**MGA Trials 2015**  
Neil Groom Technical Director Grainseed Ltd  
Sulphur for Maize  
Maize under plastic variety trial

### Why sulphur?
Combinable crops and grassland show good response to additional Sulphur – WHY NOT MAIZE?
Historically 20-40kg S deposited, now 1-4kg/ha
Sulphur used for protein, deficiency results in smaller leaves and reduced chlorophyll (photosynthesis)
Application of S on grass in deficient sites increases dry matter by 10-30%

### NIABTAG recommendations
Sulphur recommendations: summary
Winter OSR – 75 - 100 kg/ha SO₃ (30-40 kg/ha S)
Spring OSR – 50 - 60 kg/ha SO₃ (25-32 kg/ha S)
Cereals – 25 - 30 kg/ha SO₃ (10-15 kg/ha S)

### MGA SULPHUR TRIAL 2012 Harper Adams University
2 Replicated Trials
- Four gates FYM, no bagged N
- Flatt nook no FYM history, 150kg AN split dose
4 different rates applied as elemental sulphur – Brimstone 90
  - 0%
  - + 10%
  - + 20%
  - + 40%

<table>
<thead>
<tr>
<th>Sulphur level (t/ha)</th>
<th>% Dry Matter</th>
<th>Fresh Yield (t/ha)</th>
<th>Dry Matter (t/ha)</th>
<th>%</th>
<th>Yield (t/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>21.3</td>
<td>54.0</td>
<td>11.5</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>21.8</td>
<td>58.8</td>
<td>12.8</td>
<td>109</td>
<td>0.16</td>
</tr>
<tr>
<td>20%</td>
<td>21.8</td>
<td>57.7</td>
<td>12.6</td>
<td>109</td>
<td>0.16</td>
</tr>
<tr>
<td>40%</td>
<td>22.0</td>
<td>58.3</td>
<td>12.9</td>
<td>112</td>
<td>0.16</td>
</tr>
</tbody>
</table>

**2012 Conclusions**
Statistically no benefit, but systematically increased yields
Visually greener, larger leaf in August
Cost of sulphur paid for by increased yield
Nutrient budgeting essential
**MGA Maize Sulphur Trial 2015 - Treatments**

- Ammonium N (17.5kg N/ha bagged fert)
- Ammonium Sulphate to supply 20kg S
- Ammonium N (35kg N/ha bagged fert)
- Ammonium Sulphate to supply 40kg S
- Ammonium N (52.5kg N/ha bagged fert)
- Ammonium Sulphate to supply 60kg S
- None

Sulphur applied as Ammonium sulphate = 40% S

All plots drilled as Ballade and thinned to standard pop.

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**SOIL ANALYSIS REPORT**

Plants absorb sulphates, not sulphur

Sulphates water soluble and leach like Nitrogen

Stored within organic matter in the soil

Plant tissue tests showed no differences in S level

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**Additional Sulphur is important for maize when:**

- Light and sandy soils
- Low organic matter soils
- Where deficiency known in other crops
Previous advice to members was from trials in Northern and Southern Ireland.

Crop performance 'with' and 'without' Plastic Mulch

<table>
<thead>
<tr>
<th>Sowing Date</th>
<th>Total yield T/ha</th>
<th>DM Content %</th>
<th>Starch yield T/ha</th>
<th>Starch Content %</th>
<th>ME yield GJ/ha</th>
<th>ME Content MJ/kg</th>
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<tbody>
<tr>
<td>Plastic mulch</td>
<td>30 Jul 15.5</td>
<td>15.9</td>
<td>25.7</td>
<td>37.7</td>
<td>171.1</td>
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<tr>
<td>Open</td>
<td>15 Aug 12.7</td>
<td>18.0</td>
<td>3.6</td>
<td>26.0</td>
<td>158.0</td>
<td>15.8</td>
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<tr>
<td>Plastic</td>
<td>19 days</td>
<td>2.0</td>
<td>0.0</td>
<td>2.1</td>
<td>6.0</td>
<td>0.6</td>
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</table>

Climate and growing conditions in UK could be different (drier) so in 2014 the first replicated trials were conducted by MGA.

