POLY4
A SIRIUS MINERALS PRODUCT

TRIAL RESULTS

SILAGE CORN

UK (2014)

poly4.com

TRIAL OBJECTIVE

Compare responses of MOP, SOP and POLY4 on silage corn on a K_2O basis.

HIGHLIGHTS

UP TO 39% IMPROVEMENT IN DRY MATTER YIELD.

UP TO 9% CRUDE PROTEIN IMPROVEMENT.

28-52% NUTRIENT UPTAKE IMPROVEMENT FOR ALL SIX MACRO-NUTRIENTS.

LOWER FERTILIZER PLAN COSTS.

TRIAL DESIGN

PARTNER: WARWICK UNIVERSITY

LOCATION: UK

YEAR: 2014

- Corn harvested for silage is an important feed for animals, especially in areas where crop land for grazing is limited.
- Managed well the crop can provide a high yielding, nutrient rich, source of protein crucial for animal diets produced at a lower cost than grass silage.
- Silage corn is proven to be an effective route around the yield ceiling associated with grass silage dairy systems.
- The European Union grows ~5 million hectares silage corn equivalent to a potential 7mtpa POLY4 market[1].
- Potassium offtake from a corn silage crop is up to 10 times as much as a corn grain crop[2], the K_2O requirement is potentially 220 kg K_2O ha^{-1}.
- Where soil potassium levels are normal, agronomic practice dictates that off take is replaced by a fertilizer source nutrient.
- High quality mineral supplements can be incorporated into silage corn in order to create the optimal animal feed ration.

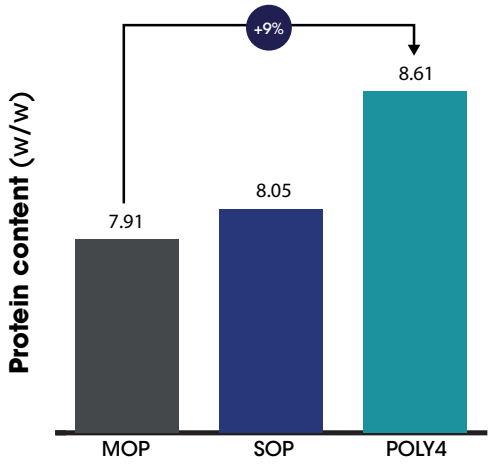
TREATMENT TABLE

TREATMENTS	AVERAGE NUTRIENT APPLIED IN TRIAL (kg ha^{-1})						
	N	P_2O_5	K_2O	CaO	MgO	S	Cl
Control	120	100	0	0	0	0	0
MOP	120	100	188	0	0	0	150
SOP	120	100	188	0	0	68	11
POLY4	120	100	188	224	81	256	40

CORN CRUDE PROTEIN CONTENT [3]

- POLY4 improves corn crude protein content which is important for animal nutritional value, POLY4 outperforms MOP by 9% and SOP by 7%.
- Crude protein content in corn silage should be ~8% for beef cattle.
- POLY4 elevates protein content making it a highly desirable fertilizer source for the silage crop.
- Silage grown on POLY4 minimises the supplementary protein required in the animal diet.

