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Want to add a bit of competition to the 2017 season?
Enter the BBRO’s Beet Yield Competition – find out more on page 51
FIREFLY

LIGHTING YOUR WAY TO HIGHER YIELDS AND LOWER BOLTING

Newly Recommended to the 2017 BBRO List, FIREFLY highlights what the UK market needs: higher yield, lower bolting and excellent establishment. Whilst some varieties flicker or fade SESVANDERHAVE varieties endure, remaining the preferred choice for enlightened growers.

SESVANDERHAVE UK LIMITED Grantham Road, Wellingore, Lincoln, LN5 0HH, UK

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The British Sugar Beet Review

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2 CPD points
**Industry update from British Sugar,**

**British Sugar update**

**A new season underway!**

As I write this piece drilling of the 2016 crop is well underway with well over 50% of the crop drilled to date. Regular and heavy rainfall has caused delays in a few areas, especially on the heavier soil types but hopefully the weather will be kind to us and we will get the rest of the crop in during the normal drilling window.

The 2016 crop will be the last crop of the current sugar regime and the 2017 the first of the new arrangements where national sugar quotas no longer exist. We all know the new trading environment will result in a market place that is much more competitive but we are confident that by working closely with the NFU and growers we will be able to collectively compete in that environment to the benefit of both growers and British Sugar.

Key to our competitiveness is continuing to enhance our sugar beet yields and I know that continued yield advancement is very much at the forefront of the BBRO team’s minds. Our yield progression has been superb in recent years and there is no reason why that can’t continue (Fig. 1). Following the very successful Fig. 1 – Beet yield.

**BBRO update**

**Collaboration will be key to delivering yield**

Whilst BBRO is a relatively small levy organisation we have built a strong reputation for working collaboratively. This has helped us identify partners who we believe will be able to ensure BBRO continues to ‘punch’ well above its weight, developing the UK beet industry and ensuring it continues to be competitive in the future. One such collaboration is with BSPB, and I am delighted to announce that we will be continuing to work with them on delivering the Recommended List varieties programme. This will be a four year agreement and a vital part in the engine room of our focus on yield improvement.

BBRO has also strengthened its links with other Research Institutes and has a strong presence on the IIRB (International Institute of Beet Research) with BBRO holding the presidency and Dr. Mark Stevens about to take the chair role of the Scientific Advisory Board. There are a number of working groups on which BBRO is well represented.

These groups enable a sharing of current research and an opportunity to discuss current challenges. They cover the following topics and include Genetics and Breeding, Seed Quality and testing, Plant and Soil, Weed Control, Pest and Diseases, Beet Quality and Storage.

BBRO are pleased to represent the sugar industry as a member of SARIC (Sustainable Agriculture Research and Innovation Club). This club has access to a much larger source of funding (£10 million) thus giving us an influence over the type of research projects that are funded. One of our key drivers is to ensure new research has a clearly defined output and the outcome of any

**NFU update**

**World Sugar Market – Spring 2016**

Sugar is one of the world’s most volatile soft commodities. Global demand for sugar is actually quite predictable, increasing at a rate of around 2% per year. It is the supply side factors, such as harvest quality and volume, the effects of weather (for example, El Nino in 2015/16), and the proportion of the sugar harvest used for bioethanol production in Brazil (as the world’s largest producer), which influences the sugar price. Stock levels and exchange rates also play a role, in particular the Brazilian Real against the US Dollar. Brazil is the world’s biggest exporter and sugar markets are traded in US Dollars.

The world sugar market in the Spring of 2016 has recovered from the lows seen six months previously. Excess global production over consumption since 2010 has led to a record build-up of sugar stocks in excess of 80 mt (Fig. 1). As a result, raw sugar prices (New York No. 11 futures contract) fell to a seven year low of 10.39¢/lb ($228/tonne) in August 2015. White sugar futures (London No. 5 futures contract) also showed a similar trend, falling to $333/tonne.

Beginning in September 2015 a number of sugar analysts issued forecasts of a sugar deficit (where consumption exceeds production) for 2015/16 (Fig. 1). Raw and white sugar prices responded accordingly, with the former rising by 50% in two months (Fig. 2, priced in US$/tonne), before falling back before Christmas on a weakening Brazilian Real against the US Dollar.

Since Christmas, global sugar markets have witnessed large price swings as a result of conflicting information (Fig. 2). The drought caused by the El Nino event has reduced the sugar harvest in countries such as Thailand, India and Australia. This, combined with overall net long sugar positions on the futures exchanges resulted in a rally in prices between the beginning of February and March 2016. Since then, prospects for an excellent harvest in Brazil during 2016 and a weakening of that currency against the dollar have put pressure on prices, although both raw and white prices are still more than 25% higher than in August 2015.

**Fig. 1 – Global sugar balance showing a surplus between 2010/11 and 2014/15. A 5 mt sugar deficit is predicted for 2015/16.**

(Source: International Sugar Organisation (ISO)).
The EU market does not have its own white sugar futures contract. Instead, the EU Commission issues monthly price reporting data. This data is not spot price data – instead it is an average of prices during a particular month (and reflects contracts signed in the past). As a result the EU price tends to lag the world white sugar price by 6-12 months. The EU sugar price in January 2016 was €429/t, and is beginning to recover from the record lows seen in the summer of 2015. The EU price and world prices (converted to GBP sterling) are shown in Fig. 3.

In conclusion, the global sugar market is beginning to recover from five years of falling prices caused by excess production. Although global prices have a long way to go to reach the highs seen in 2010, a forecast deficit sugar balance should reduce stocks and lend support to prices in the medium to long term.

Pamela J. Forbes
NFU Chief Sugar Adviser

BBRO Technical Meetings the team have focussed on redesigning the spring BBRO open days to keep the focus on supporting growers to achieve even higher yields. I hope you found this season’s Field Demonstration Days beneficial.

Don’t forget to read the article in this edition on the exciting Anaerobic Digestion plant for the production of biogas being built at our Bury St. Edmunds factory. This plant will have the capacity to use 97,000 tonnes of pressed sugar beet pulp and generate five megawatts of electricity for export to the local grid. This is a £15 million plant and part of a wider investment programme across all our sites. By focusing on our improvement plans and continuing to work together with our growers, the NFU and other stakeholders, the UK beet sugar industry can have a successful and sustainable future for all concerned.

Finally, you may be aware that during March this year Paul Kenward joined British Sugar as the new Managing Director to lead the business through the next steps of regime reform and the next phase of our business’s development. I know Paul understands the importance of and is very keen to develop, strong and sustainable relationships with the NFU and our growers. He is already gaining an understanding of the challenges and opportunities that exist for our growers and will be visiting our growing areas and key agricultural events during the season so hopefully you will get a chance to meet him. If you are at one of these events please say hello to him I know he would really appreciate that!

Colm McKay
British Sugar
Agriculture Director

Developing technology and its application is key and examples of this can be seen in a number of the projects we are currently working on with other research/industry groups. These are being presented to all our stakeholders in the form of an annual report which covers the current research programmes undertaken on your behalf. With a brief summary, overview of project developments and key messages it will provide a clear vision of the scope of our work and the outcomes we are targeting. We hope you find this a valuable additional resource.

Colin MacEwan
Head of BBRO

Fig. 2 – New York No. 11 (Raw) and London No. 5 (White) sugar prices – August 2015 to present.

The EU market does not have its own white sugar futures contract. Instead, the EU Commission issues monthly price reporting data. This data is not spot price data – instead it is an average of prices during a particular month (and reflects contracts signed in the past). As a result the EU price tends to lag the world white sugar price by 6-12 months. The EU sugar price in January 2016 was €429/t, and is beginning to recover from the record lows seen in the summer of 2015. The EU price and world prices (converted to GBP sterling) are shown in Fig. 3.

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Pamela J. Forbes
NFU Chief Sugar Adviser
Five new varieties are added to the BBRO/BSPB Recommended List (RL) of Sugar Beet Varieties for 2017 sowing. From KWS UK Ltd: Darnella KWS and Alisha KWS; from Limagrain UK Ltd: BTS 260 and BTS 860; from SESVanDerHave UK Ltd: Firefly. All represent either improvement in yield potential or offer other agronomic benefits over other listed varieties.

The Descriptive List (DL) is augmented with three new Beet Cyst Nematode (BCN) tolerant varieties: Cantona KWS from KWS UK Ltd, Davy from Strube UK Ltd, Flixter from Syngenta UK Ltd.

Seed of commercial varieties are supplied for RL trials by five UK agents (KWS UK Ltd, Limagrain UK Ltd, SESVANDERHAVE UK Ltd, Strube UK Ltd and Syngenta UK Ltd). All seed is pelleted and coated by Germains Seed Technology. Commercial seed is maintained by the continental parent companies with Betaseed GmbH acting as the maintainer for the commercial varieties marketed by Limagrain.

All listed varieties have partial resistance to standard strains of rhizomania. Sandra KWS also has enhanced partial resistance to the AYPR strain of the disease.

Recommended List – yield potential

The difference in yield between recommended varieties and their stability of performance will be the main criteria for selecting a variety. However, differences of less than 3% may not be statistically significant and should be treated with caution. The RL yield data are presented as a three-year mean based on 24 trials in total (nine in 2013, eight in 2014 and seven in 2015). Yield figures are derived from plots with an average established population of 104,000 plants/ha. Yield ratings are presented in comparison to the mean of five control varieties of the year. In 2015 these were Cayman, Lipizzan (no longer listed), Pasteur, Springbok and SY Muse. Figure 1 shows the annual mean yields recorded for the individual recommended varieties, and illustrates their consistency of performance over the past three years.

Bolting

As part of the RL programme, early-sown trials are carried out each year to screen varieties for bolting from sequential early sowing dates; these are included in the RL and DL tables as the numbers of bolters per hectare from early sowing. Bolters are also recorded from the yield trials and expressed as the numbers from normal sowings in the RL and DL tables. The bolting figures in the tables are calculated assuming a final plant population of 100,000 plants/ha. Risk of bolting will increase with all varieties in colder areas and fields that are north facing and/or are slow to warm up.

Table 1 shows the annual levels of bolters recorded, for the RL varieties, from both trials series from 2013 to 2015. The early-sown trials have drilling dates ranging from the 21st February to the 5th March. These dates are earlier than most commercial drillings and therefore the numbers of bolters recorded are high. The figures are higher than previously reported as, in order to clarify the difference between the varieties, all trials sown before the 5th March are now included in the analyses. The early-sown data indicates the increased risk of bolting if sowing earlier than the 5th March and/or extreme vernalisation takes place.

Growers should use the early-sown figures to select varieties if they are intending to sow in the first two weeks of March. In most seasons, for sowing after mid-March, the...
Establishment

Establishment figures in the Recommended Lists (Tables 5 and 6) are plant populations presented as % of controls. All trials were sown at 9 cm and thinned to produce an average population, for yield determination, of 104,000 plants/ha. Pre-thinning plant counts were used to prepare the establishment ratings.

Whilst this is not a true record of establishment (as number of seeds sown is not counted but is calculated from known drill settings) it does indicate the small differences that exist between recommended varieties. For early sowings, and on fields with a record of low populations, varieties with higher levels should be chosen, after other factors such as bolters and yield potential are taken into account.

Growers are advised to adjust seed rates according to the season’s conditions and after consulting germination figures published by British Sugar for each commercially prepared seed lot. Paying particular attention to plant populations will pay dividends through to harvest time. Typical field establishment is somewhere around 80%, which suggests a drilling rate of 1.25 units/ha to establish 100,000 plants as recommended by the BBRO.

Table 1 – Mean and annual bolter levels recorded from early-sown trials and yield trials (normal sowing). Varieties are ranked in ascending order of mean levels of bolters from early sowings.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Bolters per ha (based on 100,000 plants/ha)</th>
<th>Early sowing (sown on or before 5th March)</th>
<th>Normal sowing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean of controls</td>
<td>8,086</td>
<td>13,997</td>
<td>3,392</td>
</tr>
<tr>
<td>Haydn</td>
<td>3,121</td>
<td>3,581</td>
<td>1,692</td>
</tr>
<tr>
<td>Firefly</td>
<td>3,355</td>
<td>4,768</td>
<td>841</td>
</tr>
<tr>
<td>Pasteur</td>
<td>5,166</td>
<td>5,683</td>
<td>2,342</td>
</tr>
<tr>
<td>Stingray</td>
<td>6,145</td>
<td>7,750</td>
<td>2,508</td>
</tr>
<tr>
<td>Cayman</td>
<td>7,147</td>
<td>8,290</td>
<td>3,853</td>
</tr>
<tr>
<td>Sabatina KWS</td>
<td>8,954</td>
<td>17,750</td>
<td>2,133</td>
</tr>
<tr>
<td>BTS 340</td>
<td>9,447</td>
<td>43,259</td>
<td>862</td>
</tr>
<tr>
<td>SY Muse</td>
<td>9,471</td>
<td>26,227</td>
<td>2,631</td>
</tr>
<tr>
<td>Hornet</td>
<td>9,740</td>
<td>15,032</td>
<td>2,917</td>
</tr>
<tr>
<td>BTS 860</td>
<td>10,143</td>
<td>25,915</td>
<td>3,989</td>
</tr>
<tr>
<td>Springbok</td>
<td>10,561</td>
<td>15,788</td>
<td>4,741</td>
</tr>
<tr>
<td>Salamanca KWS</td>
<td>11,359</td>
<td>30,769</td>
<td>2,027</td>
</tr>
<tr>
<td>BTS 260</td>
<td>12,183</td>
<td>43,361</td>
<td>1,924</td>
</tr>
<tr>
<td>Alisha KWS</td>
<td>12,646</td>
<td>51,481</td>
<td>3,027</td>
</tr>
<tr>
<td>BTS 470</td>
<td>15,788</td>
<td>26,669</td>
<td>4,794</td>
</tr>
<tr>
<td>Darnella KWS</td>
<td>18,724</td>
<td>32,651</td>
<td>9,447</td>
</tr>
</tbody>
</table>

Note: the large variation in the annual figures is due to different weather conditions affecting the levels of vernalisation and hence premature flowering (bolting). In order to allow for this, the mean levels are calculated using transformed data. Individual trial results can be seen on the BBRO website – www.bbro.co.uk/varieties.

ratings from normal sowings are applicable. Varieties that are most suited to early sowing due to lower bolting risk are Haydn, Firefly, Pasteur, Stingray and Cayman.

Varieties that should not be sown before mid-March, due to their propensity to produce higher levels of bolters, are: Darnella KWS, BTS 470, Alisha KWS and BTS 260.

Most varieties show low levels of bolters from normal sowings with Haydn, Pasteur, BTS 860, Sabatina KWS and SY Muse being the lowest.

Disease resistance

Varieties are included in special inoculated trials to assess their reaction to rust and powdery mildew but are not taken to yield. The powdery mildew trial receives no fungicide spray whilst the rust trial is treated with quinoxifen, if needed, to retard the build-up of natural infection of powdery mildew. Ratings for resistance calculated from these trials are given in the lists (Tables 5 and 6).

The data matrices for rust and powdery mildew are incomplete for some varieties; these are denoted in Tables 5 and 6 with bracketed figures. Whilst figures in the RL/DL normally use the mean of the most recent three years of trials, those for disease control are an exception. The low disease incidence in the powdery mildew and rust trials in 2012, 2013...
and 2014 meant that no meaningful data were collected. Therefore the data in the RL/DL tables uses data from 2009, 2010, 2011 and 2015. The data matrices are available to view on www.bbro.co.uk/varieties.

All yield trials are treated with fungicide to control foliar diseases. A fungicide spray programme is recommended by BBRO to control diseases, with rust being more critical for later-lifted crops.

Other characters

There is no evidence from these trials to indicate that any recommended varieties show any response to later lifting or greater frost tolerance. No records are currently taken on crown size or top size because differences between modern diploid varieties are small.

Impurities (sodium, potassium and amino nitrogen) are measured as part of sugar juice quality assessments. At present there are no important differences between varieties so these characters are not presented in the tables. The full data sets are available to view on www.bbro.co.uk/varieties

Recommended categories

Provisionally Recommended varieties (PR) are tested for a minimum of three years before being added to the list in PR1. They are tested for a minimum of three further years before potential promotion to the fully Recommended (R) group.

