

Hybrid Rye Development



KWS UK 2018/19

SEEDING
THE FUTURE
SINCE 1856



Presentation Contents:



- **UK Strategy**
 - Benefits for UK farmers
 - Ergot Resistance + PollenPlus®
- **End Markets & 2018 Portfolio**
 - Biogas
 - Feed Grain - Pig Finishing
 - Food Industry - Baking or Distilling
- **Expanding UK Acreage & 2018 Portfolio**

> 2-3 Year focus;

- Expand rye in pig finishing diets
- Maintain leadership in AD
- Promote rye as a 'heart healthy' grain for food use



Rye – a multifunctional hybrid cereal



KWS - a long term player in rye breeding



Rye – the benefits of a hybrid cereal

- **Consistent** yield progression
- Extreme **winter hardiness**
- Superb **drought tolerance**

- **Growing acreage** in many cereal markets – EU, UK, USA, CANADA

- International development of the RYEBELT Project www.ryebelt.com



Hybrid Rye – benefits for UK farmers



Hybrid Rye - a place in UK rotations

- **High grain yields** of 10 – 13 t/ha exceeding 2nd wheat
- **Early harvest** (wholecrop) or grain (typically between winter barley and wheat)
- Ultra low **take – all** carry over (2nd lowest comp. to oats) *
- High **black grass suppression**
- High **straw yield** (around 30% higher than wheat or barley)
- Ideal option for **OSR establishment** to ensure volunteer control





Hybrid Rye – Ergot resistance through breeding



Ergot resistance through breeding



▪ Ergot

- Infection > **spores invade stigma at flowering**
- Effects **outcrossing species** (such as rye)
- Also effects **triticale, wheat & barley**
- **Toxic** to livestock and humans
- **Blackgrass** is a common host

▪ Breeding goal >

- **Prevent ergot access to the stigma**
- Aim for 100% pollination
- Obtain **rapid pollination** + closed stigma

