EU Sugar reform outcome

Gauging harvester losses

Sugar beet seed production
Not to put too fine a point on it, Stingray is the highest yielding variety available on the 2014 BBRO Recommended List.*

An excellent pedigree with lower bolting, it is the variety others look up to.

*Source – BBRO 2014 recommended list - Full data set at www.bbro.co.uk
The British Sugar Beet Review is published quarterly in March (spring), June (summer), September (autumn) and December (winter). It is sent to all sugar beet growers in the UK and is funded jointly by growers and British Sugar plc as part of the British Beet Research Organisation education programme. Neither the editor, nor British Sugar plc, is necessarily in agreement with opinions expressed in this journal. No responsibility is accepted for statements contained in advertisements. © Copyright is only by permission of the editor and charges may be applicable. Published images are copyright of this journal unless stated otherwise.

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Whole beet delivery for the 2013/14 campaign
Andrew Dear and Tom Brown remind us of the importance of accurate crowing of sugar beet if yield and quality is to be maximised this harvest.

Sugar beet storage: Best practice to maximise yield
Philip Ecclestone reviews the key factors to consider when planning sugar beet storage this campaign, and offers some timely advice for growers and contractors.

Targeted application of herbicides to control weeds in sugar beet and vegetables
Nick Tillett and Paul Miller give an insight into their work with spot-spraying technology, which has potential to reduce inputs and increase efficacy.

Sugar beet seed production and the trait pipeline
Marc Lefebvre and Ian Munnery of SESVanderHawe explain the complex processes involved in sugar beet seed production and how the painstaking work of breeders has given us the varietal improvement we enjoy today.

Updating the BBRO/Broom’s Barn sugar beet growth model
Aiming Qi, Eric Ober and Keith Jaggard illustrate how yield modelling and prediction for the UK sugar beet crop has been brought up to date for the 21st century.

US Red River Valley growers’ report from the World Association of Beet and Cane Growers (WABCG) conference in India
Laura Rutherford gives us an overview of the WABCG conference which took place in New Delhi in March this year.

West, after the event – UK pauses for thought...
Jo Gilbertson provides a timely reminder of the risks associated with fertiliser handling and storage following the recent explosion at West in Texas.
2013 Crop promises to finish on a high...

This year’s beet crop has been spurred on by the near ideal growing conditions of the last two months. A regular combination of sunshine and showers has ensured that all but a few crops are now well developed and continuing to grow rapidly. Further rainfall would help optimise growth and ease soil conditions for harvesting, ahead of the campaign start in mid-September.

Root sampling on 480 fields started at the beginning of August and continued until early September. Although initial indications were unremarkable, the excellent growing conditions mean that some lost potential, following the late spring, has been recovered and current prospects are much more promising. At this time of year the crop grows at the rate of one tonne of sugar per hectare per week, so factory opening dates always have to strike a balance between maintaining supplies to customers and maximising the sugar yield of the delivered beet.

The autumn issue of the British Sugar Beet Review contains some timely advice on best practice harvesting, handling and storage of your beet crop, with the focus clearly on maximising delivered yield. Following the outcome of EU Sugar Regime reform, Ruth Digby explains the implications for the UK beet industry following the removal of quotas in 2017.

Further afield, we gain an insight into the Indian sugar industry with a report on the recent WABCG conference, held in New Delhi. Sugar beet seed production comes under the spotlight in an article provided by Ian Munnery and Marc Lefebvre and we learn what the winners of the ‘Beet the Best’ competition winners got up to on their recent study tour of French sugar industry.

I hope you enjoy the third issue of the Review in 2013 and on behalf of the editorial committee may I wish you a successful campaign.

Robin Limb
Editor
CAP reform: the political deal is confirmed

On the 26th June 2013, twenty-one months after the European Commission first presented the draft proposals for the new Common Agricultural Policy (CAP) and Common Market Organisation (CMO) regulations, a deal was finally struck between the European Institutions in Brussels. This political agreement represented the end of several months of detailed discussion and negotiations between the European Council, Parliament and Commission and sets out the main areas of agreement on the majority of the key issues for the future of European Agricultural Policy, including the prolongation of the existing sugar regime.

Whilst detailed information of the full content is still sketchy at this time, and as some points were left out of the deal relating to the EU budget Multi-Annual Financial Framework (MFF) agreement (including external convergence, capping and the movement of money between the pillars of the CAP), this article aims to provide an overview of the political agreement reached and the key areas of impact for sugar beet growers. Full briefings on the whole CAP package are available on the NFU website.

The remaining official steps

With the tripartite discussions going on until the last minute, the Irish Presidency has been highly commended by all for securing a final political agreement before the end of their term, and have now passed on the task of completion of the final stages of the package, including the delegated acts and the MFF related issues, to the new Lithuanian presidency.

The final stages therefore are not expected to take place before the autumn of 2013.

The legislative texts resulting from the agreement reached at the end of June are currently being consolidated by the Secretariat of the Council. As with all new legislative texts, the political deal is undergoing a legal ‘cleaning’ by the legal services of the Institutions. Technical exchanges are running and will continue until just after the summer break for this purpose.

Provided that progress is made on the outstanding issues, the adoption of these texts will, or should, take place through the following process:

- European Parliament Committee of Agriculture vote in September/October 2013
- European Parliament Plenary vote in November 2013

Council of Ministers, Agricultural Council vote in November/December 2013

In parallel to this formal process, transitional measures (mainly on aspects of the main CAP text on direct aids and rural development) are under discussion at both the Council of Ministers and the European Parliament’s Committee on Agriculture. Discussions between the Council and the full European Parliament are expected to commence in October, with the text to be adopted in December 2013 so as to apply from 1st January 2014.

