



Oregon State
University

Christina H. Hagerty, PhD
Columbia Basin Agricultural Research Center
Oregon Wheat Faculty Scholar
Oregon State University
48037 Tubbs Ranch Road
Adams, Oregon, 97810
541-990-9673
agsci-labs.oregonstate.edu/cerealpathology

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To: Growers and Stakeholders
From: Christina Hagerty, Don Wysocki and Larry Lutcher
Re: Frost Damage on Winter Wheat

Dear growers and stakeholders,

Given the advanced growth stage of the current winter wheat crop, recent freezing temperatures across the Columbia Basin may have caused injury to the wheat head of the primary tiller — the most advanced tiller on the plant.

Symptoms also resemble herbicide injury; however, the pattern of damage observed is more typical of frost than herbicide effects. Herbicide damage was considered unlikely because injury was concentrated on the primary tiller, was widespread across the region, and was observed across all herbicide classes and timings and genetic backgrounds (Clearfield, CoAXium, and conventional varieties).

Symptoms also include Fusarium head blight (FHB), but several key differences can help distinguish the two issues.

Freeze damage that occurs while wheat is in the boot stage can reduce kernel set because florets are injured prior to flowering. In contrast, FHB infects wheat during anthesis (flowering), so kernels are typically formed but become shriveled and lightweight. In addition, FHB-infected heads often develop greyish or pinkish fungal growth that can be observed with the naked eye. FHB symptoms also generally appear later in the season, typically after the dough stage.

Overall, this issue is unlikely to have a major impact on regional yield, but the symptoms are notable and have been observed across widespread acreage in the Lexington, Pendleton, Adams, Helix, and Athena areas, warranting this announcement.

If you would like to learn more about freeze and cold injury in winter wheat, Texas A&M has an excellent bulletin: <https://sanangelo.tamu.edu/agronomy/agronomy-publications/freeze-injury-on-wheat/>

If you want to learn more about FHB, here is a link to our diagnostic guide:
<https://apsjournals.apsnet.org/doi/10.1094/PHP-10-22-0110-DG>



Picture 1. Cold injury of awnless winter wheat at the Columbia Basin Agricultural Research Center.



Picture 2. Cold injury of awned winter wheat at the Columbia Basin Agricultural Research Center.



Picture 3. Cold injury of winter wheat sometimes only impacts rachis strength, leading to “kinked” wheat heads.

Why is the middle of the head impacted?

Envision a wheat head in the boot stage that is only partially emerged. If freezing temperatures settle on the head overnight, the upper and lower portions of the head may still be partially protected by the flag leaf sheath, while the exposed middle section remains vulnerable to injury.



Picture 4. Partially emerged wheat head, with the upper and lower portions still protected by the flag leaf sheath.