

2021 GRAIN TRIAL DATA

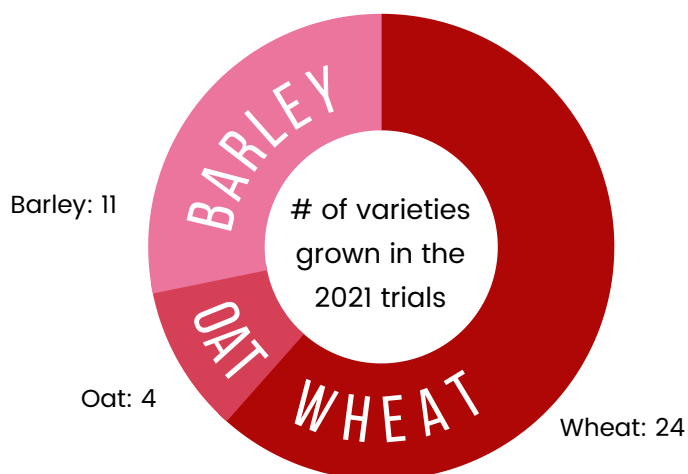
A glance at the data from the 2021 grain trials in the Colorado Front Range.

The 2021 grain trials worked with ancient and heritage grains grown by 5 farmers across the Colorado Front Range, ranging in size from 1 to 50 acres. While one farmer grew over 30 varieties on 1 acre with the mission of seed preservation and variety experimentation, another farmer grew 40 acres of one variety to be sold to markets for milling and baking.

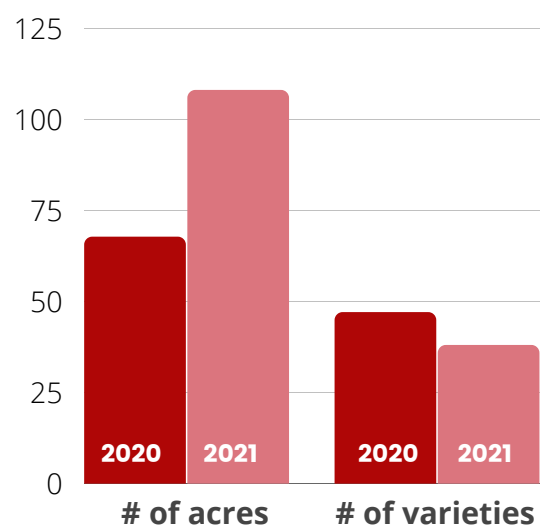
2021 was wet and cold in the beginning months, with 4 inches above year-to-date average precipitation. This weather caused delays in some wheat plantings, but generally added helpful moisture to the developing crops. Although most of Colorado saw record lows of precipitation during the summer months, Boulder County actually received more rain than usual, allowing several grain farmers to lower their water inputs significantly.

Read below to see trends in Front Range grain farming and learn more about the morphological and developmental differences between grain varieties.

TRENDS IN THE FRONT RANGE



Most of the grains in the 2021 trials were wheat, with 24 varieties, followed by barley with 11 varieties, and oats with 4 varieties.



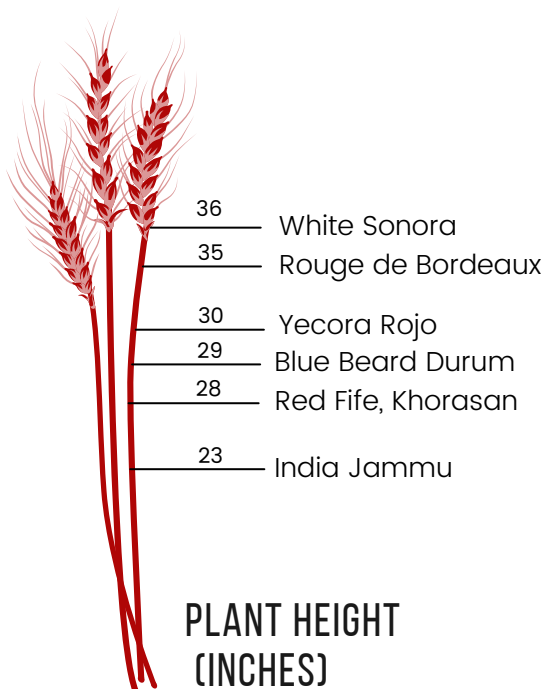
The Front Range saw a growth of 40.25 acres between the 2020 and 2021 seasons and a decline of 9 varieties.

