

STATUS®: Unique activity on Photosystem I leads to increased Nitrogen Use Efficiency in arable crops

INTRODUCTION

There is significant pressure on the agricultural industry to reduce greenhouse gas emissions and the use of nitrogen fertilisers. Scope 3 emissions are emissions generated indirectly throughout the supply chain and are a company's biggest opportunity to reduce their carbon footprint. The use of nitrogen fertiliser can contribute up to 50% of these Scope 3 emissions. There are many benefits of increasing the nitrogen use efficiency (NUE) of arable crops, both environmentally and economically. Environmentally, increased NUE reduces greenhouse gas emissions, volatilisation and leaching. Economically, growers can benefit from higher return on investment from their fertiliser, they can reduce their fertiliser spend and still maintain yield and quality. Applied at a rate of 0.25l/ha on arable crops, Status is a pure plant biostimulant with proven effect on NUE, containing 0.5g/ha 1-(2-methoxyethyl)-3-(1,2,3-thiadiazol-5yl) urea (MTU) and 80g/ha pidolic acid. This patented technology gives complementary modes of action with MTU acting on photosynthesis and pidolic acid on nitrogen assimilation.

STATUS MODE OF ACTION

MTU® blocks the degradation of photosynthetic apparatus increasing chlorophyll pigment content by up to 20%. MTU enhances photosystem I activity and promotes cyclic electron flow around photosystem I which reduces stress and age-related senescence.

As MTU enhances photosynthesis, it increases carbon fixation and therefore to maintain the carbon-to-nitrogen ratio, the plant must increase nitrogen uptake.

MTU also promotes root growth, meaning there is a larger surface area to facilitate increased nitrogen uptake.

The benefits of each application of MTU last for around 28 days.

Pidolic acid is a signalling compound at the heart of the nitrogen assimilation cycle, that maximises and increases glutamic acid production during healthy and stressed conditions, respectively. This means ammonia can be assimilated into glutamine more efficiently and permits the retention of more green leaf area.

The benefits of each application of pidolic acid last for around 14-21 days.

1. Nitrogen uptake

Efficient photosynthesis means plants take up more CO₂ from the air. To compensate the plant increases nitrogen uptake to balance the C:N ratio.

2. Nitrogen assimilation

Status improves the assimilation of nitrogen into amino acids.

3. Nitrogen access

Greater root growth provides a much larger surface area for the plant to access nitrogen in the soil.