Ergot in grassweed infested fields

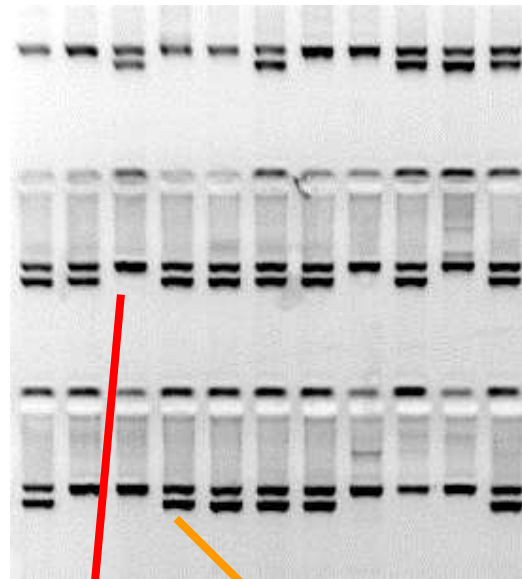


Pictures from Wimpole, (Sadeik) Agrii & BCS trials, 2016

PollenPlus® - QTL marker selection



1. Identifying candidate lines

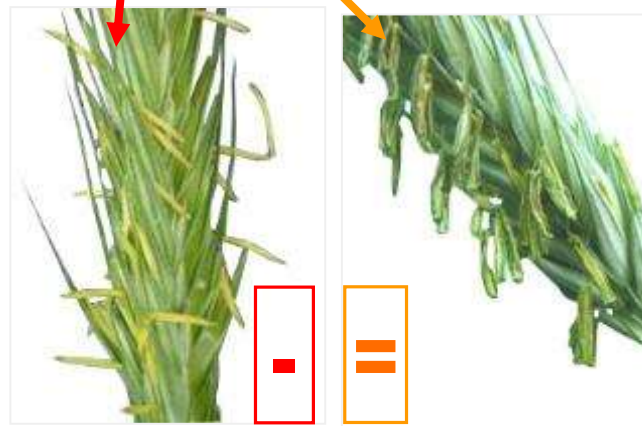


2. Marker selection



3. Ergot screening

- High speed line development
- Accurate screening + QTL
- Breeders eye



Normal pollen production

QTL selected - PollenPlus®



90% + 10% Pollinator v. 100% F1 Hybrid



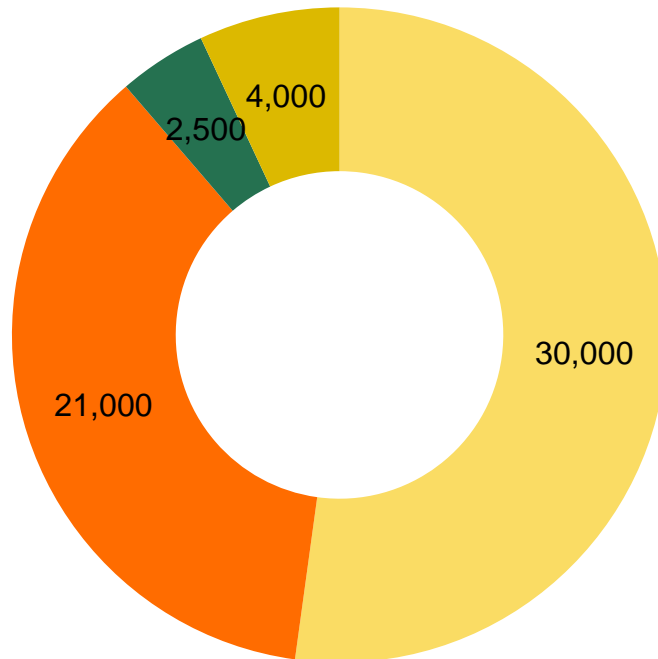


Hybrid Rye for Biogas





Share of UK Feedstock Use (ha)



■ Maize

■ Hybrid Rye

■ Beet

■ Other (Grass, Mix Wholcrop Cereals, Triticale, Oats, Crimped Maize, B. Pulp, Feed Grain)

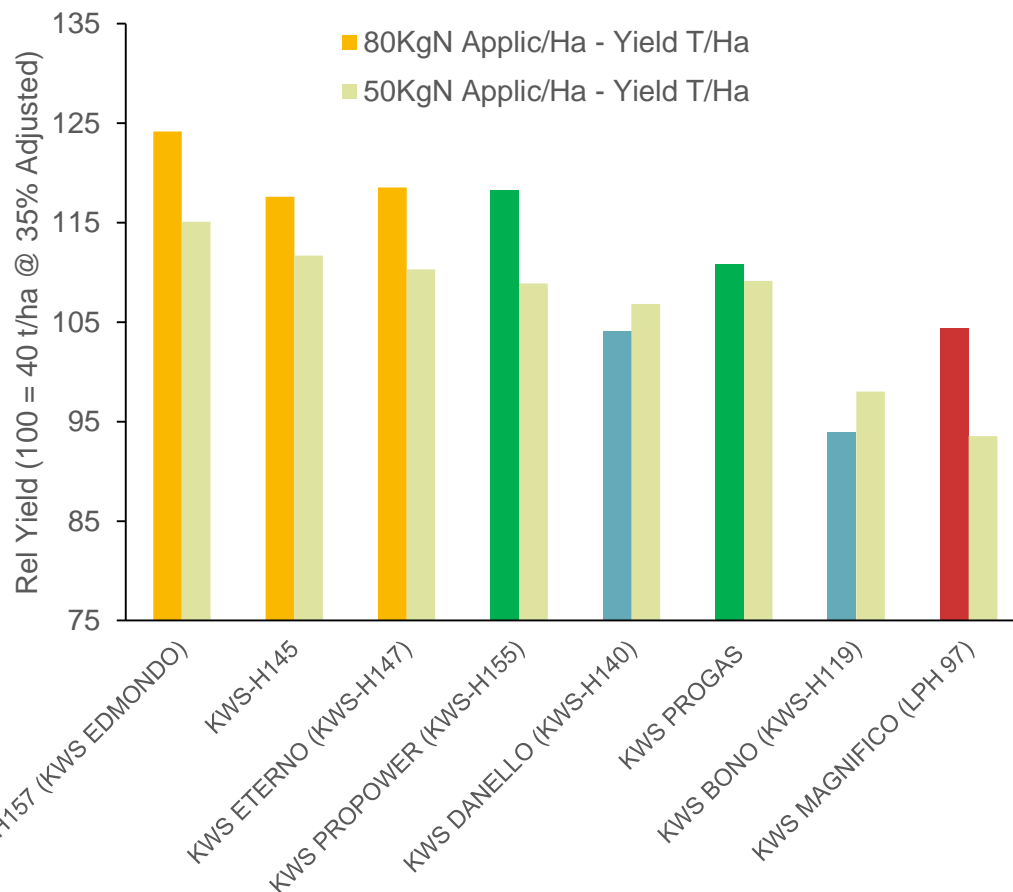
UK Biogas Market

- ca. 270 on farm register AD installations active as of April 2018
- Total deployed capacity
 - Biomethane: 17,000 (Nm3)
 - CHP: 110,200 (kWe)
 - **55K. ha** (1.2% of UK Arable)
- **20 Year CPI linked tariff**