While most of the 2021 varieties were grown on a small experimental level at less than half an acre each, seven varieties were grown at larger scales and will be the focal point of the data analysis for the sake of sample size.

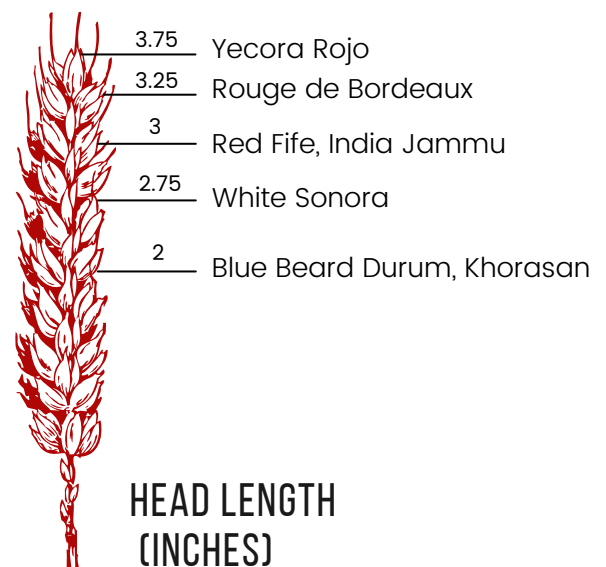
White Sonora: 45 acres
Red Fife: 38 acres
Rouge de Bordeaux: 11 acres
Khorasan: 4 acres
Blue Beard Durum: 4 acres
India Jammu: 4 acres
Yecora Rojo: 4 acres

PHYSICAL CHARACTERISTICS

Compared to modern varieties that are bred for short stems and large, thick heads, ancient and heritage grains exhibit a wide variety of lengths and sizes. Often, heritage grains can be difficult to grow because tall stems are more prone to lodging and smaller heads often result in lower yields.



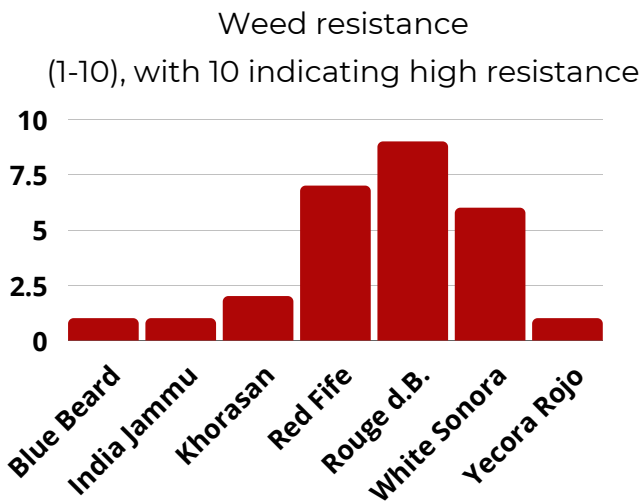
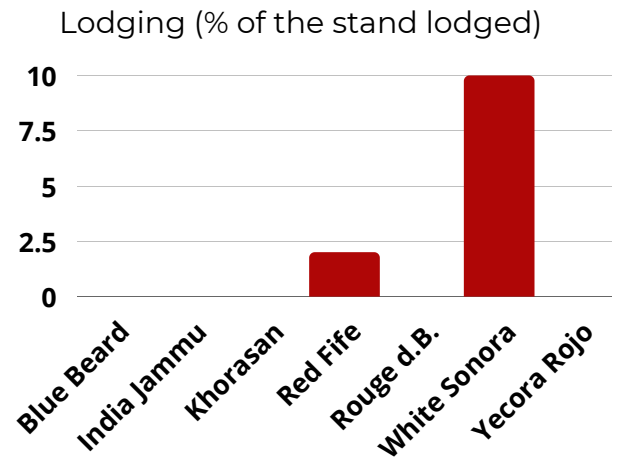
Plant height was measured from the ground to the base of the head, averaging measurements from four random samples.



