

## Prairie Oat Growers Association



August report from Oat Advantage, Year 3 of the 5-year project beginning.

As Oat Advantage, plant breeding for high quality specific kernel size has been successful as we use hand and machine (Kicker (K)) sieves. The uniform kernels of our oat varieties contribute to easier cleaning, stronger seed, and uniform fields, which benefits oat growers. Many growers have recounted to us their experience showing that Oat Advantage varieties have yielded well across the prairies. They are yielding in the top 5, and their value is even greater when quality is considered. Oat Millers have spoken of the valuable grain quality of our oat varieties and appreciate our that focus.

Adding to the kernel uniformity work is our Gravity Table (GT) selection which has been implemented now for about 4 years. We have seen at our Westlock 2022 location that GT selection made a 4% increase in off the combine 1000 kernel weight overall. At Codette in 2022, the gain was just under 1% where the season conditions were much better for growth. The chart to the right here shows an example of density gain for specific pairs in our main GT project. At both Westlock and at Codette we observed 2% to 10% density gains for the high-quality seed size fraction measured. Gains in oat kernel density, while appearing small, points us in the right direction.

WST 1000 kernel wt			CDT 1000 kernel wt		
%A/B gain series 2+3	GT pair	A/B entry #	%A/B gain series 2+3	GT pair	A/B entry #
110.6	Pair 7	3/3	110.6	Pair 7	3/3
108.6	Pair 4	1/2	109.5	Pair 15	1/1
108.3	Pair 1	2/3	107.3	Pair 4	1/2
108.2	Pair 8	3/3	107.1	Pair 5	2/2
107.1	Pair 23	1/1	105.5	Pair 1	2/3
102.3	Pair 5	2/2	104.8	Pair 19	1/1
102.3	Pair 15	1/1	103.8	Pair 21	2/2
102.3	Pair 19	1/1	103.4	Pair 6	2/2
98.9	Pair 6	2/2	102.3	Pair 12	1/1
97.8	Pair 22	2/2	100.8	Pair 8	3/3
97.7	Pair 12	1/1	100.0	Pair 9	3/3
97.6	Pair 14	1/1	97.6	Pair 23	1/1
96.8	Pair 9	3/3	96.7	Pair 10	2/2
91.0	Pair 21	2/2	93.0	Pair 22	2/2
90.9	Pair 20	1/1	90.5	Pair 14	1/1
86.3	Pair 10	2/2	86.0	Pair 20	1/1

In the distant past, oats were set as a 34lb/bu crop and had limited grain quality. These days a 40lb bushel is really the minimum and oat grain quality is reaching much higher. Growers have told us that seeing off the combine test weight values in the high 40's happens from time to time. It is only a matter of time until reports will see off the combine values in the low 50's.

Our ambitious goal for a 55lb/bushel heavier oat continues. With several K+GT processed and selected oat populations in progress the path to heavier varieties is speeding up. These populations have a mix of traits including high grain quality, high protein, and high beta glucan. More scrutiny is taking place on plant types and oat panicles that have higher yield potential. This fall we will be preparing selections pick out of 14,000 plants from Manitoba and Alberta to be sent to New Zealand for increase in the 2023/2024 winter. Seed from up to 300 plants will be grown out in New Zealand and will return in spring 2024. With the extra seed that a New Zealand increase provides, extensive 2024 field testing will take place across the prairies. Increasing oats in New Zealand speeds up time to market certainly by a year, and in many cases by two.

The Oat Advantage New Zealand increase is being supported by RDAR (Results Driven Agricultural Research) out of Alberta. That funding, in coordination with our POGA work is continuing to bring a new and strong focus to Alberta oat development. This Alberta work will bring benefits all across the prairies.

Field yield is important to us at Oat Advantage. In the chart the right we can see where an advanced group of our K+GT selected oat lines sit relative to commercial oat varieties. This 2022 Codette data was not replicated in the field. The Reference Oat Variety Group (ROVG) is highlighted here in blue lines for easy comparison to non-highlighted oat lines Grams per plot yield are highlighted in green. Yields were very good at Codette in 2022. Perhaps at a maximum.