KWS UK Wholecrop Trials Data 2017

w/ Split N Rate GS 29 – 32 50 Kg/Ha N v. 80 Kg/Ha N Yield Responce



Split N Rate GS 29 – 32
50 Kg/Ha N v. 80 Kg/Ha N



Data source; KWS UK Wholecrop Trials Data – 2017
Trial Drilled October 2016, Harvested June 2017
DM Yield adjusted to 35% DM expressed as Rel. % Split N Rates applied between GS 29 - 32

- Reference AD / Silage Hybrid
- Reference Grain Hybrid (KWS DANIELLO)
- Reference AD / Silage Hybrid (KWS PROGAS, KWS PROPOWER)
- New Candidate Hybrid *Tested only in 2015 + 2016

Hybrid Rye – Portfolio 2018



Type (H = Hybrid)

Use

KWS PROPOWER

PollenPlus® - H

Biogas (AD)

Dedicated hybrid for AD

- AD area stable
- Stiffer + less lodging v. KWS PROGAS
- Key competitors Helltop and SU Performer
- 100% UK seed production





Hybrid Rye for Feed Grain (Pigs)



Hybrid Rye for Feed Grain (Pigs)



Unique characteristics of rye grain

- **Higher lysine:protein ratio** in comparison to other cereals
 - Low Glycemic Index (GI) and **high satiety**
 - **Decreased gut ulceration**
 - High dietary fibre %
 - Increased welfare + occupation & **reduced stress/boredom** (nipping, bruising, mounting etc..)
- **Home Mixing Pig Units**
- **Reduced feed cost**
 - **Higher welfare**



Pig farming in the EU (sows by region)

- higher use of rye as a feed grain (DK, DE, PL, NL)

