



OAT ADVANTAGE oat breeding is motivated! We are supported financially in significant ways by industry and oat grower organizations.

Thanks to POGA and all members. Your vision for the oat industry and your valued support for oat breeding makes great things happen!

Thanks to RDAR and the Alberta Government for providing us with the funding to formulate a significant Alberta oat breeding.

Thanks to the Alberta Oat Growers Association for specific funding to advance our oat breeding efforts.

Thanks to Oat Industry partners such as SeCan, Richardson, General Mills, Seed Depot, Alliance Seed, and others, for generous support and encouragement as we build our oat breeding momentum in western Canada.

OAT ADVANTAGE **2024**



“An outward-looking dynamic breeding program must be targeted at achieving ambitious radical changes rather than merely making small incremental gains aimed at just beating the best ‘on the list’.”

Oats: Chemistry and Technology 2nd edition, 2011,
Chapter two, p. 13 – J. Valentine, A.A. Cowan, and A.H. Marshall,
Institute of Biological, Environmental and Rural Sciences,
Aberystwyth University, United Kingdom





Canadian Grain Commission
Commission canadienne
des grains

Canada

TEST WEIGHT CONVERSION CHART / TABLEAU DE CONVERSION DU POIDS SPÉCIFIQUE
Oats / Avoine

g/0.5 L g/0.5 L	kg/hL kg/hL	lb/A bu lb/boiss. A	lb/W bu lb/boiss. W	g/0.5 L g/0.5 L	kg/hL kg/hL	lb/A bu lb/boiss. A	lb/W bu lb/boiss. W
170	39.9	32.0	27.8	240	52.0	41.7	37.2
180	40.1	32.1	27.9	241	52.2	41.8	37.4
181	40.3	32.3	28.1	242	52.4	42.0	37.6
182	40.5	32.4	28.2	243	52.6	42.2	37.7
183	40.7	32.6	28.4	244	52.8	42.3	37.9
184	40.9	32.8	28.6	245	53.0	42.5	38.0
185	41.1	32.9	28.7	246	53.2	42.6	38.2
186	41.3	33.1	28.9	247	53.4	42.8	38.3
187	41.5	33.2	29.0	248	53.6	43.0	38.5
188	41.8	33.4	29.2	249	53.8	43.1	38.8
189	41.8	33.6	29.3	250	54.0	43.3	38.8
190	42.0	33.7	29.5	251	54.2	43.4	39.0
191	42.2	33.9	29.6	252	54.4	43.6	39.1
192	42.4	34.0	29.8	253	54.6	43.8	39.3
193	42.5	34.2	30.0	254	54.8	43.9	39.4
194	42.8	34.4	30.1	255	55.0	44.1	39.6
195	43.0	34.5	30.3	256	55.2	44.2	39.7
196	43.2	34.7	30.4	257	55.4	44.4	39.8
197	43.4	34.8	30.6	258	55.6	44.5	40.0
198	43.6	35.0	30.7	259	55.7	44.7	40.2
199	43.8	35.2	30.9	260	55.9	44.9	40.4
200	44.0	35.3	31.0	261	56.1	45.0	40.5
201	44.2	35.5	31.2	262	56.3	45.2	40.7
202	44.4	35.6	31.4	263	56.5	45.3	40.8
203	44.6	35.8	31.5	264	56.7	45.5	41.0
204	44.8	35.9	31.7	265	56.9	45.7	41.1
205	45.0	36.1	31.8	266	57.1	45.8	41.3
206	45.2	36.3	32.0	267	57.3	46.0	41.4
207	45.4	36.4	32.1	268	57.5	46.1	41.6
208	45.6	36.6	32.3	269	57.7	46.3	41.7
209	45.8	36.7	32.4	270	57.9	46.5	41.8
210	46.0	36.9	32.6	271	58.1	46.6	42.1
211	46.2	37.1	32.7	272	58.3	46.8	42.2
212	46.4	37.2	32.9	273	58.5	46.9	42.4
213	46.6	37.4	33.1	274	58.7	47.1	42.5
214	46.8	37.5	33.2	275	58.9	47.3	42.7
215	47.0	37.7	33.4	276	59.1	47.4	42.8
216	47.2	37.9	33.6	277	59.3	47.6	43.0
217	47.4	38.0	33.7	278	59.5	47.7	43.1
218	47.6	38.2	33.8	279	59.7	47.9	43.3
219	47.8	38.3	34.0	280	59.9	48.1	43.5
220	48.0	38.5	34.1	281	60.1	48.2	43.6
221	48.2	38.7	34.3	282	60.3	48.4	43.8
222	48.4	38.8	34.5	283	60.5	48.5	43.9
223	48.6	39.0	34.6	284	60.7	48.7	44.1
224	48.8	39.1	34.8	285	60.9	48.8	44.2
225	49.0	39.3	34.9	286	61.1	49.0	44.4
226	49.2	39.5	35.1	287	61.3	49.2	44.5
227	49.4	39.6	35.2	288	61.5	49.3	44.7
228	49.6	39.8	35.4	289	61.7	49.5	44.9
229	49.8	39.9	35.5	290	61.9	49.6	45.0
230	50.0	40.1	35.7	291	62.1	49.8	45.2
231	50.2	40.2	35.9	292	62.3	50.0	45.3
232	50.4	40.4	36.0	293	62.5	50.1	45.5
233	50.6	40.6	36.2	294	62.7	50.3	45.6
234	50.8	40.7	36.3	295	62.9	50.4	45.8
235	51.0	40.9	36.5	296	63.1	50.6	45.9
236	51.2	41.0	36.6	297	63.3	50.8	46.1
237	51.4	41.2	36.8	298	63.5	50.9	46.2
238	51.6	41.4	36.9	299	63.7	51.1	46.4
239	51.8	41.5	37.1	300	63.9	51.2	46.6



Canadian Grain Commission
Commission canadienne
des grains

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TEST WEIGHT CONVERSION CHART / TABLEAU DE CONVERSION DU POIDS SPÉCIFIQUE
Oats / Avoine



A	lb/W bu lb/boiss. W	g/0.5 L g/0,5 L	kg/hL kg/hL	lb/A bu lb/boiss. A	lb/W bu lb/boiss. W
	27.8	240	52.0	41.7	37.2

28.0	241	52.1	41.8	37.3
28.1	242	52.2	41.9	37.4
28.2	243	52.3	42.0	37.5
28.3	244	52.4	42.1	37.6
28.4	245	52.5	42.2	37.7
28.5	246	52.6	42.3	37.8
28.6	247	52.7	42.4	37.9
28.7	248	52.8	42.5	38.0
28.8	249	52.9	42.6	38.1
28.9	250	53.0	42.7	38.2
29.0	251	53.1	42.8	38.3
29.1	252	53.2	42.9	38.4
29.2	253	53.3	43.0	38.5
29.3	254	53.4	43.1	38.6
29.4	255	53.5	43.2	38.7
29.5	256	53.6	43.3	38.8
29.6	257	53.7	43.4	38.9
29.7	258	53.8	43.5	39.0
29.8	259	53.9	43.6	39.1
29.9	260	54.0	43.7	39.2
30.0	261	54.1	43.8	39.3

Apr 2008



55 lbs. / bushel ???
Will this happen for
Oats?





EXPORT READY ALBERTA oats...?