In this 2022 Codette trial, the large number of our own oat lines was such that we didn't have the available seed or the budget to replicate. Nevertheless, the spread and ranking of the ROVG makes sense for comparison with, for instance, AC Morgan and CDC Arborg higher up in the chart.

Yield levels in any crop are very dependent on the season conditions and the particular field and agronomics. Small plot trial results do not act like the skillful crop performance that oat growers achieve. Still, this trial at Codette gives us a sense that our oat lines have potential.

The next page and chart show top lines from 2023 at Codette.

SECONDARY OAT ADVANTAGE RDAR TESTING SITE - 2022N108R ERAoats project CODETTE SASKATCHEWAN									
Secondary Testing site	GT Entry Names, with Check plots for reference	Entry type	WST plot	WST OKU % Series 1 plus Series 2	CDT OKU % Series 1 plus Series 2	Related YLD at WST AB plot yield (g)	SORTED for YLD CDT SK plot yield (g)	Check variety highlighted for reference	
CDT	118CM3212A	Hi GT	511	62	62	4705	6419	Oat Advantage	
CDT	118CM3122A	Hi GT	419	63	71	4788	6416	Oat Advantage	
CDT	118CM3221A	Hi GT	514	45	47	4601	6368	Oat Advantage	
CDT	118CM3212B	Lo GT	513	64	59	4686	6347	Oat Advantage	
CDT	118CM366B	Lo GT	316	75	77	4264	6308	Oat Advantage	
CDT	118CM3221A	Hi GT	510	56	45	4819	6251	Oat Advantage	
CDT	118CM383B	Lo GT	407	59	47	5562	6178	Oat Advantage	
CDT	118CM3141B	Lo GT	502	57	64	4474	6174	Oat Advantage	
CDT	118CM381B	Lo GT	406	65	58	5550	6151	Oat Advantage	
CDT	118CM353B	Lo GT	312	54	48	4651	6147	Oat Advantage	
CDT	118CM3223A	Hi GT	515	68	63	4112	6139	Oat Advantage	
CDT	118CM352B	Lo GT	311	56	NA	4862	6136	Oat Advantage	
CDT	118CM314A	Hi GT	302	73	70	4838	6090	Oat Advantage	
CDT	118CM312B	Lo GT	303	72	78	4628	5948	Oat Advantage	
CDT	118CM3211B	Lo GT	512	57	58	4755	5906	Oat Advantage	
CDT	118CM3151B	Lo GT	504	43	NA	5167	5902	Oat Advantage	
CDT	AC Morgan	Check	117	57		4748	5848	AC Morgan	
CDT	118CM316B	Lo GT	305	65	NA	4315	5840	Oat Advantage	
CDT	118CM354A	Hi GT	310	64	63	4851	5839	Oat Advantage	
CDT	118CM384B	Lo GT	408	63	54	5356	5834	Oat Advantage	
CDT	118CM3201B	Lo GT	509	70	63	5204	5816	Oat Advantage	
CDT	118CM3181B	Lo GT	505	77	74	4937	5808	Oat Advantage	
CDT	118CM371A	Hi GT	317	78	86	4299	5795	Oat Advantage	
CDT	118CM341B	Lo GT	308	42	49	4686	5764	Oat Advantage	
CDT	118CM351A	Hi GT	309	74	72	4379	5753	Oat Advantage	
CDT	118CM396A	Hi GT	411	72	NA	5145	5729	Oat Advantage	
CDT	118CM384A	Hi GT	405	79	NA	5241	5688	Oat Advantage	
