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agricultural industries confederation

Agribusiness 2017

Driving today's agricultural revolution

A step change in plant breeding to achieve UK competitive advantage

Dr Cristobal Uauy
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A step change in plant breeding to achieve a UK competitive advantage?

John Innes Centre

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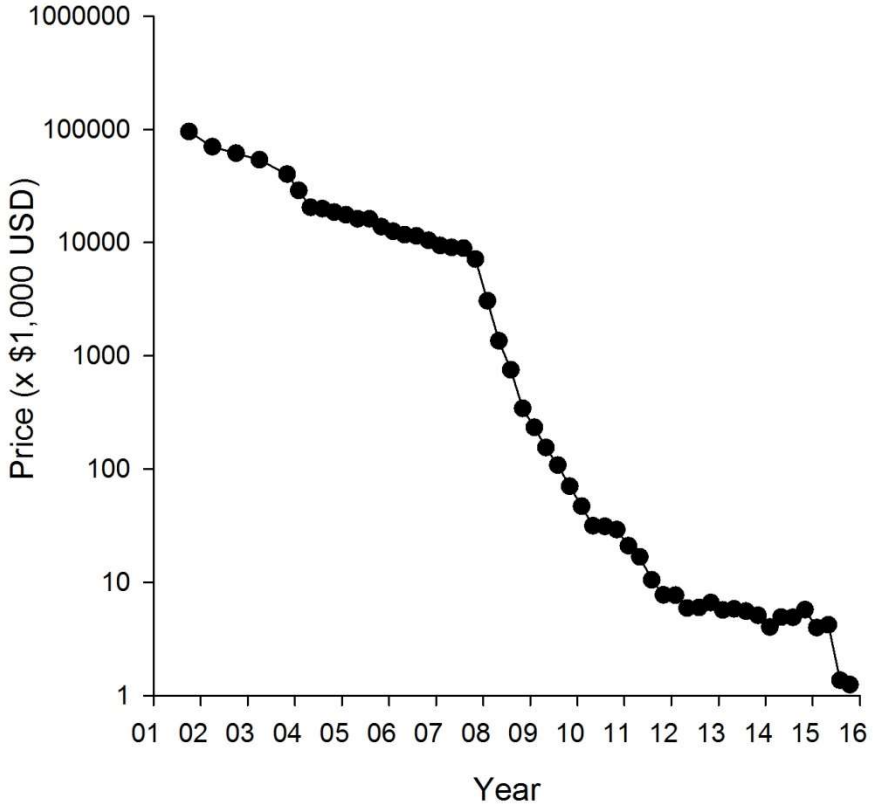
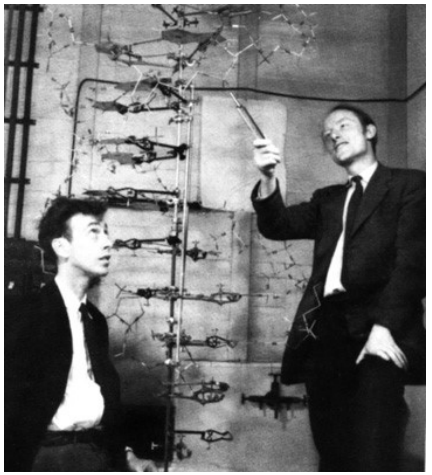
@CristobalUauy

Main messages

- We are in the middle of a DNA revolution
- Wheat has huge hidden potential…
- Is it sustainable to continue to ignore transgenics?
- New plant breeding techniques (CRISP-Cas9) will redefine, accelerate, and enhance traditional breeding.