The number of varieties included in trials in 2015 are shown in Table 2.

Of the 13 varieties included in year-3 testing in 2015, five were added to the Recommended List for 2017; three were added to the Descriptive List.

Table 4 – Mean and annual bolter levels recorded from early-sown trials and yield trials (normal sowing). Varieties are ranked by type in ascending order of mean levels of bolters from early sowings.

<table>
<thead>
<tr>
<th>Bolters per ha (based on 100,000 plants/ha)</th>
<th>Early sowing (sown on or before 5th March)</th>
<th>Normal sowing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2013</td>
<td>2014</td>
</tr>
<tr>
<td>Mean of controls</td>
<td>8,086</td>
<td>13,997</td>
</tr>
<tr>
<td>Mean no. vernalising days</td>
<td>38</td>
<td>51</td>
</tr>
<tr>
<td>AYPR</td>
<td>25,792</td>
<td>50,880</td>
</tr>
<tr>
<td>BCN</td>
<td>3,305</td>
<td>9,593</td>
</tr>
<tr>
<td>Flixtor</td>
<td>7,110</td>
<td>31,885</td>
</tr>
<tr>
<td>Cantona KWS</td>
<td>7,511</td>
<td>20,777</td>
</tr>
<tr>
<td>Aurora</td>
<td>9,666</td>
<td>11,677</td>
</tr>
<tr>
<td>Davy</td>
<td>12,836</td>
<td>33,119</td>
</tr>
<tr>
<td>Leesha KWS</td>
<td>13,488</td>
<td>28,174</td>
</tr>
</tbody>
</table>

Note: the large variation in the annual figures is due to different weather conditions affecting the levels of vernalisation and hence premature flowering (bolting). In order to allow for this, the mean levels are calculated using transformed data. Individual trial results can be seen on the BBRO website – www.bbro.co.uk/varieties.
longer period and mostly with seed from commercially available seed lots after PR1. See the BBRO website (www.bbro.co.uk/varieties) for further information on seed provenance of all recommended varieties. Many PR1 varieties are potentially high yielding and should be considered for selection. Variety selection is not necessarily all about yield and consistency of performance: additional characters e.g. bolting, establishment, disease resistance and sugar content are factors that should be taken into consideration.

If selecting a range of varieties it may be beneficial to make selections of material from different genetic backgrounds (breeders).

Varieties for specific use

There are seven varieties in this category: one for use where the AYPR strain of rhizomania is present, and six for use in Beet Cyst Nematode (BCN) infected fields. All of the BCN tolerant varieties have partial-resistance to standard rhizomania

Annual variation in sugar yield under non-infected conditions for both characters is shown in Fig. 2.

Bolting

All varieties are included in early-sown trials to assess bolting risk. Table 4 shows the annual levels of bolting recorded from these trials as a % of the control mean values.

Growers should use the early-sown figures to select varieties if they are intending to sow in the first two weeks of March. In most seasons, for sowing after mid-March, the ratings from normal sowings are applicable. DL varieties that are most suited to early sowing due to lower bolting risk are Thor, Flixter and Cantona KWS.

DL varieties that should not be sown before mid-March, due to their propensity to produce higher levels of bolters, are: Sandra KWS, Leesha KWS and Davy.

Beet cyst nematode tolerance

There are six BCN tolerant varieties which are listed for use only under BCN-infested conditions. In non-infected situations most are generally lower-yielding than non-tolerant material and should not be considered unless BCN is confirmed in the field. BCN tolerance does not apply to free-living nematodes such as those causing Docking Disorder. The BCN tolerance breeding technology has been demonstrated, in independent testing in the UK and mainland Europe, to give yield benefits under BCN infested conditions. The Recommended List is not indicative of the performance of BCN varieties under nematode infestation. With tighter rotations, BCN could be an increasing problem in some beet rotations but generally this problem remains patchy within fields. It should be remembered that oilseed rape and many other brassica crops act as good hosts for BCN too. Growers are advised to consider an integrated approach which includes soil sampling, rotation and drilling date to minimise damage.

Based upon breeders’ submissions, the BCN varieties are listed as tolerant to BCN-infection. These types are able to produce higher yields under BCN infected conditions and may also

1 Tolerance = A variety that is infected by a pathogen to the same extent as a susceptible variety, but expresses little or no symptoms and, in comparison with a susceptible variety, has increased yield performance in the presence of the pathogen.
## Overview of Sugarbeet Varieties

### Recommended List 2017

The yields, bolting, disease ratings and plant populations were determined in uninfected situations (no AYPR or BCN present).

<table>
<thead>
<tr>
<th>Variety</th>
<th>Year</th>
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**Adjusted yield**

<table>
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<th>Variety</th>
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<th>Variety</th>
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**Recommended List**

- BTS 470
- Alisha KWS
- Earley
- Flixter
- Haydn
- Leesha KWS

### Performance Summary

#### Bolters per ha

- BTS 470: 5,110
- Alisha KWS: 2,976
- Earley: 2,312
- Flixter: 96
- Haydn: 80
- Leesha KWS: 114

#### Disease Ratings

- BTS 470: 18.3%
- Alisha KWS: 18.3%
- Earley: 18.3%
- Flixter: 99.1%
- Haydn: 99.1%
- Leesha KWS: 99.1%

#### Plant Populations

- BTS 470: 9,447
- Alisha KWS: 8,043
- Earley: 8,043
- Flixter: 8,043
- Haydn: 8,043
- Leesha KWS: 8,043

### Additional Notes

- The yields, bolting, disease ratings and plant populations were determined in uninfected situations (no AYPR or BCN present).
- Adjusted yield is provided for comparison.

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*Recommended List 2017 - Recommended list of sugar beet varieties for 2017 (arranged by order of sugar yield)*
Supporting generations of UK Sugar Beet Growers

Maximising the UK’s potential through:

- UK field trials to test treatments and advancements in technology to improve yield
- Working with UK Growers to understand and overcome challenges
- Xbeet® plus development for UK market to increase crop yield
- Quality checks at every stage of the process

Our Seed Technologies:

- prime
- pellet
- filmcoat
- health
- polymer

Xbeet® plus

germans
seed technology

We Maximise Nature’s Potential™

Global Markets, Local Service

Visit our new website germains.com now to learn more about our Sugar Beet Technologies

Xbeet® is a registered trademark of Ger mains Seed Technology
cause lower multiplication of the nematode population compared to other varieties. Growers should look to yields outside of infestation (e.g. the DL table figures) for a guide on the most appropriate variety to use in lower or patchier infestations.

Recent research work has highlighted trends and benefits when using tolerant varieties in the presence of BCN. The interaction of these varieties with the pest, and multiplication of BCN are complex issues influenced by a number of interrelated factors including starting population, cyst viability, soil type and weather; these factors have increased the variability within current results. Breeders have their own information on the use of BCN varieties, as does BBRO. If you require further guidance or advice please discuss with the specific agent, BBRO or your British Sugar area manager.

**AYPR strain of rhizomania**

All recommended varieties are partially resistant to standard strains of rhizomania, which will retard the development of the disease and reduce its impact. Since 2007, rhizomania outbreaks have been identified in resistant varieties at 38 fields and these continue to be monitored. However, breeders have developed varieties with enhanced resistance genes conferring stronger resistance to the AYPR strains of rhizomania found at these sites in the UK. Sandra KWS is listed for use under these conditions only.

Glasshouse studies have been carried out, using soil collected from AYPR-infected sites, to determine how effective these new varieties are at reducing the build-up of this strain of rhizomania. Roots of these varieties have been tested for the presence of the virus using established diagnostic methods. Lower values indicate a slower build-up of the disease by the specific variety (Fig. 3).

Unless the AYPR strain of virus is confirmed in fields to be sown with sugar beet then Sandra KWS is likely to produce lower yields than standard rhizomania partially-resistant varieties.

**Acknowledgements**

The BBRO Recommended List (RL) is derived from trials data from a programme of RL and National List (NL) trials and tests that were carried out by BBRO, British Sugar, NIAB, KWS and SESVanderHave with funding from BBRO and the member companies of the British Society of Plant Breeders.
Project Comet – Bury
Anaerobic Digestion project

As some of you will be aware, we are well underway with our exciting new renewable energy business project at Bury St. Edmunds where we are constructing a new £15m anaerobic digestion plant (AD) which will come on line later this summer.

Electricity generation

Once operational, the AD plant will be fed with pressed sugar beet pulp as the sole feedstock to be converted into biogas. The methane from the biogas generated will then be consumed in two gas engines to generate electricity, which will be exported to the National Grid; a small proportion will be used to power the AD plant itself, making it self-sufficient electrically (Pic. 1).

The plant, when operating at capacity, will consume 97kt of pressed pulp annually, with a generating capacity of 5MW of electricity, and will provide 38GW annually to the national grid, making a significant contribution to the UK’s renewable energy targets under the Renewable Energy Directive.

Digestate production

This operation will also create another exciting downstream product, digestate; this will be used in the local farming area for both soil conditioning and fertiliser replacement. Half of the liquid digestate will be dried in a digestate drying plant using the waste heat from the gas engines, providing the opportunity to supply both liquid and dried digestate markets.

Construction

Construction work started towards the end of last summer, and the plant comprises two primary digesters, one secondary digester, two gas engines, a dedicated electricity export connection to the grid, and a digestate drying plant (Pics. 2 and 3). The civils works are now substantially completed, with all of the digesters in place, and both the two pulp feeding units and both of the gas engines are on site and in position. The focus is now on completing the mechanical and
This is an exciting opportunity for British Sugar; the AD plant is not just a new technology for the business, but is also breaking into an important and rapidly developing technology, in a market which has the potential to open up opportunities with our beet-growing supply base and the wider local business community.

Pressed pulp baling

In readiness for the plant start-up, the operational team completed the baling of over 18,000 tonnes of pressed pulp during the last campaign, so that we have sufficient feedstock to commence the AD plant operations over this summer, before next campaign starts (Pic. 4). The AD plant operational team has been in place for several months now, and is working closely with the project team in order to finalise the plant construction, and to progress the commissioning and plant start-up plans.
The sugar debate

Very few people will have missed George Osborne’s surprise sugar tax announcement in the March Budget. It had been widely expected that an announcement (if any) would form part of the much-delayed Childhood Obesity Strategy due later this year.

The sugar tax debate has been rumbling on for over a year now. In 2014, a lobbying group called Action on Sugar was created by the same team who previously formed Action on Salt. Action on Salt has had success with reducing the amount of salt in the public’s diet over the last few years, mainly through the reformulation of products. Since the formation of Action on Sugar, a number of high profile media reports have pressurised the government to take action on obesity through the use of a tax on the sugar in soft drink products.

Background

Within days of each other, in July 2015, the British Medical Association (Ref. 1) called for a 20% tax on sugary drinks, while Public Health England’s Scientific Advisory Committee on Nutrition (Ref. 2) published a report saying that free sugars should be reduced to no more than 5% of daily dietary energy intake (the previous recommendation from World Health Organisation (WHO) was 10%).

These reports were not released in isolation and they were reinforced by a documentary, entitled Jamie’s Sugar Rush, released by Jamie Oliver in September. Jamie’s programme focussed on the contribution of sugar to weight gain and type-2 diabetes. The celebrity chef came armed with a manifesto asking for sugar content, measured in teaspoons, to be put on the labels of sugary drinks. His petition to introduce a 20p per litre tax on sugary drinks hit the 100,000 signatures needed to ensure the petition was debated in parliament.

Entertaining TV and high profile reports do not always reveal the full picture. The independent Institute of Economic Affairs report ‘The Fat Lie’ (Ref. 3) stated that the average body weight of English adults has increased by 2 kg since 2002. During this time, calorie consumption has declined by 4.1% and sugar consumption has declined by 7.4%.

The author of that report, Christopher Snowden, concluded that the rise in obesity has been primarily caused by a decline in physical activity at home and in the workplace, not an increase in sugar, fat or calorie consumption. Similar conclusions have been reached in research done in Australia (Ref. 4).

Sugar tax announcement

George Osborne announced in the budget (Ref. 5) that the Government will introduce a new soft drinks industry levy in two years’ time to be paid by producers and importers of soft drinks that contain added sugar. The levy will be charged on volumes according to total sugar content, with a main rate charged on drinks above 5 grams of sugar per 100 ml and a higher rate for drinks with more than 8 grams of sugar per 100 ml.

The Chancellor announced exclusions for small operators, milk based and pure juice drinks and will consult on the details over the summer, for implementation from April 2018 onwards. The tax will add 18-24p/litre depending on the amount of sugar in the product. The levy will fund a doubling of the
primary schools sports premium to £520 million per year from September 2017.

Industry reaction to the budget

The Food and Drink industry has reacted to the Chancellor’s announcement, with the Food and Drink Federation (Ref. 6) claiming that the tax will result in less innovation and product reformulation. They highlighted the fact that within the industry, 57% of the soft drink market is low or zero calorie, 5% mid calorie and 38% regular.

Recent press reports have suggested that the soft-drink makers will proceed with a legal claim that the tax is discriminatory, because it will not hit other beverages with high sugar content, such as fruit juices and milkshakes. There have been successful challenges to similar taxes in Finland and Denmark.

Success of sugar taxes in other countries

The London based Institute of Economic Affairs (IEA) (Ref. 7) has looked into the success of sugar taxes in other countries. Several countries have already put sugar taxes in place on a range of products, including sugar drinks, saturated fat, confectionery, chocolate and ice-cream. In the USA, 33 states have put soft drink taxes in place. In Europe, France introduced a tax on all fizzy drinks in 2012 (including low calorie versions). Hungary and Finland have introduced taxes on high calorie food products as well as sugary soft drinks. In Denmark, there was a tax on soft drinks in place for 80 years before it was repealed in 2014, in addition, they introduced a wide-ranging tax on saturated fat in October 2011 before repealing it in January 2013.

A recent report, by market analyst Nielsen (Ref. 8), has shown that sugary soft drink consumption in Mexico, where it is subject to a 1 peso/litre tax, has returned to pre-tax levels. It was initially claimed that the levy reduced sugary soft drink consumption by 10%, but the most recent data shows only a 0.39% reduction from pre-2014 levels.

And what have been the outcomes from a sugar tax in other countries? The results from the IEA have consistently shown the following:

- demand for sugary drinks, snack and fatty foods are inelastic. People tend to be quite unresponsive to price hikes and do not significantly change their shopping habits
- consumers respond by switching to cheaper brands of the product or shopping in cheaper stores. This leads to the consumption of inferior goods rather than the consumption of fewer calories
- taxes on sugary drinks lead consumers to switch to other high calorie drinks, such as fruit juice, milk or alcohol
- taxes on energy-dense food and soft drinks take a greater share of income from the poor than the rich. This regressive effect is exacerbated by low income consumers being less responsive than the rich
- no impact on obesity or health outcomes has ever been found.

UK industry response

AB Sugar has taken a lead for the industry in responding to this action by setting up a website called Making Sense of Sugar (www.makingsenseofsugar.com). Making Sense of Sugar was set up to help inform and educate people about sugar and the role it can play as part of a healthy balanced diet. The aim is to provide factual information based on robust science, which has been reviewed by a number of third party experts, and is freely accessible to everyone.

Another group leading on this topic is Sugar Nutrition UK which is predominantly funded by UK sugar manufacturers. Sugar Nutrition UK was set up in 1964 as a not-for-profit, scientific organisation that is a leading source of expertise on sugars and health in the UK for a range of audiences, including health professionals, researchers, academics, policy makers, industry and media. Sugar Nutrition UK also funds scientific research in academic institutions throughout the UK. The website address is www.sugarnutrition.org.uk

What does the introduction of a sugar tax mean for sugar beet farmers? There is no suggestion that sugar should not continue to make an important contribution to a healthy balanced diet. UK beet growers will continue to play an important part in delivering a reliable, sustainable, traceable and secure supply of home-grown sugar to consumers. We know that more than eight out of ten shoppers want to see more British food on supermarket shelves and we need to trust them when they decide how their sugar intake fits into their lifestyle choices.

Sugar continues to be put under the microscope by the press. That is the case for nearly every farm sector as consumers become savvier about the food they eat, however, we know we can continue to produce the high quality sugar our customers expect.

