Possible reasons for bad malting result(s)

Saatzucht Josef Breun
Herzogenaurach
Marketing and Sales Malting Barley
Dr. Ernst A. Loop
E-Mail: *Loop@breun.de*

Ellinor Malting Quality

Sort		Proteinindhold						Sortering, pct kerner >2,5 mm						Viskositet, cP				Beta-glucan, mg/l				Ekstrakt, pct			
		Lok.1	Lok.2	Lok.3	Lok.4	Lok.5	Gns.	Lok.1	Lok.2	Lok.3	Lok.4	Lok.5	Gns.	Lok.1	Lok.2	Lok.3	Gns.	Lok.1	Lok.2	Lok.3	Gns.	Lok.1	Lok.2	Lok.3	Gns.
ngress Mash																									
2014	Quench	9,8	10,4	9,1	9,1	10,6	9,8	97	96	98	97	98	97	1,51	1,55	1,43	1,50	149	114	50	104	83,6	83,7	83,1	83,5
2014	Crossway	10,0	10,1	9,8	9,1	10,7	10,0	96	97	97	97	98	97	1,45	1,49	1,44	1,46	50	63	54	56	84,7	84,5	82,6	83,9
2014	Flair	9,0	10,4	9,6	8,9	10,2	9,6	95	93	97	93	97	95	1,46	1,50	1,43	1,46	62	148	50	87	82,5	84,3	82,8	83,2
term mæsk 65°C																									
2015	Quench	9,6	7,9	8,2	8,9	9,8	8,9	97	95	98	98	97	97	1,49	1,46	1,47	1,47	127	50	63	80	85,1	84,3	84,9	84,8
2015	Flair	9,8	7,8	7,7	8,4	9,6	8,7	96	95	96	96	93	95	1,46	1,42	1,44	1,44	78	50	50	59	85,4	82,6	84,7	84,2
2015	Embrace	8,9	7,4	8,1	8,6	9,7	8,5	97	98	97	97	96	97	1,49	1,44	1,47	1,47	191	53	130	125	85,7	83,2	85,0	84,6
2015	Cosmopolitan	10,0	7,4	8,0	8,5	9,6	8,7	98	97	97	99	98	98	1,51	1,47	1,45	1,48	223	103	91	139	84,3	83,2	85,5	84,3
2015	Prospect	9,8	7,3	7,9	8,8	9,6	8,7	97	95	96	98	96	96	1,52	1,46	1,47	1,48	167	60	94	107	86,0	84,8	85,0	85,3
term mæsk 65°C																									
2016	Quench													1,69	1,56	1,52	1,59	708	268	204	393	81,7	85,1	83,9	83,5
2016	KWS Irina													1,69	1,60	1,53	1,61	753	459	293	502	82,9	84,2	83,8	83,6
2016	Laureate													1,66	1,54	1,49	1,56	645	396	218	420	83,3	85,0	84,0	84,1
2016	Embrace													1,68	1,54	1,51	1,58	543	286	221	350	81,1	85,8	83,9	83,6
2016	Cosmopolitan													1,78	1,54	1,47	1,60	543	288	120	317	81,0	85,0	84,4	83,5
2016	Prospect													1,73	1,61	1,52	1,62	729	423	231	461	81,0	84,7	84,7	83,5
2016	Champ													1,73	1,63	1,50	1,62	480	486	265	410	81,7	83,6	84,3	83,2
2016	Applaus													1,64	1,48	1,47	1,53	654	144	151	316	80,8	85,1	84,1	83,3
2016	Rotator													1,74	1,60	1,50	1,61	798	298	240	445	80,4	84,2	82,9	82,5
2016	Elinor													1,82	1,58	1,51	1,64	1000	432	250	561	80,6	83,6	84,3	82,9

Ellinor Malting Quality

Country	Trial / Status 2017	Number of locations Malting quality
FR	CTPS 1 + 2 (2015/2016) Results private malsters (2016/17) CBMO trials 2017	5 ✓ (harvest 2015 / 2016 11 ( ) 10 ( )
EU / DE	EU-1	5 ✓ (harvest 2017)
AT	NL1	2 ✓ (harvest 2017)
DK	VLB stresstest (2017) Tystofte (2016)	3 ✓ 2 ✓ 1 👎

