
Sejet
plant breeding


Spring Barley
PAST – PRESENT -FUTURE


Annika
Applaus
Austen
Avenue
Blixen
Brentano
Brentano
Buttress
Cosmopolitan
Flair
Fontane
Gangway
Geraldine
Flair
Fontane
Fortitude
Gangway
Geraldine
Jensen
Killian
Lene
Magnitude
Nolan
Olsen
Prospect
Prospect
Sartre
Thermus


Sejet
plant breeding

Nordic Seed


Airway
Bounty
Cadiz
Eastway
Fairway
Feedway
Feedway
Kakadu
Kimberly
Dueholm
Gambit
Kimberly
Malvern
Gambit
Holtgaard
Keira
Lollipop
Munro
Pantani
Pantani
Playmaker
Salpa
Tuike
Unity
Upstairs
Valda
Rockway
Skyway

Sejet spring barleys in Europe

Sejet

Sejet

Annika
Thermus
Fossum new
Tiller new

Austen
Annika
Blixen
Prospect
Fontane new
Sartre new

Fairytale
Lene
Brentano new

Fontane new
Sartre new

Austen
Blixen
Prospect
Wish
Fontane new
Sartre new

Fontane new
Sartre new

Gangway
Geraldine
Bennett new

Cosmopolitan
Invictus
Prospect
Nolan new
Olsen new

Applaus

Prospect
Brentano new
Fontane new
Sartre new

Flair
Paustian
Blixen
Fontane new
Satre new

Sebastian
Fontane new

Sebastian
Prospect

Fontane new

Magnitude

Flair
Valerian
Magnitude new

TARGETED BREEDING

improved beer quality and lower climate impact

÷ LOX1 X LOX2 X MMT

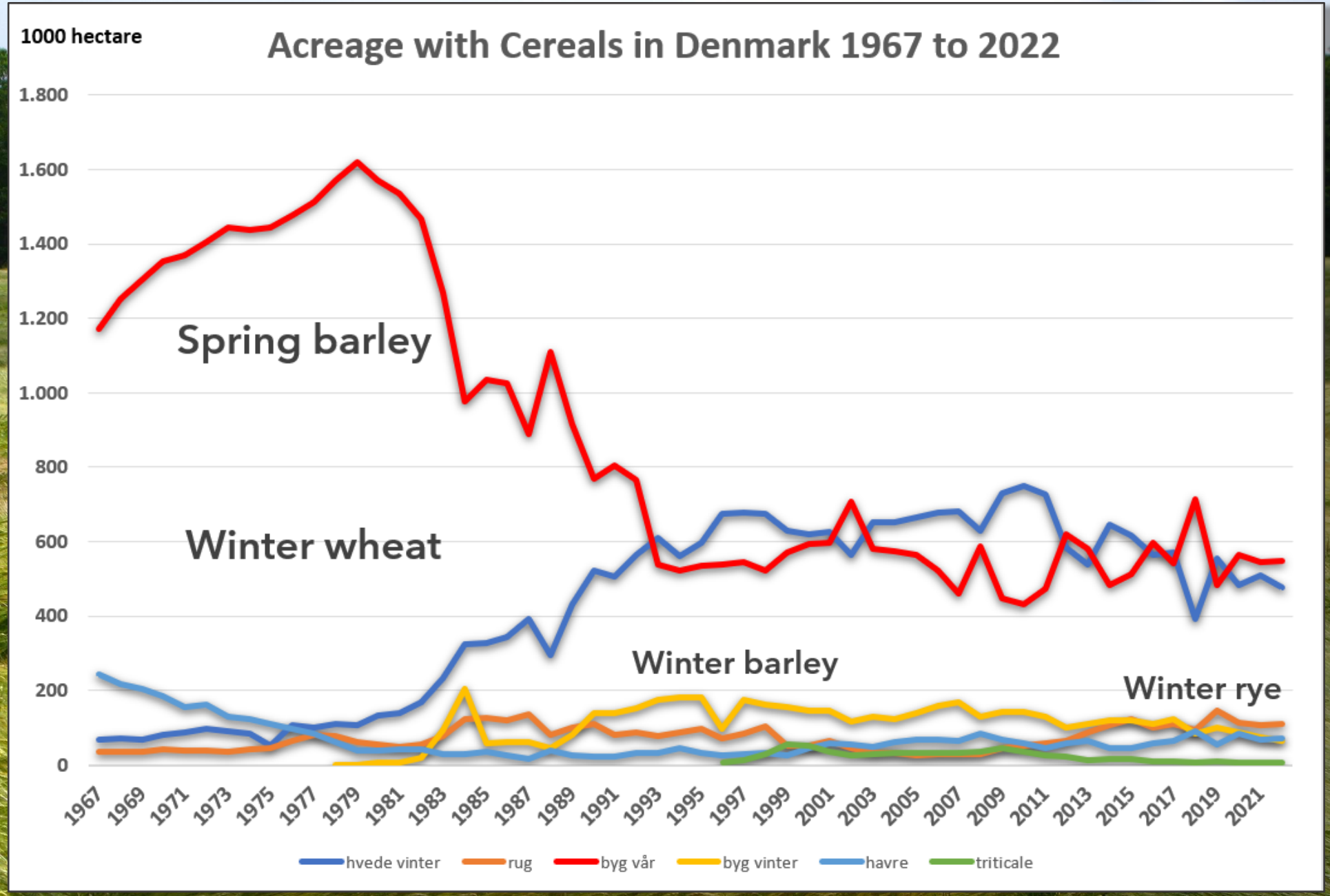
Null-LOX3G barley

- Freshness
- Foam stability
- Energy savings
- Less water loss
- Improved beer quality

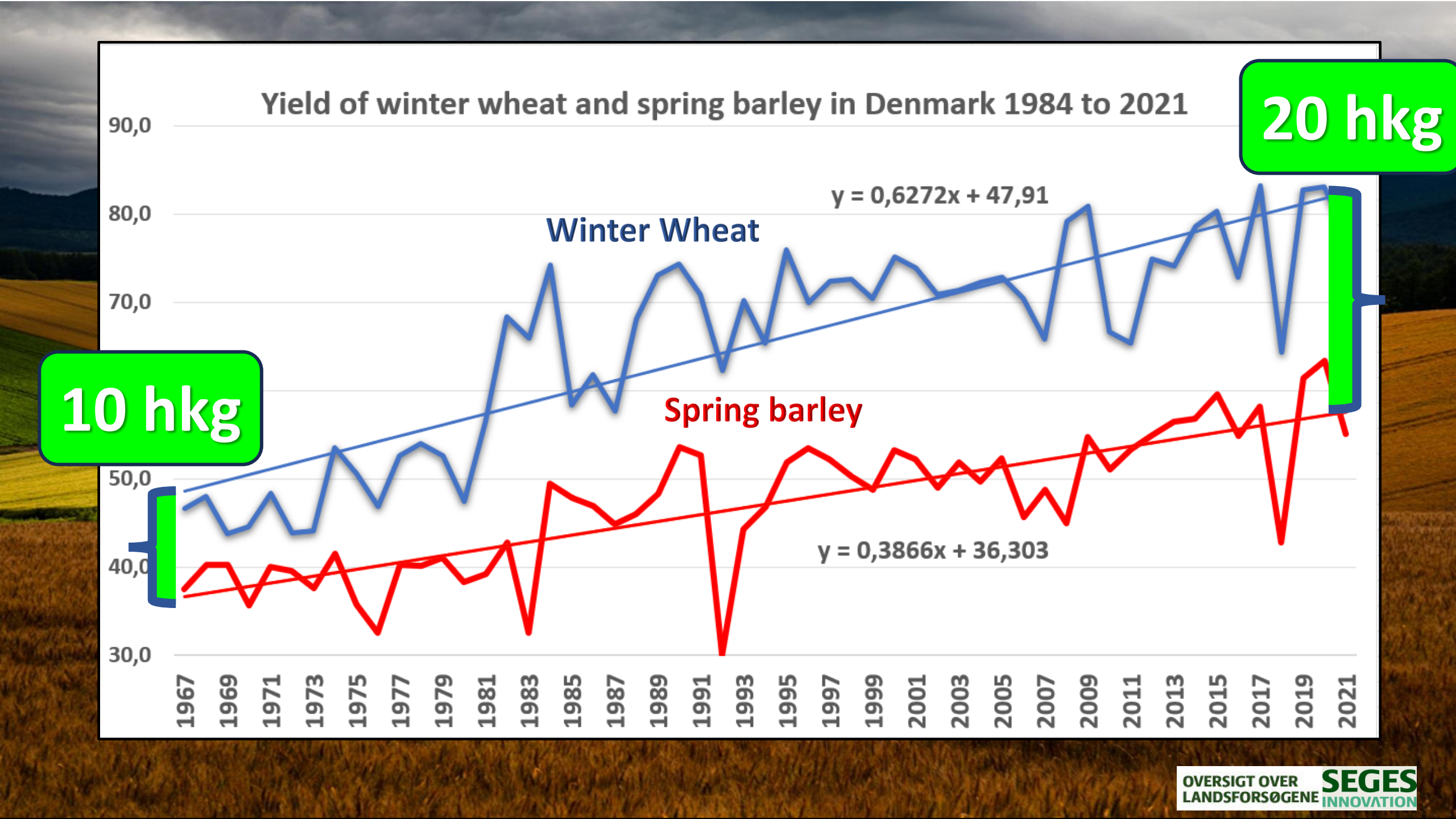
÷ LOX1 X LOX2 X MMT X PA

Null-LOX4G barley

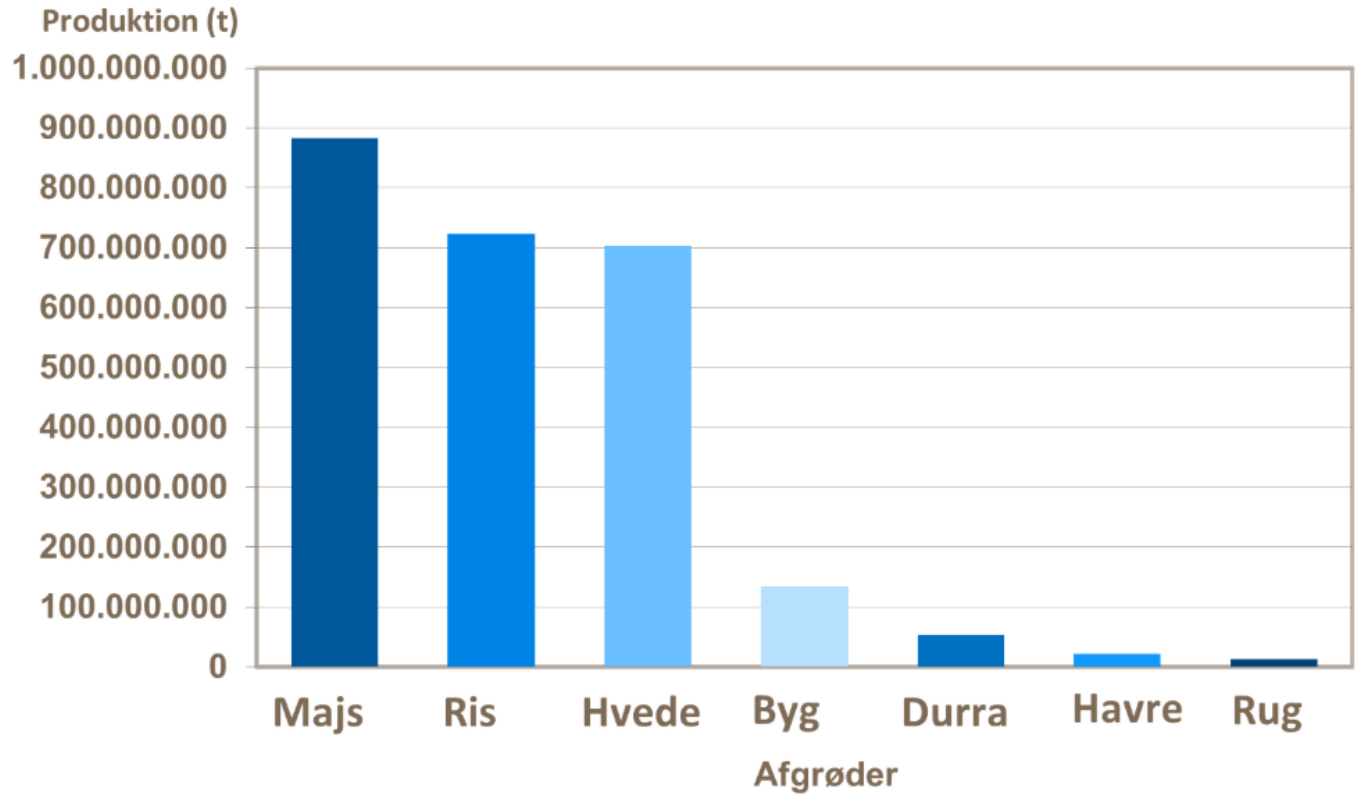
- Freshness
- Foam stability
- Energy savings
- Less water loss
- Improved beer quality
- No beer stabilisation



SEGES INNOVATION

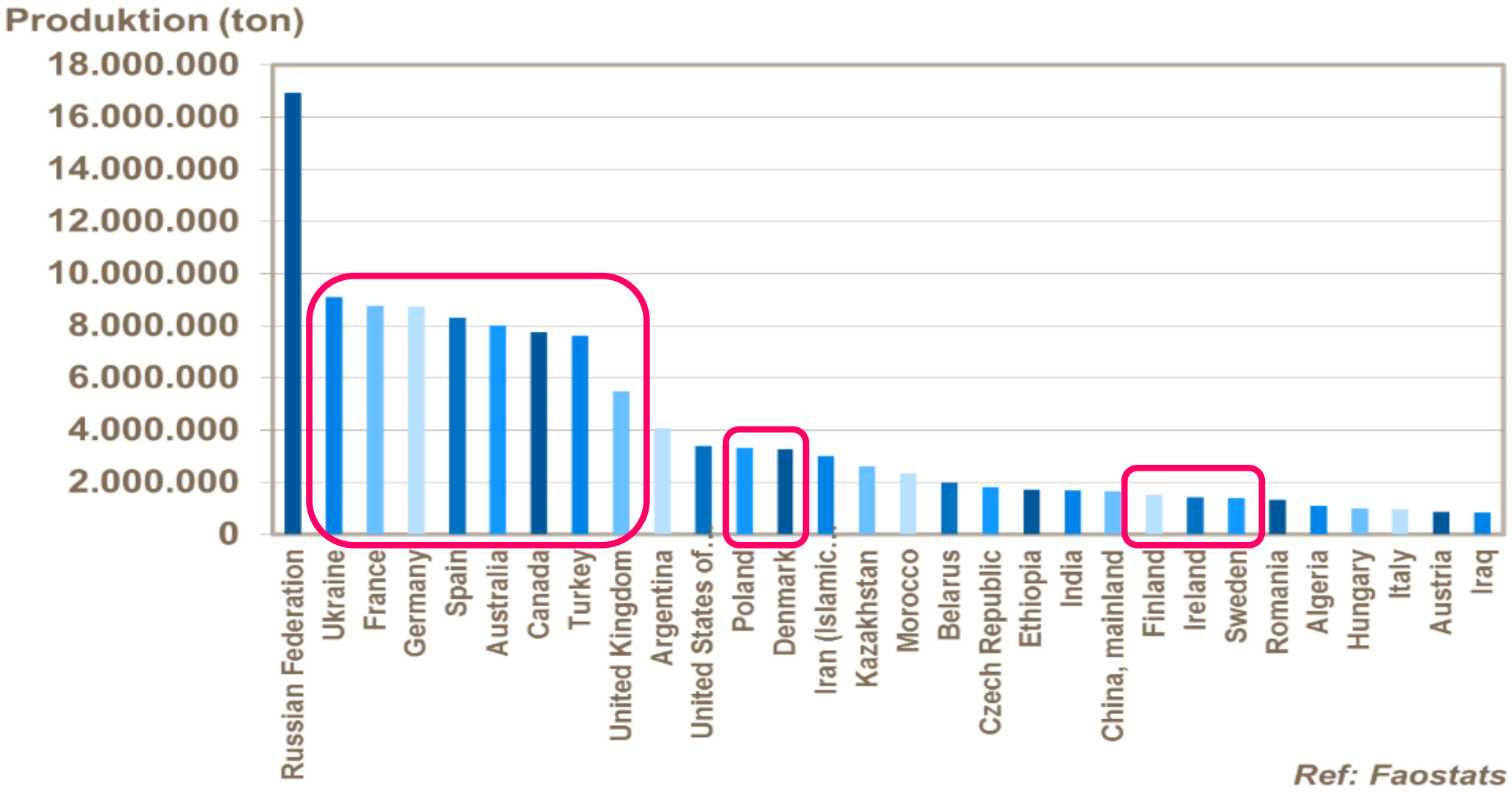

Yield of winter wheat and spring barley in Denmark 1984 to 2021
20 hkg
10 hkg
y = 0,6272x + 47,91
Winter Wheat
Spring barley
y = 0,3866x + 36,303
90,0
80,0
70,0
50,0
40,0
30,0
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
OVERSIGT OVER LANDSFORSØGENE
SEGES INNOVATION

