

TRIAL RESULTS

BARLEY

WARWICKSHIRE, UK (2014)

TRIAL OBJECTIVE

To determine the effectiveness of POLY4 as a potassium and sulphur fertilizer on barley and assess different fertilizer timing applications.

HIGHLIGHTS

**IMPROVES YIELD BY
125% OVER MOP AND
10% OVER SOP**

**PROVIDES FLEXIBILITY IN
THE TIMING OF FERTILIZER
APPLICATION**

**IMPROVES MACRO AND
MICRO NUTRIENT UPTAKE**

**ECONOMICAL ALTERNATIVE
FOR FARMERS**

TRIAL DESIGN

PARTNER: WARWICK UNIVERSITY
LOCATION: WARWICKSHIRE, UK
YEAR: 2014
CROP VARIETY: FLORENTINE

- Barley is one of the world's top broadacre crops by area used as a foodstuff, malt production and animal feed, amounting to a global coverage of 49.4 million hectares in 2014¹.
- European barley can be planted in either spring or winter offering farmers flexibility in crop production
- Treatments were selected to supply potassium and/or sulphur and applied as a rate response study at rates of 50, 100 or 150 kg K₂O ha⁻¹ and applied in the autumn.
- An additional set of potassium rate response POLY4 treatments were established with fertilizer applied in the spring.
- All plots received 100 kg N ha⁻¹ from Ammonium Nitrate and P was not recommended³.
- Florentine is a two-row feed barley that offers a stiff straw and has good disease resistance.
- Plots were established in a randomised block design.

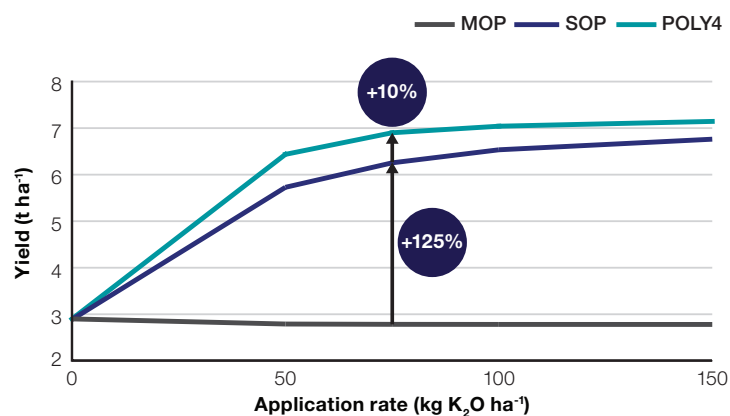
TREATMENT TABLE

FERTILIZER	NUTRIENT APPLIED IN TRIAL (kg ha ⁻¹)						
	N	P ₂ O ₅	K ₂ O	MgO	CaO	S	Cl
Control	100	0	0	0	0	0	0
MOP	100	0	100	0	0	0	80
SOP	100	0	100	0	0	14	6
POLY4	100	0	100	43	120	55	21



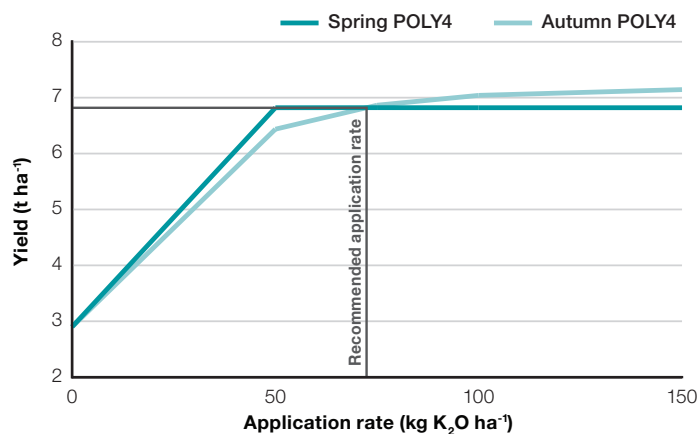
YIELD RESULT $(t\ ha^{-1})^2$

- MOP replaced potassium offtake but had little direct effect on yield without sulphur.
- Local recommendations support the use of additional sulphur³. The benefit can be seen in this trial, with SOP outperforming MOP by 125% and POLY4 improving yield by a further 10%.



