



Central NC Observational Trial: Small Grain Varieties for Use in Baking

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Introduction

I am a baker with a small business interested in finding new grain varieties with interesting flavors or other distinctive baking qualities. From sampling and baking with about 4 dozen different small grain varieties, I know from experience that there is a wide variation in these characteristics and that modern small grain breeding is for the most part not interested in exploring them. This is my first solid effort to explore a bunch of new varieties I have never tried before against a few I do know.

Variety Selection and Sources

A complete listing of varieties in the trial is provided in the table on the final pages of this report. I had seen grown in our area two of the varieties: Appalachian White Wheat and Red Fife Wheat. The other 39 I don't think had any recent history of being grown in our area and so were meant to be a large observational set with essentially the majority expected to fail.

I attempted to get a wide variety of heirloom/landrace species to try to find some successful varieties outside of just common bread wheat. I am extremely limited by the varieties which are available and also don't have the knowledge or access to the large seed banks.

Trial Locations and Production Practices

Root Down Farm; Cedar Grove, NC. Site is on a minor hill with some slope. The bed I planted in was laid out roughly North/South. Farm focuses on vegetable/fruit production and prepared for this trial a 200' x 3' raised bed. The farm uses organic type of methods, an active cover crop and rotation plan, and does basic additional amendments to get NPK and soil pH in acceptable bounds. Unless otherwise indicated, plants were started in the greenhouse and then transplanted at a 1' hexagonal spacing in roughly 3'x10' blocks (1 block per variety). Occasional hoeing was done in between plants, some fertilizer added, but no irrigation, pesticide, herbicide, or fungicide applied at any point in the process. Put seeds in trays 10/28/13 in greenhouse. Each tray had 8 varieties and 16 cells per variety. Kept in greenhouse, but hardened off a few days before transplanting 11/18/13 (direct seeded the two varieties noted in the details).

3/5/14 Update

Many good looking 8" diameter crowns of grains that were planted in the Fall. It looks like all the Barley varieties got killed off and a number of other things, but overall still a good sampling to see through the Spring growth. I'm excited to see too that 3 of the Perennial Rye (Mountaineer) are looking strong - only 9 of 16 seedlings got transplanted and I had read that you'll see lots of variation in the seed stock so it's good to see we ended up with something to watch. Also exciting to see other interesting varieties like Poulard Wheat, Einkorn, Dinkel Spelt, and Red Lammas Wheat doing well. The spacing might look way too big, but the plants look so much happier than the two wheat varieties direct seeded at the more typical spacing and that is what is recommended with these heirloom varieties. Still I can see how you might want the crowns touching at this point for Spring weed suppression. We'll see how they fill out.

6/3/14 Update

Tallest about 5'. No significant lodging and very little disease shown. Einkorn was the only one that hadn't headed out. About 6" gap between plants with the 1' spacing so should really do a 6" spread, try planting earlier, etc.

6/23/14 Harvest

Harvested most of the grains. Some variation in dryness and lots of variation in productivity.

7/7/14 Final Harvest (only for small number noted as late maturing)

Data Collection and Results Summary

A complete listing of data collected and results is in the trial is provided in the table on the final pages of this report. Qualitative data includes the following:

Grade: My A through F overall assessment of how interested as a baker I am in continuing the planting/improvement of the variety. The pictures taken include a wide view of the shock against a ruler and should help to compare the quality of the stand, height/variation, and to identify varieties. They also include a closeup of small set of hand hulled grains.

Est. Bran Size: I used a mortar and pestle to manually grind 5 grains of each variety and used this to give it a grade of how well a grist mill would do in breaking up the bran which is a pretty good indicator of hardness of the variety and thus protein level and just a helpful observation. Large bran size with soft wheat for instance makes it easy to sift the flour through a coarse screen and get what is called a high extraction flour with lots of flavorful wheat germ, but a low amount of bran and a fine flour texture.

Comment: Notes on overall health of the individual plants or the stand; any evidence of disease; any evidence of lodging.

