

# 20:20 Wheat®

Malcolm J. Hawkesford

# 20:20 Wheat®



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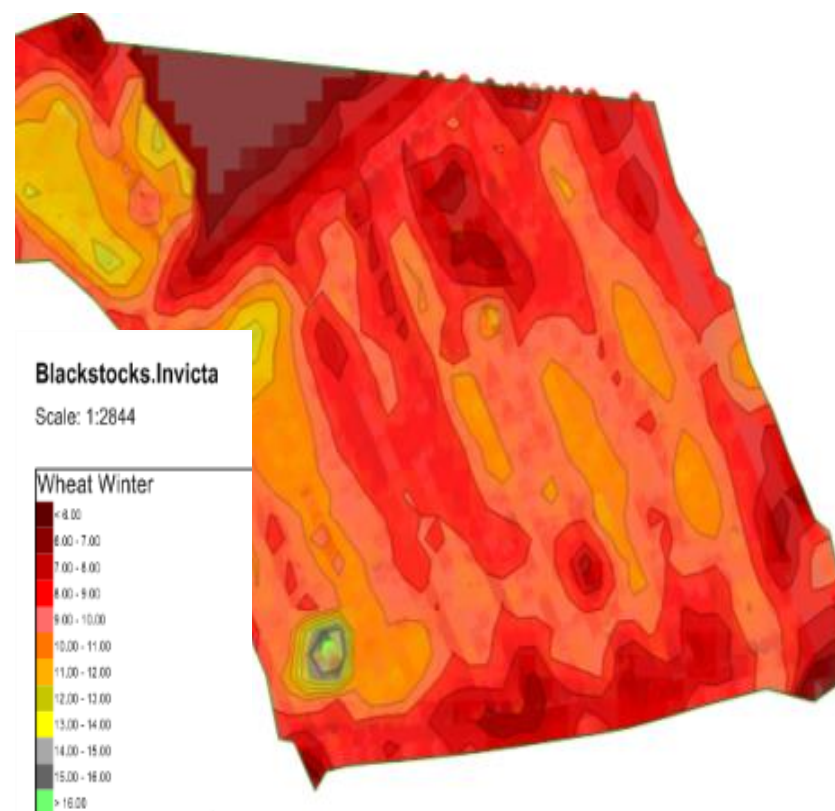
**20:20 Wheat®** aims to provide the knowledge base and tools to increase potential wheat yields (in the UK) to **20 t.ha<sup>-1</sup>** within the next **20 years**

# Wheat yields: the current situation



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- UK, 20 years ago – 7 t/ha
- UK, Now: 8 t/ha
- Rothamsted WGIN trials 13.6 t/ha
  - (Napier, 2008)
- UK record (?) 14.3 t/ha
  - (Kielder, Tim Lamyman, Worlabby Farms, 2013)
- World record 15.6 t/ha
  - The highest wheat yield (Einstein) is 15.636 tonnes/ha and was harvested from 8.869 ha (21.9 acres) by Mike Solari (New Zealand) on his farm in Otama, Gore, New Zealand, on 8<sup>th</sup> March 2010
- Yield mapping

