

# Managing fusarium head blight: Learning from the past and moving forward

Barb Ziesman

Provincial Specialist, Plant Disease

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# Fusarium head blight

- The major concerns with FHB are losses in quality
  - Yield
  - Losses in grade and end use quality
    - Fusarium damaged kernels
    - Presence of mycotoxins
- FDK and mycotoxins are not always correlated

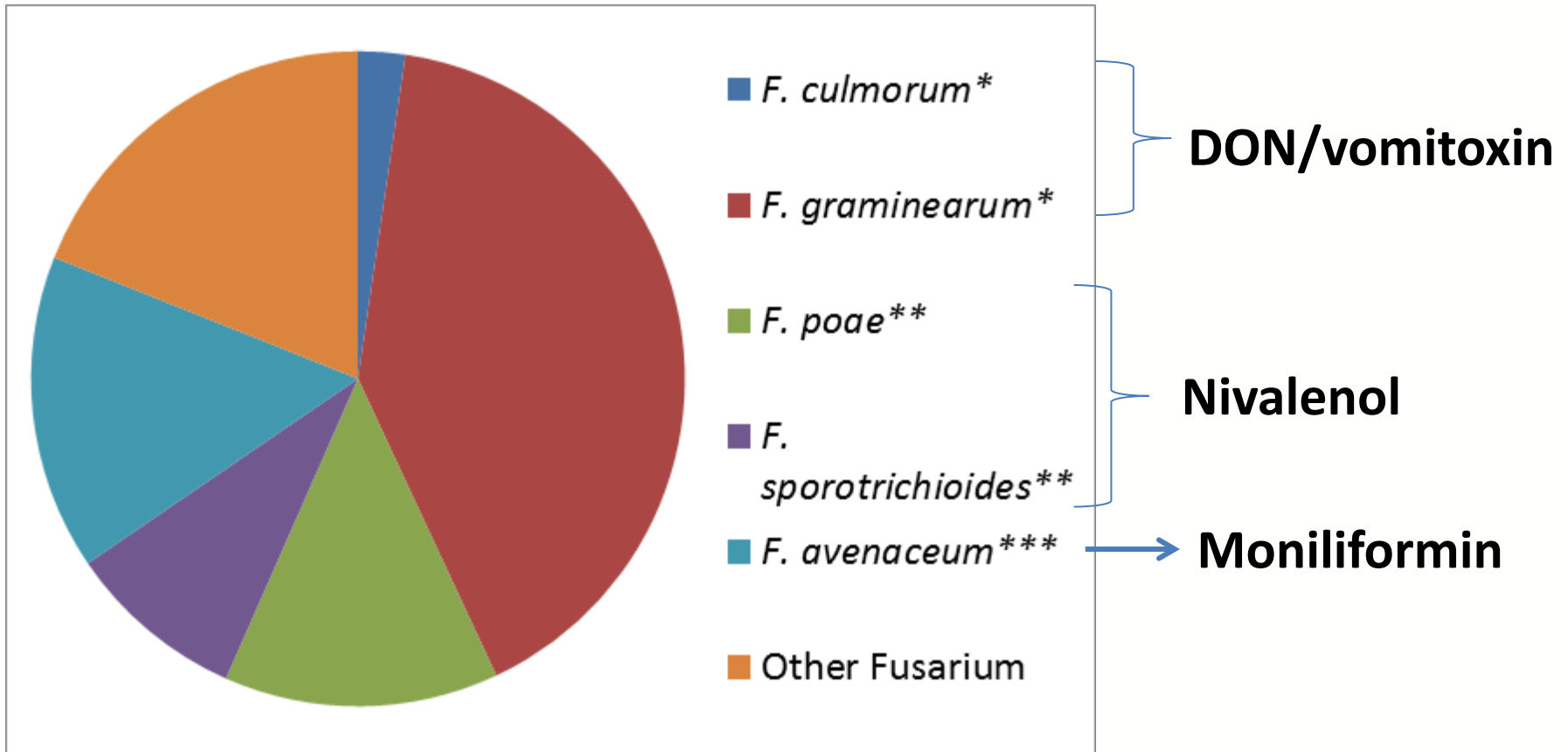


# Fusarium head blight

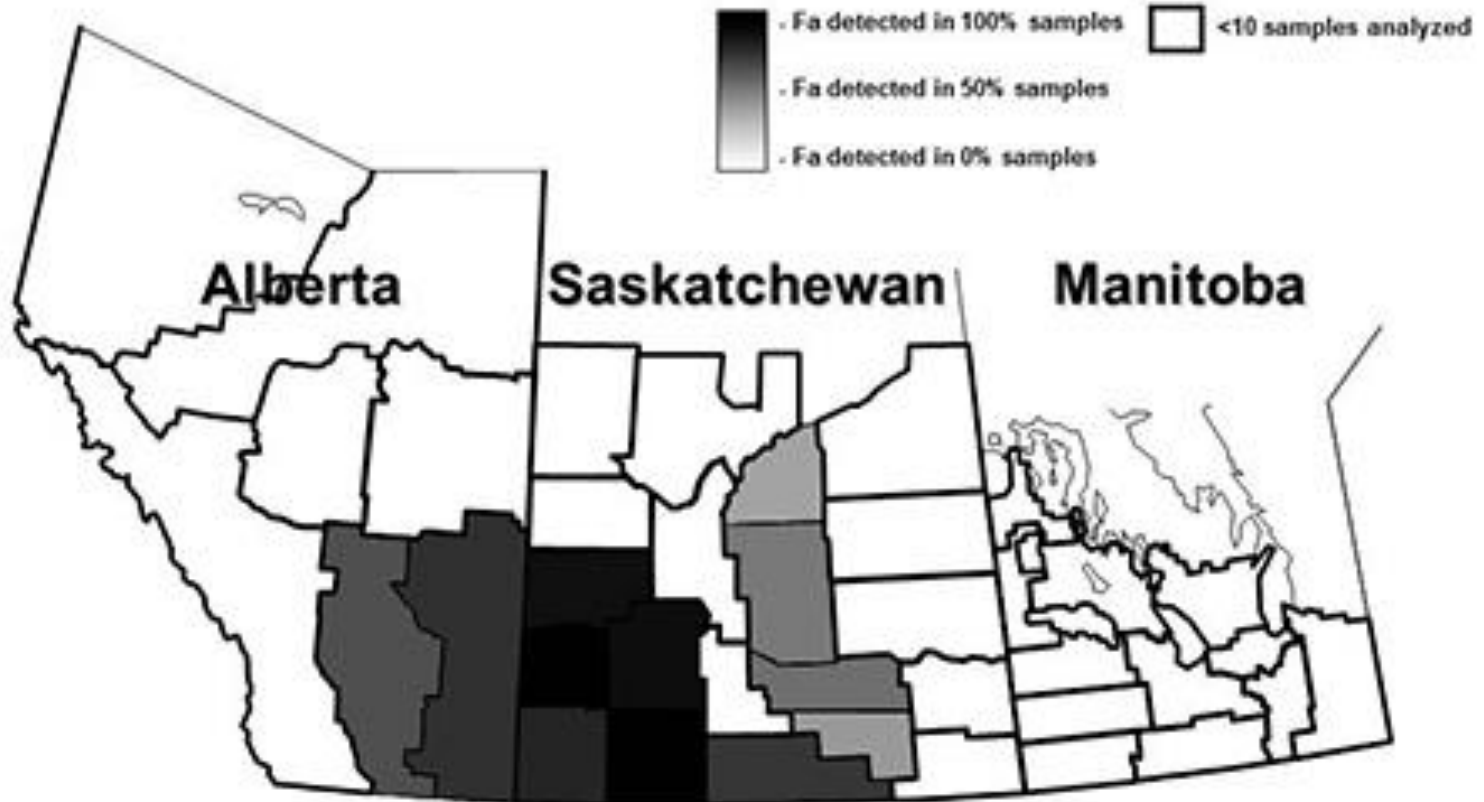
- The main *Fusarium* spp. in Saskatchewan are
  - *F. avenaceum*
  - *F. poae*
  - ***F. graminearum***
    - **3ADON and 15ADON**