Bake Test: Did 10 varieties total with some of the leading contenders. I did a tortilla recipe because it was easy to bake and keep them separate. 40g flour (50 g measured and coarse sifted); 1 g salt; 5g light olive oil; 16g water. Because the amount was smaller than my scale accuracy, I multiplied all the non-flour ingredients by 10 and divided them out roughly evenly by volume. Baked them longer than normal to get crispier and to encourage some more browning to see that aspect of baking on flavor.

Quantitative data: Since larger grains correlate well to flour quality and best kept as planting seed, I put the grains through an appropriate screen sift for the variety and then measured where possible the volume and weight of both what stayed on top of the screen and what fell through. Density, est. bushels/acre, and row feet I could plant with the variety should all be considered wildly speculative calculations, but it helped me to see these to give an overall grade to the varieties. (All the shaded cells are calculations) Overall for the varieties that thrived, pest/disease damage didn't seem to significantly affect the harvest. This will have to be observed more as these trials are scaled up. This was a good grain growing season with adequate rain and then enough sun to let the grains harden off in May through July so more difficult growing conditions might put a lot more stress on these varieties that wasn't seen this year.

Sirvinta Wheat

Best productivity of everything I tried and medium bran size so protein/hardness/flour quality should be pretty good. However Sirvinta, Ukrainka, and Banatka were close. Among these three Banatka won the flavor tests easily. Sirvinta had a mild flavor and Ukrainka was in the middle and perhaps my best overall personal preference.

VT Read 1898

Best of my trial soft wheats/soft flour feel. Bake test between it and Red Lammas: VT Read won the flavor test 5 to 1. I think it is good flavor for a white wheat and the Lammas was OK, but didn't have a great after-taste.

Blau Emmer

Only Emmer to do well and grain heads are a lovely blue-gray offset by light tan stalks. Flour also milled up super nice with small bran.

Mirabella

This was the best performer of my Kamut look-alike and so even though productivity was very low it is worth trying another year to see if seed selection can improve it

Mountaineer Perennial Rye

My only perennial and it shows promise especially since 1st year production could be lower than 2nd year

Ardennes Spelt

Beat out Uberkulmer by just a little. Customer flavor preference was 6 to 4 for Ardennes, but I think Uberkulmer still has a better looking flour and more flavor. Sungold would still beat it in productivity so no solid candidate to pursue and will compare all these 3 varieties further.

Triticale Pika

Looks like might be too much Rye. Productivity not that great so I think better to just do Rye since will be much harder to sell a wheat/rye mix. Nice mild Rye flavor, but super weak dough and productivity so low I don't think it will help to grow a non Rye unless you just wanted good straw.

Seed Savers Exchange Varieties Listed: Sirvinta, Ukrainka, Banatka, VT Read 1898, Blau Emmer, Ardennes, Uberkulmer

