Wheat Genetic Improvement Network

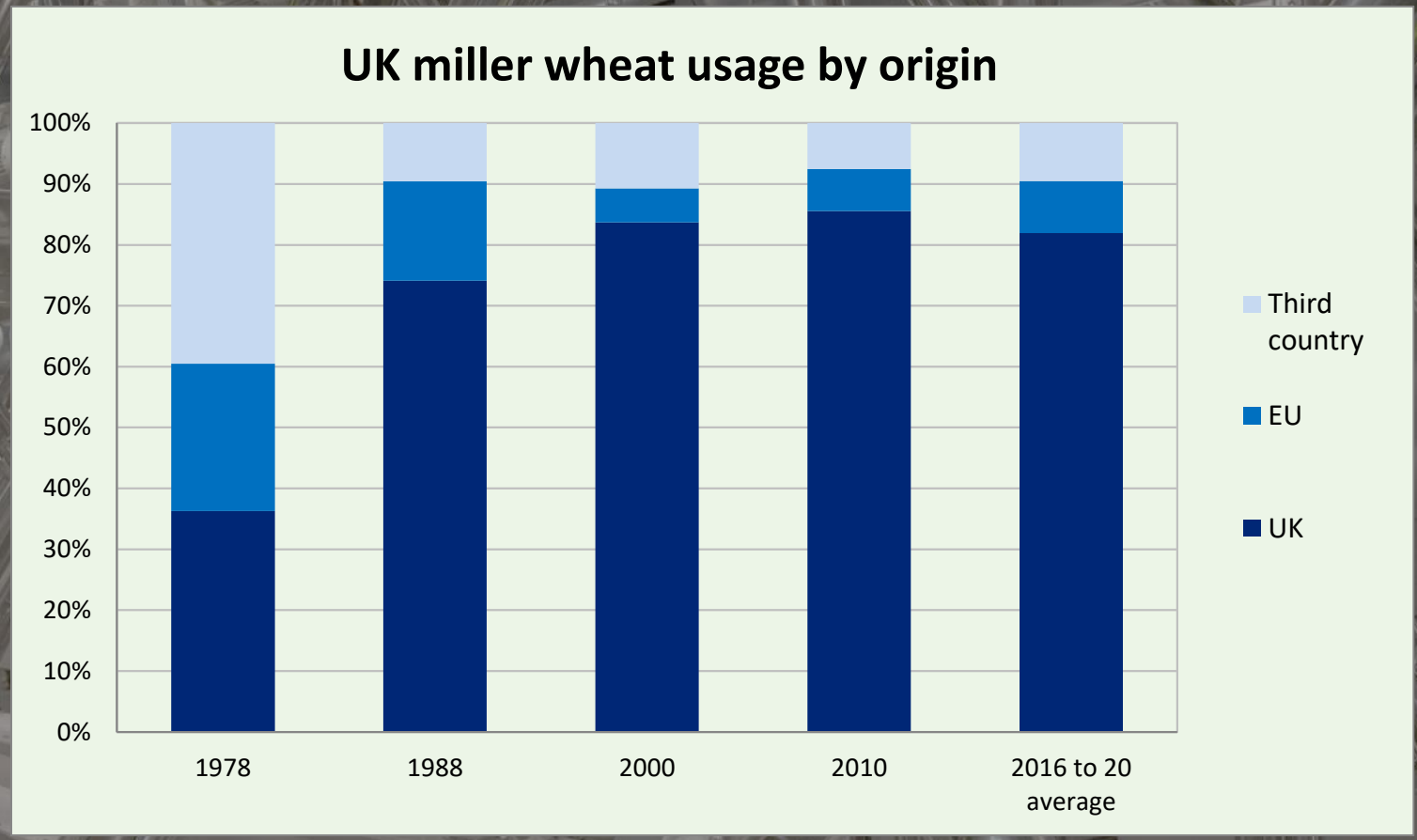
UK FLOUR MILLERS

Sustainability and nutrition – why milling research is crucial

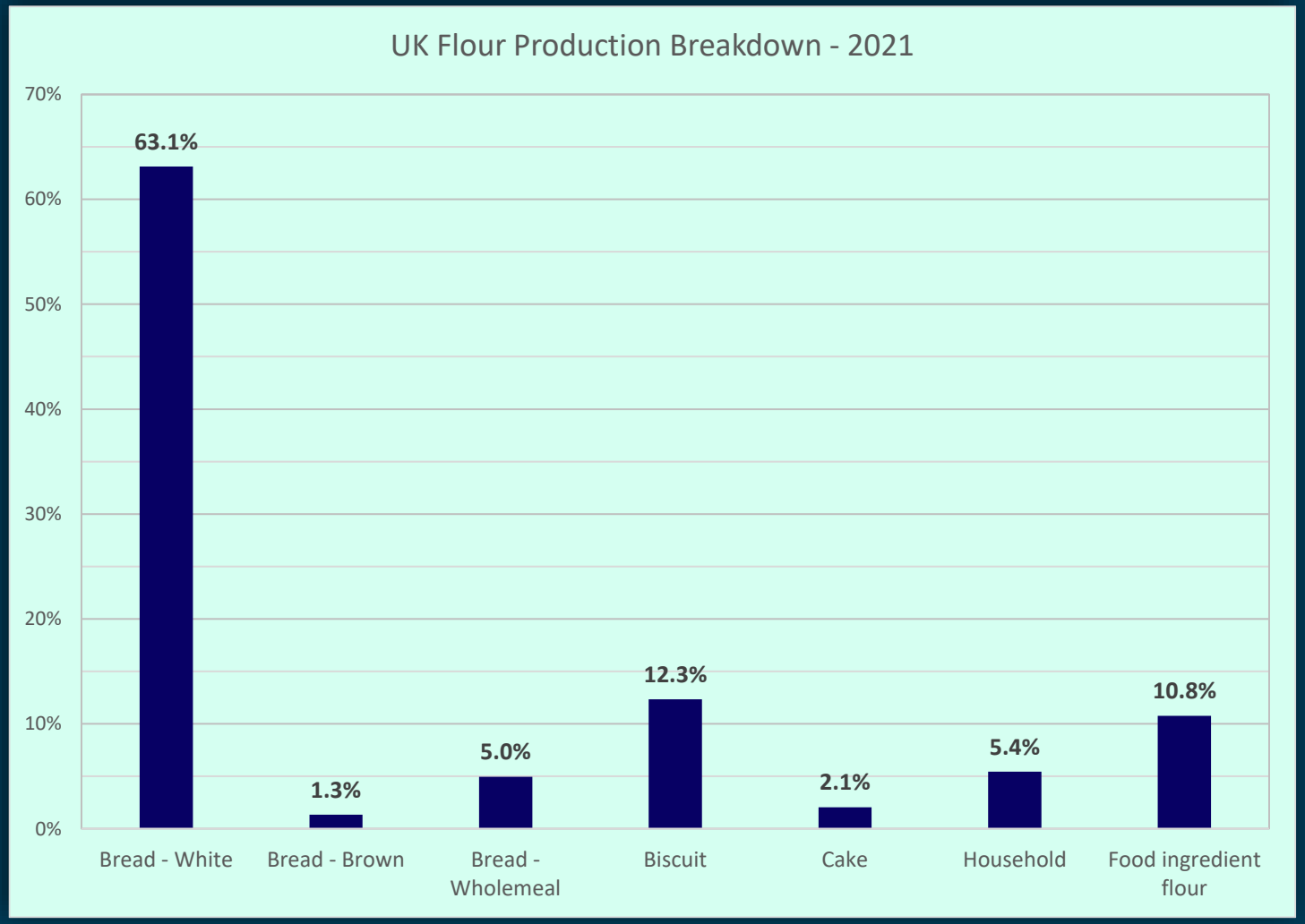
20th WGIN Stakeholders Meeting
06 February 2023
JIC