OAT EXPORTS BY DESTINATION - Q1

	2019/20	2020/21	2021/22	2022/23	2023/24
US	478,255	491,818	457,460	412,860	391,952
Chile		100,177			50,885
Mexico	36,171	69,314	28,310	79	49,139
Peru	9,843	11,504	8,220		17,600
Japan	8,538	8,208	8,848	1,503	8,523
S Korea	2,028	1,402	3,164	1,082	4,763
Other	11,703	22,815	3,362	338	972
Total	546,539	705,237	509,364	415,862	523,834

Down to the US, up
everywhere else



Opportunities

- Peru
- India
- China

WHAT DOES IT TAKE??

RDAR

Alberta – GRO & Oat Advantage



Table 1.4

Summary of grain quality data for second year entries averaged over locations from years (2021 and 2022).

Source: WCORT Feb 2023 report

ENTRY	GROAT *PROTEIN 2021 (%db)	GROAT PROTEIN 2022 (%db)	GROAT PROTEIN 2yr mean	GROAT ** OIL 2021 (%db)	GROAT OIL 2022 (%db)	GROAT OIL 2yr mean
AC Morgan	17.2	15.6	16.4	6.5	5.9	6.2
Summit	18.1	16.0	17.1	7.5	7.1	7.3
CS Camden	19.3	17.1	18.2	7.4	7.0	7.2
OT6038	22.0	19.8	20.9	6.8	7.3	7.0

*Data supplied by M. Izydorczyk, Grain Research Laboratory, Canadian Grain Commission.

Wholemeal samples were analyzed by Combustion Nitrogen Analysis

** Data supplied by M. Izydorczyk, Grain Research Laboratory, Canadian Grain Commission. Wholemeal samples were analyzed by standard procedures

Table 1.5

Summary of grain quality data for second year entries averaged over locations from years (2021 and 2022).

Source: WCORT Feb 2023 report

ENTRY	*MEGAZYME β - Glucan 2021 (%db)	MEGAZYME β - Glucan 2022 (%db)	β -Glucan 2- Year Mean (%db)	**TDF 2021 (%db)	TDF 2022 (%db)
AC Morgan	4.4	4.3	4.3		9.2
Summit	4.8	4.9	4.9		10.2
CS Camden	5.2	5.5	5.3		10.4
OT6038	5.0	5.5	5.2	N/A	10.8

*Data supplied by M. Izydorczyk, Grain Research Laboratory, Canadian Grain Commission. Standard analytical procedures were used to quantify beta-glucan

**Data supplied by M. Izydorczyk, Grain Research Laboratory, Canadian Grain Commission. Standard analytical procedures were used to quantify total dietary fibre

Table 1.2

Yield (Kg/Ha) means for second year entries by soil climate zones averaged over two years (2021 and 2022).

Source: WCORT March 2023 report

ENTRY	ZONE 2 BLACK & GREY WOODED (SK & AB)			OVERALL MEAN 2021	OVERALL MEAN 2022
	ZONE 1 BLACK (MB & SK)		ZONE 3 BROWN (SK)		
AC Morgan	5964.3	6348.8	3790.6	4835.4	6670.8
Summit	5124.0	5399.2	3269.8	3824.0	5975.9
CS Camden	6036.1	5757.4	3840.8	4638.2	6524.3
OT6038	4844.4	4881.5	2925.0	3403.2	5811.8

Table 1.3

Summary of grain quality data for second year entries averaged over locations and years (2021 and 2022).

Source: WCORT Feb 2023 report

ENTRY	TWT (Kg/HI)	MKW (G)	PLUMP ^Z (%)	THINS ^Y (%)	GROAT ^X (%)
AC Morgan	56.1	38.8	84.0	2.9	71.6
Summit	58.2	36.7	83.5	4.2	75.8
CS Camden	55.1	38.0	82.2	3.5	71.1
OT6038	55.4	46.0	96.9	0.8	70.9

^ZPercent plump based on portion of 50 gram sample remaining on top of 5 1/2 /64 x 3/4 " sieve.

^YPercent thin was determined by the portion of 50 gram sample passing through 5/64 x 3/4 " sieve.

^XPercent groat determined on a 50 gram sample using a Codema dehuller.



Table 1.0

Summary of agronomic data for second year entries averaged over locations and years (2021 and 2022). Source: WCORT March 2023 report

ENTRY	YIELD (Kg/Ha)	HEADING (Days)	MATURITY (Days)	HEIGHT (CM)	LODGING (1-9)
AC Morgan	5753.1	55.4	89.1	92.0	2.2
Summit	4900.0	52.7	87.8	84.8	3.2
CS Camden	5581.3	53.2	85.3	87.2	2.0
OT6038	4607.5	54.3	86.6	88.9	2.5

Table 1.1

Yield (Kg/Ha) means for second year entries from selected locations (2021 and 2022). Source: WCORT March 2023 report

ENTRY	ZONE 1 2022 BRA*	ZONE 2 2022 LAC*	ZONE 4 2021 LET*	ZONE 4 2022 LET*	ZONE 4 Mean
AC Morgan	7303.7	10873.3	8417.5	8461.0	8439.3
Summit	6967.2	9844.1	6380.7	7727.4	7054.1
CS Camden	7111.5	10590.4	6951.5	8122.4	7537.0
OT6038	8216.3	9849.4	6243.1	8207.5	7225.3

*Brandon MB, Lacombe AB, Lethbridge AB



OT6038 - Request For Support for Registration

2023 Prairie Recommending Committee for Oat and Barley

March 1st and 2nd Banff Centre, Banff, Alberta. PGDC Meetings.

Proposer: **Jim Dyck** - Oat Breeder
Oat Advantage
Vesper Sparrow Prairie Research Inc.
Saskatoon, Saskatchewan
306-991-9978
@gmail.com



- ① **Crop:** Oat - spring milling oat
- ② **Test Numbers:** OT6038
- ③ **Primary data source:** 2021 Oat Registration Trial (WCORT).
- ④ **Pedigree:** OT6009 x OT9006 (in house)
- ⑤ **Area of adaptation:** targeted for specific growing conditions suitable for irrigated production.

Description: OT6038 is an awnless, yellow hulled, later maturing, high protein oat with acceptable grain yield in certain well managed situations. OT6038 has excellent disease resistance. The quite high protein content of OT6038, plus high beta-glucan level, in combination with true* high % plump is an advantageous pairing for ingredient extraction and high milling value.