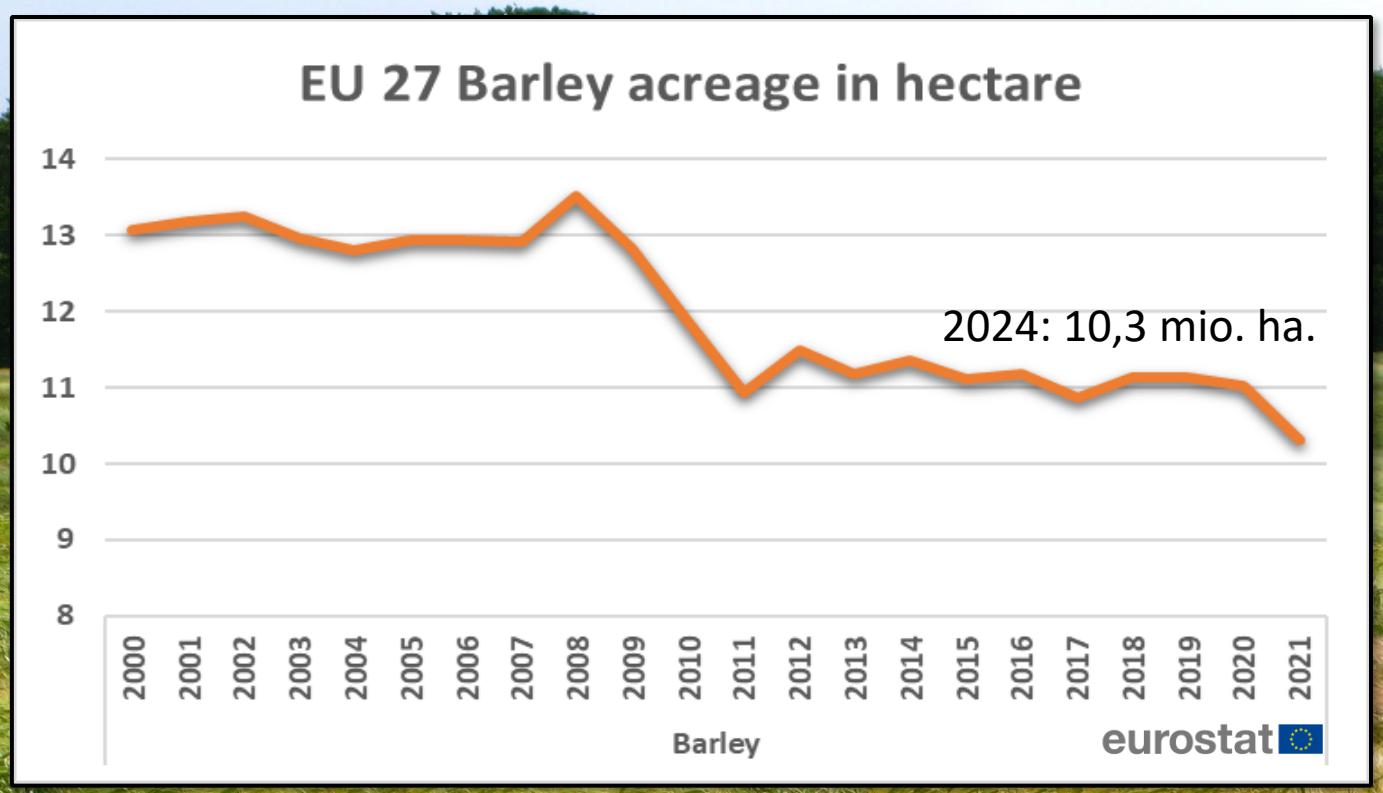
Verdens kornproduktion

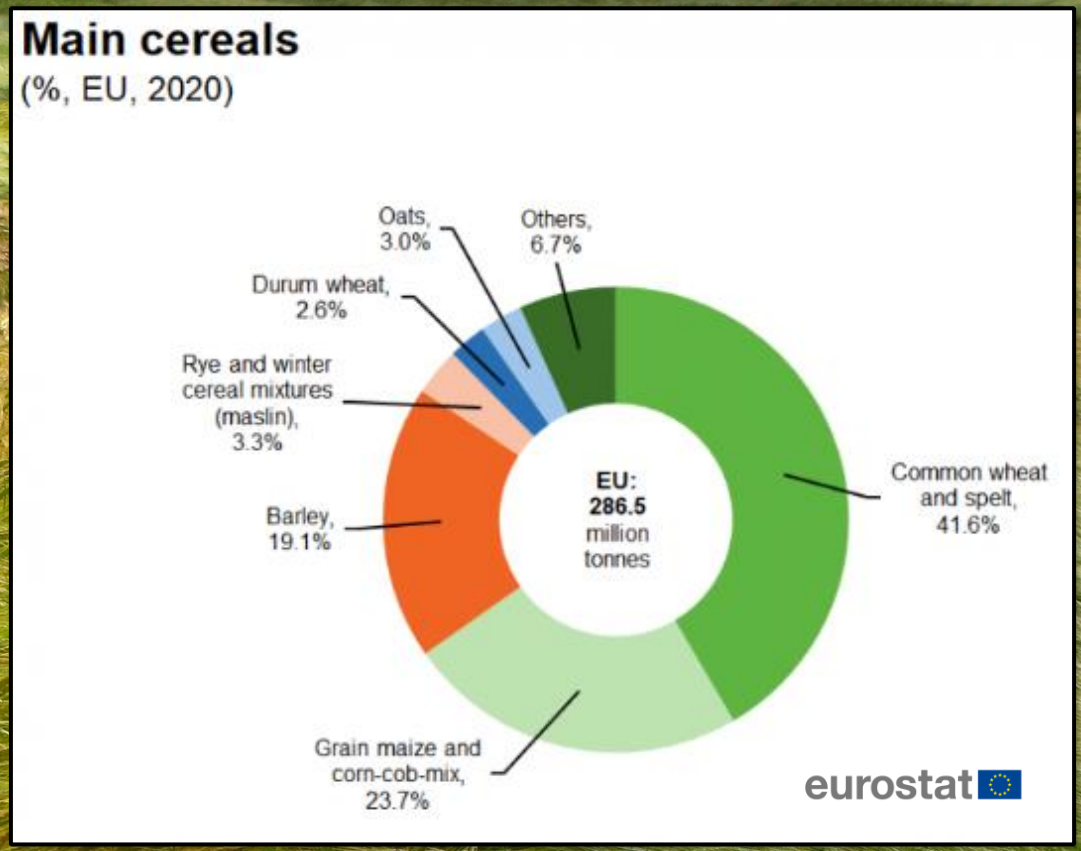


REF: FAOSTATS

Top 30 over lande der dyrker byg – 2011 (ton)




EU 27 Barley acreage in hectare
14
13
12
11
10
9
8
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2024: 10,3 mio. ha.
Barley
eurostat


Main cereals
(%, EU, 2020)
Oats, 3.0%
Others, 6.7%
Durum wheat, 2.6%
Rye and winter cereal mixtures (maslin), 3.3%
Barley, 19.1%
EU: 286.5 million tonnes
Common wheat and spelt, 41.6%
Grain maize and corn-cob-mix, 23.7%
eurostat

mio.
ha.

Production spring- and winter barley

	Spring Barley	Winter Barley
EU 27	40%	60%
World	80%	20%

Production of malt from

	Spring Barley	Winter Barley	Wheat
World	> 75 %	< 25 %	< 5 %

Barley for feed or malt ?

80%

150m MT

20%

10%

24m MT

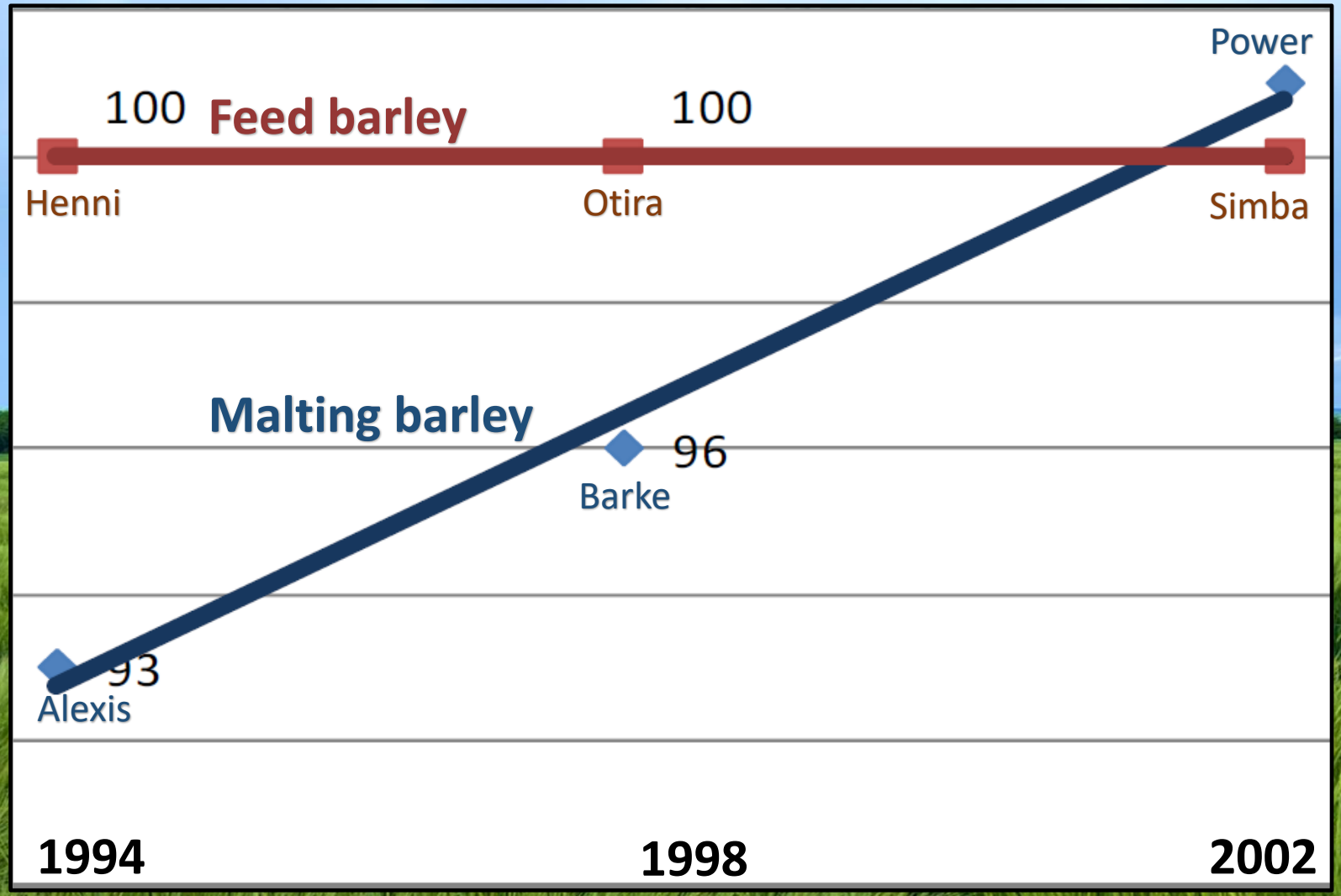
90%

Premium for malt
11–30 DKK pr. hkg

0 to 60 DKK

Rabobank

Relative yield - malting barleys compared to feed barleys



Danish National Trials SortInfo

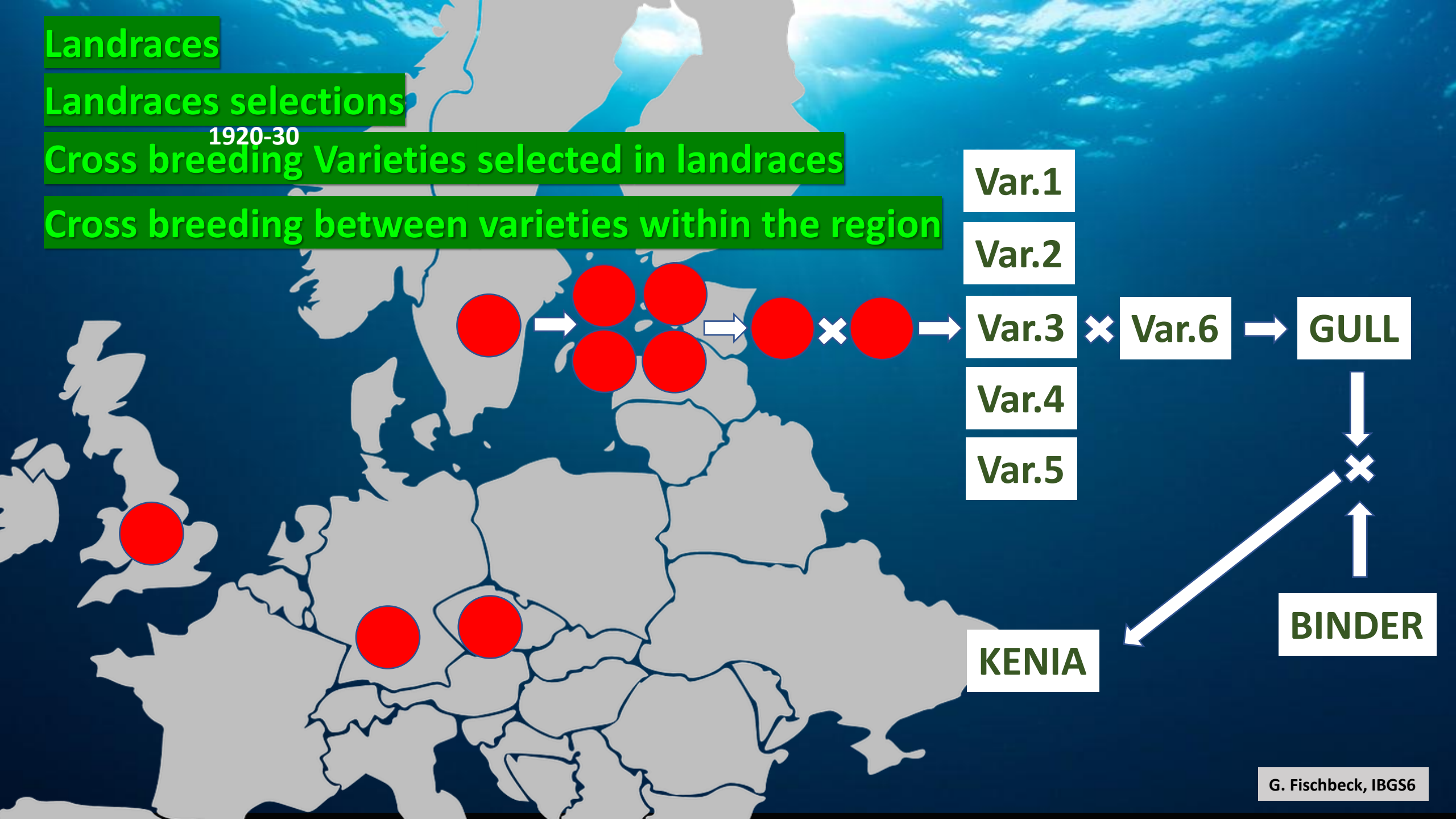
Spring Barley
PAST

Barley Genetics VI (1992)