We are in the middle of the DNA revolution





US National Institute of Health

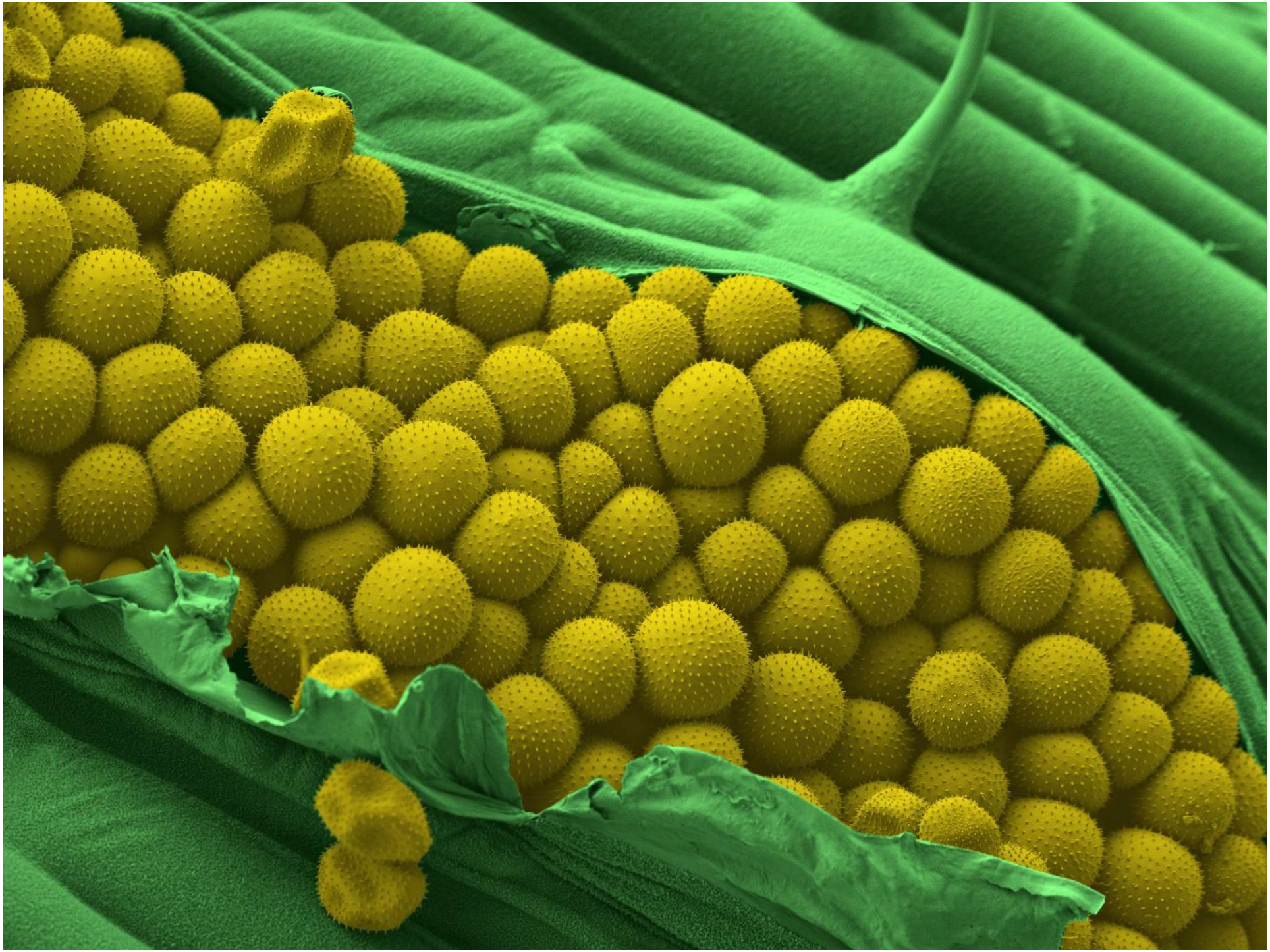
Everyone can now access their genome

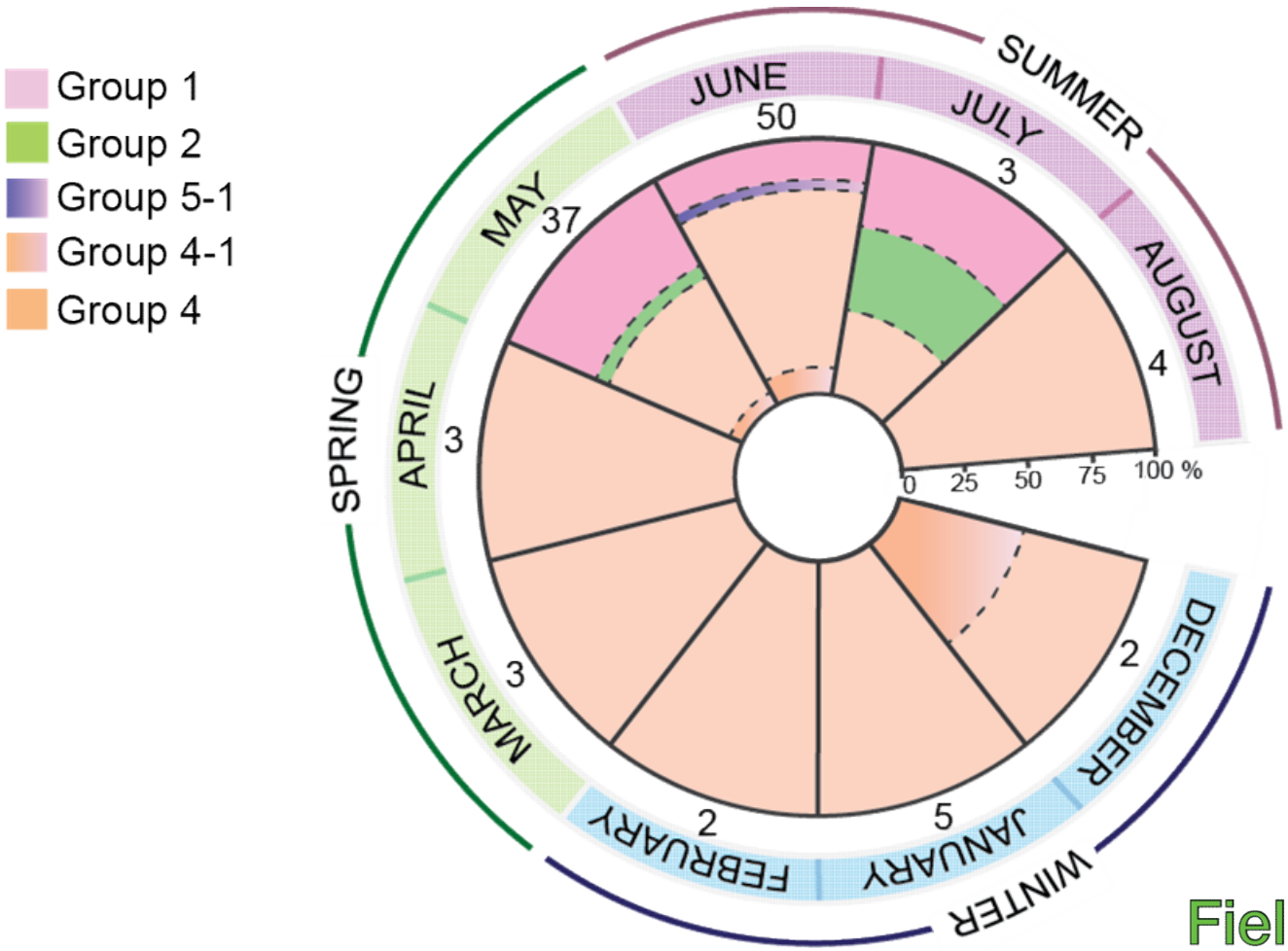
23andMe

Some people lack a gene (GSTM1) which appears to prevent them retaining the sulforaphane inside their body - it's excreted. Broccoli with higher levels of glucoraphanin may be more important for this group.

