POLY4
A SIRIUS MINERALS PRODUCT

TRIAL RESULTS

COTTON

VIRGINIA, US (2016)

HIGHLIGHTS

56-76% INCREASED LINT YIELD WITH POLY4 USE

47%-97% IMPROVED ECONOMIC RETURNS

ROBUST ECONOMIC CASE

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TRIAL OBJECTIVE

To compare the performance of POLY4 to common fertilizer plans containing MOP.

TREATMENT TABLE[2]

TREATMENTS	AVERAGE NUTRIENTS APPLIED (kg ha^{-1})					
	N	K_2O	CaO	MgO	S	Cl^-
CONTROL	112	0	0	0	0	0
MOP	112	100	0	0	0	80
POLY4	112	100	120	43	137	21
MOP+POLY4 (50:50)	112	100	60	21	68	51
MOP BALANCED	112	100	51	18	52	80

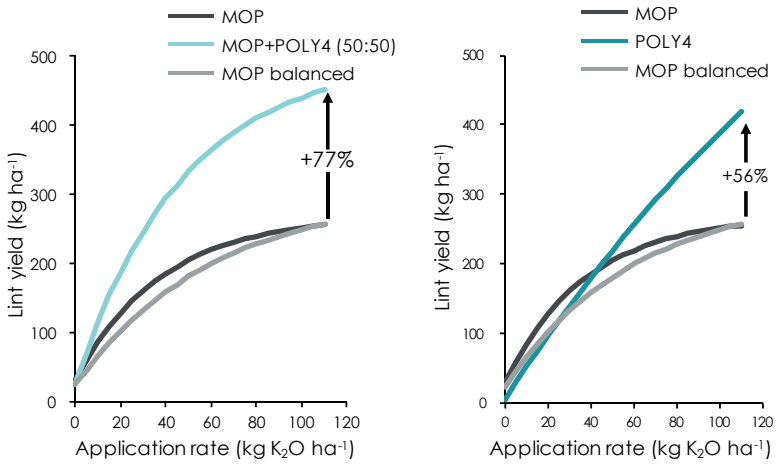
OVERVIEW

PARTNER: VIRGINIA TECH UNIVERSITY
LOCATION: VIRGINIA, US
YEAR: 2016
CROP VARIETY: PHYTOGEN 333

- The US is the third largest cotton producer in the world after China and India.[1]
- Cotton is produced in 17 southern US states from Virginia to California.[1]
- A major component of profitable cotton production is an adequate and balanced nutrition.[2]
- Potassium is essential nutrient for cotton fibre development.[3]
- Each treatment was replicated four times in a randomised complete block design.
- Soil types ranged from sands to sandy loams with limited ability to fix potassium (K).

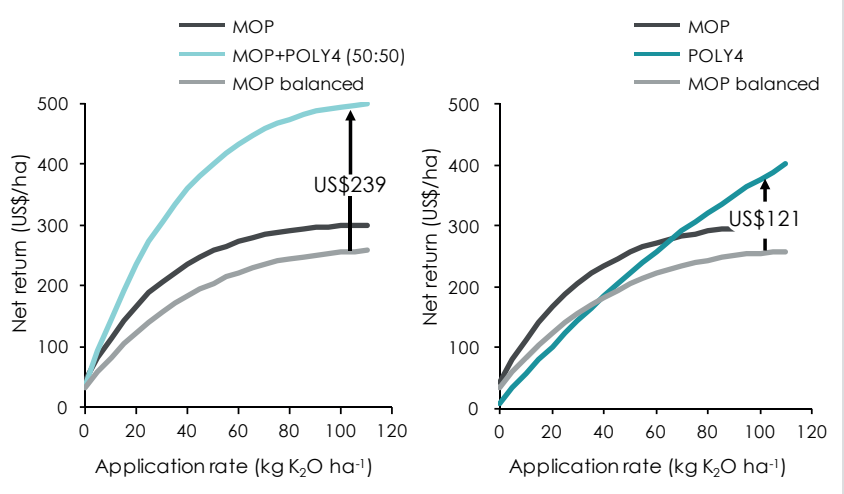
YIELD COMPARISON[5]

- Only supplying nitrogen, phosphorus and potassium limits cotton lint yield.
- Magnesium and sulphur uptake by the cotton plant is similar in quantities to phosphorus.
- Availability of calcium is essential for plant uptake in order to form strong plant cells.
- POLY4 options deliver these nutrients more effectively than gypsum and kieserite.



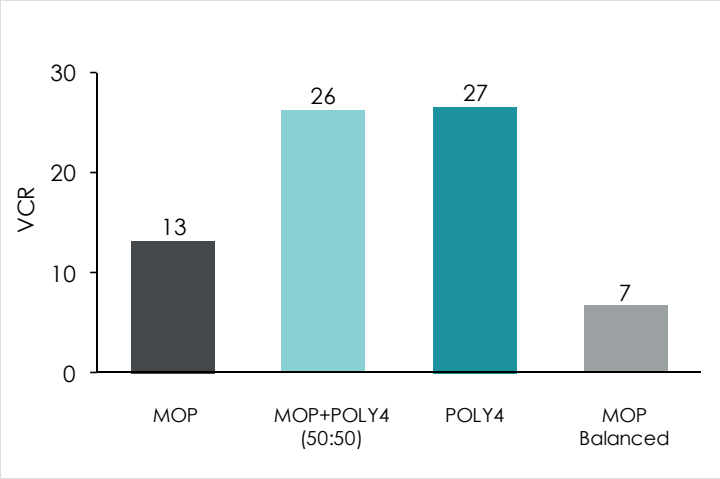
FERTILIZER NET RETURN[6]

- Using POLY4 as the K source for cotton increased net return by US$121.
- Using POLY4 with MOP in a 50:50 ratio increased net return by US$239.
- Higher application rates of POLY4 were associated with the higher yield and the increase in net return.
- Supplying potassium from MOP and POLY4 gave the largest economic return.



ECONOMIC ANALYSIS[7,8]

- POLY4 offers the best marginal rate of return with an extra US$1.7 gained for every US$1 spent on the fertilizer plan.
- A higher value-cost ratio with POLY4 options demonstrates that farmers gain more economic value than expend on fertilizers.



Note: 1) USDA (US Department of Agriculture, 2017); 2) IPNI (International Plant Nutrition Institute, 2000); 3) First cotton trial (2015) in Virginia, US; 4) Treatment table is based on the recommended K_2O rate. MOP balanced contains MOP+kieserite+gypsum; 5) Results presented are based on data from GENSTAT regression analysis. All treatments received 112 kg N ha^{-1}; 100 kg K2O ha^{-1} from MOP and/or POLY4 and 1.12 kg B ha^{-1}. MOP+POLY4 was used in a ratio of 50:50 K_2O split. Initial soil analysis: pH 5.9; P 23 mg kg^{-1}, K 18 mg kg^{-1}, Mg 40 mg kg^{-1}, Mg 40 mg kg^{-1}; 6) Fertilizer prices based on US South 2016 annual prices: MOP (US$260/t), POLY4 (US$200/t), kieserite (US$250/t), gypsum (US$25/t). Analysis accounts for fertilizer application of spreading cost of US$16.16/t, cotton was equivalent of 2016 price (62 cent/lb) US$1.37/kg; 7) Net return = crop output (US$/ha) – (cost of fertilizer material + cost of fertilizer application); 8) VCR = ratio of crop yield to fertilizer rate divided by ratio of fertilizer price to crop price.

Sources: Virginia Tech (2016) 23000-VIR-23014-16

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