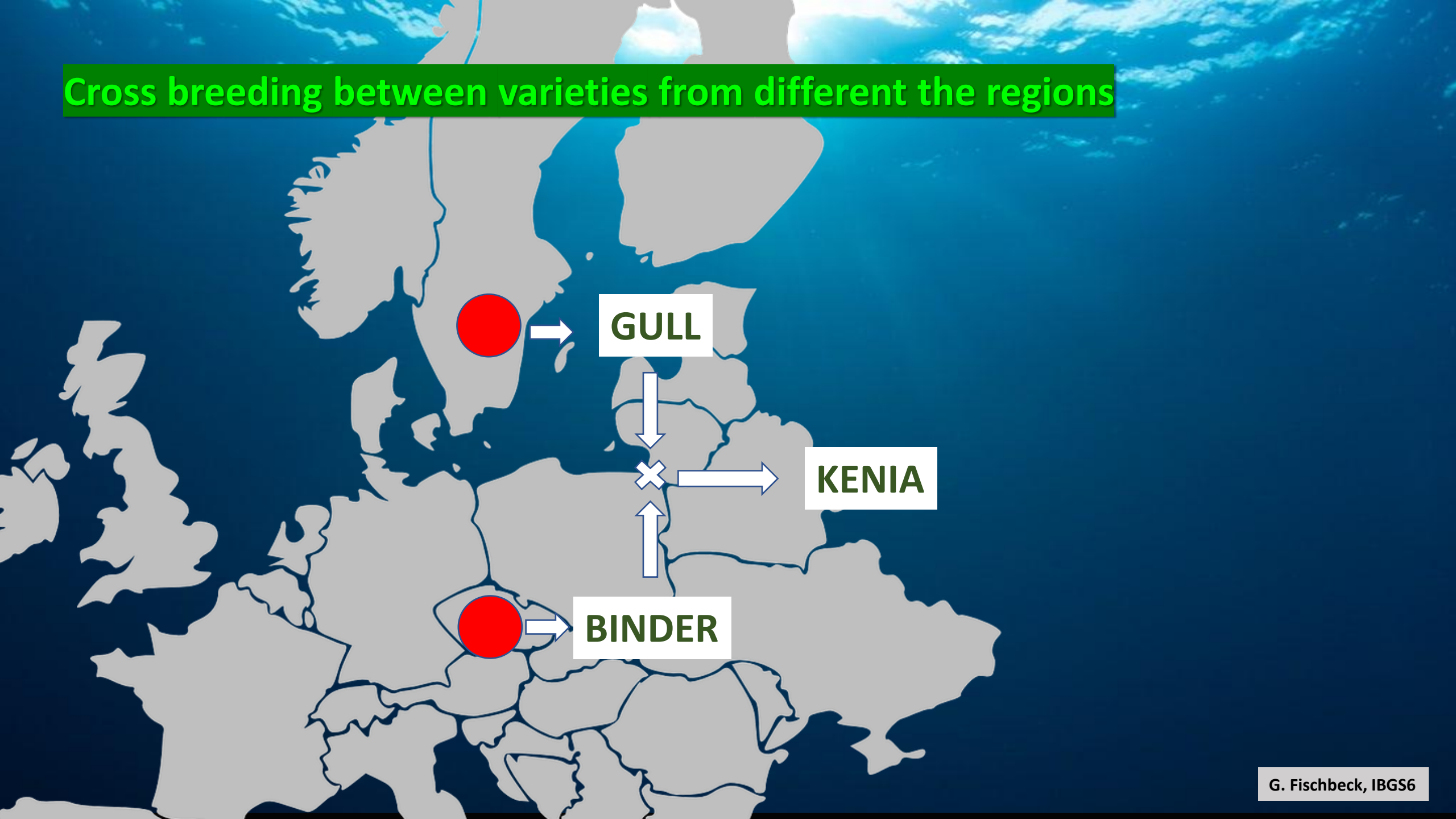
BARLEY CULTIVAR DEVELOPMENT IN EUROPE - SUCCESS IN THE PAST AND POSSIBLE CHANGES IN THE FUTURE

G. Fischbeck

Technische Universität München,
Lehrstuhl für Pflanzenbau und Pflancenzüchtung,
D-8050 Freising-Weihenstephan, Germany


Landraces
Landraces selections
1920-30
Cross breeding Varieties selected in landraces
Cross breeding between varieties within the region
Var.1
Var.2
Var.3
Var.4
Var.5
Var.6
GULL
BINDER
KENIA
G. Fischbeck, IBGS6

Cross breeding between varieties from different the regions



G. Fischbeck, IBGS6

Broad-based cross breeding

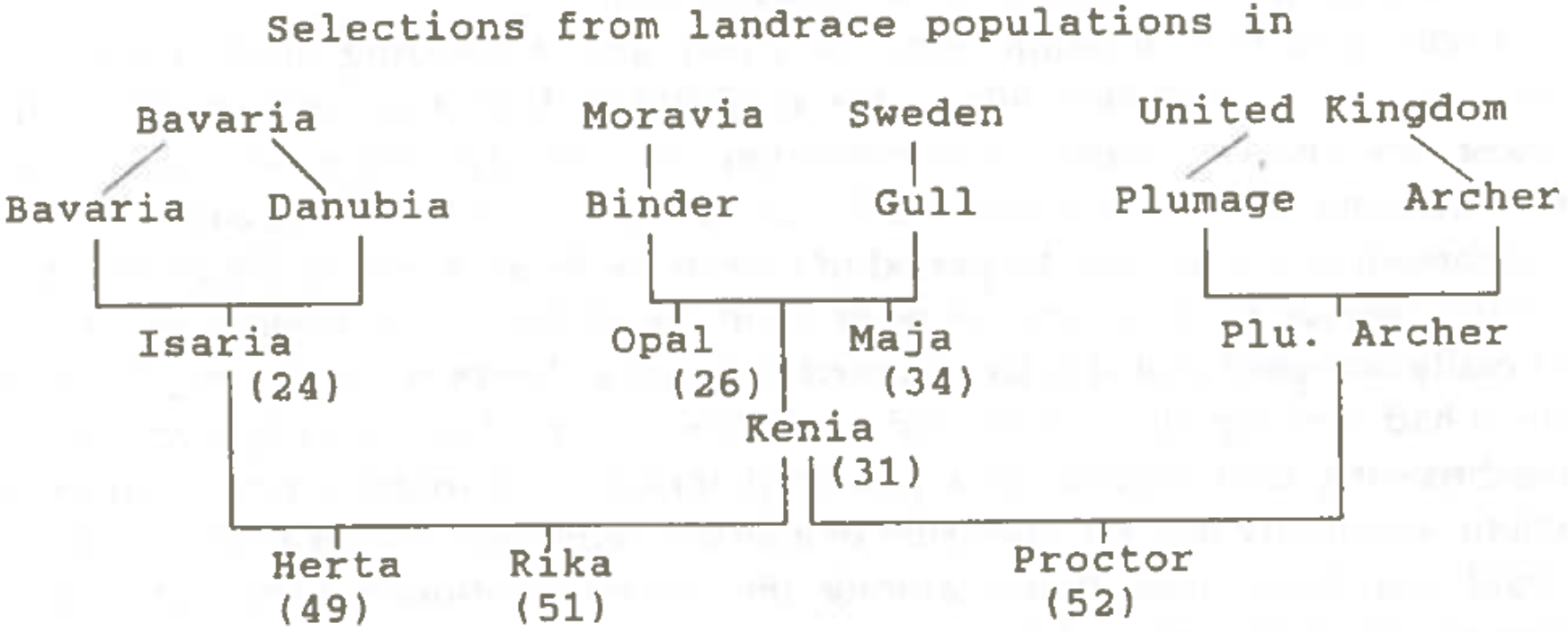


Fig. 1. Pedigree of spring barley cultivars derived from early cycles of broad-based cross breeding (Aufhammer *et al.*, 1958)

G. Fischbeck, IBGS6

Narrow-based cross breeding

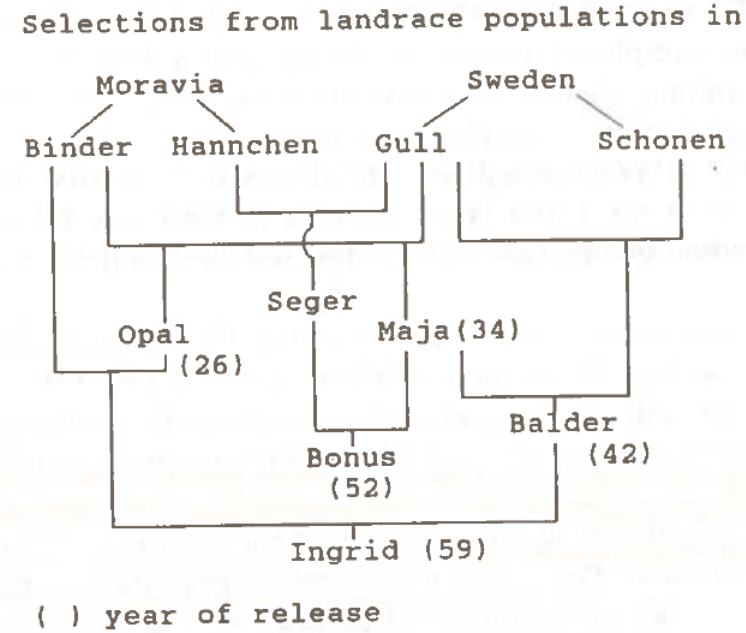
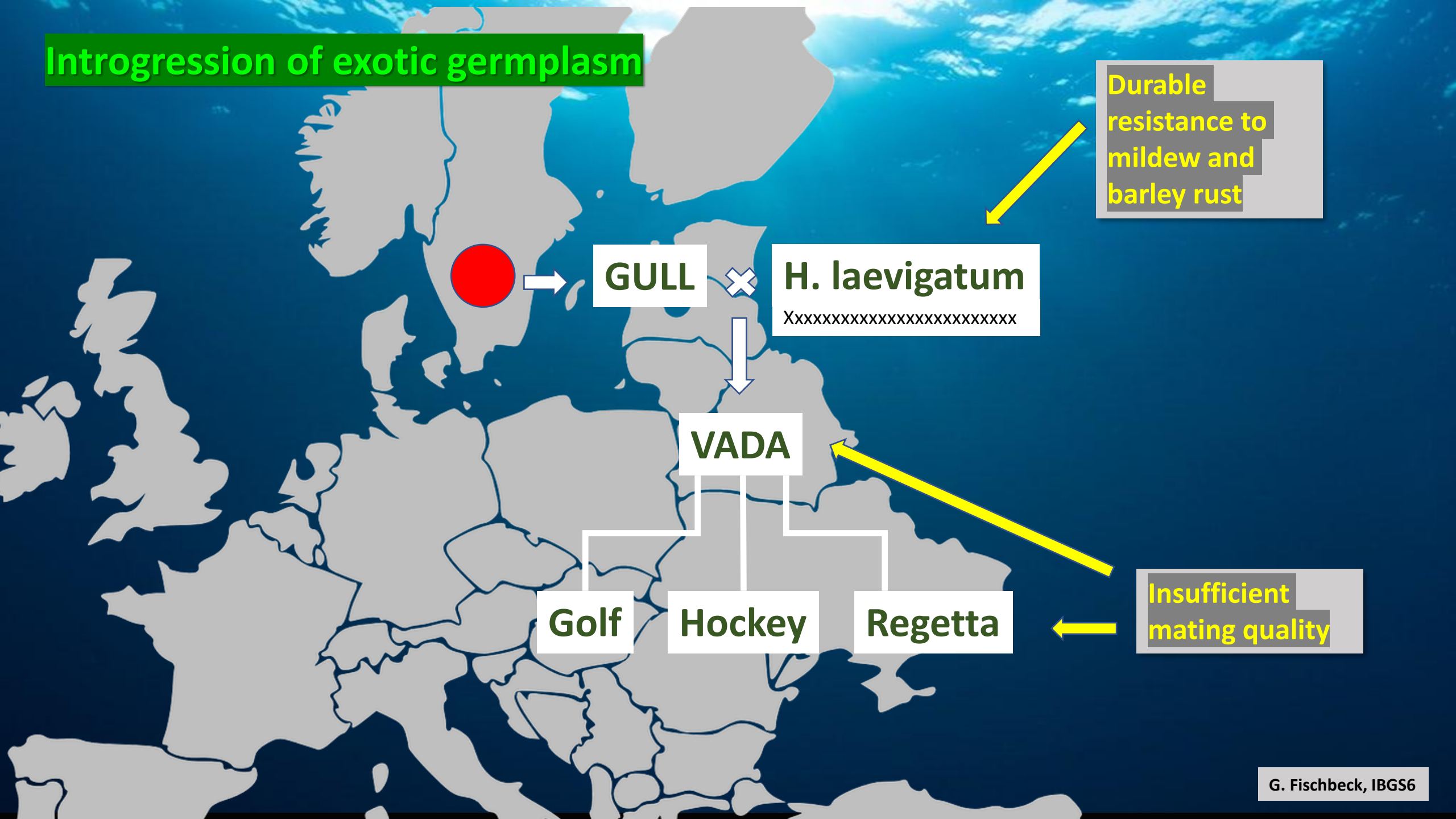
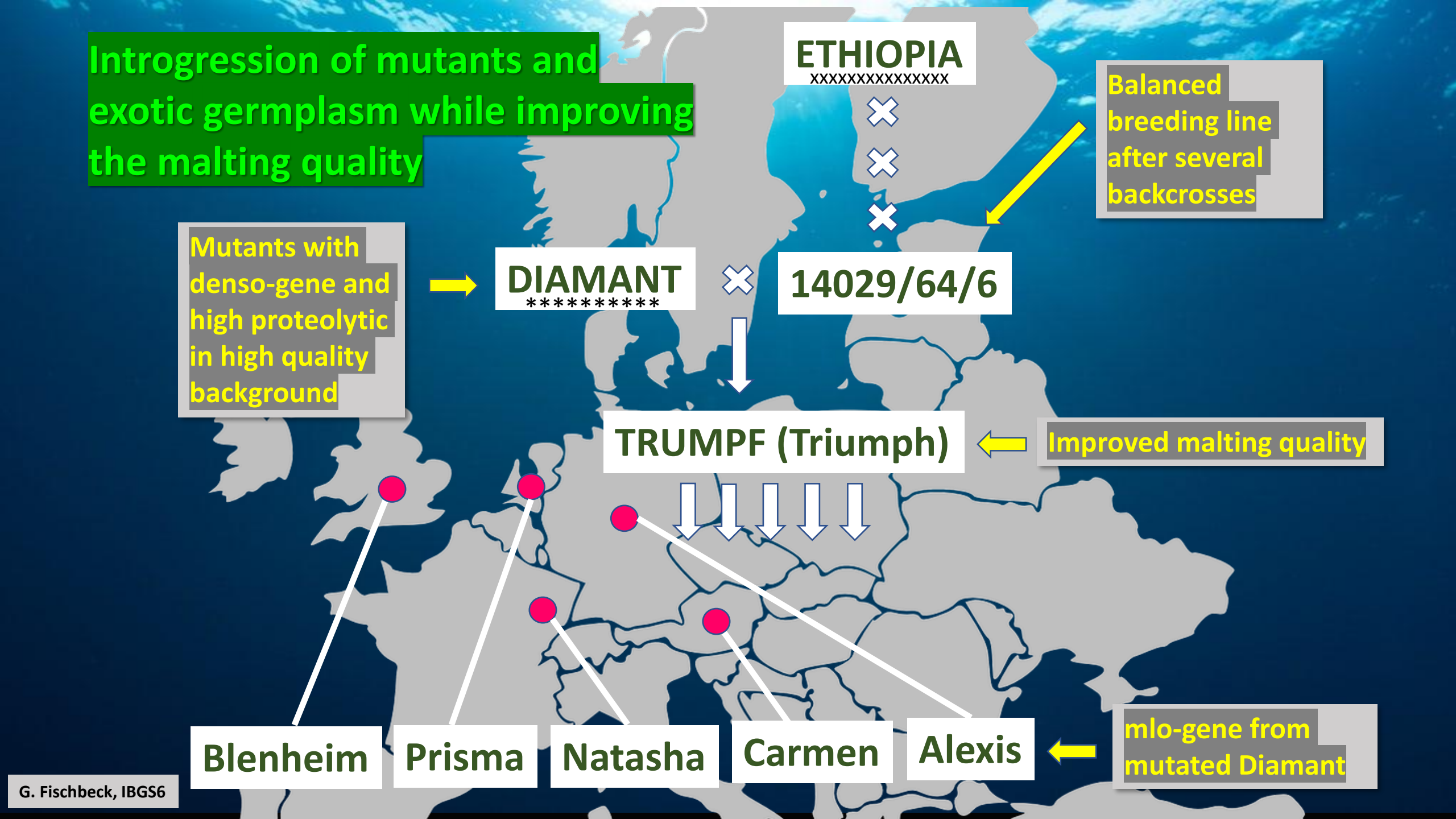


Fig. 2. Pedigree of spring barley cultivars derived from early cycles of narrow-based crossbreeding (Arias *et al.*, 1983)

Introgression of exotic germplasm



G. Fischbeck, IBGS6


Introgression of mutants and exotic germplasm while improving the malting quality
ETHIOPIA
xxxxxxxxxxxxxxx
Balanced breeding line after several backcrosses
Mutants with denso-gene and high proteolytic in high quality background
DIAMANT
****
14029/64/6
TRUMPF (Triumph)
Improved malting quality
Blenheim
Prisma
Natasha
Carmen
Alexis
mlo-gene from mutated Diamant
G. Fischbeck, IBGS6