DECLINED



PHASE I

2021 Westlock, SeCan Oat Advantage initiative

2022 Westlock – RDAR

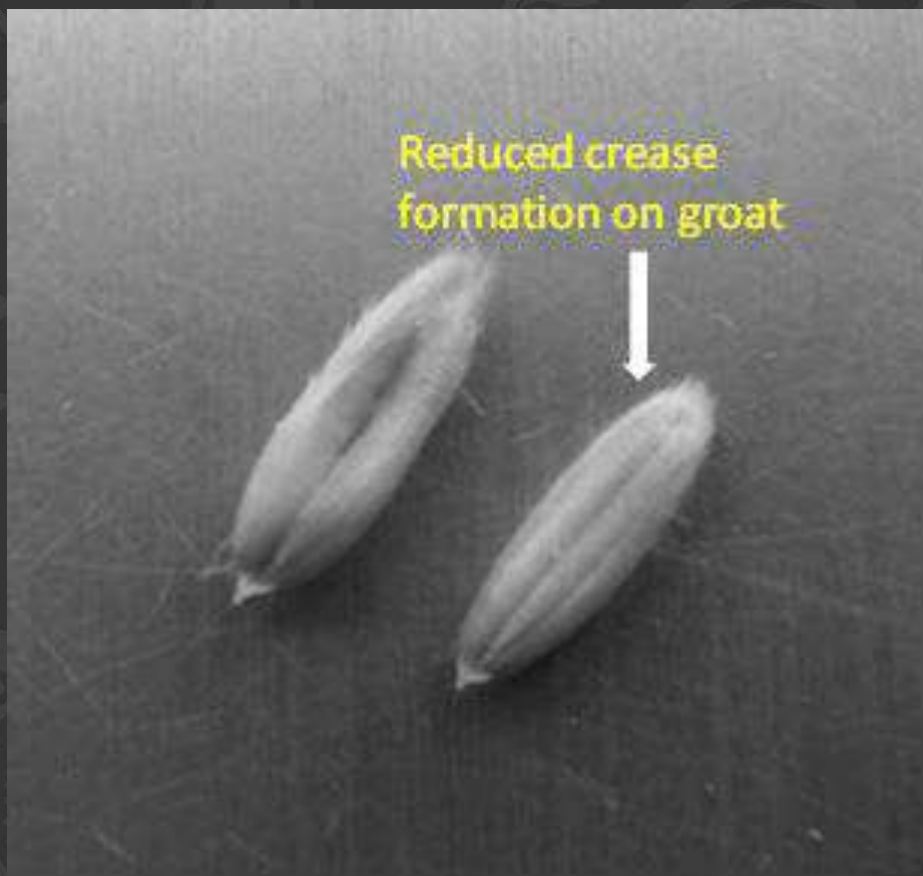
PHASE II

2023 Westlock, Lakeland – RDAR



2022

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



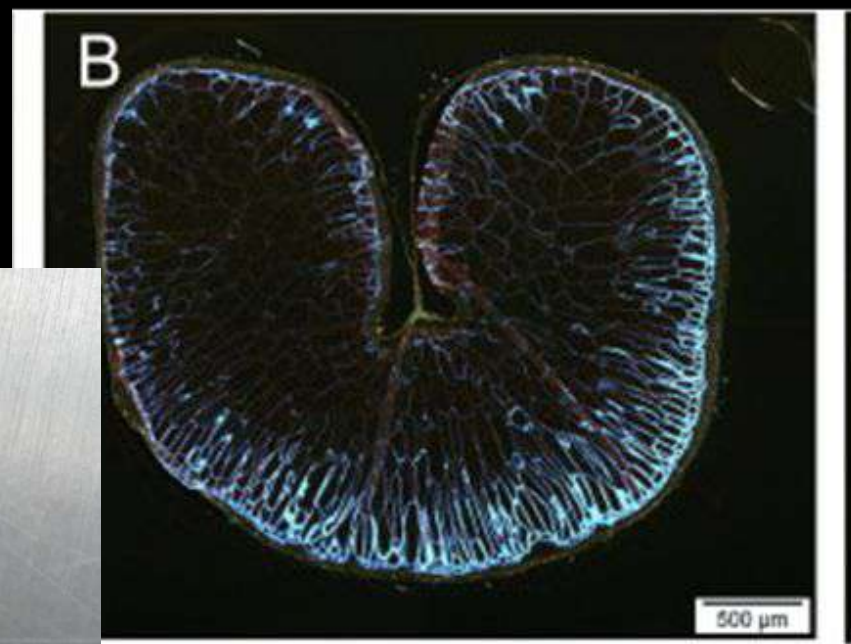


WHAT MORE COULD WE WORK ON ...
WHAT IS AMBITIOUS ...

We are also wondering about how the unused spaces in or on or around the oat groat can be filled...

Can we increase the oat groat density to help create a 55lb/bu oat variety? Can we find oat kernels that are a better shape?

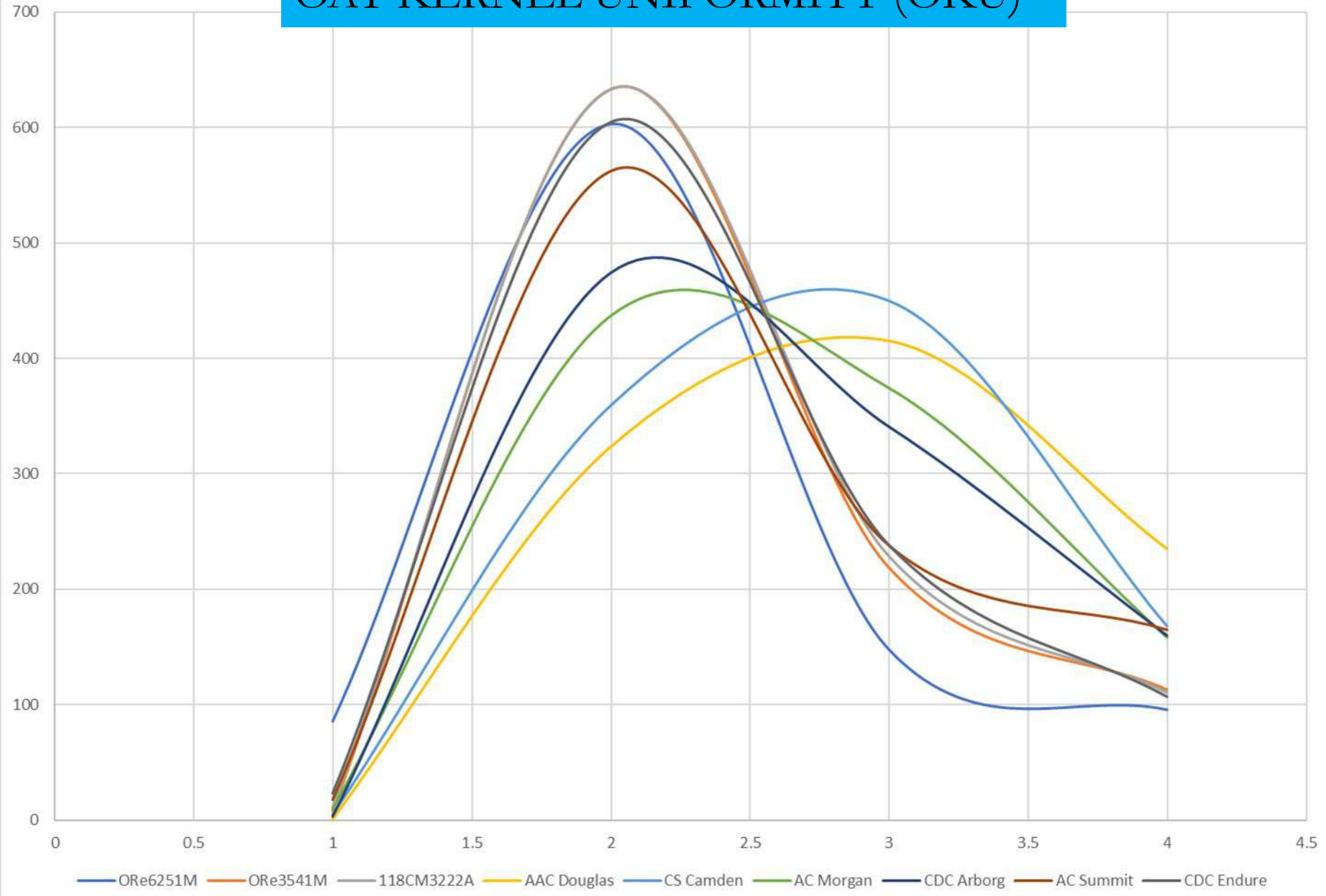
Internet photo, oat



Oat Advantage photo



OAT KERNEL UNIFORMITY (OKU)



DESIGN EFFICIENCIES

We began to see that we could have a role in Oat Design Efficiencies.