CDT	118CM3241B	Lo GT	520		51	4595	5676	Oat Advantage	
CDT	118CM3151A	Hi GT	503	72	71	4439	5613	Oat Advantage	
CDT	CDC Arborg	Check	118	56		5573	5606	CDC Arborg	
CDT	118CM383A	Hi GT	404	84	NA	4944	5604	Oat Advantage	
CDT	118CM3102B	Lo GT	418	67	67	4922	5602	Oat Advantage	
CDT	118CM3121B	Lo GT	420	56	68	4737	5602	Oat Advantage	
CDT	118CM312A	Hi GT	301	79	72	4263	5596	Oat Advantage	
CDT	118CM365A	Hi GT	313	52	50	4544	5593	Oat Advantage	
CDT	118CM341A	Hi GT	306	70	70	4490	5575	Oat Advantage	
CDT	118CM3191A	Hi GT	506	61	66	4714	5575	Oat Advantage	
CDT	118CM366A	Hi GT	314	64	80	4500	5556	Oat Advantage	
CDT	118CM3222B	Lo GT	517	60	62	3930	5494	Oat Advantage	
CDT	118CM3191B	Lo GT	507	51	56	5124	5481	Oat Advantage	
CDT	118CM342B	Lo GT	307	75	76	3889	5475	Oat Advantage	
CDT	118CM371B	Lo GT	320	64	63	4558	5470	Oat Advantage	
CDT	OT6024	Check	105	84		4750	5434	OT6024	
CDT	118CM3151B	Lo GT	304	71	NA	4612	5423	Oat Advantage	
CDT	ORe Level48	Check	103	84		5393	5416	ORe Level48	
CDT	118CM3201A	Hi GT	508	60	54	4374	5362	Oat Advantage	
CDT	118CM364B	Lo GT	315	77	78	4317	5341	Oat Advantage	
CDT	118CM3143A	Hi GT	501	55	43	4652	5336	Oat Advantage	
CDT	CS Camden	Check	116	52		4651	5336	CS Camden	
CDT	118CM3231B	Lo GT	519	48	67	3574	5312	Oat Advantage	
CDT	118CM393A	Hi GT	409	80	74	4876	5287	Oat Advantage	
CDT	118CM373B	Lo GT	402	74	75	4657	5225	Oat Advantage	
CDT	118CM375A	Hi GT	319	71	75	3942	5190	Oat Advantage	
CDT	OT6038	Check	107	87		4424	5185	OT6038	
CDT	118CM3231A	Hi GT	518	66	70	3520	5161	Oat Advantage	
CDT	118CM391B	Lo GT	412	82	73	5099	5160	Oat Advantage	
CDT	118CM372A	Hi GT	318	73	82	4129	5101	Oat Advantage	
CDT	118CM3103A	Hi GT	416	81	NA	4902	5074	Oat Advantage	
CDT	118CM381A	Hi GT	403	81	83	4717	5073	Oat Advantage	
CDT	118CM372B	Lo GT	401	66	63	4529	5070	Oat Advantage	
CDT	118CM393B	Lo GT	414	79	71	5354	5059	Oat Advantage	
CDT	OT6038	Check	120			4260	5048	OT6038	
CDT	ORe Level50	Check	104	89		5176	4958	ORe Level50	
CDT	118CM3101B	Lo GT	417	81	80	4939	4950	Oat Advantage	
CDT	ORe3541M	Check	101	77		5249	4879	ORe3541M	
CDT	118CM394A	Hi GT	410	80	66	5168	4861	Oat Advantage	
CDT	118CM3221B	Lo GT	516	60	62	3876	4782	Oat Advantage	
CDT	118CM3101A	Hi GT	415	79	68	4953	4777	Oat Advantage	
CDT	OT9006	Check	108			4249	4688	OT9006	
CDT	118CM392B	Lo GT	413	82	74	4808	4681	Oat Advantage	
CDT	CDC Dancer	Check	115	56		4990	4671	CDC Dancer	
CDT	AAC Douglas	Check	119	32		5340	4625	AAC Douglas	
CDT	ORe3542M	Check	102	87		5113	4537	ORe3542M	
CDT	ORe6251M	Check	106	82		4009	4188	ORe6251M	