Crop genomes in past 5 years


4,000,000





Diane Saunders

Field Pathogenomics

Genomics-based pathogen surveillance

BBSRC bioscience for the future

UKCPVS

NIAB

John Innes Centre

Earlham Institute

AHDB CEREALS & OILSEEDS

KWS

BASF The Chemical Company

Agrii

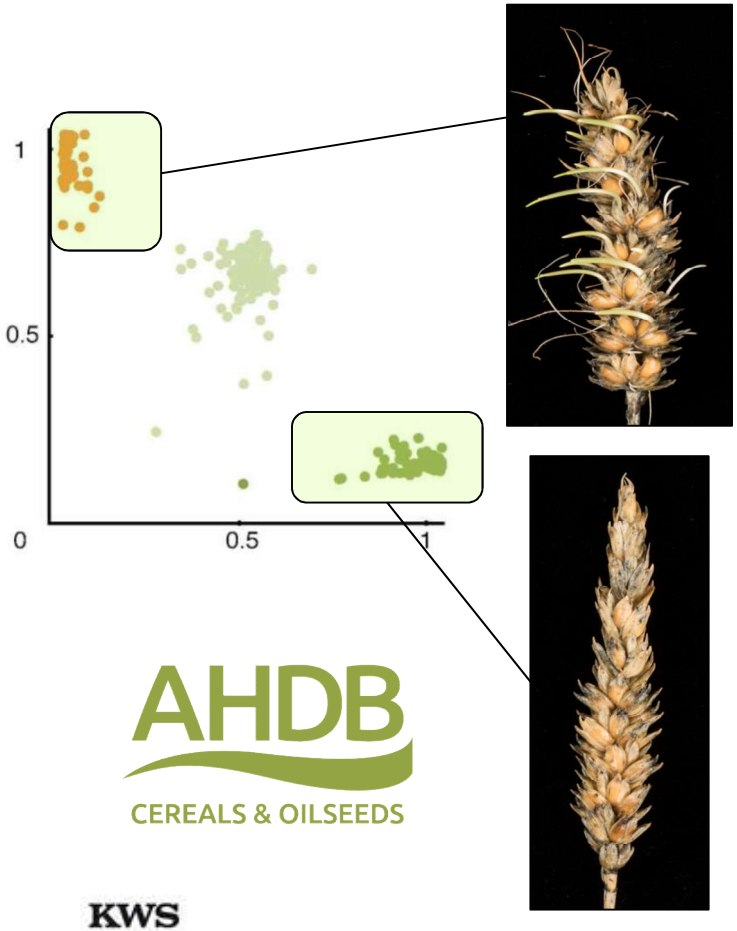
syngenta

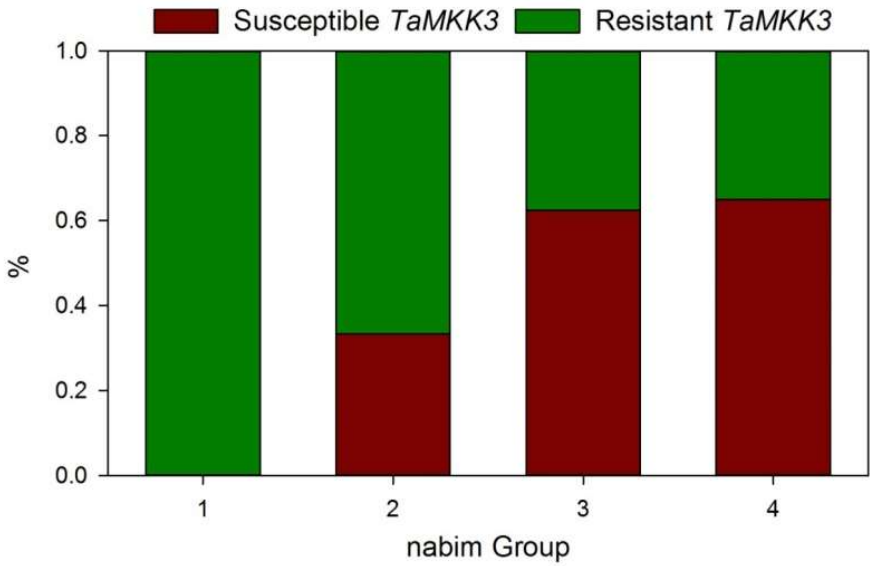
Limagrain United Kingdom