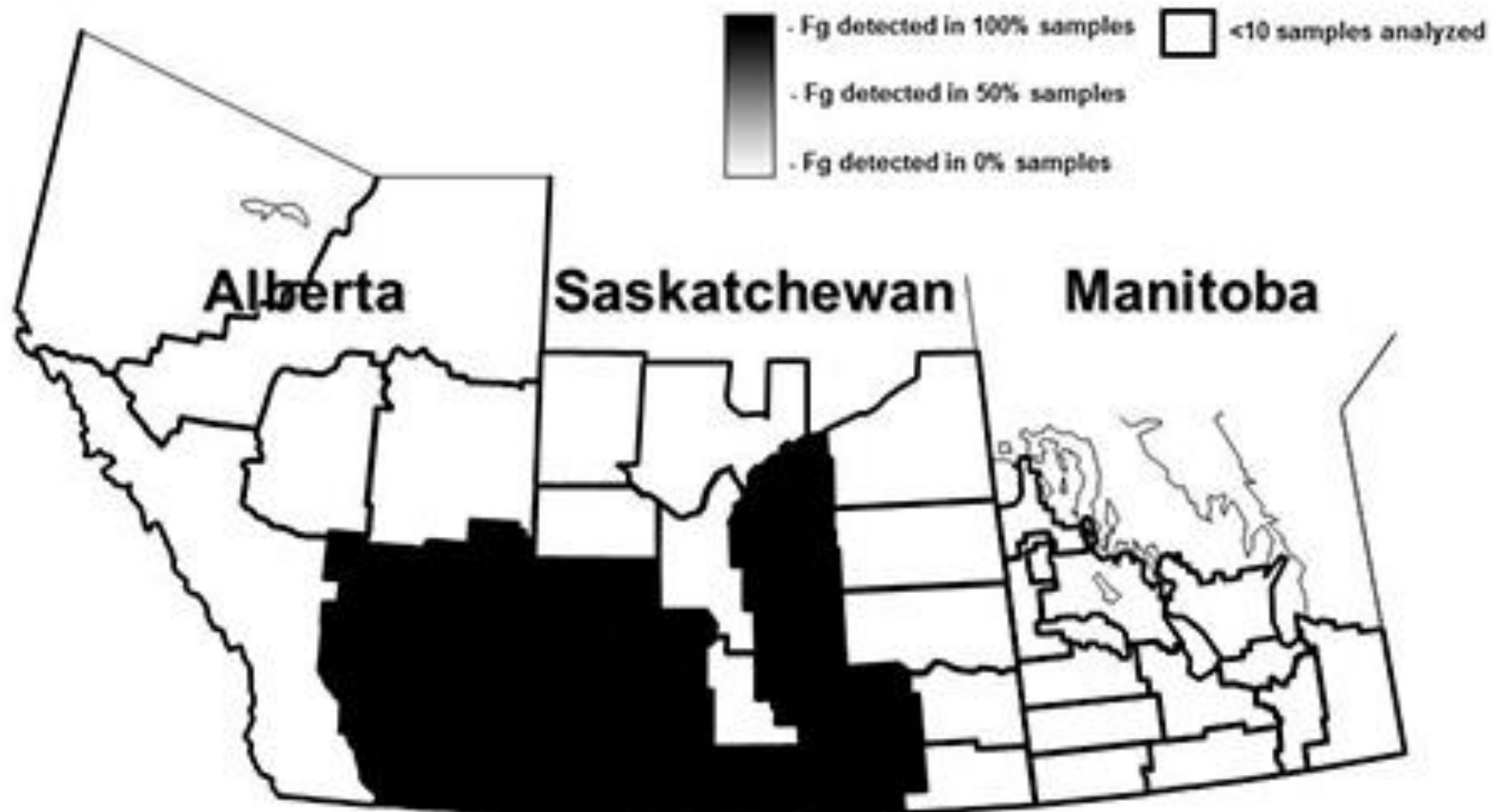
# FHB in 2016



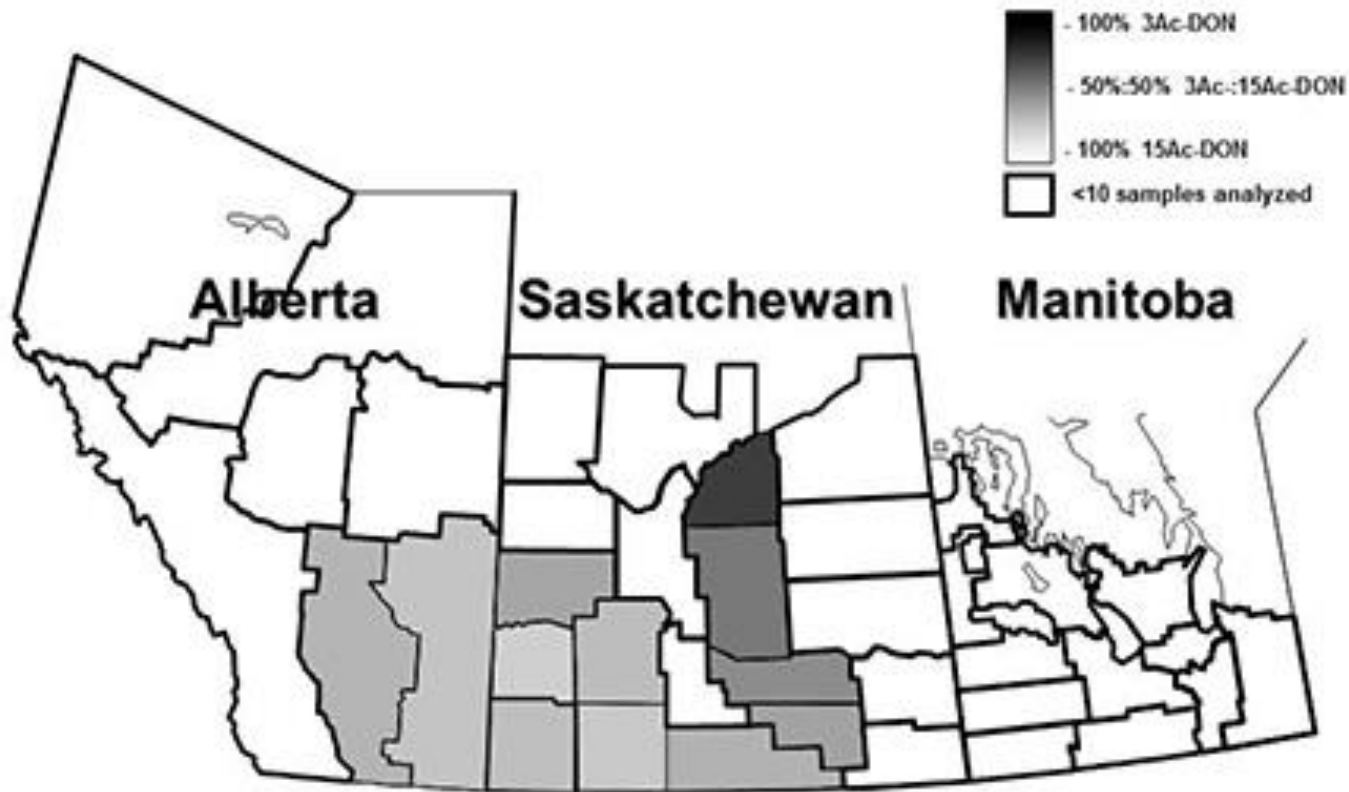
# Percentage of FDK samples affected by *Fusarium