

DANISH MALTING BARLEY

Catalogue 2020

Updated: 24th November 2020
Next update: February 2021

Introduction

The Danish Preferred Committee welcomes you to the 2019 Danish Malting Barley Catalogue. In this catalogue, you will find a short presentation on the varieties which have finished industrial testing in 2019.

Further information on the program and full dataset for both Stress- and Industry Test can be accessed via <https://danishpreferred.com/>

Danish Preferred approved varieties

Danish Preferred Approved Varieties			
Variety	Breeder	Year of approval	Page
Evergreen	Nordic Seed	2017	*
KWS Irina	KWS	2017	*
Odyssey	Limagrain	2017	*
Propino	Syngenta	2017	*
Quench	Syngenta	2017	*
RGT Planet	RAGT	2017	*
Crossway	Nordic Seed	2018	6
Flair	Sejet	2018	7
Laureate	Syngenta	2018	8
Chanson	Ackermann	2019	9
Ellinor	Saatzucht Josef Breun	2019	10

*Pre-approved variety – well known and accepted by malting and brewing industry

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Short description of program

Preconditions for application:

- Two years results from either Danish Official Testing or Farmer Union Trials.
- Two years of micro malting performed at VLB with samples and application through the Tystofte Foundation.
- Minimum 5 tons of seed available at application.

Stress Test:

- Micro malting from three locations under variable conditions: Steeping degree 45%, 43%, 41%; germination temp. 18/14,5°C; 5 days germination; isothermal mashing at 65 °C.
- The applicants will be invited to present the candidate varieties for the committee and comment on the results from stress test/micro malting.

Industry Test:

- Large scale malting at the two Danish malting companies (Viking Malt and Fuglsang) and one large scale malting at one of the other partners in the program (currently: Avangard Malz, Cargill, Crips Malting Group, Holland Malt, Malteurop, Soufflet)
- Brewing test at three breweries in Denmark or abroad.
- The industry step will have to be completed during either one or two growing seasons.

Final approval:

- Before final approval, a multiplication acreage of 500 hectares is required.

Distribution of Industry Tests



Variety owner and representative				Full scale malting and brewing																						
1 Variety	2 Breeder	3 Applicant	4 Supplier	Malting plant	Brewery	Grain lots from crop																				
						2016	2017						2018				2019		2020		2021					
				Fuglsang, DK Viking Malt, DK Fuglsang, DK Viking Malt, DK Cargill, NL Holland Malt, NL Malteurope, DE Soufflet, PL Fuglsang, DK Viking Malt, DK Holland Malt, NL Crisp Malt, DE Fuglsang, DK Malteurope, DE Fuglsang, DK Viking Malt, DK tbd tbd Fuglsang, DK Viking Malt, DK tbd tbd	Carlsberg Obernai pilot, FR Fuglsang, DK Carlsberg, SE Carlsberg Obernai pilot, FR Carlsberg, NO Miss Bavaria, NL Javier, DE Miss Darguner Brauerei, DE Fuglsang, DK Ringnes, NO Royal Swinkels Family Brewers, NL Miss Fuglsang, DK Miss Fuglsang, DK Carlsberg tbd tbd tbd Fuglsang, DK Carlsberg tbd tbd tbd																					
Tests to be performed with grain lots from crop 2016 and 2017																										
CROSSWAY	Nordic Seed	Nordic Seed	DLA/Danish Agro		x	x																				
FLAIR	Sejet	Sejet	DLG	x						x																
KWS FANTEX	KWS	KWS	Hornsyld	x		Withdrawn																				
LAUREATE	Syngenta	Sejet	DLG			x	x																			
Tests to be performed with grain lots from crop 2017 and 2018																										
CHANSON	Ackermann	Nordic Seed	DLA/Danish Agro										x													
COSMOPOLITAN	Sejet	Sejet	DLG			x																				
EMBRACE	Sejet	Sejet	DLG			x																				
KWS BECKIE	KWS	Nordic Seed	DLA/Danish Agro				x																			
KWS CANTTON	KWS	KWS	Hornsyld/ Brdr. Ewers			x																				
Tests to be performed with grain lots from crop 2018 and 2019 and 2020																										
ELLINOR	Saatzucht Josef Breun	Nordic Seed	DLA/Danish Agro										x	x	x											
CHAMP	Sejet	Sejet	DLG																							
PROSPECT	Sejet	Sejet	DLG										x								x	x				
APPLAUS	Sejet	Sejet	DLG																			Withdrawn				
Tests to be performed with grain lots from crop 2019 and 2020																										
FOCUS	Secobra Recherches S.A.	Nielsen & Smith	Hornsyld																	x	x					
KWS CHRISSIE	KWS	Sejet	DLG																			Withdrawn				
Tests to be performed with grain lots from crop 2020 and 2021																										
FIREFOXX	Ackermann	Nordic Seed	DLA/Danish Agro																		x	x	x			
STAIRWAY	Nordic Seed	Nordic Seed	DLA/Danish Agro																		x		x			
SKYWAY	Nordic Seed	Nordic Seed	DLA/Danish Agro																		x					
SY SPLENDOR	Syngenta	Syngenta	Brdr. Ewers																		x		x			

