POLY4

An Anglo American PLC Product

K_2O 14% | S 19% | MgO 6% | CaO 17%

Cotton and Soybean rotation

response to Anglo American's POLY4.

Trial focus

Evaluate the yield response of cotton and of soybean in rotation to NP + MOP + gypsum and POLY4 programme.

Overview

- In Bahia, cotton is grown in rotation with soybean. Soils in this region are sandy and low in pH and nutrients.
- Fertilisers are applied to the cotton crop. No fertiliser is applied to the soybean crop in the following year.
- Gypsum is also used, to supply calcium (Ca) which alleviates aluminium toxicity but displaces potassium (K) and magnesium (Mg) down the soil profile, making them less available for plants.
- While POLY4, phosphorus and potassium sources are spread at 36 metres, gypsum, being in powdered form, is spread at 12 metres. This necessitates the use of different spreading equipment and additional resources.

Crop:
Cotton - Soybean rotation

Year:
2018 - 2020

Location:
Bahia, Brazil

Data source:
Trials conducted by third-party, independent researcher

50 *kg/ha*
Cotton

150 *kg/ha*
Soybean

POLY4 programme yield advantage over MOP + gypsum treatment.

Treatments applied

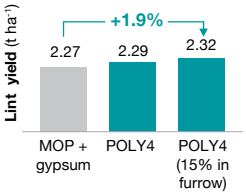
- Fertilisers were applied to the cotton crop in the first year, with no fertiliser for the rotational soybean crop in the second year.
- All cotton treatments received N and P applied at 160 kg N ha^{-1} and 100 kg P_2O_5 ha^{-1} with MAP and urea.
- MAP applied in the furrow, and urea broadcast half at 25 days after emergence (DAE) and half 45 DAE of cotton.
- K fertilisers evenly split between 30 and 60 DAE. For the in-furrow treatments, 16% of the K was applied in the furrow and the rest at 30 and 60 DAE.

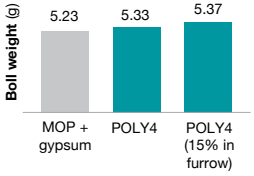
Average nutrients applied (kg ha^{-1})

	K_2O	S	MgO	CaO
NP + MOP + gypsum	180	179	0	332
POLY4	180	251	77	219
POLY4 (15% in furrow cotton)	180	251	77	219

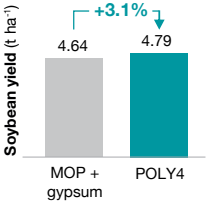
Results

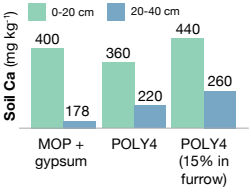
Cotton (year 1)





Soybean (year 2)





Conclusion

- The results demonstrate that POLY4 offers the benefits of a balanced, season-long crop nutrition helping to increase yield potential.
- POLY4 practice increased cotton yield over NP + MOP + gypsum practice outperforming it by 1.9%. A residual benefit of POLY4 was observed in the soybean crop in year 2, with a 3.1% yield increase.
- Potassium applied in-furrow as a starter fertilizer can supress root growth at high levels due to the osmotic effect of increased soil salt levels. The results show that POLY4 was safe to apply in the furrow with MAP.
- Compared to gypsum, POLY4 treatments increased the Ca in the 20-40 cm depth of soil, which can decrease aluminium toxicity, encouraging roots to grow deeper.
- POLY4 Ca can be supplied to crops in one application with other nutrients. This dramatically reduces both the number of field runs and labour costs.

Notes: POLY4 yield and TGW results for soybean are an average of plots that received POLY4 in the furrow and those that did not.
Source: Cotton-Soybean Rotation. POLY4 application rate was 380 kg POLY4 ha^{-1}.