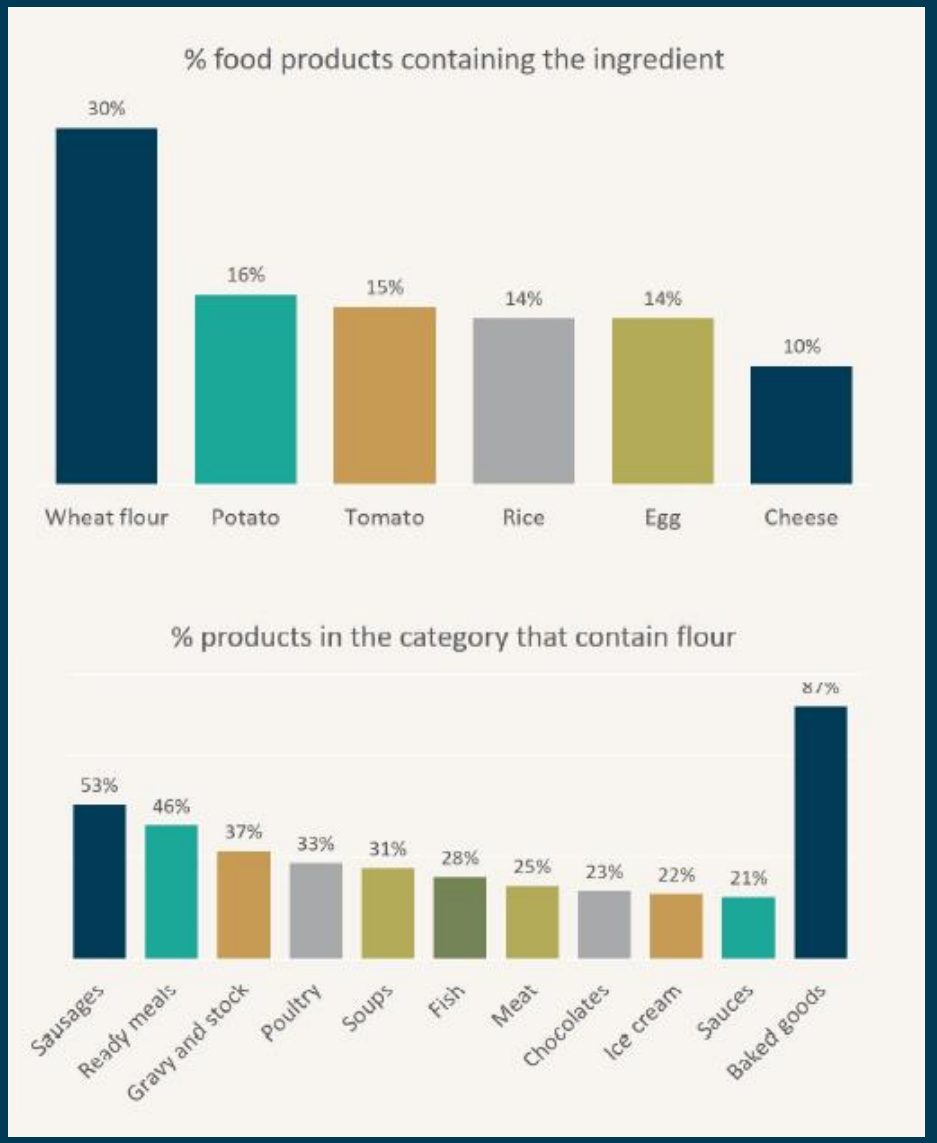
Flour milling sector at a glance

- 5 million tonnes of wheat per year to produce approximately 4 million tonnes of flour.
- Typical year, 4 million tonnes of homegrown milling wheat.
- Significant shift over past 40-50 years owing to improvements in UK breadmaking wheat protein quality.
- Now, 80-85% of wheat we use is homegrown.