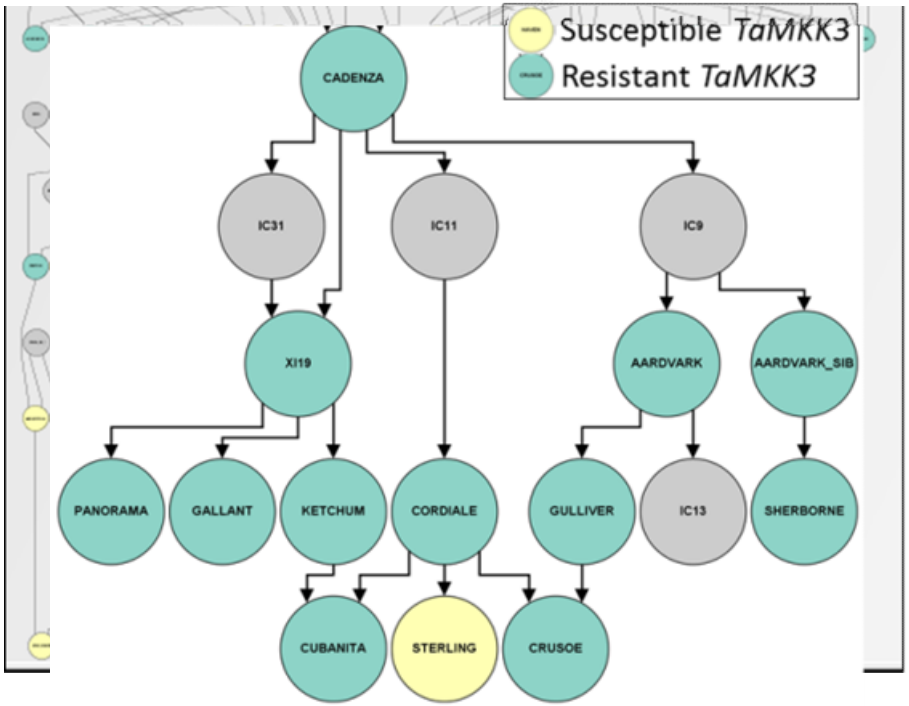
RAGT SEEDS


Susceptible
Resistant

Improving Pre-harvest sprouting in UK wheat







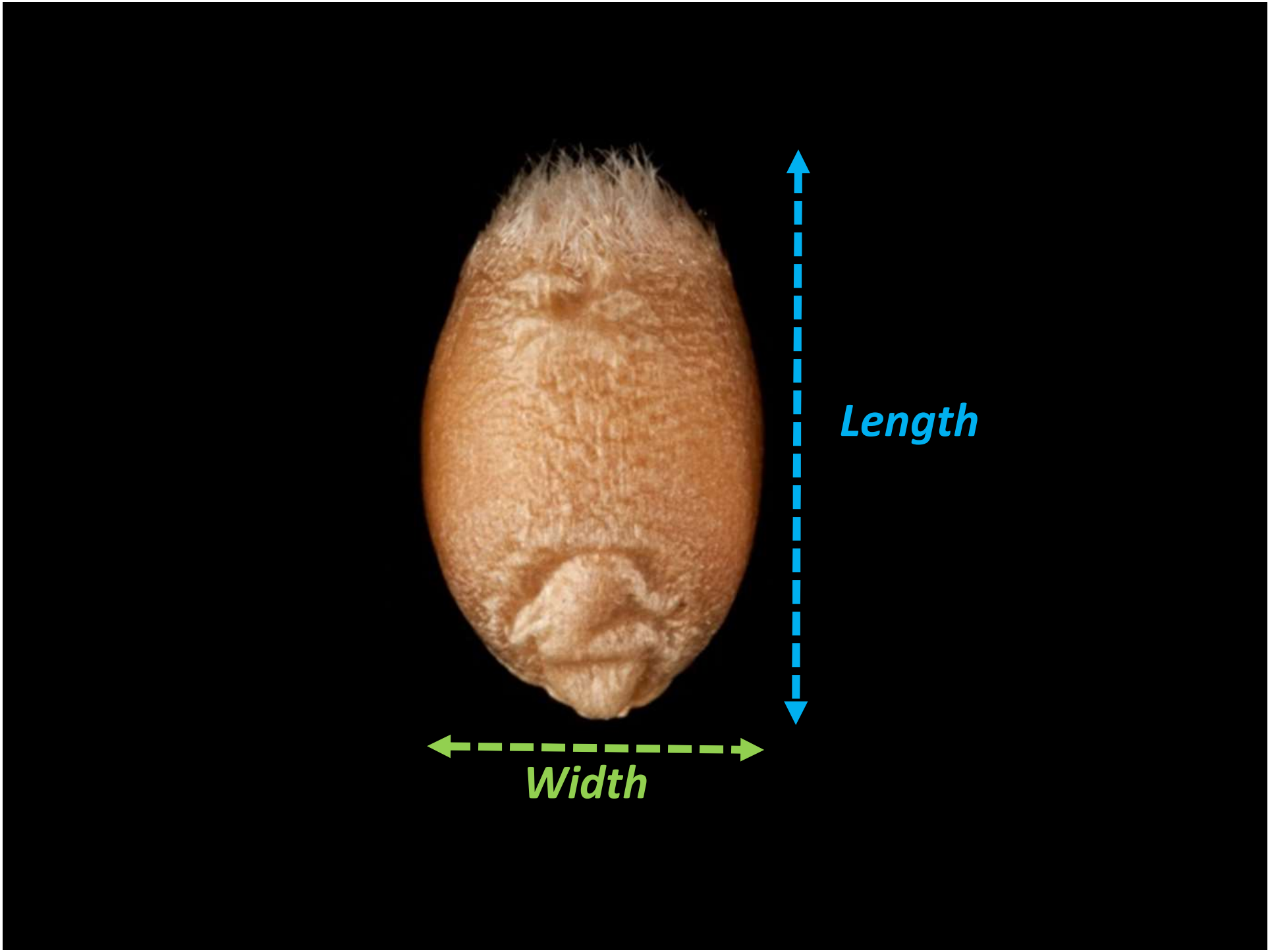
AHDB
CEREALS & OILSEEDS

KWS

RAGT SEEDS

Limagrain United Kingdom

Lantmännen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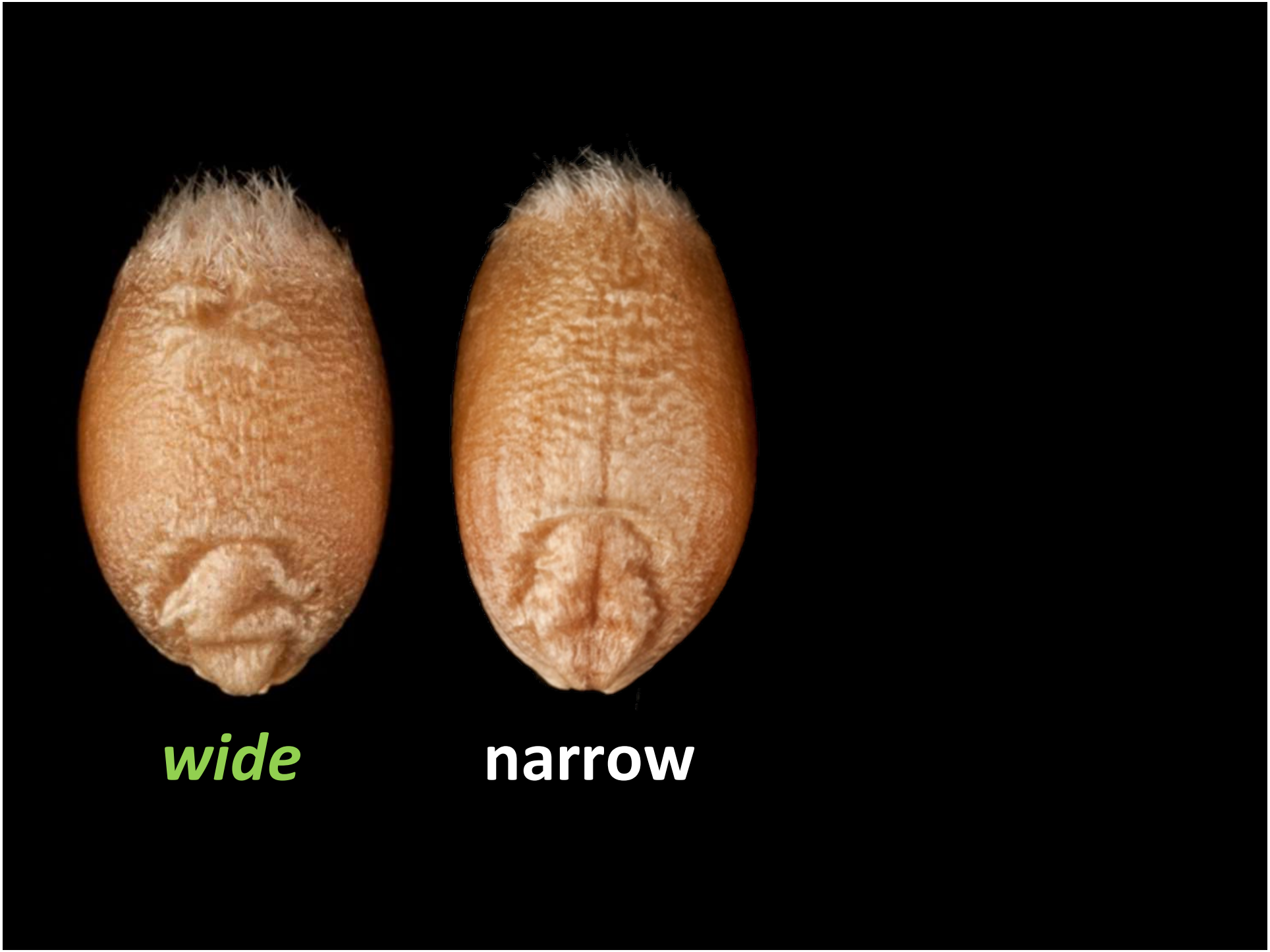
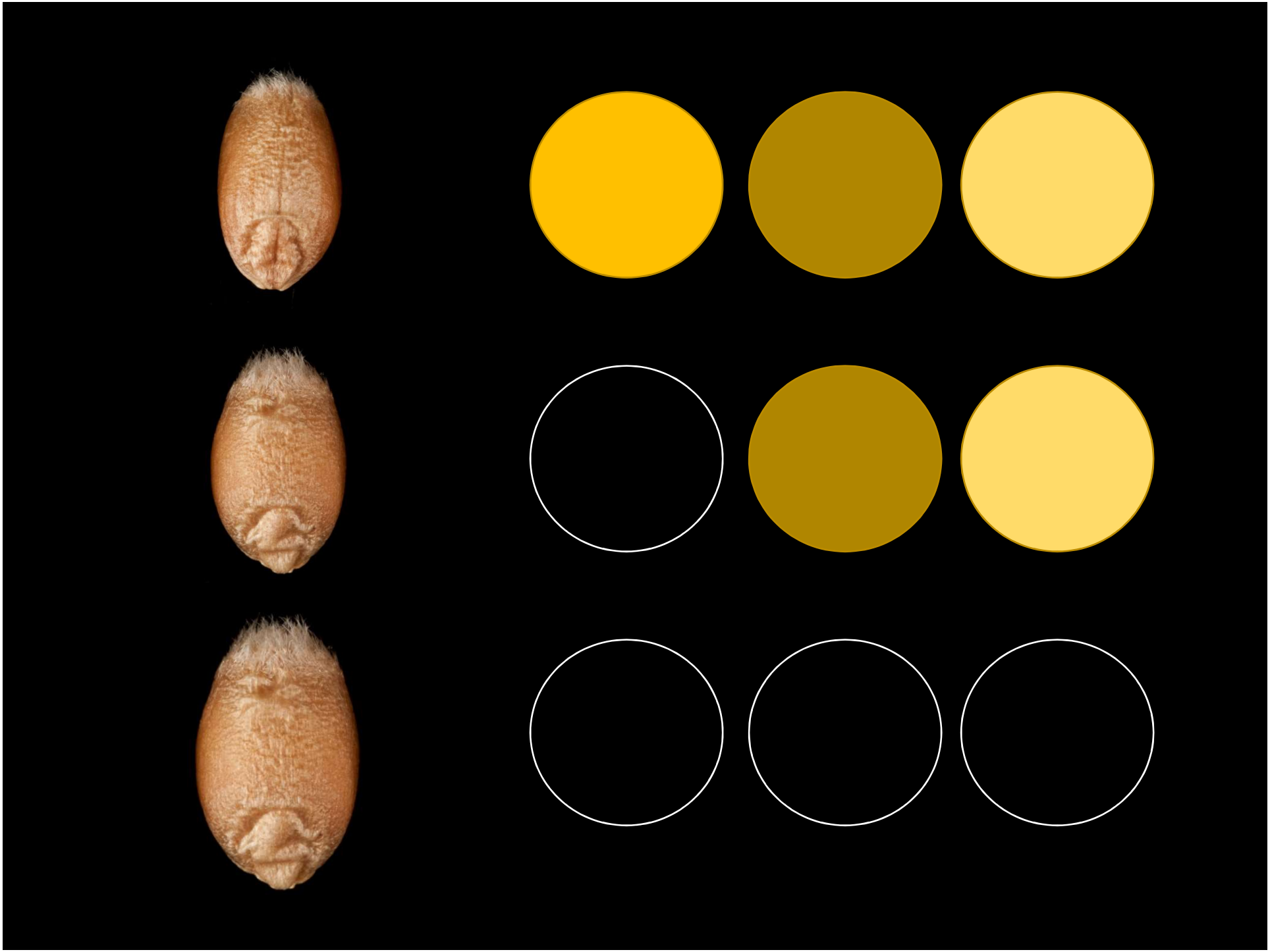