References

8. FMCG Business. 21st March 2016. FGC: Mexico’s sugar tax was a failure. www.fmcbusiness.co.nz/2016/03/21/27756/
The lowest bolting gives you more options

Why is HAYDN first choice again for 2017?

☑ High adjusted tonnes
☑ The lowest bolting
☑ Consistent commercial performance

Bolters are bad news and unsightly. With the lowest bolting, HAYDN gives you options to drill when conditions are right to get the yield benefit of earlier drilling without the risk.

In three seasons at the top, HAYDN has demonstrated the consistent and credible commercial performance that should put it at the heart of your 2017 crop.
Emergence patterns and pest control in mangold fly

Historically, mangold fly (Pegomya hyoscyami), or beet leaf miner as it is also known, has been a sporadic pest of beet crops but, in recent years for some, it has become a regular problem. The larvae of the pest mine through the leaves, reducing photosynthetic area and increasing sensitivity to herbicides and frost damage. While a relatively small area of sugar beet production (1-2%) experiences problems each year, affected fields can lose up to 50-70% of the crop canopy. Seed treatments provide good protection from early-season larval damage but late-season attacks can be treated only with foliar sprays which may provide limited control. This article describes an initial one year BBRO-funded project carried out in 2015 to investigate alternative chemical control options for mangold fly, and the regional patterns of adult activity.

The mangold fly problem

There are two to three generations of the pest each year (Fig. 1). The first generation of adults usually emerges in April. The flies are greyish-brown and 6-7 mm long; they lay 1 mm long white, oval eggs in rows of two to ten on the underside of leaves. Depending on temperature, these hatch in four to five days (Ref. 1) and the larvae burrow into the leaf, creating mines as they feed and grow (Pic. 1). When they are fully developed, which takes up to 15 days (Ref. 1), they will drop from the leaf and burrow into the soil to form a pupa. The next generation of adults usually emerges in June and, if the summer has been hot, a final generation can occur in August. The pest then overwinters as pupae.

The first generation of mangold fly has traditionally posed most risk to the crop as it coincides with crop establishment. However, neonicotinoid seed treatments currently provide good protection from the pest for the first eight weeks of crop growth (Ref. 2). Subsequently, it is the second and third generations that have been causing problems for growers in recent years. These generations can cause significant damage, especially as badly affected crops will re-mobilise sugars to replace lost canopy rather than to grow roots or store sugar. Control of these generations relies on foliar insecticides, of which only the pyrethroid, Hallmark Zeon, is currently registered for use. As Hallmark Zeon is a contact action insecticide, applications have to be timed accurately to strike the larvae before they enter the leaves. Otherwise the larvae will be protected by the leaf epidermis and control can be limited.

This project had two primary objectives:
1. To assess whether alternative foliar insecticides provide improved control of the pest. This could also ensure that control does not rely on a single product, thus enabling the development of strategies to reduce the potential for pesticide resistance.
2. To monitor adult emergence patterns across the region. A greater understanding of the pest life-cycle would lead to improved IPM programmes and timing of sprays.

Field trial

A field trial consisting of 124 plots, totalling 0.45 ha, was carried out in an existing sugar beet crop to assess ten insecticides for their control of the second and third generations of the pest. The insecticides used were either commercially available or experimental,
and covered a range of modes of action. Each insecticide was applied at three different timings to target either the adults (T1), eggs (T2) or larvae (T3). Sprays dates are shown in Table 1.

Table 1 – Dates of insecticide applications to the second and third generation of mangold fly.

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<td>2nd</td>
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<td>3rd</td>
<td>T3 (larvae)</td>
<td>27th August 2015</td>
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Egg numbers (after each T1 spray), percent leaf area mined, number of mines and number of larvae (twice after each T3 spray) were all assessed, and yield was taken at harvest (14th December 2015).

The results showed that, while none of the treatments had any significant effect on egg numbers, significant reductions (P = 0.04) in larvae were found in the 2nd pest generation where Dursban WG had been applied at T3.

The area of the leaf mined was also significantly affected by treatment. During the second pest generation, percent leaf area mined was significantly lower when sprays were applied at T2 or T3 compared to T1 sprays and the untreated control (P = 0.001). A number of insecticide-timing combinations also provided significant reductions in leaf area mined, specifically Dursban WG at T2 and T3, BCS507 (an experimental product) at T2 and Hallmark Zeon at T2 and T3 (P < 0.001).

During the third generation of the pest, significant reductions in leaf area mined were recorded in plots treated with Dursban WG, Hallmark Zeon and the coded product, ADAS0306, in comparison with the untreated control (P < 0.001). Spray timing also had an effect on leaf mining, with significant reductions in the area mined when sprays were applied at T3 compared to other spray timings and the untreated control (P = 0.003).
The most promising treatments in terms of their efficacy against beet leaf miner (and the untreated control) were selected for hand-harvesting. Dursban WG was the only insecticide to produce a significant yield response (Fig. 2), with an increase of 15 t/ha compared to the untreated plots ($P < 0.001$). Yield was also significantly higher in plots receiving T2 and T3 sprays compared to T1 plots ($P = 0.015$). The treatments had no significant effect on sugar content or impurities.

**Monitoring adult activity**

Little is known about the pattern of adult emergence in mangold fly. A better understanding of this aspect of its life-cycle would open the door to improved control through better targeting of adults or by helping to predict periods of egg-laying and egg-hatch. BBRO maintains a network of yellow water traps across the sugar beet region with the primary objective of monitoring aphid populations, but this could also be used to monitor other pests and beneficial arthropods. In 2015, yellow water traps at ten sites, from Little Bentley in Essex to Barton upon Humber in Lincolnshire, were monitored for mangold flies. The number of mangold flies at each site were counted on a weekly basis from mid-May to mid-July (Pic. 2).

The results showed large regional variations in the numbers of adults caught in the traps (Fig. 3). The numbers of adults were highest at Holbeach St. Marks on the Wash and Guyhirn in Cambridgeshire, intermediate in Lincolnshire and north Norfolk and very low in Essex, Suffolk and the rest of Norfolk. These correspond to the areas where crops experienced the highest levels of larval damage in 2015. The pattern of pest incidence in recent years also suggests that mangold fly pressure is gradually shifting north; in 2013 the focus of the problem had been in coastal Suffolk and Norfolk and around the Wash (Ref. 2) and in 2014 the main problems were experienced around the Wash (Ref. 3). The results also showed two peaks in emergence at the start of June and early July, corresponding to the second and third generation of adults. The findings also suggest that the generations of the pest are distinct, with a clear gap in adult emergence between them. This is important as it would make predictions relating to peak emergence, egg-laying and egg-hatch simpler and, in turn, make decision-support systems based on these more reliable. However, it should be emphasised that further work is required to confirm these emergence patterns.

**Acknowledgements**

This work was funded by the BBRO. Du Pont, Bayer Crop Science, Syngenta, Gowan, Dow Agrosciences and Headland Agrochemicals provided insecticides for the field trial. The author also acknowledges the assistance of the host farmer for hosting the field trial.
SUMMARY

The field trial showed Dursban WG to be the most effective treatment for mangold fly; however on 12th February 2016 broad-acre uses for this insecticide were lost following a risk assessment by the Health and Safety Executive. Other insecticides, including Hallmark Zeon and a number of experimental products, did provide some control of mangold fly. The most effective control was achieved when treatments were applied at egg-laying and, particularly, egg-hatch. Monitoring of adult emergence patterns using the BBRO yellow water trap network showed: two distinct peaks of adult activity, the focus of the problem centred on the Wash, generations of the pest are discrete, and water traps are an effective method of monitoring this pest. The major conclusions of this work are:

■ Hallmark Zeon can be an effective method of controlling mangold fly if applications are timed accurately.
■ Control was most effective when applied at egg-hatch or egg-laying.
■ Regional monitoring of adult activity showed numbers to be highest around the Wash.
■ Two distinct peaks in emergence were evident and the generations of the pest do not appear to overlap.

References

Opinion: The benefits of Neonicotinoid seed treatments in the sugar beet industry

The group of agrochemicals known collectively as neonicotinoids (‘neonics’ for short) were introduced in the early 1990s. At the time they were seen as a major breakthrough, due to their more targeted approach to pest control and their requiring just a fraction of the active ingredient when compared to the pesticides they replaced. This reduced the environmental loading and lowered the risks to beneficial insects and other wildlife.

Their use in sugar beet was of particular value, as it allowed a small amount of active ingredient to be incorporated onto the seed pellet, which provided protection from a number of soil and foliar pests, until the plant was big enough to take care of itself. For example, substituting a neonicotinoid seed treatment for an in-furrow carbamate granule reduced the active ingredient applied by a factor of more than ten, while offering more reliable pest control at the same time. It seemed like an obvious ‘win-win’ for farmers and environmentalists alike.

Virus yellows disease of sugar beet has historically been the most serious threat to the crop, with severe infection capable of reducing yields by half – as it did in the mid-1970s. The vector for virus transmission, Myzus persicae, is an endemic aphid pest well suited to our mild climate, with a very successful overwintering strategy on host crops such as oilseed rape. Overnight, the use of products such as ‘Gaucho’ (imidacloprid) and later ‘Poncho Beta’ (clothianidin + beta-cyfluthrin) and ‘Cruiser Force’ (thiamethoxam + trifluthrin), almost completely removed the threat posed by the virus. Yields benefited immediately and field scale crop ‘yellowing’ was rarely ever seen again. Only relatively tiny amounts of active ingredient (60-100 g/ha) were applied to the beet crop as a seed treatment, because this was all that was needed to protect the seedlings at their most vulnerable stage of growth.

In the UK, combining the plant protection product with the seed is carried out during the pellet coating process performed by Germains Seed Technology UK, based in King’s Lynn. The company has a long history of seed coating technology development, which requires a huge focus on consistency, quality control and attention to detail at all stages to ensure the correct amount of plant protection product is applied to each and every seed. Active substance recovery tests are performed on every seed batch in the laboratory, using HPLC methods, to ensure that the seed despatched onto farms is of the highest consistency and quality.

Fast-forward now to the early part of this decade, to when a cloud suddenly began to form over these hitherto, and apparently benign plant protection products. An unexplained decline in bee populations was causing concern amongst bee-keepers and the wider scientific community. Many reasons were touted for the cause, such as harsher winters, the parasitic varroa mite (Varroa destructor), and the over-use of agrochemicals. Environmental groups soon jumped on the band-wagon, only contributing to the confusion as to what the real cause of ‘colony collapse disorder’ was. The role of bees in the pollination of many staple food crops was seen ultimately as vital to the survival of mankind, and so before the profligate use of neonics came under the spotlight. A number of questionable scientific claims were being made, based upon a limited amount of artificial laboratory work, that bees were being affected by tiny amounts of neonicotinoid pesticide either resident in the flowering parts of the crop, by creation of dust at planting, or guttation offering chemically laden moisture which were ingested by bees, thereby disorienting them and disrupting their natural homing instincts, or simply contributing to increased hive mortality.

Further criticism was being levelled at neonics in the prophylactic and widespread way in which they were being used. By applying the products to the seed in advance of sowing, there was no indication of the potential pest threat, and hence it was alleged that unnecessary over-use was being encouraged, posing a risk of higher selection pressure and potential resistance build-up in the pest population. The responsible use of neonicotinoids was being called into question.

Despite sustained attempts by the farming industry to refute these allegations, the EU Commission imposed a ‘temporary’ two-year moratorium on the use of neonics in flowering crops in December 2013. The subsequent damage done to the yields of oilseed rape, alone, has since been estimated at over £15M on an EU-wide scale, as not only the seed treatment was banned, but available replacement sprays were both costly and largely ineffective. The greatest threat to the successful establishment of oilseed rape, in the absence of neonics, is the Cabbage Stem Flea Beetle, which swarms on the emerging plants, attacking the growing points, resulting in a total crop failure in the worst cases.
Sugar beet escaped the moratorium at the time, due to the fact the commercial crop does not flower and, thanks to the coating technology, is quasi dust free. Germaines Seed Technology was the first UK recipient of the ESTA accreditation, a European Seed Association driven initiative, which ensures adherence to strict quality management systems to minimise the generation of dust in process and in product; furthermore, beet is a poor producer of guttation. So, for the time being beet is safe. If neonicotinoid use was banned in sugar beet tomorrow we could rapidly see a return to the dark days of the 1970s, with devastating yield reductions, possibly threatening the viability of the crop itself. The situation would in fact be even worse than historically, due to the fact that the aphid vectors of the virus are now almost totally resistant to the foliar pesticides used in the past to control them, as experienced by oilseed rape farmers since the start of the moratorium. Farmers would be forced back into the use of repeated and indiscriminate oils from an unjustified and irrational ban.

It may take more than just ‘thanking the heavens’ to save these once-hailed ‘heroes’ of crop protection. It may take more than just a 50:50 chance that we will not see the demise of these chemicals from an unjustified and irrational ban.

BBRO COMMENT
Since their introduction, the neonicotinoid seed treatments have been widely adopted by the sugar beet industry as they provide an important, targeted approach for the control of up to 15 different UK pests (and associated insect-transmitted diseases). They are applied to the seed in low doses and protect the crop for up to 14 weeks from sowing, which often removes the need for regular follow-up sprays with other insecticides. For example, during the last 15 years these products have prevented the potential for 10 Virus Yellows epidemics, a disease that can decrease yield by up to 49% within infected plants. Also, they are currently protecting the crop from the first generation of man-gold fly larvae attack that is causing a number of growers concern.

The BBRO are fully aware of the current debate surrounding the use of neonicotinoid insecticides, such as their potential impact on bee health, and are constantly reviewing the scientific literature and following developments across Europe. The BBRO encourage the use of integrated pest management strategies whenever possible to avoid the use of prophylactic treatments. In addition, the BBRO have a diverse research portfolio investigating a range of alternative approaches for the control of these pests. Examples of this research can be found in the BBRO Annual Report, a copy of which is enclosed with this issue of the British Sugar Beet Review. The BBRO is also working closely with the sugar beet breeding companies to develop new and effective pest and virus resistant varieties for the future. However, these approaches take time to develop and currently there are few effective alternatives to the neonicotinoid seed treatments in sugar beet. Therefore, the BBRO supports the targeted use of these products until effective alternative solutions are found.
Health and Safety – telehandlers

This article describes typical hazards associated with the use of telescopic materials handlers (often referred to as telehandlers) used for beet handling and loading. However, the general principles of safe working practice can also be applied to other types of material handling equipment such as loading shovels.

There are in use today, many different types of machines some of which may lack the safety features found on modern telehandlers. Always be sure you know what type of machine you are operating and what safety features are provided.

Looking at the accident history associated with telehandlers and teleloaders reveals that most serious injuries and fatalities are caused by:
- being struck by the machine or run over by it
- being struck or crushed by moving parts
- overturning (in both lateral and longitudinal directions)
- loads or attachments falling on to people
- falling from height (when lifting people)
- loss of control
- contact with overhead electricity power lines
- carrying passengers
- attachments falling off when misused or unsecured.

Factors that can contribute to telehandler accidents can include:
- poor standards of maintenance, particularly the brakes
- lack of visibility due to poorly adjusted, missing or dirty mirrors or windows
- lack of formal operator training and/or competence
- safety devices defeated, not used, not working or missing
- inadequate information for operators e.g. missing load charts or manuals
- poor planning and a failure to assess the risks
- failure to exclude pedestrians from the working area
- performing tasks that exceed the lifting or carrying capacity
- failing to de-rate (adjust) when handling loads with boom elevated
- disregarding safe operating parameters specified by the manufacturer
- using the machine to perform tasks for which it is unsuitable
- failure to secure attachments correctly.

Control measures

It is extremely dangerous to carry out any work on a machine while it is under power. The most important safety measure is to follow the safe stop procedure (Ref. 1) before carrying out any maintenance or adjustments:
- handbrake on
- boom or attachment lowered fully to the ground
- controls neutral
- stop engine
- remove key.

Many serious and fatal accidents have occurred where operators have dismounted from or worked on the machine for any reason with the engine running or power engaged. So always make sure you follow the safe stop procedure.

