Practical management of Fusarium head blight (head scab)

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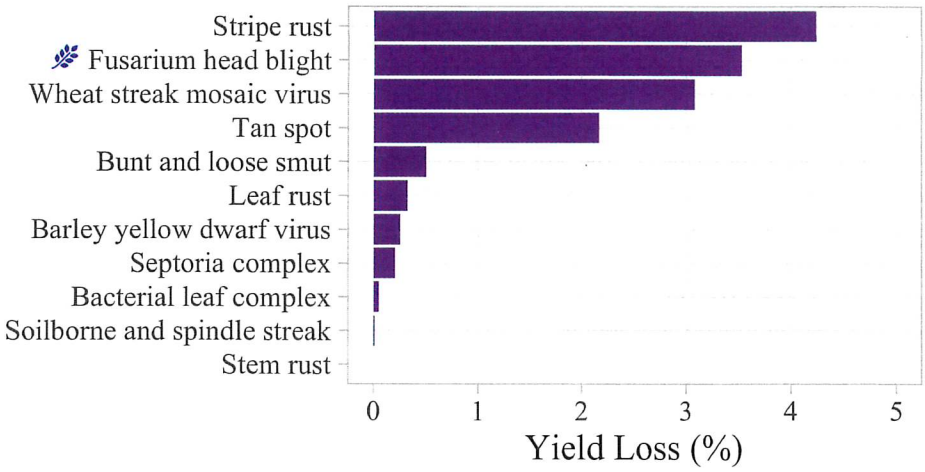
13.3 million bushels of wheat lost to FHB in Kansas alone in 2021



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Fusarium head blight (aka **Scab**, **FHB**)

- Caused by the fungal pathogen *F. graminearum* (and friends- *F. culmorum, F. avenaceum, others*)
- Survives in wheat, corn, and soybean residue
- Disease results in both **yield and quality loss**
  - Lightweight, chalky kernels
  - Decreased yield and test weight
  - May negatively impact wheat protein quality
  - Several pathogens are produced

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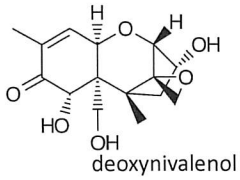
When it comes to scab we need to manage both **grain damage** and **mycotoxin accumulation**

- **Deoxynivalenol (DON) aka VOMITOXON**
- Acetyldeoxynivalenol (3-ADON, 15-ADON)
- Nivalenol (NIV)



deoxynivalenol

- These secondary metabolites increases infection efficiency
- Harmful to humans and livestock and regulated (1 ppm for human consumption)
  - Vomiting
  - Feed refusal
  - Neurological problems
- Contaminated grain will be blended or discounted

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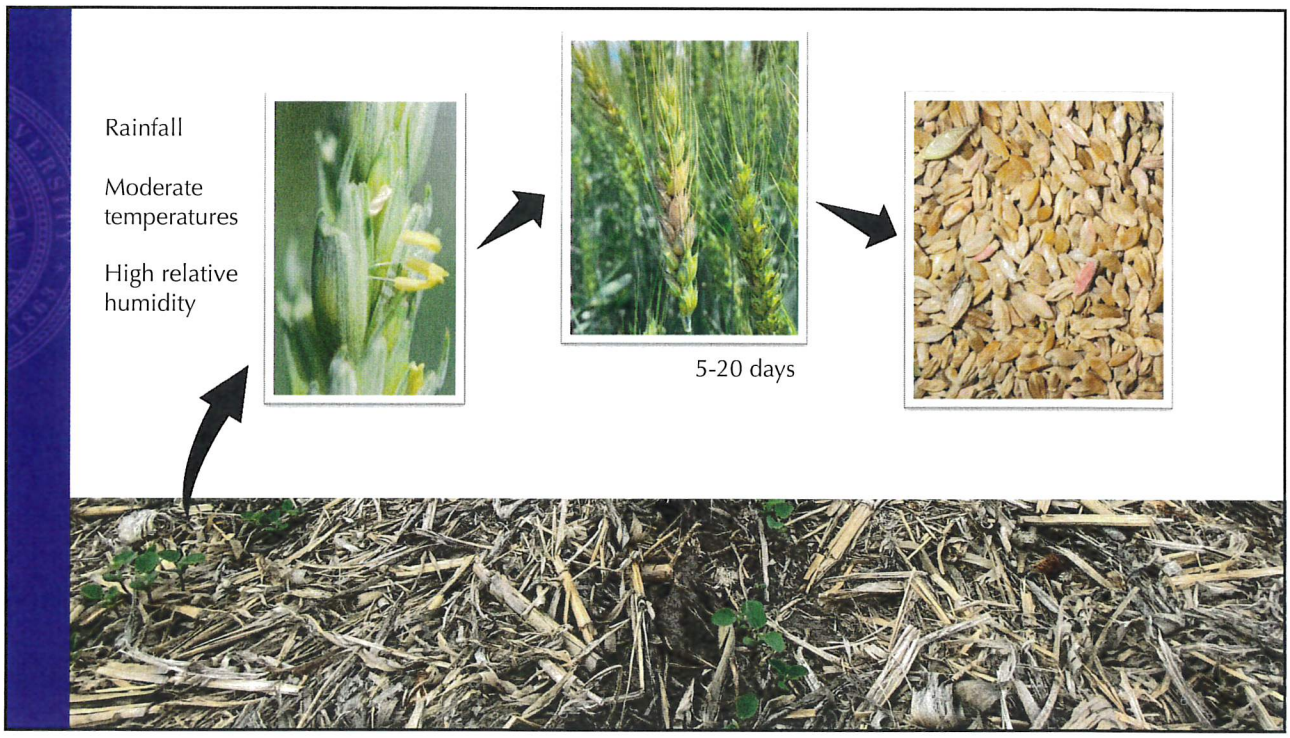

