ADAS document ref: 1021801-04 (00)
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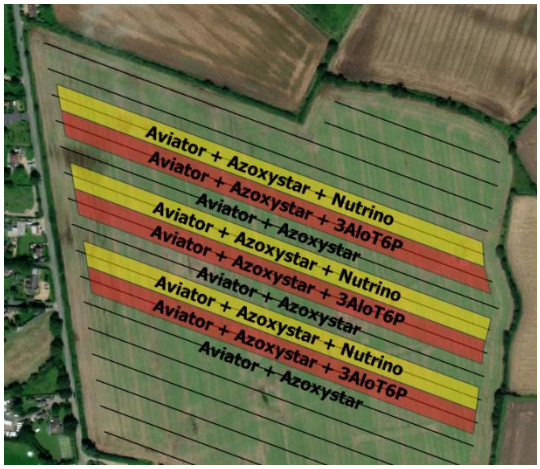
Trial type: Biostimulants
Farm location: Sussex

Variety: Skyfall
Soil type: Brickearth

This trial was part of the AICC Crop Nutrition Club 2022, which has been run in conjunction with the Farm-PEP project led by ADAS. This report contains the results of a winter wheat trial testing the effects of two biostimulant products applied at T3.



Treatments

1. T3 fungicide (Aviator + Azoxystar)
2. T3 fungicide + 3 Alo T6P 1.0 l/ha (Unium Biosciences)
3. T3 fungicide + Nutrino Pro 20 l/ha (Intracrop)

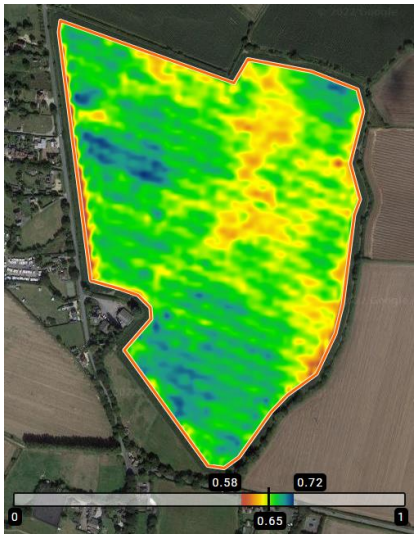
The trial was well designed with three replicate tramlines of each treatment, and placed in a reasonably even field.

Satellite imagery

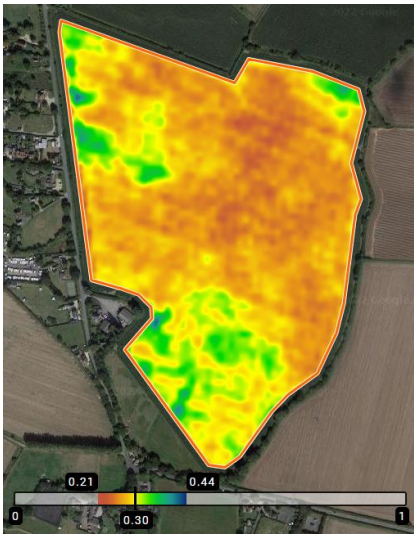
NDVI (normalized difference vegetation index) is a spectral reflectance index which shows a combination of canopy size and greenness, on a scale from 0 to 1. NDVI images were sourced from www.datafarming.com.au, based on freely available 10m resolution data from the Sentinel 2 satellites. The scale varies between images but always runs from red (low) through orange, yellow and green to blue (high). The availability of imagery is constrained by the need for cloudless conditions.

Prior to trial initiation, the main variation in the field ran across the tramlines so should not have biased the treatment comparison. There were no visible differences in NDVI between treatments.