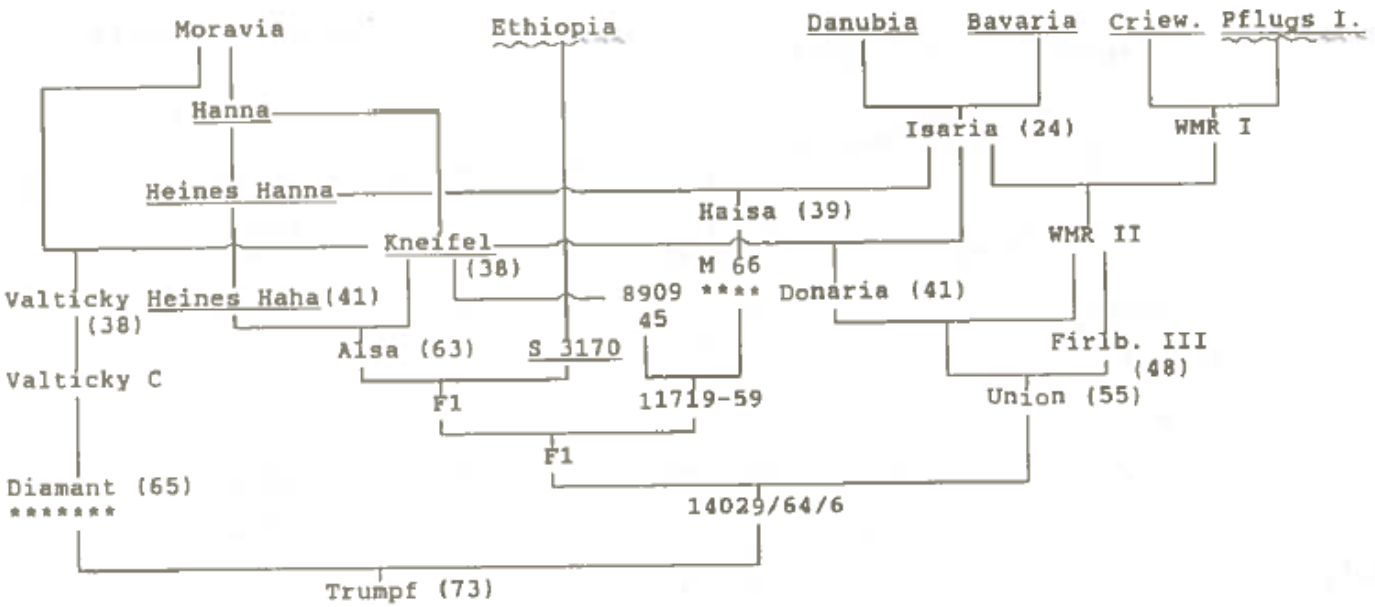
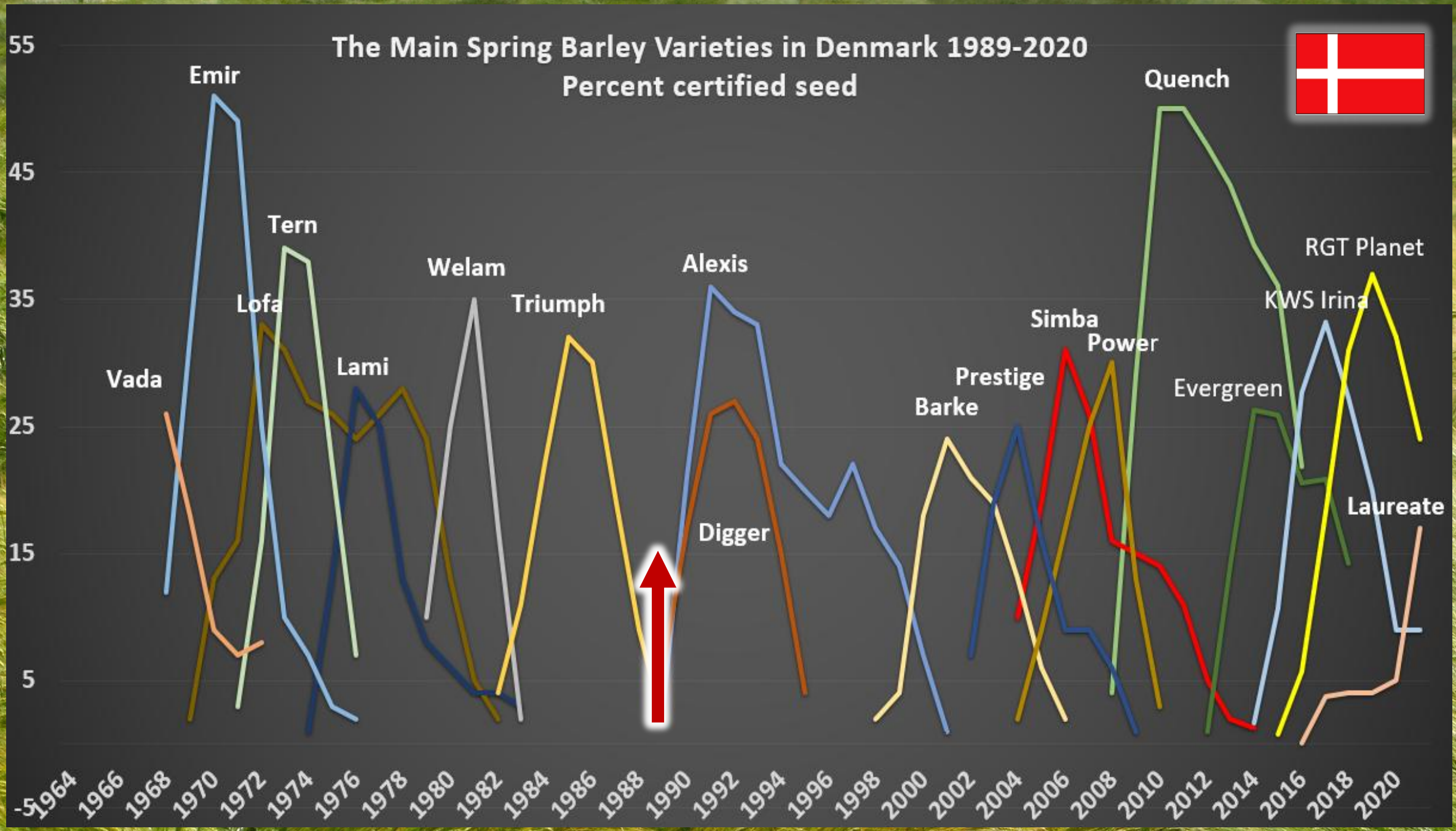
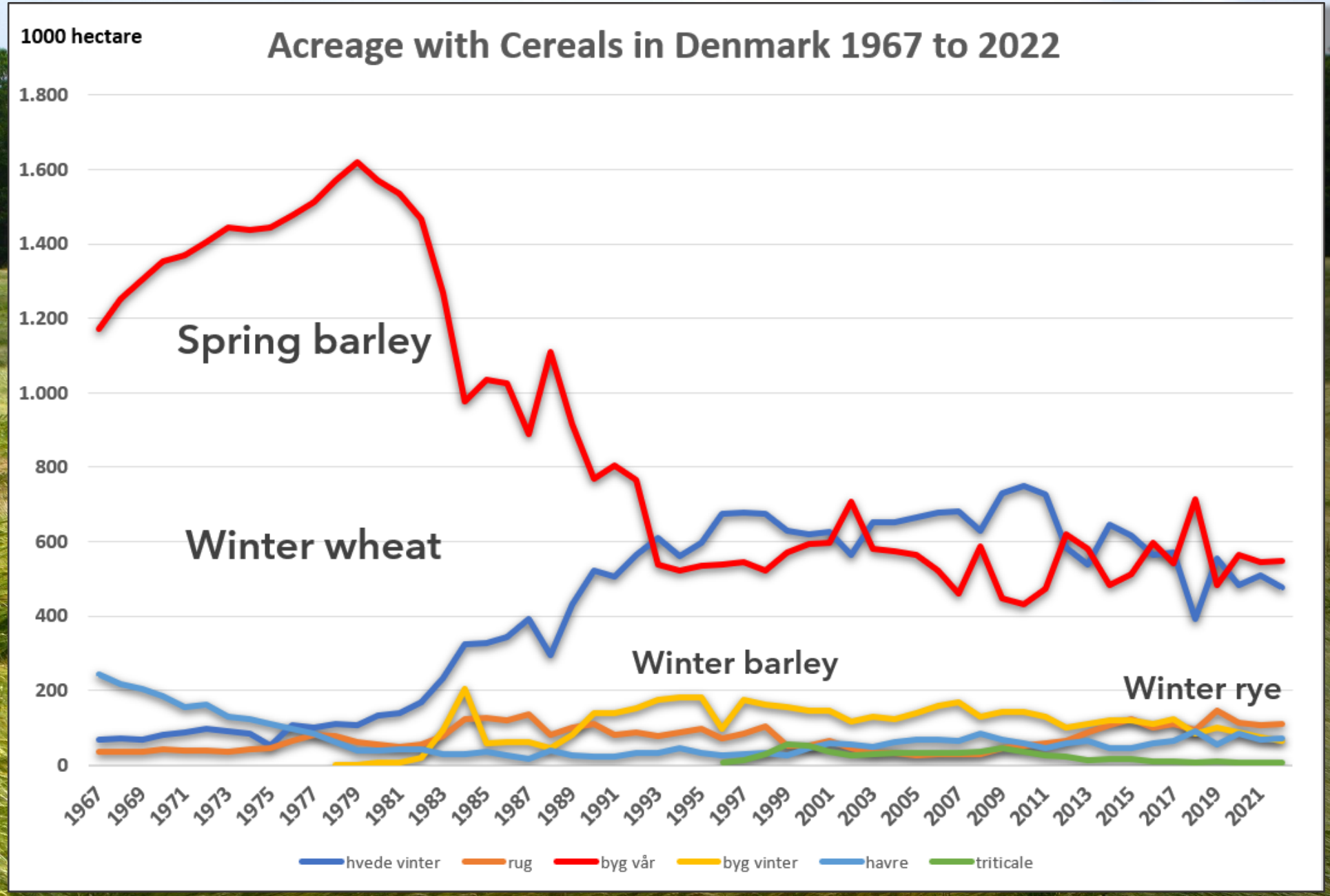


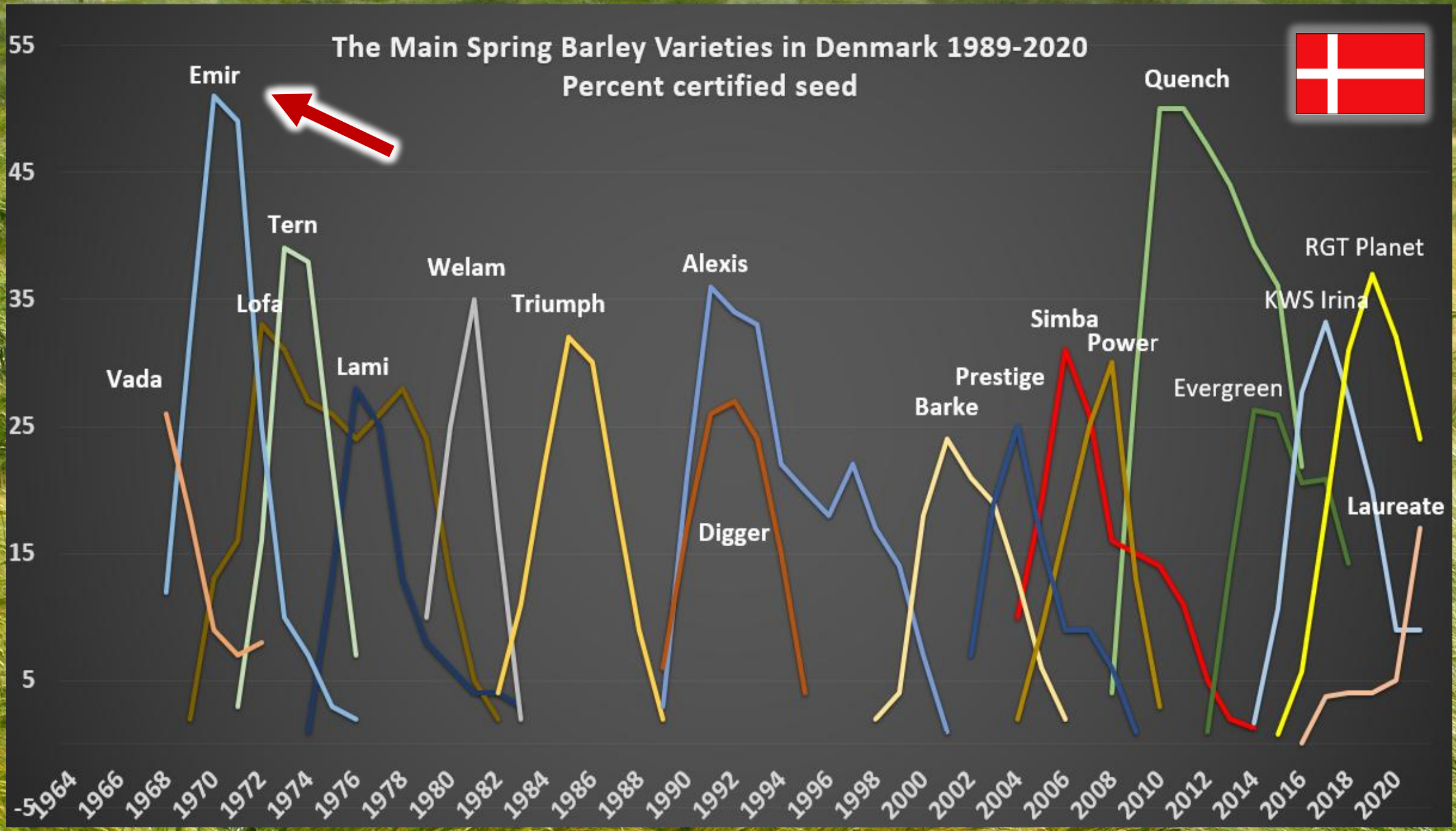
Fig. 5. Pedigree of spring barley cultivar Trumpf and related derivatives (from the Trumpf breeding cycle) (D. Lau, Personal communication)

G. Fischbeck, IBGS6


The Main Spring Barley Varieties in Denmark 1989-2020
Percent certified seed
55
45
35
25
15
5
-5
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
Emir
Tern
Lofa
Welam
Triumph
Alexis
Vada
Lami
Digger
Barke
Prestige
Simba
Power
Quench
Evergreen
KWS Irina
RGT Planet
Laureate