In 2023 at Codette, here in a partial snapshot chart to the right, yield rankings are different with respect to ranking of the oat entries.

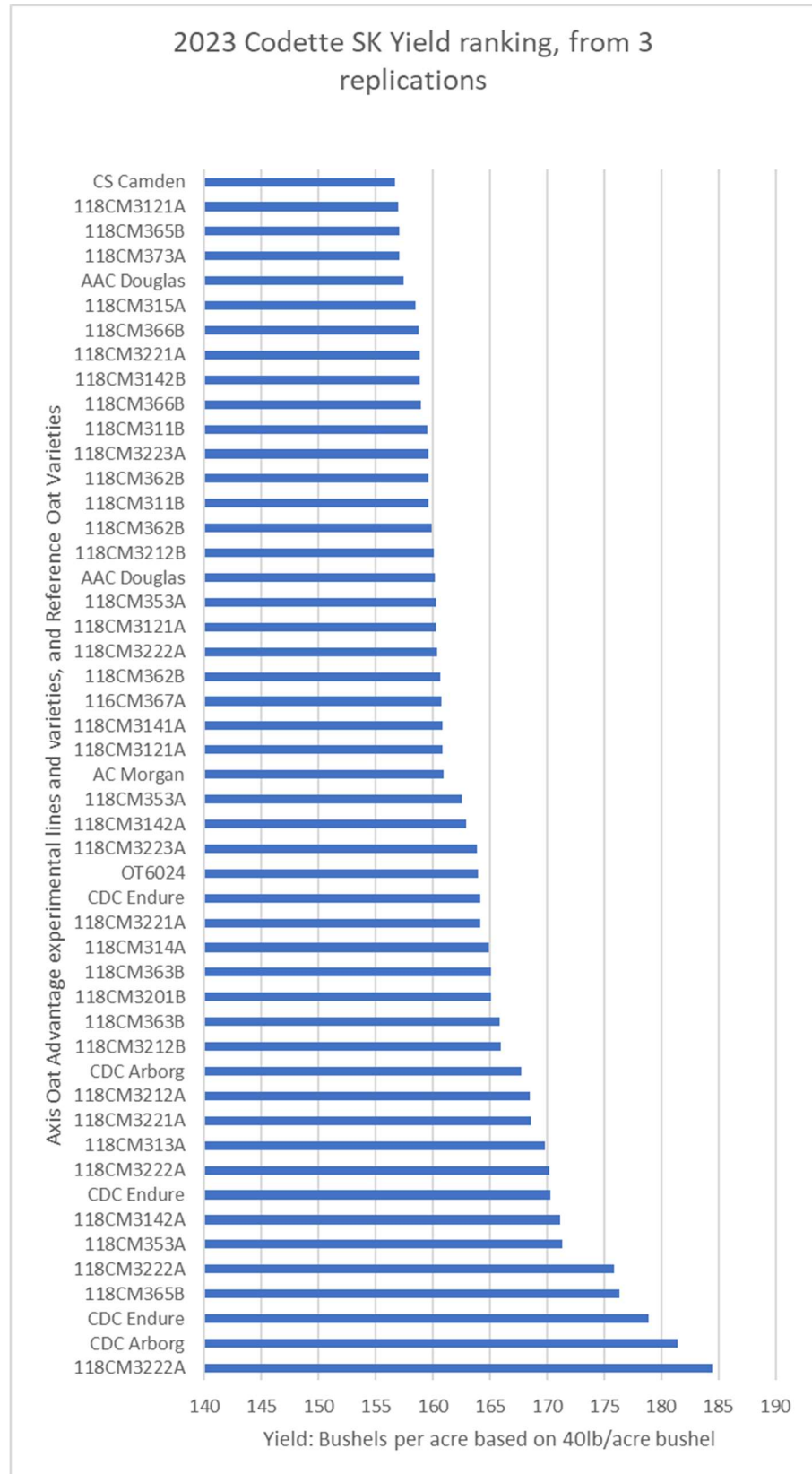
This 2023 trial, just harvested on August 20, had 3 replications. Like the chart on the previous page, the oat lines and reference group varieties are intermingled and I have only included the top performing portion of a 144 entry list.