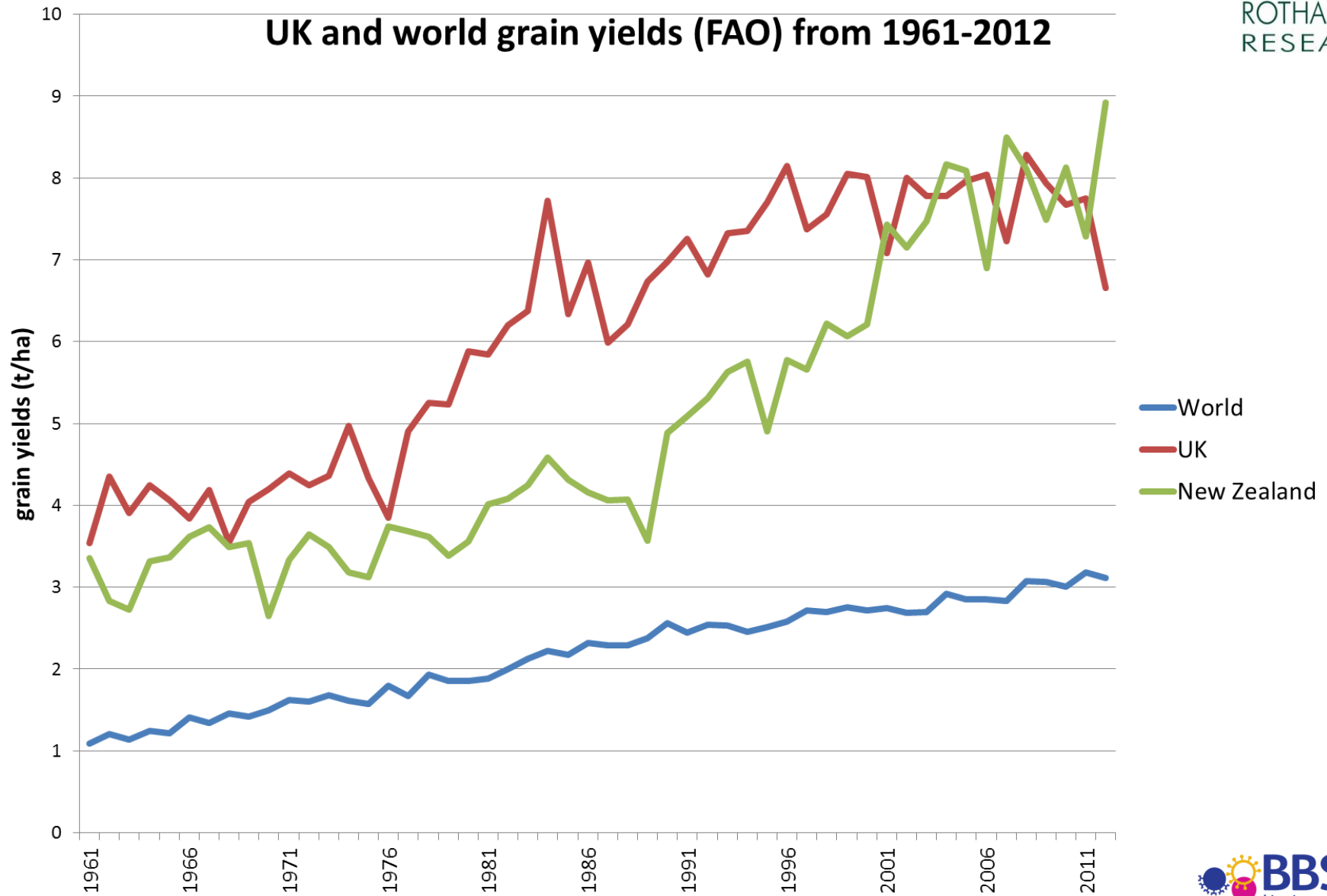


Courtesy, Graham Birch (RR Board and Dorset farm)

# Trends in wheat yields



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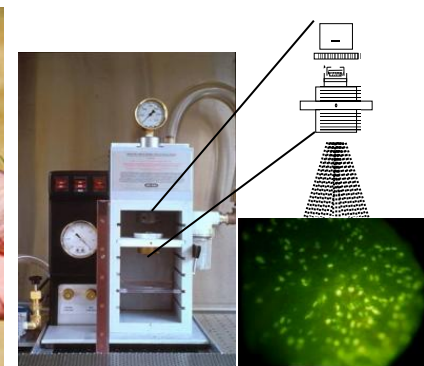


# What's in/not in 20:20 Wheat®?

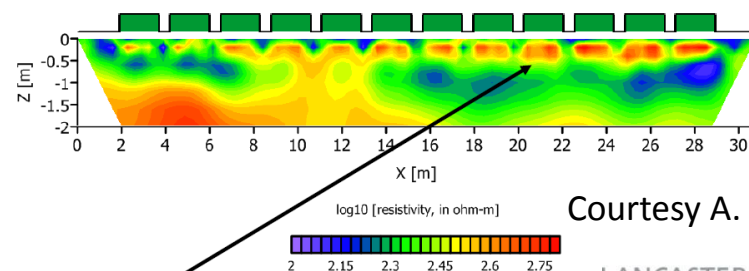


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- Modelling
- Soil root interface
- Germplasm mining
- Biotechnology
- Pathology
- Agronomy



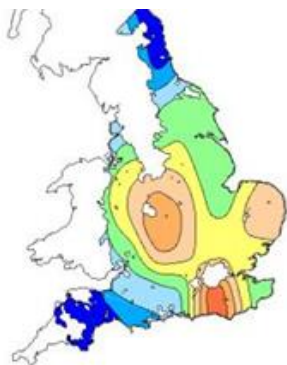
**Non-irrigated**  
Absolute inversion 13-May-11