SEGES INNOVATION


The Main Spring Barley Varieties in Denmark 1989-2020
Percent certified seed
55
45
35
25
15
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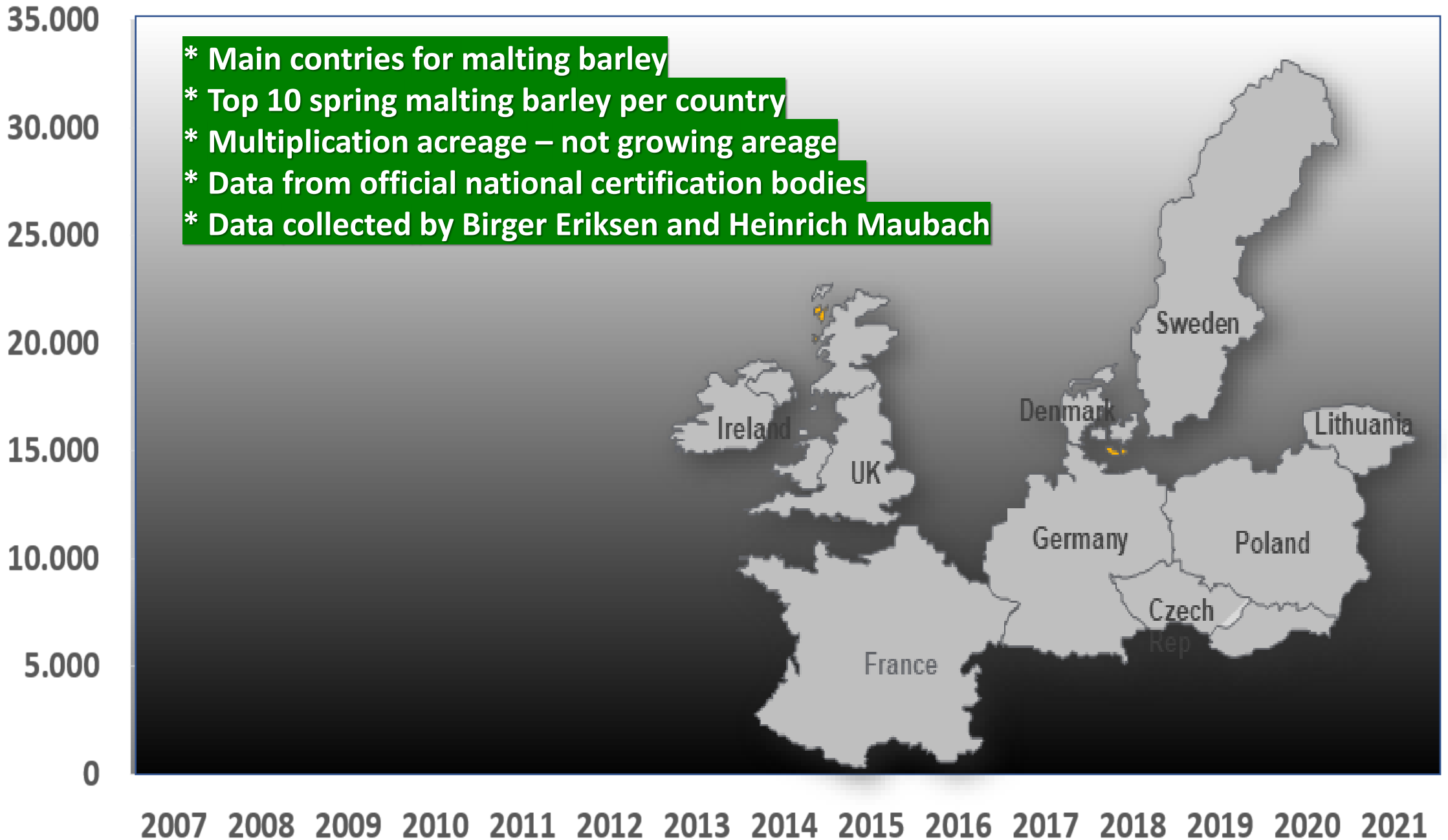
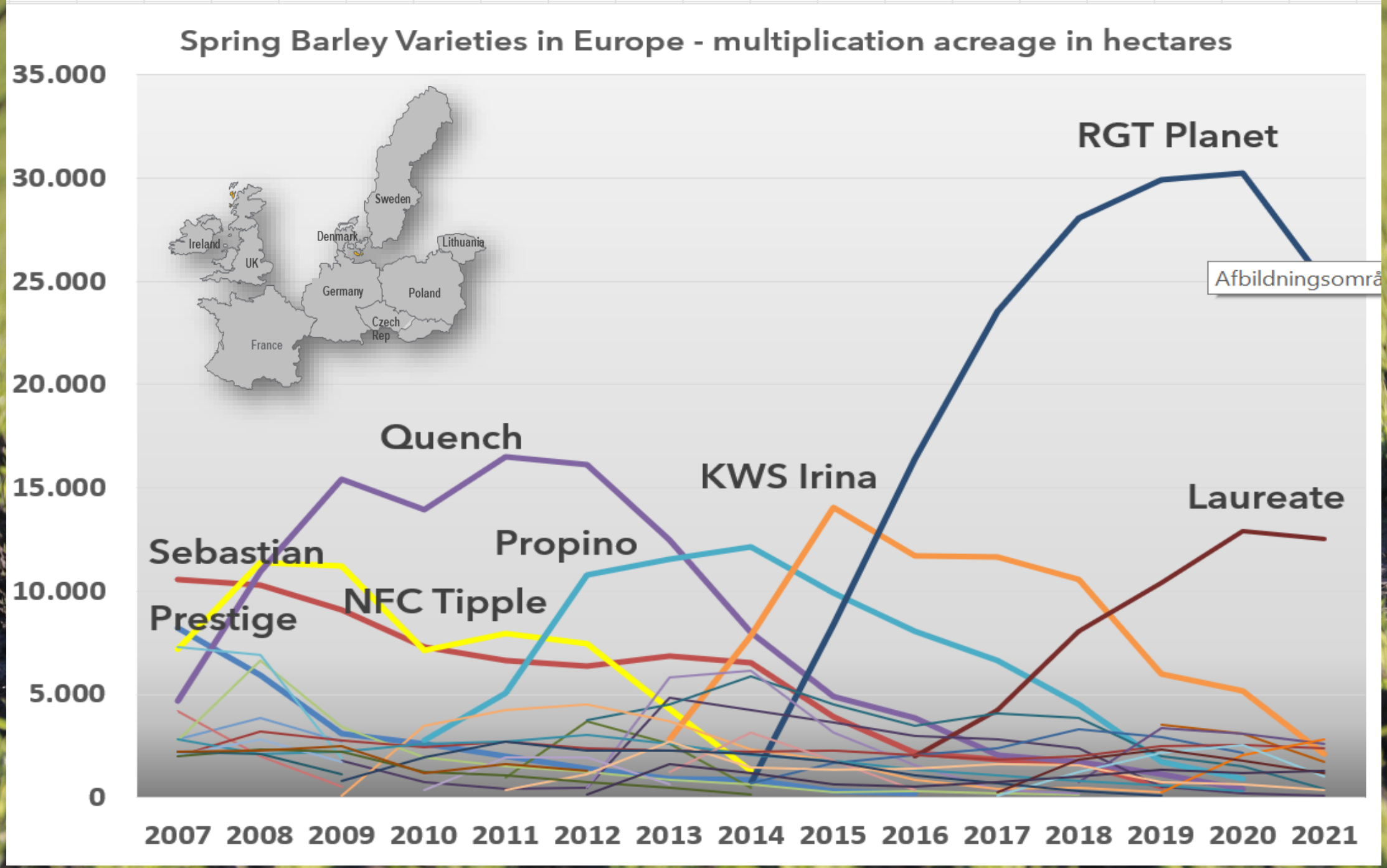
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
Emir
Tern
Lofa
Welam
Triumph
Alexis
Vada
Lami
Digger
Barke
Prestige
Simba
Power
Quench
Evergreen
KWS Irina
RGT Planet
Laureate


PRESENT
Sejet
plant breeding

Spring Barley Varieties in Europe - multiplication acreage in hectares



Spring Barley Varieties in Europe - multiplication acreage in hectares



Spring Barley Varieties in Europe - multiplication acreage in hectares

120.000+ tons certified seed

RAGT SEMENCES
RGT Planet

syngenta
Quench

KWS
KWS Irina

RAGT SEMENCES
syngenta
Laureate

Sejet
Sebastian

syngenta
Propino

syngenta
NFC Tipple

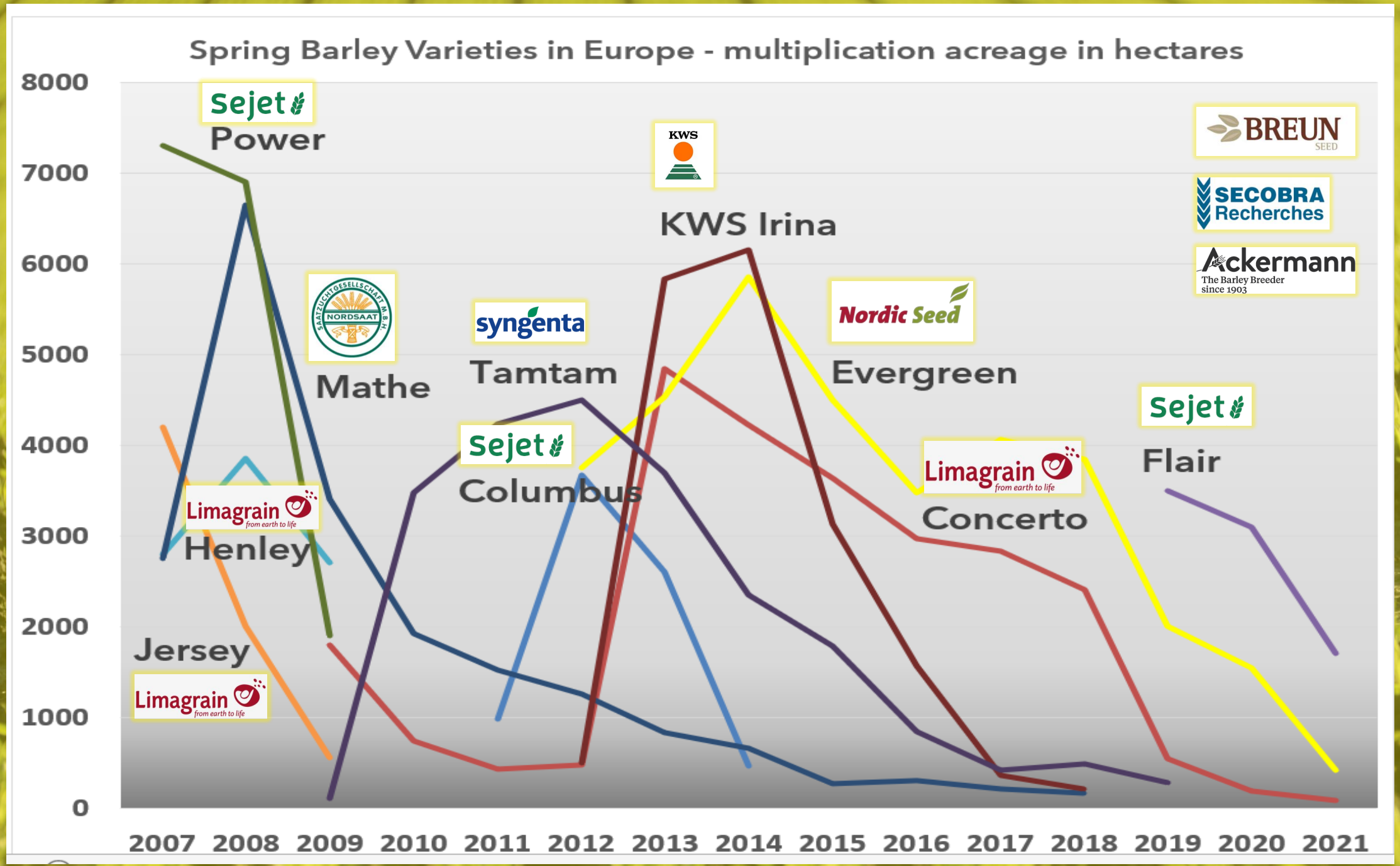
Prestige

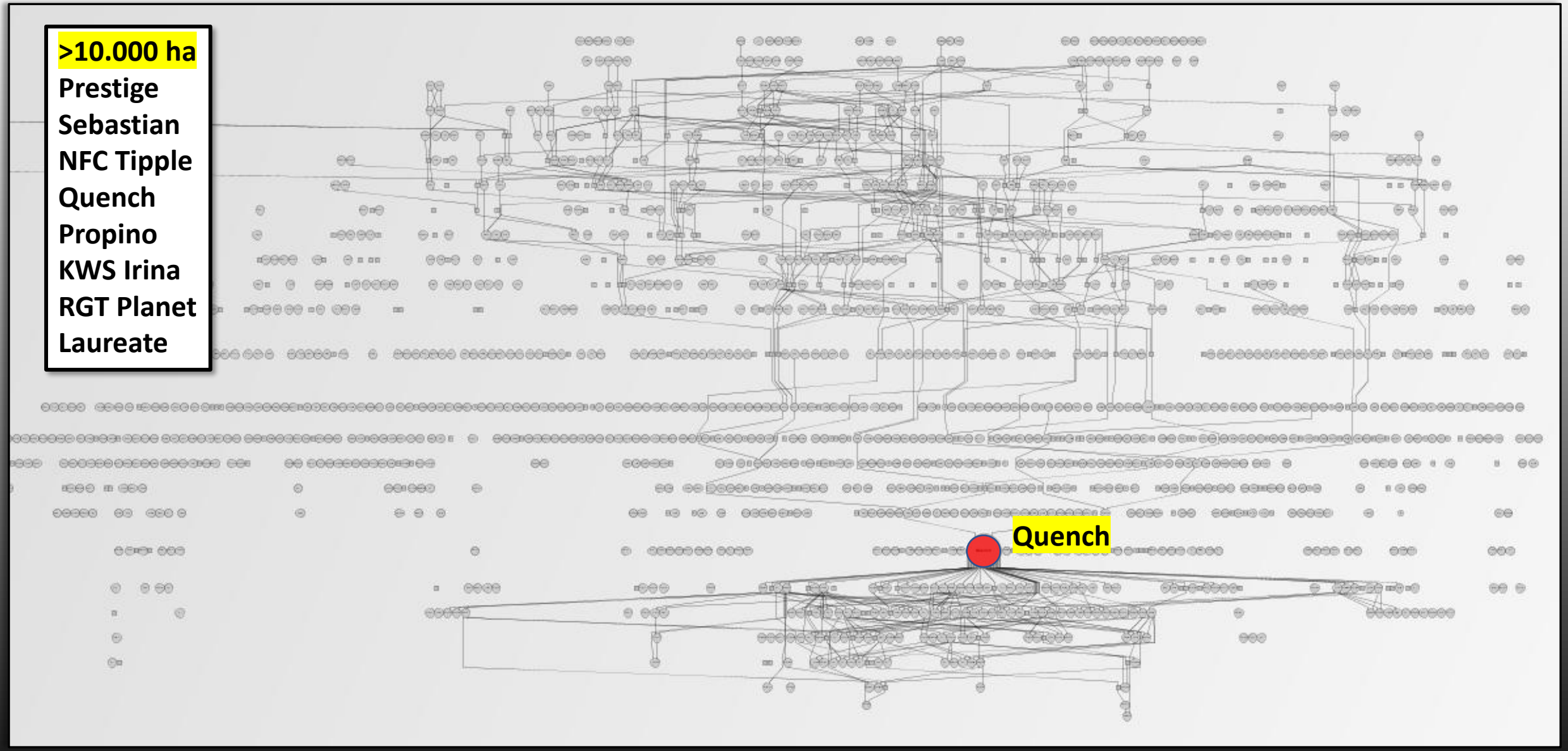
SERASEM

RAGT SEMENCES

35.000
30.000
25.000
20.000
15.000
10.000
5.000
0

2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021


Spring Barley Varieties in Europe - multiplication acreage in hectares
8000
7000
6000
5000
4000
3000
2000
1000
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Sejet
Power
Mathe
syngenta
Tamtam
Sejet
Columbus
KWS
KWS Irina
Nordic Seed
Evergreen
Limagrain
from earth to life
Concerto
Sejet
Flair
Limagrain
from earth to life
Henley
Jersey
Limagrain
from earth to life
BREUN
SEED
SECOBRA
Recherches
Ackermann
The Barley Breeder
since 1903



IMPROMALT, The International Barley Hub (IBH) JHI, Helium

Shaw, P., Graham, M., Kennedy, J., Milne, I., & Marshall, D. (2014). Helium: visualization of large scale plant pedigrees. *BMC Bioinformatics*, *15*(1), 259

The James Hutton Institute

> 10.000 ha
Prestige
Sebastian
NFC Tipple
Quench
Propino
KWS Irina
RGT Planet
Laureate