VARIETY NAME: CROSSWAY

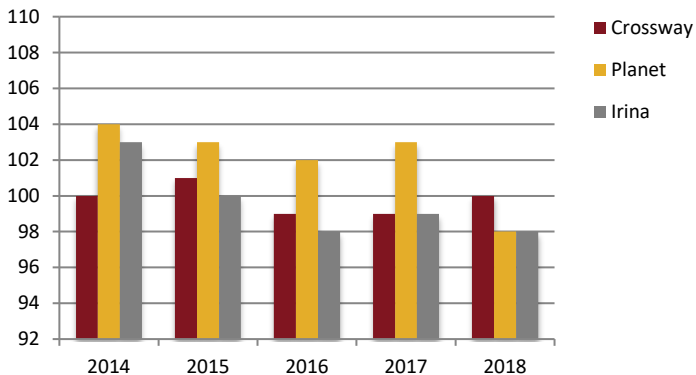


GENERAL INFORMATION

Variety: Crossway
 Type: Two row spring malting barley
 Breeder: Nordic Seed, Denmark
 Representative: Nordic Seed, Denmark
 Distributer: DLA
 Pedigree: Quench x (Perdita x Titan)
 Status: 736 ha multiplication in DK in 2018
 Geography: DK, DE and the Baltics

AGRONOMY

Data from Danish Official and National trials.
 Relative yield index.



Data from Danish National Trials 2014-2018	Irina/Planet	Crossway
Relative yield %	101	100
Protein %	10,7	10,7
Grading >2,5mm %	97	96
Grading >2,8mm %	86	84
Specific weight (hl/kg)	66,7	67,5
Maturity	02 Aug	02 Aug
Straw length in cm	60	63
Lodging (0-10, 1 is best):	0,3	1,6
Straw breaking (0-10, 1 is best)	3,1	6,1
Mildew (% coverage)	0	0
Barley rust (% coverage)	12	14
Skald (% coverage)	3,4	0,9
Net Blotch (% coverage)	1,3	3,3

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VLB MICRO MALTING

Stress test crop 2017 at 41%, 43% and 45% steeping degree. Tested variety is compared to the two largest malting barley varieties in Denmark for crop 2017.