Courtesy A. Binley



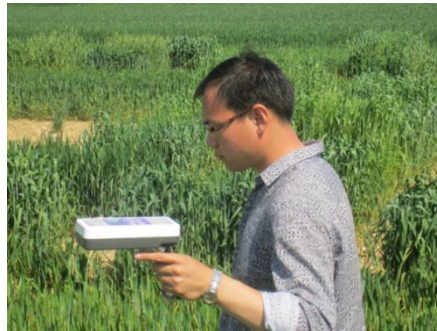
Appears to show significantly reduced water content down to 0.5m, especially in the plots towards the end of the line.



# Intensive phenotyping



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# Germplasm (variety) screening



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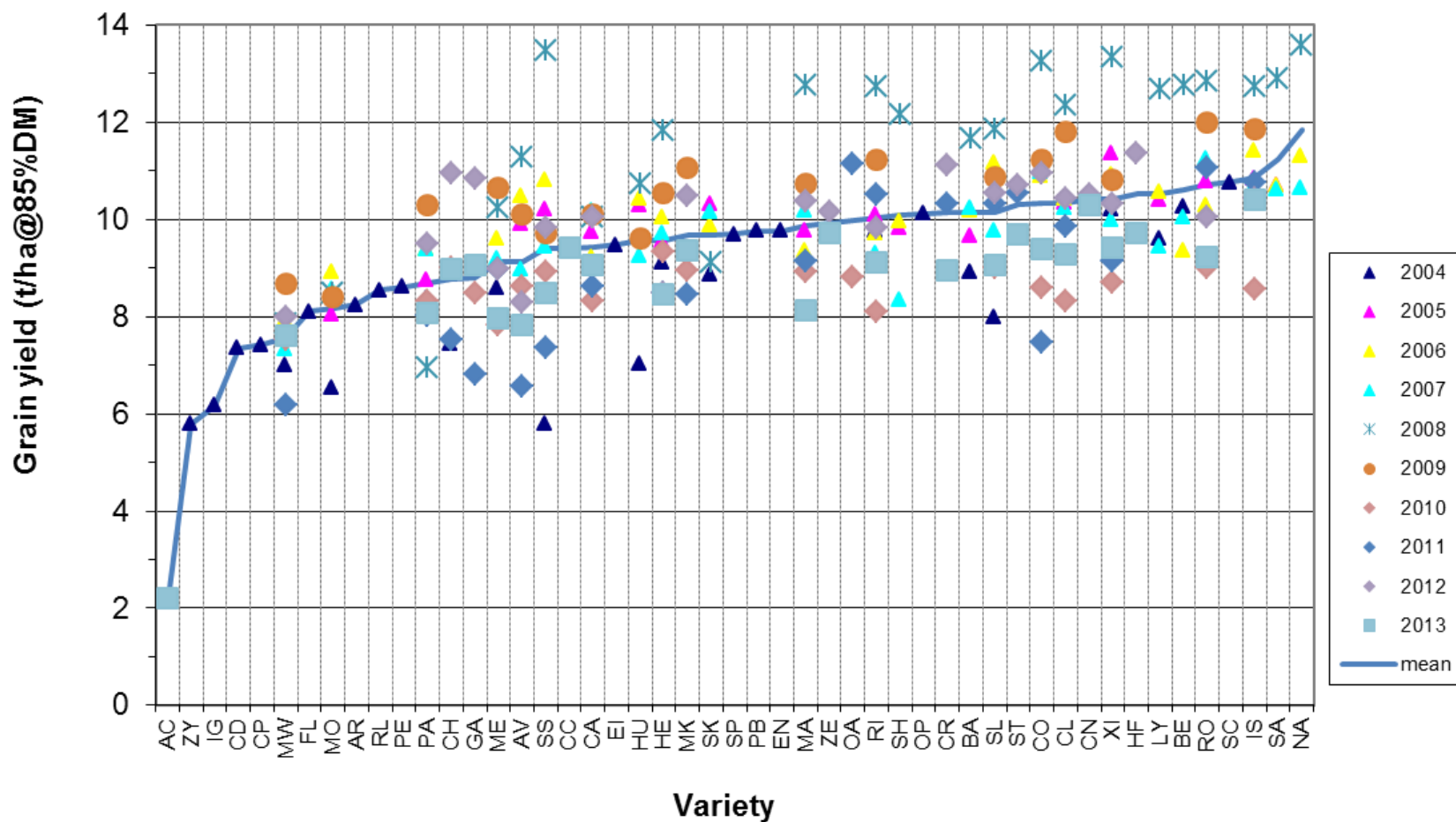
# Rothamsted WGIN Trials



