

# Fusarium Head Blight in Idaho — What, Me Worry?



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Cropping systems and crops vary tremendously in Idaho. In cooler, upper elevation areas of Soda Springs, continuous grain has been grown for decades. In the areas around the Treasure Valley, a tremendous diversity of crops from onions to sweet corn flourish under controlled irrigation. The fertile grounds of the Palouse are a perfect niche for soft white winter wheat, legumes and grass seed production. But times they are a'changin'.

Hard red winter wheat is gaining in acreage in the northern areas. In the Treasure Valley, the TVRR will require at least 80,000 acres of high beta-glucan barley. Currently, only about 9,000 acres of feed barley are grown. The Magic Valley is becoming the Wallace and Gromit Valley. ("Cheese, please Gromit — is it Wensleydale?") While in Southeastern Idaho, corn tassels bounce in the wind all the way up the valley to St. Anthony and Ririe.

Change is good. Rotation is good. Diversity is good. I know corn is an excellent feed stock for cattle. However, I want to see **less** of it.

I am a plant pathologist. What do plant pathologists like? Why, a great plant disease epidemic, of course! Well, yes, within reason. Some plant diseases are especially frightening; (1) because once they take hold in an area, it is hard to rid ourselves of the scourge; (2) some diseases will spread rapidly in the air when the right weather conditions occur; (3) some diseases result in accumulation of vile toxins that make grain fit for neither man nor beast, bread nor beer; (4) some diseases thrive on multiple crops, causing problems over many growing seasons.

I am not worried about "some" diseases. I am worried about one disease. One disease that can be characterized by all of the descriptions above. One disease that can increase under corn production. That disease is Fusarium Head Blight (FHB), aka, Scab.

## Environmental Impacts

Conditions in Idaho produce high quality, toxin free grain that meets the needs of many industries — food, feed, fuel, and malt, mainly. The environmental conditions here favor healthy plants, and we usually have minimal disease problems, especially if you compare us with the Midwest or eastern production areas.

Meet *Fusarium graminearum*, the causal organism for Fusarium head blight of wheat and barley. You can find him almost wherever wheat, barley and corn are grown. But not in Idaho - Yet.

Previous studies have found that the most commonly isolated Fu-

sarium found in southern Idaho is *Fusarium culmorum* and it prefers cooler climates. Usually, this fungus causes foot and crown rot in dry-land grain. However, over the past five years, it is occurring with higher frequency in irrigated production, and sometimes can be found causing head blight. *F. graminearum*, on the other hand, causes head blight in lower elevation areas throughout the world where wheat and barley are grown in more humid areas.

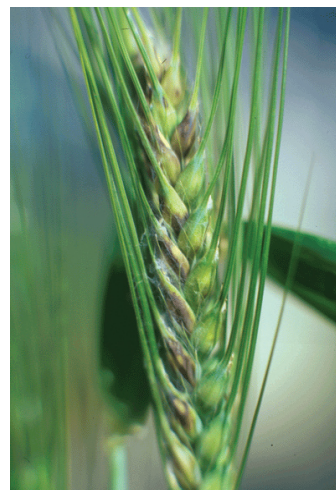
The conditions that promote Fusarium head blight in wheat and barley are well documented: humid and rainy environmental conditions at and after flowering, a source of inoculum of various *Fusarium* species, and susceptible host cultivars.

## Changing Conditions

While FHB occurs sporadically and at limited incidence, epidemics have occurred in only a few years in south central and eastern Idaho. There are several factors that may substantially be increasing the risk of FHB occurrence.

### 1) Increasing temperatures and precipitation.

*F. culmorum* is favored by cooler climates and is the most frequently isolated pathogen causing foot and crown rot and FHB in southeastern Idaho. Under very similar environments, Montana has regularly occurring FHB outbreaks in wheat and barley production caused by *F. graminearum*, while southeast Idaho maintains relatively FHB free.



Scab in Wheat.

Environmental conditions, such as very dry southwesterly winds coming off the high plains desert, may effectively prevent infection in southeast Idaho. Various climate models are predicting an increase in temperatures in the Pacific Northwest and Intermountain West regions. Precipitation may increase 20%, with a decrease in snowpack duration. This changing environment may enhance the potential for FHB development, with conditions in Idaho becoming more similar to Montana, where estimates of FHB related damage occurred on up to 250,000 acres in 2006.

### 2) Increasing acreage of corn production.

The dairy industry in Idaho has continued to expand and ranked 4th in the nation for production in 2006. As a result, the corn acreage planted in the last ten years has more than doubled.