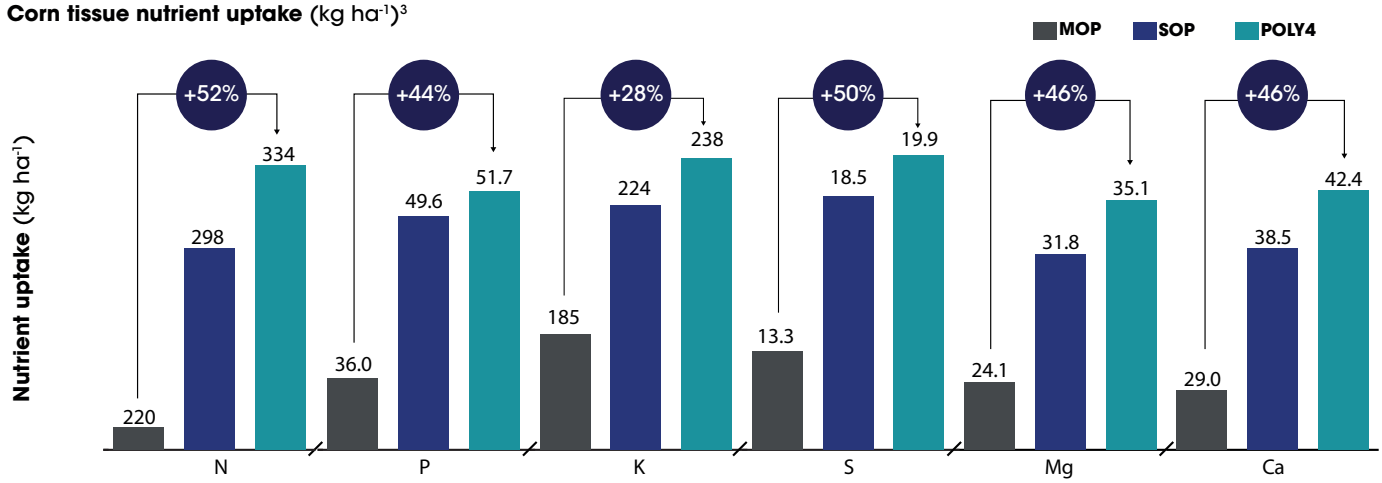
Corn crude protein content [1]



NUTRIENT UPTAKE

- POLY4's sulphate seems to be supportive of nitrogen uptake which appears to be linked to POLY4 nutrient release rates.
- Potassium is the highest demanded nutrient by corn and POLY4 supports 28% greater uptake compared to MOP.
- POLY4 seems to be the preferred source of macro-nutrients for corn, consistently improving nutrient uptake.

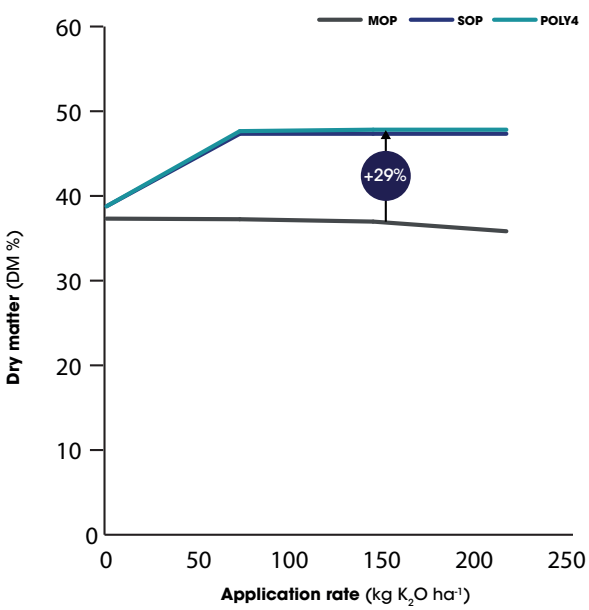
Corn tissue nutrient uptake (kg ha^{-1})[3]



DRY MATTER CONTENT (%)[4]

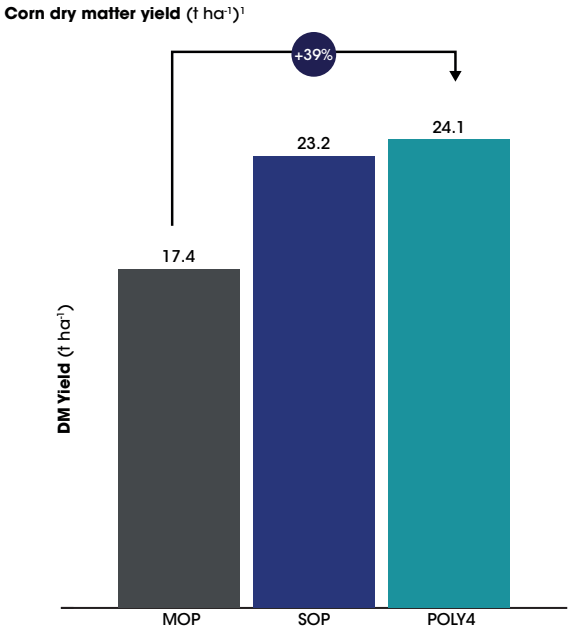
- POLY4 supports maximum tissue dry matter content, maintaining dry matter in a range which is not detrimental to animal digestion.
- A high moisture content is undesirable since it hinders fermentation.
- POLY4 is supportive of quality by reducing the risk of aerobic spoilage.
- In order to achieve a high-quality silage grade dry matter content should be 30+ % regardless of K_2O application rate POLY4 exceeds this benchmark.