wide
narrow


wide
narrow
wide in green


narrow
wide



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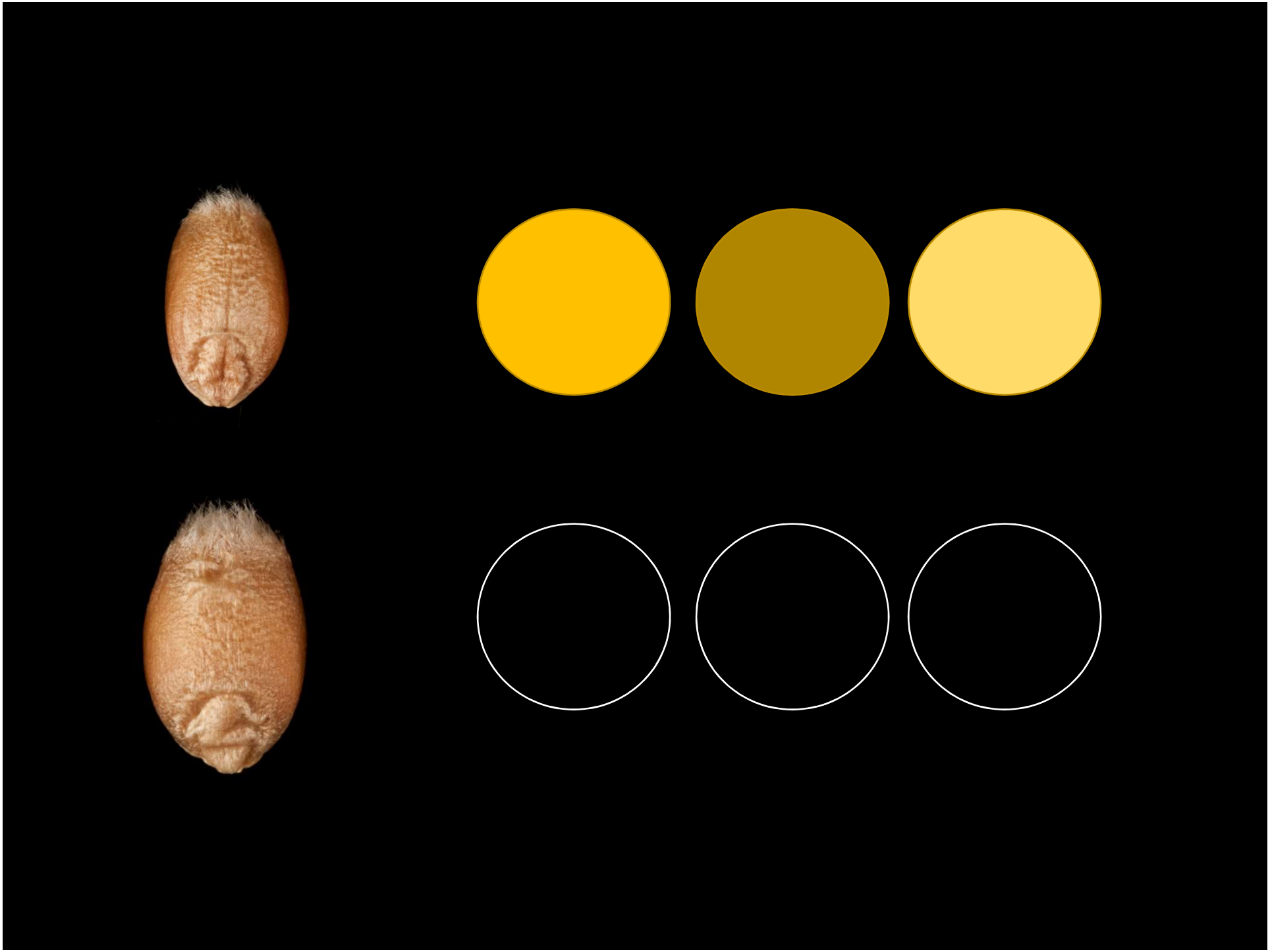


Is it sustainable to continue to ignore transgenics?