A significant part of UK food security





Approx. 20% of nation's food energy are from wheat flour

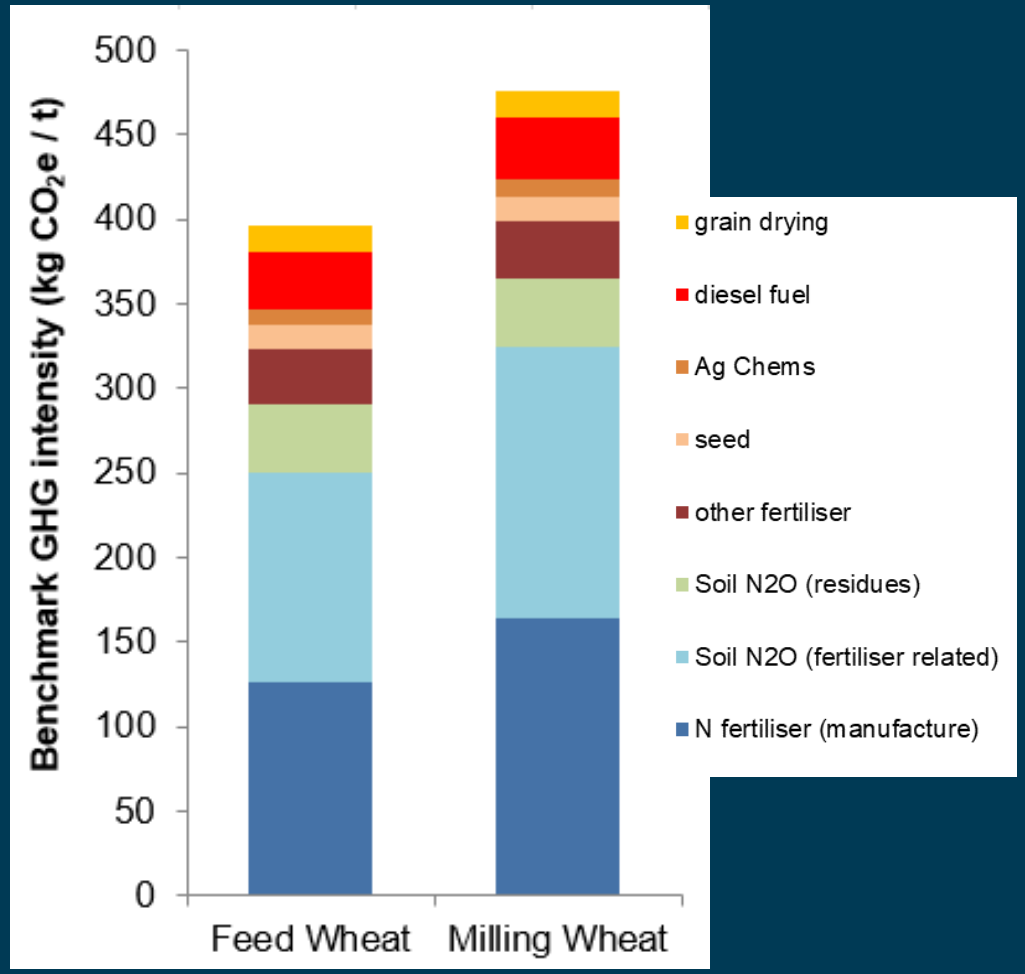
Milling wheat

- UK millers use specific varieties and grades.
- ‘Breadmaking’ wheats typically high to mid protein. Hard milling.
- ‘Biscuit’ wheats lower protein, less elastic gluten. Soft milling.
- Fundamentally, wheat research benefits millers. More resilient, more productive, more profitable for farmers.
- But there are challenges specific to milling wheat and flour.

Classification	Qualities and uses
UKFM Group 1	Bread-making varieties with consistent milling and baking performance. They will achieve a premium if they achieve specified quality requirements of 13% protein, 250s Hagberg Falling Number and 76kg/hl specific weight.
UKFM Group 2	Varieties with bread-making potential but not suited to all grists because of variability in performance or some undesirable traits.
UKFM Group 3	Soft varieties used for biscuits, cakes etc. They are lower in protein (11.0 – 11.5%), have good extraction rates and extensible but not elastic gluten.
UKFM Group 4	These are both hard and soft wheats used mainly for animal feed. Millers may use some varieties in general purpose grists.

Nitrogen fertiliser

- High protein and high yields – more N fertiliser needed.
- Environmental impacts:
  - Indirect - greenhouse gas emissions (manufacture and application).
  - Direct – run-off, leaching.
- Growing pressure from policymakers and the market.
- Wheat protein fundamental to flour quality and functionality.
- If millers could reliably meet customer demands using lower protein wheat, they would!



Improving nitrogen use efficiency

- Research found some wheat varieties had good quality at low nitrogen regime.
- Need reliability season-to-season.
- Breeding programmes should focus on:
  - Improving nitrogen use efficiency
  - Improving gluten elasticity
- Need to establish markers for these traits.

