

# EFFECTS OF POLY4 FERTILIZER ON EUROPEAN CEREAL CROPS

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## Abstract

POLY4 is a fertilizer derived from polyhalite mineral. POLY4 has been applied in commercially-relevant blends with MOP at 19 sites growing cereals across four European countries.

The POLY4 blend was compared to standard practice of K and S fertilizers in most of Europe (MOP-K and ammonium sulphate-S). The POLY4-fertilized cereals had significantly greater yields across these 19 sites. In 11 out of 19 trials POLY4 achieved a greater yield than MOP + S. The other eight sites had small treatment differences.

## Introduction

- Small grain cereals dominate European arable agriculture (59 million hectares excluding Russia).
- Trials took place at 19 fertilizer responsive sites for wheat and barley in four countries – United Kingdom, France, Germany and Poland – over four years.
- These four countries combined produce 142 million tonnes of small grains per year.

## Trial location



## Methodology

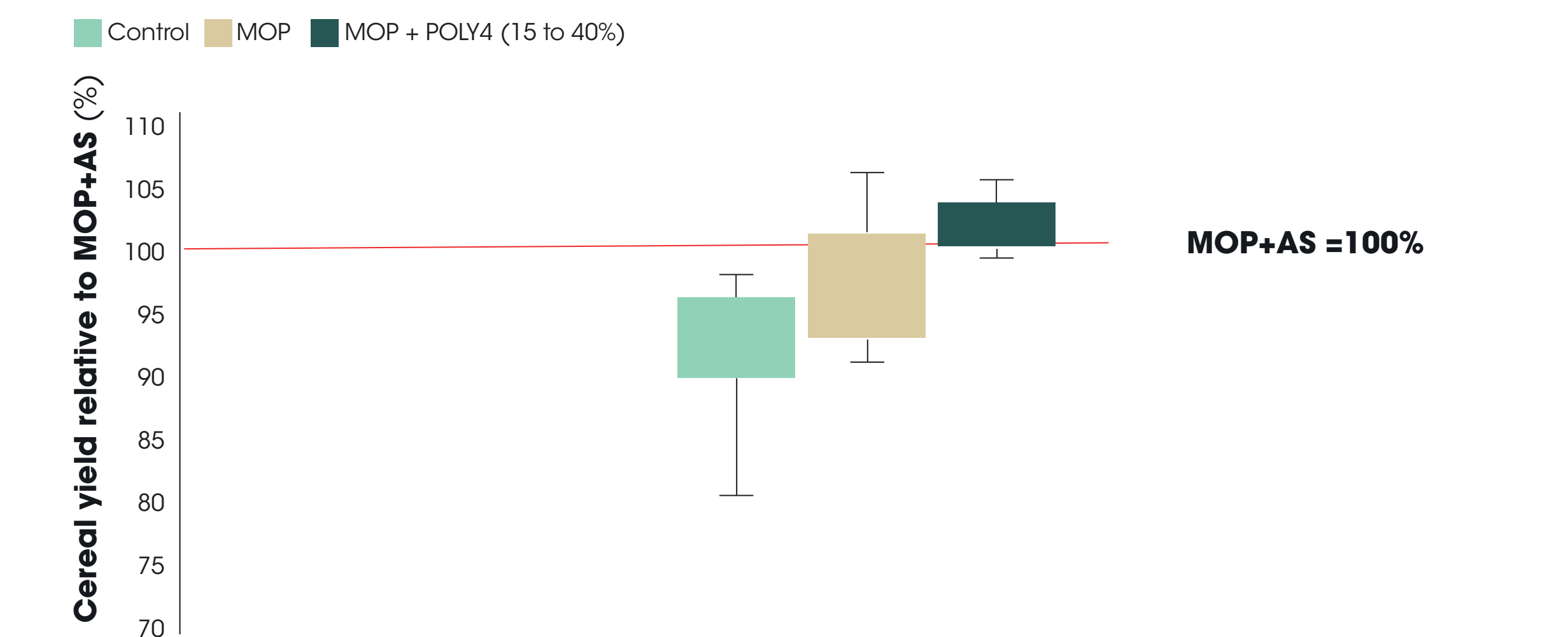
- All fertilizers were applied to good farming practice.
- Northern European cereal farmers typically apply MOP as their K<sub>2</sub>O fertilizer. S is typically applied as ammonium sulphate (AS).
- Trials compared K and S fertilizer at typical application rates from MOP + POLY4 mix with industry standard MOP + AS.
- The trials were randomised block designs with four replications.