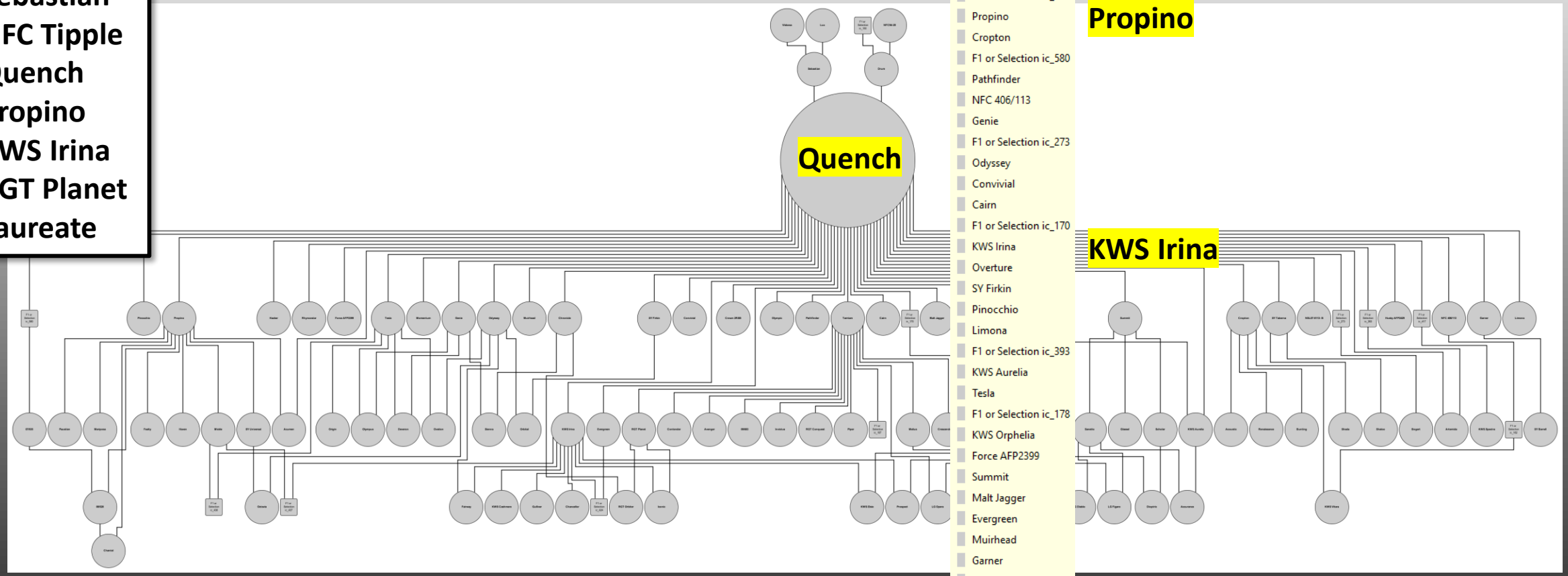
Sebastian

Tamtam → RGT Planet

Propino

Quench

KWS Irina

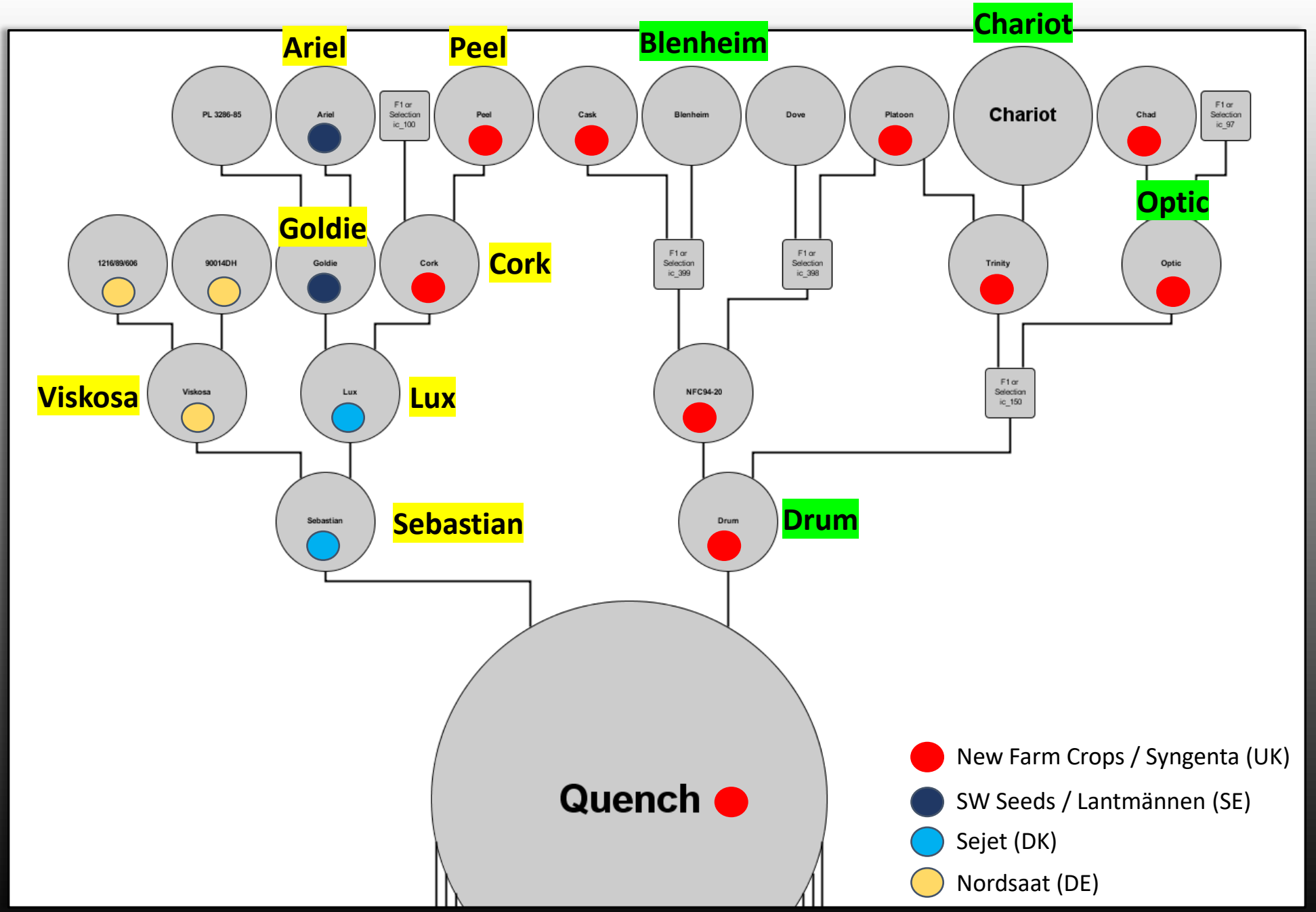


Parents:2
- Drum
- Sebastian

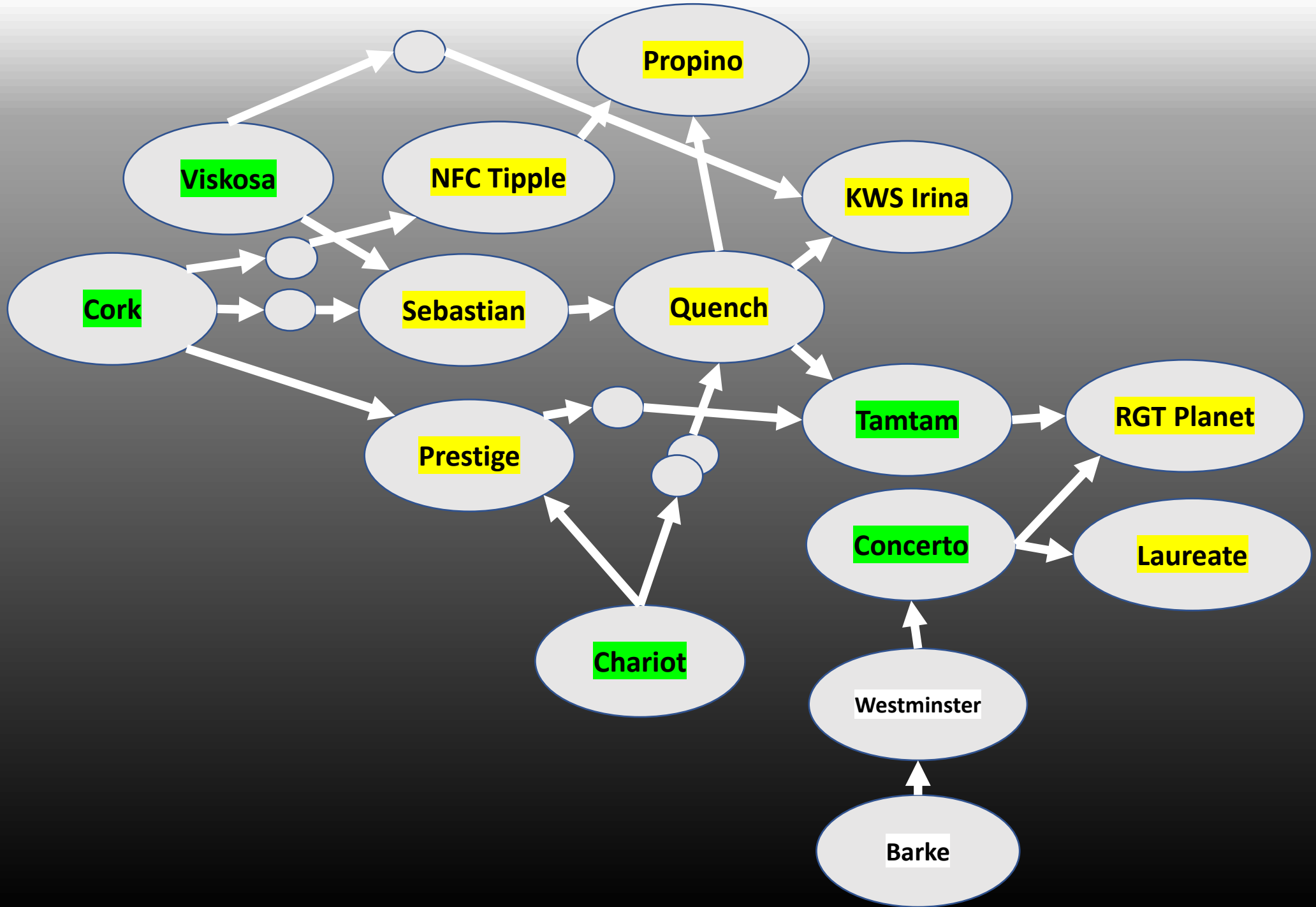
Children:41
- Tamtam
- Kelim
- F1 or Selection ic_417
- Propino
- Cropton
- F1 or Selection ic_580
- Pathfinder
- NFC 406/113
- Genie
- F1 or Selection ic_273
- Odyssey
- Convivial
- Cairn
- F1 or Selection ic_170
- KWS Irina
- Overture
- SY Firkin
- Pinocchio
- Limona
- F1 or Selection ic_393
- KWS Aurelia
- Tesla
- F1 or Selection ic_178
- KWS Orphelia
- Force AFP2399
- Summit
- Malt Jagger
- Evergreen
- Muirhead
- Garner
- SY Taberna
- Acumen
- Artemida
- Chronicle
- Crown 2RSB
- Hacker
- Husky AFP2429
- Momentum
- NSL07-8113- B

IMPROMALT, The International Barley Hub (IBH) JHI, Helium
Shaw, P., Graham, M., Kennedy, J., Milne, I., & Marshall, D. (2014). Helium: visualization of large scale plant pedigrees. *BMC Bioinformatics*, *15*(1), 259

The James Hutton Institute


Ariel
Peel
Blenheim
Chariot
PL 3286-85
Ariel
F1 or Selection ic_100
Peel
Cask
Blenheim
Dove
Platoon
Chariot
Chad
F1 or Selection ic_97
Goldie
Optic
1216/89/606
90014DH
Goldie
Cork
Cork
F1 or Selection ic_399
F1 or Selection ic_398
Trinity
Optic
Viskosa
Viskosa
Lux
Lux
NFC94-20
F1 or Selection ic_150
Sebastian
Sebastian
Drum
Drum
Quench
New Farm Crops / Syngenta (UK)
SW Seeds / Lantmännen (SE)
Sejet (DK)
Nordsaat (DE)

> 10.000 ha
Prestige
Sebastian
NFC Tipple
Quench
Propino
KWS Irina
RGT Planet
Laureate



Sejet
planteforædling

1,5 mio. € per year

year 1

10.000

Succesrate
0,001 pct.

year 2

1.000

year 3

100

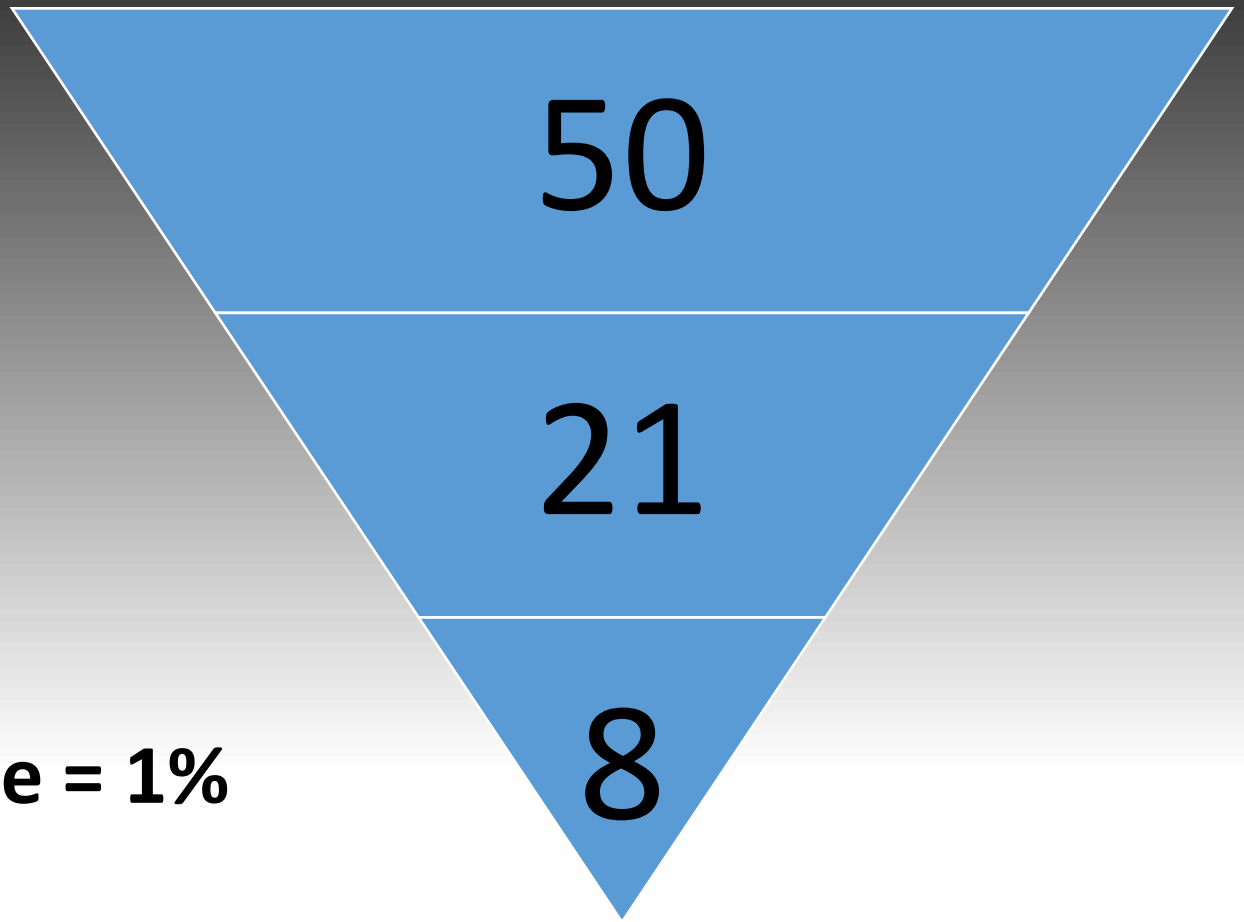
Registration

10

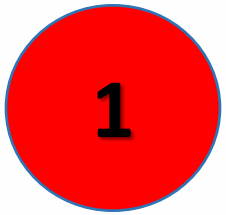
1 variety in
10 years

Pan-european succes

Tyske officielle forsøg i vårbyg



Succesrate = 1%



Berlinerprogram

Malting barleys in western part of Europe

Germany

Approved varieties	acreage 2021		Industry test	acreage 2021		WP3 crop 2022	breeders ref./name proposal
(RGT Planet)	1.516	R.A.G.T.	LG Flamenco	10	Limagrain	LGBN 17002-104	Limagrain
Amidala[2021]	1.222	Nordsaat	~~LG Rumba~~		Limagrain	NORD 19/2338 Sting	Nordsaat
Avalon	935	Breun				NORD 19/4111(Rane	Nordsaat
Leandra	792	Breun				SY 419 607	Syngenta
Lexy[2022]	672	Breun					
Accordine	567	Ackermann					
Prospect[2020]	509	Sejet					
KWS Jessie[2021]	417	Sejet					

France

CBMO preferred varieties			CBMO appr. for industy vali. '22			Pilot test Crop 2022	
RGT Planet	7.933	R.A.G.T.	KWS Thalis	234	KWS	LG Rhapsody	Limagrain
KWS Fantex	1.803	KWS	LG Flamenco	88	Limagrain	Sy Chaska	Syngenta
Fandaga	952	Nordsaat	~~CB Score~~	58	Carlsberg	Greta*	Breun
Focus	710	Secobra	Lexy	53	Breun	KWS Premis*	KWS
Laureate	353	Syngenta	Shetty	8	Breun	LG Bolero*	Limagrain
LG Tosca	311	Limagrain					
Yoda	295	Breun					
Explorer	161	Secobra				* on breeders request	
~~Sebastian~~	58	Sejet					
~~Sunshine~~	10	Breun					
~~KWS Irina~~	10	KWS					
~~Valerian~~	59	Sejet					
~~LG Belcanto~~	15	Limagrain					
~~Amidala~~	0	Nordsaat					

England

Remommended varieties			Industry test			RL-cand. harvest 2022		
RGT Planet[B,F]	4.581	R.A.G.T.	CB Score[B,T,Null-]	62	Carlsberg	Diviner	SC58707W	Secobra
Laureate[B,D,F]	4.030	Syngenta	SY Bronte[B,T]	30	Syngenta	Florence	BR13773AZ3	Senova
Lg Diablo[B,D,F]	1.689	Limagrain	Jensen[B,T]	3	Sejet	KW419531	Maronis	KWS UK
Skyway[B,P]	708	Nordic Seed	Spinner[B,T]	2	Secobra	KWS Curtis	KWS192073	Sejet
Sy	494	Syngenta				LG Flamenco	LGBN16509-4	Limagrain
Sy Splendor[B,P]	395	Syngenta				LG Loxstar	LGBU18-1301-A	Limagrain
Firefoxx[D,P]	97	Ackermann				LG Mulgrave	LGBU18-1560-A	Limagrain
Fairing[DG,F]	13	Syngenta				NOS114.171-07	NOS114.171-07	Nordic Seed
KWS Sassy[D,F]	9	KWS				RGT Starlight	RP19013	R.A.G.T.
						SC53421W	Sun King	Secobra
B=Brewing						SY Jewel	SY419554	Syngenta
D=Destilling			B=Brewing			SY Signet	SY419542	Syngenta
F=Full MBC approvaly, P=Provisional			T=test for MBC approval			SY Tennyson	SY419544	Syngenta