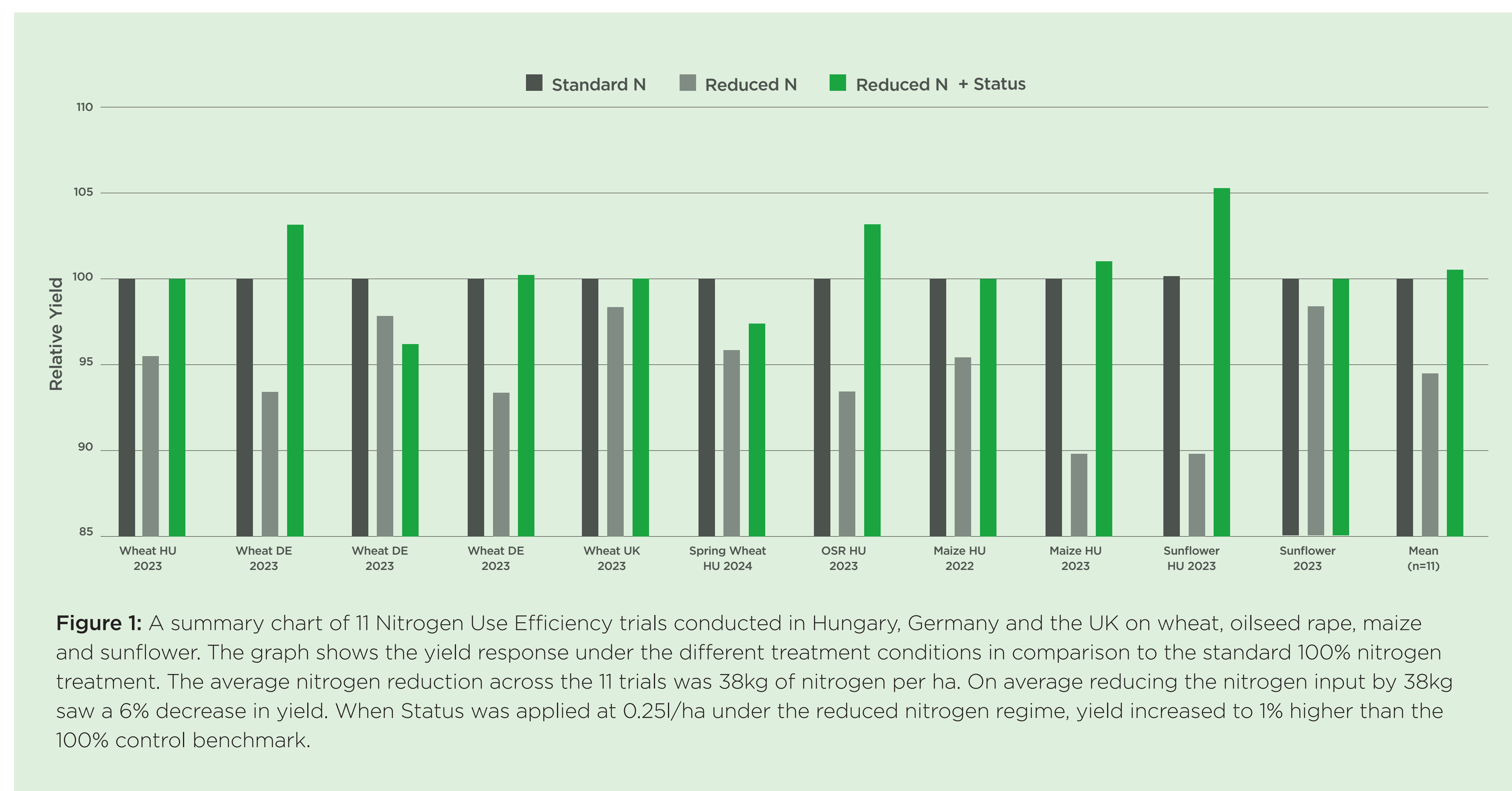