Head length was measured from the base of the head to the tip, excluding awns. Measurements were averaged from four random samples.

LODGING

No significant connection was found between the heights of varieties and lodging. Midsummer hail in Boulder County caused a decent amount of lodging for several farms. While lodging data from the 2021 season is more likely connected to the unique conditions of the field and exposure to inclement weather, White Sonora stood out as an especially solid-stemmed variety.

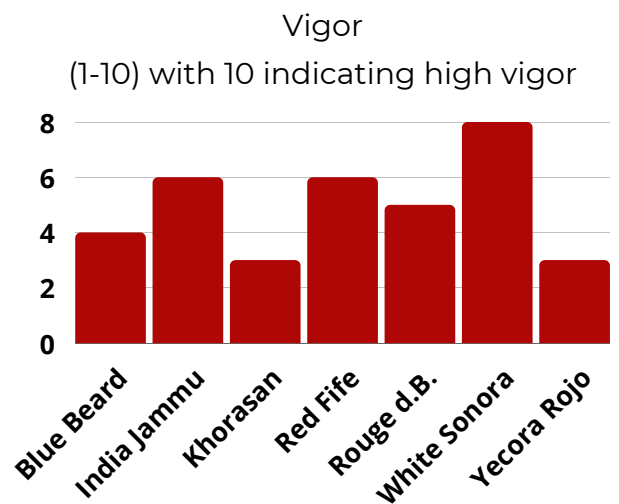


WEED RESISTANCE

The most prominent weeds in the 2021 grain trials were bindweed, sunflower, pigweed, lamb's quarter, and foxtail. Weed resistance scores are calculated based on the plant's ability to suppress weed growth, rated on a scale from 1 to 10. A high score indicates high weed resistance (few weeds observed).

VIGOR

Vigor is a measurement of the health, strength, and volume of the grain stand. The varieties were rated on a scale from 1 to 10, with 10 indicating high vigor. The most frequent cause of a low vigor score in this year's trials was an inundation of tall weeds in the stand.



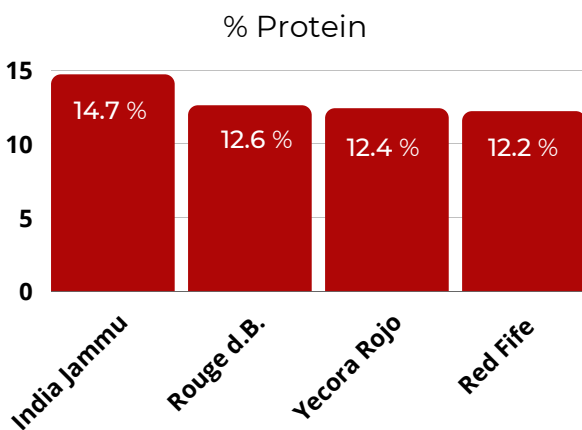
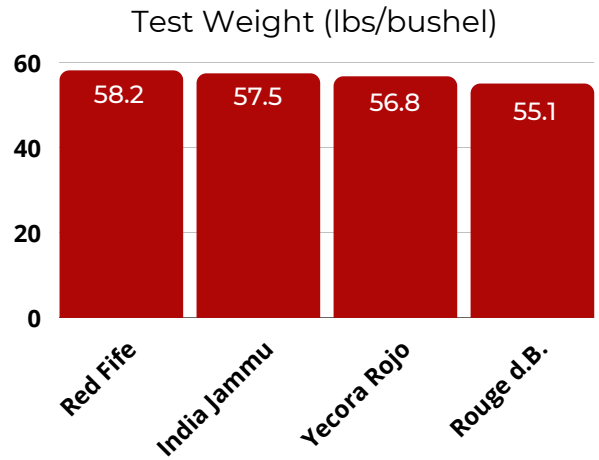
DISEASE PREVALENCE

There were very few indications of disease in all of the 39 varieties. A few plants exhibited signs of loose smut, tan spot, and Mosaic virus, but the symptoms were not widespread and these samples were never tested to confirm infection.