Training is a fundamental requirement

Telehandler operators should receive adequate training in accordance with the HSE’s Approved Code of Practice (see further guidance listed on page 24). This applies to anyone who operates a telehandler. The training needs to be appropriate for the type of machine and attachments to be used. Operators for machines such as teleloaders and loading shovels also need adequate training. Training courses are widely available from a...
Escolta’s proven two-spray strategy.

Escolta’s hard to beat for protecting your sugar beet:
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For further information on the best two-spray strategy visit www.bayercropscience.co.uk/escolta
range of training organisations, colleges and awarding bodies in the land-based sector. They will help ensure your safety and that of your staff, and help you get the best performance from your machine. It is also a legal requirement.

Make sure all operators read and understand the instruction manual before using the machine. The manual and other safety information such as load charts should always be readily available, e.g. carried in the cab.

**General guidance on safe working practice**

When selecting a suitable machine, choose one which has adequate lifting capacity and is well matched to the size, weight and nature of loads to be lifted and carried.

When travelling telehandlers should always be driven with the boom lowered to ensure that the centre of gravity of the machine and the load is as low as possible. Driving with the boom raised should never be considered as good practice, as it increases the risk of instability.

Never carry passengers in or on a telehandler, for example in the bucket, on an attachment, or riding on the mounting steps. They may easily fall off and be run over. Always use the boom prop or safety stops when working under a raised boom, e.g. for maintenance tasks. Never use the boom, or attachments such as grain buckets mounted on the boom, as a tool for pushing or driving in fence posts. Fatal accidents have occurred whilst carrying out this unsafe practice. Always use purpose-designed, post-driving equipment where mechanical assistance is required.

**Visibility is a top priority**

Restricted visibility when the boom is raised or when carrying large loads, together with poor segregation from pedestrians, are major causes of accidents involving telehandlers. The operator’s view around the machine, when seated normally in the driving position, may be obstructed by the cab pillars and other parts of the structure. Operating the boom also interferes with the driver’s line of sight and many older types of machine feature a high pivot point for the rear of the boom, further restricting the view. Remember:

- wherever possible pedestrians should be segregated from moving vehicles
- visibility aids and operator vigilance are valuable control measures, but segregation should always take priority
- mirrors and windows should be regularly cleaned and maintained in good condition
- keep people clear of the machine before reversing or moving off. If in doubt dismount and walk around the machine to check, and always stop if you see people approaching.

**Attachments**

Many attachments are available, including pallet forks, muck forks, a variety of buckets, bale spikes, block cutters and grabs. To ensure safe working always check that the attachment is suitable for the task, properly maintained and compatible with the telehandler to be used.

Accidents have occurred where operators have failed to operate isolation switches or valves to secure attachments or to isolate the locking mechanisms. Failure to perform the correct procedures increases the risk of the attachment coming off and causing serious injury. Operators should understand and apply the principles of de-rating. The fitting of an attachment may alter the characteristics of the machine and this needs to be considered when determining revised lifting capacities (a process known as de-rating).

**Precautions for work near overhead electricity power lines (OHPLs)**

The safest option is always to avoid operating telehandlers near OHPLs where you can. If you cannot avoid working within ten metres of OHPLs you will need to carry out a risk assessment and implement a safe system of work.

Before creating a beet clamp or loading bulkers, plan where you can do this to avoid OHPLs. Reduce the risks near OHPLs by retracting booms and travelling with them close to the ground when the telehandler or loader is moving near them. Modern machines are capable of reaching well above the minimum height of OHPLs (typically 5.2 metres above ground for 11kV and 33 kV lines) and this has increased the risk of them making contact with OHPLs. Check the height and reach of your machine and check these against the safety clearances required for the OHPLs where the machine will be used. Speak to your local distribution network operator for advice.

**Maintenance**

The effective maintenance of a telehandler is an essential part of safe operation.

Many accidents occur as a consequence of poor maintenance. Machines should be maintained in accordance with the manufacturer’s recommendations. Items to check regularly should include:

- brakes – parking brake and service brakes checked and maintained in good working order
- mirrors – correctly fitted, clean and properly adjusted
- windows – clean, and with wipers working where they are fitted. The machine must not be operated if the glazing between the cab and the boom is missing, as there may be a risk of serious injury from contact with the boom
- wheels and tyres – with sufficient tread, in good condition and at the correct pressures. All wheel nuts secured and rims undamaged
- headstock linkage – check regularly to ensure attachments can be adequately secured to prevent them becoming detached in use
- safety devices – fitted and working, e.g. safe load indicator, longitudinal load moment control (on telehandlers)
- seat restraint (lap belt) – fitted, working, and worn by the operator!
- attachments – these will also need to be checked regularly and properly maintained so they are safe to use.

**Further guidance**

*Rider operated lift trucks – operator training and safe use – approved code of practice and guidance – L117*  
www.hse.gov.uk/pubns/books/l117.htm

*Working safely near overhead electricity power lines AIS8(rev3)*  
www.hse.gov.uk/pubns/ais8.htm

**Reference**

UK’s No. 1 for yield: it’s all in the seed.

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- No. 1 for adj. yield – 105 %*
- Consistent high yields across all seasons*
- Resistant to downy mildew

* 2017 BBRO Recommended & Descriptive List

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Sugar beet forms an integral part of the farm’s seven-year rotation, along with winter wheat, winter and spring barley, winter oilseed rape and spring beans. The farm also has a Christmas tree enterprise and TASCC (Trade Association Scheme for Combinable Crops) grain storage for third party grain traders. Arable and permanent pasture Stewardship Schemes occupy 180 ha on the estate with some of the pasture let for grazing.

The farm’s approach to all crops, sugar beet in particular, is to push hard for yield and to maintain input costs despite recent changes in crop prices. This successful approach was made possible by a change in farm policy in the mid 90s when it adopted an integrated approach to rotation and soil management. This maintains sugar beet as a key crop, both currently and in the future.

Managing the soils for optimum yield

Soil types vary across the farms and within fields, and range from sandy loams and medium loams to some areas of boulder clay. Overall, soils are relatively heavy for sugar beet and require careful management to achieve optimum yields. “Timeliness and patience is the key to obtaining good establishment and subsequent yields,” James Beamish explains; this is applied to all the crops grown on the farm.

The selection of crops and wide rotation has improved the soil structure and nutrient reserves over the last 12 years. This has been achieved by careful selection of cultivation strategies for each crop in the rotation and being unafraid to change an intended cultivator choice if soil conditions dictate. The farm’s selection of cultivation machinery has evolved over the years and now consists of key pieces of equipment with interchangeable options, which are changed regularly depending on the crop that is being established. This includes 80 and 50 mm wide cultivation tines for shallower and deeper cultivations respectively fitted to a primary cultivator, and fitting a straw rake or crosscutter attachment, depending on the cultivation requirement, to a disc and press cultivator.

The farm is split into blocks of approximately 120 ha, each containing both medium and heavy soil to spread risks and aid efficiency of operations. An integral part of the management is the application of turkey manure and LimeX to provide organic matter and nutrients, and improve soil condition. The techniques used to establish the crops, and improve the organic matter, continue to evolve each year.

Rotation and establishment techniques

The seven-year rotation is: winter malting or feed barley established after winter wheat, winter oilseed rape, winter feed wheat, sugar beet, winter feed wheat or spring-sown malting barley (depending on harvest date of the beet), spring beans (following an oil radish cover crop), and winter feed wheat.

The straw from the winter wheat preceding the first barley is chopped and then incorporated using an 8.2 m Väderstad Carrier. Volunteers are allowed to emerge before being sprayed off with glyphosate. This is followed by one pass of a 7 m Väderstad Opus cultivator (Pics. 1 and 2) prior to drilling.

All the cereals and bean crops are drilled using an 8 m Väderstad disc drill. All straw is chopped at harvest and incorporated to improve organic matter content throughout the rotation, with the exception of the winter barley straw, which is baled and sold. The winter barley straw is removed to minimise trash, ease drilling and reduce the threat of slug damage. The early harvest of the winter barley allows contractors to apply turkey manure at 7.5 t/ha and LimeX70 at 8 t/ha which are immediately incorporated using the Opus. Oilseed rape is drilled by the Opus fitted with a Bio Drill.
Oilseed rape stubbles are left for ten days after harvest to allow the stalks to become brittle and the volunteer rape to chit, before being cultivated with the Carrier cultivator fitted with a crosscutter (Pic. 3). This encourages further volunteers to chit before cultivating with the Opus cultivator prior to drilling.

For the following sugar beet, the wheat stubbles preceding sugar beet are ploughed when conditions allow, starting with the heavier fields in mid-October with the aim of completing ploughing by the end of December. This is achieved by a 450 hp Cat Challenger operating a ten-furrow Gregoire Besson plough and two John Deere 7310Rs operating in-furrow and pulling Lemken six-furrow ploughs. However, a new approach is being tried on 60 ha for 2016 (described later in this article). Spring cultivation is with a 6 m Lemken Kompactor and the crop is sown with an 18-row Kvernland Monopill drill fitted with a mulch kit and, new for 2016, a liquid fertiliser placement kit.

The block of sugar beet grown on the heavier soils is harvested early, when the campaign starts. These fields are either ploughed or cultivated by the Opus before drilling with wheat. Fields where sugar beet is harvested after the beginning of November are ploughed and drilled with spring barley for malting.

Immediately following harvest of the winter wheat and spring barley that follow sugar beet, LimeX70 at 8 t/ha is applied by contractors. This is incorporated with the Opus cultivator with the Bio Drill attached to sow oil radish at 16 kg/ha as a cover crop to increase organic matter. This cover crop is sprayed with glyphosate in late February before incorporation with the Opus and the drilling of spring beans.

After harvest of the beans, the stubble is cultivated with the Opus, and the winter wheat is drilled, thus completing the seven-year rotation.

**Improving soil fertility, organic matter and nutrient reserves**

Over the last 12 years Salle has used LimeX to increase and maintain soil pH, to supply phosphate, magnesium and sulphur, and also as a soil conditioner. This, along with the use of poultry manure and incorporation of chopped straw, has improved soil structure significantly over this period. Soil phosphate and potassium levels have also increased and indices now average between 2 and 3. Poul says, “A recent change to include LimeX70 twice in the rotation has shown only a positive response and there has been no negative response from the farm, now running at quite high pH levels, averaging pH 7.5 across the rotation.”
All nitrogen applications contain sulphur and are applied to sugar beet, cereals and oilseed rape at optimum rates for yield and intended market.

The farm is actively involved in Catchment Sensitive Farming; it is one of three Demonstration Test Catchment (DTC) projects in England funded by Defra and the Environment Agency. At Salle this is based on the Blackwater catchment, which is a feeder stream to the Wensum and runs through the estate. The project started in 2010 and has been investigating on-farm measures to reduce diffuse pollution whilst maintaining sustainable food production. All year round, 24 hour monitoring of the water quality measures phosphate and nitrogen levels in the stream every 30 minutes. Since 2013, the project has looked at the use of cover crops and strip tillage to minimise over-winter leaching on a closely monitored block. In 2013-14, a cover crop (oilseed radish) sown prior to spring beans was successful in reducing N loss over winter. In subsequent years the project has continued monitoring losses from winter crops established using strip-tillage compared with traditional cultivations.

This year, a monitored field has been sown with sugar beet. In August 2015, the field was divided into two sections; turkey manure was applied at 7.5 t/ha (Table 1) to one of these prior to the whole field being sown with a cover crop mix of oilseed radish at 9 kg/ha and forage rye at 18 kg/ha. Losses throughout the winter were monitored and compared to neighbouring ploughed fields and conventional spring cultivations. If this proves successful (by increasing organic matter and improving soil structure in the soil surface layers) and offtake in the remainder of the rotation is balanced by P and K from the turkey manure, this may become the farm practice. This would eliminate the requirement for Korn-Kali in the spring. The field is being monitored by BBRO, to identify any differences in soil structure from the use of the cover crop (Ref. 1).

**Sugar beet**

**Fertiliser**

Sylvinité is applied at 300 kg/ha, pre-ploughing, to all fields. Korn-Kali at 300 kg/ha is applied at the 2-4 true leaf stage of the crop. In 2016 a different approach to applying nitrogen has been tried. Liquid fertiliser at 100 l/ha containing 27 N, 7 SO\textsubscript{3} was applied at drilling and followed by 280 l/ha of a N 25, 14 SO\textsubscript{3} applied pre-emergence with the herbicide with a final treatment of 15 kg/ha of 33% ammonium nitrate at full emergence of the crop.

**Establishment**

Good structure of these soils, which can easily compact, is achieved by ploughing only when conditions are relatively dry, ideally in the autumn and early winter using the equipment mentioned earlier.

Spring cultivations depend on the conditions of the seedbed at drilling. Patience is critical as soil type can vary within the field. Salle always wait until the soil beneath the surface is dry enough to cultivate. All spring cultivations are carried out using dual wheels on John Deere 7310 tractors operating with tyre pressures of 1.05 bar. Usually just one pass of a 6 m Lemken Kompactor is sufficient. If two passes are required, then an initial pass of an 8 m
Väderstad NZA springtine is used prior to the Kompactor (Pic. 4). In situations where ploughing is delayed, cultivation choice is adjusted according to conditions. In 2016 ploughing was delayed until January and that required a pass with a Rexios twin-ring press in late February.

In 2011, Salle purchased an 18-row Monopill drill fitted with a mulch drilling kit. The decision was based on the fact that these drill units are heavier than the standard design and, using split discs and double press wheels, would provide more consistent depth control with only one cultivation pass (Pic. 5). The electric drive drill is connected to GPS with automated row switch-off at headlands and is used to vary seed rates following soil mapping. The crop is drilled on 44.4 cm rows and tramlined at 32 m centres. In 2016, in conjunction with BBRO and Richard Lapage (RWL Services), the drill was fitted with a liquid fertiliser placement kit placing liquid N 5 cm to the side of the row and 5 cm below seed depth (Pic. 6).

The cover crop in the field being monitored by BBRO was destroyed with glyphosate pre-drilling, and the plant residues incorporated with the Opus cultivator in mid-April. However, the prolonged wet spring proved challenging and required patience to wait for conditions to dry sufficiently before preparing the seedbed. This was carried out with a Väderstad NVZ springtine followed by one pass of the Kompactor before the beet was sown with the Monopill drill in late April. Nitrogen was placed as for the conventional crop, although the pre-emergence application of liquid N was reduced to 210 l/ha and no granular fertiliser was applied because turkey manure was applied in the autumn.

**Variety selection**

Varieties are selected from the top yielding varieties on the BBRO/BSPB Recommended List, with Sabatina, BTS 470 and Hornet chosen for 2016. These were primed with Xbeet and treated with Cruiser Force, as soil pests were considered a risk.

**Weed control**

Peter Riley, senior partner in Prime Agriculture, has advised on the agronomy of all crops on the estate for many years and has been actively involved in the evolution of the rotation. Knowledge of the likely weed spectrum allows a pre-programmed approach to be used, in particular to control the main problem weeds: volunteer oilseed rape and knotgrass. The programme is based around a pre-emergence application of chloridazon tank-mixed with liquid N plus sulphur. Post-emergence treatments are based around Betanal MaxxPro (desmedipham + ethofumesate + lenacil + phenmedipham) and metamitron, which tends to be delayed until the crop is at 2 to 4 true leaves; the rate is varied according to crop and weed size. A second application is applied just over a week later, and includes additional lenacil and Debut (triflusulfuron-methyl). Depending on weed pressure, an additional final application of a mixture of phenmedipham, lenacil and Debut may be applied.

Because of the wide rotation, blackgrass levels have been dramatically reduced and it is no longer a major problem. Any patches seen in the beet crop are treated with Centurion Max (clodinafop) as a separate operation.

**Fungicides**

All but the early harvested block of beet receives two fungicide applications; the aim is to apply the first treatment at the end of July, followed by a second at the end of August. Escolta at the full recommended rate is applied in both applications.