Could we do, like the railways and their redesigned grain railcars, redesign oat varieties by focusing on plants that gave the 'Right' profiles of kernel fractions?

SIZE MATTERS



Standard grain hopper cars have a capacity of **4,550 CUBIC FEET** and can carry **90 TONNES OF WHEAT.**

The unloaded weight of each car is **62,000 LB.** and each car is **60' LONG.**



New grain hopper cars have a capacity of **5,431 CUBIC FEET** and can carry **100 TONNES OF WHEAT.**

The unloaded weight of each car is **60,000 LB.** and each car is **56' LONG.**



TEST WEIGHT ??

Most millers and growers of oats rely on Test Weight (Kg/Hl) to evaluate the initial quality of oat grain in a truckload. While generally useful, Test Weight can hide deficiencies of a poor quality oat variety. Very small kernels fill in the gaps between larger kernels and create the look of a dense, valuable grain load.





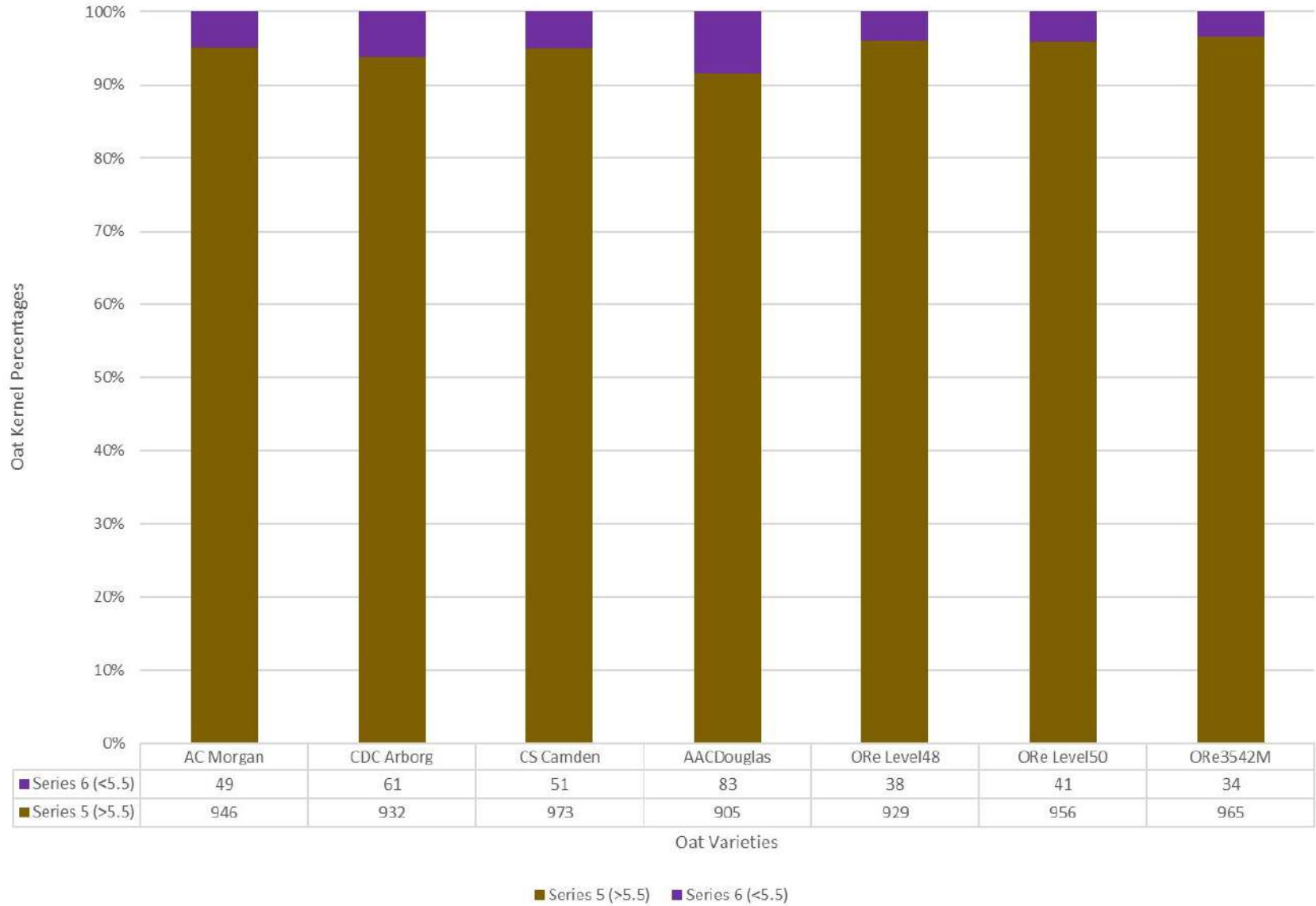
PLUMPS & THINS

From earlier years (1994 and on) being involved with the oat registration process, the work on oats for grain size was taken to be a simple matter of 'Plump' and 'Thin'.



The same...??