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So, how do we manage scab?

Pre-planting

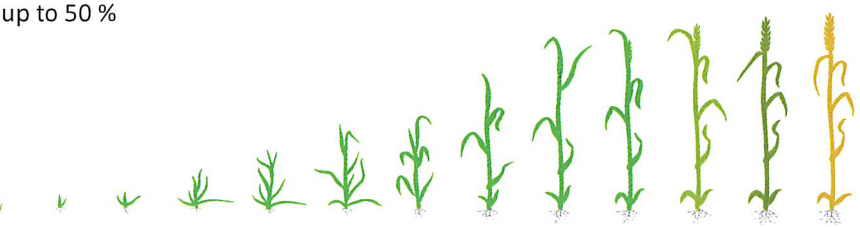
- Crop Rotation
- Tillage
- Select variety with highest available level of resistance – may reduce FHB and DON by up to 50 %

Within-season

- Fungicide applications
  - Timing is critical!

Harvest

- Harvest timing and proper grain storage can limit DON accumulation
- Combine settings



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What fungicide products do we use in wheat?

QoI	DMI	SDHI
Quinone **o**utside **i**nhibitors	**D**emethylation **i**nhibitors	**S**uccinate **d**ehydrogenase **i**nhibitors
FRAC CODE 11	FRAC CODE 3	FRAC CODE 7
Example: azoxystrobin	Example: tebuconazole	Example: fluopyram

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What we know about managing FHB with fungicides?

- DMI fungicides (triazole group) most effective against FHB and DON, although there are differences between individual products
- DMI single application reduces FHB and DON 40-50% (Paul et al. 2008)
- QoI fungicides are not recommended and can result in increased levels of DON (Paul et al. 2018)
- Moderately resistant cultivar + DMI fungicide can reduce FHB and DON by >70% (Willyerd et al 2012)!
- There have been several reports of fungicide resistance to DMI group fungicides in recent years (Anderson et al. 2020, Spolti et al. 2014).
- The addition fungicides within the SDHI group are promising for FHB management.

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Key products labeled and effective for FHB control

Product	Rate (fl oz/A)	Pre-harvest interval	GROUP NAME	FRAC CODE
Prosaro	6.5-8.2	30 Days	DMI	FRAC 3
Proline	5-5.7	30 Days	DMI	FRAC 3
Caramba	10-17	30 Days	DMI	FRAC 3
Miravis Ace	13.7	Feekes 10.5.4	DMI + SDHI	FRAC 3 + FRAC 7

- New products to be labeled: **Sphaerex** (metconazole and prothioconazole) and **Prosaro Pro** (Tebuconazole + Prothioconazole + Fluopyram (Group 7))

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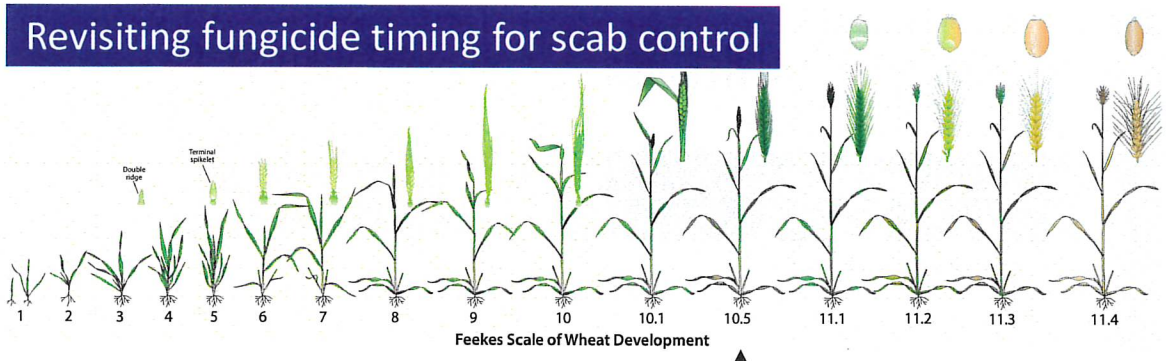
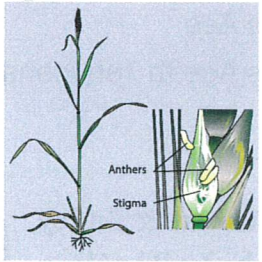
Revisiting fungicide timing for scab control