Dr. Cathie Martin, JIC

Extended postharvest of purple tomato

Normal tomato

Purple tomato

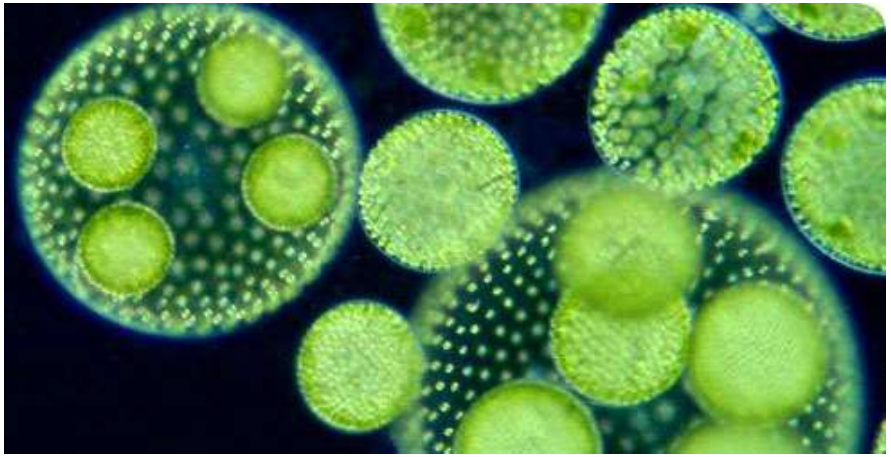
Dr. Cathie Martin, JIC

Sustainable potato late blight resistance from wild potato

Prof. Jonathan Jones (TSL)

Urgent need for sustainable source of fish oils

Prof. Johnathan Napier (RRes)



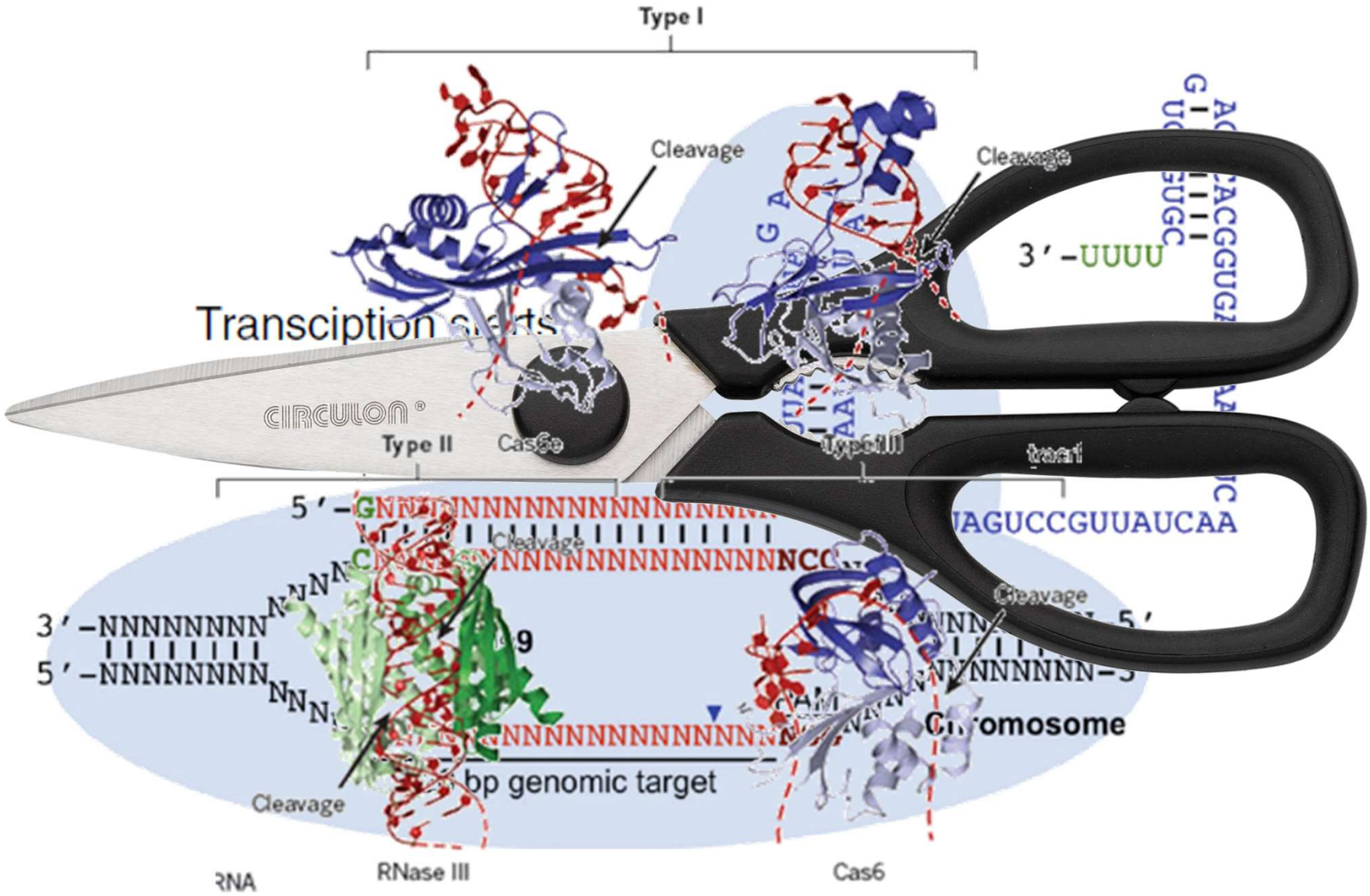
Is it sustainable to continue to ignore transgenics?

New plant breeding techniques (CRISPR-Cas9) will redefine, accelerate, and enhance traditional breeding.

- Traditional transgenics include baggage can insert anywhere in the genome

- NPBT: can be used to modify plant genomes without introducing any foreign DNA into the final product.
- CRISPR/Cas9: Precise modifications into a plant genome, which are indistinguishable from those introduced by conventional breeding

New plant breeding techniques (CRISPR-Cas9) will redefine, accelerate, and enhance traditional breeding.