2022 Codette SK, Industry plump & thin oats





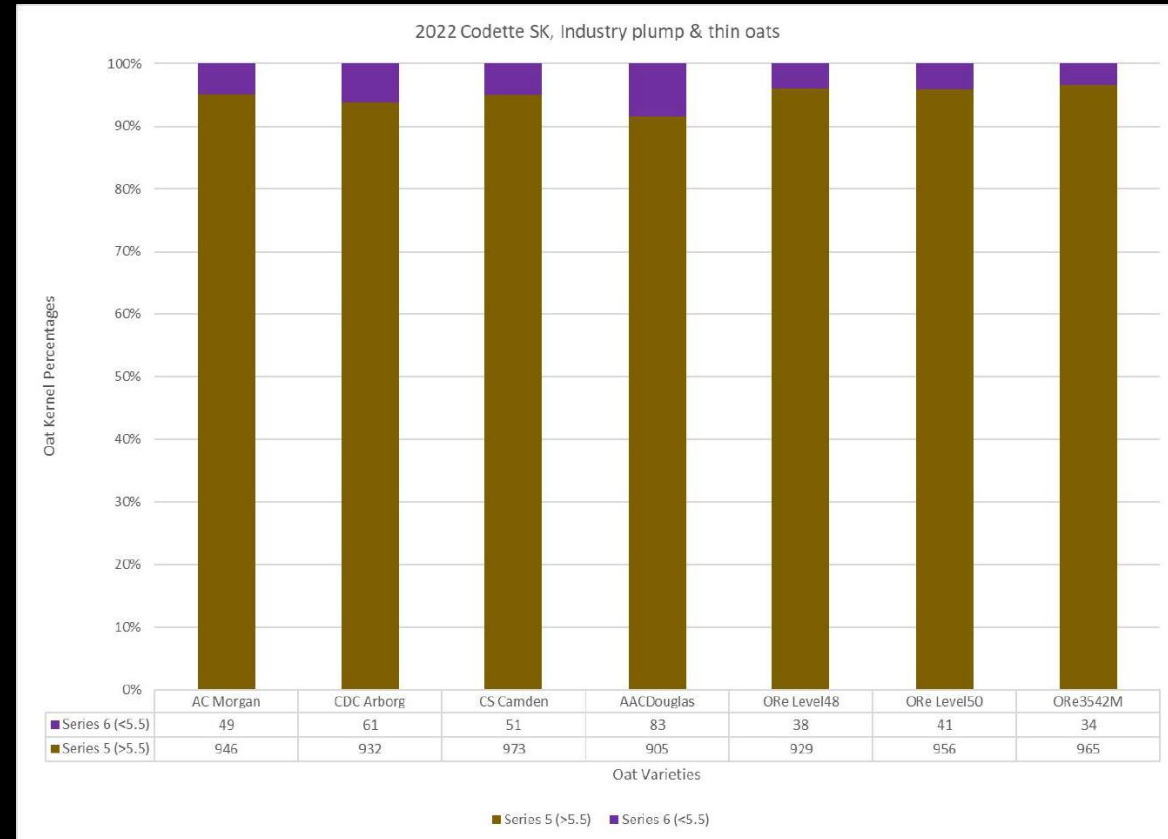
FRACTIONS OF PLUMP OATS

Then along came this machine! We saw the need for one of these years ago so that we could dispense with hand sieving everything!



And we also realized that this view of oat plumps and thins is all that the Oat mills get to see as the Grain trucks are unloaded at the Elevator or the Mill.

Once co-mingled no one knows any further the true potential of profitability or loss of the load of oats of a specific oat variety to the mill.