Sugar CMO

The sugar Common Market Organisation was one of the last aspects of the CAP package agreed by the institutions. The sugar quota end date represented one of the big political items, which meant it was held to the last minute by all involved.

The agreement will see quotas finish on 30th September 2017, effectively meaning that, excluding the current crop in the ground, there are now only three more cropping years under the current quota system remaining.

A major success of European beet growers’ associations was the securing of the important provisions allowing farmers to be represented by a single body with the right for collective negotiation agreed as part of the extension of the quota regime; this has secured the current framework for the period until 30th September 2017.

However most importantly, and a success from the lobbying by beet growers’ organisations (including the NFU), is the reference in the political agreement to such collective negotiation rights continuing beyond the end of quotas. How these rights will operate now needs to be looked at carefully...
to ensure they can deliver the intention of the political agreement in maintaining balance in sugar supply chains in the future.

For UK sugar beet farmers, who have only one processor in their market place, the ability to stand together as one mitigates against a grossly unbalanced supply chain offering little hope of perhaps achieving a fair deal. These provisions are therefore critical in supporting farmers’ interests in the market place in future.

**CAP deal – beyond the sugar market**

After the announcement of the original proposals by the Commission in October 2011, the concept of greening was one which drew considerable attention in the farming sector here, where environmental schemes already apply to two thirds of farmed land in England and Wales.

Farmers were concerned because concepts such as crop diversification and ecological focus areas appeared to be qualifying conditions for receipt of direct payments. The concept of greening has therefore received significant attention and the political deal, while having been modified from the original proposal, may still pose significant challenges on farm.

Farmers will be required to observe, on all of their eligible land, agricultural practices deemed beneficial to the environment. In return they will receive a payment which is equal to 30% of the regional average payment. The environmental conditions will be those shown below, or equivalent practices that yield an equivalent or higher level of benefit compared to one or more of the three measures.

1. **Crop diversification**

   - Where the arable land covers more than 30 ha, there shall be at least three different crops. The main crop shall not cover more than 75% of the arable land and the two main crops together shall not cover more than 95% of that arable land.

   - The definition of a crop shall mean a culture of the different genera, or a culture of the species in case of Brassica, Solanaceae and Cucurbits. It will also include land lying fallow and temporary grass. Winter and spring cultivars will be distinct crops, meaning for example that spring barley and winter barley will be treated as different crops.

2. **Ecological focus areas**

   - Where the arable land covers more than 15 ha, farmers will ensure that at least 5% of their arable area is ecological focus area. Examples include: fallow land, landscape features, buffer strips, catch crops and nitrogen fixing crops.

   - An exemption will be granted where more than 75% of the holding is in grassland (temporary or permanent) subject to a maximum of 30 ha of the remaining land, or where more than 75% of the arable land is temporary grassland, fallow, leguminous crops or a combination of these, again subject to a maximum of the 30 ha remainder of the arable land.

   - The Crop Diversification obligation will not apply to holdings where more than 75% of the arable land is used to produce grass or left fallow, or a combination of these, provided the arable area not covered by these uses does not exceed 30 ha.

   - Furthermore where more than 75% of the eligible agricultural area is permanent or temporary grass, or a combination of these, provided the arable area not covered by these uses does not exceed 30 ha.

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**European Union**

*A quick guide*

**The Presidency**

Every six months a different Member State chairs the Council of Ministers meetings. Lithuania currently holds the chair until the end of December 2013.

**European Council**

The highest decision making body in the EU. Made up of the Heads of States or Government. The UK is represented by David Cameron. The European Council decides how much money is assigned to the CAP every seven years in a process known as the Multi-annual Financial Framework (MFF).

**The European Parliament**

The other main European decision-making body, consisting of 754 members (known as MEPs). MEPs are directly elected by the citizens of the EU every five years. The next European Parliament elections take place on 4th June 2014. The MEPs organise themselves into committees. The Agriculture committee makes recommendations to the full European Parliament on CAP policy.

**The European Commission**

The EU’s executive body, representing the interests of Europe as a whole (as opposed to the interests of individual countries). The term ‘Commission’ refers to both the college of commissioners and the institution itself. The current Agricultural Commissioner is Dacian Ciolo. A new team of 27 Commissioners (one from each EU country) is appointed every five years; with the accession of Croatia an additional Commissioner will be appointed bringing this to 28. The UK Commissioner is Catherine Ashton, Trade.

**Member States**

28 Member States are members of European Union. Croatia joined as the 28th member this summer.

**Greening**

New environmental conditions a farmer will have to undertake to unlock 30% of his future single payment under pillar 1.

**CAP budget**

The total budget assigned to the CAP for the period 2014-2020 is set at €362.787 billion. The CAP policy and its budget are split between ‘two pillars’.

**Multi-annual Financial Framework (MFF)**

The EU’s Multi-annual Financial Framework (MFF) sets out spending ceilings for each policy category or ‘heading’. The MFF, helps to ensure that EU spending takes place in an orderly fashion and remains within the limits of the EU’s ‘own resources’ income. It also limits overall spending to a percentage of EU Gross National Income (GNI).
With the Brussels process all but complete, attention now turns firmly to the implementation of the new CAP rules in England. A cross-industry coalition has been formed to bring together sector representatives and articulate a clear united industry position.

