

WRKY this way: a new approach to tackling biotic and abiotic stresses in crops

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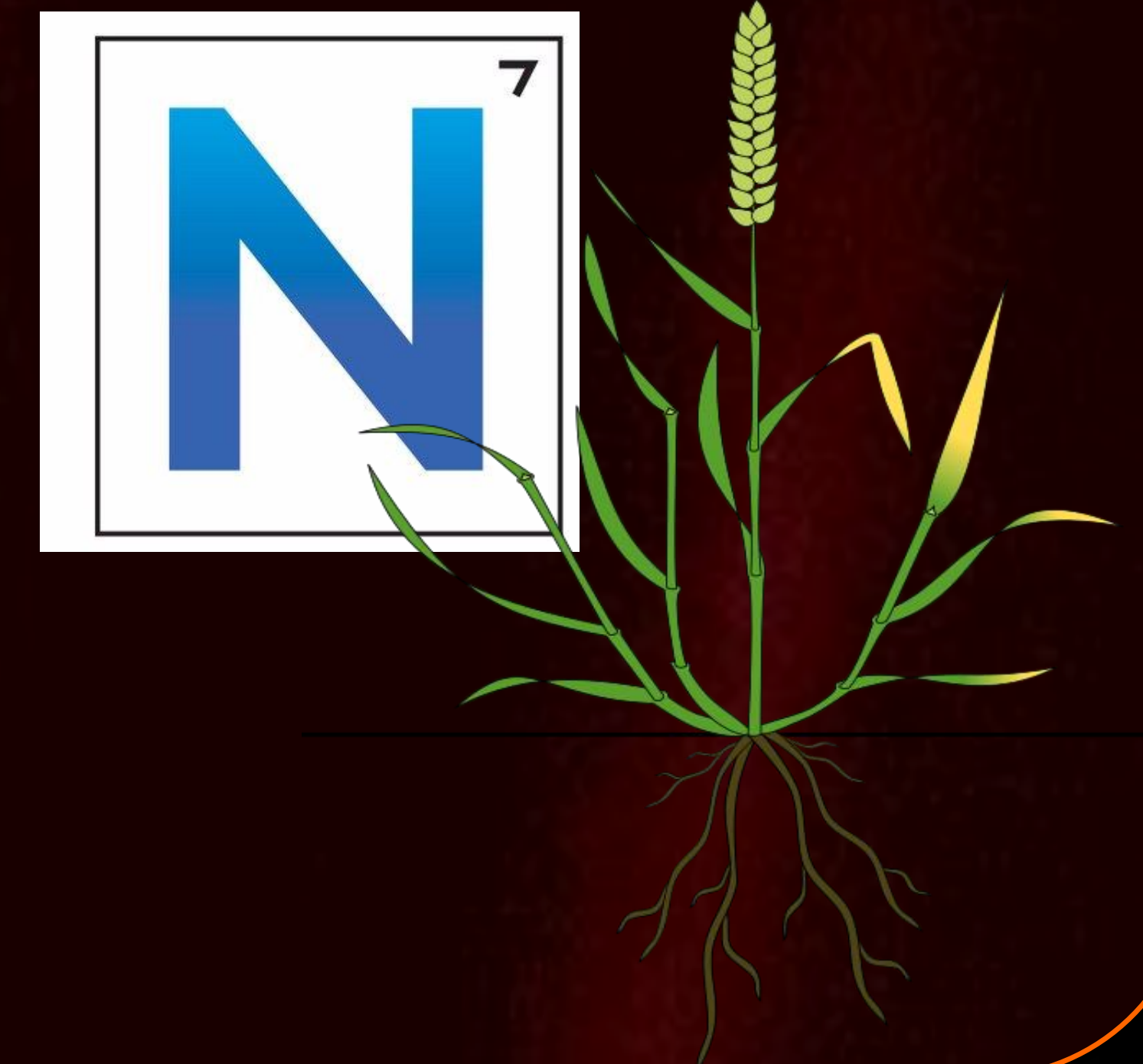
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The challenge

- Crop yield gains throughout the 20th century have been driven by the application of synthetic nitrogen (N) fertiliser.
- High N promotes yield and product quality, necessary for securing livelihoods and staple food supplies.
- However, both its over- and under-use have significant implications for pest & pathogen prevalence, farmer incomes and for the environment.



The opportunity

- Our work is targeting the link between N fertiliser inputs and foliar disease resistance in the major food security crop wheat (*Triticum aestivum*) through manipulation of WRKY gene family transcription factors (a component of the plant immunity signalling cascade).
- WRKY transcription factors have been shown to play a key role in wheat response to the foliar pathogen *Zymoseptoria tritici*, the causal agent of Septoria leaf blotch disease.
- This is a short- to medium term opportunity to manipulate the link between high yielding N dependent cereals and foliar disease pressure.

Our idea

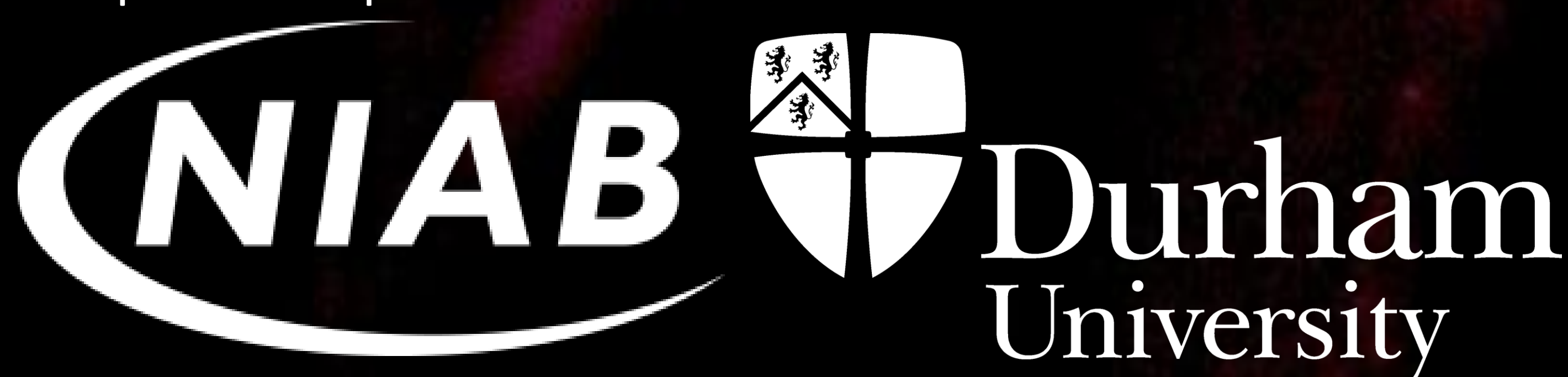
- We are creating a transgenic wheat series to determine if it is feasible to exploit endogenous defence mechanisms driven by WRKY that do not rely on fungicides as a method to control foliar diseases.
- In parallel, we have developed an experimental approach for assessing N fluxes (right) capturing variation in remobilisation & post-anthesis uptake.



Our current work addresses the key timings, dynamics & drivers of crop N demand.

We propose that understanding how and why N nutrient level and disease resistance are linked will lead to strategies enabling exploitation of endogenous defence whilst maintaining high crop yields and product quality.

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