June 2020

AHDB
CEREALS & OILSEEDS

Project Report No. 621

Low protein wheat for bread making

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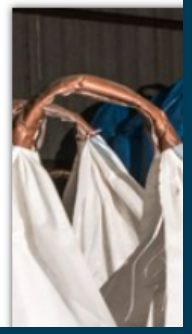
Improving nitrogen use efficiency

- Nitrogen fertiliser recommendations for wheat yield and quality remain appropriate.
- Late N sprays have positive protein quality impact.
- Improvements should be sought elsewhere…

No change to milling wheat nitrogen guidance?

Wednesday, 11 January 2023

Findings from nitrogen and sulphur trials on milling wheat are available in a new research report. The results do not suggest major changes to guidance are needed but do show the grain protein benefits associated with applying nitrogen above RB209's recommendation for yield.



Improving nitrogen use efficiency

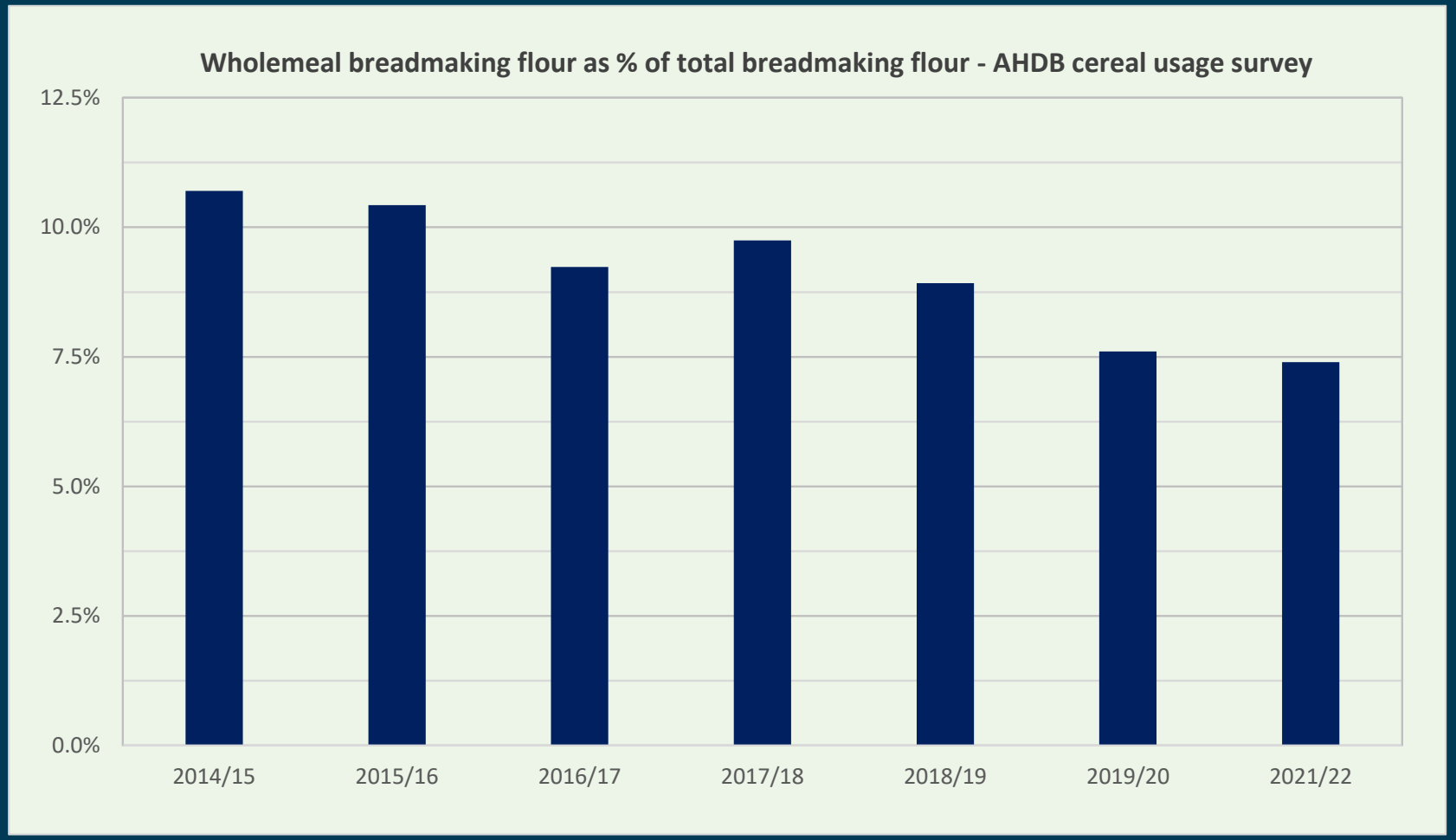
- Precision farming – more targeted N applications, reduce direct environmental impacts?
- Precision breeding – more easily integrating NUE traits into elite varieties?
- Precision breeding – more resilient wheat, more resilient protein.
- Improved N fertiliser manufacture? Lower GHG emissions?