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Rothamsted WGIN-N200

Combine Grain Yield (2004-13)



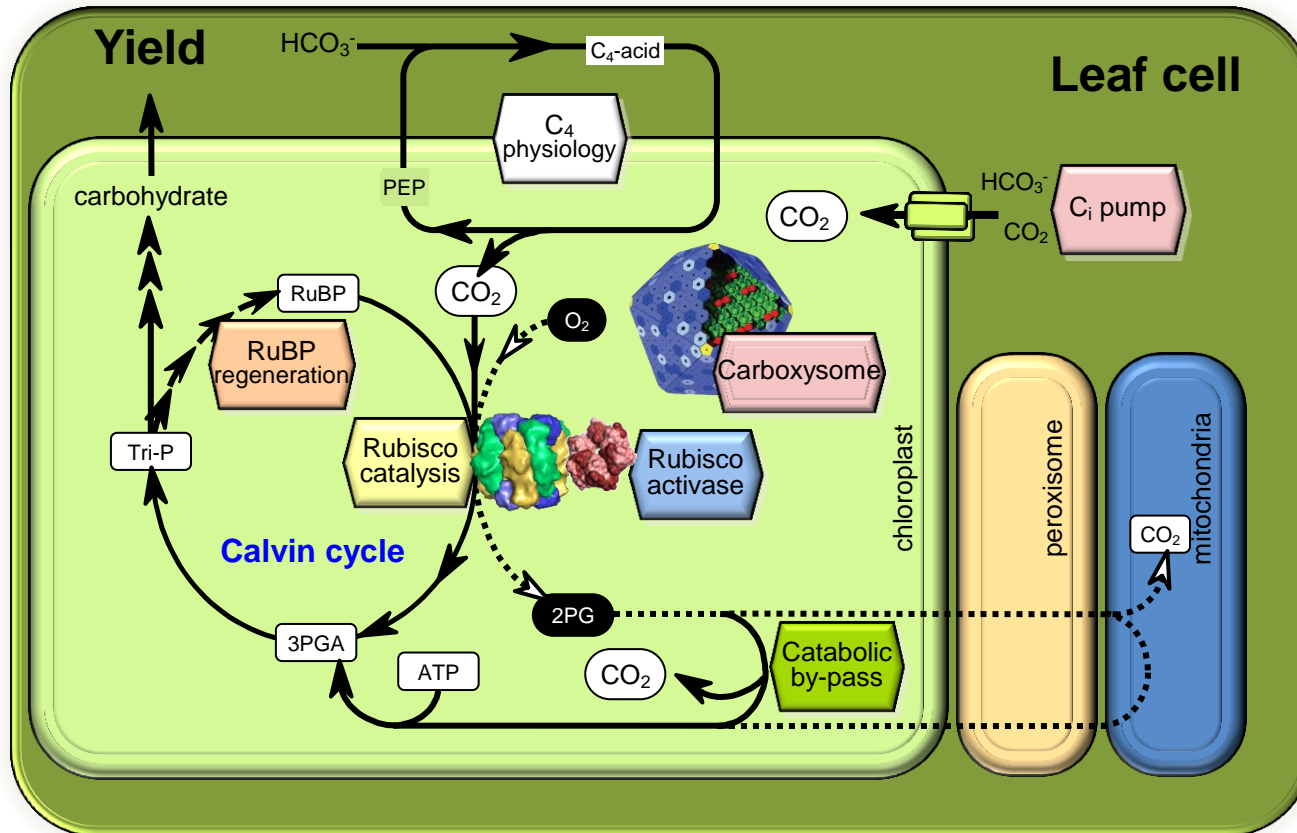


# Biotechnology: improving C capture



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## Strategies



Rubisco  
catalysis

C<sub>4</sub>  
physiology

CCM

Catabolic  
by-pass

Rubisco  
activase

RuBP  
regeneration

# Where do we want to be?



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Rowland Biffen (1874–1949)