TRIAL RESULTS

WHEAT

JIANGSU PROVINCE, CHINA (2014)

HIGHLIGHTS

7% yield improvement over MOP.

Increased fertilizer margin by US$91/ha.

Significant improvement in nutrient uptake.
OVERVIEW

• In 2016 China had over 24 million hectares of wheat and was the largest wheat producer in the world producing 131 million metric tonnes.¹

TRIAL OBJECTIVE

To assess wheat response to potassium fertilization from MOP and POLY4 in China.

PARTNER: Institute of Soil Science, Chinese Academy of Science
LOCATION: Suqian, Jiangsu Province, China
YEAR: 2014

METHODOLOGY

• Autumn drilled wheat field trials were carried out in central China in Suqian, Jiangsu Province.
• Soil was a silty loam.
• N and P₂O₅ were applied at local recommended rates as urea and MAP.
• Crop production with POLY4 was compared to MOP at different rates (45, 90 and 130 kg K₂O ha⁻¹). Mean data is presented.
• The trial was a randomised block design with four replications using 30 m² plot.

TREATMENT TABLE²⁴

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>MgO</th>
<th>CaO</th>
<th>S</th>
<th>Cl⁻</th>
</tr>
</thead>
<tbody>
<tr>
<td>N + P (control)</td>
<td>140</td>
<td>95</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MOP</td>
<td>140</td>
<td>95</td>
<td>88</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>71</td>
</tr>
<tr>
<td>POLY4</td>
<td>140</td>
<td>95</td>
<td>88</td>
<td>38</td>
<td>107</td>
<td>119</td>
<td>19</td>
</tr>
</tbody>
</table>
YIELD IMPROVEMENT OVER MOP

- Wheat grain yield was increased by adding K from either MOP and POLY4 compared to N + P (control). However, POLY4 improved yield by 7% compared to MOP.

INCREASED MARGIN

- Balanced crop nutrition delivered by POLY4 improved grain fill and increased the efficiency of resource allocation.

- POLY4 had the best fertilizer margin.
Plant population can limit yields.

Over-winter survival and cold tolerance of cereals was improved by good nutrition, particularly by N and K.

POLY4 fertilizer treatment increased wheat survival through winter.

Manganese is important for protecting plants from both abiotic and biotic stresses and for efficient photosynthesis.

Boron is essential for good seed set.

• Manganese uptake (g ha⁻¹)
  - N + P: 57
  - MOP: 71
  - POLY4: 82

• Boron uptake (g ha⁻¹)
  - N + P: 15
  - MOP: 55
  - POLY4: 131

Notes: 1) FAOSTAT data (2017); 2) All plots received 140 kg N ha⁻¹ and 95 kg P₂O₅ ha⁻¹ from urea and MAP; 3) Genstat means; 4) Initial soil analysis: pH 8.1; EC 429 µS cm⁻¹; 57 mg K kg⁻¹; 750 mg Ca kg⁻¹; 57 mg Mg kg⁻¹; 92 mg S kg⁻¹; 5) Results presented are based on data from Genstat ANOVA at average rate of 90 kg K₂O ha⁻¹; 6) Fertilizer prices obtained from CRU are 2014 annual prices for China: MOP (US$310/t), POLY4 (US$200/t), urea (US$278/t) and MAP (US$256/t); spreading cost (US$10.78/t) and wheat price from FAOSTAT (US$377/t). Fertilizer margin is crop output minus cost of fertilizer material and spreading.

Sources: Institute of Soil Science, Chinese Academy 2014 (20000-CAS-20011-14).