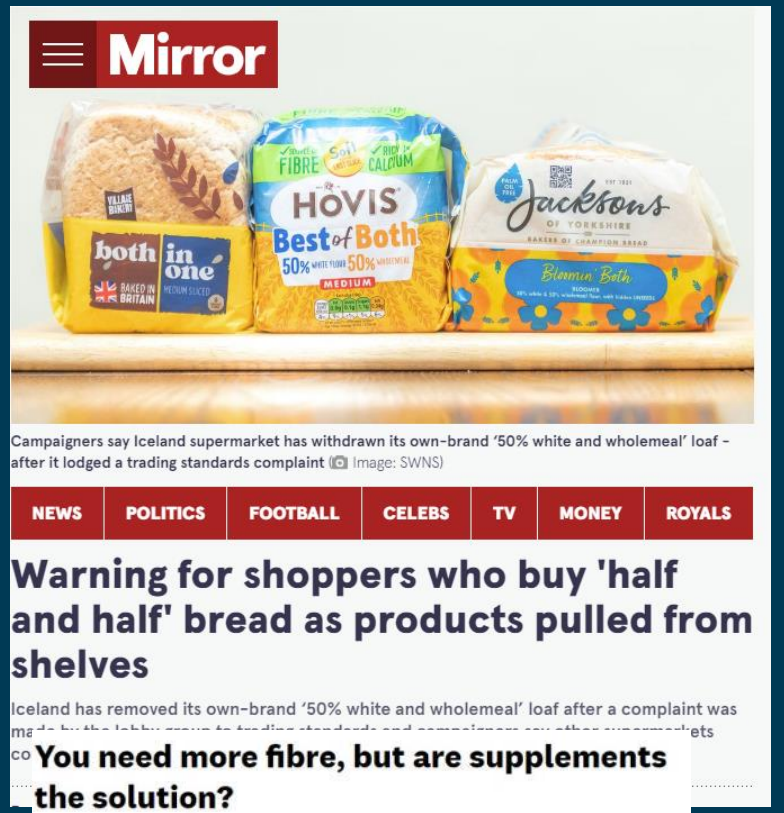
Genetic Technology (Precision Breeding) Bill

[AS AMENDED IN COMMITTEE]

CONTENTS

Nutrition


Wholemeal breadmaking flour as % of total breadmaking flour - AHDB cereal usage survey
12.5%
10.0%
7.5%
5.0%
2.5%
0.0%
2014/15
2015/16
2016/17
2017/18
2018/19
2019/20
2021/22


Mirror
both in one
HOVIS
Best of Both
50% 50%
MEDIUM
Jacksons
Bloomin' Both
Campaigners say Iceland supermarket has withdrawn its own-brand '50% white and wholemeal' loaf - after it lodged a trading standards complaint (Image: SWNS)
NEWS
POLITICS
FOOTBALL
CELEBS
TV
MONEY
ROYALS
Warning for shoppers who buy 'half and half' bread as products pulled from shelves
Iceland has removed its own-brand '50% white and wholemeal' loaf after a complaint was


You need more fibre, but are supplements the solution?
Most of us don't get enough fibre, but supplements aren't usually your best bet. We reveal the high-fibre foods that will help you reach your daily needs, and what to know about high-fibre snack bars
14 Jan 2023

Biofortification - fibre

- Significant project by Lovegrove et al.
- Breeding high-fibre wheat lines.
- Not trying to change consumer habits.
- Careful not to impact agronomy, yields or wheat quality.