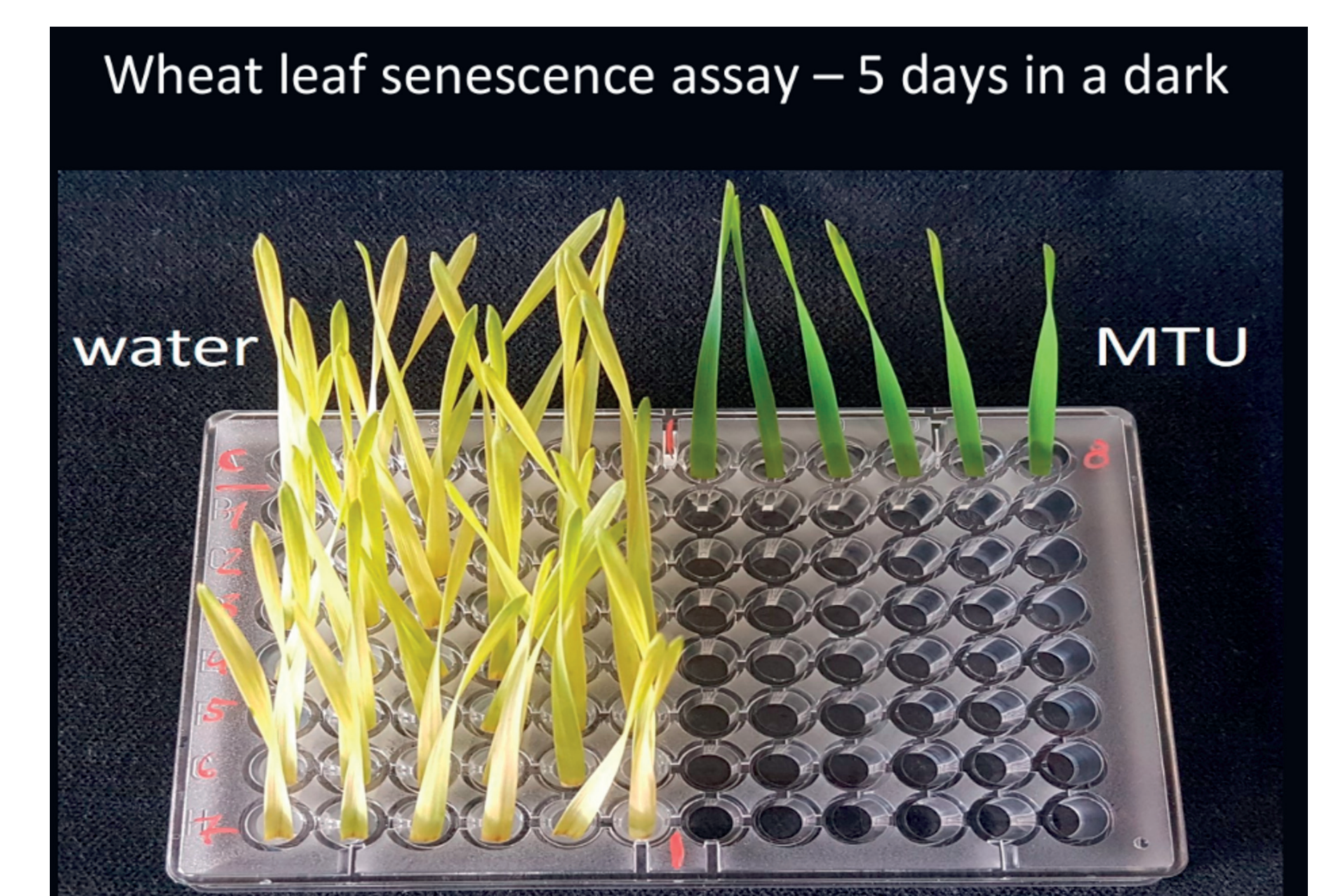