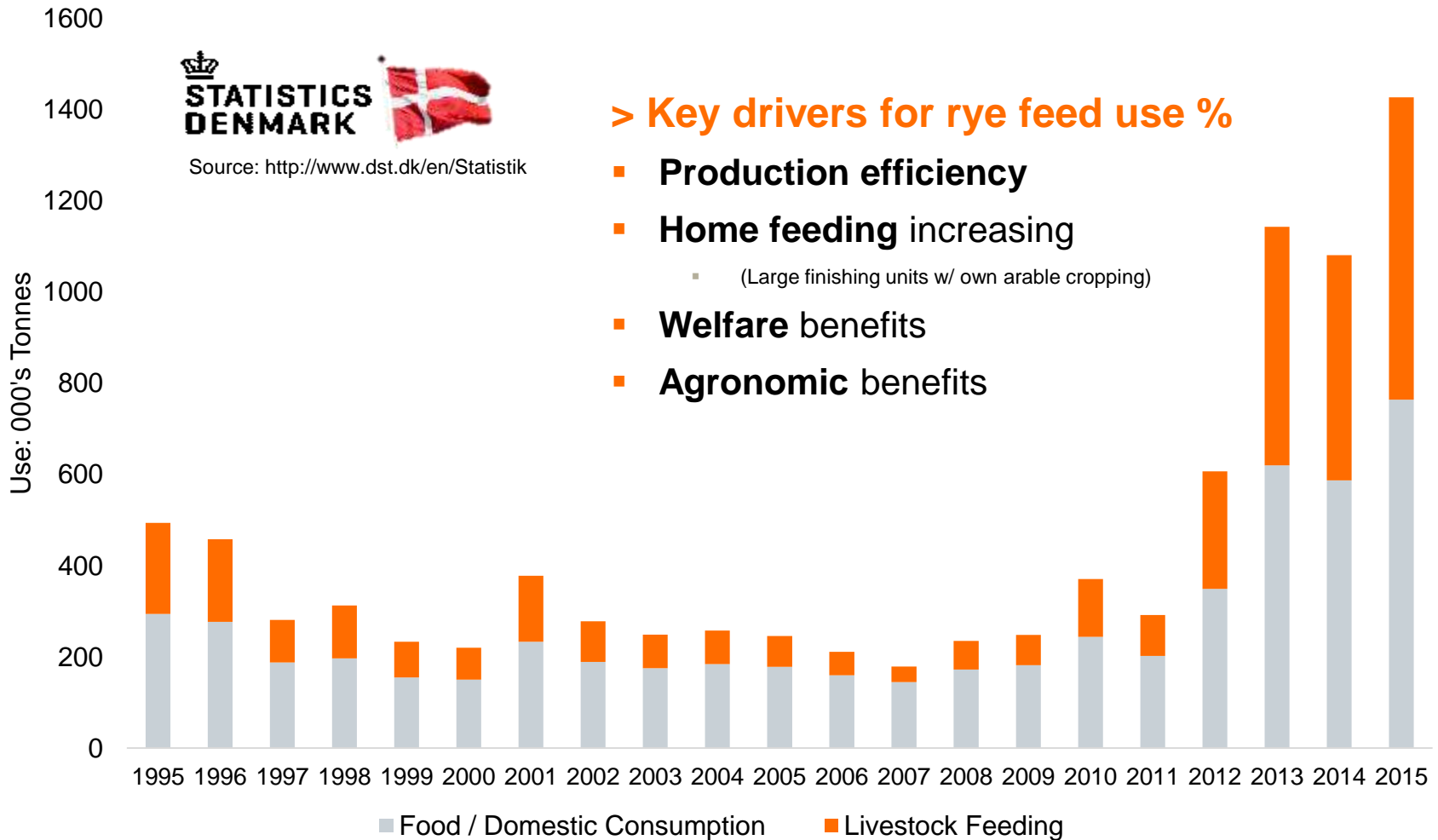


Source: http://ec.europa.eu/eurostat/statistics-explained/index.php/Pig_farming_sector_-_statistical_portrait_2014

Denmark case study... Increasing use of Rye in Pig Rations



Rye - Food + Livestock Use 1995 - 2015



Pig industry – UK Welfare post 2019



Pig industry – UK Welfare post 2019

- **UK Farm assurance** in a global market
- **UK pork exports** v. domestic consumption
- Supermarket supply chains focus on **UK production** (Waitrose, Sainsbury's & Co-op)
- EU regulation on future **zinc oxide use** - & impact on **salmonella control** in piglets and finishing pigs



The background of the slide is a photograph of several slices of rye bread stacked on a wooden cutting board. The bread has a golden-brown crust and a dense, porous interior. In the foreground, a pile of reddish-brown rye grains is scattered on the wooden surface. An orange rectangular box is overlaid on the right side of the image, containing the title text and a small icon.

Hybrid Rye for Human Nutrition





Hybrid Rye - Key advantages for baking and food use:

- High **dietary fibre** content
- Stable glucose and **insulin** balance
- Rye has the lowest **Glycemic Index (GI)** values of all cereal grains
- Improve **bowel function** – lower risk of constipation
- Long term **cardiovascular health** – rye based diets are linked to decreased incidence of myocardial infarction & beneficial effects in **lipid metabolism**