With Defra having flexibility in their implementation of these new ‘greening’ elements, concern now turns to how this flexibility will be operated in England. Additionally, the government has also stated its firm intention to reduce English farm payments by up to 15% through modulation, further disadvantaging English farmers compared to their near neighbours in Wales and Scotland, as well as the rest of the continent where this use of monetary flexibility is not being considered.

With these two concerns in mind, the NFU, CLA and TFA, as founding members of the coalition, have agreed the following principles and messages for Defra on the considerations they need to adopt in the design and delivery of the future CAP in England:

- English farmers, like farmers in the rest of Europe, must have a choice of greening options, including access to all the applicable categories deemed ‘green by definition’, which recognise those already providing environmental benefit at least equivalent to the greening requirements in other ways.

- Greening should not impose higher standards, or compliance costs, on English farmers than those in other UK regions or Member States of the EU. Given food security and economic concerns, greening must be implemented in a way that does not require the land in question to be taken out of production and avoids unjustifiable loss of farm income; a point endorsed by the EU Heads of Government.

- The coalition, like Defra, believe that our current combination of statutory and voluntary measures produces levels of environmental protection and improvement that are well above the European average.

- English farmers recognise their obligation to the natural environment and, as a result, founded the Campaign for the Farmed Environment (CFE), which will play a central role in enhancing environmental outcomes from farmed land in England. The coalition remain focused on actively promoting its message.

- The outcome of the EU Budget negotiations 2014-2020 means that there must be a strategic review of Government policy that ensures the objectives of the next programme can be fulfilled with the monies that are made available.

- For a Government which rightly emphasises the importance of budgetary discipline, we believe that it is wrong to start from the premise that the maximum amount must be transferred from pillar 1 to pillar 2. What is required is a quantifiable analysis that establishes how any transfer of monies to pillar 2 will impact on English farmers and, if transferred, how monies can remain accessible to active farmers before any rate of modulation is set.

- Defra has the flexibility to set the modulation rate initially to less than the maximum 15%. There would then be the option of reviewing the rate upwards in 2017, if a further analysis demonstrates it be necessary.

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Sugar Industry Programme – Westminster and Brussels away days

In the Summer 2013 edition of the British Sugar Beet Review I wrote an article on how the Sugar Industry Programme (SIP) learnt about Research & Development within the UK beet sugar industry, and specifically the great work that the BBRO are doing.

By Chris Wheatley, National Farmers’ Union

For this Autumn edition I will touch on the SIP participant’s visit to Brussels and London and the in-depth insight into the world of policy development in Europe and the UK provided by the programme.

As a reminder, the SIP was developed back in 2010 to engage with the younger generation of growers in the sugar industry. 2013 was the third year for this programme to run and has improved every year, as proved by the numbers of growers interested and participating, as well as the keenness of policy makers and speakers to get involved. 2013 included thirteen growers and British Sugar staff members.

UK Policy – Westminster visit

On 12th March 2013 the NFU London office hosted the SIP group to provide an overview of the role NFU plays in influencing policy and to provide an opportunity for a selection of key industry speakers to provide insight into the broader sugar industry. Matt Ware, the NFU’s Senior Parliamentary Adviser introduced the day by presenting the NFU’s approach to political lobbying. Matt referenced the importance of the location of the NFU Westminster office, a short distance from the Houses of Parliament, in enabling the NFU to react quickly to political events and to host MPs frequently, enabling the establishment of effective working relationships with politicians and civil servants. Matt presented the NFU’s golden rules for lobbying and the current issues and successes the NFU London office contributes to.

The group were then given the opportunity to hear from four exceptional speakers covering key topics for the UK beet sugar industry including an update from Defra officials on the ongoing CAP reform. The group expressed shock when Defra’s Head of Sugar, John O’Gorman explained the UK government’s position in favour of quota removal in 2015 (the end of the current regime).

NFU London office current issues and successes:

- Groceries Code Adjudicator (‘Ombudsman’)
- Bovine TB
- Dairy Industry
- CAP reform
- Taxation, SMEs & Better Regulation
- (Annual investment allowance £25k - £250k)
- Climate Change and Sustainable Farming
- Lanterns
Following an informative and interactive morning of discussion the group received an exclusive insight into the theory of lobbying being put into action in the House of Commons. The group were taken on a tour of the House and sat in on a debate. They also participated in a session with some of their local MPs, which was kindly hosted by Keith Simpson MP. Other MPs that attended the afternoon discussion were Henry Bellingham MP and Shaielsh Vara MP.

**EU Policy**

As well as learning about policy and lobbying in the UK, the NFU and British Sugar have been keen to ensure that there is also understanding of where many agricultural policies originate and how many areas of legislation come to be implemented in the UK. As part of the SIP, the group therefore spent two days in Brussels (23rd and 24th April) learning about the European legislative process, including meeting some of the MEPs responsible for, or are involved in, agricultural policy. They were then provided with an opportunity to listen to and question key industry lobbyists. In addition to the overview of the political process in Brussels the group also visited the Raffinerie Tirlemontoise sugar beet factory and the SESVanderHave seed processing facilities in Tienen to provide an insight into the beet sector on the continent in comparison to the UK.

The first day in Brussels is always a very busy and long one to make best of use of the group’s limited time. The 2013 programme was no different and Maeve Whyte, the NFU British Agriculture Bureau (BAB) office Director kicked the day off by welcoming the group to Brussels. She gave a full insight into lobbying and the process of the creation of new or the changing of existing legislation including the length of time this can take before it is ever seen by the individual within Member States as a final piece of policy. Maeva covered the CAP reform in detail to give the group the background on just how long and complex the legislative process is; to note, it has been on the radar in Brussels for about four years!