**Harvesting**

Salle has always owned its own harvester; this allows flexibility to harvest when conditions are optimum, especially early in the season, and minimises soil compaction and allows winter wheat to be sown, ideally, without ploughing. Until three years ago the farm operated a Grimme Maxtron tracked harvester, which worked well and minimised compaction. Its Oppel wheels, and the ability to transfer weight, proved very successful on the heavier soils in dry conditions, allowing beet to be lifted when share machines would not have been able to operate. However, the harvester’s cleaning system proved limiting in wet conditions and therefore in 2013 Salle changed it for a two-year old Grimme Rxor which, although wheeled, has crab steering to spread its weight and Oppel wheels for lifting, but with a roller bed and turbines to provide improved cleaning. Salle joined up with Raynham Farms, located 20 miles away, and jointly operated the harvester for two years. In 2015 this machine was replaced with another two-year old Grimme Rxor, which is operated jointly with Raynham Farms.
and Holkham Estate. Holkham, being a light land farm, has the flexibility to harvest later in the season, allowing Salle and Raynham to lift their heavier soils earlier in the campaign (Pic. 7). Each farm grows around 250 ha of beet.

Over the years at Salle, the estate has invested in purpose-built beet pads, strategically situated around the estate. These have the capacity to hold 1,500 tonnes each, and out of campaign are used to store LimeX70 (Pic. 8) (of which a proportion is back-loaded throughout the campaign) and also turkey manure in spring, prior to application in late July.

Since 2014, the beet crop has been delivered using the Industry Haulage Scheme. Poul commented, “It has worked very well and gives us some flexibility to lift bigger areas and larger tonnages of beet, clearing complete fields, especially early in the season”.

Yields of all crops, but sugar beet in particular, have increased over the last 12 years since the seven-year rotation has been in place. Figure 1 shows the yield at Salle Farms over the last 13 years.

**SUMMARY**

Over recent years Salle Farms has adopted an integrated approach, using a wide rotation, careful selection of cultivation equipment and combining regular organic manure and LimeX applications. This has led to a sustainable rotation, with yields and gross margins of all crops well above the local and national averages.

The farm is benefiting from the experimental work on the use of catch crops that is being carried out on its land with the DTC. In addition, BBRO is working with Salle Farms to evaluate the benefits of catch crops and placement of fertiliser. This will form part of a PhD thesis by Jake Richards and the results will be published at a later date.

Salle Farms see sugar beet as a profitable and integral part of the rotation now and in the future.

**Reference**

Nuffield Farming Scholarship – My journey so far!

Maximising Efficiency within the UK Sugar Beet Industry Supply Chain

My journey began in October 2014 when I was awarded a Nuffield Farming Scholarship to study how to maximise efficiency within the UK Sugar Beet Industry Supply Chain. Ever since that date, I haven’t stopped travelling, meeting new people and experiencing new ideas and challenges.

Background to Nuffield Farming Scholarships Trust

The Nuffield name and emblem, a bull riding a bicycle, both derive from the late Lord Nuffield. Born in 1877, near Worcester, William Morris was a grandson of a farmer. From repairing students’ bicycles, he progressed to make new models. His motor car business arose from a desire to produce something better than the early cars brought to him for repair by wealthy Oxford students.

Morris realised, at an early stage in his businesses’ development, that he should seek best practice in this new industry. He travelled to the emerging motor capital of Detroit to understand how the Americans were able to produce reliable cars that could undercut the price of those produced in Britain at that time.

He successfully took on Henry Ford with a new car, the Morris Cowley, mass produced on American principles. Morris continued to travel, seeking new ideas and markets. Recognising the value of travel and study, he also sent his key employees out into the world to develop themselves, and introduce new concepts to his business.

Established as travelling awards for farmers in 1947 by the Nuffield Foundation, the NUFFIELD FARMING SCHOLARSHIPS TRUST is now an independent, industry-funded, charitable organisation. Approximately 20 awards are made each year: to people who work within farming, food, horticulture, rural and associated industries, or are in a position to influence those industries.

The mission of the Nuffield Farming Scholarships Trust is, ‘Leading positive change in agriculture, inspiring passion and potential in people’. Key principles are:

- Developing tomorrow’s leaders
- Inspiring commitment

Why do we need to maximise efficiency within the UK sugar beet industry supply chain?

In June 2013, the European Council of Ministers confirmed that existing quota arrangements would continue until 30th September 2017, after which sugar quotas for domestic production would end. There has been a higher availability of sugar in the EU as a consequence of the conversion of non-quota sugar to quota, additional tariff rate quotas for imported sugars and low world sugar prices. In addition, competition has increased as other European producers look for new market opportunities ahead of this forecasted change to quotas. These factors have created a downward pressure on EU prices. Owing to this rapidly adjusting market ahead of the regime reform in 2017, the UK industry must become a more efficient producer to remain competitive in this changing market place.

One of the key areas for improvement is the supply chain, from field to flume, as it can account for over 35% of the production costs. This includes operations such as harvesting, loading, cleaning and delivery of the crop to the processing site in order to maximise yield for both the grower and processor. The adoption of a more efficient supply chain would benefit many UK growers by reducing the costs of production and securing UK competitiveness in changing international sugar markets.

The journey of a Nuffield Farming Scholar

One of my first experiences was to join the 2015 new scholars’ briefing, which began by attending the NFU Conference, and continued by being hosted by Savills at their headquarters in London, listening to a range of speakers including Sir Peter Kendall (chairman of AHDB) and Allan Wilkinson (head of HSBC Agriculture), making a 24 hour visit...
In July, I visited Australia to investigate the cane industries based mainly in Queensland and New South Wales. The main aim was to investigate how they organise and manage getting the cane from the field to the mill. Sugar cane is more susceptible to sugar loss when harvested/cut, so supply chain management is critical to ensure minimal sugar loss. The Australian industry is very efficient in managing this process, which operates 24 hours a day, 7 days a week. In nearly all cane mills I visited, the agricultural team manage the inbound logistics at each site, via supply chain management software designed by a company called Agtrix. Agtrix is an innovative Australian company providing sophisticated technology solutions for the agricultural sector, servicing more than 85 percent of Australia’s sugar industry. They have been internationally acclaimed for supply chain management solutions. They develop spatially enabled systems that improve harvest management and make the supply chain more efficient; taking the guesswork out of recording and reporting farm activity.

During my visit, I met many cane growers who are pushing yields to the maximum, including Joe Muscat who was awarded a 2013 Nuffield Scholarship to research best practice in production, manufacturing and marketing of fibre crops. I also visited farms growing avocados, mangoes and macadamias, and also the SunRice company which is the world's fifth largest rice food exporter.

I then travelled onward to Africa where I visited Illovo in South Africa, Zambia and Malawi; here again the objective is to use JIT to get the cane from the field to the mill. The agricultural teams use supply chain management software to manage this process 24-7, aiming to have the cane processed within 48 hours of cutting.
In October, I returned to the USA, but this time to visit Michigan, Minnesota and North Dakota, the largest sugar beet areas in the country. Again, they manage an inbound supply chain model similar to that seen in Idaho. This comprises JIT harvest and delivery at the beginning of the campaign to minimise sugar loss and then delivery to piling stations from which the beet are delivered to the processing factory. At some sites they deliver beet from long-term storage in buildings which can be temperature controlled.

I have also visited other European countries which process sugar beet. I am currently in the process of gathering my recommendations and producing my Nuffield Farming Scholarship Trust report, but some key themes that have been discovered while benchmarking best practice show that visibility and haulage optimisation are key to driving utilisation through:

- Avoid double handling; JIT delivery
- Backhaul optimisation
- Maximise payloads

Other key points include:
- Strategic storage can give competitive advantage but comes at a cost
- Best in class use assets 24-7 in their supply chain
- Fuel efficiency can lead to a 5% improvement
- Truck efficiency, driver training, performance monitoring
- Total integration of harvesting and haulage has large potential benefits.

I plan to present my findings at the 2016 Nuffield Farming Conference to be held at the Gosforth Park Hotel, Newcastle 23rd – 25th November. If you wish to apply for a Nuffield Farming Scholarship, applications are made electronically by 31st July each year via the website (www.nuffieldscholar.org).
Getting to know the BBRO

In each issue we will be meeting a different member of the BBRO team, asking them about their day-to-day roles and what they think is important in the future of sugar beet growing.

Name: Lee Oxborough
Role: Field Trials Technician
Where are you from? I grew up in the small village of Ashill, Norfolk, surrounded by agriculture, helping my grandfather with his sheep as often as I could.

How long have you been with the BBRO? I started working here in September 2014, based at Holmewood Hall.

What did you do previously? I attended Easton and Otley College to study engineering before completing an apprenticeship with an agricultural machinery dealership.

Why did you want to work here? As much as I enjoyed spending my days underneath a tractor, I was keen to work more closely with crops. My job with the BBRO is great because I have been able to learn much more about how crop trials are carried out and sugar beet agronomy.
What does a typical day look like for you (at this time of year)?
The job is so varied; there is never a typical day!
This time of year is all about planning. Yesterday, I was making plans for the coming season’s trials, visiting our Garboldisham trial site, then the Morley Research Centre where we will be holding our Cantley Field Demonstration Day.

What is your favourite part of the sugar beet year?
I really enjoy drilling the trial plots; it’s a skilfully orchestrated effort to get everything in the right place, with the whole team involved. It’s great to see the plans turn into reality; then watching the crop develop through the season makes me really proud of what we achieved.

What projects are you involved in?
I hope to implement a system for organising and scheduling the maintenance of our machinery. A breakdown is serious for us as delays could invalidate the results of a trial, so our kit needs to be reliable. Once the system is in place, it will be far easier to keep on top of all the work; anticipating the tasks coming up and preparing for them better.

What do you think is the ‘next big thing’ in agriculture?
New technology has endless possibilities, we have been using our drone to take aerial photos that help us assess potential trial sites and crop health. Getting a bird’s-eye view makes it far easier to identify uneven conditions within the field and so ensure that the trial plots are standardised. There are also a wide variety of cameras that offer different options: for instance infra-red can determine crop cover. I’ll be attending a course in the next few months to become a qualified UAV Pilot, so then I will be able really to make the most of this equipment.

What are your aspirations for the future?
I’m very ambitious, so I like being here where I am able to find new challenges all the time. I’d really like to get more experience of the wider business. I think it’s great that we are able to work together with growers to improve crop yields; that’s what the BBRO is all about. One day I’d like to be more involved in the delivery of that information.
Sugar beet seed storage

In the UK, as in other countries, treated sugar beet seed that is not used in the season for which it is first produced is carried over to the following season. This means that some seed is stored for about 18 months before it is sown. Stocks of unopened boxes of seed are stored in warehouse conditions at 50% relative humidity (RH) and 20°C. Some seed is stored on farm under a range of conditions. Any seed, raw or primed, if not stored properly can deteriorate quite rapidly, especially if the storage conditions are damp and/or warm. Understanding the effects that slight differences in temperature or relative humidity have on storage potential is useful when storing seed and managing stocks.

Factors affecting seed storability
Seed storage has been the subject of much research, not only by companies who produce and market seed, but also in seed banks around the world, to determine how long different seeds may be stored under various conditions before they start to deteriorate (Fig. 1).

Apart from the initial quality and storage potential of the seed, the storage temperature and moisture of the seed are the two most important factors affecting storability. Seeds, if not in a sealed package, will take up moisture from the air if the relative humidity is high, and will lose moisture if the relative humidity is low. Seeds like sugar beet generally store for longer under cooler and drier conditions; it is not uncommon for seeds to be stored at 15% relative humidity and -20°C in seed banks, such as the Millennium Seed Bank at Wakehurst Place run by the Royal Botanic Gardens Kew.

Viability equation
Back in 1980, two researchers at the University of Reading developed an equation that describes how seed populations deteriorate over time under different conditions of seed moisture and temperature (Ref. 1). This

\[ v = K_i - \frac{P}{10K_E - C_W \log m - C_H t - C_Q t^2} \]

*vi* = final viability (expressed as %, NEDs or probits) after *P* days storage

*P* = storage time (days)

*m* = % moisture content (fresh weight basis)

*t* = temperature (°C)

*Ki* = initial viability of the seed lot at *p* = 0 days (seed lot constant)

*C*<sub>H</sub> and *C*<sub>Q</sub> = species-specific temperature constants

*C*<sub>E</sub> and *C*<sub>W</sub> = species-specific moisture content constants

Ellis & Roberts (1980) Viability Equation

Fig. 1 – Representation of how germination of a seed lot changes as it deteriorates over time.

Fig. 2 – The equation that describes how seed populations deteriorate over time under different conditions of seed moisture and temperature.
equation has been widely used to quantify and predict the seed longevity of many species according to storage environment (Fig. 2).

So what does this mean in practical terms? The output of the viability equation is similar to Harrington’s Rule (Ref. 2): seed storability is halved for every 1% increase in moisture content or every 5.6°C (10°F) increase in temperature. So a 2% increase in moisture will reduce seed storability by a factor of 4, and storing seed at 20°C will mean that it only stores for about half as long as at 15°C.

**How long does sugar beet seed store?**

Sugar beet seeds can be stored for many years under appropriate cold and dry conditions. The exact duration will depend on the quality of the seed and the precise storage conditions. Using the viability equation it is possible to calculate how long a seed lot will survive under different storage conditions.

In the example shown at Fig. 3, a seed lot that stores for 9 years at 15°C and 40% RH, would store for only 3.5 years when stored at 50% RH and the same temperature. If the storage RH is raised further to 60% the storability is reduced to only 16 months. The effect of storage temperature can be equally dramatic. Raising the temperature from 15°C to 20°C, whilst keeping the same 40% humidity, reduces the storability from 9 years to 5; another 5°C increase takes it down to 2.75 years. Increasing both the temperature and humidity together has the greatest effect: 9 years storability at 15°C 40% RH drops to only 2 years by changing the storage conditions to 20°C and 50% RH. Looking at this the other way around, by keeping seeds under dry and cool conditions, shelf life can be lengthened considerably.

It is clear that the storability of the seed can vary massively depending on the temperature and relative humidity at which the seed is stored.
Effect of priming on storability

All priming processes reduce the shelf life of seed slightly; however, Germains Xbeet® priming has been developed, and is routinely tested, to ensure that not only final germination, but also the speed of germination is maintained during at least 18 months storage at 20°C and 50% RH, provided that the initial quality and storage potential of the seed are good.

Using an accelerated aging test at high temperature and humidity, we have been able to demonstrate that the Xbeet® process still gives good final germination and advancement after being aged for the equivalent of 20 months storage at 20°C and 50% humidity (aging 2 in Figs. 4 and 5).

Not all priming processes are the same and alternative priming B and C have been primed using different conditions and the effect on storability is quite dramatic.

Storage recommendations

Ideally, seed should be kept in a seed store where temperature and humidity are controlled. In reality, few people will have access to this type of facility. Moisture of the seed, which is affected by relative humidity, has a massive impact on storability. If seeds are dry they can survive higher temperatures for much longer; therefore, keeping seeds dry is vitally important. When the seeds are packed into the unit boxes in the factory, they are at a relative humidity below 45%, and the unit boxes have a lining that will retard the movement of moisture into the seeds as long as the boxes are unopened. However, the boxes are not completely airtight, so over time, if left in high humidity, the seed moisture will increase. There are some relatively easy steps that can be taken to ensure seed stays dry.

1. Store in a cool, dry well-ventilated building
2. Store opened boxes in a sealed polythene bag

If the seed can be kept cool as well, that’s even better, but be careful if considering the use of fridges or refrigerated units because, unless there is humidity control, the humidity is likely to be high.

In the North American horticultural seed industry there is a guideline for safe seed storage: the rule of 100. It states that for safe seed storage, the temperature in Fahrenheit and the relative humidity added together should not exceed 100. Sugar beet is a bit tougher than some horticultural seed, so can withstand slightly harsher conditions; maybe 115 should be the limit for sugar beet to ensure 18 month storability, and it is also a more achievable target for most of us.

Other conditions to avoid in order to optimise storability are volatile vapours, paints, solvents and other chemicals, so do not keep the seed in a chemical store.

Further information can be found at germains.com

References

Wheat after beet: maximising the gross margin

Whether you are sowing wheat in November or late February, variety selection plays an important role in ensuring optimum crop performance, and this has to reflect drilling date. Trials over several years have identified both winter and spring types best suited to follow beet, but deciding between a spring wheat drilled in November or a winter variety sown into December is often a decision based on the soil conditions and a grower’s attitude to risk.

Sugar beet is one of only a few broad-acre crops that allows the grower to harvest two crops from the same parcel of land in the same year. With farm incomes under pressure, the need to exploit this opportunity has rarely been greater.