The lifesaving food 90% aren't eating enough of

11 January 2019 · Comments

Scientists find secret to healthier white bread

6 February 2020

Dr Alison Lovegrove said the high-fibre white loaf tastes the same as normal white bread

Healthier white bread could be available on supermarket shelves within five years after scientists discovered how to double its fibre content.

Biofortification - iron

- Cereal products can be significant source of iron, a crucial micronutrient.
- Iron biofortification of endosperm could help address poor iron intakes.
- Bioavailability an important consideration.

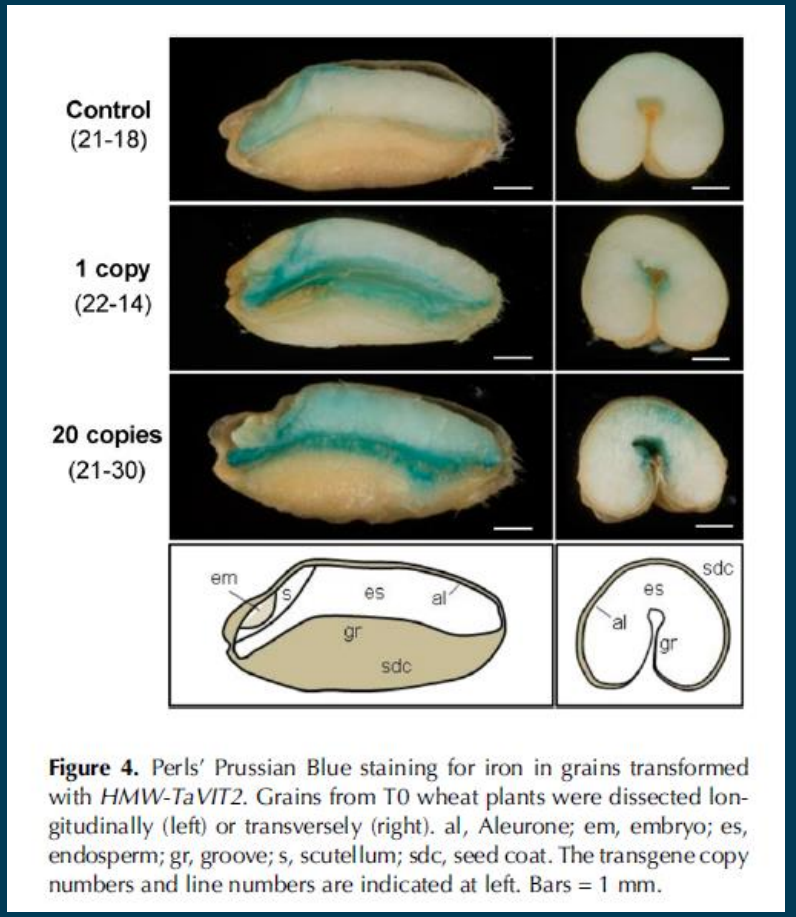


Figure 4. Perls' Prussian Blue staining for iron in grains transformed with *HMW-TaVIT2*. Grains from T0 wheat plants were dissected longitudinally (left) or transversely (right). al, Aleurone; em, embryo; es, endosperm; gr, groove; s, scutellum; sdc, seed coat. The transgene copy numbers and line numbers are indicated at left. Bars = 1 mm.

Low asparagine wheat

- Precision breeding to reduce acrylamide forming potential.
- Reduce risk of cancer from some foods?
- Demonstrate consumer value of gene editing.


News > UK > Home News

Scientists closer to making bread with 'low cancer-causing risk' when toasted

The British researchers' wheat gene-editing experiment will be the first of its kind in Europe

Lamiat Sabin • Thursday 02 September 2021 01:02 • Comments

Wheat research crucial role in tackling milling and baking industry challenges

- Sustainability and nutrition improvements without compromising on quality – is it possible?
- Trait identification – NUE, gluten quality, high fibre.
- Trait integration – can precision breeding deliver for environment and consumers?
- The UK milling industry has to play a role – please reach out and involve us!
- Grain processing workshop – 19 April 2023.

Thank you

Any questions?

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Business card