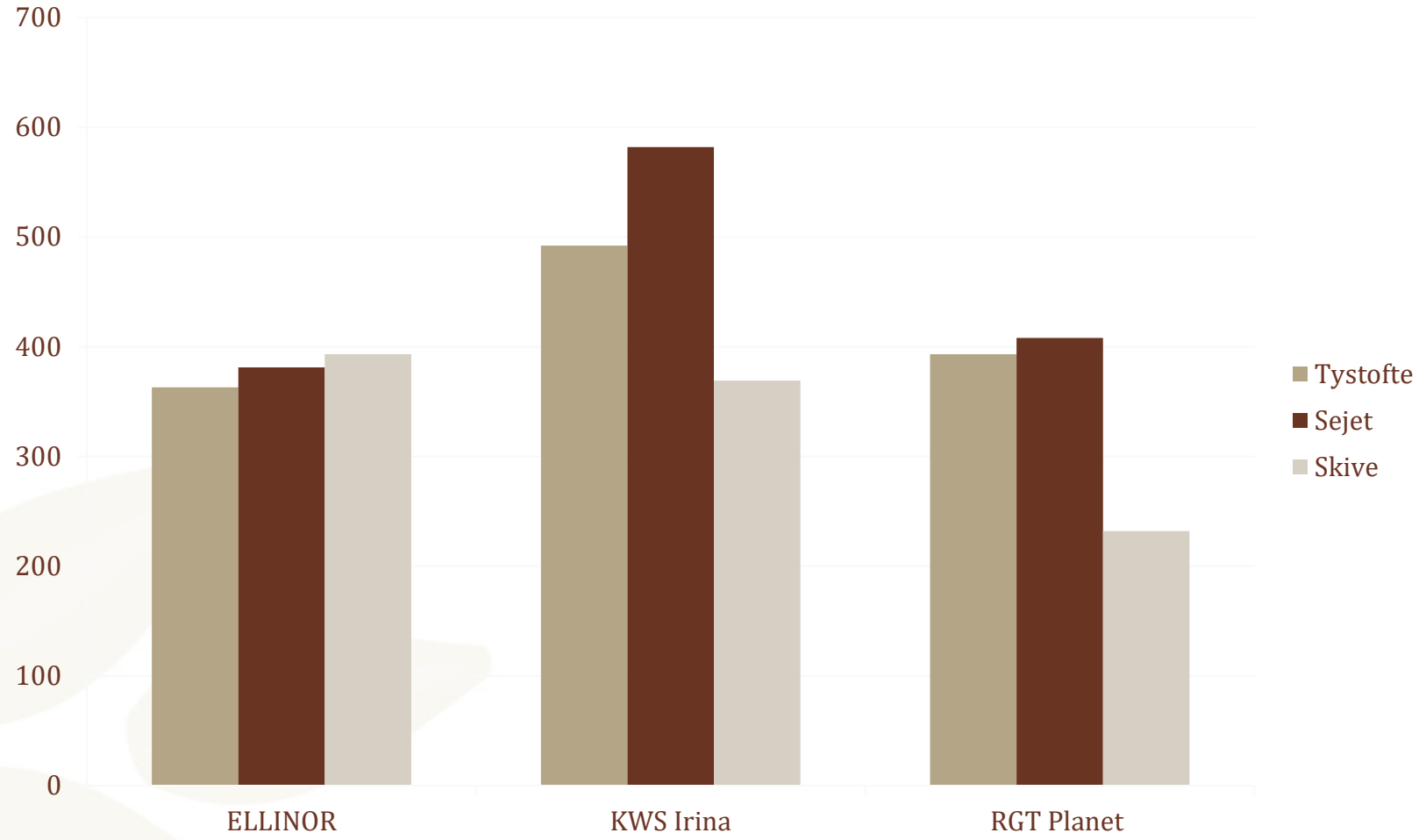
VLB Stress Test Danish Preferred 2017 Mean n=3

Breeder labelling	Extract, VZ65 [% dm]	Viscosity VZ 65°C (8,6) [mPa*s]	Protein content [% dm]	Kolbach Index VZ65 [%]	FAN VZ65 [mg/100 g dm]	Turbidity VZ65 EBC	Friability [%]	Beta-Glucan (FIA/VZ 65°C) [mg/l]	Alpha-Amylase activity [DU/g dm]	Beta-Amylase activity [BU/g dm]	Total loss
KWS Irina_45	82,5	1,6	10,6	41	129	2,5	78	481	48	1093	11,3
RGT Planet_45	82,5	1,6	10,3	46	137	4,2	83	344	65	1065	8,7
Laureate_45	83,1	1,6	10,4	44	140	3,6	79	408	63	1004	9,1
ELLINOR_45	**82,6**	**1,6**	**10,1**	**46**	**136**	**2,8**	**81**	**379**	**69**	**912**	**9,9**
KWS Irina_43	82,3	1,7	10,8	39	126	3,6	67	682	51	1077	9,8
RGT Planet_43	82,0	1,6	10,5	42	136	5,3	74	561	62	1070	7,9
Laureate_43	83,1	1,6	10,3	41	119	3,8	74	590	63	970	8,3
ELLINOR_43	**81,8**	**1,7**	**10,2**	**43**	**132**	**3,5**	**73**	**610**	**57**	**885**	**8,7**
KWS Irina_41	82,3	1,9	10,8	37	117	3,0	60	906	47	957	8,4
RGT Planet_41	81,8	1,8	10,5	38	106	4,4	60	811	55	1052	6,5
Laureate_41	82,2	1,7	10,3	39	112	3,0	61	858	57	984	7,2
ELLINOR_41	**81,7**	**1,8**	**10,4**	**39**	**122**	**2,6**	**61**	**807**	**57**	**890**	**7,4**