**Life in Brussels**

- 15,000 lobbyists in Brussels
- 27 Member States
- 20 languages
- 500 million European Consumers
- UK farming unions have had office since 1972

The group learnt the following key facts, which are crucial to understand when working in Brussels as a lobbyist:

- In agricultural legislation the Parliament and Council both have equal say over the final agreement
- Under this co-decision procedure, the European Commission proposes legislative acts for the European Parliament and European Council to amend and adopt
- A lobbyist needs to be mindful of the numbers game in terms of weighted voting and political alliances which can impact the outcome, including how tactical voting on legislation can be crucial.

The presidency changes between Member States every six months, with the current presidency now Lithuania, who will hold the position until December 2013.

The next two speakers on the agenda were Marie Christine Ribera and Elisabeth Lacoste from CEFS and CIBE respectively; the European umbrella organisations of the processors and the growers respectively. British Sugar are members of CEFS and the NFU are members of CIBE. They both work on behalf of their members at the European level.
Both spoke in detail about their organisation’s roles and how they conduct themselves on behalf of so many members. Both agreed that it was often challenging having to represent different members with such differing views. The most interesting point that the group picked up was that, although Marie Christine and Elisabeth represented different sides of the industry, they still had the same CAP reform goal which was to be competitive post-reform with both sides lobbying for an extension of quotas to 2020.

The European sugar buyer for Coca Cola and CIUS Vice President, Malcolm Philips, was the final speaker for the morning in order to provide the group with his viewpoint on CAP reform from the entire supply chain. Malcolm presented to the group a different position to that heard from the processors and beet growers associations. The CIUS position was for quota removal immediately upon completion of the current regime in 2015. Some of Malcolm’s reasoning didn’t sit well with some of the group and resulted in a lot of questions to clarify several points.

Malcolm informed the group that the food industry is in trouble as a result of quotas and was lobbying in Europe to this affect, with the following issues:

- Security of supply risks
- Unmanageable price volatility (primarily for small users)
- Competitiveness of EU industrial sugar users is compromised

The group were quick to pick up on several things from Malcolm’s presentation, most notably on the volatility issue. One member of the group referred to quota removal in other markets, such as cereals and oilseeds, has actually created more volatility. They also asked whether Coca Cola and CIUS were lobbying for the same thing two years ago when EU prices were far lower.

Malcolm was very open and it was a very insightful discussion with the group, and certainly one I will look to incorporate in future programmes as it provides a wider view of the situation, the work going on and also allows participants to challenge their own and others’ viewpoints.

Away from CAP, Malcolm expressed one other very worrying point, however, regarding sustainability. In the UK we have the Red Tractor Assurance (RTA) already in place, which provides consumers with the safe knowledge that their products are safe, fully traceable and produced to high standards. It is a well-recognised standard and there are many others across Europe. Malcolm informed the group that Coca Cola were looking to implement their own form of assurance scheme. Some of the group were shocked to hear this, as it would essentially mean further burden and potentially more on-farm inspections.

**European Parliament**

Following lunch the group headed over to the European Parliament for a tour and to meet with some of the MEPs directly involved in CAP discussions. Robert Sturdy MEP kindly hosted the group and his brilliant assistants Neeley Williams and Hilary Peden helped in securing other MEPs to meet the group too. These included Stuart Agnew MEP, Jim Nicholson MEP, Richard Ashworth MEP and Dan Dalton, Policy Adviser to the European Conservatives and Reformists (ECR) group.

The SIP group certainly made best use of their time with the MEPs and covered all manner of subjects. They felt this session was of high value and would have liked more time with them. Some of the discussion topics included, but were not limited to:

- Food labelling and how the UK public are often misled
- Sugar quotas post reform
- Monopoly businesses – beneficial or detrimental to the UK beet sugar industry?
- GM and the importance it will serve in future years to feed an ever-growing population with the same amount of land
- CAP reform with differing views on when quotas will end from different MEPs in discussion
- Cheap food and how unsustainable it is
- Food scares and the associated issues they cause globally
- CAP greening
- Agri-environment schemes

The afternoon was very lively and a fantastic experience for the group, debating with the MEPs at the forefront of discussions that affect them on farm. Mr. Sturdy closed the afternoon session stating that farmers should have the confidence to manage their own land and that farming is changing and it will change for the better.

Following the MEP session the group visited the Parliamentarium, for interest, over the road from the European Parliament to get an idea of the history of the
European Parliament. They were then able to enjoy some well-deserved social time that evening with dinner and drinks in the wonderful town of Leuven, hosted by Bill Newton-Dunn, the UK’s longest serving MEP, before another full day of tours and discussions.

**Brussels factory and SESVanderHave tours**

Following the visit to the IRBAB facility, (please see coverage in the summer edition of the *British Sugar Beet Review*) the group visited the Raffinerie Tirlemontoise (RT) factory and were hosted by the Agriculture Manager Erwin Boonen. The factory visit enabled the group to draw their own comparisons of the factory compared with the four at home in the UK.