avenaceum* in 2016 CWAD



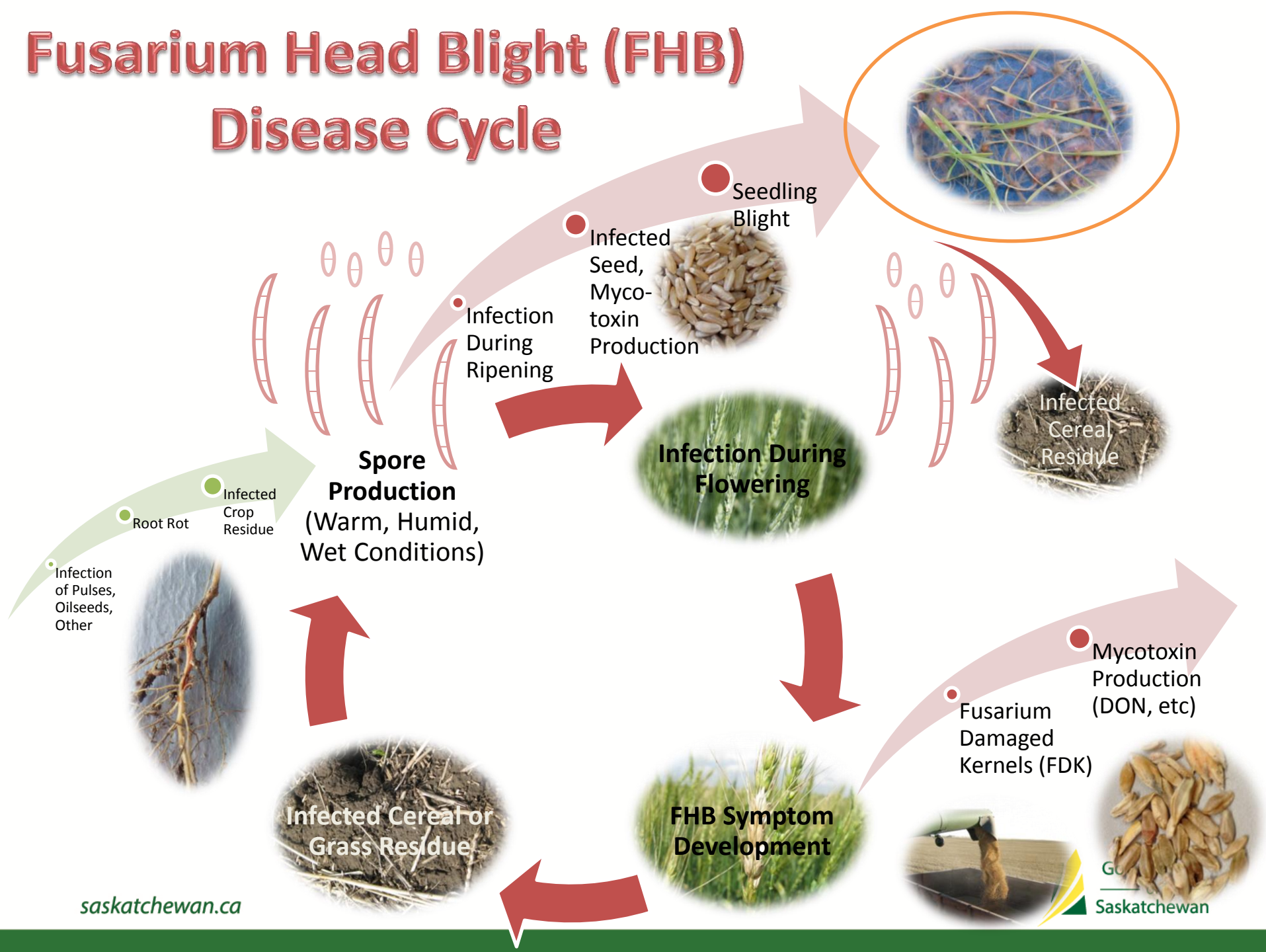
# Percentage of FDK samples affected by *Fusarium graminearum* in 2016 CWAD