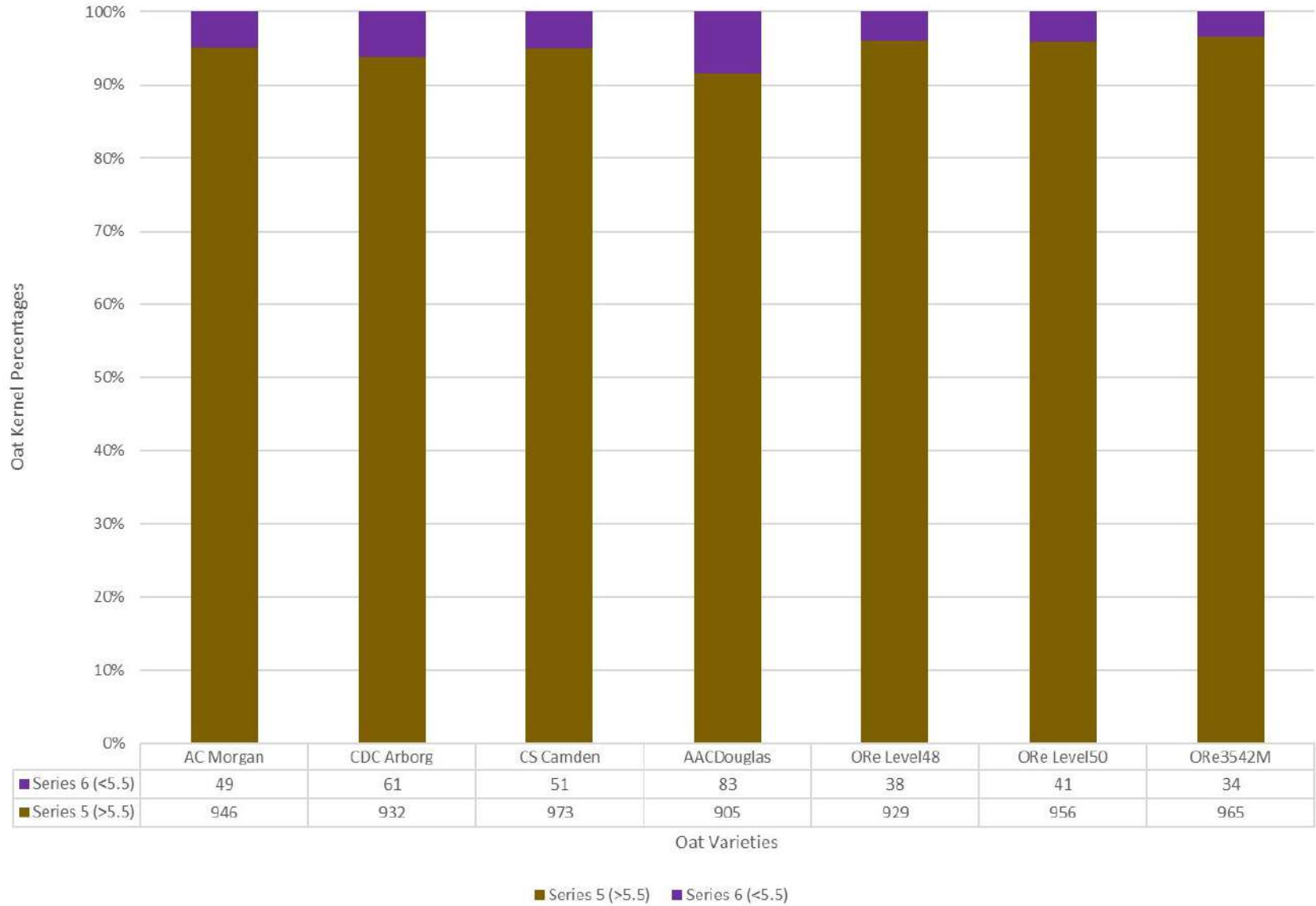


TIME TO LOOK AT OAT SAMPLES



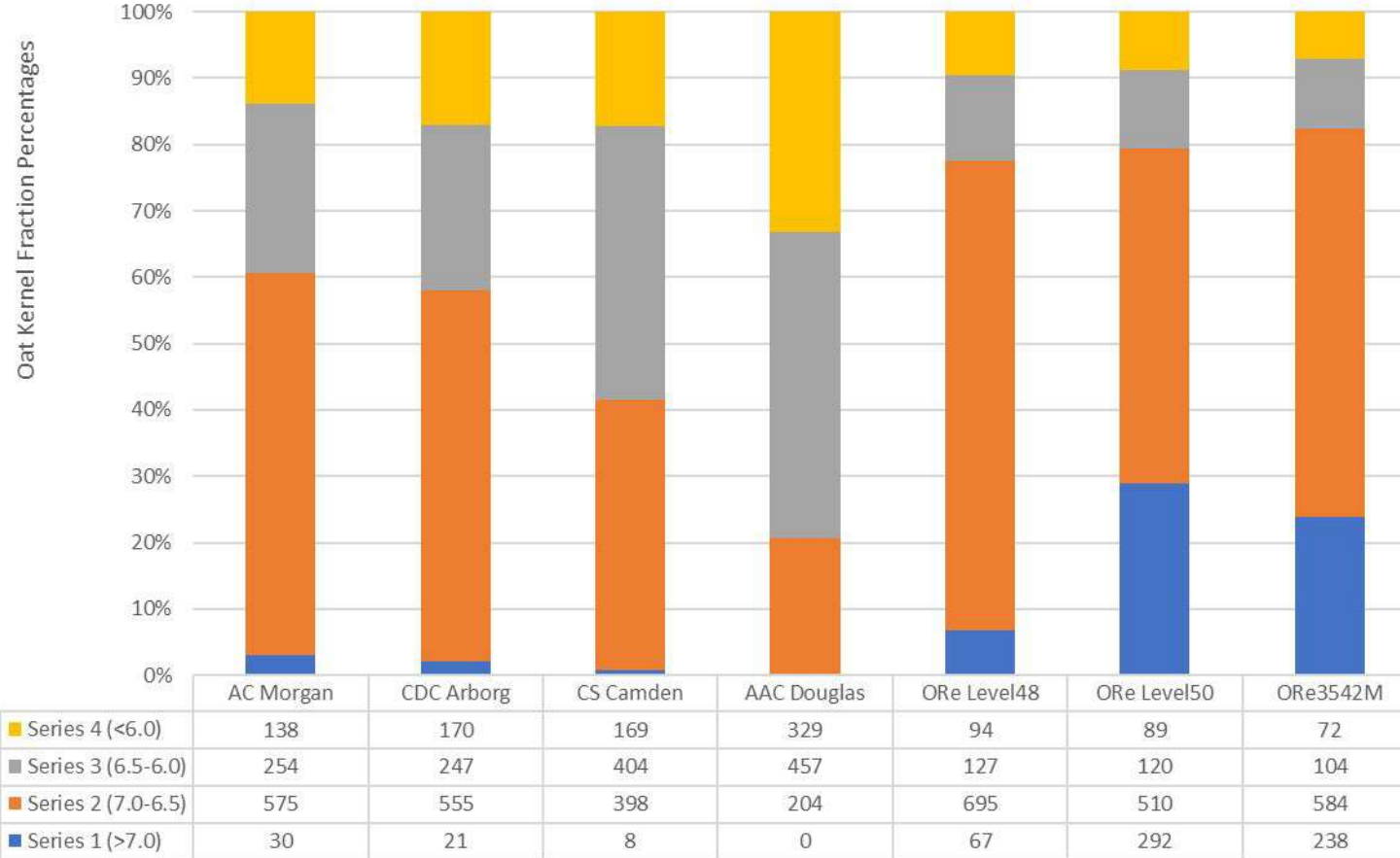
So we realized...
that this
view of
thins and
plumps...

2022 Codette SK, Industry plump & thin oats



... does not tell the story like this view.

2022 Codette SK Oat trial, YQO Target Fraction % Investigation, from 1kg "Off the Combine" samples



OAT VARIETIES

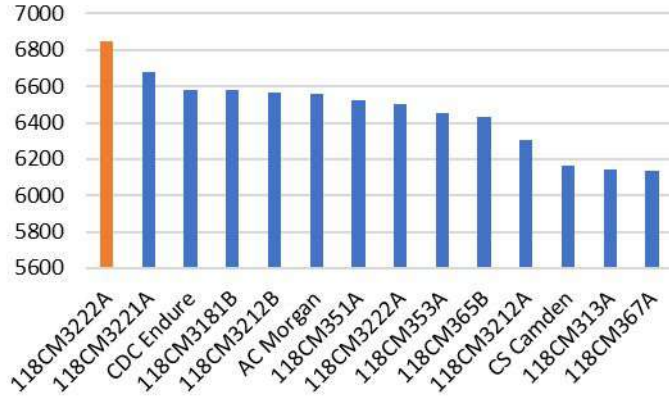
Series 1 (>7.0) Series 2 (7.0-6.5) Series 3 (6.5-6.0) Series 4 (<6.0)



