



## Wyoming First Grains Project

Spelt, emmer, and einkorn are early predecessors of modern wheat (*Triticum* spp.) and are some of the many “ancient grains” gaining popularity with consumers and chefs. The market has seen a 269% increase in processed food products labeled as “ancient” between 2010 and 2016 due to their nutritional qualities and flavor profiles. Some people with gluten sensitivity can eat older wheat varieties like einkorn and emmer without adverse effects. Previous research has shown that these early cereal grains have higher nitrogen use efficiency, higher water use efficiency, and stronger disease resistance compared to many modern wheat varieties.

The *Wyoming First Grains Project* is a research and economic development effort of the University of Wyoming. We have established field trials on five farms and three research stations across the state and are working with malters, brewers, and commercial bakers to develop markets. On-farm plots range in size from 1 to 3 acres and include a combination of dryland, irrigated, conventional, no-till, and certified organic production systems.

These early wheat varieties are not free-threshing. This means the grain does not come out of the hull at harvest and requires an extra processing step before use. They are also lower yielding and more likely to lodge than modern wheat cultivars when grown in high-input systems. However, research in other regions shows that these early wheats thrive in marginal conditions and outperform their modern cousins when water and nutrients are limited.

### **Field Trials:**

Field trials were established to study the nitrogen and water demands of spelt, emmer, and einkorn; evaluate crop performance in three Wyoming growing regions; and quantify costs and benefits associated with growing these grains in the state. At the same, we are working to develop local markets for cooking, baking, malting, and brewing with ancient grains, and supporting the establishment of associated industries in Wyoming. In 2019, we are growing ‘Stone Age’ einkorn, ‘Lucile’ spring emmer, ‘Ethiopian Blue’ spring emmer, ‘CDC Origin’ spring spelt, and ‘Sun Gold’ winter spelt.

Small plots (3 nitrogen X 4 crop treatments) at three UW research stations will provide detailed information about water and nutrient use, heading date, lodging, pest pressure, harvest date, yield, and grain quality. On-station trials will include both fall and spring planted plots, under irrigated and dryland conditions.

We are collaborating with five farmers across the state to grow larger test plots (1-3 ac) of the five cultivars under a variety of production systems including conventional tillage, no-till, certified organic, dryland, and irrigated. Funding for field trials is provided by Western SARE.

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**Einkorn** (*Triticum monococcum*) was one of the first cereal grains domesticated and grown for food in the fertile crescent (Tigris-Euphrates region). It was widely cultivated throughout the Near East, Mediterranean region, southwestern Europe, and the Balkans during the Neolithic and early Bronze Ages (10,000-4,000 B.C.). While einkorn is more nutritious than modern wheats (higher in protein, fat, phosphorus, potassium, and beta-carotene) the dough quality (gluten) is considered inferior for baking. Einkorn is a diploid wheat with only 2 sets of chromosomes. There are some reports that people with gluten sensitivity can eat einkorn without adverse effects.



**Emmer** (*Triticum dicoccoides*) and barley eventually replaced einkorn as the dominant cereal grains near the end of the Bronze Age. The addition of another genome gave it four sets of chromosomes (tetraploid) and allowed it to thrive in a wider range of conditions than einkorn. It was more widely used than einkorn, but was eventually replaced by the naked wheats. Similar to einkorn, emmer tends to outperform other grains under marginal conditions. It is less challenging to bake with than einkorn but still considered inferior in dough quality compared to modern wheats. In 1915, the Worland Grit newspaper carried several articles and advertisements about the new Emmer Products Company in Worland and their “emmer breakfast food”.

**Spelt** (*Triticum spelta*) is even more widely adapted than einkorn and emmer due to the addition of a third genome from a wild grass, giving it 6 sets of chromosomes. Like modern wheat, this makes spelt a hexaploid. More crop breeding and cultivar selection work has been done with spelt than the other early wheats and as a result it has less of a tendency to lodge and is higher yielding. There are also several forage spelt cultivars. Spelt and emmer production in the U.S. peaked in the early 1900s at nearly 600,000 acres. Spelt is easier to bake with than the other ancient wheats and is still used in many commercial bread products in the U.S and Europe.



For more about the Wyoming First Grains Project visit: [www.uwagec.org/neolithicbrand/](http://www.uwagec.org/neolithicbrand/)

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