Erwin gave a good background presentation on RT, part of the Sudzucker group, their factory operations, their business model and how they do as much as possible to benefit the

<table>
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<tr>
<th>UK and Belgium comparisons</th>
<th>Belgium</th>
<th>UK</th>
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<tbody>
<tr>
<td>Number of growers</td>
<td>5,000</td>
<td>3,600</td>
</tr>
<tr>
<td>Number of factories</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Campaign length</td>
<td>110-140 days</td>
<td>145-170 days</td>
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<tr>
<td>Average distance to factory</td>
<td>28.5 miles</td>
<td>28 miles</td>
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<tr>
<td>Beet production</td>
<td>3.8 million tonnes</td>
<td>7.5 million tonnes</td>
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<tr>
<td>Sugar production</td>
<td>625,000 tonnes</td>
<td>1.25 million tonnes</td>
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<tr>
<td>Average yield</td>
<td>Between 12 and 14.5 tonnes per ha</td>
<td>Between 11 and 13 tonnes per ha</td>
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As all farmers, the group were particularly keen on the visit to their machinery shed. SESVanderHave develop all of their own machinery and alter and tweak them as necessary to improve their trial drilling and harvesting.

Sugar Industry Programme in 2014 – How to get involved

The 2013 Sugar Industry Programme was the third successive programme and another hugely successful one. The group were brilliant to host and a really enthusiastic set of growers that learnt huge amounts about the entire beet sugar industry, both in the UK and over in Brussels. The programme is predominantly about learning more about the industry you work in, but there is also a social element to it, which we see as of equal importance as learning about what goes on. It’s about meeting other like-minded growers, sharing best practice and getting the most out of the programme on offer.

Based on feedback over the past three programmes, the 2014 programme will run from December 2013 through to March 2014 to avoid your busiest times of the year in March and April. It will take the same format as before though it will incorporate an additional day at Germains:

- NFU AGM
- Brussels trip
- Westminster visit
- BBRO visit
- Wissington factory visit
- NFU HQ day
- Launch day
- Germains

If you’d like to put your name forward for 2014 or find out more information then please get in touch with me via email or phone, chris.wheatley@nfu.org.uk or 024 7685 8616.

SESVanderHave key facts and figures:

- International market leader in the sugar beet seed industry
- Specialises in every aspect of the production of sugar beet seed
  - Sells 360 varieties worldwide (the result of a dedicated comprehensive research process)
- Each and every variety represents a customised solution for all sugar beet markets
- 200 years of experience in the field of sugar beet
- Seeds sold in over 50 countries worldwide
- Over 500 specialised staff across entire group
- Cutting-edge R&D
  - Invests more than 18 percent of its annual turnover in R&D
  - The primary objective is to develop new varieties with
    - increased tolerance to diseases
    - higher yield potential
    - flexible adaptation to abiotic stress factors
    - and with a higher seed quality
- High quality processing across factories in Belgium, France, Italy, Russia and Ukraine

growers and the local community. Following Erwin’s presentation and a question and answer session with the group, the group were given a tour of the whole facility including the packaging plant.

The final part of the Brussels trip was spent at SESVanderHave’s headquarters in Tienen, hosted by UK General Manager Ian Munnery, who had kindly cut short his ‘Beet the Best’ winner’s tour in France to be with the group.

Ian gave a detailed description of SESVanderHave, their history, the work they do, the markets they are involved in and the fantastic work they are doing on research and development.

The group were then treated to a full afternoon tour of the entire Tienen facility, including the laboratories where they carry out many millions of DNA tests.
Winners of the third ‘Beet the Best’ competition, run from October to December 2012, were treated to a superb trip to France in April 2013 to see and learn about the production of the seed crop, as well as visit seed crop growers in the south-west and commercial beet farmers in the northern areas of the country. The competition featured a distinct flavour of the 100 year celebration of the UK beet sugar industry (Ref. 1), and many questions required knowledge of the history of our industry as well as current growing techniques.

The group included winning sugar beet growers and agronomists plus judges from British Sugar, BBRO, Newcastle University and the NFU. The trip was assisted by SESVanderHave who kindly facilitated access to their seed breeding operation as well as local contacts for farm visits. This article describes some of the interesting experiences and what was learnt by the group.

By
Paul Bee,
British Sugar plc
Understanding seed production

Sugar beet yields have increased year on year, largely as a result of improved crop management and the introduction of enhanced genetics. The visit to SESVanderHave’s breeding and research station at Le Castang provided a rare opportunity to see and understand the 2-3 years of work that go into producing seed for our current UK varieties, and the 10-20 years of development work that precedes new introductions. Technical Director of the Station, Emilie Lannoy (Pic. 1) explained the complicated three-stage seed production process. The many thousands of crosses for the breeding programme utilise labour-intensive cages for small-scale production of basic seed. These coverings ensure that no pollen from other plants contaminates the seed bearers. However, when it comes to commercial seed production, it would require a very big tent to produce the necessary volume of seed. For this reason, commercial seed crops in the field are not covered but have a designated isolation distance around them.

The specialist seed growers work together with the company fieldsman to ensure any volunteer beta species such as chards, red beet, etc. within 1000 m of the seed crop are destroyed, to keep pollen contamination to a minimum.

In addition, breeders work in defined and separate production zones to ensure they place their own seed crops with appropriate flowering timings in the right location. SESVanderHave varieties for the UK are bespoke, so it is important they don’t have any pollen ingress from varieties destined for other markets. For this reason they tend to cluster varieties in the field and perform rigorous cross checks both during production and throughout processing to maintain quality; this ensures blinkers are kept to a minimum as well as issues with bolting.

When the male sterile ♀ (monogerm) in the seed crop is pollinated, the pollinator ♂ (multigerm) is destroyed to keep the monogerm hybrid pure. Typically there are three rows of male sterile to one row of pollinator, giving a nice striped effect to the fields (Pic. 2).