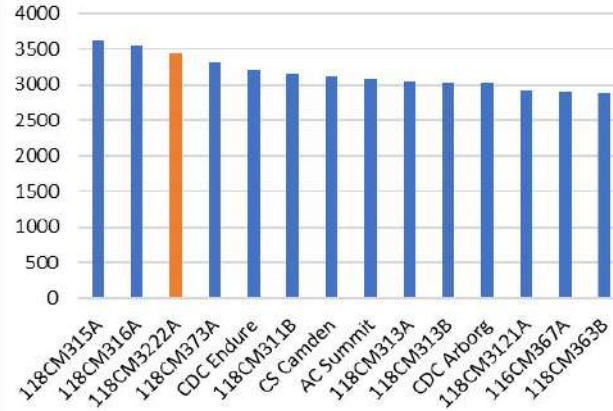




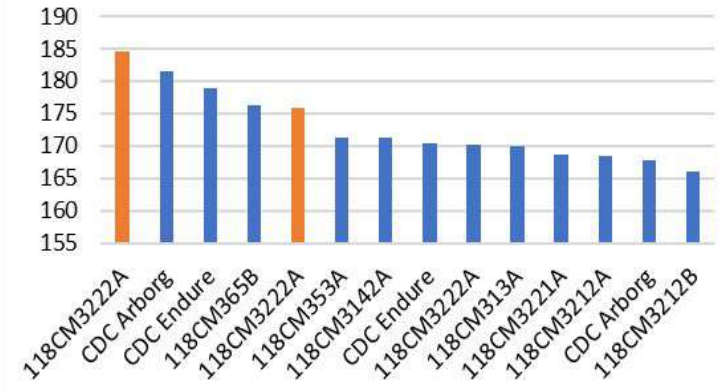
WESTLOCK 2023 YLD - very wet



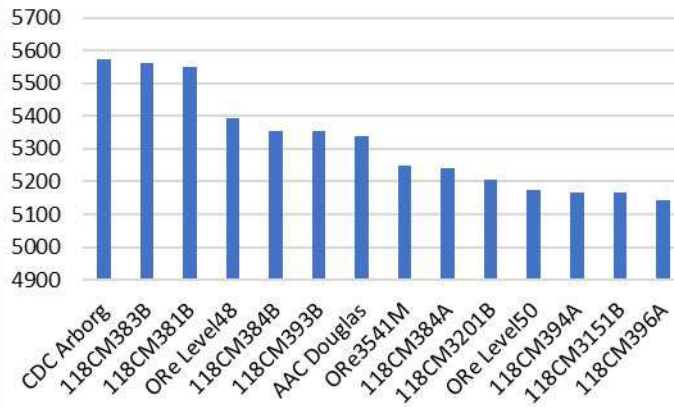
2023 LAKELAND YLD - dry



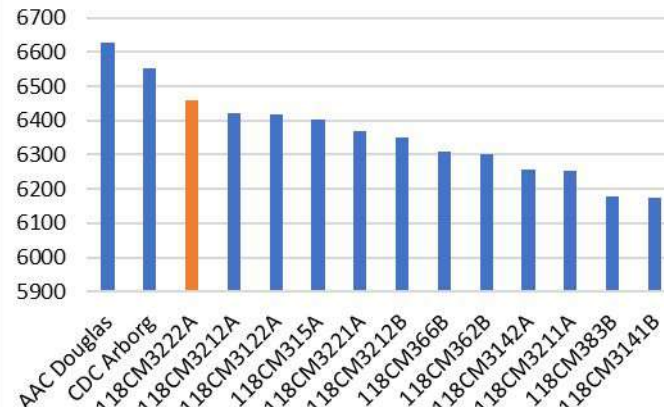
CODETTE 2023 YLD - moderate



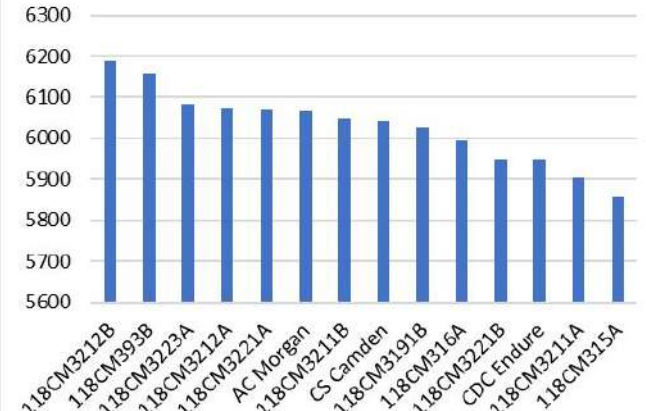
2022 WESTLOCK YLD - moderate



2022 CODETTE YLD - wet

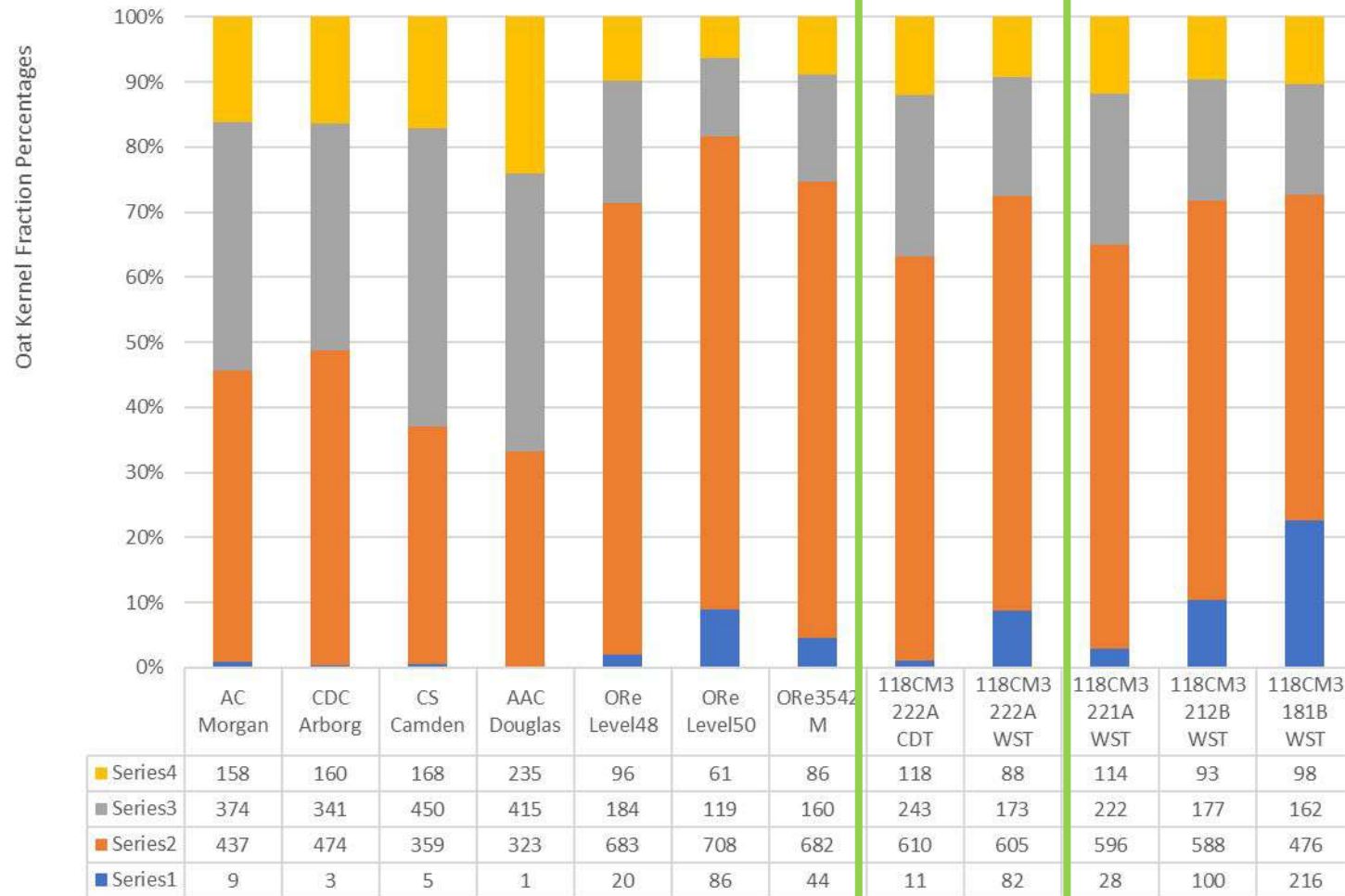


2023 KELBURN YLD - dry



2023 CDT
[Codette Sk]
again, plus
experimental
lines from
CDT and
Westlock
[WST]

2023 Codette SK Oat trial, YQO Target Fraction % Investigation, from 1kg "Off the Combine" samples. Plus 4 new lines, here with Westlock AB data 1 rep



118CM3222A is a top yield line above top check varieties.

CDT WST
DRY WET

VARIETIES

Series1 Series2 Series3 Series4





OAT GROWER COMMENTS

We are beginning to collect more comments from growers to show that Yield and Quality can and do profitably exist together in our oat varieties

Rick Mueller, seed grower at Barrhead Alberta says that they sell both Morgan and ORe3542M oat varieties. Comparable fields for the two yield 200bu per acre each. At the same time it is a "Night and Day" difference growing **42M**. "ORe3542M is way easier to combine" says Rick's son Adam. A lower cylinder speed is required and there are noticeably fewer green leaves with ORe3542M.

- Rick's Pedigreed Seed, Barrhead AB 2023

"Hi there, I was just talking with Garry, his 41M screenings made 'milling grade' in town. In a year when guys are struggling to make milling grade out of their bin, I made it with my 41M screenings!!!!" – Brad, re 2021

"Hi jim , we are well into our oat harvest, next year it will be all 35-42m. Really happy with that variety. One half section was yielding 150 bushels an acre . Not bad for a severe drought. This was on zero till. It did get a bit more rain than some other fields . I noticed really nice plump oat seeds...." – James, August 4th, 2021





“2023 has provided some opportunity for Level48... Growers had them close to or on the same fields as other varieties - both were more than happy with how the Level48 turned out vs the Camden, one grower also had Endure and yield was similar.” – Walter Smith, Seed Depot