# Frequency of Fusarium genotypes of DON derivatives in 2016 CWAD

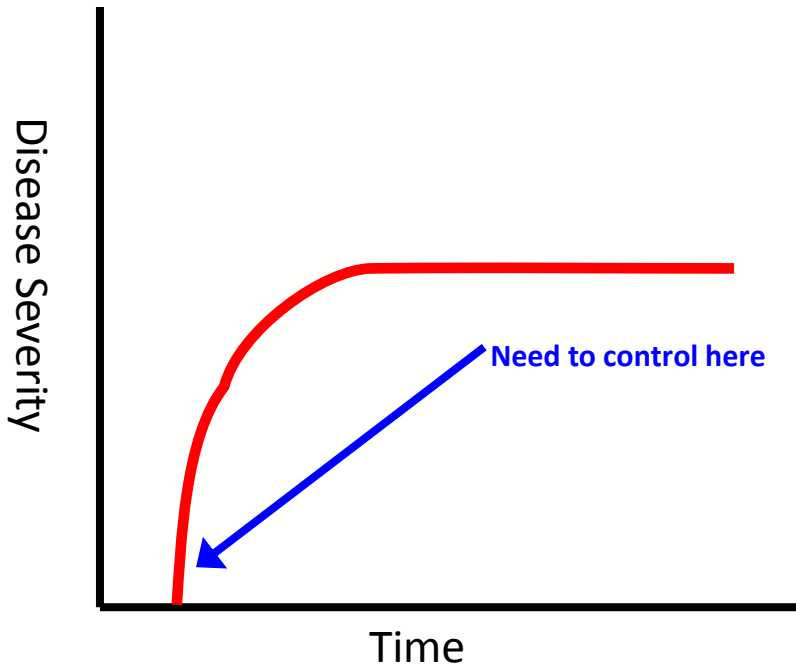


# Fusarium Head Blight (FHB) Disease Cycle





# Fusarium head blight

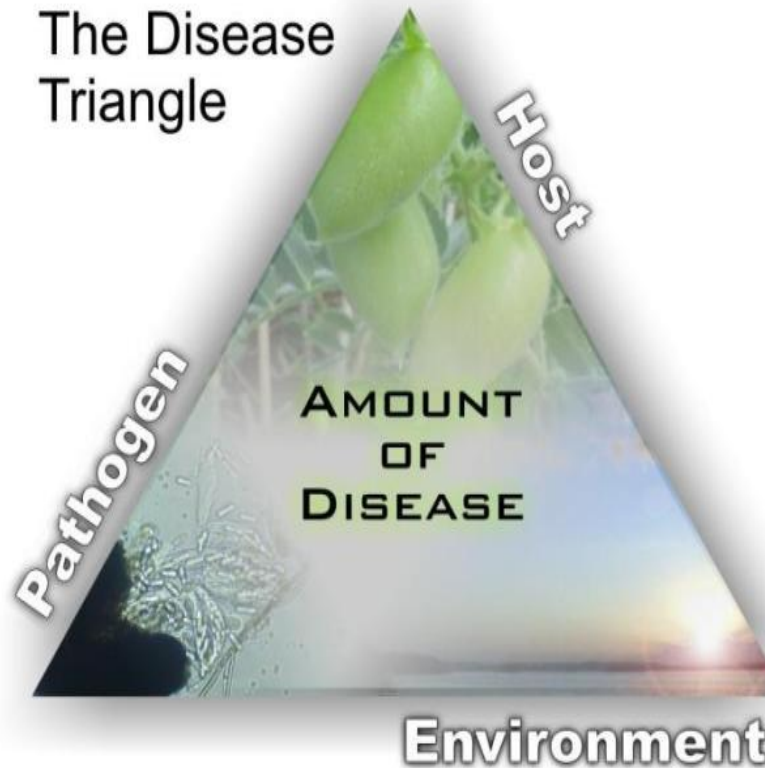


- Mono-cyclic diseases with **only 1 infection cycle per season**
- You need to control it at the start of its infection cycle
  - Too late once you see disease symptoms

## Take-home message:

Instead of scouting for symptoms to determine risk ... you need to scout for the conditions that favour disease.