NDVI before treatments (17 Mar)



NDVI after treatments (22 Jun)



NDVI pre-harvest (10 Jul)

Agronomics analysis

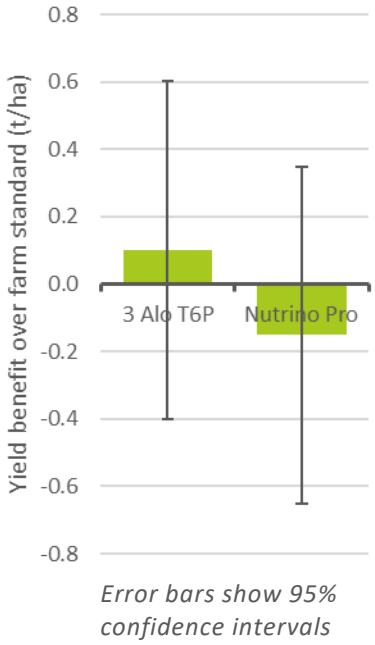
The yield data were analysed using the ADAS Agronomics approach. First the data were cleaned to remove headlands, anomalous combine runs (header not full or spanning two treatment areas), wheelings, and locally extreme data points, and to correct any offset created by changes in combine direction. Then a model of underlying variation was applied to the data to account for spatial variation across rows and along rows, and for the effect of the treatment. The statistical analysis led to estimates of the treatment effects and the associated standard errors. Thus, subject to the assumptions of the underlying statistical model, it was possible to calculate 95% confidence limits for the yield effects and the % probability that the yield effect was greater than any chosen threshold.

Yield results

The average measured yield of the farm standard treatment was **12.87 t/ha**, according to yield map data. This is likely to be a little higher than the true average due the exclusion of headlands and wheelings from the analysis.