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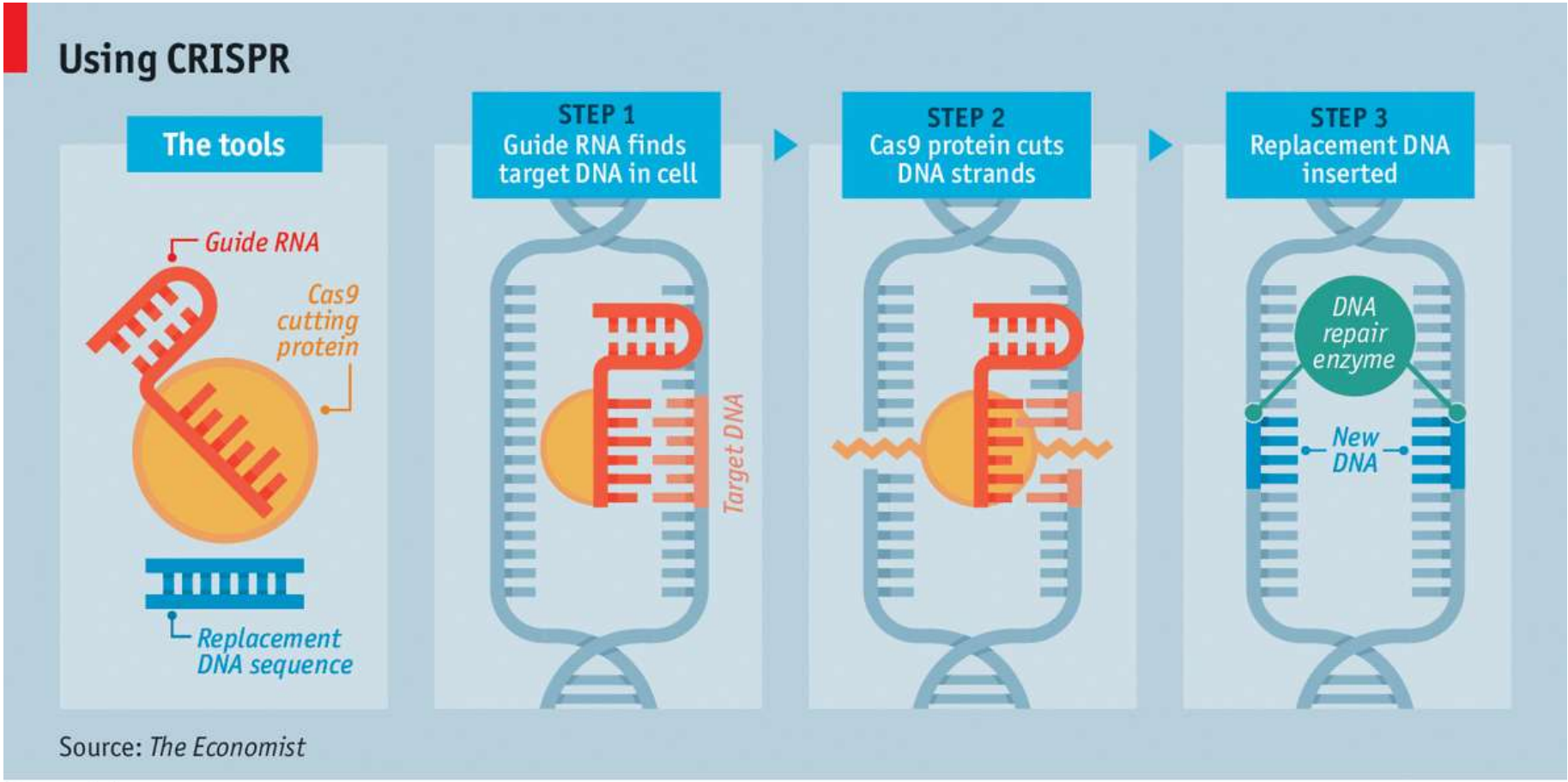

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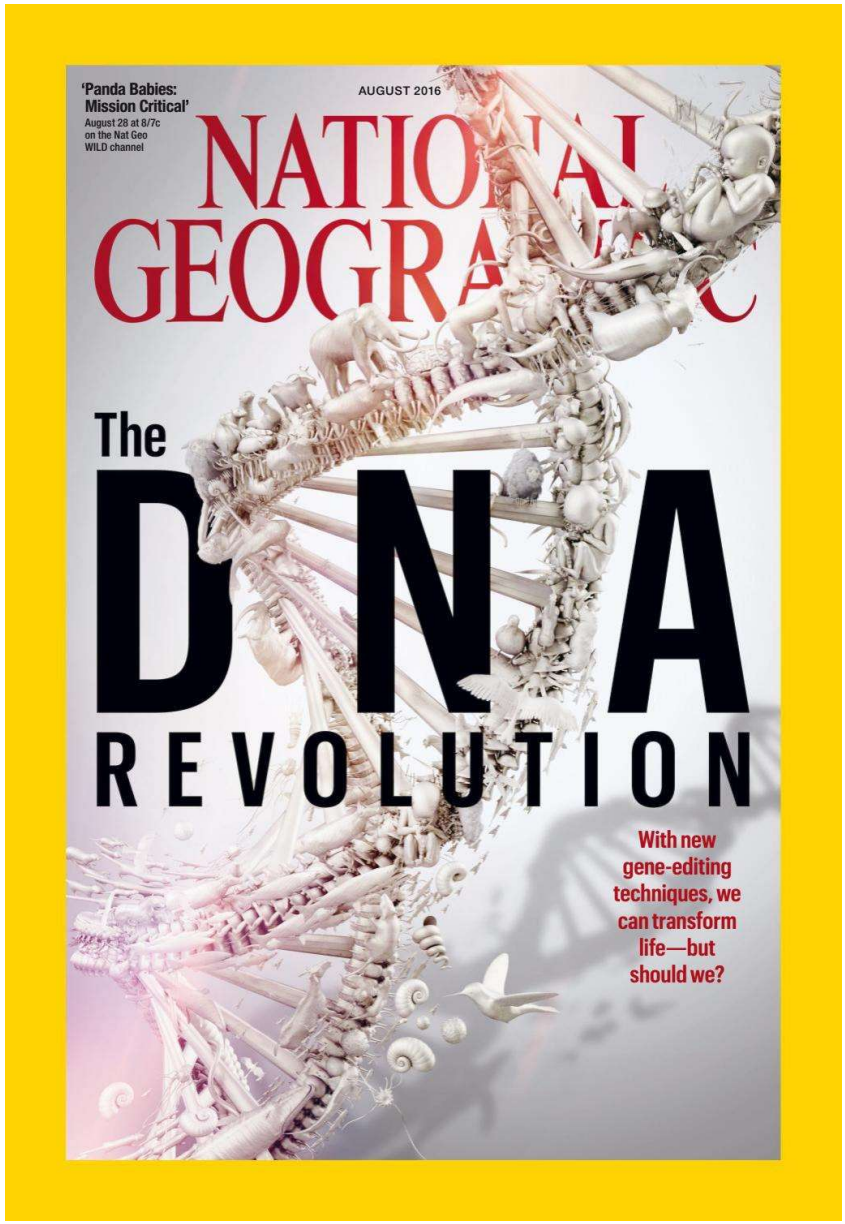