# Risk assessment



# The environment

- Precipitation or high humidity for at least 12 hours is required for spore germination and infection
- Temperature: 16 to 30°C
  - 25 to 28°C for *F. graminearum*
- Spores are spread by rain splash and wind
- FHB infection is most likely during flowering but can occur until the soft dough stage if conditions remain warm and moist

# The pathogen

- *Fusarium graminearum* is the most aggressive
- The amount of pathogen available to cause infection will depend on the crop rotation and field history
- Infected seed can introduce more inoculum



# The host

- There are differences in susceptibility of cereal crops

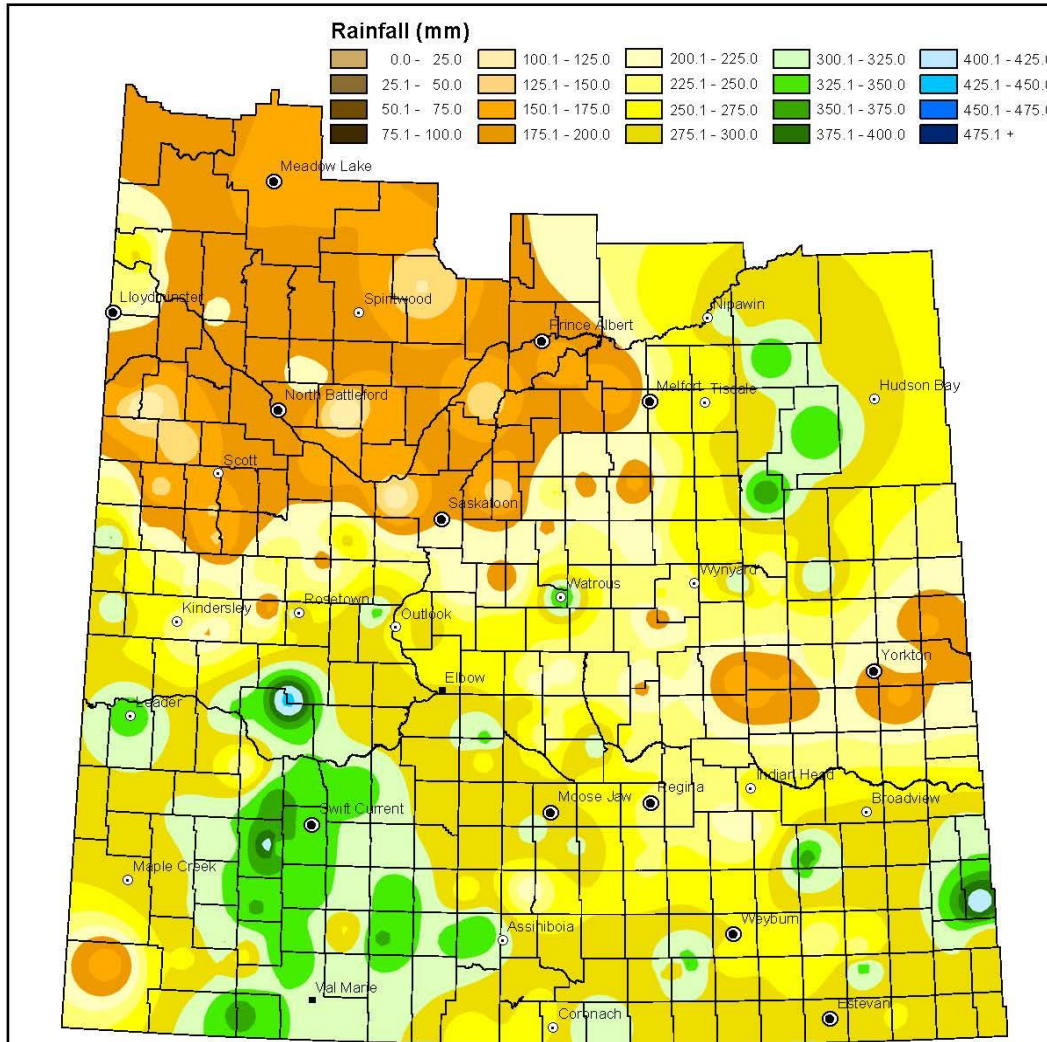


- Choose the most resistant variety available
  - Choose varieties with MR ratings

# What happened in 2016?


# Cumulative Rainfall

from April 1 to July 25, 2016



**250-300  
mm**


NOTE: Since techniques used to smooth the transition between zones can affect the values in localized areas, this map should be used for regional analysis only.



Government of Saskatchewan



0 25 50 100 150 200  
Kilometers



N

Data Source:  
Rainfall - Ministry of Agriculture, Crop Report Database  
IDW interpolation (power 2.5, fixed radius 300 km)

Geomatics Services, Ministry of Agriculture July 27, 2016

Projection: UTM Zone 13 Datum: NAD83

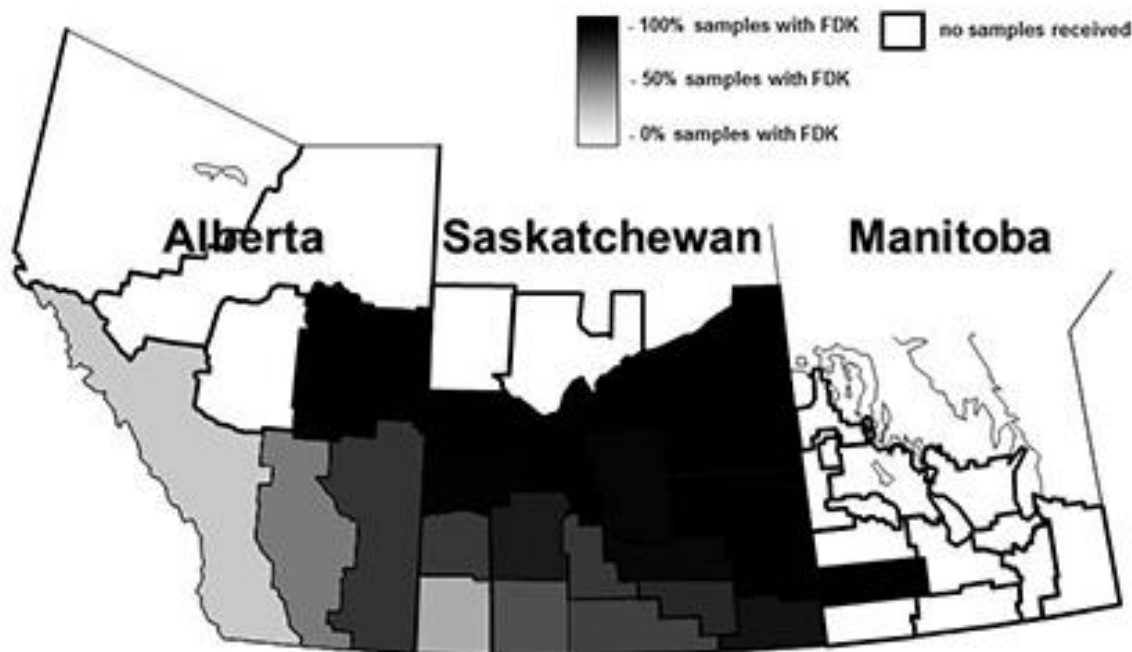
# 2016 Saskatchewan FHB survey

- FHB Symptoms were detected in:
  - 68% of the barley fields
  - 83% of the common wheat fields
  - 91% of the durum fields