Source:
Danish Preferred 2017

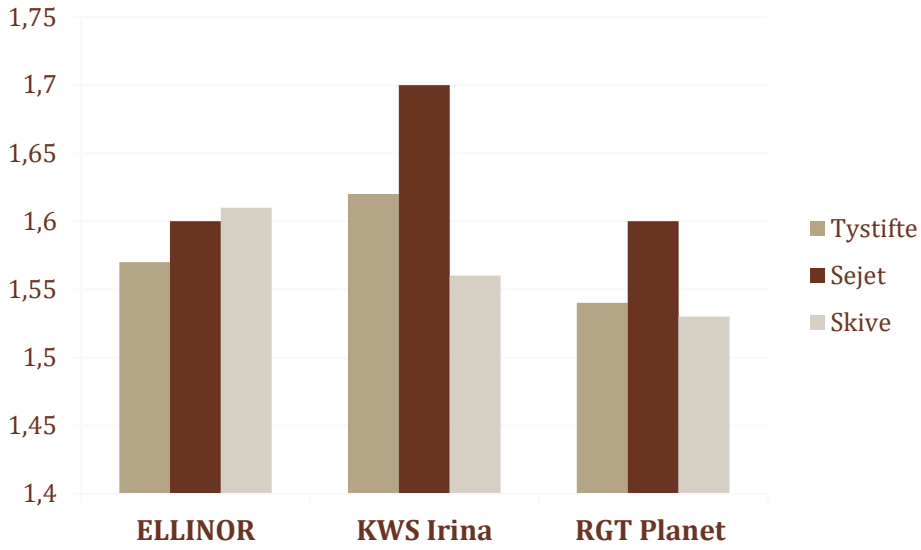
VLB Stress Test Danish Prefered

ß-Glucan

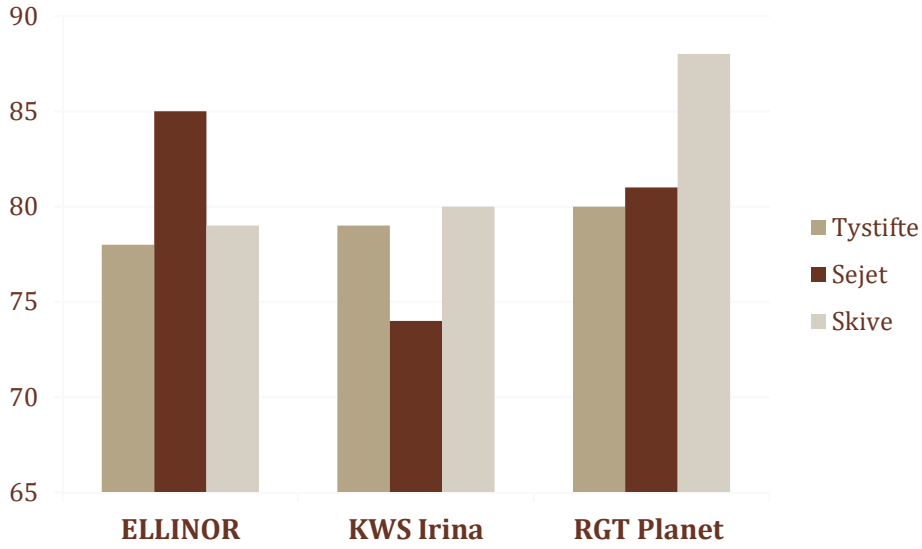


VLB Stress Test Danish Preferred

Viscosity

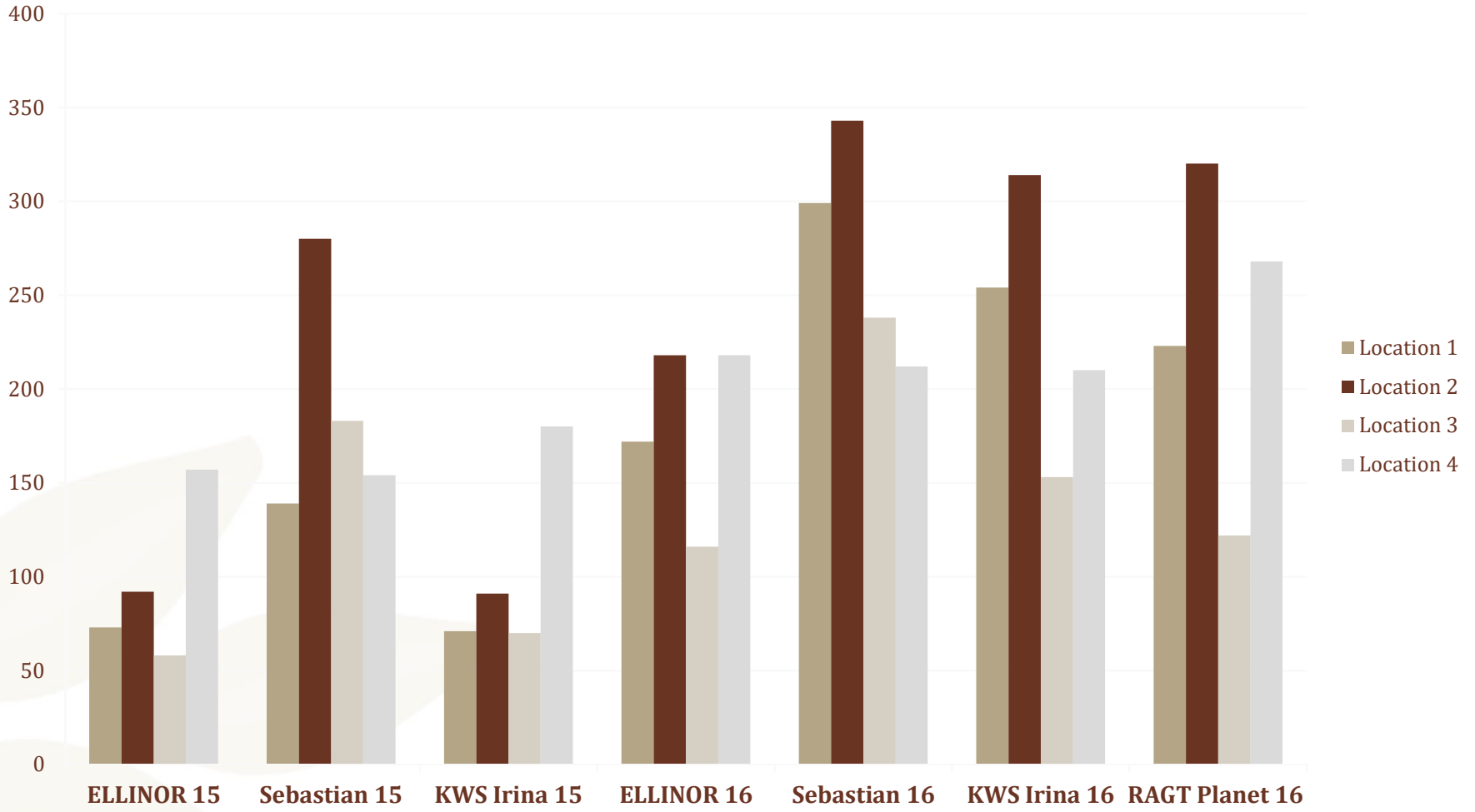


Friability



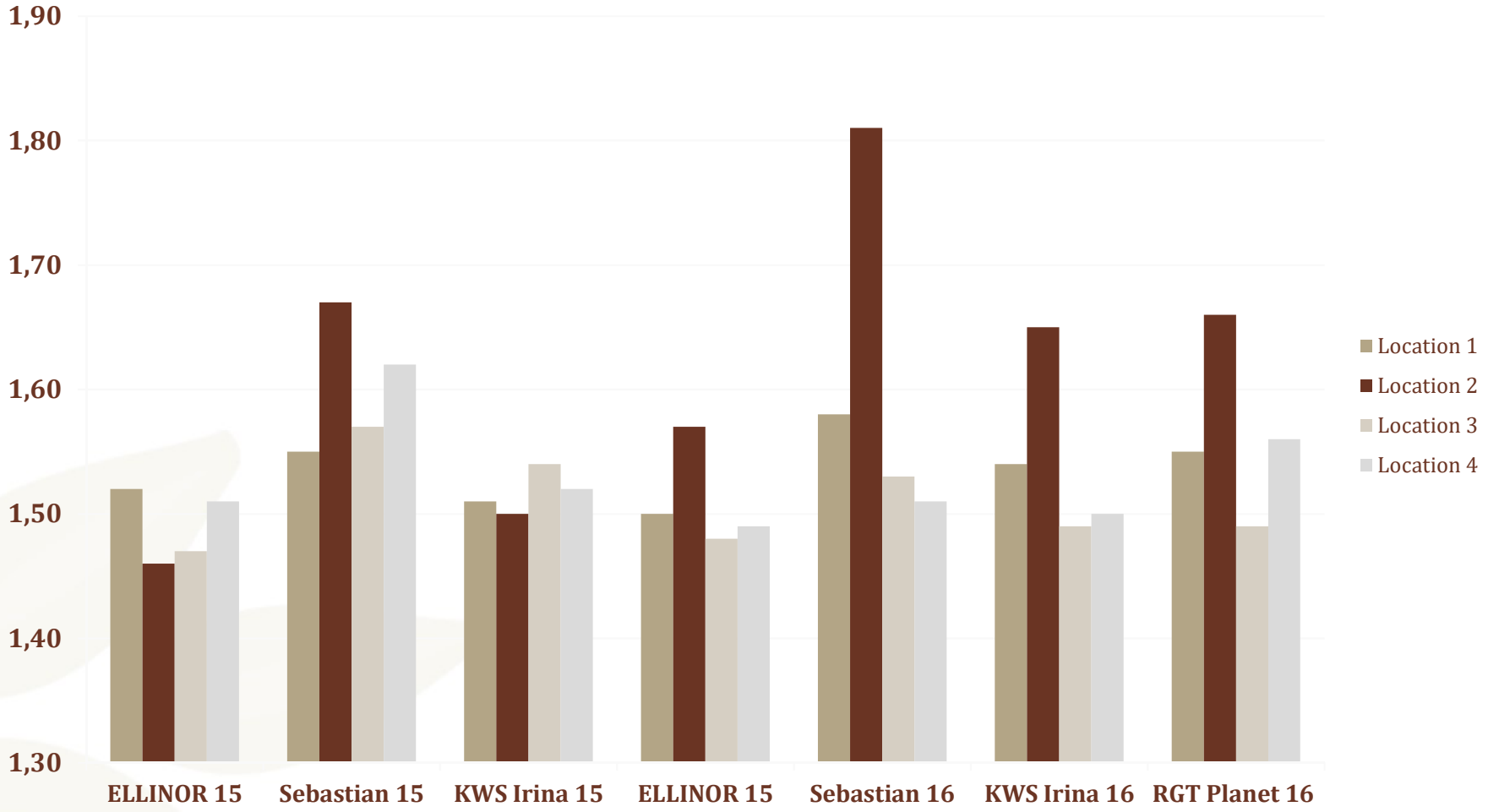
Results CTPS 2015 / 2016

ß – Glucan mg / l



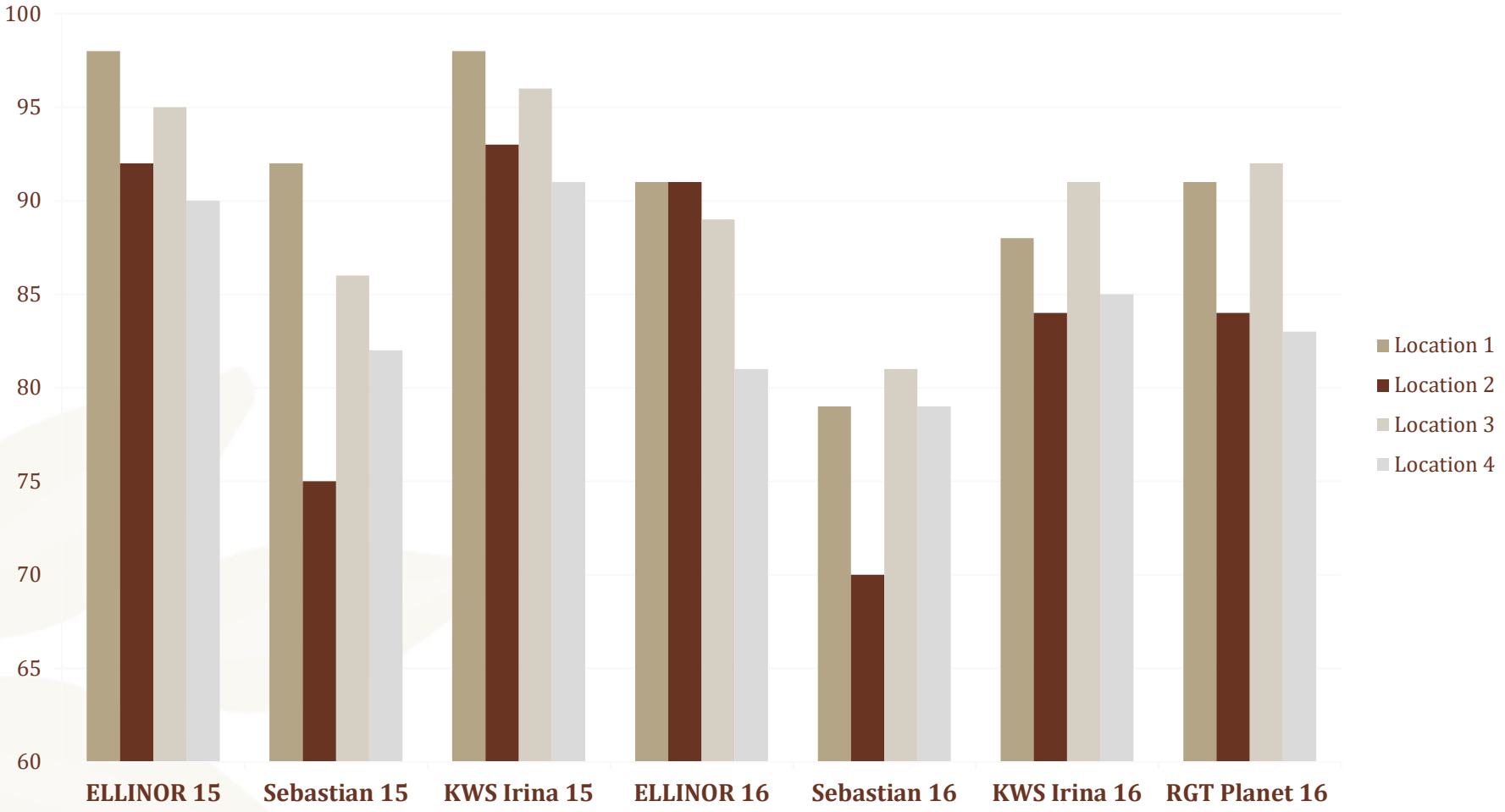
Results CTPS 1 + 2 (2015/2016)

Viscosity



Results CTPS 1 + 2 (2015/2016)

Friability (%)



Malting Quality- NL1 AT - Harvest 2017

Variety	ß – Glucan		Viscosity	
Location	1	2	1	2
Ellinor	**175**	**164**	**1,51**	**1,45**
RGT Planet	**155**	**155**	**1,47**	**1,48**
Laureate	**268**	**152**	**1,48**	**1,45**

Possible impacts on malting quality for one barley variety in multi-variety trials? *(With equal treatments/handling!)*

→ "undercover"-sprouting?

No high temperatures before harvest with breakdown of dormancy!

→ damage at harvest with too high rotations of combiner drum causing decreasing germination damage with less 12% H^2O-content of seeds?

Never will happen in Scandinavia!

→ differences in maturity, disease resistance, etc. are causing differences in moisture content of seeds per variety at harvest