Grade	Species	Variety	Hardness	Screen Cut	High		Low		Total Wt.(g)	Est Bu/ Ac	Est Bran Size (Grist mill)	Row Ft @6"	Comment
					Vol (ml)	Wgt (g)	Vol (ml)	Wgt (g)					
A	Common Wheat	Banatka	Hard	6/64	300	242	175	138	380	41	Small	531	
A	Common Wheat	Sirvinta	Hard	8/64		50	600	462	512	55	Medium	110	Thinner looking stand, but best productivity of everything I tried and medium bran size so protein/hardness/flour quality should be pretty good.
A	Common Wheat	Ukrainka	Hard	6/64	350	272	200	130	402	43	Medium	596	Harvested, good stand, but some bent stems. Some disease on 1 plant.
A	Common Wheat	VT Read 1898	Soft	8/64	100	64	340	258	322	34	Large	140	Good stand w/very thick straw and some very bushy stalks. Best of my soft wheats/soft flour feel. VT Read won the flavor test 5 to 1. I think it is good flavor for a white wheat and the Lammas was OK, but didn't have a great after-taste.
A	Emmer	Blau	N/A	6/64	275	180	125	100	280	30	Small	395	Matured late. Only Emmer to do well and grain heads are a lovely blue-gray offset by light tan stalks. Flour also milled up super nice with small bran.
A	Khorasan ?	Mirabella	N/A	8/64	10	8	50	42	50	5	Medium	18	Thin/weak stand overall. This was the best performer of my Kamut look-alike and so even though productivity was very low it is worth trying another year to see if seed selection can improve it.
A	Perennial Rye	Mountaineer	N/A	1/13	125	110	25	26	136	14	Medium	241	Rye very tall w/good lower tillering, but looks later heading out than other varieties. Acting like a perennial still with some stalks still green. Smaller than normal Rye seeds.
B	Common Wheat	Bezbanat	Hard	7/64	225	170	150	116	286	30	Large	373	
B	Common Wheat	Red Fife (Direct)	Hard	6/64	200	164	80	76	240	13	Medium	360	Pretty sparse and small. Fairly erratic looking stand. Mixed height and thin.
B	Common Wheat	Red Fife (Transplant)	Hard	7/64	10	6	100	88	94	10	Large	13	Decent head size - some disease Not very hard, shorter grain, but well filled out
B	Spelt	Ardennes	N/A	6/64	150	108	200	124	232	25	Medium	237	2 plants died. Matured late.
B	Spelt	Dinkel	N/A	6/64	50	42	60	42	84	9	Large	92	Maturing early for Spelt, but some lodging and thin grains.
B	Spelt	Uberkulmer	N/A	6/64	90	76	150	124	200	21	Medium	167	Weak looking stand

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C	Common Wheat	Baart Early	Hard	6/64	75	64	40	34	98	10	Medium	140	Mixed height, thin stand. Didn't seem to mature earlier than the average.
C	Common Wheat	Frederick Soft	Soft	6/64	140	116	175	134	250	27	Large	254	Medium height - a little thin. Pretty hard, smaller grain
C	Common Wheat	Huron	Soft	6/64	50	78	50	36	114	12	Large	171	Thin stand. Very hard and decent looking grains.
C	Common Wheat	Mauri	Hard	8/64	20	14			14	1	Small	31	Only 2 out of 16 plants survived to harvest, but grain very big and hard.
C	Common Wheat	Red Lammas	Soft	8/64	350	292			292	31	Large	640	Pretty hard grain, smaller grain than Red May
C	Common Wheat	Red May	Soft	8/64	175	146			146	16	Medium	320	Good head size, but not a great stand and some disease. Pretty hard grain (matured early). I've heard that this variety might be also labeled as Red Lammas and the plants/grains do look the same.
D	Common Wheat	Rouge de Bordeaux	Hard	7/64	20	16	60	50	66	7	Small	35	Decent head size - some disease. Pretty hard, but grain has deep crease.
D	Einkorn	Einkorn	Hard										Best looking greenery of all trials, but headed out and matured very late. Had to end trial before grains filled out properly, but might work as a very late maturing variety.
D	Khorasan ?	Sin El Pheel	N/A	6/64	20	22			22	2	Medium	48	Late maturing. Thin but interesting hull shape w/some disease showing. Low survivor rate, but finished nice big kamut style grains
D	Triticale	Pika	N/A	7/64	135	80	200	124	204	22	Medium	175	Nice mild Rye flavor, but super weak dough and productivity so low I don't think it will help to grow a non Rye unless you just wanted good straw.
F	Barley	Chushi Gangdruk collection	N/A										All winter killed
F	Common Wheat	Chigong											No successful plants to transplant.
F	Common Wheat	Hartland Spring	Hard										All winter killed
F	Common Wheat	Hourani											Looked good as transplants, but all dead by early June
F	Common Wheat	Macedonia											No successful plants to transplant.
F	Common Wheat	Marquis de Loiselle	Hard										Only 25% survived Winter, but look weak. Unable to harvest any grains.

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F	Common Wheat	Milagre											Only 2 out of 16 survived as transplants and then all dead by early June
F	Common Wheat	Poulard											Looked good as transplants, but all dead by early June
F	Emmer	Golden											All winter killed
F	Globe Wheat	#1506											Very short and sparse stand. Grains didn't fill out properly – didn't harvest.