Treatments	Nutrients applied					
	N	P	K	S	Ca	Mg
N + P (control)	Yes	Yes	No	No	No	No
MOP	Yes	Yes	Yes	No	No	No
MOP + AS	Yes	Yes	Yes	Yes	No	No
MOP + POLY4*	Yes	Yes	Yes	Yes	Yes	Yes

## Results

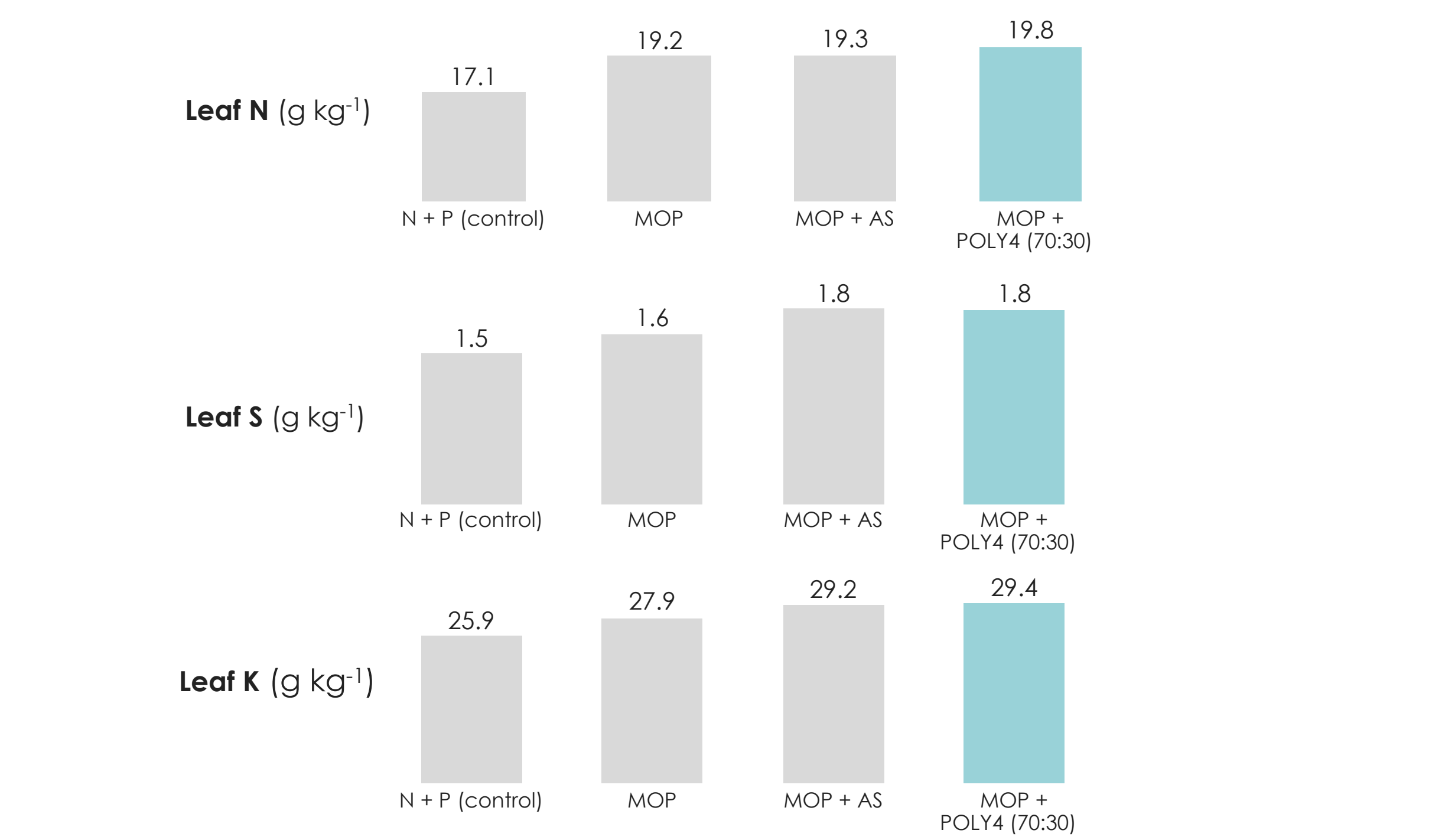
### Yield performance

- Yield response of 19 sites was normalised relative to typical farmer practice (MOP + AS).
- MOP + POLY4 had significantly higher yield (mean = 103%) than MOP + S.
- MOP + POLY4 fertilized cereals matched or outperformed MOP + AS at all 19 sites.
- Wheat and barley, spring and winter plantings, all had similar results.