Dry matter results (%)[1]



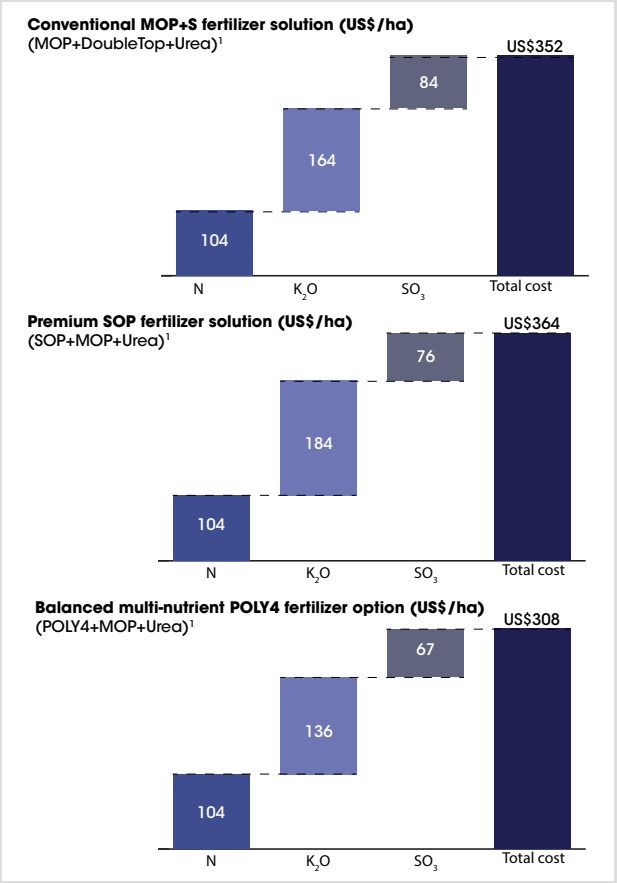
CORN DRY MATTER YIELD (US$ t^{-1})[5]

- The dry matter yield is the most important yield parameter.
- Dry matter yield represents the feed and energy value for the animal.
- POLY4 significantly outperformed MOP by 39% and outperformed SOP by 4%.



FERTILIZER ECONOMICS[5]

- POLY4 demonstrates an opportunity to improve farmers' margins.
- POLY4 is shown to be a high value source of potassium and sulphur providing nutrient requirements at a competitive price point, even at a high input cost of US$250/t.
- In addition, POLY4 supplies beneficial micro-nutrients not supplied by MOP or SOP.
- Sulphur containing potassium sources are the most economical choice for the farmer with POLY4 reducing total fertilizer cost by US$56/ha^{-1} over the SOP based option.



Notes: 1) FAO 2017; 2) The removal of plant biomass accounts for the additional nutrient offtake; 3) GENSTAT means; 4) GENSTAT exponential regression; 5) Assumed costs per hectare based on retail pricing available January 2015; SOP US$800/t, MOP US$450/t, Urea US$480/t, POLY US$250/t, commercial N/S top dressing (Double Top) US$450/t. Initial soil analysis pH 6.8; P 36 mg kg^{-1}, K 157 mg kg^{-1}, Mg 157 mg kg^{-1}, Ca 1554 mg kg^{-1}, SO_4 11.9 mg kg^{-1}.

Sources: Warwick University, Sirius Minerals 8000-WCC-8012-14.

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