To many, there is a level of uncertainty around whether to lift beet early in a bid to give the following cereal crop more time to accumulate yield, or lift later in the expectation that the increasing beet yield will compensate for lower cereal yields. There is much to consider when managing the trade-off, but it is less complicated than many growers realise. While sugar beet continues to grow throughout the autumn, the rate of growth declines until sugar yield peaks, typically in mid to late November (Fig. 1). Over the three months prior to this, the crop will have put on an additional 25-30 t/ha, adding more than £500/ha to enterprise gross.

Once the late delivery allowance (LDA) is included (payable from 26th December), the financial returns from the crop improves the longer the crop is left in the ground. At roughly four pence per tonne per day, the LDA adds roughly 10% to the contract price for beet lifted at the end of February.

There is more to the decision than just the trade-off in yield performance. As harvesting conditions worsen with the onset of winter, the risk of damage to soil structures increases. With all commodity prices under pressure, remedying any soil damage can be costly.

Wheat performance

Across the UK, optimum wheat yields are achieved by drilling winter wheats between mid-September and early October; after this, yield potential falls. Data from the last ten years of Recommended List (RL) trials suggests the difference in yield between winter wheats drilled before the beginning of October and spring wheats drilled in March is nearly 3 t/ha.

Growers can expect the difference to be smaller if wheat is sown mid-October to December. This decline in comparative performance is evident in Fig. 2 below and the financial implications displayed in Fig. 3.

Fig. 1 – Beet yield accumulation over time (t/ha). Source: Robin Limb Consulting (2015)

Fig. 2 – Wheat yield decline in relation to sowing date. (Source: Mean of Recommended List trials 2005-15)
The introduction of the three-crop rule (Ref. 1) and problems with black-grass means the area of spring cereals has risen in recent years. Consequently, market premiums for certain varieties have tumbled as supplies have increased. This increases the focus on yield in maximising returns. As Table 1 highlights, some varieties require a healthy premium simply to achieve parity with higher yielding alternatives. Failure to meet specification and secure the premium can have a dramatic impact on enterprise performance.

For the majority of growers, farm situation will determine variety choice: drilling date and storage availability being the main considerations. KWS Willow is a Group 2 wheat that performs best when sown in late autumn, but with

**Combined crop performance**

Combining the relative performances of both crops enables an analysis of the trade-off between later lifting of beet and the subsequent later planting of wheat. Figure 4 shows the individual gross margins of wheat at £120/t (as shown in Fig. 3) and beet at £20.30/t (derived from the yield displayed in Fig. 1).

In summary, there is little to be gained or lost from a financial perspective between November and the beginning of February from lifting beet and drilling the following crop shortly after. Instead, the considerations are all practical. Growers can lift their beet if necessary, but there is little to be gained by rushing to get the following crop in the ground.

**Table 1 – Comparative performance of spring wheats.**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Mulika</th>
<th>KWS Willow</th>
<th>KWS Alderon</th>
<th>KWS Kilburn</th>
<th>Conqueror</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base price (£/t)*</td>
<td>127</td>
<td>127</td>
<td>127</td>
<td>127</td>
<td>127</td>
</tr>
<tr>
<td>Yield (% controls)**</td>
<td>100</td>
<td>99</td>
<td>108</td>
<td>101</td>
<td>106</td>
</tr>
<tr>
<td>Yield/ha (based on 4 Year NL)**</td>
<td>9.2</td>
<td>6.9</td>
<td>9.9</td>
<td>7.1</td>
<td>9.8</td>
</tr>
<tr>
<td>Output (£/ha)</td>
<td>1168</td>
<td>876</td>
<td>1257</td>
<td>902</td>
<td>1245</td>
</tr>
<tr>
<td>Variable costs***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seed</td>
<td>75</td>
<td>75</td>
<td>75</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>240</td>
<td>220</td>
<td>180</td>
<td>180</td>
<td>150</td>
</tr>
<tr>
<td>Sprays</td>
<td>238</td>
<td>135</td>
<td>241</td>
<td>138</td>
<td>138</td>
</tr>
<tr>
<td>Total variable costs (£/ha)</td>
<td>553</td>
<td>430</td>
<td>496</td>
<td>393</td>
<td>466</td>
</tr>
<tr>
<td>Gross margin (£/ha)</td>
<td>615</td>
<td>446</td>
<td>761</td>
<td>509</td>
<td>779</td>
</tr>
<tr>
<td>Premium/t required to equal winter sown KWS Alderon</td>
<td>17.74</td>
<td>1.75</td>
<td>0</td>
<td>n/a</td>
<td>23</td>
</tr>
<tr>
<td>Premium/t required to equal spring sown KWS Kilburn</td>
<td>18.91</td>
<td>9.59</td>
<td>3.53</td>
<td>0</td>
<td>n/a</td>
</tr>
</tbody>
</table>

* Nov 2016 feed market price on 11/11/15.  ** AHDB RL stats.  *** KWS North, large plot trials.
Conclusion

There are clear, tangible benefits to be had from managing the wheat after beet scenario more efficiently, maximising margins in both crops. Those that stand to gain most from this approach are beet growers on lighter land who lift mid-season from the beginning of November through to the end of December. Recommended List data show that growers have a wide late-season drilling window, and can wait until ground conditions stabilise before sowing wheat.

The introduction of selected winter wheats that can cope with later drilling, and the successful remodelling of spring wheat varieties, have significantly improved late-sown productivity. Several new varieties, including KWS Siskin, a Group 2 winter wheat, and KWS Crispin, a Group 4 winter wheat, have shown themselves suited to this situation.

By selecting these wheats, growers can simplify their cropping by adding the harvested grain to their existing wheat heap. Whether they are targeting a specific quality or feed market, there are varieties available that can suit all outlets. At the same time, by selecting the most appropriate varieties for later drilling, they can maximise their margins from both crops in the rotation, and gain significant agronomic advantages that bring benefits across the whole farm operation.

Reference

How the BBRO works

The strategic direction of BBRO is defined by the industry related Stakeholder Board, reviewing new technology and issues/threats to the crop and evaluating potential impact and value to the industry. Work is delivered by a small staff team, both internally and through collaboration. The Technical Board monitors the scientific rigour of our research programme, ensuring good value and timely results are delivered. The diagram below shows the areas of work being determined on the left, with level of decision making in the centre and those responsible for implementation on the right.

Colin MacEwan, Head of BBRO

What we do:
identify, commission and evaluate research delivering a knowledge exchange programme directly to growers.

Why we do it
to increase the competitiveness and profitability of the UK sugar beet industry in a sustainable and environmentally acceptable manner.

How we do it:
The strategic direction of BBRO is defined by the industry related Stakeholder Board, reviewing new technology, issues/threats to the crop and evaluating potential impact and value to the industry. Work is delivered by a small staff team, both internally and through collaboration. The Technical Board monitors the scientific rigour of our research programme, ensuring good value and timely results are delivered.

Source, fund, manage projects and collaborations to meet industry needs in cost effective manner and ensure key messages are disseminated.

Trial plots, variety list, laboratory investigations, plant clinic, data analysis. Publications and events.

Informed from UK and international beet industry. Growers, agronomists, seed breeders, chemical companies, IIRB, Nordic Beet etc.

Strategic decisions

Activity allocation, evaluation and management

Delivery

- Head of BBRO – Colin MacEwan
- Crop Progression lead – Dr Simon Bowen
- Crop Stability lead – Dr Mark Stevens
- Crop Recovery lead – Colin Walters
- Technical Board – scientific expertise

- Sugar Industry Exec Board NFU and British Sugar
- BBRO Stakeholder Board industry representatives

- BBRO Laboratory and glass houses
- BBRO Field team
- Partnerships and collaboration with other research organisations.
- Administration and communications
For the sweetest yields: it’s all in the seed.

SABATINA KWS

- Most popular UK variety in 2016
- Very high a.d. yield – 103.8 %
- Resistant to downy mildew

* 2017 BBRO Recommended & Descriptive List

www.kws-uk.com
Sugar Industry Programme 2015/16

The Sugar Industry Programme (SIP) has now been running for six years and is run jointly by the NFU and British Sugar. It is open every year to ten growers and five sugar industry representatives. It runs from November through to March and gives a broad insight into the organisation of the industry and the work that goes into ensuring a healthy relationship between growers and processor. This year’s meetings and discussions were particularly interesting due to the upcoming Brexit vote and sugar tax.

Open event: Gina Gould

After hearing various stories about the programme from colleagues I couldn’t wait to get started. The first meeting was at the Knights Hill Hotel where we were all greeted with a welcome cup of tea and a chance to meet our fellow participants. We started with a few introductions and our SIP leader, Diane Armitage, gave us an overview of NFU and what her role of Sugar Adviser involved. Donald Hume, Sugar Beet Intake Manager, followed to explain the NFU’s presence and role at each of the factories.

Lunch followed, giving us more of a chance to get to know each other before we were hurled into Media Training with Graham Percy. Graham has previously worked within the BBC and, since leaving, has been providing media training to numerous people. We were all keen to learn from his wealth of knowledge and enthusiasm for the subject. We started by learning the basic do’s and don’ts of broadcasting, and were given some top tips in preparing for interviews. We then learnt about the importance of soundbites and tricolons (a series of three words or phrases). After a break we had to put what we had learnt to the test. Two people were picked to complete a radio interview with Graham and two were picked for a television interview, which were then going to be played to the group for analysis. I was picked for the television interview! I had to stare straight down the camera lens for the duration of my interview so as to appear that I was talking directly to the viewer ... this was surprisingly difficult! Fortunately for me though, Graham accidentally pressed pause, not record, so I got away with not having my interview shown to the rest of the group; however it was still a valuable experience.

Following the training we all made our way to our rooms to get ready for a dinner later that evening with William Martin, Michael Sly and Pam Forbes from the NFU Sugar Board, and also Nick Morris, Agricultural Business Manager at Newark factory.

Wissington factory: Gina Gould

No matter how many times I go round Wissington factory, there is always something new to see and learn about, and this time was no exception.

We all met at the factory to get our protective clothing before heading up to the offices to start our day with some talks. We started by hearing about BSUK and the ‘Wissington Story’ from Andrew Dear and Dan Green. After this introduction, Richard Cogman joined us for an overview of the LimeX and Topsoil businesses, and the advantages of these products. Colm McKay (Agriculture Director at British Sugar) followed with an interesting talk covering the future challenges and opportunities that British Sugar and our growers face with the upcoming change to quota post-2017, and the possible contract options that could be available to growers in the future. He also pointed out the work being done in the Making Sense of Sugar campaign, to help educate people about sugar consumption.

After lunch, Mark Culloden went through seed production and ordering, the Industry Harvest and Haulage Scheme and Self Grow. The final talk was from Simon Leeds on the contracting process. After all the talks we were taken round the factory on a site tour, and shown the processes involved in turning sugar beet into the white stuff we put in our cuppa.

Germaines: Tom Saunders, sugar beet grower for Bury

Germaines kindly invited the SIP group to return to the Knights Hill Hotel in Kings Lynn, for dinner on the 2nd of December. We were joined by Steve Moon, managing director and Jordan Long, senior scientist at the company. Steve welcomed the group and explained what Germaines did, as many of us were not fully aware of the extent of their work. We were well-looked-after and enjoyed a superb dinner, finally retiring in the small hours of Thursday morning.

After our late night, we made our way, slightly blurry eyed, to the Germaines offices. Steve spoke again, giving a more
detailed overview of the business. We were also given presentations on the European side of the company and on their commercial development.

The group then visited the first factory, seeing the priming operation take pace. Priming regulates the germination process by managing seed temperature and moisture content to bring all seeds close to germination. This ensures uniform emergence in the field. In the second factory we saw the pelleting process and the application of a film coating. The coating gives a targeted and even application of plant protection products, a reduction in active substance load to the field and minimal dust during handling and planting of the seed. It was impressive how Germains were carrying out regular quality checks and laboratory trials to ensure consistency of their operations.

In the afternoon, SIP participants travelled to the company’s Research and Development site, a few miles from the main offices and factories. Jordan Long gave a tour of the extensive facilities before explaining some of the research Germains is involved in. New developments can take up to ten years he explained. It was also interesting to see how technology such as drones was being used for analytical work.

Steve Moon concluded the day by asking for suggestions for future areas of development.

**Westminster:** Mark Waling, sugar beet grower for Wissington

Our day in Westminster started at the NFU London office for some key presentations in the morning. We had an overview of the world sugar markets from Guilherme Kfouri, senior economist at the International Sugar Organisation, including some interesting market facts on Brazil (stagnating market), China (running a huge deficit with production falling) and India (over-production).

Jonathan Williams, Director at Czarnikow, talked us through changes in Europe post-2017 and the EU impact on the world sugar market, and its likely casualties.

We then had a very insightful and impressive tour of the Houses of Parliament with a lady who had been doing these tours for 20 years, and knew the place inside out; we got the impression she might, in fact, run the entire government.

After lunch, we met with Heloise Tierney, Head of Crops at Defra. This was followed by Matt Ware, Head of Government and Parliamentary Affairs, NFU, who took us through an overview of the NFU’s role in Westminster and gave us some useful lobbying tips. The day concluded with a visit to Portcullis House to meet Dan Poulter MP and use our newly found lobbying tips to impress on him the key issues we are facing in the industry (Pic. 1).

Altogether, a very interesting day; it was useful to learn the context of the global market and also get a greater understanding of how the NFU is working on our behalf at the heart of UK politics. It helped impress on me the positive work we can do together to influence policies pro-actively and ‘bat away’ the negative views for which many pressure groups seem to get so much air-time.

Although, perhaps, the biggest achievement of our day was getting a group of farmer boys and girls into and out of London without any losses!

**BBRO:** Louise Walker, Agriculture Helpdesk Supervisor, British Sugar

Half way through our SIP experience, we were taken to the Norwich Research Park, to the BBRO headquarters. After a long drive along the A47, our first challenge was finding the correct car park; unfortunately I was the navigator and failed miserably. The day commenced as always, with a welcome cuppa and biscuit, shortly followed by an introduction from Colin MacEwan, the Head of the BBRO.

Colin presented the main aims and objectives of the BBRO and what we can expect in the future. The vision of the BBRO should be of no surprise to growers: ‘To ensure the UK beet industry remains competitive and profitable for growers and processor now and beyond the 2017 sugar regime’ with their Mission being: ‘To identify, commission and evaluate research projects to ensure best practice and maximise yield return’.

Three key goals that the BBRO are working towards are: yield progression, yield stability and improved harvest and haulage. Others on the agenda included Colin Walters, BBRO Ag Development Manager, Dr. Mark Stevens BBRO Lead Scientist and Dr. Debbie Sparkes from Nottingham University. Each talked enthusiastically about their part in the BBRO and generated much discussion in the group.

After a quick lunch at the BBRO, we set out on foot to the conveniently located TGAC (The Genome Analysis Centre) building. Here we had a tour of the laboratories and learnt how the BBRO are using TGAC to learn more about the detailed overview of the business. We were also given presentations on the European side of the company and on their commercial development.

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genomics and bioinformatics of plants and diseases. Unfortunately at times, the talk went slightly over my head, but was still very interesting.

Finally, we visited the BBRO labs to look at the type of research and analysis they do there: finishing the day with a brainstorming session on what ideas we had as a group for future research. Overall a really good day, which generated lots of discussions and proved just how important the BBRO is.

**Brussels: Gina Gould**

Our three-day adventure to Brussels started at the champagne bar in St. Pancras station on Monday afternoon (unfortunately just outside it ... not in it). Once we were all present and correct, including Andrew Sinclair from the BBC (film camera and all) we were ready to go.

On arriving in Brussels we all followed our leader Diane like sheep in a small huddle, so as not to get left behind or lost (this actually happened on most of our trips!) and safely made it to our hotel for the night. Once ready we headed out for an all-you-can-eat buffet and were joined by Fay Jones (Parliamentary and Communications Adviser for the British Agricultural Bureau, BAB), Stuart Agnew (UKIP MEP) and Geoffrey Van Orden (Conservative MEP) which sparked the start of our Brexit discussions. Once the meal was over, we ventured further into Brussels to sample the local beers on offer (unfortunately no-one warned us they were a lot stronger than what we are all used to back in the UK) (Pic. 2).