The reason SESVanderHave produce genetics tailored to each market is that each country’s needs are different. For instance, as the UK growers sow earlier into cooler conditions than France, more importance is attached to low bolting. This complicates matters for seed production. It would certainly be more convenient to have a single pan-European variety but performance would suffer.

After visiting the station at la Castang the group visited SESVanderHave’s new state-of the-art seed-processing factory in Calignac, which was opened in 2012. The factory pre-cleans and prepares commercial seed before shipping to Tienen in Belgium for final processing or ‘polishing’. Some interesting figures to explain the scale of seed production by SESVanderHave were quoted:

- 350 varieties produced each year
- Only 25% of what is harvested as seed crops is used, and this can be reduced further subject to bolting testing.

The work is hugely labour intensive and the high selection criteria for seed selection ensures only the best seed reaches the market, helping to deliver the on-going yield improvements growers expect.

French commercial farm

One of the unique experiences for the group was the visit to a commercial beet farm close to Bazancourt near Reims hosted by the grower, Joachim Gaillot (Pic. 3). The farm extends to 445 hectares of arable land growing 140 ha winter wheat,
Mr. Gaillot has paid large fees to secure delivery rights and to benefit from the ‘share’ payments he now receives from the co-operative. It was also explained that 50% of his crop was to be sold for bioethanol production for a price of €29/t. He was keen to point out that he believes that increasing his crop yields will be crucial for the future of his farm and to enable the French beet industry to prosper beyond the forthcoming sugar regime reforms.

Mr. Gaillot was also keen to see the development of new crop production techniques and he supported the research and development effort by hosting trials on his farm. The group saw a variety trial (one of fifteen in France) that had 1000 plots; the results will be used in determining varieties on the National List for the 2014 crop season.

110 ha sugar beet, 70 ha barley, 80 ha oilseed rape, 25 ha alfalfa and 20 ha poppies. Twenty percent of the land is owned with the rest rented under contract agreements by Mr. Gaillot and his brother. All farm operations are carried out by the brothers and one farm worker. No irrigation is available and the average rainfall is 650 mm per year. The soil type is a deep chalky clay loam.

The group, and myself, were as keen to hear how the sugar beet enterprise is managed and what yields were being achieved. Mr. Gaillot told us that he achieved his best ever (adjusted) yield in 2011 at 135 t/ha but would usually expect over 100 t/ha in most seasons. A discussion then followed about the techniques employed to achieve this performance. A summary of these is shown below:

- Chicken manure applied in winter (5 t/ha – containing 20 kg/t nitrogen).
- Base fertiliser applied before ploughing (250 kg/ha K, 100 kg/ha P), no sodium fertiliser applied.
- 120-140 kg/ha N applied post-drilling. There is no N-max limit in this region of France.
- Ploughing carried out shortly before drilling.
- Seedbed cultivations carried out just before drilling between mid-March and mid-April. Five days needed to drill entire crop.
- Seed rate of 1.2 units/ha (aim to establish 110,000 plants/ha).
- BCN varieties grown on 50% of crop.
- Four post-emergence herbicide sprays (FAR system) to control broadleaved weeds – main problem is fat hen.
- Two fungicides sprayed; mid-July strebiliurin and mid-August triazole – cercospora main disease issue.
- Harvesting carried out from campaign start (around 10th September) to end November.

Mr. Gaillot explained more about his sugar beet enterprise and described his contract with a French co-operative (Cristal Union) that paid €43/t for beet in 2012, but that was made up of just €25/t as a basic beet price with the remainder as a dividend from the co-operative; much of which had been derived from non-sugar related enterprises. Previously

SUMMARY

Winners of the third British Sugar ‘Beet the Best’ competition were given a great opportunity to see and hear all about the French sugar industry.

The rare opportunity to learn about how sugar beet seed is bred and produced, as well as seeing seed crops, was both interesting and informative for the group. Talking to French grower, Joachim Gaillot, gave a fascinating insight into how he produces sugar beet and showed that UK growing techniques are very similar, but soil and climatic conditions provided some advantage in the Reims area of France. Comparing contracting conditions revealed some of the ‘co-operative’ payments made to growers in some years but also some of the investments that had been made by growers to receive them. It was also interesting to note that French growers were keen to see yields increase to secure a bright future for their industry – similar to UK growers’ aspirations.

The ‘Beet the Best’ Competition has been available for growers and industry professionals to enter at the BBRO Open Days in May and at the Cereals event in June 2013. Winners will be informed of their prizes in late summer/early autumn. The judges are finalising details of another chance to compete and win fantastic prizes during the latter part of 2013. Details will be announced soon – watch this space ...

References


Acknowledgement

I am very grateful to everyone at SESVanderHave who assisted with the study tour, in particular, Ian Munnery, Alice Lorriau and Jean-Noel Evrard.
Sugar beet irrigation seminar

In many regions of the world, irrigation of sugar beet fields is necessary to aid plant emergence, yield and the efficacy of plant protection products. The need for these benefits has to be balanced against cost efficiency and environmental sustainability. A good understanding of how sugar beet plants use water throughout their growth cycles can help to protect limited water resources and avoid soil degradation as well as ground water pollution.

This article reports on two recent events held in Valadolid, Spain which outlined the current position with regard to irrigation management in sugar beet production by providing insight into water requirement monitoring and latest research findings.

