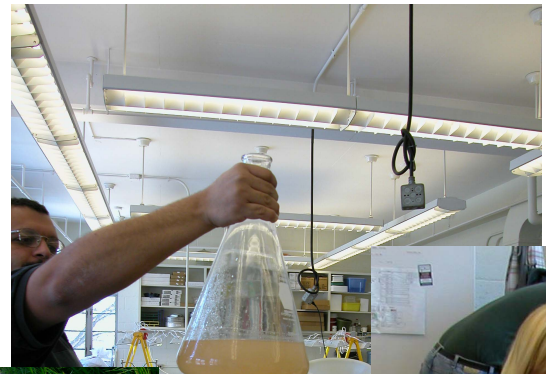
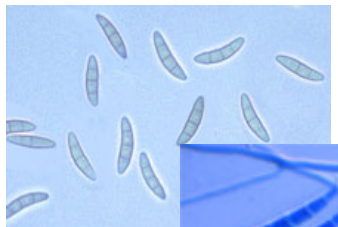
Growing *Fusarium graminearum* inoculum

- Develop a collection of isolates: hosts, years, locations
- Storage of Isolates: think of long term
- Think about what type of inoculum production you want: ascospores vs conidia
- Media: PDA and CLA, Komada's, Water Agar
  - Komada's Agar – selective media for FG produced macroconidia
  - Carnation leaf agar – FG verification and ascospore production for small assays
  - Water Agar – transfer from CLA to obtain single spore
  - Potato dextrose agar – Transfer single spore from Water agar to PDA for culture and storage
  - Carrot agar-large ascospore production
  - Mung Bean agar-large macroconidia production





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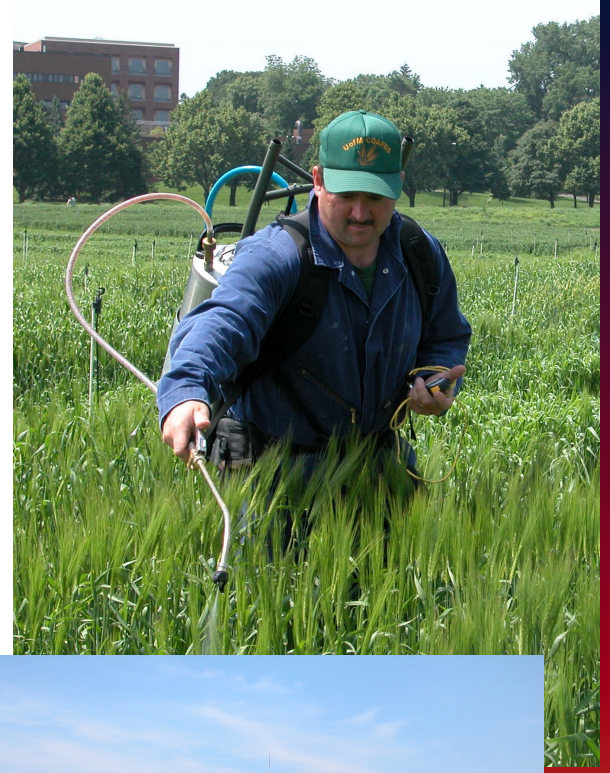
Nursery Inoculation Methods

- Corn
  - Tillering through boot
- Conidia
  - Head emergence/anthesis apply 1 -2 applications
  - Use 50,000 to 200,000 spore/ml
  - Concentrations are Weather Dependent



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Mist Irrigation Systems and other notes

Pumps, pipe, nozzles, design (adequate coverage across nursery)

Misting Regimes – Amount, frequency, duration, pressure

Planting of Rye Grass

Corn spawn requires irrigation

PLAN AHEAD!!!!! Expect the unexpected

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Rating FHB

- Types of resistance
  - Type I: Resistance to initial infection
  - Type II: Resistance to disease spread within a spike
  - Type III: Resistance to deoxynivalenol accumulation

- **Incidence -** proportion of diseased spikes (number of spikes with nonzero severity divided by the total number of spikes sampled).
- **Severity -** average proportion of diseased spikelets per spike on ***diseased spikes***.
- **FHB Index -** (Scale of 0 to 100 or 0 to 9) - average proportion of diseased spikelets per spike (sum of the proportion of diseased spikelets per spike divided by the total number of spikes sampled, ***including those with zero severity***).

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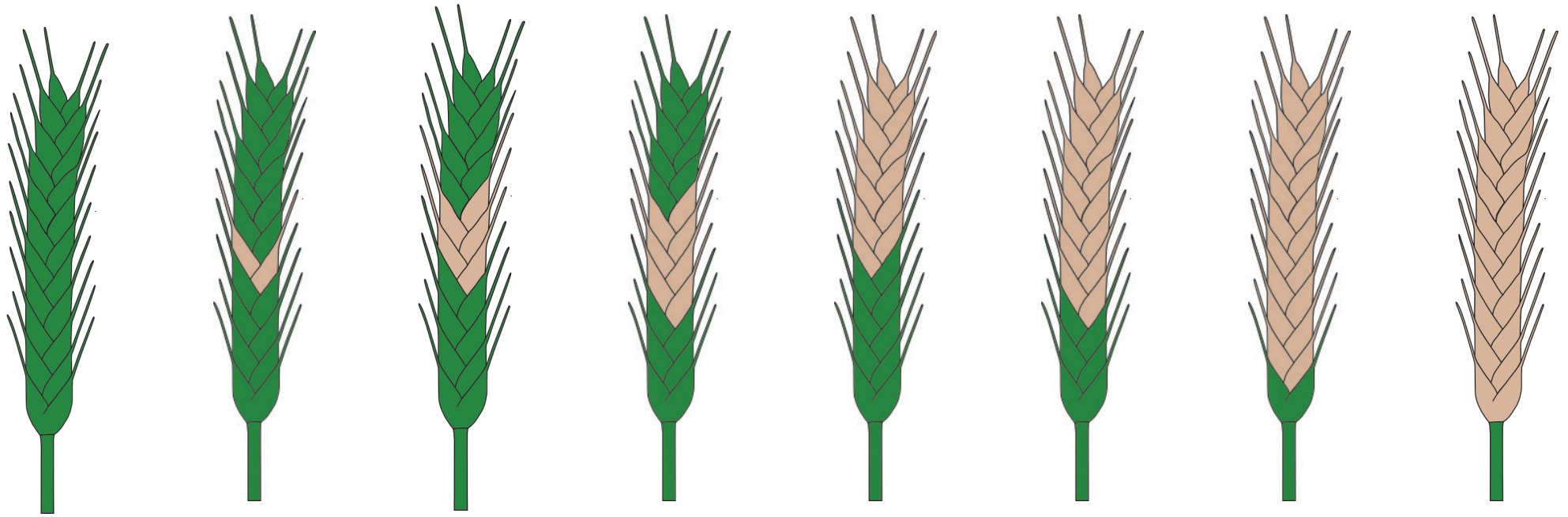
Rating FHB – Severity (%)