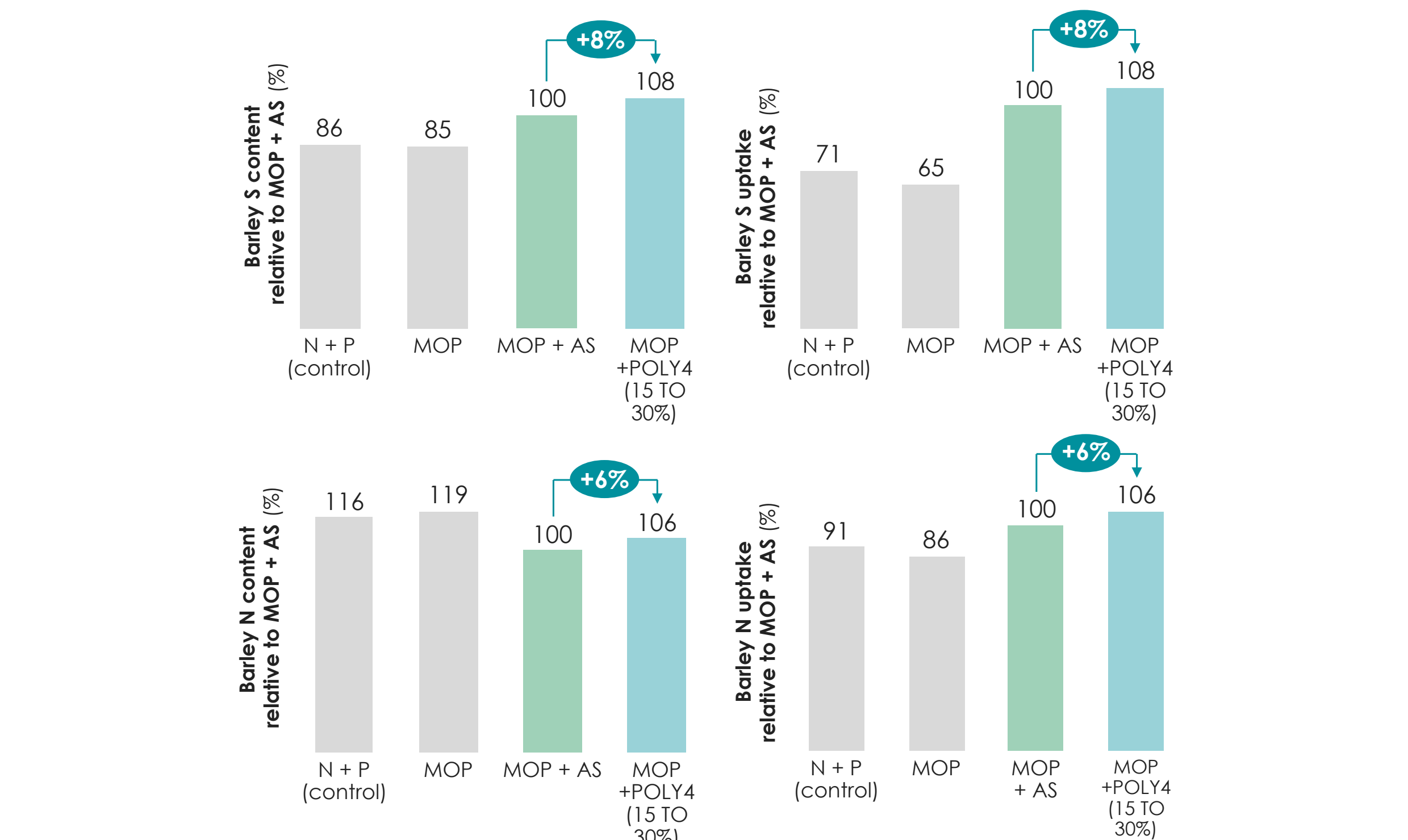
## Leaf nutrients

- Nutrient concentrations were measured in flag leaves at five sites.
- N, S and K contents were improved with MOP + POLY4 treatment.



## Nutrient offtakes

- Grain nutrients measured in three barley trials (two in France and one in the UK).
- N content of MOP + AS and MOP + POLY4 was diluted by greater yield.
- Total offtake of N and S was greater with MOP + POLY4 than other treatments.
- MOP + POLY4 was a more efficient S fertilizer than MOP + AS.



## Conclusions

- MOP + POLY4 produced robust yield improvements compared to balanced nutrients from standard fertilizers.
- Yield improvements follow increased nutrient uptake into flag leaves.
- N and S offtakes in grain are also greater after applying MOP + POLY4.

## Notes

Notes: Europe production statistics from ec.europa.eu/; Significance tested at 5% levelSources: Antedis: 17000-ASA-17011-16, 17000-ASA-17012-17, 17000-ASA-17014-18; Institute of Soil Science & Plant Cultivation: 49000-PUL-49010-16, 49000-PUL-49011-17; Oxford Agricultural Trials: 57000-HUT-57010-16; Warwick Crop Centre: 8000-WCC-8016-16; SGS: 18000-SGS-18012-18.

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