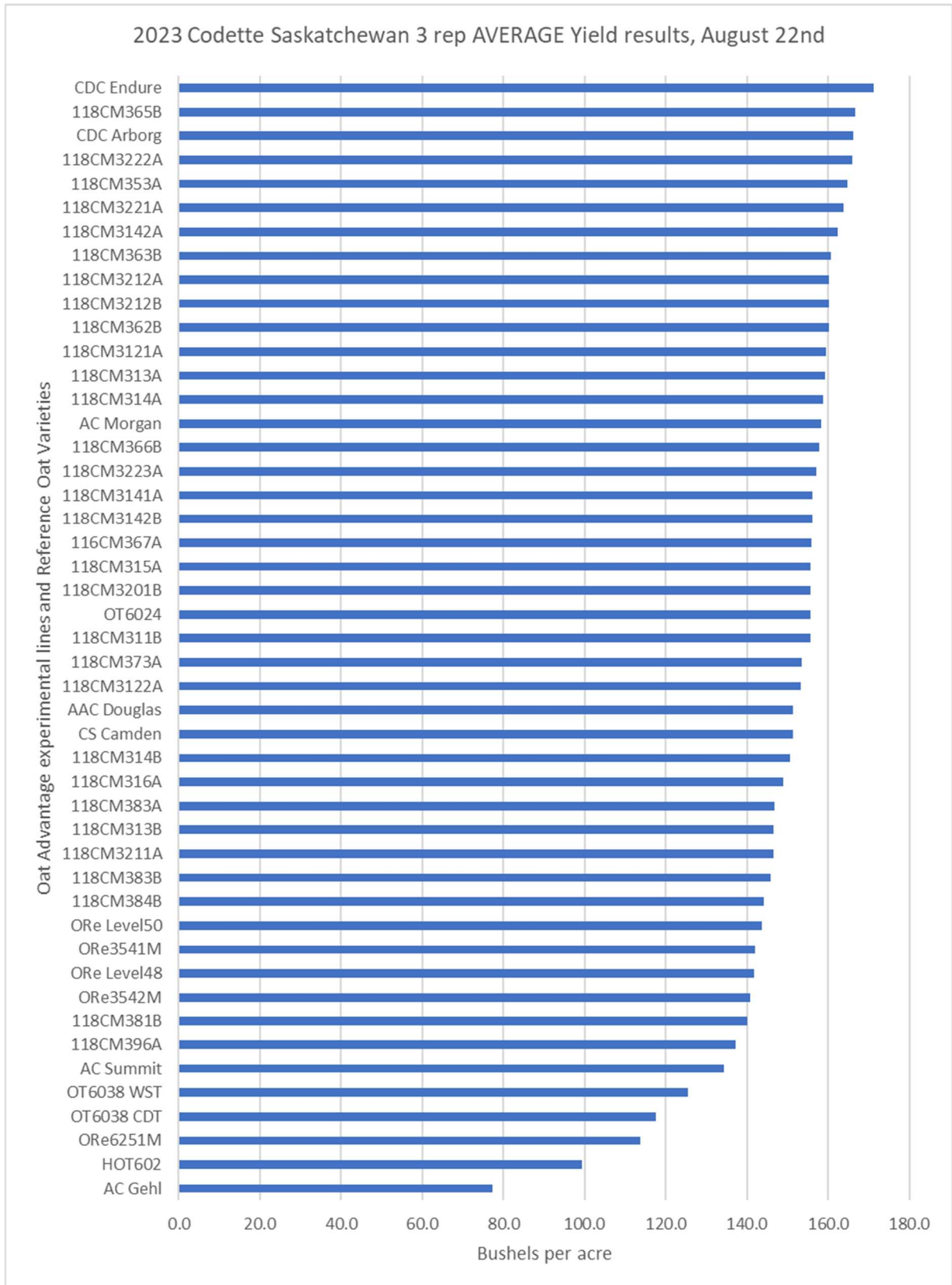
The top yielding entries are at the bottom of this chart and here the yield is by bushels per acre based on a 40lb bushel. CDC Arborg and CDC Endure are high performing with the Oat Advantage advanced oat line, 118CM3222A, being slightly greater yielding.

CDC Endure appears up the list 3 times with all 3 replications performing well. 118CM3222A also appears 3 times. CDC Arborg appears 2 times.

The chart on the next page shows the averages of the whole ROVG plus all of the experimental lines.

A significant number of Oat Advantage oat lines are doing well for yield. This replicated trial gives more confidence.





In this chart above, average yields are represented. The 3 replications give confidence and we see at the top of the chart that Oat Advantage lines are at the top with Arborg and Endure and above Morgan.

