Cambridge - India Network for Translational Research in Nitrogen

CINTRIN
a truly translational centre

CINTRIN will translate new understanding of the biological mechanisms of N uptake from model species to crops and provide innovative approaches to tackle crop biological nitrogen use

CINTRIN: *a truly translational centre*

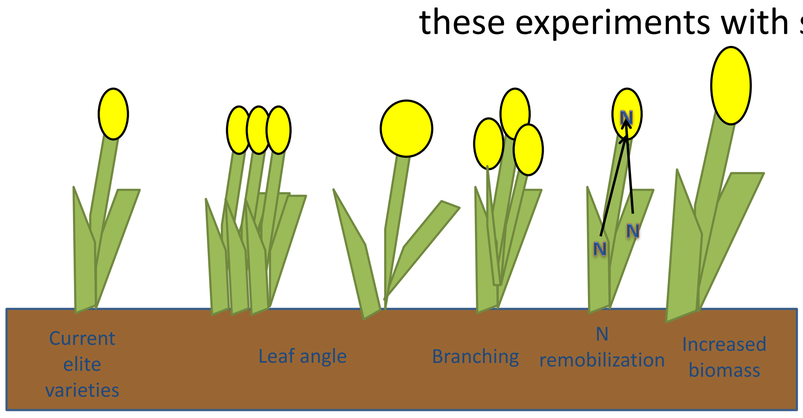
Newton Fund · BBSRC bioscience for the future · DEPARTMENT OF BIOTECHNOLOGY Ministry of Science & Technology

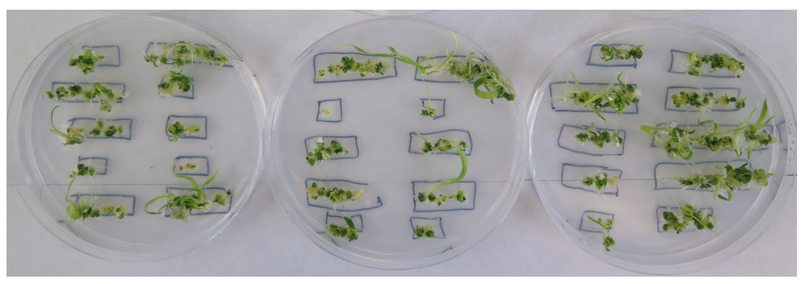
CINTRIN is one of four UK-India Virtual Joint Centres in Agricultural Nitrogen funded by the Newton Fund in 2016. It brings together partners from the UK and India with a focus on production of the important cereals wheat, sorghum and pearl millet which are central to food security in India and where current yields are supported by fertiliser inputs (particularly N, as well as phosphate and potash).

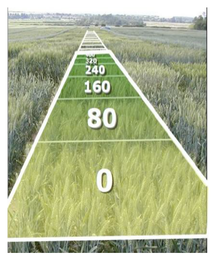
CINTRIN: *progress to date*

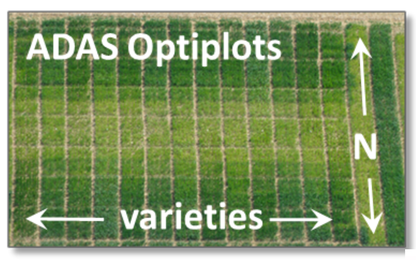
WP1. Interdisciplinary research to prime the translation of biological N
Previous work at SLCU has identified fundamental variation in *Arabidopsis thaliana* relating to shoot branching plasticity correlated with biomass allocation. We have developed a screening system for *Brachypodium distachyon* and *Setaria italica* allowing precise control of nitrate supply. CRISPR/Cas9 mutagenesis is also underway in Brachypodium to target key candidate genes.

WP2. Defining optimal N use in key cereal germplasm
In order to maximize yield potential and grain quality, there is a pressing need to develop a better mechanistic understanding of the physiological basis to N and carbon (C) partitioning. This WP is developing new methodologies for application of stable isotopes to evaluate genetic variation in N use in key cereal crops and coupling these experiments with screening in WP1 and WP3.









WP3. Translational N germplasm for pre-breeding and exploitation
This WP is focussed on the translation of new understanding of variation in biological N use from model plants (WP1) and new physiological N knowledge (WP2) via genomics-led pre-breeding. We are using and developing next generation germplasm resources and genomic tools to allow widespread uptake of WP1 and WP2 findings into breeding and production.

WP4. Field-scale evaluation of optimal N allocation to identify HYLO lines
The knowledge and germplasm developed or identified in WP1, WP2 and WP3 is being assessed in "Optiplot" wheat field trials with six ramped N levels in the UK and India. This will extend knowledge of biological N use at the field scale and several important agronomic characters are being assessed for hypothesis testing in relation to biological N use. We are comparing the performance of elite varieties and germplasm from WP3 for "N requirement" and to identify High Yield Low Optimum (HYLO) traits. The N requirement or optimal N rate is the rate at which any further increase in N application will result in greater N fertiliser costs than the value of the additional grain produced.

WP5. Develop and deliver resources for breeders and farmers. KisanHub is developing a platform in India and the UK for existing and generated N data for applications in optimal N use available to UK and Indian farmers.

WP6. Build and expand the CINTRIN network
CINTRIN is also actively promoting knowledge exchange through training, exchanges and extension

For more information & to register to receive updates from the CINTRIN network see: www.niab.com/cintrin @CINTRIN_UKIndia