Denmark

Approved varieties	acreage 2021		Industry test	acreage 2021		Passed stress test feb. 2022		
RGT Planet	4.547	R.A.G.T.	Stairway, org.	3.033	Nordic Seed	KWS Premis	KWS 18/3518	KWS
Laureate	3.907	Syngenta	Skyway	1.975	Nordic Seed	KWS Thalis	KWS 17/2942	KWS
Prospect	1.497	Sejet	Firefoxx	1.098	Ackermann	Lexy	BR14052a1	Breun
Flair	1.352	Sejet	CB Concorde	30	Carlsberg	LG Flamenco	LGBN16509-4	Limagrain
KWS Irina	779	KWS	CB Score	29	Carlsberg	NOS 114.299-1	Gambit	Nordic Seed
Focus	531	Secobra	~~LG Belcanto~~		Limagrain	SY Solar	SY 417021	Syngenta
Ellinor	518	Breun				NOS 113.259-19		Nordic Seed
Evergreen	444	Nordic Seed				NOS 114.124-10		Nordic Seed
~~Chanson~~	0	Ackermann						

Sweden

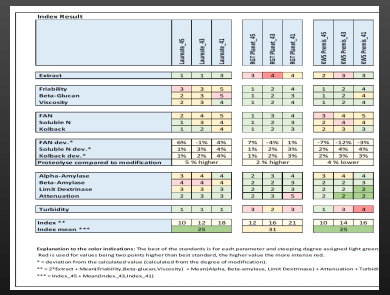
Viking Malt			Year 3+4 Länsförsök 2022			Year 2 Länsförsök 2022		
RGT Planet	3.722	R.A.G.T.	Shetty	117	Breun	Firefoxx	AC 16/03	Ackermann
Laureate	1.717	Syngenta	Skyway	153	Nordic Seed	KWS Premis	KWS 18/3518	KWS
Prospect	800	Sejet	Tellus	21	Secobra	KWS Thalis	KWS 17-2942	KWS
KWS Irina	597	KWS				Lexy	Br 14052a2	Breun
Ellinor	499	Breun	Fender		Secobra	LG Flamenco	LGBN16509-4	Limagrain
SW Catriona	102	Lantmännen	SY Tennyson		Sungenta	SCW 18-4618	SCW 18-4618	Secobra
			SY Solar		Syngenta			
			Yoda		Breun			


Mallasohrakomitea –
Malting Barley Committee
(VTT / PBL Brewing lab.)
VIKING MALT
Danish Preferred
The Irish malting
barley variety
committee
magb
MBC
Malting Barley Committee
VERARBEITUNGSEMPFEHLUNG
Braugersten Gemeinschaft
2022
BERLINER PROGRAMM
Research Institute of Brewing and Malting
MALTEURS DE FRANCE
BRASSEURS DE FRANCE
C.B.M.O.

Variety registration and industry approval of malting barley varieties

Sejet planteforædling

Year 1	Year 2		Year 2	feb.	Year 3	Year 4	.
Micro malting	Micro malting	VAR. REGISTRATION	Stress test	APP. INDUSTRY TEST	Industry malting/brewing	Industry malting/brewing	FINAL APPROVAL
VCU-1	VCU-2		Danish Preferred		Danish Preferred	Danish Preferred	
Seed: 50 kg	250 kg				5 tons	75 tons	500 ha



Index Result

	Laureate_45	Laureate_43	Laureate_41	RGT Planet_45	RGT Planet_43	RGT Planet_41	KWS Premis_45	KWS Premis_43	KWS Premis_41	KWS Thalis_45	KWS Thalis_43	KWS Thalis_41	Lexy_45	Lexy_43	Lexy_41	LG Flamenco_45	LG Flamenco_43	LG Flamenco_41	NOS 113.259-19_45	NOS 113.259-19_43	NOS 113.259-19_41	NOS 114.124-10_45	NOS 114.124-10_43	NOS 114.124-10_41	NOS 114.299-14_45	NOS 114.299-14_43	NOS 114.299-14_41	SY Solar_45	SY Solar_43	SY Solar_41
Extract	1	1	3	3	4	4	2	3	3	2	3	3	2	1	3	1	3	3	2	2	5	3	5	5	2	2	4	1	2	3
Friability	3	3	5	1	2	4	1	2	4	1	2	4	1	1	1	1	2	4	2	2	5	2	3	5	1	2	5	1	2	4
Beta-Glucan	2	3	5	1	2	3	1	2	4	1	2	4	1	1	1	1	2	3	1	2	5	1	3	4	1	3	4	1	2	3
Viscosity	2	3	4	1	2	4	1	2	4	1	2	3	1	1	1	1	2	3	2	3	5	1	2	5	2	3	5	1	2	4
FAN	2	4	5	1	3	4	3	4	5	1	2	3	1	2	3	1	2	4	4	5	5	3	5	5	1	3	4	2	3	5
Soluble N	1	3	4	1	2	3	2	4	4	1	2	3	1	1	2	1	2	3	4	4	5	3	4	5	1	2	3	2	3	4
Kolback	1	2	4	1	2	3	2	3	3	1	2	3	1	1	1	1	2	3	3	5	5	3	4	5	1	2	4	2	3	4
FAN dev.*	6%	-1%	4%	7%	-4%	1%	-7%	-12%	-3%	4%	3%	14%	4%	-5%	-6%	12%	9%	6%	-9%	-14%	7%	-8%	-9%	-4%	13%	8%	6%	-2%	-6%	-9%
Soluble N dev.*	1%	3%	4%	1%	2%	3%	2%	4%	4%	1%	2%	3%	1%	1%	2%	1%	2%	3%	4%	4%	5%	3%	4%	5%	1%	2%	3%	2%	3%	4%
Kolback dev.*	1%	2%	4%	1%	2%	3%	2%	3%	3%	1%	2%	3%	1%	1%	1%	1%	2%	3%	3%	5%	5%	3%	4%	5%	1%	2%	4%	2%	3%	4%
Proteolyse compared to modification	5 % higher			2 % higher			4 % lower			4 % higher			5 % lower			1 % higher			6 % higher			8 % lower			7 % lower			6 % higher		
Alpha-Amylase	3	4	4	2	3	4	3	4	4	2	3	4	1	1	2	2	3	3	3	4	5	5	5	5	2	4	4	5	5	5
Beta-Amylase	4	4	4	2	2	3	2	2	3	4	4	4	3	3	3	1	1	1	3	4	4	4	4	5	5	5	5	3	4	4
Limit Dextrinase	3	3	3	2	2	3	2	2	2	2	3	3	2	2	2	2	2	2	4	5	5	3	4	4	2	3	4	3	3	4
Attenuation	2	3	3	2	3	5	2	2	2	1	2	3	2	3	3	1	1	2	3	4	4	5	5	5	3	4	3	1	3	4
Turbidity	1	1	1	3	2	3	1	3	4	1	1	1	1	2	3	1	1	1	2	4	5	1	1	1	1	1	1	1	1	1
Index **	10	12	18	12	16	21	10	14	16	9	14	17	9	9	13	6	11	14	13	16	25	17	22	25	12	15	20	8	13	18
Index mean ***	25			31			25			24			20			19			33			40			29			24		

Explanation to the color indications: The best of the standards is for each parameter and steeping degree assigned light green. Values lower than best standard are marked with increasingly intens green color.

Red is used for values being two points higher than best standard, the higher value the more intense red.

* = deviation from the calculated value (calculated from the degree of modification).

** = 2*Extract + Mean(Friability,Beta-glucan,Viscosity) + Mean(Alpha, Beta-amylase, Limit Dextrinase) + Attenuation + Turbidity/3

*** = Index_45 + Mean(Index_43,Index_41)

Approved lists of malting barley varieties

Danish Preferred Approved Varieties			
Variety	Breeder	Year of approval	Page
RGT Planet	RAGT	2017	*
Laureate	Syngenta	2018	6
Focus	Secobra Recherches S.A	2022	7
Prospect	Sejet	2022	8
Skyway	Nordic Seed	2022	9
Firefoxx	Ackermann Saatzucht	2023	10
CB-Score	Carlsberg	2024	11
KWS Thalis	KWS	2025	12
NOS Gambit	Nordic Seed	2025	13

own and accepted by malting

Variety	Breeder
Tests to be	
LG Caruso	Limagrain
NOS Lollipop	Nordic Seed
Tests to be	
Fontane	Sejet

Approved lists of malting barley varieties

LISTE DES VARIÉTES PRÉFÉRÉES DE MALTEURS DE FRANCE et BRASSEURS DE FRANCE ORGES DE BRASSERIE - RECOLTE 2026

VARIÉTÉS PRÉFÉRÉES*

ORGES DE PRINTEMPS		ORGES D'HIVER	
		2 RANGS	6 RANGS
Supérieur à 15 000 ha →	RGT PLANET / KWS THALIS / STING		KWS FARO / CARROUSEL (JNO)
Inférieur à 15 000 ha →	LAUREATE		
Usage limité →	LEXY	COMTESSE	CONSTEL (JNO)

* Certaines variétés dont les surfaces de production ont baissé, restent brassicoles et apparaissent au dos de cet encart.

VARIÉTÉS EN OBSERVATION COMMERCIALE ET INDUSTRIELLE

Étape 2 →	LG FLAMENCO / LG RHAPSODY / MAGNITUDE		KWS DELIS (JNO)
Étape 1 →	LG ALLEGRO / TIMBER / BUZZER	DUCHESSE	

VARIÉTÉS ADMISES EN VALIDATION

LG BAROK / SAILER	

Neue Sorten, die im „Berliner Programm" geprüft wurden

Zulassung 2022	LG Caruso Sting	
Zulassung 2023	Ostara Bounty	
Zulassung 2024	Excalibur RGT Corella Belladonna Ökosorte Kosima KWS Enduris LG Allegro LG Baryton	
Zulassung 2025	Tilda Fontane	

Erläuterung: Sortenname = Teilnahme am Berliner Programm
Sortenname = Praxisgroßversuche durchgeführt

19 Jahre Berliner Programm
92 Sorten
28 Großtechnik
24 Verarbeitungsempfehlungen
Gesamtaufwand nur für Analytik ca. 2.000.000,00 €

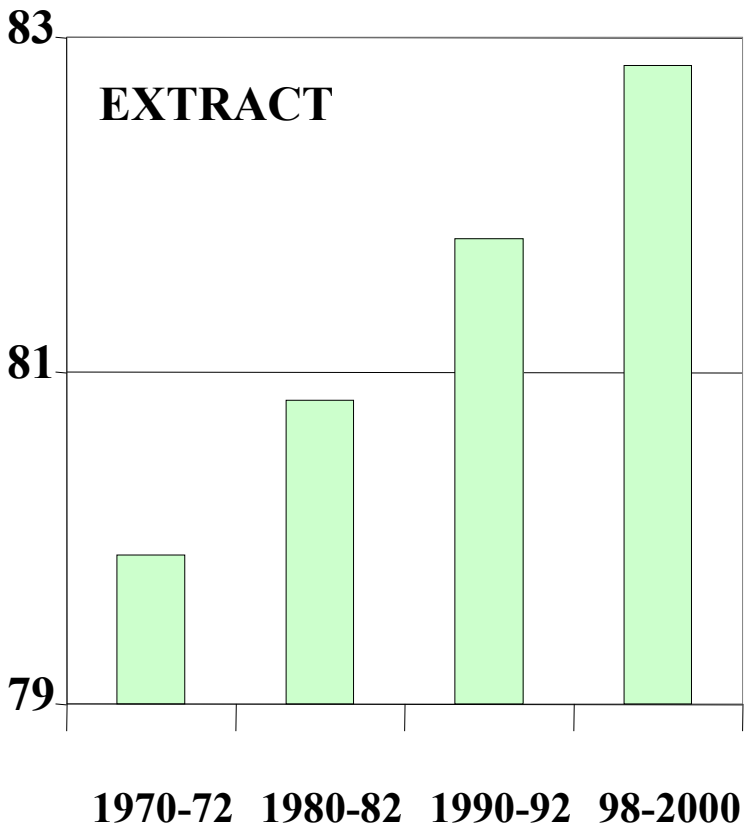
Verarbeitungsempfehlung Berliner Programm

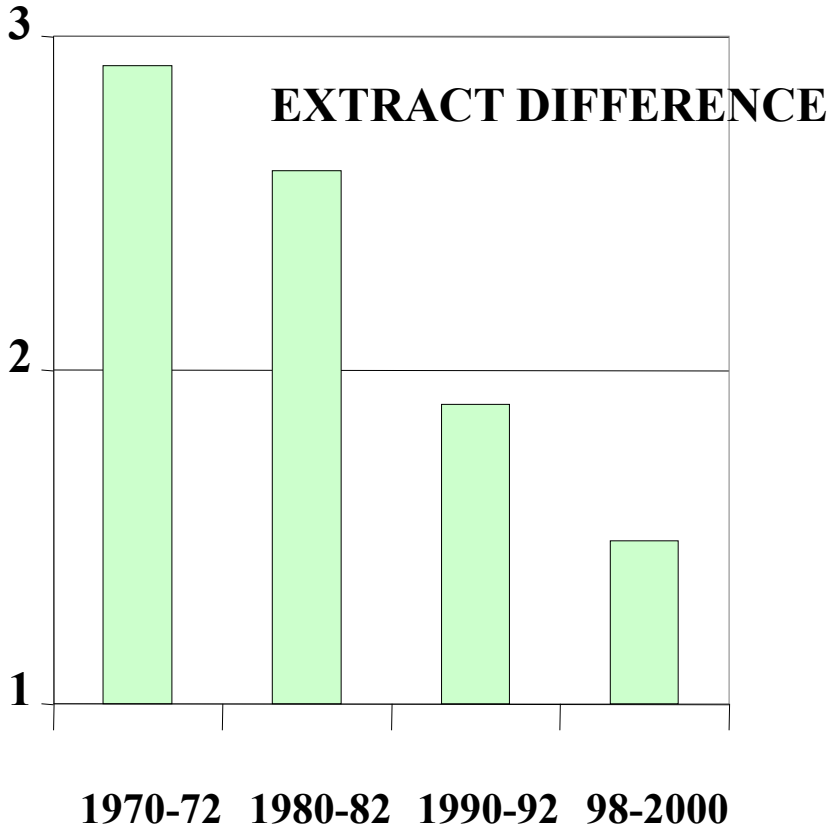
Zur Verarbeitung empfohlene Braugerstensorten ab 2005

Marthe	Zulassung 2005	Verarbeitungsempfehlung 2007
Power	Zulassung 2005	Verarbeitungsempfehlung 2007
Lisanne	Zulassung 2006	Verarbeitungsempfehlung 2008
Quench	Zulassung 2006	Verarbeitungsempfehlung 2008
Streif	Zulassung 2007	Verarbeitungsempfehlung 2009
Grace	Zulassung 2008	Verarbeitungsempfehlung 2010
KWS Bambina	Zulassung 2009	Verarbeitungsempfehlung 2011
Propino	Zulassung 2009	Verarbeitungsempfehlung 2011
Sunshine	Zulassung 2009	Verarbeitungsempfehlung 2011
Catamaran	Zulassung 2011	Verarbeitungsempfehlung 2013
Passenger	Zulassung 2011	Verarbeitungsempfehlung 2013
Solist	Zulassung 2012	Verarbeitungsempfehlung 2014
Avalon	Zulassung 2012	Verarbeitungsempfehlung 2015
Ventina	Zulassung 2014	Verarbeitungsempfehlung 2016
Cervinia	Zulassung 2015	Verarbeitungsempfehlung 2017
Accordine	Zulassung 2016	Verarbeitungsempfehlung 2018
Leandra	Zulassung 2017	Verarbeitungsempfehlung 2019
Prospect	Zulassung 2018	Verarbeitungsempfehlung 2020
Amidala	Zulassung 2019	Verarbeitungsempfehlung 2021
KWS Jessie	Zulassung 2019	Verarbeitungsempfehlung 2021

Braugersten-Gemeinschaft e.V. - Oskar-von-Miller-Ring 1 - 80333 München
Tel. 089 286604-31 - www.braugerstengemeinschaft.de