	KWS Irina_45	KWS Irina_43	KWS Irina_41	RGT Planet_45	RGT Planet_43	RGT Planet_41	Crossway_45	Crossway_43	Crossway_41
Extract	3	3	3	3	4	4	2	2	3
Friability	3	4	5	2	3	5	1	1	2
Beta-Glucan	2	4	5	2	3	5	1	1	2
Viscosity	2	3	5	1	2	4	1	1	2
FAN	2	2	3	2	2	3	3	3	3
Soluble N	2	2	3	2	2	3	3	2	2
Kolbach	2	3	3	2	2	3	2	2	3
Alpha-Amylase	4	4	4	1	2	3	3	3	4
Beta-Amylase	1	1	2	1	1	1	5	5	5
Limit Dextrinase	1	2	3	1	2	2	2	2	3
Attenuation	1	2	2	1	1	2	2	3	3
Turbidity	1	2	1	3	4	3	5	4	4

Positive:

- Good extract level at all steeping levels
- Very good malt modification values

Negative:

- Very poor Beta-amylase level!
- Very high wort turbidity!

INDUSTRY MALTING

Comments to malted barley lots:

- No comments to appearance of barley – and only “low to medium level” of Skinned Grains found
- Average Germination Energy in malted barley lots
- Below average barley screening >2,8 mm
- High specific weight for barley from Danish crop 2016

Malt results - Positive:

- High extract level in malt - but also “low to medium” level of Skinned Grains in the barley!
- Well modified malt expressed by good betaglucan level and friability values

Malt results - Negative:

- All tests found high level of soluble nitrogen in the produced malt. – This could be problematic or positive depending on maltsters preference!
- A low beta-amylase level in the malt was partly confirmed in the full scale industry malting tests

INDUSTRY BREWING

Brew house:

- In one of the trials additional deepcuts and wort collection time was needed.
- Brewhouse loss in one test reported to be slightly higher than normal.

Fermentation and filtration:

- As normal

Packaged beer:

- As normal

RECOMMENDATION

Crossway is an average yielding malting barley variety with average agronomic features – however tendency to slightly higher than average straw breaking. Barley grading in terms of grain fraction >2,8 mm was found to be normal in National Trials, but below average in the malted barley lots. Maltsters will need to be aware of the very high level of soluble nitrogen in produced malt. This characteristic could be problematic or positive depending on maltsters preference! Limit attenuation level was found to be normal even through the beta-amylase level is consistently low.

VARIETY NAME: FLAIR

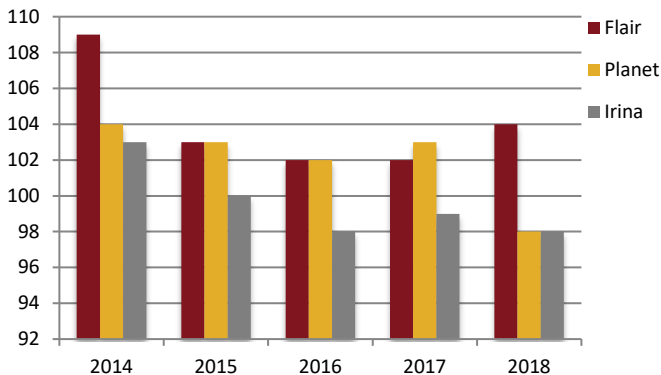


GENERAL INFORMATION

Variety: Flair
 Type: Two row spring malting barley
 Breeder: Sejet, Denmark
 Representative: Sejet, Denmark
 Distributer: DLG
 Pedigree: Dacapo x (Tamtam x Overture)
 Status: 2.680 ha multiplication in DK in 2018
 Geography: DK, SE, PL and ES

AGRONOMY

Data from Danish Official and National trials.
 Relative yield index.



Data from Danish National Trials 2015-2018	Irina/Planet	Flair
Relative yield %	100	103
Protein %	10,9	10,9
Grading >2,5mm %	96	95
Grading >2,8mm %	85	77
Specific weight (hl/kg)	66,7	66,8
Maturity	03 Aug	02 Aug
Straw length in cm	59	58
Lodging (0-10, 1 is best):	0,7	1
Straw breaking (0-10, 1 is best)	3	2,8
Mildew (% coverage)	0	0
Barley rust (% coverage)	12	10
Skald (% coverage)	2,5	4,3
Net Blotch (% coverage)	1,6	0,1

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VLB MICRO MALTING

Stress test crop 2017 at 41%, 43% and 45% steeping degree. Tested variety is compared to the two largest malting barley varieties in Denmark for crop 2017.

