TRIAL RESULTS
COTTON
TRIAL OBJECTIVES
To evaluate cotton’s response to potassium and sulphur from POLY4 compared to a synthetic alternative of MOP, Gypsum and Kieserite.

HIGHLIGHTS
US$40 INCREASE IN RETURN PER HECTARE
LINT YIELD INCREASED BY 3%
16% INCREASE IN SULPHUR UPTAKE
QUALITY INDICATORS MAINTAINED INCLUDING FIBRE LENGTH, STRENGTH AND UNIFORMITY

TRIAL DESIGN
PARTNER: VIRGINIA TECH
LOCATION: VIRGINIA, US
YEAR: 2015

- Potassium demand rises when the rounded seed capsules (bolls) are set on the plant, forming a K sink to retain sufficient water pressure for fibre elongation. Supply is therefore critical for cotton.
- Calcium plays a vital role in the development of lint.
- Virginia cotton production is grown on coastal plains which are often deficient in both potassium and sulphur.
- This trial was conducted in the south-eastern coastal plain of Virginia within a medium to high fertile soil with a sand to sandy loam texture.
- This response study with 34, 67, 101 and 134 kg K₂O per hectare was applied by hand prior to planting.
- Four row plots were established with an area of 45 m², with four replications per treatment in a randomised complete block design.

TREATMENT TABLE (kg ha⁻¹)

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>NUTRIENT APPLIED IN TRIAL (kg ha⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Control</td>
<td>112</td>
</tr>
<tr>
<td>MOP Balanced</td>
<td>112</td>
</tr>
<tr>
<td>MOP+POLY4 (50:50 K₂O)</td>
<td>112</td>
</tr>
</tbody>
</table>
YIELD RESULTS (kg ha⁻¹) ¹ ⁴

- Cotton lint describes the fibres harvested and collected into bales for use in textile manufacturing.

- MOP+POLY4 showed a 3% improvement over the MOP Balanced alternative.

ECONOMIC SUMMARY (US$/ha) ⁵

- Changing fertilizer inputs can increase a farmer’s margin. Calculating economic returns using different multi nutrient fertilizer plans highlights the optimal solution for cotton growers.

- POLY4 contributes to an effective multi nutrient fertilizer plan in supporting farmer margins.

- For this cotton trial, the inclusion of POLY4 into a blend delivered an increase in a farmer’s margin over input of US$40 per hectare. ³ ⁴ ⁵
NUTRIENT UPTAKE (kg ha⁻¹)

- Increasing sulphur uptake through the cotton plant and into the cotton is essential for yield improvements.
- The MOP+POLY4 fertilizer plan showed a 16% improvement in sulphur uptake in the entire cotton plant compared to the MOP Balanced blend.
- POLY4 can be incorporated into a fertilizer plan to supply the crop sulphur need and support the potassium, magnesium and calcium requirement, more effectively than conventional options.
- The MOP+POLY4 blend produced 46 kg per hectare higher seed cotton yield than the control blend and 18 kg more per hectare than the MOP Balanced blend.

Sulphur uptake (kg ha⁻¹)

<table>
<thead>
<tr>
<th></th>
<th>Seed cotton</th>
<th>Bracht</th>
<th>Stem</th>
<th>Leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.5</td>
<td>3.8</td>
<td>1.5</td>
<td>8.0</td>
</tr>
<tr>
<td>MOP Balanced</td>
<td>1.4</td>
<td>3.4</td>
<td>1.8</td>
<td>12.5</td>
</tr>
<tr>
<td>MOP POLY4 (50:50 K₂O)</td>
<td>1.5</td>
<td>3.5</td>
<td>2.1</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Notes: 1) GENSTAT means; 2) All treatments received 112 kg N ha⁻¹ and 45 kg P₂O₅ ha⁻¹ from AN and phosphorus solution source; 3) MOP+POLY4 was used in a ratio of 50:50 to meet the K₂O requirement; 4) MOP balanced was made from MOP, Gypsum and Kieserite.5) Fertilizer prices based on US East Coast 2016 Annual prices of MOP (US$233/t), POLY4 (US$200/t), Gypsum (US$25/t) Kieserite (US$250/t). Initial soil analysis P 35 mg kg⁻¹, K 73 mg kg⁻¹, Ca 211 mg kg⁻¹, Mg 33 mg kg⁻¹.