The three trials were undertaken by SAMCO and overseen by MGA members.

Varieties identified by the breeders

UK Maize Under Film Descriptive List 2015

Drilled 24 April

Harvested 29 September

Maize Heat Units Analysis

2015 By Region

-7% -5% -12% -5% -10% -7% -3% -8% -4%

Drilled 24 April

Harvested 29 September

Air temperature from 2014 season

Average temp under film 29.3 / Average temp open 16.7

Start of maize growth 10°C

Air temperature from 2016 season

Average temp under film 23.8 / Average temp open 13.7

Start of maize growth 10°C

Varieties identified by the breeders
Agronomy of sites
SAMCO drill applied Green 28 Pinhole plastic + pre-em herbicides:
Pendimethalin (Stomp Aqua) @ 1 l/ha + Chlorimuron-ethyl + pendimethalin (Wing-P) @ 4 l/ha.

SRUC Dumfries – Drilled 22 April. Harvested 20 November. 28m Ht above sea level
Exeter – Drilled 17 April. Harvested 20 September. 138m Ht above sea level
Chester – Drilled 19 April. Harvested 20 September. 25m Ht above sea level

3 replicates drilled and harvested separately to enable statistical analysis
Graeme and Patrick Cock
Ashburton, Exeter
• Steep slopes
• High genetic cows

<table>
<thead>
<tr>
<th>DM (%)</th>
<th>Dry Yield (t/ha)</th>
<th>Starch (%)</th>
<th>ME Mj/ha</th>
<th>Starch Yield</th>
<th>ME Yield</th>
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<td>5.0</td>
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<td>19.2</td>
<td>21.3</td>
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<td>LG 30.212</td>
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<td>15.5</td>
<td>6.0</td>
<td>10.5</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Best plastic varieties approaching 30% starch; non-plastic 0%

MGA Plastic trial – Devon 24 Sept 2015

MGA Plastic trial – Cheshire 20 Sept 2015

No plastic used on farm crop, earlier and more quality from the plastic plots
Early sown no plastic  Early sown plastic

MGA Plastic trial – Dumfries 20 November 2015

<table>
<thead>
<tr>
<th>DM (%)</th>
<th>Dry Yield (t/ha)</th>
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<th>Starch Yield</th>
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<tr>
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<td>29.6</td>
<td>10.5</td>
<td>4.4</td>
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<tr>
<td>Ambition</td>
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<td>11.9</td>
<td>31.9</td>
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<td>3.8</td>
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<tr>
<td>Mas 16v</td>
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<td>13.3</td>
<td>10.2</td>
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<td>Abgar</td>
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<tr>
<td>Non plastic</td>
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<td>7.4</td>
<td>0.0</td>
<td>10.7</td>
<td>0.0</td>
</tr>
</tbody>
</table>

No colour in grains of non plastic plots, plastic always used in Scotland now

Challenges with plastic:
• Local contractor kitted up for plastic
• High level of care and attention by drill operator
• Requires deep stone free soil
• Excellent weed control essential

Extra investment paid for?

Maize – Still an economic feed for 2016

<table>
<thead>
<tr>
<th>Feed</th>
<th>Crop Cycle</th>
<th>Harvest</th>
<th>Yield (t/ha)</th>
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</thead>
<tbody>
<tr>
<td>Seed</td>
<td>17.5</td>
<td>99%</td>
<td>16</td>
</tr>
<tr>
<td>Stalk</td>
<td>17.5</td>
<td>99%</td>
<td>16</td>
</tr>
<tr>
<td>Sugar</td>
<td>17.5</td>
<td>99%</td>
<td>16</td>
</tr>
<tr>
<td>Silage</td>
<td>17.5</td>
<td>99%</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>17.5</td>
<td>99%</td>
<td>16</td>
</tr>
</tbody>
</table>

Thanks to:
Matt Shine and the team at SAMCO
NIAB for harvesting Devon
Harper for quality and stats analysis
Host growers:
Graeme and Patrick Cock
John and Kath Cottle
Hugh McClymont at SRUC Dumfries

Plastic cost = £1171/ha
Av DM yield = 15.8t/ha = £74/t DM

£250/ha = £100/acre

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