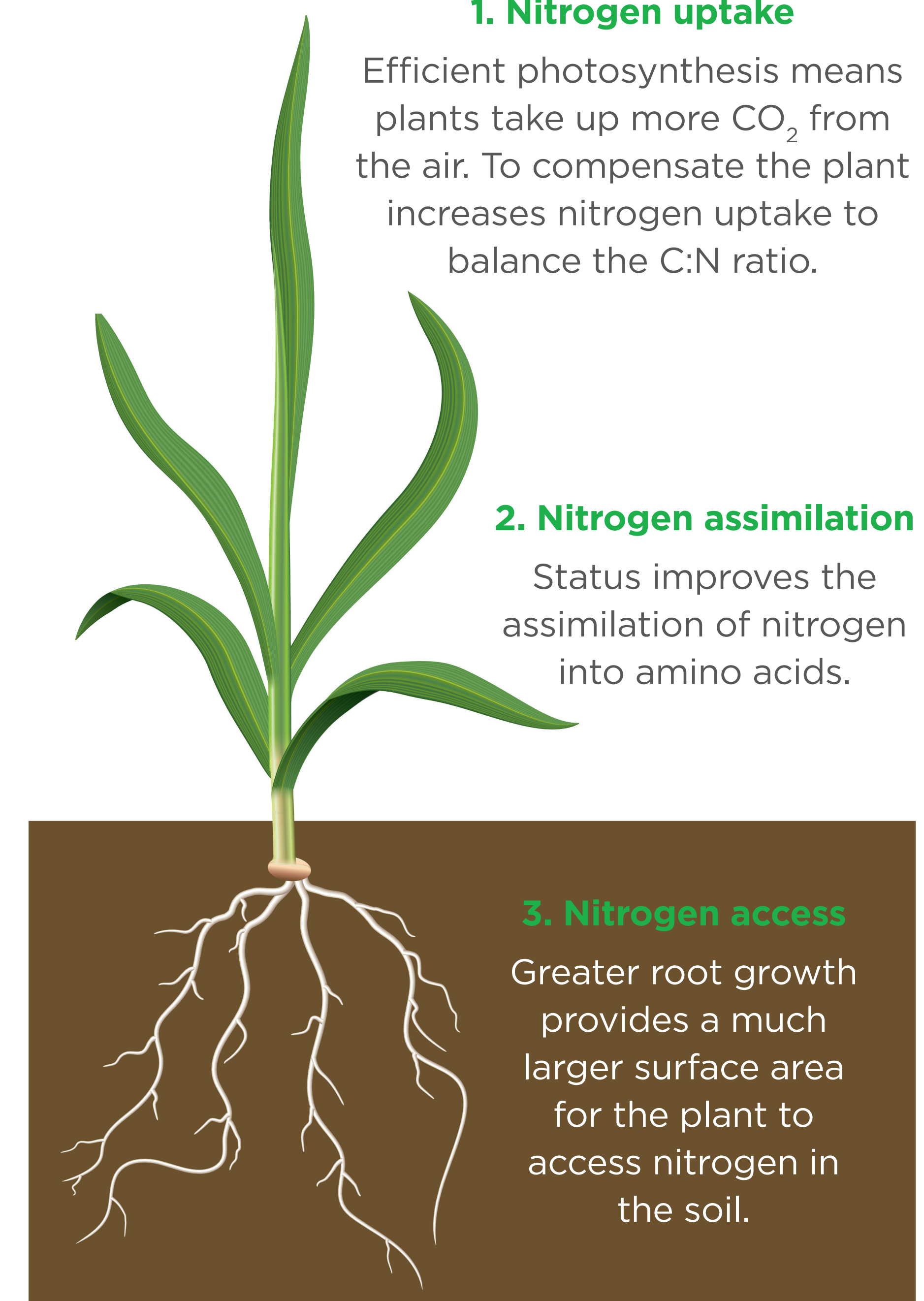


