**TRIAL OBJECTIVE**

To compare soybean growth, yield and quality responses to MOP, SOP and POLY4.

**HIGHLIGHTS**

**UP TO 18% YIELD IMPROVEMENT**

**TOTAL NUTRIENT UPTAKE IMPROVED BY 18–23% FOR MACRO-NUTRIENTS**

**16% HIGHER BEAN PROTEIN YIELD**

**TRIAL DESIGN**

**PARTNER:** TEXAS A&M  
**LOCATION:** US  
**YEAR:** 2014

- The global soybean market is worth US$119 billion with US producing 32% and Brazil 30% in 2012¹.
- The equivalent K₂O consumption of POLY4 would be 72 Mt in US and 38.2 Mt in Brazil².
- 85% of soybean is used in meal or oil production, 6% consumed and 9% in manufacturing³.
- Plots were set out in a randomised complete block design with four replications.
- Soybean variety used was Vernal 36.
- Soils were predominately calcareous with a sandy clay loam texture.

**TREATMENT TABLE**

<table>
<thead>
<tr>
<th>TREATMENTS</th>
<th>NUTRIENTS APPLIED AT RECOMMENDED RATE (kg ha⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer</td>
<td>K₂O</td>
</tr>
<tr>
<td>MOP</td>
<td>90</td>
</tr>
<tr>
<td>SOP</td>
<td>90</td>
</tr>
<tr>
<td>POLY4</td>
<td>90</td>
</tr>
</tbody>
</table>

¹, ², ³: Source numbers are not provided in the text.
• POLY4 improved yields over MOP by 15% and SOP by 18% at the recommended application at 90 kg K₂O ha⁻¹ at 90 kg K₂O ha⁻¹.

• Improved yield with POLY4 indicates the value of the addition of magnesium and calcium.

• To maintain a yield of 3.2 t ha⁻¹, POLY4 can be used at 75 kg K₂O ha⁻¹ replacing offtake then supplying an additional 32 kg MgO, 67 kg CaO and 101 kg S ha⁻¹.

• Balanced nutrition is more effective thus an option presents itself to reduce inputs.

SOYBEAN YIELD (t ha⁻¹)⁴⁻⁶

- POLY4 drives significant improvements in nutrient uptake for N, K, S, Mg and Ca even on a high nutrient testing soil.

- Results indicate POLY4 supports improved fertilizer use efficiency.

- Improving the nutrient uptake means yields contain more nutrients essential for soybean meals.
• Commercial success of the soybean crop reflects yield and protein content in the harvested bean.

• POLY4, a vital component of a multi-nutrient fertilizer plan, supports a significant improvement over MOP at the recommended application rate of 90 kg K$_2$O ha$^{-1}$.[6]

• Using 50% less K$_2$O with POLY4 still maintains bean protein of 1.1 t ha$^{-1}$ compared to MOP at the recommended application rate of 90 kg K$_2$O ha$^{-1}$.[7]

Notes: 1) FAO 2017; 2) Based on the recommended rate of 90 kg K$_2$O ha$^{-1}$.[6]; 3) SoyaTech 2015; 4) GENSTAT regression analysis; 5) 35 kg N ha$^{-1}$ and 45 kg P$_2$O$_5$ ha$^{-1}$ was added to all treatments; 6) 23 kg K$_2$O t$^{-1}$ grain recommendation adapted from “The Fertilizer Handbook” TFI, 1982 with a 3.6 t ha$^{-1}$ yield; 7) GENSTAT means results over 50–250 kg K$_2$O ha$^{-1}$. Initial soil analysis pH 7.4; P 19 mg kg$^{-1}$, K 242 mg kg$^{-1}$, S 177 mg kg$^{-1}$, Mg 213 mg kg$^{-1}$, Ca 1029 mg kg$^{-1}$.

Sources: Texas A&M (2014) 0000-TAM-0027-14

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