The following data include the lab test results for 4 varieties: India Jammu, Red Fife, Rouge de Bordeaux, and Yecora Rojo.

TEST WEIGHT

Test weight is a volumetric measurement of grain weight per bushel. The USDA standard weight for wheat is 60 pounds/bushel. Higher test weight grains have more nutrient density. Although a common misconception, test weight does not reflect yield.

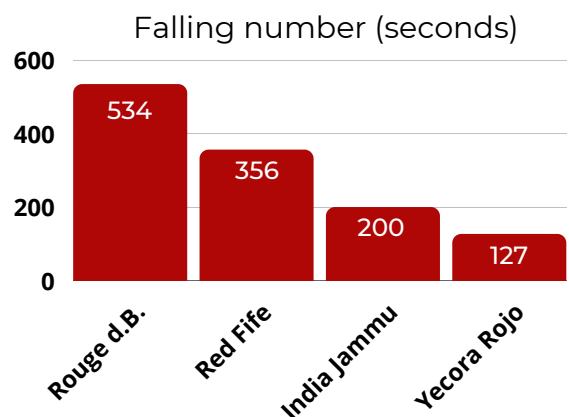


PROTEIN

Protein content is a key consideration in the end use of the grain and its market value. Higher-protein wheat is more absorbent, creating high loaf volumes and longer shelf life. Protein content varies greatly depending on the variety of wheat, environmental conditions, and fertilizer inputs, especially nitrogen. Bread flour is typically 12-14% protein.