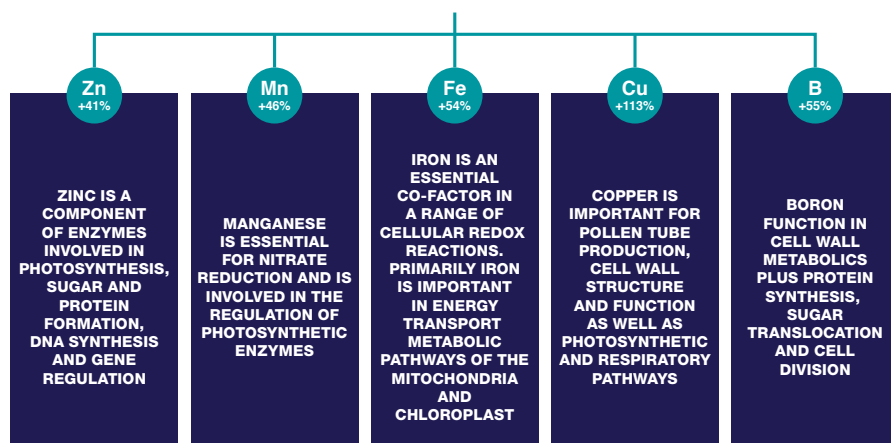
APPLICATION TIMING YIELD $(t\ ha^{-1})^4$

- The performance of POLY4 was maintained, regardless of the timing of application⁵.
- Flexibility in timing of application allows farmers to overcome practical application constraints and can have positive implications for a farm's workload and economics.



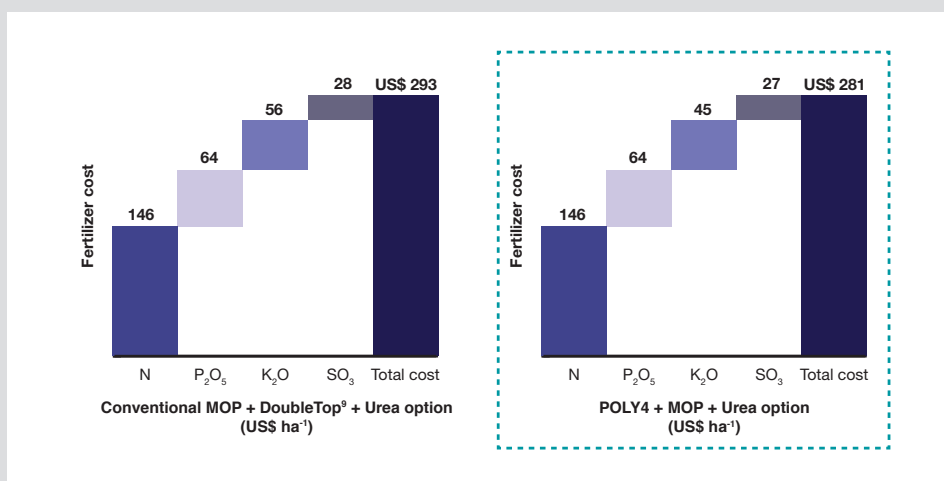
NUTRIENT UPTAKE^{6,7}

- POLY4 improved macro nutrient uptake of nitrogen, potassium, sulphur, magnesium and calcium by 75%, 54%, 257%, 146% and 114% respectively.
- POLY4 also appeared to significantly improve uptake of a range of micro-nutrients.



ECONOMIC SUMMARY (US\$ ha⁻¹)⁸

- Traditional fertilizer practice would include an application of MOP with a separate application of DoubleTop⁹ to satisfy the sulphur requirement.
- POLY4 as a sulphur source reduces the overall cost of meeting the potassium requirement with sulphur and includes beneficial magnesium, calcium and a range of micro nutrients.
- Even at a high input cost of US\$250 per tonne, POLY4 provides a US\$12 saving over MOP.



Notes: 1) FAO 2017; 2) GENSTAT exponential regression; 3) RB 209 HMSO 2010; 4) GENSTAT exponential regression; 5) GENSTAT ANOVA P=0.876; 6) Mean results 50-150kg K₂O ha⁻¹ of POLY4 as a percentage increase compared to MOP; 7) GENSTAT ANOVA P<0.001; 8) Assumed costs based on retail pricing available October 2014; MOP US\$450/t, Urea US\$480/t, POLY US\$250/t, TSP US\$408/t commercial N/S top dressing US\$450/t; 9) DoubleTop is a trademarked name for ammonium nitrate/ammonium sulphate blends from GrowHow. Initial soil analysis: pH 6.7, N 17.97 mg kg⁻¹, P 30.0 mg kg⁻¹, K 52.3 mg kg⁻¹, SO₄ 7 mg kg⁻¹, Mg 118.0 mg kg⁻¹.

Source: University of Warwick (2014) 8000-WCC-8010-14

siriusminerals.com | +44 1723 470 010 | commercial@siriusminerals.com

Registered Address: 3rd Floor Greener House, 66-68 Haymarket, London SW1Y 4RF, UK

Company Registered Number: 4948435