## From the June 1<sup>st</sup> 2021 Oat Advantage proposal to POGA:

### 10. Outcomes

#### **a. Main Outcome: 10% higher bushel weight**

“The 55lb\* bushel target will create efficiencies for farm oat grain storage, trucking, and the harvesting operation.” I said this at the outset of the current 5 year POGA/Oat Advantage project. While this remains our goal, we have come to learn that higher bushel weight **MUST NOT** come from a multitude of thin kernels co-mingled with larger more desirable kernels. That kind of density coming from thin kernels works against real quality. For true grain improvement in the oat industry, Oat Kernel Uniformity (OKU) must be sought after. When OKU is partnered with low hull content, bushel weight and true yield will rise in a meaningful way.

#### **b. Main Outcome: low hull content**

Oat hulls are packaging. More and more, society is looking to reduce waste. So too through plant breeding we work to reduce waste by reducing oat hull content. Formerly, we said that “High bushel weight goes hand in hand with low hull percentage.” While this connection may at times be true, we want to make sure, as said above in ‘a.’, that OKU remains high. We will endeavour to move and hold OKU from 70% to 90% and beyond. In 2022 at Westlock AB, OKU of Oat Advantage oat varieties ranged from 76% to 87%. while reference oat varieties (checks) ranged from 32% to 57%. Our goal is a 17% oat hull or an 83% groat on average for the WCORT evaluations. By fixing our kernel size requirements and ‘forcing’ oat plants to produce denser kernels, hull percentage will go down.

#### **c. Extra Outcome: high protein**

The high protein goal was proved in OT6038, an oat line that was voted down in the PRCOB meetings in March 2023. This line was a proof of concept oat line that actually did bring together exceptional quality traits and strong hints of good field yield. OT6038 had good yield, high protein, high beta glucan, high OKU, and other good agronomic strengths. We continue to investigate this oat population to find higher yield. 2023 Westlock selected lines with from the OT6038 parent population will be going to New Zealand for increase. As with other populations, we will be looking more intently at single plants, here at the end of summer 2023, that have high yield architecture and plant type.

#### **d. Extra Outcome: harvest durability**

We have been unable to find the opportunity to develop an independent strategy to work on harvest durability. At the same time, we are always on the lookout for problematic oat lines with respect to shattering. Poor lines are removed. Strong yielding lines over the years are take to indicate a durability on their own.

#### **e. Main Outcome: high yield and valued oat varieties**

As elaborated on pages 3 and 4 of this report, our Oat Advantage lines have good yield potential. The work on sieve selection (K) and Gravity Table work (GT) does not get in the way of yield goals. We are working to merge the yield and quality pathways. 118CM3222A in the charts above may be one of the lines that gets us closer to the goal. As a newer strategy for single plant selection, I am changing some decision principles and boundaries to be able to see and select better plant types and panicle architecture to bring success to this goal.

August 23<sup>rd</sup>, Oat Advantage Report to POGA

Thank you to POGA. Thanks to your members in Manitoba, Saskatchewan and Alberta.

August report to POGA!

2023 is rolling along and commercial oat harvest has begun across the prairies. Our OAT ADVANTAGE 2023 effort in oat research is in good shape with a significant body of work going on at 6 locations in western Canada. Financial support from POGA very important to us. Yet not only that, but what is also key to us is your invitation to meeting discussions, the speaking opportunities, board meeting dialogue, and your confidence support with things like our RDAR project.

In Alberta, the Westlock location run by the Gateway Research Organization is a key site for our progress in oat breeding goals. A smaller site at Vermillion with Lakeland College will deliver extra yield and agronomic data on an advanced subset of our Westlock oat lines. RDAR has come on as an additional funder of our work in Alberta, and gains in genetics and oat performance shows concrete growth. We are thankful for POGA's support in our RDAR applications.

In Saskatchewan, the Codette location has had a good season of oat growing conditions. When good elements of oat agronomy, weather, and genetics come together, the potential of oat lines in development is seen at a maximum. The oat lines at Codette represent a backup and confirmation to the Westlock RDAR work. At Saskatoon we are more or less getting another look at oat lines in a drought situation and seeking to learn from the oat lines that show benefits here.

In Manitoba, oat development work on the research farms of both Richardson and Paterson has experienced some moisture challenges but looks quite good. The support of these two oat milling companies is welcomed.

All the best you as Oat Growers. May good harvest situations come to you. May the challenges of 2023 not be overwhelming. May your plans for next year be full of hope.

Thanks for your support!

Sincerely,

Jim Dyck