AIMCRA Open Day
A field day, organised by the Spanish sugar beet research institute AIMCRA on 4th June was attended by more than 1000 sugar beet growers from across Spain. In Spain, irrigation is critical to the success of the crop and the very latest in water monitoring, irrigation techniques and equipment was on display for all to see. The site of the event was arranged in two separate areas, with visitors walking through a trial field demonstrating different drilling dates, different water requirement monitoring technologies and herbicide trials. The field had an irrigation system installed which consisted of a network of Drip irrigation system.
overground aluminium pipes and standpipes, these were arranged in a grid pattern across the field. Flexible rubber rather than rigid pipes, were used across tramlines to allow the passage of machinery such as crop sprayers, etc. with the irrigation equipment remaining in-situ. A target plant population of 100,000 plants/ha had been established and, following a cool spring as seen across most of Europe this year, the crop was beginning to respond to warmer conditions and the canopy was expanding quickly. Various automatic irrigation control systems were demonstrated all relying on software to interpret measurements of soil ground moisture, evapotranspiration and irrigation/rainfall to automatically start and stop the irrigation pumps as required. It was impressive to see, and finding oneself in the middle of such a field when the pumps started was certainly refreshing, although probably taking the demonstration experience slightly further than was absolutely necessary. At least the warm sun dried my clothes quickly!

The second element of the day was held around a nearby grain store and incorporated a mix of technical presentations and machinery trade stands. All aspects of sugar beet growing were represented, although it was notable that companies supplying irrigation equipment accounted for some 80% of the trade stands present, reflecting the importance of irrigation water as an input to the Spanish crop. Most of the water in Spain is applied via standpipe sprinklers, booms or centre pivot irrigators, although some is applied via surface drip systems, and all were there for visitors to see. AIMCRA, the Spanish equivalent of the BBRO, were on hand to provide technical input to discussions throughout the day.

IIRB seminar

The following day, AIMCRA/IIRB hosted a seminar entitled ‘Advances in sugar beet irrigation’ at the Centro Cultural San Agustin, in Valladolid. This event was attended by 200 participants from around the world who were able to hear a range of papers regarding water and agriculture with a particular emphasis on sugar beet production.

Topics ranging from water’s role in food production, through modelling and remote sensing of irrigation requirements, drought tolerance in sugar beet varieties and applicator nozzle design. A mini seminar followed on different countries’ approaches to irrigation and water scheduling. Irrigation scheduling models were presented from France, Italy and Morocco where a range of different application techniques are used.

Currently irrigation is seen by many UK growers as less important, and many do not have spare water for beet. Also, longer-term water availability continues to be an on-going concern for UK agriculture. We recognise this and the industry is investing in an updated crop growth model for the UK, which will allow us to better predict yield patterns and potential. BBRO are particularly interested in developing decision support tools based on this model to assist UK growers in their crop planning, and irrigation could form such a decision support module. We have seen a recent increase in interest in irrigation for the UK crop amongst some UK farmers and this seminar provided a useful opportunity to catch up on the latest thinking on watering sugar beet. Some useful contacts were also made and will be followed up further. We will of course keep you updated as this work develops.
Gauging harvester losses

Since 1995, British Sugar’s Agricultural Teams have been working closely with growers and harvesting contractors to assess and improve the quality of the harvesting operation. In-field assessments measure levels of root bruising, root damage and whole beet losses; the results of this work are used to adjust machines appropriately for the lifting conditions.

These assessments have been well received and the improvement in harvesting operations is there for all to see. Back in 1995, the average harvester losses stood at 9% – a staggering 1 in every 11 beet was never making out of the field! Today the situation is much different, with the best 20% of assessments recording losses of less than one tonne per hectare.

It is estimated that 70% of harvesting losses are within the control of harvester operators, whereas the remaining 30% are caused by factors associated with crop uniformity, seedbed levelness, soil conditions, weed control and harvester maintenance. Even the very best operators cannot achieve good results on weedy, irregular crops grown on un-level seedbeds. Perhaps too often, the assessment of lifting quality is based solely on the sample of beet going into the trailer (has it got too much green material on it?) and the number of whole roots left on the surface. To try and help growers and harvester operators recover more yield, the BBRO has produced a harvesting gauge (free in this issue of the BSBR) which will allow a very rapid assessment of lifting quality enabling operators to make the appropriate adjustments to their machines.

Crowning losses

Recent focus has been on whole beet recovery as the UK industry has moved to a fixed crown tare system of payment, incentivising the delivery of all root material. More information on whole beet recovery is included in Andrew Dear and Tom Brown’s article in this issue on page 18, so there is no need to cover it in great detail here. The first side of the harvester losses gauge provides a pictorial reference to crowning quality and the standard which should be aimed for. Excessive leaf material is a problem, and the aim should be to have less than 5% of roots with petioles still attached. The optimum defoliation of beet, either through a flail or scalper, should result in more than 90% of the sample having very few roots over-crowned. Over-crowning can cause a very significant yield loss – just 5 roots out of 100 over-crowned can easily account for 1 tonne of yield lost per hectare. Accuracy of topping is significantly influenced by crop uniformity and BBRO trials have shown that the best topping performance is always achieved on crops with a higher plant population.
Whole beet losses and root breakage

Whole beet losses at harvest are easy to see; more than one or two very small beet within an area of six rows by 20 m means that some form of harvester adjustment is required. Often these beet will lie in the same row indicating that a turbine gate has slipped or is broken, allowing the beet to ‘leak’ out of the harvester.

Yield loss through root breakage, where pieces are broken off the end of the tap root are much less visible but are often much more significant. The BBRO’s experience is that yield loss through root breakage is usually two to three times greater than whole root losses.