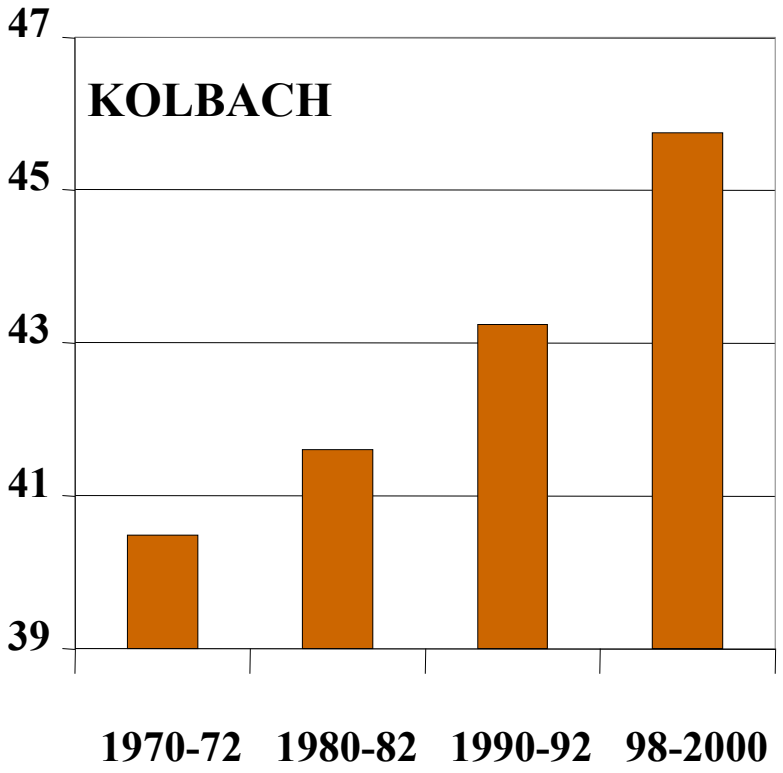
Increases in Extract During Last 30 Years

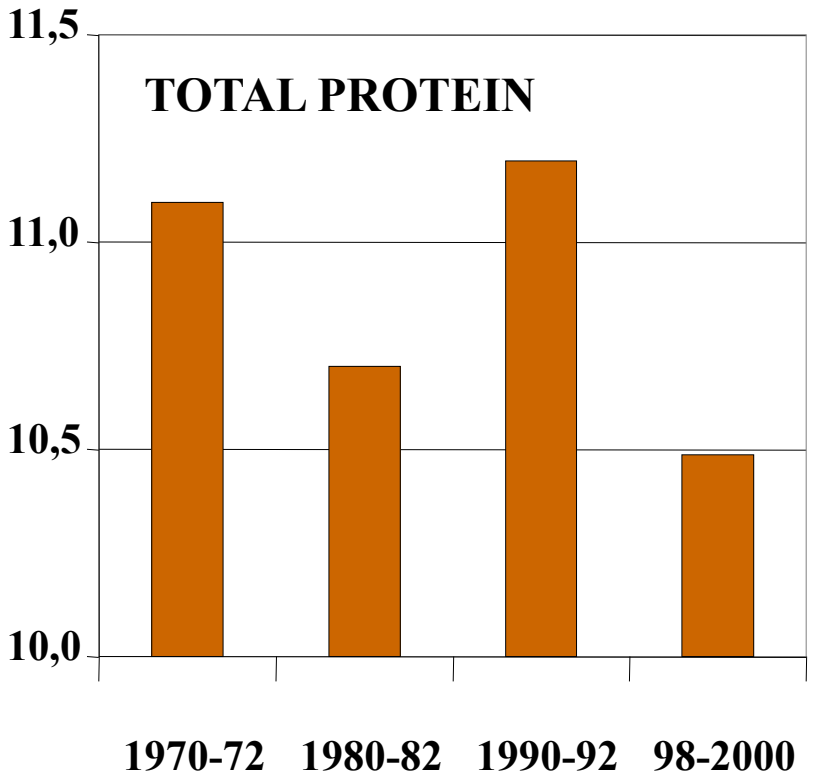




Data from EBC Trials in Germany, compiled by Prof. R. Schildbach

Increases in Soluble Protein During Last 30 Years





Data from EBC Trials in Germany, compiled by Prof. R. Schildbach

Improved malting quality over a 30-year period (based on German Official Trials)

	1983	2015	Diff.
Extract	81,5	83,3	1,8
Friability	76,3	95,5	19,2
Viscosity	1,52	1,46	-0,06
Kolbach	43,3	47,4	4,1
Attenuation	80,8	83,2	2,4

Outstanding breeding achievements

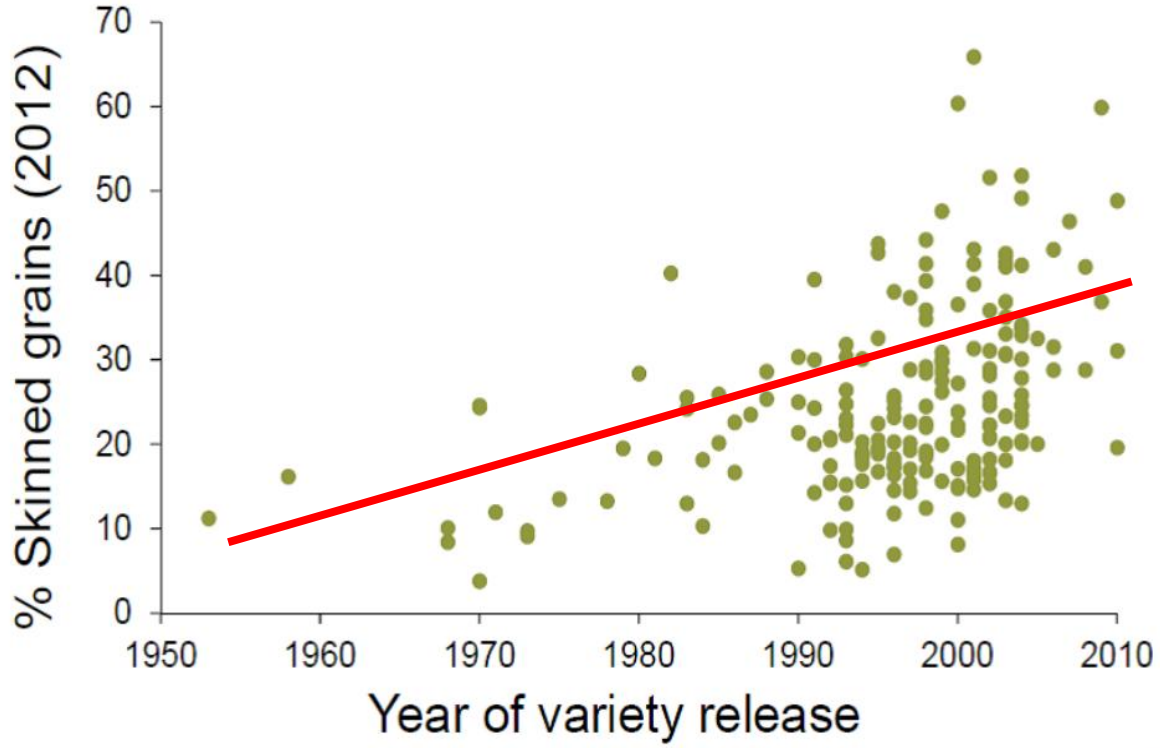
of great importance to the brewing industry


ORIGINAL ARTICLE

Breeding progress, genotypic and environmental variation and correlation of quality traits in malting barley in German official variety trials between 1983 and 2015

Variety age vs skinning

Are we breeding skinning into new varieties?



Source: BBSRC CIRC project, SRUC and JHI

BBSRC bioscience for the future

CIRC · CROP IMPROVEMENT RESEARCH CLUB

The James Hutton Institute

SRUC

AHDB CEREALS & OILSEEDS

Fast Malting

- **Hurtigere modifikation:** Processen kan potentielt forkortes med **25-40%**. Det betyder, at malterierne kan producere mere malt på den samme tid.
- **Vandbesparelse:** Ved at optimere måden, kornet optager fugt på, kan man reducere vandforbruget markant (ofte nævnt op mod **15-20%**).
- **Lavere energiforbrug:** Da spiringstiden forkortes, spares der energi på ventilation og køling i malteriet.
- **Højere ekstraktudbytte:** Hurtig modifikation sikrer, at stivelsen i kornet bliver lettere tilgængelig for bryggeren, hvilket giver et bedre udbytte i bryghuset.

AAAS

Science

Editor's summary

Short seed dormancy durations have been selected during cereal domestication to allow fast and even germination after sowing. However, when dormancy duration is too short, seeds can begin germinating while still attached to the parent plant, a phenomenon known as preharvest sprouting. Jørgensen *et al*. explored variation in sequences and copy number of barley MKK3, a kinase involved in dormancy regulation. Domesticated barley had more copies of MKK3 than its wild relatives, which generally only had one copy. Additional copies of MKK3 increased transcript levels, whereas sequence variation affected kinase activity. Together, these variations correlate with dormancy duration and preharvest sprouting across global growing regions. This research may help with grain selection for plants suited to their local climate, particularly in regions where preharvest sprouting is common or may become more common with climate change. —Madeleine Seale

Science

NG OR
UTING

barley kinase
ormancy duration
routing p. 90

arya in control at NIH? p. 16
s rogue planet pp. 23 & 96
elates of cooperation p. 46


FUTURE
Sejet
plant breeding

CO_2 footprint pr. produceret kg korn er afhængig produktionen pr. hektar: flere kg at fordele CO_2 belastningen på

CO_2 footprint kan også mindskes ved at designe råvaren til optimeret industrianvendelse – typpisk gennem mutationsforædling

Bedre genetik er en af de vigtigste faktorer for at løse disse problemstillinger – Innovativ planteforædling vil blive efterspurgt som aldrig før

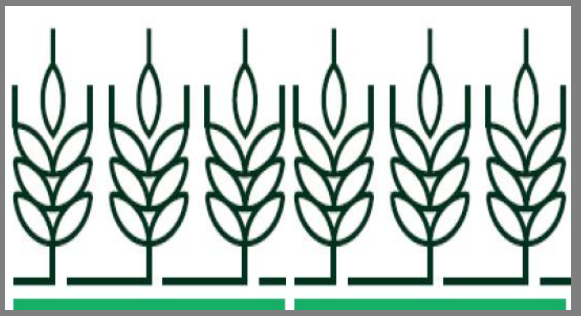
Klimaforandringerne med ekstremt vejr sætter produktionen i vise regioner under pres

Land Use Change og afskovning er ”no go”

Vi får derfor behov for at producer mere og bedre I regioner med mindre påvirkning af ekstremt vejr

Forbedret biodiversitet kræver plads til uforstyrret natur (conservation ecology)

Life cycle and CO2 footprint



14%.

THE PROPORTION OF GREENHOUSE GAS EMISSIONS
RELATING TO EACH STAGE IN THE LIFE CYCLE OF OUR PRODUCTS

17%
AGRICULTURE
Cultivation of ingredients such as barley and rice

6%
MALTING
Malting and processing of grains

14%
BREWERIES
Brewing and manufacturing of our products, including refrigerants

40%
PACKAGING
Production and disposal of all packaging materials

14%
DISTRIBUTION
Distribution of our finished products from our breweries and depots

9%
REFRIGERATION
Chilling of our drinks in bars and shops, including refrigerants

Fremtiden (med NGT)

- Komplet bladsygdomsresistens
- Tolerance mod lus
- Virusresistens (BYDV)
- Tørkeresistens / ”Soppe”-resistens
- Højere fotosyntese

- 4G til 8G?
- Fast malting uden markspiring
- Høj ekstrakt uden afskalling
- Høj indhold af varmestabile enzymer
- Bedre foderkvalitet: proteinindhold, aminosyrebalance, fytase

UDBYTTE,
UDBYTTE,
UDBYTTE

ARTICLES
https://doi.org/10.1038/s41477-019-0445-5

nature plants

Breeding improves wheat productivity under contrasting agrochemical input levels

Kai P. Voss-Fels

Based on 200 german varieties from 50 years, 18.844 yield plots

Our observation **that genetic gain for performance under high-input conditions simultaneously increases performance under suboptimal management conditions** has important consequences for the d… strategie… ns. Interesti… …ons, cultivars… **outperformed conventionally bred cultivars** from the same year of release (Supplementary Fig. 19).

Udbyttepotential "shiner" altid også under stress-betingelser inkl. øko

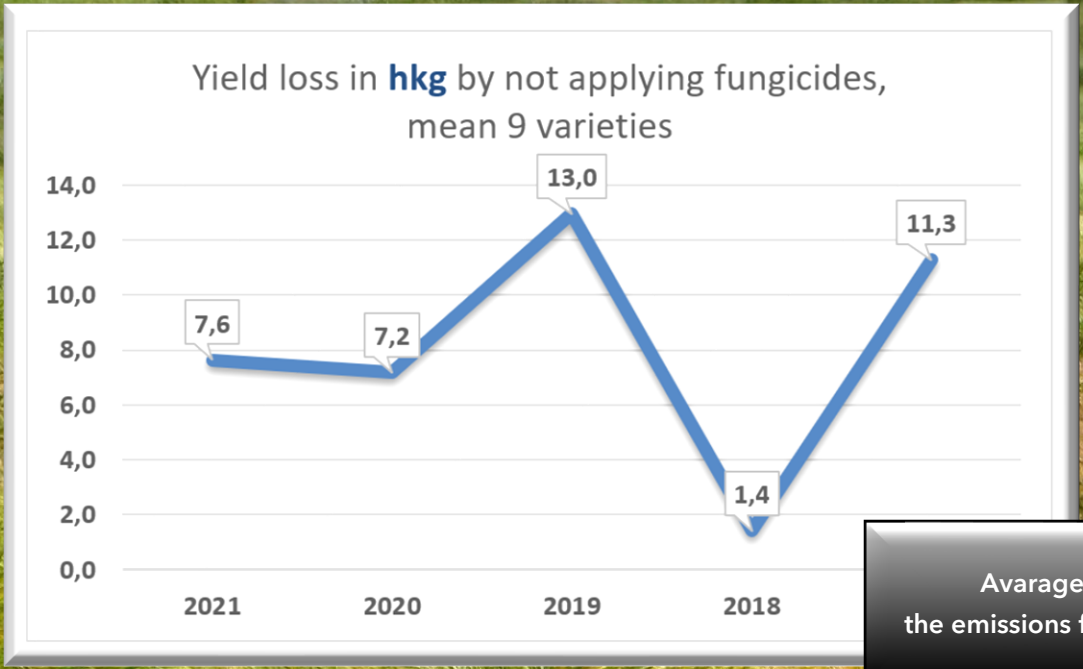

END

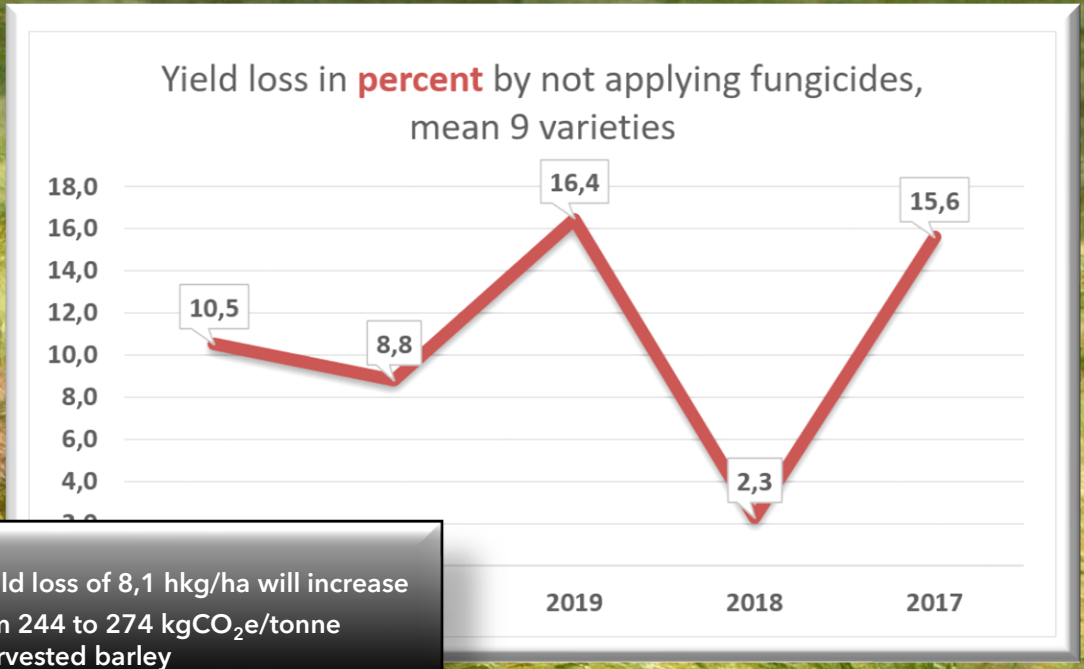
Danish Oberservation Plots, unsprayed

	Mildew	Rust	Skald	Net blotch	Ramularia
	2021	2021	2020	2021	2020
	leaf disease coverage (%)				
Best	0	0,05	0,1	0	5
Worst	3,7	21	29	40	42
Ellinor	0	0,07	24	0,19	15

Danish National Trials SortInfo

NO SPRAYING





Avarage yield loss of 8,1 hkg/ha will increase the emissions from 244 to 274 kgCO_2e/tonne harvested barley