# Fusarium incidence based on percentage of samples with FDK present in 2016 CWAD



## Crop District 7a (CWAD):

- Incidence (% samples with FDK) = 99.5%
- Average severity (% FDK in a sample) = 10.2%

# What does this mean for 2017?

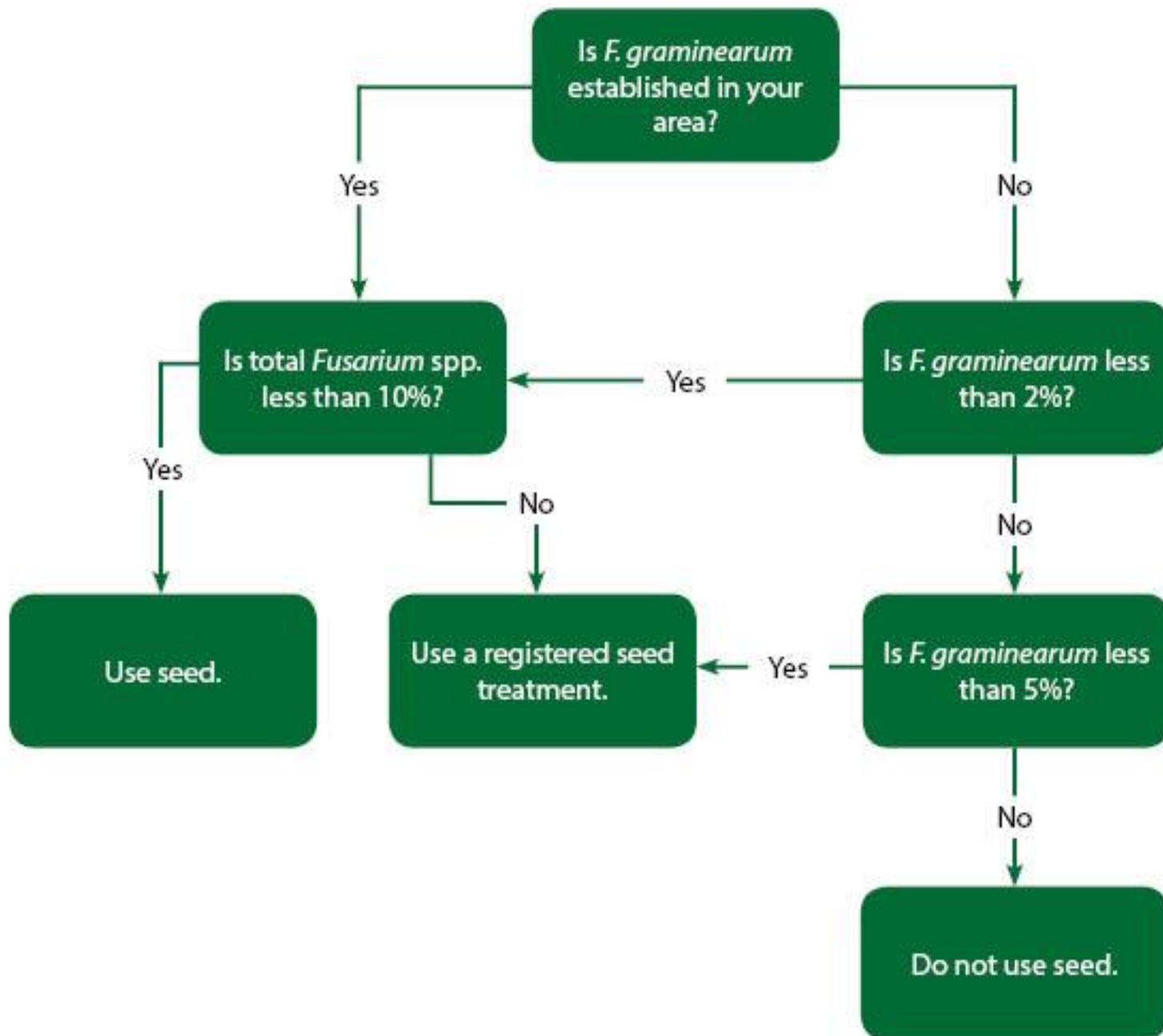
- Inoculum for disease development
- Poor seed quality and increased risk for seedling blights
- No correlation between *Fusarium* infection levels and FDK



# Seed testing

- Good investment
- Know what you've got
  - Bin-run seed
  - Certified seed
- Test all seed for disease
- **Recommend a seed test with germination and disease packages.**