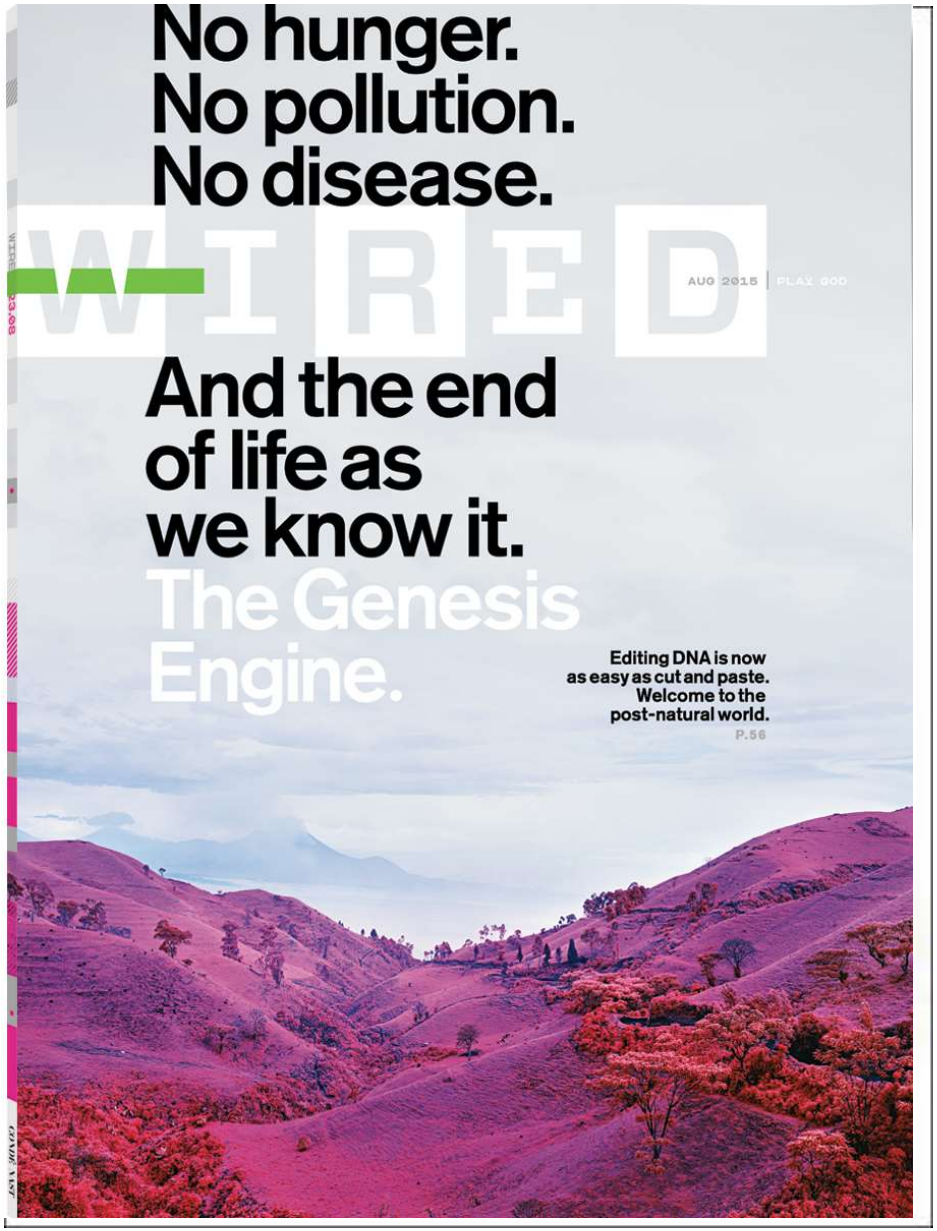

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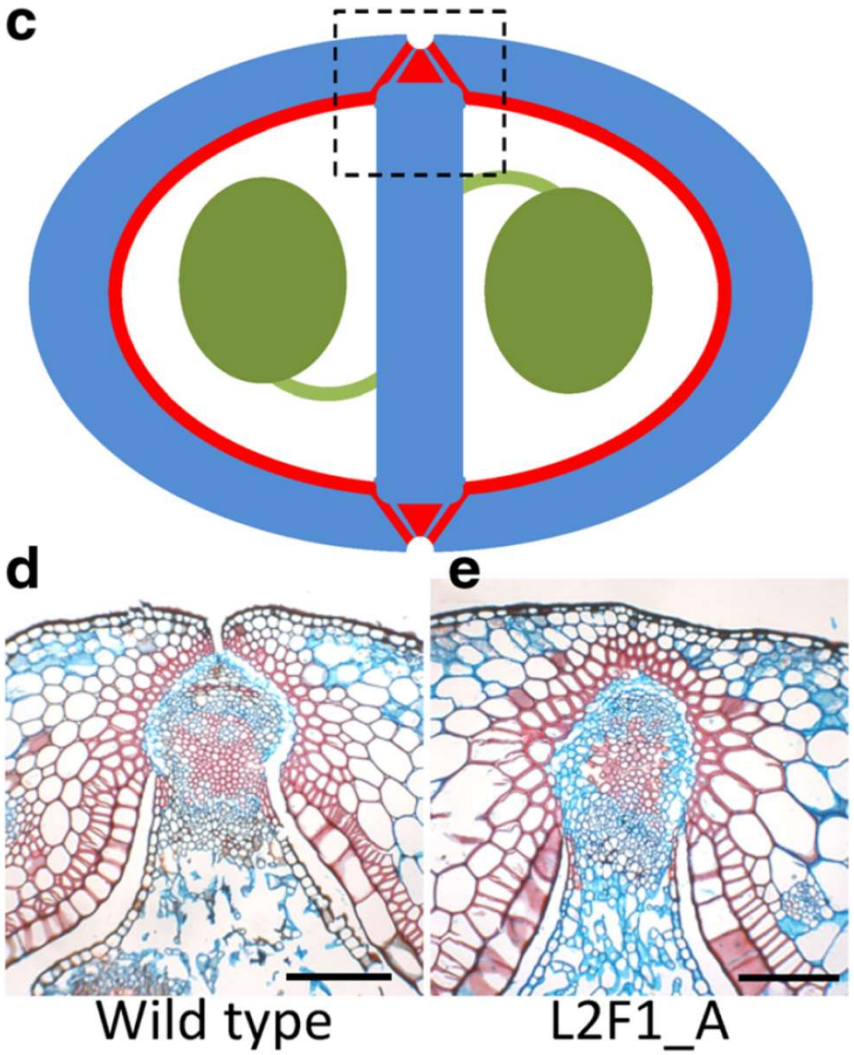

Prof. Lars Ostergaard (JIC)

…some final thoughts…

- We are in the middle of a DNA revolution.
- Wheat has huge hidden potential.
- Is it sustainable to continue to ignore transgenics?
- New plant breeding techniques (CRISPR-Cas9) will redefine, accelerate, and enhance traditional breeding.

- We need industry to deliver this potential to the public!
- Maintain the 'sense of urgency' in time: >10-15 years from lab to impact
- Basic science is not the enemy of applied science. They are one and the same!
- Not just genetic, but also human diversity!

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