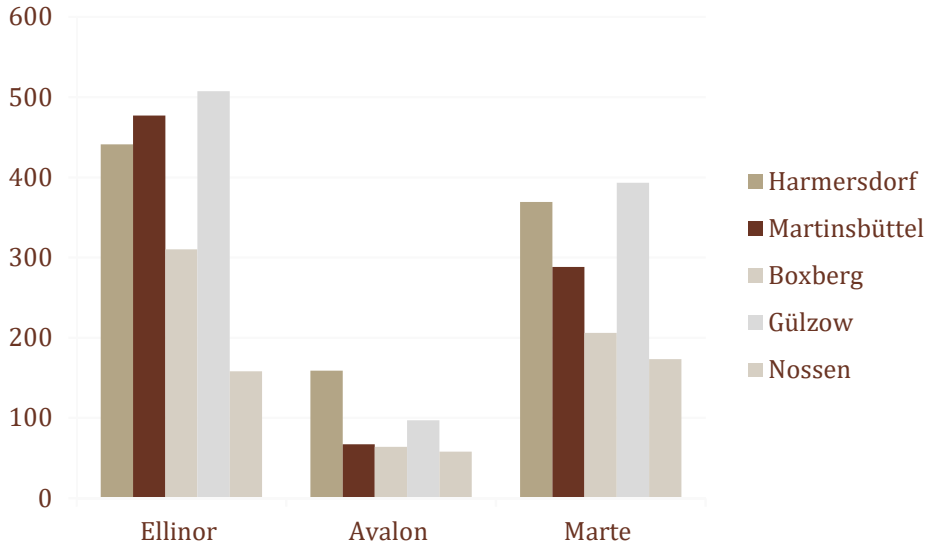
1. drying with (too) high temperatures are causing more damage with increasing water content of the single seed lot
2. harvest of not 100% mature seeds have a negative impact on germination and malting quality
3. cold weather before and at harvest and following storage of seeds under cold temperatures is stabilising dormancy (if not dried!)
4. Unsufficient or too slowly drying of too wet seed bags

Overview for spring barley (varieties in National trials 2017, latest data)

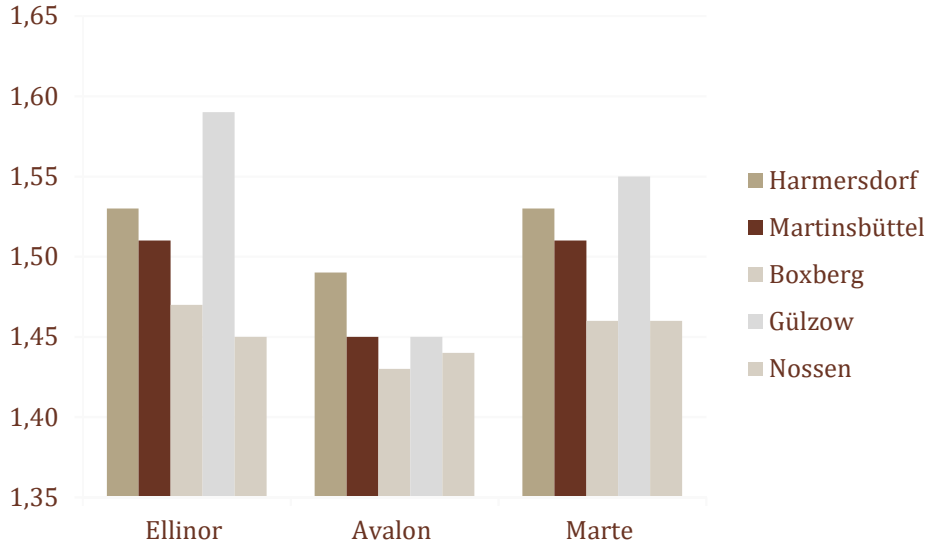
	Yield 1)		Diseases (Observation Plots) 2)				Cultivation (Observation Plots) 2)	
	Grain yield index (index)	Grain yield, hkg per ha (hkg/ha)	Barley Rust coverage (%)	Scald coverage (%)	Net and Spot blotch coverage (%)	Ramularia coverage (%)	Ripening date	Lodging (score 0 - 10)
Year	2017	2017	2017	2017	2017	2017	2017	2017
Sorting	◉	○	○	○	○	○	○	○
1. LG Diablo	107 (8)	75,1 (8)	20 (13)	2,0 (4)	2,1 (12)	17 (8)	6/8 (2)	1,0
2. Embrace	105 (8)	74,2 (8)	21 (13)	1,5 (4)	0 (12)	19 (8)	5/8 (2)	2,0
3. Laureate	105 (8)	74,2 (8)	12 (13)	0,05 (4)	0,05 (12)	10 (8)	6/8 (2)	2,0
4. Ellinor	105 (8)	74,1 (8)	9 (13)	0,4 (4)	1,0 (12)	7 (8)	6/8 (2)	2,0
5. Rotator	105 (8)	73,7 (8)	20 (13)	0,5 (4)	0,3 (12)	12 (8)	7/8 (2)	1,0
6. Dragoon	105 (8)	73,6 (8)	14 (13)	0,8 (4)	0,1 (12)	12 (8)	6/8 (2)	0,0
7. Applaus	104 (8)	73,3 (8)	16 (13)	2,0 (4)	0,6 (12)	17 (8)	3/8 (2)	1,0
8. Scholar	104 (8)	73,1 (8)	12 (13)	0 (4)	0,02 (12)	7 (8)	8/8 (2)	0,0
9. SJ 176305	104 (8)	73,0 (8)	18 (13)	0,05 (4)	0,3 (12)	10 (8)	5/8 (2)	0,0
10. SY 415584	104 (8)	72,9 (8)	28 (13)	0,3 (4)	0,2 (12)	10 (8)	6/8 (2)	0,0
11. SY 415653	104 (8)	72,9 (8)	15 (13)	0,8 (4)	0,02 (12)	18 (8)	7/8 (2)	1,0
12. Prospect	104 (8)	72,9 (8)	16 (13)	0 (4)	1,8 (12)	4,6 (8)	7/8 (2)	0,0
13. KWS Josie	103 (8)	72,7 (8)	17 (13)	0,8 (4)	1,0 (12)	21 (8)	5/8 (2)	2,0
14. SY 414473	103 (8)	72,6 (8)	16 (13)	1,4 (4)	2,9 (12)	8 (8)	5/8 (2)	0,0
15. RGT Planet	103 (8)	72,4 (8)	16 (13)	1,0 (4)	1,0 (12)	16 (8)	5/8 (2)	3,0
16. Luther	103 (8)	72,4 (8)	19 (13)	0,3 (4)	0,8 (12)	12 (8)	3/8 (2)	3,0
17. Cosmopolitan	103 (8)	72,3 (8)	20 (13)	0 (4)	0,6 (12)	16 (8)	4/8 (2)	5,0