# FHB management: Variety selection

## Variety selection:

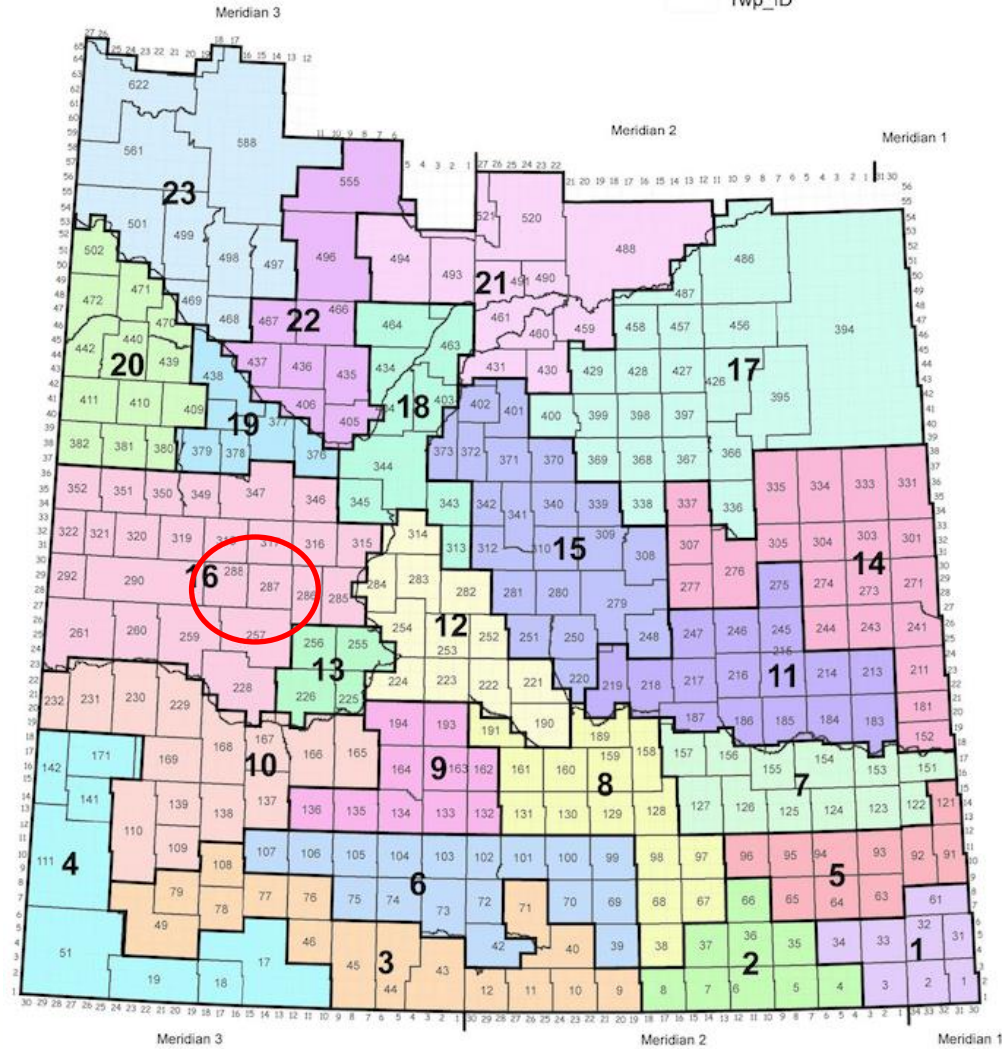
- There are differences in susceptibility of



- Choose the variety with the highest level of resistance

### Legend

- GrainsRiskZone
- RM
- Twp\_ID



# Top 5 durum varieties in 2016

## Risk zone 16

Variety	# of acres	FHB resistance rating
Strongfield	117,355	S
Brigade	65,365	MS*
Transcend	47,742	MS*
CDC Verona	47,818	MS
CDC Fortitude	15,290	MS
Total	293,570	

→ 40%

# Top 5 CWRS varieties in 2016

## Risk zone 16

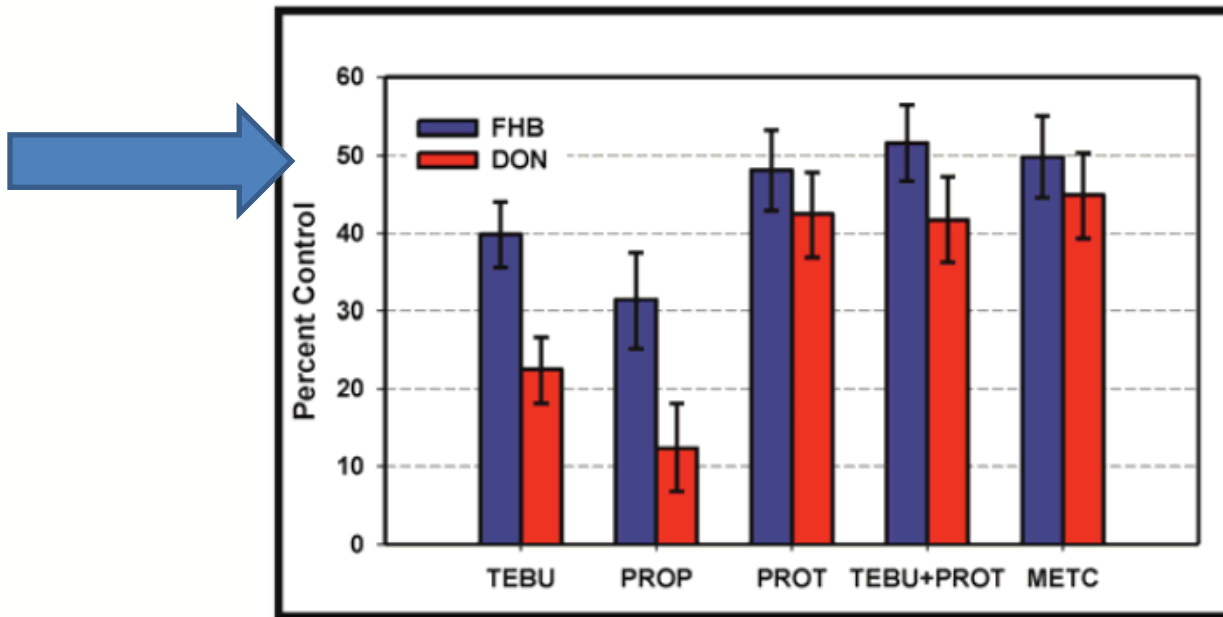
Variety	# of acres	FHB resistance rating
CDC Utmost VB	29,754	MS
Lillian	23,120	S
Shaw	19,953	MS
Cardale	16,386	MR
CDC Stanley	13,669	MS
Total	102,912	