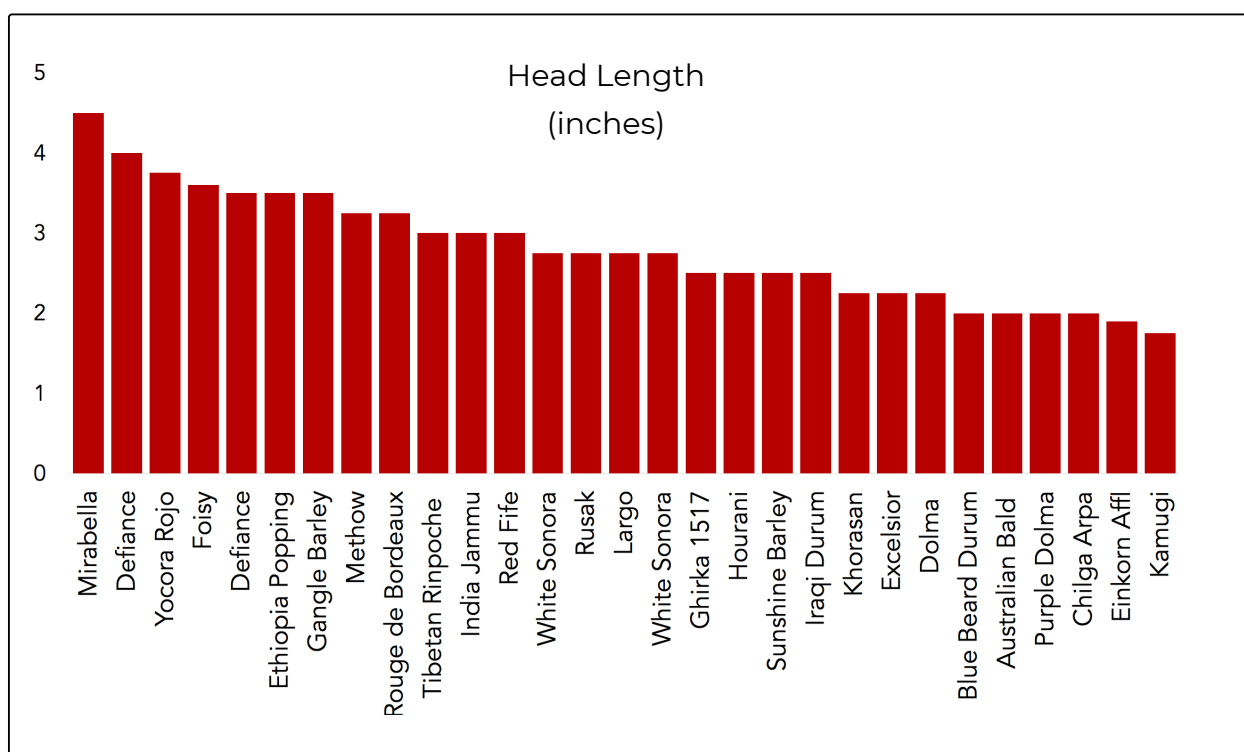
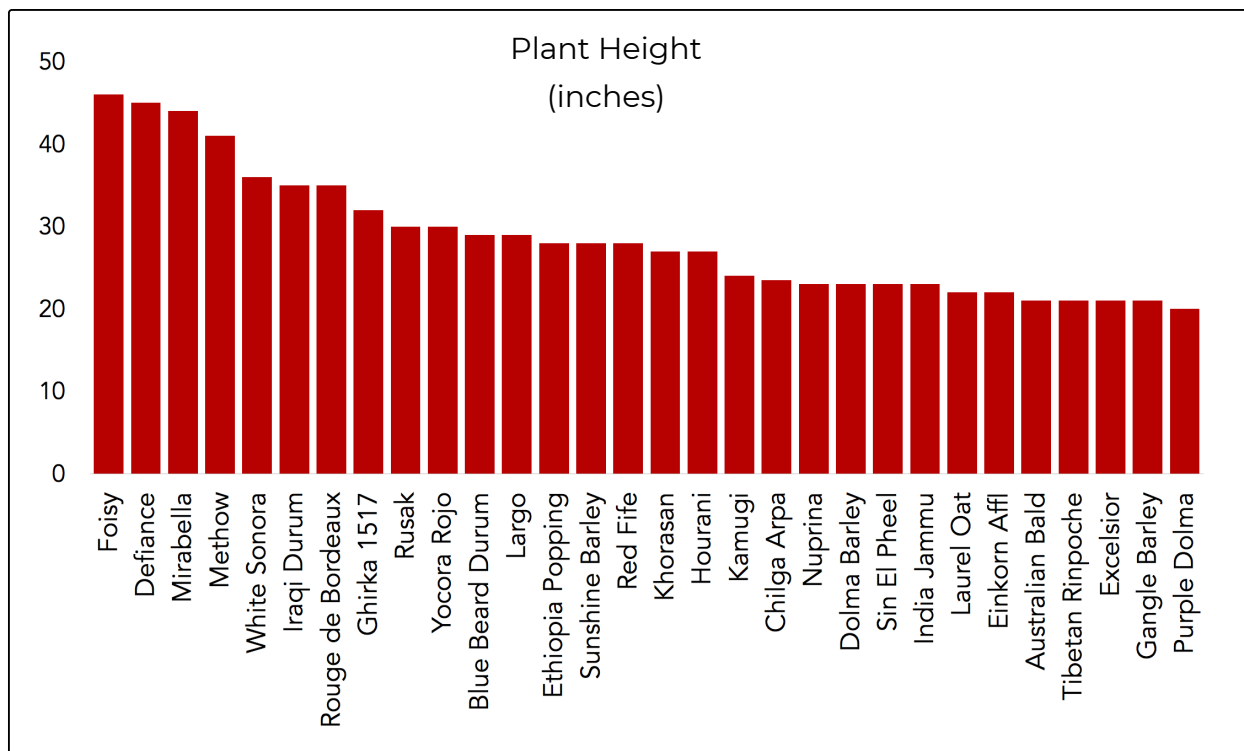
FALLING NUMBER