Quality EU trials 2017

ß-glucan



viscosity



ELLINOR Germany 2017 (official EU1-trials)

	Variety	KennNr	Yield	Rel. %
Untreated				
	Quench	2194	55,30	**96,2**
	Avalon	2606	56,90	**99,0**
	RGT Planet	2703	60,20	**104,8**
Average Standards			57,47	**100,0**
	Marthe	2125	55,30	**96,2**
	Ellinor	**3087**	**62,90**	**109,5**
Treated				
	Quench	2194	62,40	**98,0**
	Avalon	2606	62,60	**98,3**
	RGT Planet	2703	66,10	**103,8**
Average Standards			63,70	**100,0**
	Marthe	2125	60,40	**94,8**
	Ellinor	**3087**	**67,00**	**105,2**
Number of trials			13	

Malting quality EU-trials Germany 2017

Malting standards Marthe and Avalon have been significantly earlier maturing then new variety Ellinor in 2017

At northern trial locations seeds have been tried after harvest (theoretically no dormancy possible!)

→ in the 2-3 most early harvested trials locations Ellinor was higher in ß-glucan then expected
→ later harvested trials ß-glucan of Ellinor was better in relation to Avalon
→ in 4(9) of 5(10) years spring barley has not to be dried after harvest in Germany! (south)
→ all seeds of trials for quality analysis are dried together separated by variety in jute/cotton bags
→ in the critical 3 locations in the north seeds have to be dried in 2017!

Malting quality NL3-trials Germany 2017

	Beta-Glucan(65°C) mg/lStufe 2								
	GERA1	SHAST	ASTRU	HAMT1	NOMBN	DOEG1	HAHOF	BURKD	Average 7
QUENCH	69	732	576	693	181	702	477	237	514
AVALON	50	176	103	624	69	215	261	92	220
RGT PLAN	65	519	351	1.000	147	471	417	202	444
MARTHE	94	1.000	426	1.000	250	852	543	249	617
LAUREATE	107	1.000	1.000	933	384	639	666	235	694
R2N 2892	99	582	402	375	151	468	606	232	402
R2N 2893	50	615	167	459	125	274	262	128	290
R2N 2894	98	1.000	393	477	231	543	618	249	502
LOCH2907	181	702	438	1.000	306	519	813	396	596
SYPA2912	101	582	188	657	257	783	405	167	434
SYPA2915	110	576	307	741	289	699	450	186	464
BREN2934	50	203	62	390	50	147	138	50	149
BREN2935	50	378	193	804	120	213	135	70	273
BREN2939	77	471	456	651	247	597	642	208	467
Ortsmittel	86	610	362	700	201	509	460	193	433

Ihre Zukunft in der Pflanze.©

Malting ELLINOR (VLB 2016)

BREUN

VLB BERLIN
Versuchs- und Lehranstalt für Brauerei in Berlin

ıcht Josef Breun GmbH&Co.KG.; Auftrag: A2016001456; Proben: 65 Sommergerste; Referenz Kunde:

		Max:	84,8	2,96	10,4	733	50,0	175	157	90,3	99	909	86	1220				9,6
		Min:	78,9	1,42	8,3	443	29,0	81	73	80,0	45	54	19	591				1,9
		Mittel:	82,4	1,72	9,1	583	39,9	124	112	85,4	82	399	50	812				5,3
		STD:	1,4	0,33	0,5	67	4,6	22	19	2,3	15	268	13	112				1,9
Züchterbezeich		Harvested year	Extract, VZ65 [% TrS]	Viscosity VZ 65°C (8.6 %) [mP	Protein [% TrS]	sol. N VZ65 [mg/100 g TrS]	Kolbach VZ65 [%]	FAN VZ65 [mg/l]	FAN VZ65 [mg/100 g TrS]	sch. Endvergärung VZ65 [%]	Friability [%]	Beta-Glucan (FIA/VZ 65°C) [m	Alpha-Amylase Aktivität [DU/	Beta-Amylase Aktivität [BU/g	Days	Targeted Steeping degree	Final loss
KWS Irina (Standard)	6 T, 45 WG, 18 - 14 Grad	2015	81,6	1,46	9,5	617	41,0	139	125	89,0	95	101	49	818	6	45,0	8,4
KWS Irina (Standard)	**6 T, 43 WG, 18 - 14 G**	2015	83,3	1,50	9,2	600	41,0	133	120	88,3	90	162	51	778	6	43,0	7,3
KWS Irina (Standard)	6 T, 41 WG, 18 - 14 Grad	2015	82,5	1,67	9,4	568	38,0	117	106	84,9	81	307	41	707	6	41,0	6,1
KWS Irina (Standard)	6 T, 39 WG, 18 - 14 Grad	2015	81,5	1,79	9,3	511	34,0	102	92	85,3	67	615	41	742	6	39,0	4,5
KWS Irina (Standard)	**5 T, 45 WG, 18 - 14 G**	2015	81,9	1,56	8,9	569	40,0	139	124	87,7	89	227	42	752	**5**	45,0	8,8
KWS Irina (Standard)	4 T, 45 WG, 18 - 14 Grad	2015	82,0	1,71	8,7	561	40,0	138	124	85,9	76	450	34	796	**4**	45,0	7,4
RGT Planet (Standard)	6 T, 45 WG, 18 - 14 Grad	2015	82,9	1,44	8,6	644	47,0	154	139	90,0	97	< 50	59	751	6	45,0	7,5
RGT Planet (Standard)	6 T, 43 WG, 18 - 14 Grad	2015	84,8	1,48	8,4	613	46,0	138	124	87,1	95	110	50	671	6	43,0	6,8
RGT Planet (Standard)	**6 T, 41 WG, 18 - 14 G**	2015	83,8	1,58	8,9	568	40,0	122	110	85,6	88	233	53	688	6	41,0	**5,4**
RGT Planet (Standard)	6 T, 39 WG, 18 - 14 Grad	2015	82,9	1,70	8,3	535	40,0	108	97	85,8	78	307	41	703	6	39,0	4,0
RGT Planet (Standard)	**5 T, 45 WG, 18 - 14 G**	2015	83,9	1,48	8,4	638	47,0	162	145	88,0	93	95	51	742	**5**	45,0	7,7
RGT Planet (Standard)	4 T, 45 WG, 18 - 14 Grad	2015	83,3	1,62	8,5	617	46,0	157	141	87,4	86	263	46	736	**4**	45,0	6,1
AVALON (Standard)	6 T, 45 WG, 18 - 14 Grad	2015	81,4	1,44	9,1	607	42,0	126	113	87,8	98	< 50	69	925	6	45,0	6,9
AVALON (Standard)	6 T, 43 WG, 18 - 14 Grad	2015	83,6	1,45	9,6	593	38,0	118	106	85,7	97	< 50	69	833	6	43,0	6,3
AVALON (Standard)	6 T, 41 WG, 18 - 14 Grad	2015	82,3	1,53	9,1	586	40,0	114	103	85,8	96	139	59	888	6	41,0	5,0
AVALON (Standard)	**6 T, 39 WG, 18 - 14 G**	2015	82,7	1,64	9,0	564	39,0	107	96	82,7	88	244	53	874	6	39,0	4,0
AVALON (Standard)	6 T, 37 WG, 18 - 14 Grad	2015	81,9	1,86	9,1	539	37,0	98	88	83,4	79	543	50	849	6	37,0	3,1
AVALON (Standard)	5 T, 45 WG, 18 - 14 Grad	2015	82,3	1,47	9,1	628	43,0	142	127	86,1	98	54	61	856	**5**	45,0	7,1
AVALON (Standard)	**4 T, 45 WG, 18 - 14 G**	2015	82,5	1,55	9,1	638	44,0	146	131	85,0	91	192	40	915	**4**	45,0	5,9
FATIMA	6 T, 45 WG, 18 - 14 Grad	2015	84,1	1,43	8,9	660	46,0	147	133	88,3	99	< 50	66	811	6	45,0	7,6
FATIMA	6 T, 43 WG, 18 - 14 Grad	2015	84,6	1,47	8,9	593	42,0	128	115	88,1	96	117	61	753	6	43,0	6,9
FATIMA	**6 T, 41 WG, 18 - 14 G**	2015	83,5	1,59	9,0	567	39,0	114	103	84,4	89	264	48	694	6	41,0	5,8
FATIMA	6 T, 39 WG, 18 - 14 Grad	2015	82,9	1,76	9,2	540	37,0	105	95	83,3	76	546	44	775	6	39,0	4,6
FATIMA	**5 T, 45 WG, 18 - 14 G**	2015	84,1	1,48	9,0	715	50,0	163	147	87,5	95	120	52	757	5	45,0	7,4
FATIMA	4 T, 45 WG, 18 - 14 Grad	2015	82,5	1,66	8,7	625	45,0	150	135	86,2	82	294	48	797	4	45,0	6,3
ELLINOR	6 T, 45 WG, 18 - 14 Grad	2015	83,7	1,42	8,6	644	47,0	151	136	90,3	98	< 50	61	744	6	45,0	7,5
ELLINOR	6 T, 43 WG, 18 - 14 Grad	2015	83,9	1,47	8,6	621	45,0	136	123	88,2	96	147	54	758	6	43,0	6,4
ELLINOR	**6 T, 41 WG, 18 - 14 G**	2015	83,4	1,53	8,5	574	42,0	125	113	85,8	89	242	43	735	6	41,0	**5,2**
ELLINOR	6 T, 39 WG, 18 - 14 Grad	2015	82,6	1,70	8,6	514	37,0	107	96	85,5	80	498	47	838	6	39,0	4,3

Summary:

Possible reasons for recent malting quality problems in DK Loc. Tystofte 2016 and Germany 2017

1. Too early harvest with (too) high water content of seeds
2. Possible mistakes of drying together different seed lots with too high temperatures (or not sufficient air)

→ information from micro-malting tests may be limited

→ better: (more big size) malting tests from 4-6 locations with individual (optimal) handling and processing of each field/lot

Don´t count too much results of very extreme years!
Keep the international view!