	KWS Irina_45	KWS Irina_43	KWS Irina_41	RGT Planet_45	RGT Planet_43	RGT Planet_41	Flair_45	Flair_43	Flair_41
Extract	3	3	3	3	4	4	2	3	1
Friability	3	4	5	2	3	5	1	2	2
Beta-Glucan	2	4	5	2	3	5	1	1	2
Viscosity	2	3	5	1	2	4	1	1	1
FAN	2	2	3	2	2	3	3	3	2
Soluble N	2	2	3	2	2	3	2	2	2
Kolbach	2	3	3	2	2	3	2	2	2
Alpha-Amylase	4	4	4	1	2	3	1	1	2
Beta-Amylase	1	1	2	1	1	1	2	2	3
Limit Dextrinase	1	2	3	1	2	2	1	1	3
Attenuation	1	2	2	1	1	2	2	4	3
Turbidity	1	2	1	3	4	3	3	3	2

Positive:

- Good extract level at all steeping levels
- Very good malt modification values
- Well balanced proteolytic activity

Negative:

- Low attenuation at steeping degree 43%

RECOMMENDATION

Flair is a very high yielding malting barley variety with good agronomic features. Barley grading in terms of grain fraction >2,8 mm could be better. Good modification, high enzymatic level and good Final Attenuation in produced malt and beer.

INDUSTRY MALTING

Comments to malted barley lots:

- No comments to appearance of barley – however high level of Skinned Grains was noticed as it was often for barley from crop 2017
- High Germination Energy in malted barley lots
- Barley screening >2,8 mm average to slightly low
- Low but still better than average specific weight for barley from Danish crop 2017

Malt results - Positive:

- Well modified malt expressed by good betaglucan level and low viscosity values
- Very high enzymatic level in malt

Malt results - Negative:

- No significant negative values found for tested parameters

INDUSTRY BREWING

Brew house:

- Good lautering/wort collection
- Brewhouse loss in one test reported to be slightly higher than normal

Fermentation and filtration:

- Final Attenuation nicely high
- Good low beer haze
- Good beer filtration

Packaged beer:

- As normal

VARIETY NAME: LAUREATE

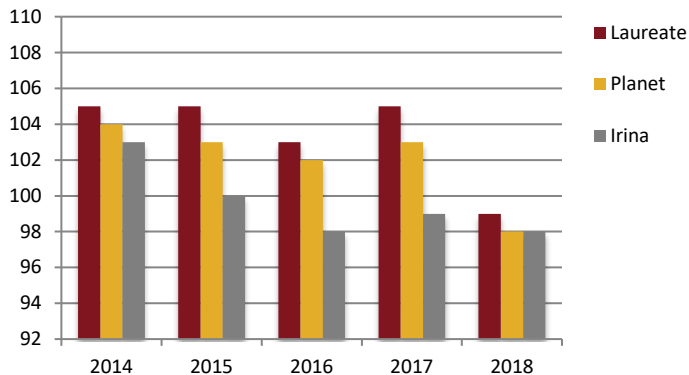


GENERAL INFORMATION

Variety: Laureate, Non GN variety
 Type: Two row spring malting barley
 Breeder: Syngenta, Germany
 Representative: Sejet, Denmark
 Distributer: DLG
 Pedigree: Sanette x Concerto
 Status: 1.152 ha multiplication in DK in 2018
 Geography: DK, UK, SE, FR, PL, DE, IR and LT

AGRONOMY

Data from Danish Official and National trials.
 Relative yield index.