PHASE III

2023-2024 Winter increase in New Zealand

2024 Westlock, Lakeland, +2 – RDAR



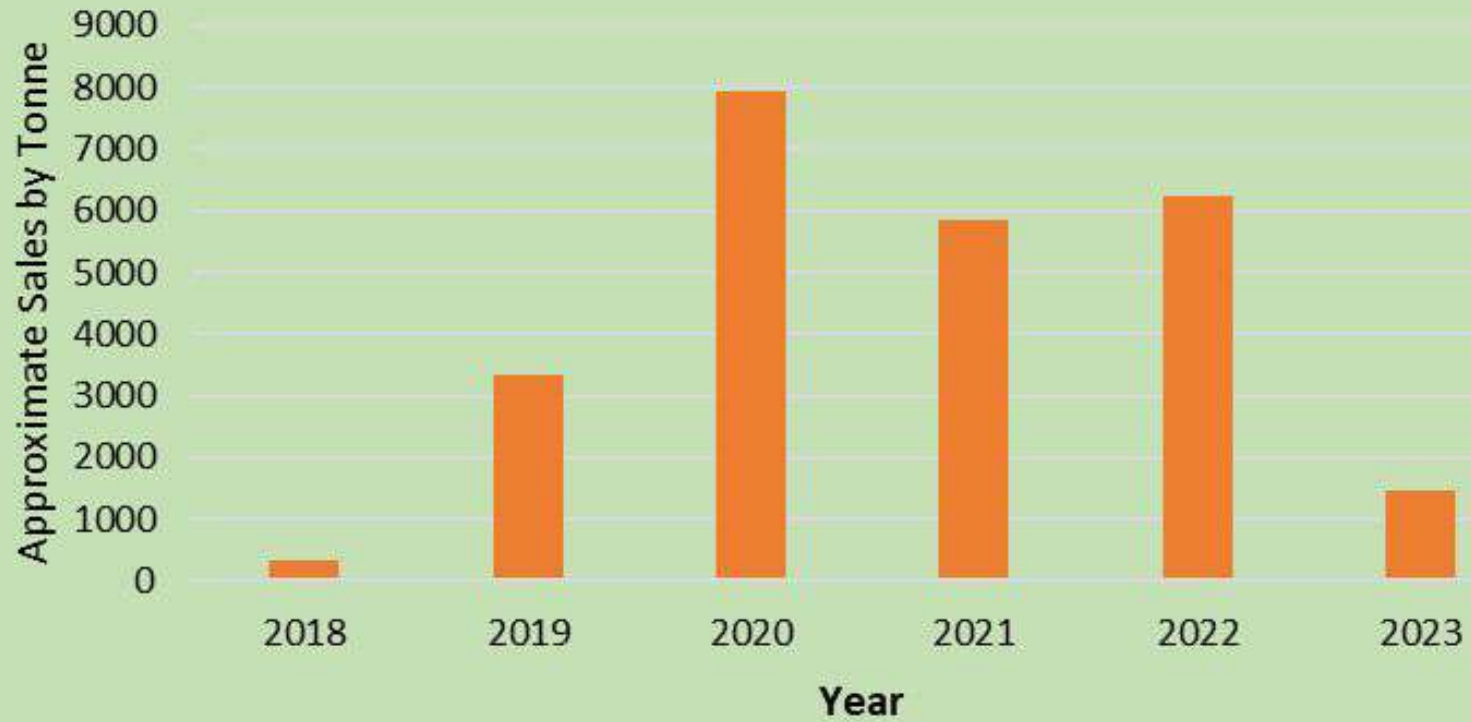
Back to the beginning
*Fully immersed in Alberta
*Gravity Table processing
*'Kicker' selections
*Protein, beta-glucan, selections
...all for ongoing density, oat
kernel uniformity and nutrition
gains



**Strong multi stem
growth habit**

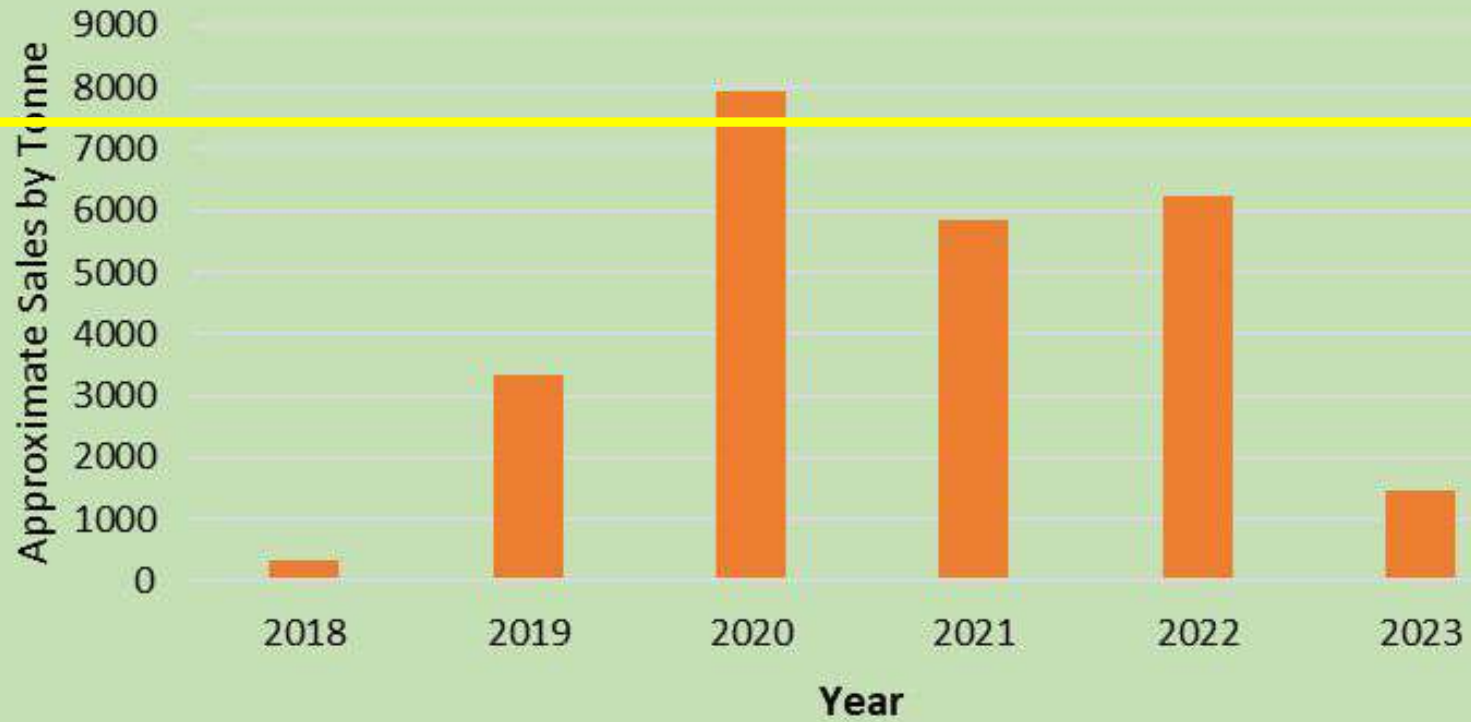


ORe3542M & ORe3541M Certified Seed volume sold - SeCan





ORe3542M & ORe3541M Certified Seed volume sold - SeCan





100
From
1000
2024 Challenge to
growers...



100 acres

From

1000 Growers....

2024 Challenge

For partnership with

Oat Advantage



55 lbs. / bushel ???
Will this happen for
Oats?





EXPORT READY ALBERTA oats...?

OAT EXPORTS BY DESTINATION - Q1

	2019/20	2020/21	2021/22	2022/23	2023/24
US	478,255	491,818	457,460	412,860	391,952
Chile		100,177			50,885
Mexico	36,171	69,314	28,310	79	49,139
Peru	9,843	11,504	8,220		17,600
Japan	8,538	8,208	8,848	1,503	8,523
S Korea	2,028	1,402	3,164	1,082	4,763
Other	11,703	22,815	3,362	338	972
Total	546,539	705,237	509,364	415,862	523,834

Down to the US, up
everywhere else



Opportunities

- Peru
- India
- China

WHAT DOES IT TAKE??

RDAR

Alberta – GRO & Oat Advantage