RYE AND HEALTH



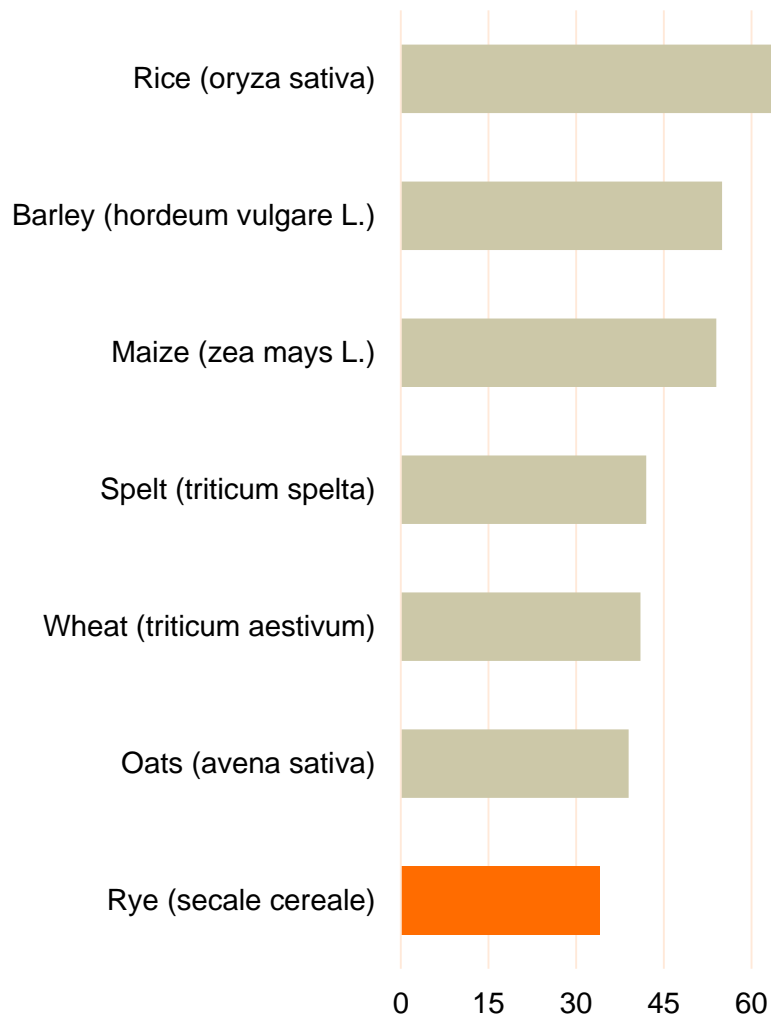
Source: Nordic Rye Group
(<http://virtual.vtt.fi/virtual/rye/rye&health.pdf>)

Rye Grain

Stable insulin balance & heart healthy !



GI Index of Common Cereal Grains





Hybrid Rye - Example end use products:

- **Milling Products:** *Whole grain rye, cut rye (steel), Malted rye kernels, Whole grain flour, Rye bread mix with sourdough, Rye bran, Rye flakes, Breakfast cereals (muesli, others)*
- **Bread Products:** *Sourdough rye bread, Crispbread, Thin crispbread, Rolls, buns and breads containing wheat/rye-mixture*
- **Other Rye Products:** *Rye porridge, pastries, Rye pasta, Snack products*
- **Distilling:** *Whisky production*





Expanding UK Acreage



UK Trials – Obs. Plots: Grains / Ear (2017)



KWS PROGAS
KWS MAGNIFICO

KWS PROPOWER



KWS BONO
KWS DANIELLO

KWS ETERNO
KWS EDMONDO

Data source; KWS UK Wholecrop Trials Data – 2017

Trial Drilled October 2016, Harvested June 2017

DM Yield adjusted to 35% DM expressed as Rel. % Split N Rates applied between GS 29 - 32

Hybrid Rye – Multi-Use Portfolio 2018



Type (H = Hybrid) PollenPlus® - H		Use
KWS BONO	KWS ETERNO*	Multi-Use (AD, Feed Grain, Food Ind.)
KWS DANIELLO	KWS EDMONDO*	Multi-Use (AD, Feed Grain, Food Ind.)

Centre stage for grain yield and drought tolerance!

KWS BONO

- High potential hybrid yield in grain
- Drought tolerant – HxH to give you resilience
- Strong disease resistance

1 1000000 THE FUTURE 2018 2018

KWS' leading multi-purpose hybrid rye!

KWS DANIELLO

- High potential hybrid yield in grain
- Drought-tolerant resilience
- Resistant to new rusts etc.

1 1000000 THE FUTURE 2018 2018

New horizons for Hybrid Rye!

KWS EDMONDO

- High potential hybrid yield in grain, high yield in straw
- Excellent early sowing & disease resistance
- High tolerance to new rusts & other diseases, high yield in straw

1 1000000 THE FUTURE 2018 2018

2 in 1 Hybrid Rye from KWS!

KWS ETERNO

- High potential hybrid yield in grain, high yield in straw
- Excellent early sowing & disease resistance
- High tolerance to new rusts & other diseases, high yield in straw

1 1000000 THE FUTURE 2018 2018





Hybrid Rye – Agronomy and Breeder Efforts

- **BSPB:** Action on FSS Rye
- **AHDB:** KWS Entries for H18 Harvest
- **PGR:** Meddax Max & Canopy
- **Seed treatments:** *sedaxane* + others



Thank you
for your attention.



www.kws-uk.com

SEEDING
THE FUTURE
SINCE 1856

KWS