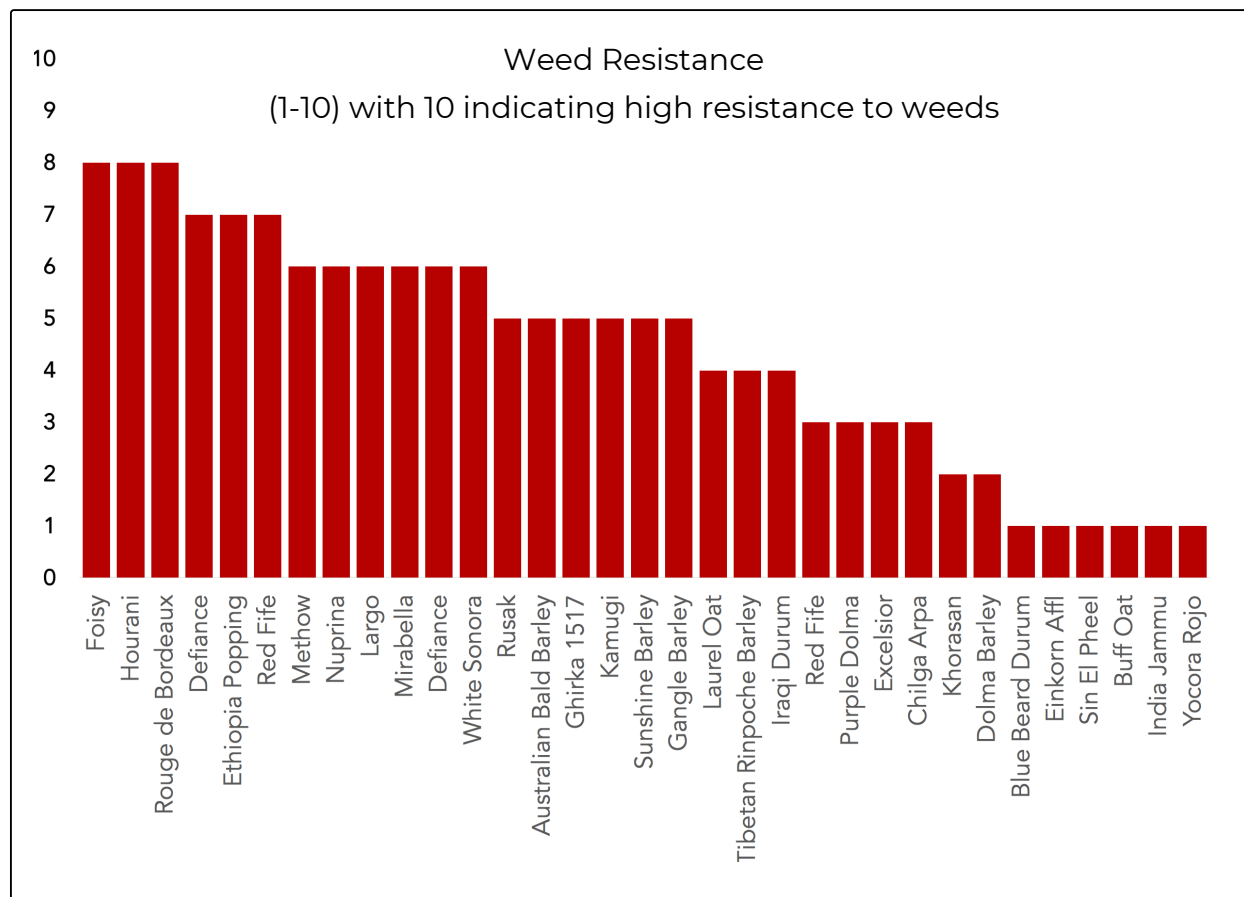
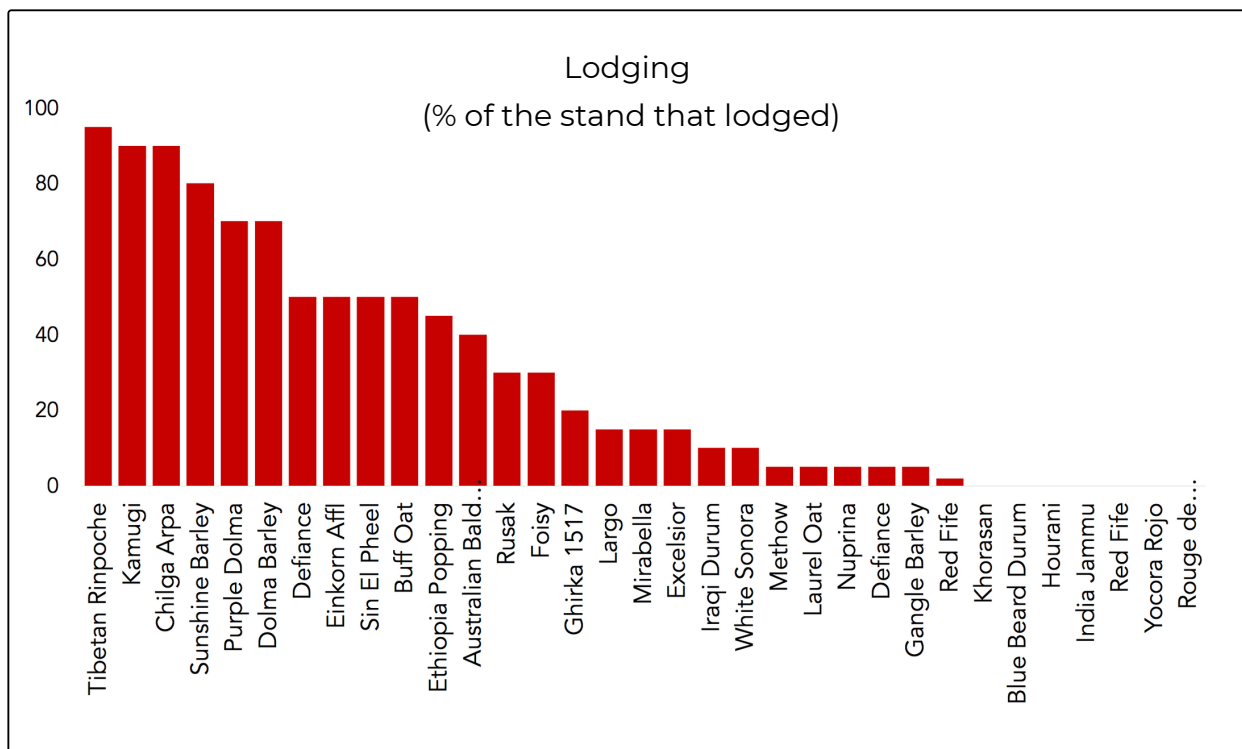
Falling number refers to a test that detects alpha amylase activity. In high amounts this enzyme breaks down starch chains and significantly reduces grain quality. The lower the falling number, the higher the enzyme activity, and thus the lower the quality of the grain. A falling number above 200 is ideal.

