

The Future of Wheat and Bread?

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- Founded 1919 – “Better Seeds, Better Crops”
- First 80 years: Variety Testing (NL/RL), Seed Certification, Seed Testing
- Privatisation (1996) → diversification away from statutory work, not-for-profit status
- Large investment into genetics & breeding research from 2005 onwards
 - Primarily wheat (and relatives) but also barley, oats, rice, oilseeds, pulses



Pre-breeding

- Crop 'pre-breeding' is one of the first stages in moving new genetic discoveries into elite commercial varieties
- Pre-breeding does not deliver new varieties to growers, but the parents and grandparents of future varieties
- Commercial breeders can integrate our most promising material into their programmes



Possible sources of diversity

GM / genome editing



Land races etc



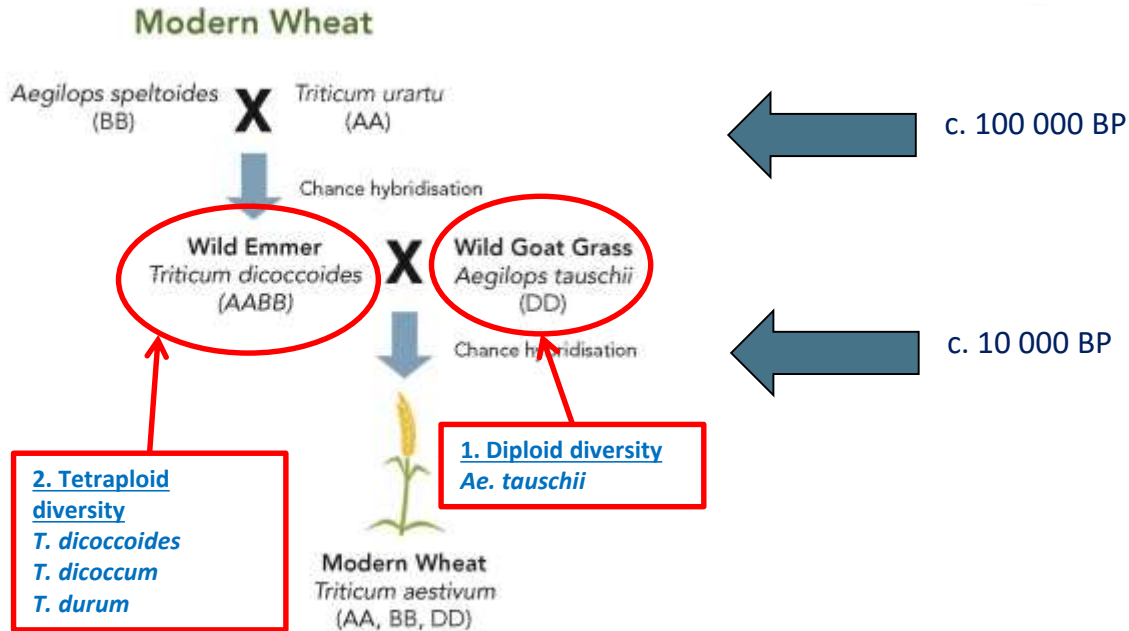
Resynthesis

Mutants



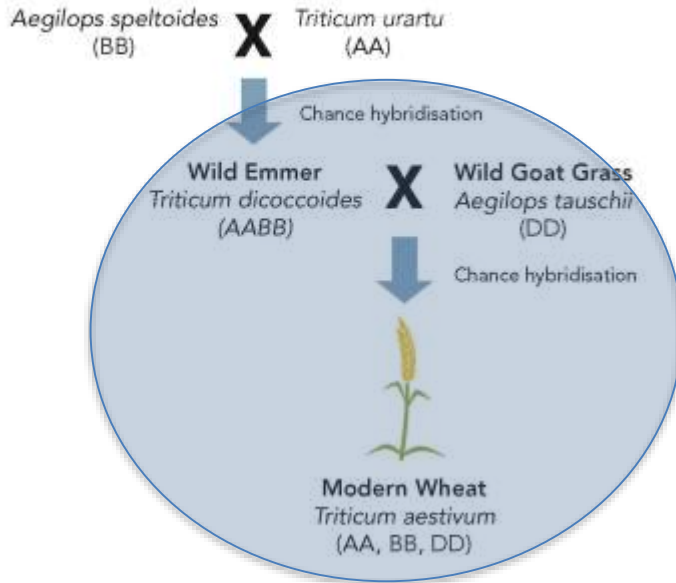
Related species

The origins of modern wheat

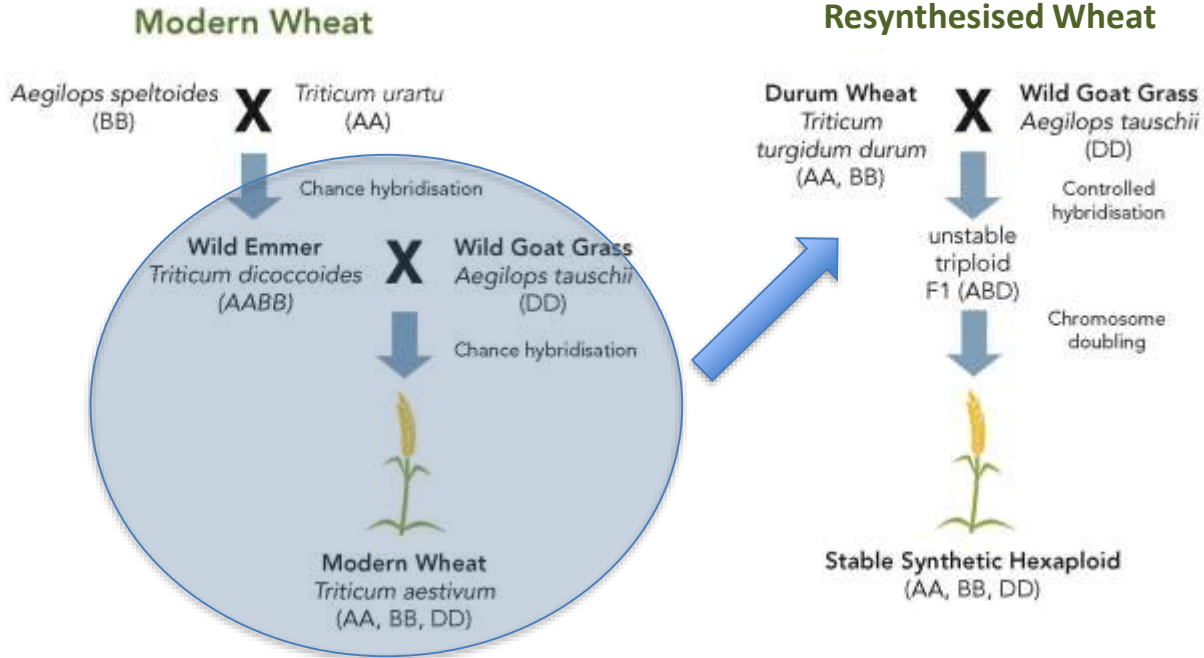


Re-wilding wheat

Modern Wheat



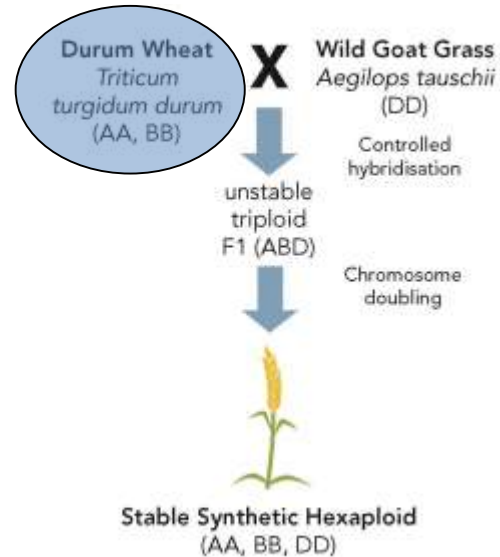
Re-wilding wheat



Re-wilding wheat



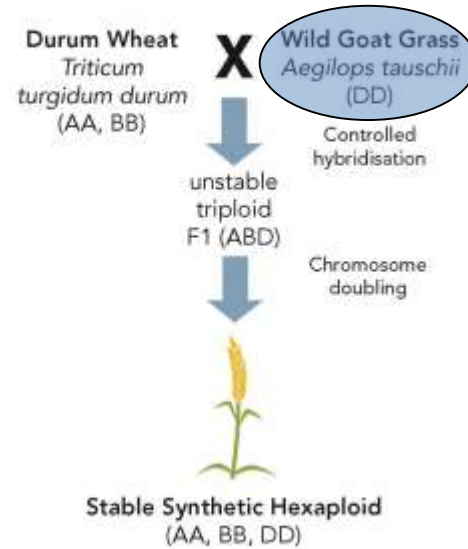
Resynthesised Wheat



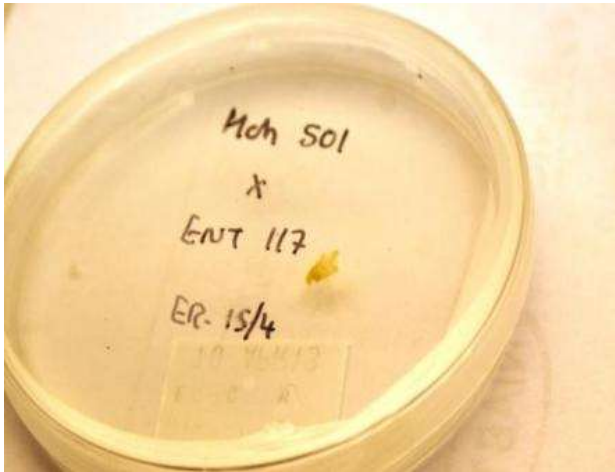
Re-wilding wheat



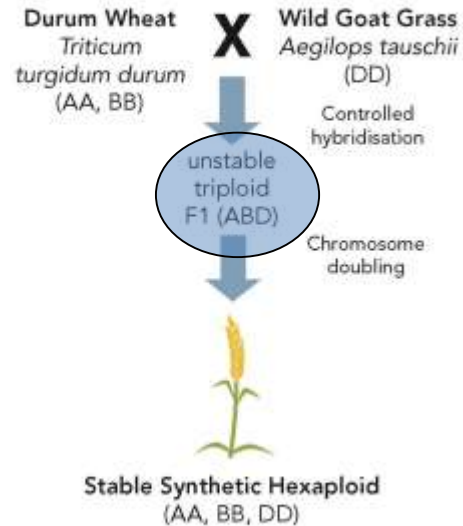
Resynthesised Wheat



Re-wilding wheat



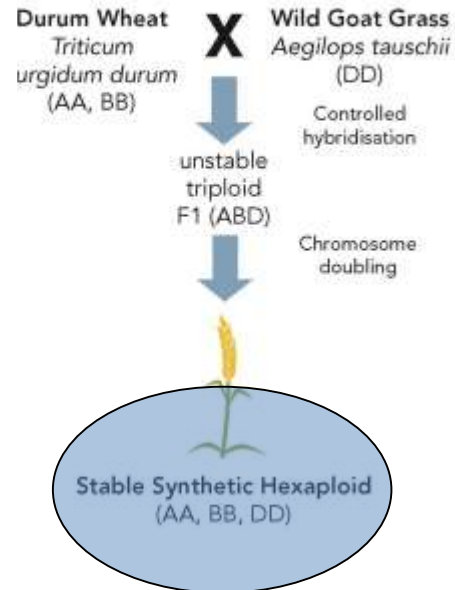
Resynthesised Wheat



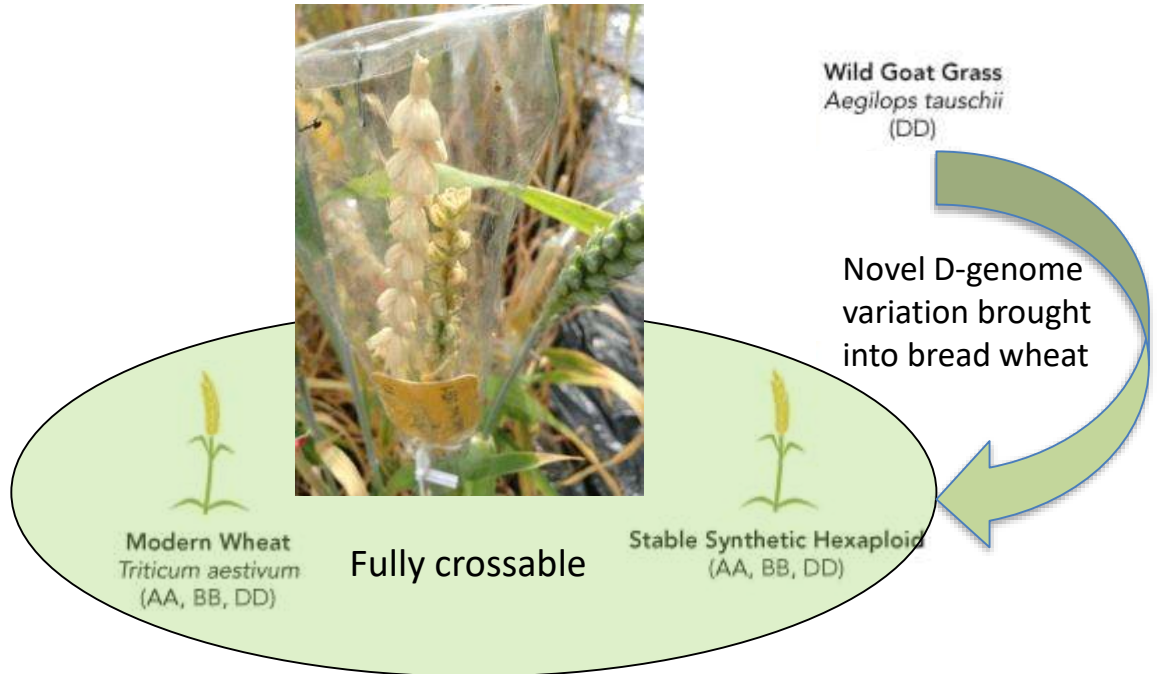
Re-wilding wheat



Resynthesised Wheat



Re-wilding wheat



Re-wilding wheat

- We are also exploring variation through crosses with other wheat relatives: durum, rivet, Khorasan, wild emmer, cultivated emmer



Why bother?



- To increase the genetic diversity of the UK wheat genepool
 - new sources of pest/disease resistance
 - new sources of stress tolerance
 - new ways of managing height / flowering time etc
 - improve flavour / nutritional profile
 - increase resource-use efficiency
 - preparation for challenges yet to be identified
 - unexpectedly, new sources of yield improvement

A chance for a new, local approach?

- We have developed novel diversity, most of it is untested
- Commercial breeders are already screening the best, but targeting their usual traits - largely agronomic
- Why not screen for flavour and nutritional traits here before the usual yield/performance bottlenecks have constrained the diversity?
- Participatory selection with local growers and bakers?
- Currently considering how best to do this – ideas welcome!