Corn acreage in Montana has been rising, and is predicted to keep

increasing in response to the needs of the biofuels industry. *F. graminearum* multiplies and persists on corn residues, FHB yield loss is greater when wheat follows corn or wheat, and DON toxins were highest when wheat followed corn.

With the increase in corn acreage in the Netherlands, a shift from *F. culmorum* to *F. graminearum* occurred. Scab has increased with no-till wheat and corn acreage in the upper Midwest, the West and Australia. The addition of corn to the rotation in Idaho and Montana's crop production may place wheat and barley production at an increased risk.

### 3) Increased aggressiveness of Fusarium Crown Rot and FHB.

Outbreaks in Montana of FHB have been severe only within the last four years. It's possible that the increase in Montana may be related to an introduction or increase of the same *F. graminearum* strains that are prevalent in the Upper Midwest. It may be that those strains are not yet prevalent in Idaho. In addition, research indicates that *F. graminearum* is causing disease in potatoes and sugar beets.

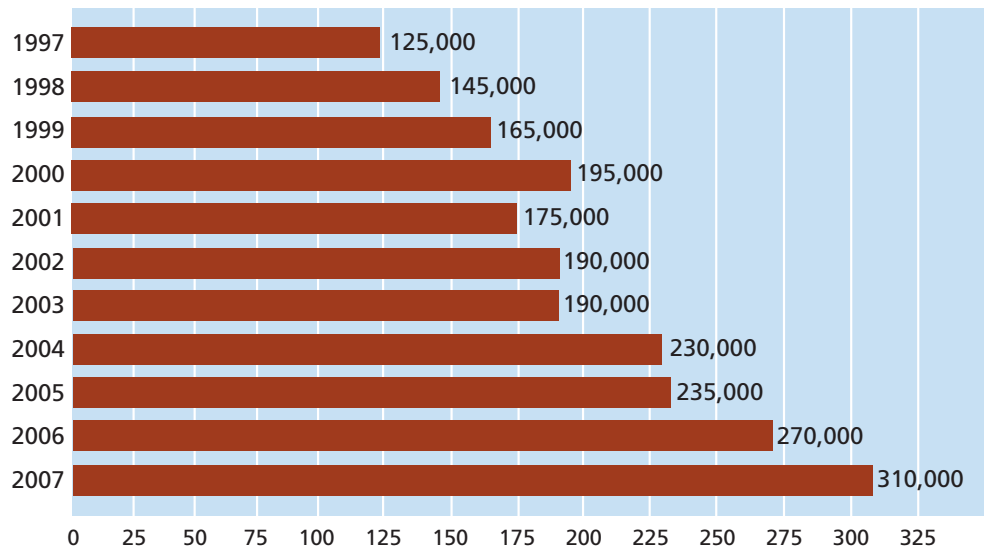
Fusarium foot and crown rot, normally a dryland production disease, has been increasing in incidence and aggressiveness in irrigated winter and spring wheat production in southeast Idaho and Montana. Head infections of *F. culmorum* resulting from heavily infected crowns and stems are also increasing under irrigation. Are both of these pathogens becoming more aggressive? If so, why?

### Control Options

With the risk factors changing for small grains production in southeast Idaho, we need research to investigate the environmental conditions under irrigated and dryland conditions that are or are not conducive to FHB. Currently available models should be tested and modified for the Intermountain West, and then utilized to predict how the change in climate, crop rotation and/or pathogen aggressiveness and prevalence of fungal strains may influence the development of FHB in the future.

What's the prognosis if the disease becomes a problem here? Controlling infection during wet weather at flowering is critical. Modifying the irrigation cycle may be possible. If the weather is favorable, fungicides applied to the head at flowering will reduce infection. Timing and coverage is critical. Some cultural practices (rotation, residue destruction) may reduce the fungus on and in the soil.

## Field Corn: Acres Planted – Idaho



The best option would be the use of resistant varieties. Since FHB hasn't been a consistent problem here in the past, few of the currently grown cultivars are resistant. However, Jianli Chen, the University of Idaho wheat breeder at Aberdeen, is screening, selecting, and breeding for resistance in many of her lines.

All of these practices will be critical to fighting the disease as there is zero tolerance for the toxins associated with the fungus. Deoxynivalenol, also called vomitoxin for obvious reasons, can accumulate in grain even at low levels of fungal grain infection.

I am not predicting that Fusarium head blight will become a serious threat to Idaho grain production. I cannot be sure. However, my opinion is "prevention is worth a ton of cure". Maybe those hot dry winds will always be there to discourage the disease. But times they are a'changin'. And I wouldn't bet the farm on it.

*NOTE: For additional information or references to materials included please contact Dr. Juliet Windes, [jwindes@uidaho.edu](mailto:jwindes@uidaho.edu), (208) 529.8376. ♦*