Data from Danish National Trials 2014-2018	Irina/Planet	Laureate
Relative yield %	101	104
Protein %	10,7	10,6
Grading >2,5mm %	97	97
Grading >2,8mm %	86	89
Specific weight (hl/kg)	66,7	66,4
Maturity	02 Aug	02 Aug
Straw length in cm	60	61
Lodging (0-10, 1 is best):	0,6	0,7
Straw breaking (0-10, 1 is best)	3,1	4,1
Mildew (% coverage)	0	0
Barley rust (% coverage)	12	6
Skald (% coverage)	3,4	1,7
Net Blotch (% coverage)	1,3	0,04

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VLB MICRO MALTING

Stress test crop 2017 at 41%, 43% and 45% steeping degree. Tested variety is compared to the two largest malting barley varieties in Denmark for crop 2017.

	KWS Irina_45	KWS Irina_43	KWS Irina_41	RGT Planet_45	RGT Planet_43	RGT Planet_41	Laureate_45	Laureate_43	Laureate_41
Extract	3	3	3	3	4	4	1	1	3
Friability	3	4	5	2	3	5	2	3	5
Beta-Glucan	2	4	5	2	3	5	2	3	5
Viscosity	2	3	5	1	2	4	1	2	3
FAN	2	2	3	2	2	3	3	3	3
Soluble N	2	2	3	2	2	3	2	2	3
Kolbach	2	3	3	2	2	3	2	2	3
Alpha-Amylase	4	4	4	1	2	3	1	2	3
Beta-Amylase	1	1	2	1	1	1	2	2	2
Limit Dextrinase	1	2	3	1	2	2	2	3	4
Attenuation	1	2	2	1	1	2	1	1	5
Turbidity	1	2	1	3	4	3	2	2	1

Positive:

- Good extract level at all steeping levels
- Good malt modification values

Negative:

- Low attenuation at steeping degree 41%

INDUSTRY MALTING

Comments to malted barley lots:

- No comments to appearance of barley and low level of Skinned Grains compared to general level of crop 2017
- High Germination Energy in all malted barley lots
- Very good screening >2,8 mm
- High Water Sensitivity noticed

Malt results - Positive:

- Generally high extract levels in all trials
- Very high alpha-amylase activity found in one of the trials and better than average beta amylase levels found generally
- High Attenuation

Malt results - Negative:

- Below average malt modification expressed by betaglucan level and friability values

INDUSTRY BREWING

Brew house:

- Very good wort collection reported - Good laureating behavior
- Good extract yield in the brew house reported

Fermentation and filtration:

- As normal

Packaged beer:

- As normal

RECOMMENDATION

Laureate is a very high yielding malting barley variety with good agronomic features. Barley grading in terms of grain fraction >2,8 mm is good. Laureate was found to be slightly difficult in regards to malt modification. Notice that Laureate is a Non-GN variety! Very high enzymatic level and high Attenuation in produced malt. Good brewery performance found through all trials.

VARIETY NAME: CHANSON

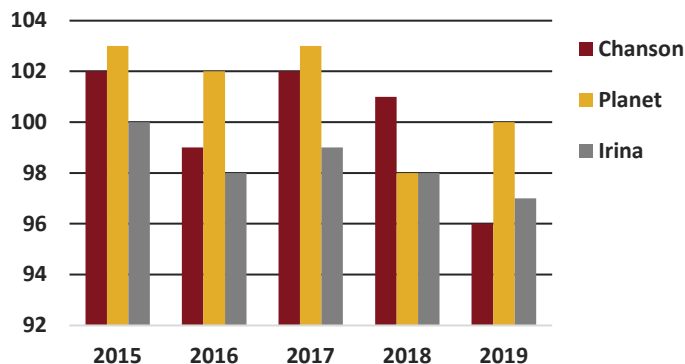


GENERAL INFORMATION

Variety: Chanson, Null-Lox variety
 Type: Two row spring malting barley
 Breeder: Ackermann Saatzzucht, Germany
 Representative: Saaten Union, Denmark
 Distributer: DLA
 Pedigree: AC 10/645 x Sparkle
 Status: 694 ha multiplication in DK in 2019
 Geography: DK, UK, FR, PL, ES, RO, RS, Benelux

AGRONOMY

Data from Danish Official and National trials.
 Relative yield index.