Using the Agronomics analysis to fit a statistical model to the data, we estimate that 3 Alo T6P increased yield by **0.10 t/ha ± 0.50 t/ha** (95% confidence interval), relative to the farm standard, and that Nutrino Pro reduced yield by **0.15 t/ ha ± 0.50 t/ha**. However, measured yield values do vary across a field even when the same treatment is applied everywhere; the bounds of the confidence intervals indicate that, according to the underlying statistical model, the estimated effects could have been the result of this unexplained variation.

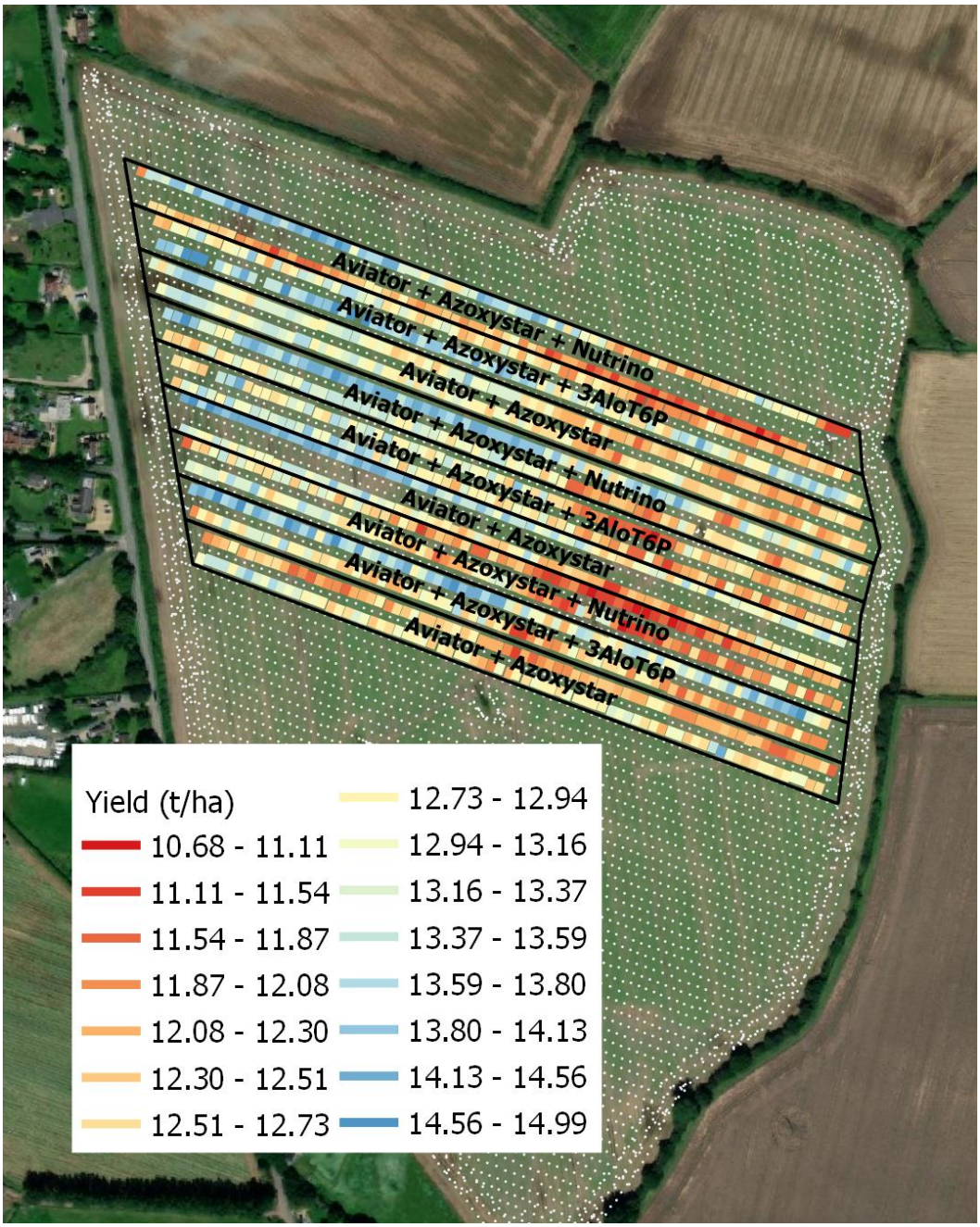
The absence of any real yield effect from the biostimulant treatments is supported by the lack of visible NDVI effects or differences in grain nutrient content (see below). However, the host, dry weather in July 2022 brought on an early harvest, curtailing the grain filling period and limiting the opportunity of these treatments applied at T3 to give positive yield effects. It is possible that results would have been different in a season with a longer grain filling period.