→ 22%



# FHB management: Fungicides

- Use a registered Triazole fungicide
- Registered for suppression

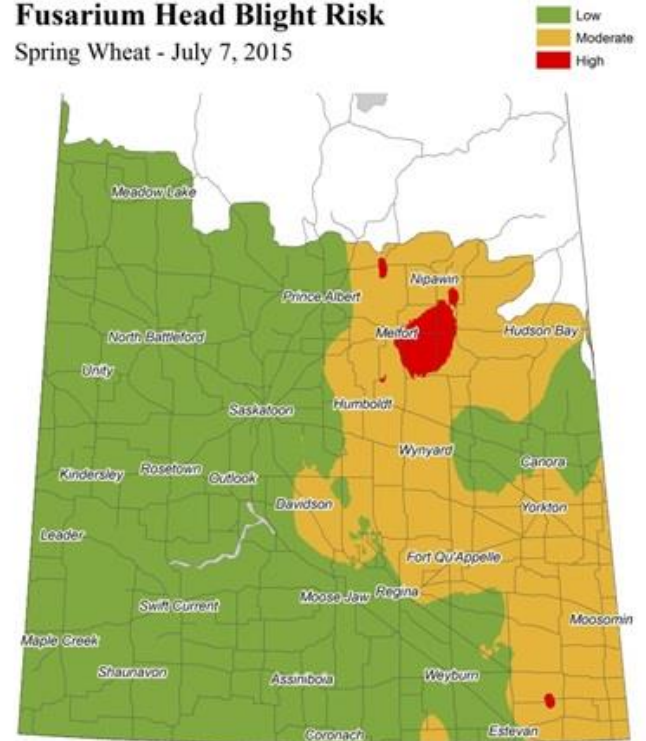


# FHB management: Fungicides

## Weather based risk maps

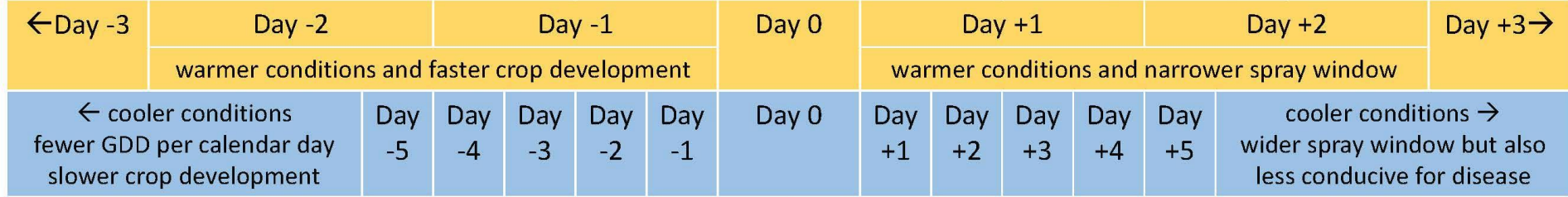
- Available on SaskWheat's website
- Need to know the stage of your crop

**Fusarium Head Blight Risk**  
Spring Wheat - July 7, 2015





<b>Assess FHB Risk</b> Step 1 – Predict Pathogen Step 2 – Stage Crop Step 3 – Watch Weather Step 4 – Crunch Numbers Step 5 – Make a Decision	↑	Flowering begins as yellow anthers become visible in middle of head. Crop will be most susceptible to FHB during flowering.	Stop spraying when 50% of the heads on main stems are in flower. Anthers turn white, dry up and blow away when flowering ends.
	↓		



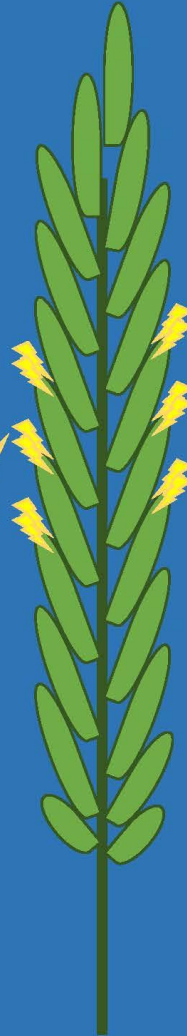
For more information, contact the Saskatchewan Ministry of Agriculture at 1-866-457-2377. Photos courtesy of Saskatchewan Ministry of Agriculture and the Crop Development Centre.

# Fungicide Timing

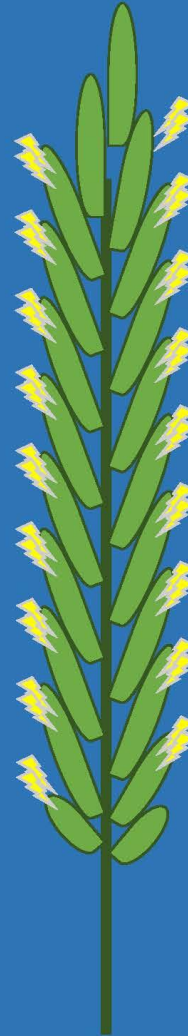
**Day 0:**  
Start spraying  
when 75% of  
the heads on  
main stems are  
fully emerged.



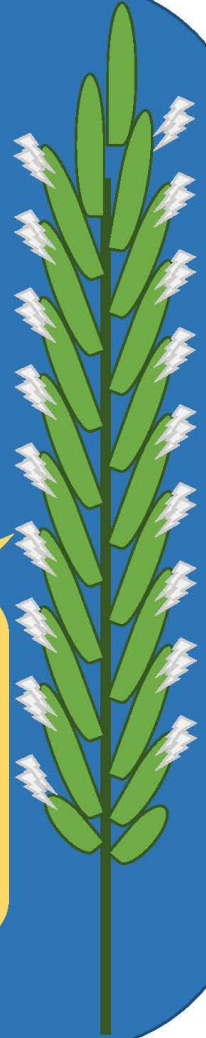
**Day +2:**  
Flowering  
begins with  
yellow anthers  
in the middle  
of the heads.  
**Perfect timing!**



**Stop spraying**  
when 50% of  
the heads on  
main stems are  
in flower.



**Day +5:**  
Anthers turn  
white and dry  
up when  
flowering is  
complete.  
**Too late!**



# FHB management

- Non-host crops (no cereals) 2 years
  - Time for infected residues to break down
- Winter wheat for alternate timing



# FHB management

- Ensure that residue is finely chopped and evenly spread



# Other management strategies

- Seeding rate:
  - Higher seeding rates may narrow flowering period



# Other management strategies

- Burning and tillage:
  - Burning may not destroy crown and root tissues
  - Tillage may improve decomposition of residue but will not remove all infected residue
- Biological control
  - DonGuard





# FHB take home points

- High levels of FHB in 2016 may impact seed quality in 2017
- Important to have seed tested for the levels of seed borne diseases
- Need to use an integrated approach for FHB management
  - Best variety
  - Fungicide application
  - Crop rotation
  - Residue management

**Any questions??**



[saskatchewan.ca](http://saskatchewan.ca)