Data from Danish National Trials 2015-2019	Irina/Planet	Chanson
Relative yield %	100	100
Protein %	11,0	10,9
Grading >2,5mm %	96	96
Grading >2,8mm %	84	83
Specific weight (hl/kg)	66,5	65,5
Maturity	02-aug	02-aug
Straw length in cm	61	65
Lodging (0-10, 1 is best):	0,6	2,4
Straw breaking (0-10, 1 is best)	3,6	5,5
Mildew (% coverage)	0	0
Barley rust (% coverage)	13	13
Skald (% coverage)	2,7	1,6
Net Blotch (% coverage)	2,8	0,0

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VLB MICRO MALTING

Stress test crop 2017 at 41%, 43% and 45% steeping degree. Tested variety is compared to the two largest malting barley varieties in Denmark for crop 2017.

	KWS Irina_45	KWS Irina_43	KWS Irina_41	RGT Planet_45	RGT Planet_43	RGT Planet_41	Chanson_45	Chanson_43	Chanson_41
Extract	3	3	3	3	4	4	1	2	2
Friability	3	4	5	2	3	5	2	3	5
Beta-Glucan	2	4	5	2	3	5	1	2	3
Viscosity	2	3	5	1	2	4	1	1	2
FAN	2	2	3	2	2	3	3	2	3
Soluble N	2	2	3	2	2	3	3	2	3
Kolbach	2	3	3	2	2	3	3	2	2
Alpha-Amylase	4	4	4	1	2	3	2	2	3
Beta-Amylase	1	1	2	1	1	1	1	1	2
Limit Dextrinase	1	2	3	1	2	2	2	1	4
Attenuation	1	2	2	1	1	2	2	3	4
Turbidity	1	2	1	3	4	3	1	1	1

Positive:

- Good extract level at all steeping degrees – Could be related to high level of Skinned Grains as naked kernels are high in extract!
 - Good malt modification values
 - Low wort turbidity
- ### Negative:
- Average to low attenuation at steeping degrees 45% and 43%

INDUSTRY MALTING

Comments to malted barley lots:

- High level of Skinned Grains was seen in barley lot from crop 2017 – slightly higher than found in average in malted lots from crop 2017
- Average Germination Energy in malted barley lots

Malt results - Positive:

- Nicely low to very low betaglucan level was found in the produced malt
- High extract level in malt produced from crop 2017 barley – but this could also be related to high level of Skinned Grains!

Malt results - Negative:

- Average to low attenuation level found in produced malt

INDUSTRY BREWING

Brew house:

- In one of the trials additionally deep cuts were needed.
- Could be related to the high level of Skinned Grains found in barley from Danish crop 2017
- In brews made on malt from crop 2018 brewers reported Chanson to behaving well
- Brewhouse yield in one brew was reported to be slightly low

Fermentation and filtration:

- Overall good performance
- One brewer experienced longer fermentation time

Packaged beer:

- As normal

RECOMMENDATION

Chanson is an average to high yielding malting barley variety where the agronomic feature lodging must be considered. Notice that Chanson is a Null-Lox variety (Lox-1).

Barley and malt from crop 2017 were negatively affected by high level of Skinned Grains whereas crop 2018 barley and produced malt generally has a good quality and performs well in full-scale industrial malting and brewery tests.