Feekes Scale of Wheat Development

- Fusarium head blight applications should be made at **early flowering Feekes 10.5.1** for maximum efficacy.
- Previous work found > 30% increased efficacy of DMIs when applied at early anthesis compared to heading



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K-State Guide to Wheat Growth and Development: https://bookstore.ksre.ksu.edu/pubs/MF3300.pdf

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Miravis Ace- evaluating the efficacy and timing of a new (ish) product

- Labeled for early (Feekes 10.3) applications
- Propiconazole (11.4%) + Pydiflumetofen (13.7%)
- DMI + SDHI products

Get a Head Start on Head Scab

Miravis® Ace fungicide takes the stress out of wheat disease control with the power to control head scab as early as 50% head emergence.

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USWBSI Multi-state Coordinated Project

Treatment Program	Rate (fl oz/A)	Timing
Nontreated (Check)	---	---
Prosaro	6.5	Feekes 10.5.1
Miravis Ace	13.7	Feekes 10.3-5
Miravis Ace	13.7	Feekes 10.5.1
Miravis Ace fb Tebuconazole	13.6/4.0	Feekes 10.5.1/4-6 DAA

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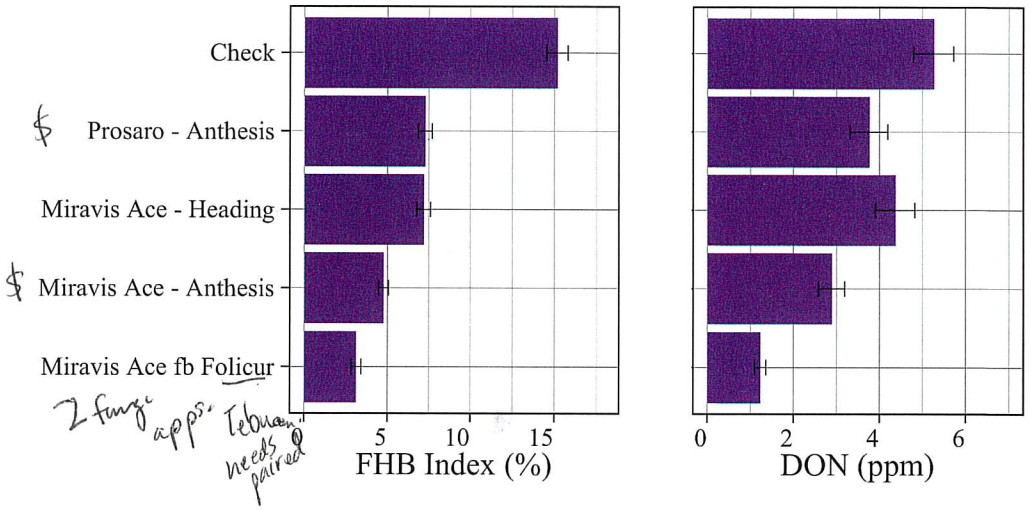
Results across 125 environments, 2018-2021



2018-2021: 125 ENV with IND > 2 or DON > 1ppm, summary prepared by Wanderson Moraes , OSU

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Comments on fungicide timing for FHB

- Pre-anthesis treatments are effective at reducing FHB and DON, but are less effective than anthesis applications (particularly for DON control).
- Pre-anthesis applications still provide improved control compared to nontreated check, which may be important when perfect timing cannot be achieved
- Two-treatments programs - an anthesis application of Miravis Ace followed by Folicur 4-6 days later led to highest levels of DON and FHB control
- Combining an anthesis application with genetic resistance results in lower FHB and DON than resistance or fungicide application alone.

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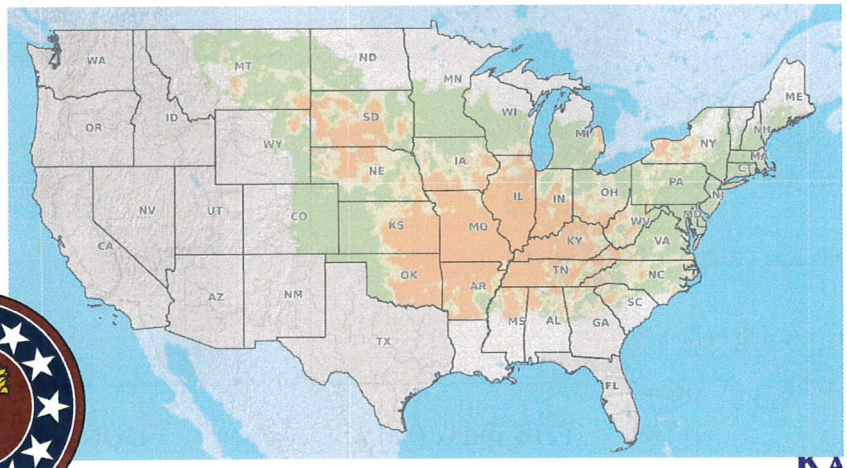
Scab weather-based risk is published on **wheatscab.psu.edu**



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