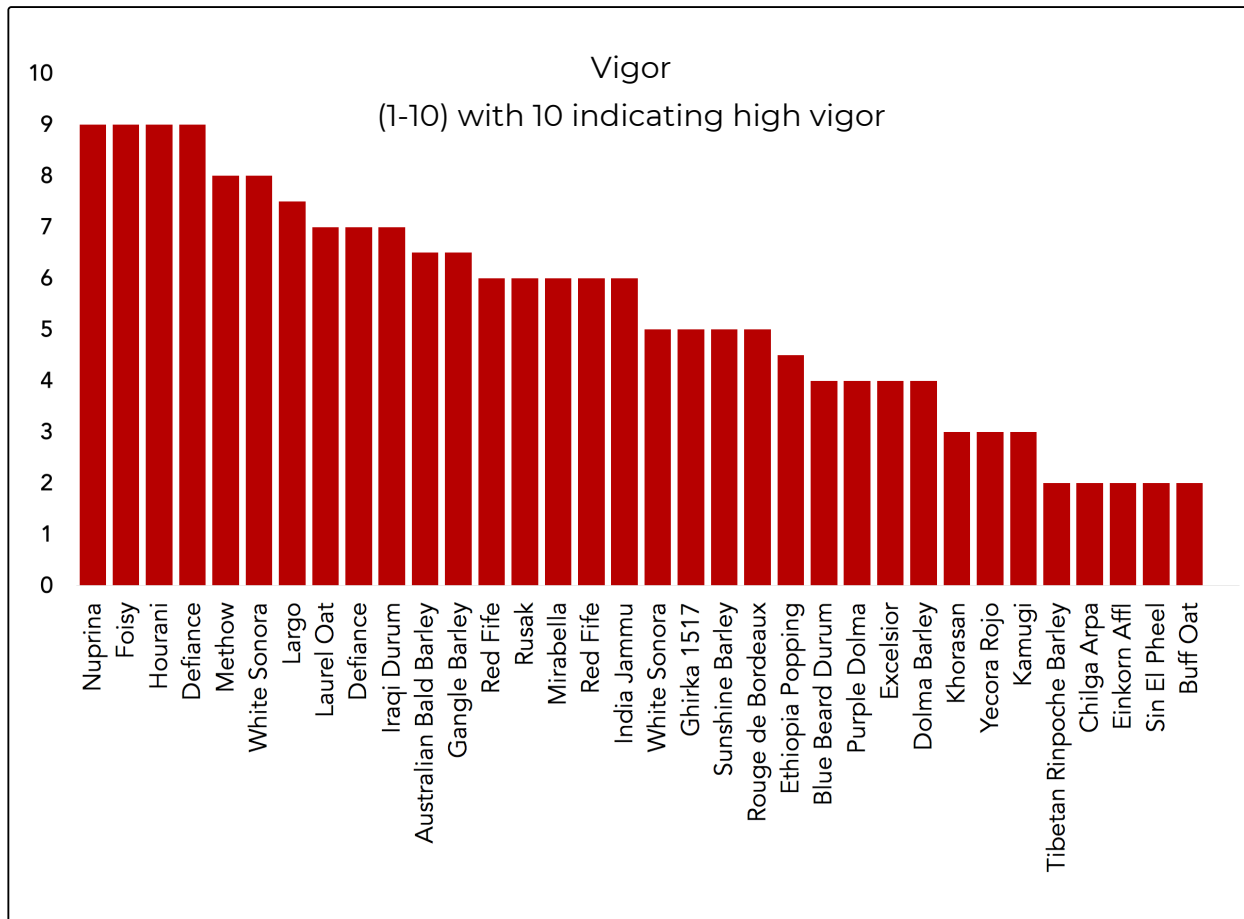


DATA INCLUDING ALL VARIETIES

Curious about a variety not included in the data above? The following graphs will give you a comprehensive overlook for all 30+ varieties grown in the 2021 Front Range grain trials.







Resources

Isleib, J. (2012). Test Weight in Small Grains. Michigan State University: MSU Extension. Retrieved from: https://www.canr.msu.edu/news/test_weight_in_small_grains

Whitney, T. (2017). Why Grain Test Weights Matter. University of Nebraska-Lincoln. Retrieved from: <https://cropwatch.unl.edu/2017/why-grain-test-weights-matter>

Cato, L., Mullan, D. (2020). Wheat Quality: Wheat Breeding and Quality Testing in Australia. Breadmaking: Improving Quality. Retrieved from: <https://www.sciencedirect.com/book/9780081025192/breadmaking>

Pennington, D. (2017). What causes low, falling numbers in wheat? Michigan State University Extension. Retrieved from: https://www.canr.msu.edu/news/what_causes_low_falling_numbers_in_wheat

Washington Association of Wheat Growers. (2021). Retrieved from: <https://www.wawg.org/>