VARIETY NAME: ELLINOR

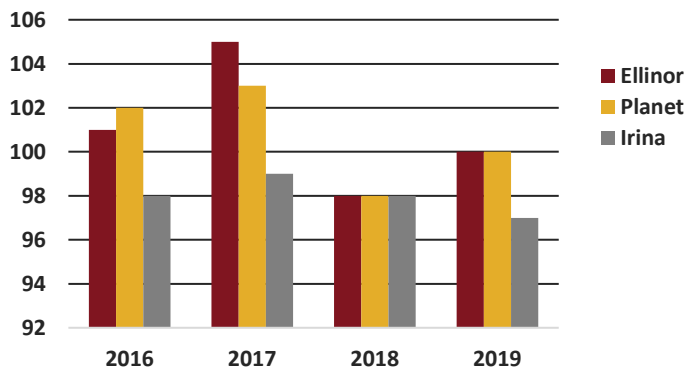


GENERAL INFORMATION

Variety: Ellinor
 Type: Two row spring malting barley
 Breeder: Saatzucht Josef Breun, Germany
 Representative: Nordic Seed, Denmark
 Distributer: DLA
 Pedigree: (Cocerto x Milford) x Quench
 Status: 1.485 ha multiplication in DK in 2019
 Geography: Scandinavia, Baltics, RUS, DE, FR, GB, IT, ES, AT, PL

AGRONOMY

Data from Danish Official and National trials.
 Relative yield index.



Data from Danish National Trials 2016-2019	Irina/Planet	Ellinor
Relative yield %	99	101
Protein %	11,5	11,6
Grading >2,5mm %	96	96
Grading >2,8mm %	85	83
Specific weight (hl/kg)	66,9	67,2
Maturity	02-aug	02-aug
Straw length in cm	61	66
Lodging (0-10, 1 is best):	0,8	1,8
Straw breaking (0-10, 1 is best)	3,5	5,4
Mildew (% coverage)	0	0
Barley rust (% coverage)	13	7
Skald (% coverage)	1,9	2,1
Net Blotch (% coverage)	3,3	0,9

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VLB MICRO MALTING

Stress test crop 2017 at 41%, 43% and 45% steeping degree. Tested variety is compared to the two largest malting barley varieties in Denmark for crop 2017.

	KWS Irina_45	KWS Irina_43	KWS Irina_41	RGT Planet_45	RGT Planet_43	RGT Planet_41	Ellinor_45	Ellinor_43	Ellinor_41
Extract	3	3	3	3	4	4	2	4	5
Friability	3	4	5	2	3	5	2	3	5
Beta-Glucan	2	4	5	2	3	5	2	3	4
Viscosity	2	3	5	1	2	4	2	2	4
FAN	2	2	3	2	2	3	2	2	3
Soluble N	2	2	3	2	2	3	2	2	3
Kolbach	2	3	3	2	2	3	2	2	3
Alpha-Amylase	4	4	4	1	2	3	1	3	3
Beta-Amylase	1	1	2	1	1	1	3	3	3
Limit Dextrinase	1	2	3	1	2	2	3	4	5
Attenuation	1	2	2	1	1	2	3	3	5
Turbidity	1	2	1	3	4	3	1	2	1

Positive:

- High extract level at 45% steeping degree
- Good malt modification values
- Well balanced proteolytic activity
- Low wort Turbidity

Negative:

- Poor scores for Beta-Amylase, Limit Dextrinase and Attenuation!

INDUSTRY MALTING

Comments to malted barley lots:

- Healthy barley lots with nice colour reported
- Very good Germination Energy in malted barley lots
- Screening >2,8 mm could be better
- As seen in general for crop 2018 level of Skinned Grains is low

Malt results - Positive:

- Nice low betaglucan values were found
- High Alpha-Amylase activity
- Good friability values in malted lot with low protein level

Malt results - Negative:

- Final attenuation was found to be average to low in two of the three malt batches
- Average/low Beta-Amylase activity found

INDUSTRY BREWING

Brew house:

- Good wort collection/lauter performance reported
- Normal to good extract yield in the brewhouse

Fermentation and filtration:

- Normal / good fermentation and beer filtration reported
- One result on experienced low fermentability was commented as "not malt related"

Packaged beer:

- As normal

RECOMMENDATION

Ellinor is a average to high yielding malting barley variety where the agronomic feature straw breaking need to be observed.

Ellinor produces malt of average to good quality. Slightly low final attenuation level found in one of the three produced malts. Generally good performance in full-scale brewery tests.