Figure 1: A summary chart of 11 Nitrogen Use Efficiency trials conducted in Hungary, Germany and the UK on wheat, oilseed rape, maize and sunflower. The graph shows the yield response under the different treatment conditions in comparison to the standard 100% nitrogen treatment. The average nitrogen reduction across the 11 trials was 38kg of nitrogen per ha. On average reducing the nitrogen input by 38kg saw a 6% decrease in yield. When Status was applied at 0.25l/ha under the reduced nitrogen regime, yield increased to 1% higher than the 100% control benchmark.

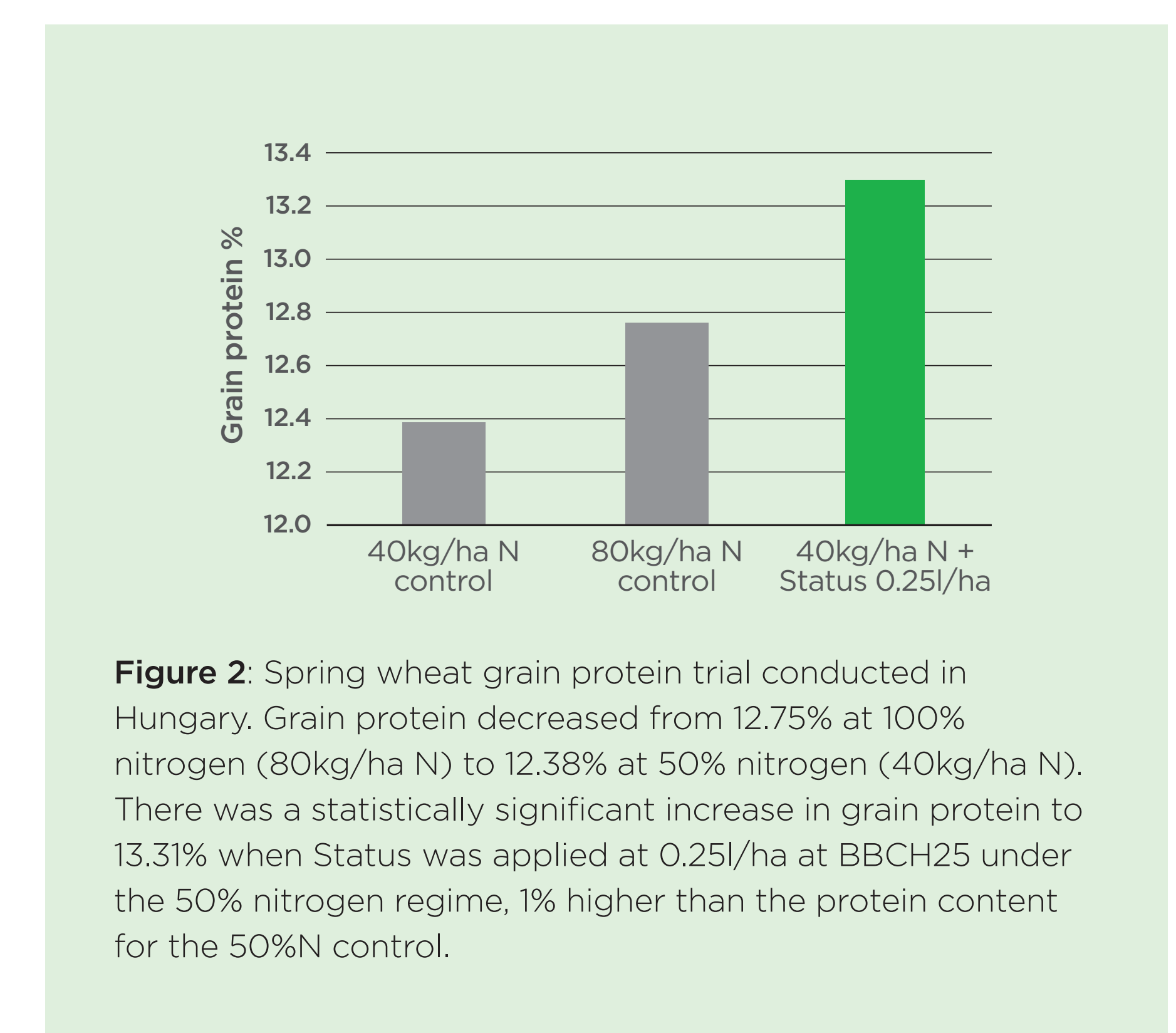


Figure 2: Spring wheat grain protein trial conducted in Hungary. Grain protein decreased from 12.75% at 100% nitrogen (80kg/ha N) to 12.38% at 50% nitrogen (40kg/ha N). There was a statistically significant increase in grain protein to 13.31% when Status was applied at 0.25l/ha at BBCH25 under the 50% nitrogen regime, 1% higher than the protein content for the 50%N control.

CE MARK CERTIFICATION

Status is CE marked under the European Fertilising Products Regulation (EU 2019/1009) as a PFC6B plant biostimulant for nitrogen use efficiency, quality traits (yield) and tolerance to abiotic stress (drought) on broadacre arable crops. As well as quality traits for woody perennial crops. Quality traits for vegetable, ornamental, aromatic and medicinal plants is currently under review.



INDICATIVE CARBON FOOTPRINT

Indicative PCF for a 1-litre pack of Status is 2.57kg Co2e. A 15% reduction in carbon emissions can be achieved when 0.25l/ha of Status replaces 30kg N/ha of ammonium nitrate.

SUMMARY

The complementary modes of action of MTU on photosynthesis and pidolic acid on nitrogen assimilation allow Status to increase the nitrogen use efficiency of arable crops. Extensive trials data has proven that yield and quality are maintained when Status is applied at 0.25l/ha under reduced nitrogen programmes (see figure 1). The result of sufficient statistically significant NUE data has meant Status is now CE marked under the new EU FPR for Nitrogen Use Efficiency (amongst other claims). **The positive impact this can have on greenhouse gas emissions and reducing the carbon footprint of crop production has recently been calculated and results showed that when 0.25l/ha of Status replaces 30kg N/ha ammonium nitrate, a 15% reduction in carbon emissions is achievable.**