Our first proper day in Brussels saw us, slightly fuzzy headed, making our way to the NFU offices for a morning of talks and discussions lead by Fay Jones (BAB), and included talks by Jess O’Flynn (European Crop Protection Association, ECPA), Elizabeth Lacoste (International Confederation of European Beet Growers, CIBE), Glenn Vaughan (Chief Executive of the British Chamber of Commerce) and finally Daniel Du Ville (La Confédération des Betteraviers Belge, CBB) before grabbing some lunch.

The afternoon saw a walk over to the European Parliament where we met up with Geoffrey again; he talked us through the procedures within the European Parliament and showed us where it all happened (Pic. 3). We then got a chance to ask him some questions about Brexit and other issues, which also got filmed. Once this was done, we made our way into the lobby where a few of the group members were interviewed by Andrew Sinclair on their views on Brexit; that was then shown on the BBC Sunday Politics show (Pic. 4). After this excitement, we made our way over to Leuven to meet Ian Munnery from SESVanderHave who was our host for the evening and following day.

Our three-day adventure to Brussels started at the champagne bar in St. Pancras station on Monday afternoon (unfortunately just outside it ... not in it). Once we were all present and correct, including Andrew Sinclair from the BBC (film camera and all) we were ready to go.

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On arriving in Brussels we all followed our leader Diane like sheep in a small huddle, so as not to get left behind or lost (this actually happened on most of our trips!) and safely made it to our hotel for the night. Once ready we headed out for an all-you-can-eat buffet and were joined by Fay Jones (Parliamentary and Communications Adviser for the British Agricultural Bureau, BAB), Stuart Agnew (UKIP MEP) and Geoffrey Van Orden (Conservative MEP) which sparked the start of our Brexit discussions. Once the meal was over, we ventured further into Brussels to sample the local beers on offer (unfortunately no-one warned us they were a lot stronger than what we are all used to back in the UK) (Pic. 2).
Wednesday morning brought an early start and a bus ride to SESVanderHave HQ in Tienen, which some coped with better than others. Luckily, Ian was prepared and there was plenty of tea, coffee ... and water awaiting us on arrival. The day was fairly relaxed and it gave us a good opportunity to have open discussions with Ian about varieties and processes involved. We also got a chance to look around their seed processing and packing plant, their trials equipment and their labs which were all fascinating to see. Before we left for the Eurostar and our long journey home, we got a fantastic lunch put on for us by SESVanderHave and a nice goody bag including Belgian chocolates to take home with us.

**NFU Conference: Sam Ward, Brown & Co, Norwich**

The annual two-day NFU conference was held at the International Convention Centre (ICC) in Birmingham this year. After battling through the big city, we SIP candidates arrived for an inspirational opening address by Meurig Raymond, the NFU president. During the conference we heard from some interesting speakers on important current issues; Elizabeth Truss, the Secretary of State for Environment, Food and Rural Affairs, on the absolute mess of BPS in 2015, Mark Berrisford-Smith from HSBC on the depressing global market outlook, and Connor McVeigh from McDonalds on the sourcing of British produce, to name but a few. There was a chance for a sugar breakout session to debate contracts post-quota and also a debate on Europe. A highlight for me had to be the evening of the conference, where we had a well-sourced meal before the ‘Pointless’ TV show presenter Alex Armstrong had me in stitches.

Day two of the conference saw a number of interesting workshops run throughout the morning, and a lively debate on the EU referendum in the afternoon where we heard the views of both George Lyon, Former MEP for Scotland and Mark Spencer, Conservative MEP for South West England and Secretary General of the Alliance of European Conservatives and Reformists. Meurig Raymond was re-elected as NFU president during the AGM later on, with Guy Smith and Minette Batters keeping their positions, as Vice and Deputy Presidents respectively, for the next two years.

As my first conference, it was very interesting for me to see the work the NFU do on behalf of farmers and the links they have with industry. Overall, an interesting two-day event that I would recommend to anyone in the farming community.

**Closing event: Gina Gould**

Our final meet was at the NFU offices at Stoneleigh Park. The first challenge was finding where we needed to be, and then once this was achieved, getting let into the building proved more challenging than we had all anticipated. But once we figured this out we were rewarded with a cup of tea and bacon roll.

The day started with presentations from Andrew Clark, Director of Policy, Edd Banks, NFU Sugar Board Member and previous SIP participant, Guy Gagen, Chief Combining Crops Advisor and Ruth Mason, Chief Food Chain Adviser. There was a lot of information from these guys to pack into the morning but we managed it, and it created a lot of productive discussion.

After lunch, we returned to the room to find the layout had been changed and we were all to be sat in an open semi-circle with a big open space in the middle. This alone scared me as I knew the session coming up was presentation training, so group participation was surely going to be a big part of the afternoon ... I could already feel my heart-rate rising. The training was carried out by Tessa Morton, who has trained many professionals in her 20 years as a presentation skills coach. She previously trained as an actress and she explained how these skills can be used when presenting. Throughout the session we worked both in pairs, and also with a few volunteering/getting picked to stand up and carry out some exercises in front of the group. I think it’s fair to say that I am not a natural-born speaker and the thought of speaking to a large group of people terrifies me, but Tessa had some great tips for how to cope with this and the reasons behind the natural reaction to want to run away and hide. I found the most useful tip was also the simplest ... breathe!

Once we had finished the training we headed off to our hotel for the night and prepared ourselves for our final event of the programme. At dinner we were accompanied by Meurig Raymond, NFU president, the NFU Sugar Board, Colm McKay, Director of Agriculture at British Sugar, and Philip Bicknell, Head of Food and Farming at the NFU. Throughout the meal, all of the SIP delegates were asked to stand and give a short two minute speech about what we had learnt: highlights and any feedback we might have had; so it was a perfect opportunity to put Tessa’s training to good use.

All-in-all, this programme is a fantastic opportunity for all those involved in the sugar industry in one way or another and I would highly recommend it to everyone. It gives a great insight into the work that both British Sugar and the NFU do, and how they work together to ensure a good working relationship between growers and processor. It also gives a wider understanding of what is being done to help support growers and the industry as a whole. For more information about how to get involved in the future, please see below.

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**How to sign up for the Sugar Industry Programme 2016/17**

In 2010/11, NFU Sugar, in conjunction with British Sugar, launched the Sugar Industry Programme. This initiative was designed to engage younger growers through a training and development programme. This successful programme will enter its seventh year in 16/17, with the official application process opening at the end of summer for interested candidates. The programme will be advertised on the NFU Sugar website (www.nfusugar.com); however, we are always keen to receive expressions of interest, and those who send an expression of interest will be contacted directly once the application process opens. If you are interested in applying or would like to learn more about the programme you can contact Diane Armitage via diane.armitage@nfu.org.uk or on 02476 858616.
Spotlight on soils

This is the first of a new series of articles where we put different aspect of soils under the spotlight, and ask some key questions of specialists and researchers who are working in these area. The focus of this edition is on soil compaction; Simon Bowen of BBRO poses the questions to Dr. Miguel Gabarron of AB Sugar.

We are all familiar with the consequences of compaction on crops, and the cost of having to put it right through subsoiling, but could we be better at identifying the factors that lead to compaction, and so avoid it in the first place? Cranfield University is among one of the UK universities which has a wealth of expert knowledge in this area. Dr. Jacqueline Hannam is a Senior Research Fellow in Pedology (soil science) at Cranfield University and has undertaken a range of research projects to improve our understanding of soil management. Jacqueline, along with other members of the soils team at Cranfield (Dr. Thomas Mayr and Dr. Robert Simmons) under a KTP (Knowledge Transfer Partnership), recently teamed up with Dr. Miguel Gabarron of AB Sugar to explore managing soils more effectively around the sugar beet harvest.

Soil structure is the arrangement of the solid parts of the soil and of the pore space located between them (see Fig. 1). It is determined by the way in which individual soil granules clump or bind together and aggregate, and affect the arrangement of soil pores between them. Soil structure has a major influence on water and air movement, biological activity, root growth and seedling emergence. The structural properties will be greatly influenced by the different soil components in terms of sand, silt and clay content.

Question: What happens to the soil structure when it becomes compacted?

Soil compaction is defined as the deterioration of soil structure by mechanistic pressure, predominantly from agricultural practices involving heavy machinery. Soil particles are pressed together and the pore space is reduced, especially larger pore spaces, often leading to an increase in the soil bulk density (Fig. 2). It happens when the stress,
caused mainly by agricultural traffic, exceeds the mechanical strength of the soil.

The consequences of soil compaction can be generalised in two groups: those related to the reduction in pore space and those related to the increase in soil strength. Reduction in pore space reduces water and air movement and storage. Compacted soils often have reduced infiltration and also drain more slowly. This can lead to an increase in runoff and erosion. The reduced capacity to store water also has an effect on plant growth and thus, yield. The increase in soil strength causes a mechanical impediment for root growth that can decrease yield and increase fertiliser demand. In addition, the energy requirement and fuel consumption for cultivation is higher in compacted fields.

**Question: Can this process leading to compaction be predicted?**

Many of the processes occurring in nature can be modelled and thus predicted to some extent, and soil compaction is no exception. The two primary factors affecting soil compaction are: firstly the soil strength, or the ability of the soil to withstand mechanical pressure, and secondly the loading or pressure exerted on the soil from agricultural machinery. Soil strength is influenced by intrinsic soil properties such as texture and organic matter, soil structure and water content. The loading depends on vehicle characteristics (axle load, tyre dimension, velocity) and also on soil-tyre interactions.

Soil compaction models take into account the more-or-less static soil properties, such as texture and organic matter, together with other properties that vary over time, primarily soil moisture. Soil strength can be calculated at the point of harvest and related to the pressure exerted by a given vehicle during harvest operations. There are three main parts to the compaction model:

i) calculation of the contact area between the soil and vehicle and the pressure distribution over the contact area

ii) calculation of the stress transmission through the soil profile with depth

iii) estimation of the strain caused by the stress, usually represented by a change in bulk density.

A key property affecting the prediction of soil compaction is the soil moisture, which will depend on weather variables (rainfall, evapotranspiration) and the soil characteristics. To predict short-term soil moisture conditions we need reliable weather forecasts and exhaustive soil properties databases to predict soil compaction accurately (Pics. 1 and 2).

**Question: Are there other case studies where soil characteristics have been modelled to avoid compaction?**

In relation to agriculture, some studies in Germany and Sweden have attempted to predict soil compaction. The common approach is the calculation of a pre-compression stress value depending on soil moisture and other static soil properties. Pre-compression stress is the maximum stress that a soil can withstand against any applied vertical stress until the soil becomes compacted in relation to defined levels. The pre-compression stress is compared with the stress caused by different vehicles to determine if the soil is likely to experience compaction. These assessments are used to determine if agricultural field traffic will cause structural damage to the soil. Models to predict soil compaction are also applied in forestry, where different models are used to plan logging operations.
The approach we are using in our model to predict soil compaction and trafficability is based on the SMART model, developed by Cranfield University for military range management. It predicts future trafficability based on a weekly weather forecast from the Meteorological Office as the starting point. A daily rainfall forecast is input in a soil water balance model, which predicts soil moisture. The soil strength is predicted from a site-specific calibration of soil moisture and soil strength, and compared with the pressure exerted by the vehicles used in planned military manoeuvres. The output of the model is a daily map of the training area with a traffic-light system representing ‘go’ and ‘no-go’ areas in relation to potential trafficability.

**Question: is it possible to improve the characteristics of soil across the rotation to be more resilient to soil structural damage?**

There are three strategies in response to soil compaction: avoidance, alleviation and acceptance. The rotation itself is a way to avoid and alleviate soil compaction. On the one hand, it reduces tillage activity and agricultural traffic at the beginning of the cropping season and, on the other hand, different rooting systems have the capacity to break subsoil compaction.

It is important to differentiate between topsoil and subsoil compaction. Topsoil compaction is very difficult to avoid since even light equipment reduces pore space in the topmost soil layers. At the same time, it is relatively easy to alleviate through chisel or mouldboard ploughing. But there are different ways to avoid subsoil compaction: the main one is restricting access to the field when soil conditions can favour compaction, i.e. soil is too wet and soft to support a given vehicle. Alternative strategies are: reducing tyre inflation or using tracked vehicles. Both of these approaches increase the contact area between vehicle and soil, and thus spread the weight and corresponding stress. Subsoil compaction is very difficult to alleviate. As mentioned previously, crop rotation can help in this sense. Subsoiling is the most common way to alleviate subsoil compaction. It may work when compaction is limited to a plough pan layer, but it is not recommended below the plough pan, since it makes subsoil even more vulnerable to further stresses. As a consequence, subsoil compaction below the pan layer can be considered an almost irreversible process.

**Question: Is the predicted trend for more intense rainfall events in the future likely to increase the risk of soil compaction?**

As the strength of soil is heavily dependent on water content, wet soils are far more susceptible to compaction than dry soils. I do not think that the increase in the frequency of intense rainfall events will have a direct effect on soil compaction per se but rather the expected shift in the seasonal patterns of rainfall distribution. The shift towards wetter winters and drier summers could have a number of potential impacts. Wetter winters will mean that the duration and timing of waterlogging in soils will change but it is not clear how this might impact on compaction as the timing of harvest operations may also shift in response to the changing weather conditions. Drier summers may mean that sugar beet crops will need to be irrigated due to lower summer rainfall and drier soils. Changing weather patterns will, however, affect our ability to predict soil conditions in the short term, which could lead to agricultural operations occurring during sub-optimal soil conditions (i.e. when the soil is too wet) and hence increase the likelihood of subsoil compaction. This is why it is very important to have reliable planning tools to ensure that we access the fields at the right time and with the right machinery.

**Question: Can you tell us a bit more about how you see the results of the KTP project benefiting growers?**

Our goal is, to predict soil conditions during a period 15 to 28 days ahead. This will allow growers and contractors to have a good estimate of the field conditions at harvest. Moreover, it would indicate where harvest operations will have the least impact on soil structural degradation, and where it will have the greatest impact, possibly leading to soil compaction. The three main effects of harvesting during predicted optimal conditions will be:

1. Soils will be trafficable and topsoil disturbance (sinkage) will be reduced. This will avoid additional harvesting delays due to slippery soil, and the extreme cases where tractors, trailers and other vehicles involved in harvesting get stuck in wet soils. Harvesting in soils at optimum trafficability will also be more fuel efficient.

2. Subsoil compaction will be avoided, and the costs associated with subsoiling will be minimised. Soils will be kept in good condition, with greater macropore space and with a high water storage capacity. This will improve yield and decrease fertiliser demand.

3. We will also predict soil stickiness, and thus the potential for ‘soil tare’. When the soil is less sticky, less of it will be removed with the roots, resulting in easier cleaning of the beet. This will have a direct effect on root damage and post-harvest sugar losses. Estimates indicate a difference of 3-5% crop losses between harvesting in optimum and sub-optimum soil conditions, a benefit well worth going after.
The Beet Yield Competition

Have you got a bright idea to increase your beet yields? Do you want to demonstrate your growing talents? Keen to better understand what is limiting your crop performance?

2017 will see the launch of the BBRO’s Beet Yield Competition, giving you the opportunity to win a fantastic, European study tour by maximising the potential of your crop.

By Rebecca Watkins, British Sugar plc

The History

You may remember an original beet growing competition, Beet the Best that was launched in 2010 and run by British Sugar and Farmers Weekly. Beet the Best attracted more than 200 entrants annually and tested their knowledge of the crop and sugar beet industry. The new Beet Yield Competition is far more practical: no questions or virtual crops; this time the proof will be in what you grow!

The Aims

The competition will stimulate growers, researchers and agronomists, individually or together in teams, to improve crop performance through development and sharing of best practice in the Sugar Beet Industry. “High yield and quality are vital for the continued success of the crop”, said independent agronomy consultant, Dr. Philip Draycott.

As 2015’s record crop yields and BBRO trial plots have shown, there is plenty of scope with the genetics currently available to reach up to 145 tonnes per hectare in the UK. Philip said, “This competition will encourage growers to try harder to push up yields even higher and that there has always been a sense of competitiveness between growers! Of all crops grown, many farmers take pride in their sugar beet performance, and it is one of the most testing to grow.” The Beet Yield Competition will challenge growers and their advisers to use innovative practices and all their crop growing skills to achieve maximum sugar yield.

