

Nitrogen and sulphur management for milling wheat crops

UK flour mills process about 5 million tonnes of wheat, 85% of which is UK grown (NABIM, 2019). Milling wheat must achieve specified quality requirements for millers to offer a premium above base prices. These requirements cover Hagberg Falling Number (HFN), specific weight and protein, which all play a significant role in flour quality and baking performance.

Data from the British Survey of Fertiliser Practice (BSFP) (Defra, 2018) indicates that the average field application rate of nitrogen on milling wheat in 2018 was 207 kg N/ha, a decrease of 6 kg/ha over 2015. Over five years (2014–18), the average field application rate on milling wheat was 208 kg N/ha, compared with 182 kg N/ha for non-milling crops. The difference of 26 kg additional N/ha is less than the 40 kg additional N/ha recommended in the AHDB *Nutrient management guide* (RB209).

The aim of this project is to update guidance on nitrogen and sulphur fertiliser use for winter milling wheat. The work will give people greater confidence to adjust nutrient applications and increase the chance of hitting milling wheat specifications on a range of varieties, soil types and growing environments.

The objectives are:

- To evaluate the grain quality (primarily grain protein and specific weight) responses to nitrogen and sulphur fertiliser application rate and timing
- To assess the impact of nitrogen and sulphur fertiliser rate and timing on dough rheology and baking performance (protein quality), including (for sulphur) the production of asparagine
- Develop the basis of new recommendations for nitrogen and sulphur fertiliser applications for milling wheat quality

Findings from the first year field trials (four sites) suggest:

- Despite relatively high nitrogen rates (e.g. 320–345 kg N/ha) very few grain samples achieved 13% protein
- No consistent trend from the addition of sulphur (≥ 75 kg/ha SO_3) was apparent at reducing asparagine
- High HFNs (suitable for milling) were only achieved at two of the four sites. Wet weather at harvest was likely to have contributed to this
- Samples are being processed to assess the impact on dough rheology and baking

It is important to note that these findings are from a single season. Further trials in years 2 and 3 will strengthen the data set. Following the project's conclusion in March 2022, recommendations to revise RB209 will be made.

Project details

AHDB project 21140040: Nitrogen and sulphur fertiliser management to achieve grain protein quality targets of high-yielding winter milling wheat (1 July 2018–31 March 2022)

AHDB cost: £179,548

Total project value: £230,999 (includes in-kind contributions)

Project leader: NIAB. Other partners: SRUC, Masstock Arable (UK) Ltd (trading as Agrii), Omex Agriculture Limited, RAGT Seeds, KWS UK Ltd, Allied Technical Centre Ltd (ATC)

This project update was released at the AHDB Milling Wheat Conference 2020 on 27 February 2020:

ahdb.org.uk/mwc