Error bars show 95% confidence intervals

Relative likelihood of a yield effect of different sizes from the biostimulant programmes, according to the Agronomics analysis of this trial. Consider the relative costs of the treatment programmes to determine what yield benefit would be required for an economic benefit.

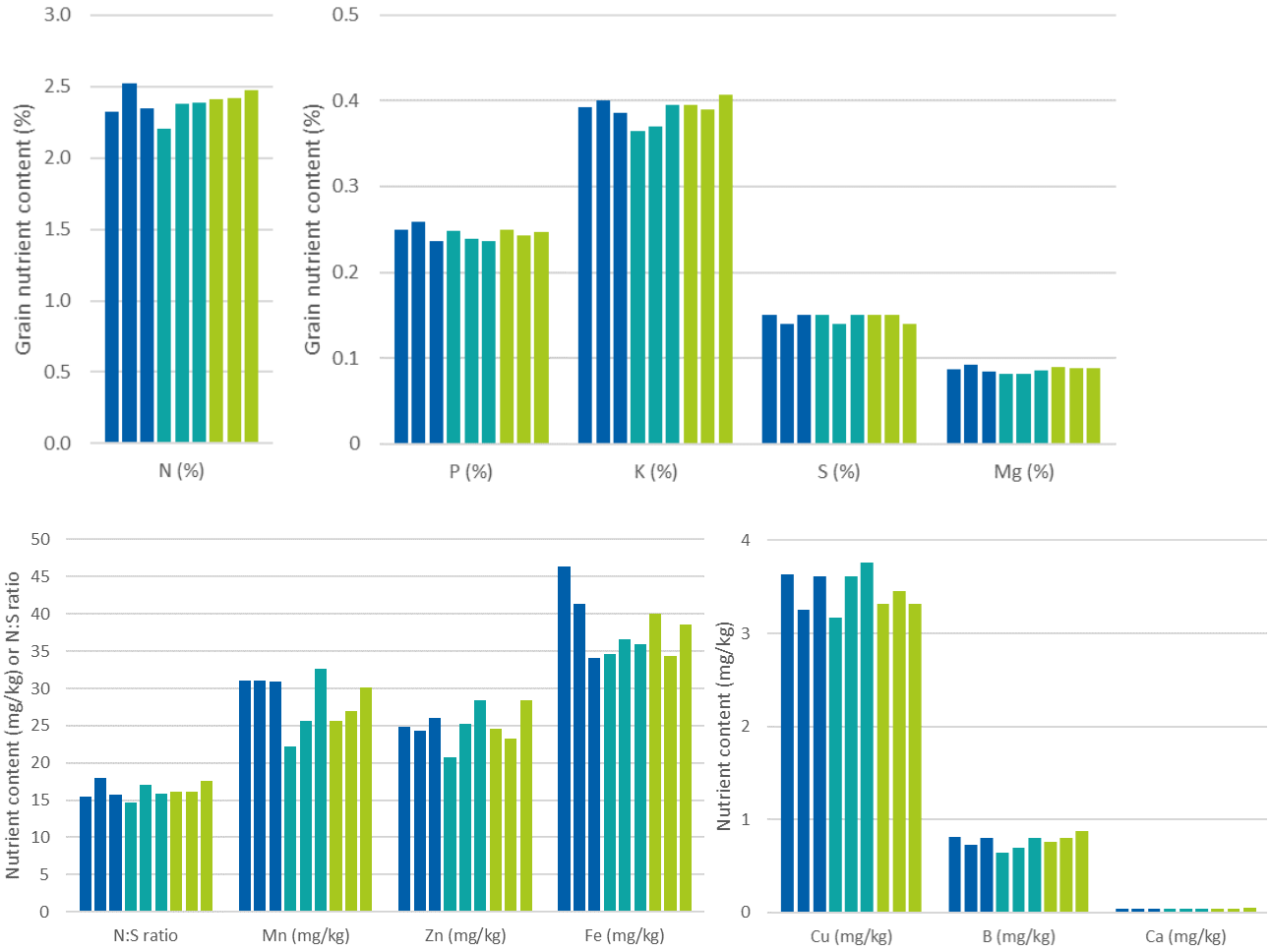
Yield benefit or loss relative to farm standard	3 Alo T6P Probability	Nutrino Pro Probability
> (greater than) 0.4 t/ha yield benefit	12 % (unlikely)	2 % (very unlikely)
> 0.2 t/ha yield benefit	35 % (about as likely as not)	8 % (very unlikely)
> 0.0 t/ha yield benefit	65 % (about as likely as not)	28 % (unlikely)
> 0.0 t/ha yield loss	35 % (about as likely as not)	72 % (likely)
> 0.2 t/ha yield loss	12 % (unlikely)	42 % (about as likely as not)
> 0.4 t/ha yield loss	2 % (very unlikely)	16% (unlikely)


Aviator + Azoxystar + Nutrino
Aviator + Azoxystar + 3AloT6P
Aviator + Azoxystar
Aviator + Azoxystar + Nutrino
Aviator + Azoxystar + 3AloT6P
Aviator + Azoxystar
Aviator + Azoxystar + Nutrino
Aviator + Azoxystar + 3AloT6P
Aviator + Azoxystar
Yield (t/ha)
10.68 - 11.11
11.11 - 11.54
11.54 - 11.87
11.87 - 12.08
12.08 - 12.30
12.30 - 12.51
12.51 - 12.73
12.73 - 12.94
12.94 - 13.16
13.16 - 13.37
13.37 - 13.59
13.59 - 13.80
13.80 - 14.13
14.13 - 14.56
14.56 - 14.99

Grain analysis results

A grain sample was collected from each of the nine tramlines in the trial, and submitted to NRM's Grain Check service for testing.

There were no significant differences between treatments in grain nutrient concentration, for any of the 11 nutrients tested. The grain P concentration was substantially below the YEN Nutrition critical threshold of 0.32% in all samples (mean 0.25%), suggesting possible yield limitation by P supply. No other nutrient levels showed any caused for concern.



Grain nutrient concentrations from each tramline, coloured by treatment (farm standard: dark blue; 3 Alo T6P: turquoise; Nutrino Pro: green). Different scales used for different nutrients.