The Demonstration Plots

To whet your appetite plots will be hosted at two of the 2016 BBRO Demonstration Days (Wimblington, Tuesday 21st June and Wymondham, Tuesday 28th June). All of the Beet Yield Competition supporters; British Sugar, NFU Sugar, the BBRO and Hutchinson’s have designed a programme for their own plot, while Philip Draycott, remains impartial. The competitive spirit is already high! Representatives will be attending all of the BBRO Demonstration Days to answer your questions and provide more information about the Beet Yield Competition and how to enter.

The 2017 Field Competition

The competition, open to all sugar beet growers, will begin in 2017 with the winner being announced at the end of the 2017/18 campaign. The winners, however, will not be chosen simply for the greatest yield. Instead, the winning crops will have achieved the greatest percentage of the theoretical potential yield as calculated using the AB Sugar BeetGro Model. This model estimates the crop yield in adjusted tonnes per hectare that a specific plot would be capable of producing, accounting for factors such as soil type and season-specific weather.

The model has been developed by AB Sugar and is based on BBRO-funded research. Assessing the percentage of theoretical potential yield with the BeetGro Model enables all entrants to compete fairly, irrespective of their individual farm conditions.

“By entering the competition, growers will gain a new insight from the Beetgro Model into what yields they can realistically aim for”, said Paul Simmonds, Yield Development Manager at British Sugar. He added, “It will be great to see data applied so practically and used to even out the playing field like this.” We are also planning to promote this exciting competition in the national farming press and to continually update you all via the British Sugar Beet Review, BBRO emails, our websites and social media. More detailed information will be available soon and the BBRO are looking forward to working with growers and advisers on this important competition.

The Prize

The winners will be recognised from each factory area, with the title of champion being awarded to the overall winner (the entrant reaching the highest percentage of their theoretical potential yield for the country). The group of winners will accompany representatives from the sponsoring organisations on a study tour in Europe.

How you can enter

Any field of beet drilled in 2017 will be eligible to enter the competition. You simply need to provide details of the location and soil type of your site and allocate an independent verifier; we’d recommend your British Sugar area manager.

For more information or to enter the 2017 Beet Yield Competition, simply email your name, grower account number to byc@bbro.co.uk and we will be in touch soon.

Entries will close on 31st December 2016.
Former editor of the British Sugar Beet Review, Bill Hollowell died recently at the age of 76. Over 200 former friends, colleagues and family attended the service at St. Mary's Church, Orton Waterville to pay their respects to a truly great man.

It was perhaps no surprise that Bill would carve out a career in journalism, as his father, uncle and grandfather had all been involved in the business. He took the profession very seriously and loved words, aiming always to convey his message succinctly and in the most effective manner.

Prior to Bill’s time with British Sugar, he worked for the Peterborough Evening Telegraph from 1970, and then went on to work for the Ministry of Defence in London, for two years, in their public relations department. However, following many frustrating commutes to the city, he returned to join the Peterborough Standard, from where he was later head-hunted by a colleague then working for British Sugar.

Bill was offered a job within 2 days and went on to work for over 20 years as editor of the British Sugar Beet Review, and its companion journal Sugar News between 1978 and 1999. The role afforded the opportunity for extensive foreign travel, encompassing both beet and cane sugar producing countries. He also visited UK beet growers frequently, and was once in such a hurry that he accidentally packed his daughter’s size-3 wellington boots instead of his own. With no other option, Bill was obliged to squeeze his size-9 feet into Adrienne’s boots and tip-toe gingerly through the muddy field.

Once, while out on a walk in Ferry Meadows Park, Peterborough in February 2009, he jumped unhesitatingly into the icy lake to rescue his daughter’s pet dog. Bill realised Hamish was not strong enough to pull himself out of the hole he had fallen through in the ice and had only a few minutes to live in the freezing water, so he plunged in still wearing his heavy clothing. Needless to say, the story had a happy ending when Bill, then 69, managed to save the dog and avoid serious harm.

Not content to bow out graciously, in his later years, Bill was a frequent contributor to both local and national media. A long-time friend of Richard Littlejohn, he had many witty and acerbic letters printed in the Daily Mail and Daily Telegraph. A great Terry Wogan fan, he was ‘president’ of the Peterborough ‘Terry’s Old Geezers’ Club, having many of his letters read out on a regular basis.

Bill will be remembered mostly by his many friends and family for his kindness, keen witticisms, charm and generous nature. He is survived by his widow, Marielyn, and daughters Adrienne, and Lynn – whom he was grateful to see married in October before he left us. Bill was never going to win any prizes for political correctness but, by golly, he left an indelible stamp on everyone who knew him, and he will be forever missed by them all.

By Robin Limb
What a drilling season! It rains and then just as it dries enough for work, it rains again, followed by frosts and wind. We have had it all.

It has been a challenging drilling period that started late due to the difficult weather. Drilling at our largest trial site, at Garboldisham, kicked off on the 22nd March and continued up to Easter Sunday before it rained again; soil temperatures were between 7 and 9°C. However, from this point onwards, drilling progress was steady; like all growers I was continually looking for a weather window. With trial sites and summer demonstration day sites all across the sugar beet growing area, it is always a challenge to get the trials machinery in the right place at the right time; someone was always telling me it was dry where they were, while I was standing in water.

The BBRO has worked closely with Debbie Sparkes and John Alcock at the Nottingham University trials department, to prepare plans and drill trials on a field scale in support of the sugar beet research being conducted there. The trials include fertiliser placement, BCN and rooting. Adrian Boor, the BBRO’s trial designer spent a lot of time collaborating with Debbie and John to ensure these trials would work, both practically and theoretically, to produce reliable results. These trials were drilled early April.

Drilling continued through to the middle of May. The last to be drilled were deliberately delayed fungicide slots which are part of the BBRO’s sequential fungicide trials, and a trial that had to be re-drilled following severe damage from wind blow which destroyed both the beet and the cover crop at one of the sites.

As soon as the sugar beet began to grow, other trial tasks lined up. Counting of emerging beet and various applications of nitrogen take a lot of effort and have to be conducted alongside preparation of the summer demonstration day sites: marking out and labelling drilled trials, spraying, visual assessments and production of photographic records. The team has already spent many hours walking up and down fields, operating drills, spreaders etc. to produce the high quality results required to keep driving yields up and the industry forward. I would like to thank my team for working long hours and giving up weekends to achieve this.
The start of May signalled the beginning of the Annual Aphid Survey. This year, 30 sites are covering the 4 factory areas. The recent warm weather encouraged early aphid activity but we were surprised by just how many *Myzus persicae* were caught in the first week of collections: in contrast to the mere two *M. persicae* caught in week one’s collections of 2015, 175 *M. persicae* were recorded this year (Pic. 1). Coincidentally, ladybird numbers were also high for the time of year, which is encouraging because of their role as biological control agents. Please see the advisory bulletins for the latest aphid data from the collections.

2016 is the second year of an Innovate UK funded project entitled *A novel pre-breeding strategy to reduce dependence on insecticides for virus yellows control in sugar beet*. In May, sugar beet accessions growing in the BBRO glasshouse were inoculated with aphids carrying the beet yellows virus and then (Pic. 2) used to establish a field trial at Boxworth in Cambridge shortly afterwards. Multiple serological tests will be performed in the coming months in an attempt to identify any resistance the accessions may have to the beet yellows virus.

Pic. 1 – Comparison of *M. persicae* numbers caught in week 1 of 2015 and 2016 collections.

Pic. 2 – Sugar beet accessions growing in plug trays in BBRO glasshouse.
Red Tractor's sugar beet and cereals assurance standards combined with UK legislative requirements have achieved Silver level equivalence with SAI Platform’s Farm Sustainability Assessment (FSA) 2.0.

For the past eight years, all the sugar beet supplied to British Sugar has been Red Tractor farm assured. By working together as an industry the two organisations are driving sustainable agriculture that promotes environmental protection, embraces creating a quality product and drives safety in the efficient production of sugar beet.

Laurence Matthews, Red Tractor’s Combinable Crops and Sugar Beet Board Chairman, said: “The world’s biggest food and drink brands are scrutinising their supply chains more than ever before. It’s becoming imperative that companies such as British Sugar, who supply these brands, can demonstrate sustainable sourcing policies.

“Not only does this achievement mean that British Sugar continues to be a great supporter of sugar beet grown in the UK, it also demonstrates that Red Tractor’s growers produce a quality product to standards that major brands recognise as sustainable”.

Simon Leeds, Grower Engagement Manager for British Sugar said: “This is great news for the UK sugar beet industry and recognises the outstanding work being achieved by our growers.

“At British Sugar we are proud of our sustainability track record – and will continue to drive our work to build efficient, productive and responsible value chains working with all our partners”.

Plants carrying this variation are tolerant to a specific ALS-inhibiting herbicide developed by Bayer.

“The herbicide has performed exceptionally in trials demonstrating reliable control of a wide range of broadleaved and grass weeds, and effective control of weed beet populations,” says Edward Hagues, Bayer root crop product manager.

“In addition, the new herbicide offers greater flexibility in application timing compared with standard herbicides and requires fewer passes to achieve control,” adds Mr. Hagues.

An application supporting the herbicide’s registration in sugar beet is currently being evaluated by regulators. For the technology to be available to UK growers both the herbicide and varieties will need to gain registration through their respective regulatory bodies.

British Sugar’s commitment to red tractor assurance sees its sustainability credentials globally recognised

Red Tractor’s sugar beet and cereals assurance standards combined with UK legislative requirements have achieved Silver level equivalence with SAI Platform’s Farm Sustainability Assessment (FSA) 2.0.

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A view from the field

BURY ST. EDMUNDS

The 2016 crop has a lot to follow after some very good yields across the Bury area in 2015; it has had a challenging start: a cold and wet first quarter this year going straight into summer, with no real spring.

We have had an elongated drilling window which started at the end of February, the last crops being drilled on the 6th and 7th of May. Seedbeds have been very variable, especially on the heavier soil types; this was due to the lack of winter frosts combined with a very wet March. In many places, seedbeds have required two passes with cultivation equipment either powered or not, which is not ideal but was necessary to get an acceptable seedbed.

There have been a number of pests active in this year’s crop, with slugs and leather jackets at or below ground level, and bird-grazing above ground; mice haven’t been as much of a problem this year as in previous seasons.

The earlier-drilled crops now have six true leaves and look well, while the later ones are at cotyledon to expanded cotyledon stage. Herbicide programmes are well under way, especially on the more forward crops; many earlier-drilled crops are now on to their second post-emergence application, and others are receiving a pre-emergence herbicide. Weed control has been reasonable considering the cold weather. Blackgrass is now starting to appear in many fields; it needs to be big enough before you spray but not too big: if it’s already the size of your fist and has received a number of broadleaf weed herbicides, it will be difficult to control. Aramo (tepraloxydim), which can currently be used for blackgrass control, needs to be used by 30th November 2016 if you have stocks on farm.

If you wish to discuss anything regarding your crop please get in touch with your area manager.

Guy Bicknell
Area and Beet Supply Manager

CANTLEY

What a spring! Prolonged cold and wet conditions lasted throughout March and April, with the Cantley area, especially near the coast, catching continuous rain showers coming down from over the North Sea. The first beet was drilled around the middle of March, into freshly ploughed light soils as all other soils were much too wet to drill. More growers made a tentative start on ‘over wintered’ ploughed land on medium to light soils during the next week, leading up to the Easter weekend. Heavy rain, especially on Easter Sunday/Monday (27 mm in total), caused a number of fields drilled prior to Easter to ‘run together’ and cap. Showers allowed little drilling from end of March through to third week of April. This rainfall, although frustrating, moistened the capped fields and enabled beet to emerge through this period. Finally the weather improved, after one final 27 mm soaking on 16th April, and growers recommenced drilling (or started in many cases); the final 60% of my crop was drilled in the last weeks of April.

Emergence from the early-drilled beet initially was good, with populations of 90 - 100 k plants/ha, although they have subsequently suffered from the cold conditions, which slowed growth, and from grazing by birds, skylarks in particular. In crops drilled the week prior to Easter, the excessive rainfall and capping resulted in populations ranging from 50 to 85 k/ha. Later drilled beet have emerged quickly and have excellent populations between 90 to 105 k plants/ha.

Weed control has been challenging but pre-emergence herbicides have worked well. Application of the first post-ems to the early-drilled crops has been difficult with overnight frost and grazing, and slight wind damage on lighter fields making decisions difficult on rates and timings of treatments.

Jonathan Pilbrow
Area Manager

It is with sadness that we must inform you of the death of John Bleach on the 28th April, aged 94. John was a British Sugar fieldsman working out of Cantley factory between 1951 and 1981, he covered an area between Wymondham and Beccles. When John retired in 1981 he returned home to help on a small family dairy farm in Tasburgh, milking Jersey cattle. He also had a keen interest in gardening. We would like to pass on our sincere condolences to his family at this time. John’s funeral took place at St. Faiths Crematorium in Norwich on Wednesday 8th June.
The earliest crops have emerged well, and are approaching the established 6 true-leaves stage. There have been very few pest problems so far, despite the poor conditions: just occasional reports of birds grazing, and mice taking seed.

Herbicide programmes are underway; Avadex (triaallate) has been widely used in blackgrass situations, followed by a programme that includes Goltix (metamitron), Nortron (ethofumesate) and Centurion Max (cloethodim) at relevant timings. The delayed start has provided an opportunity to apply glyphosate. Recent frosts will have deterred many growers from applying post-emergence herbicides, and some will have a backlog of work. If you are treating different crops, take the time to clean your sprayer thoroughly: over time many crops have been destroyed by sulphonyl urea contamination in the sprayer.

Later-sown crops seem to be germinating and emerging where there is moisture and sufficient soil covering the seed. Growers need to be cautious with herbicide programmes where emergence is variable.

Staff changes

James Edwards has recently joined the Newark Agricultural team as Agricultural Operations Manager. James has extensive experience of the process side of the business: latterly managing the animal feed operations at Newark.

Alec McNulty is completing a secondment; in Alec’s absence, Gina Gould has managed his area. Gina now returns to the BBRO trials team where we wish her luck in her future career.

David Smith
Area Manager

Crop progress

The spring has been cold and wet; a dry spell allowed sowing to start in the middle of March. 40% of the crop was drilled by the end of the month, mainly on lighter soils. The lack of frost mould and further rain made cultivations difficult on most soils; 75 mm of rain fell in March, including 28 mm that fell around the 9th.

Wet cold conditions continued into April; furrows started to dry out but, at plough depth, the soil remained wet. Many growers have used multiple cultivations (and patience) to create a tilth. 50 mm of rain fell in April, and it remained cold with frequent frosts. Sowing was almost completed by the end of the month.

The skill of farming has never been more tested than during the last few weeks but, by the end of April, virtually all of the sugar beet has been drilled. Patience has been a virtue while waiting for a suitable weather window, and getting a suitable tilth for the drill has been a rather drawn-out process with many items of kit being used to get the right seedbed. The resulting drillings are looking good with good plant numbers, although the ravages of the recent events, from frost, wind-blow and capping, to bird-grazing are evident.

From now on, the crops should motor as the mercury rises. Timing of inputs will be essential to get the most out of your sugar beet crop. Remember, second nitrogen applications need to go on as soon as you can see down the row. Just as the crop will grow, so will the weeds, so applying the right herbicides for the given weeds at the right timings is crucial; otherwise the weeds are sure to compete for light, nutrients and available water.

Later in the season, focus should be given to removing bolters and weed beet, to keep the crops as clean as possible and prevent any seed-return which will hamper management of future sugar beet crops.

As cereal harvest approaches, the first fungicide should be applied as soon as any disease warnings are given. Keeping the crop canopy healthy and free of disease is vital so that the photosynthesis can proceed at its highest level, to produce as much sugar as possible.

Philip Ecclestone
Area Manager

May day has just gone and the spring-like weather has finally arrived with some much-welcome sunshine. After the mild, wet winter we had a very cold, late spring culminating in a typical April with showers and unsettled weather. All-in-all a very challenging time for getting any spring-sown crop established. Perhaps the French saying, "If you have Christmas on the balcony, you will have Easter next to the fire", has been spot-on this time round.

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