0% 10% 25% 35% 50% 70% 90% 100%

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Scoring FDK

- Wait 1 week after harvest before scoring (allows grain to dry)
- Mix the grain before subsampling as damaged kernels tend to rise to the top
- Scoop subsample into a petri dish and fill till top is level
- Rate, return seed to bag and repeat 2-5 times per grain bag

Photos:https://agcrops.osu.edu/newsletter/corn-newsletter/2015-21/rating-fusarium-damaged-kernels-fdk-scabby-wheat

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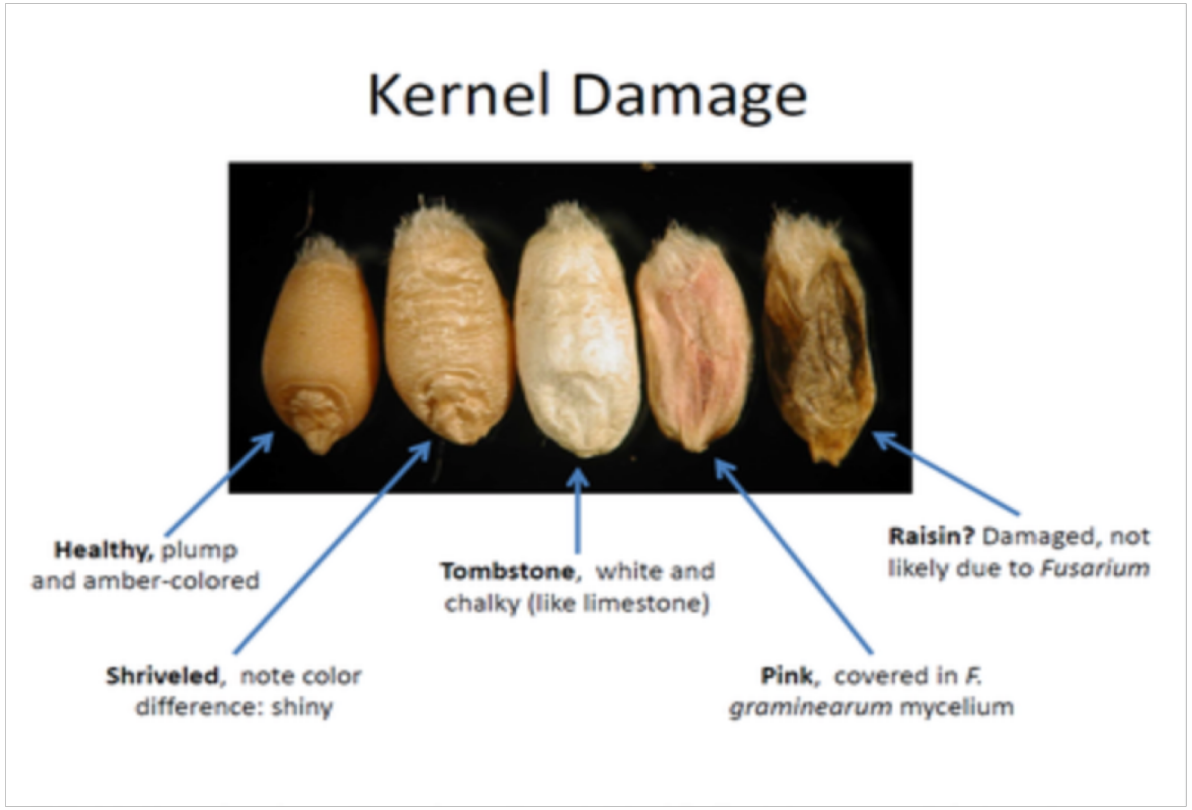
Scoring FDK



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DON Sampling

- 100g samples with from combined or hand harvested plots
  - Select representative sample

- Some prefer to grind the sample before sending, but you don't have to. If you do though you should subsample after grinding
  - *Follow lab protocol (10g sample sent to lab from ground sample)*

- Check with the lab you are shipping to for guidelines on sample labeling and processing

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Greenhouse Inoculations of *Fusarium graminearum*

- Point Inoculation
- Spray Inoculation

- Plants not harvested
- Toxin levels generally MUCH higher than field
- Most breeding programs rely on field nurseries

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Data Collection/Formatting

- Sampling methods for plots (size, patterns, etc.)
- Replications
- Data formatting
- Responses (severity, incidence, index)
- Calculating index from incidence and severity ([inc * sev]/100)

Thank you !!!

Follow-up questions:

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