Root breakage is often very difficult to assess in the field because the broken pieces get covered with soil and wheeled into the ground by the harvester. Therefore, to assess root breakage go to the clamp face, select 100 roots and measure the diameter of each root’s breakage point. Avoid those roots with bright white breaks as these are likely to have broken in the trailer tipping process, not at the point of harvest.

Ideally, all roots should have a break that is no more than 2 cm in diameter. In practice, the best 20% of performers from our harvester assessments have at least 90% of roots with a break of no more than 2 cm diameter (1 finger width), and the remaining beet having tap roots with a break no greater than 4 cm diameter (2 fingers width).

The second side of the harvester losses gauge provides a ruler to measure root breakage diameter along with a quick ready reckoner for assessing the likely impact on yield from different levels of root breakage. In addition, there is a QR code which can be scanned with a smart phone to take users to the UK Sugar Beet Portal website where a tool can be found which allows a more accurate assessment of yield loss to be made. With this tool, a minimum of 20 roots need to be assessed and recorded so that an estimate of actual yield loss can be produced. Users are then able to adjust the machine, repeat the assessment and quantify the difference the change has made in terms of yield recovered.

Harvester losses is an important issue which warrants regular inspection, so your area manager will always be pleased to help you, should you have any questions.

Machine settings

Root breakage is influenced by machine settings relative to soil conditions. The following guidance may be of help when deciding what adjustments are required to harvester settings.

Dry soil conditions

<table>
<thead>
<tr>
<th>Type of loss/damage</th>
<th>Suggested setting changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole root losses</td>
<td>▪ Set lifting mechanism deeper ▪ Fit discs in place of shares ▪ Add Oppel wheel star wheels</td>
</tr>
<tr>
<td></td>
<td>▪ Check condition of shares – if worn, replace or repair if possible ▪ Increase forward speed</td>
</tr>
<tr>
<td>Root tails broken off at lifting</td>
<td>▪ Reduce forward speed</td>
</tr>
<tr>
<td>Root damage – chipping, breakage and cracking in the cleaning mechanism</td>
<td>▪ Increase or decrease forward speed ▪ Set lifting mechanism deeper ▪ Fit turbine gate plates ▪ Reduce turbine speed ▪ Fit ringed turbines and/or more helper tines ▪ Remove agitator rollers from chain cleaning systems</td>
</tr>
</tbody>
</table>

Wet soil conditions

<table>
<thead>
<tr>
<th>Type of loss/damage</th>
<th>Suggested setting changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole root losses</td>
<td>▪ Increase or decrease forward speed ▪ Set lifting mechanisms deeper ▪ Replace discs with shares or close discs</td>
</tr>
<tr>
<td></td>
<td>▪ Adjust depth of lifting mechanism – raise/lower</td>
</tr>
<tr>
<td>Root tails broken off at lifting</td>
<td>▪ Reduce turbine speed</td>
</tr>
<tr>
<td>Root damage – chipping, breakage and cracking in the cleaning mechanism</td>
<td>▪ Increase forward speed ▪ Check lifting accuracy</td>
</tr>
<tr>
<td>Excessive soil adhering to harvested roots</td>
<td>▪ Increase turbine speed ▪ Remove gate plates ▪ Fit pigtines instead of railed gates ▪ Fit lifting shares in place of discs ▪ Raise lifting mechanism ▪ Fit agitator rollers and chains ▪ Increase turbine gate gaps ▪ Increase angle of roller bed and lower grub chain</td>
</tr>
</tbody>
</table>

Crop conditions

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Suggested setting changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small beet</td>
<td>▪ Fit gate plates ▪ Reduce gaps on links in cleaning/transport chains or place plastic pipe over chain links to reduce pitch ▪ Close turbine finger wheel gaps ▪ Close Oppel wheel gaps</td>
</tr>
<tr>
<td>Gappy beet</td>
<td>▪ Open discs and move further from skids ▪ Sharpen topper knives ▪ Reduce scalper arm pressure</td>
</tr>
<tr>
<td>Weed infestation</td>
<td>▪ Increase gap between turbine and gates ▪ Increase angle of roller bed ▪ Replace flails on topper ▪ Sharpen knives</td>
</tr>
</tbody>
</table>
Whole beet delivery
2013/14 campaign

Work carried out in the 2010/11 and 2011/12 campaigns determined that a fixed crown tare of 6.61% should be used for all future beet deliveries. This figure was used for the 2012/13 campaign and will continue to be used going forward.

In order to maximise yield as much root material as possible should be delivered to the factory. To achieve this, refer to the guide below which indicates the optimum defoliation level required.

What happens if too much green material is delivered with the load?

a) The load may be rejected at the point of delivery due to the presence of excessive green material (whether loose or attached to beet), because this has the potential to adversely affect processing of the beet into sugar.

b) If leaf material is attached to the beet it may find its way into the sample, causing a reduction in the measured sugar content and, hence, affecting the overall value of the load plus any other loads that are represented by that sample.

c) Green material does not weigh very much when compared to whole sugar beet, so any gain in weight from the leaf will be more than outweighed by the reduction in sugar content. If any loose green material is present in the sample then this will be included as dirt tare.

Research in other EU countries has indicated that growers could gain between three and five per cent additional yield by delivering more of the beet crown to the factory rather than leaving it in the field.

During the 2012/13 campaign, random visual crown assessments were carried out on samples of beet processed through the tarehouse. The percentage of beet that had been over-crowned is illustrated in Fig. 1.

As can be seen, there was a slight decrease as the campaign progressed, but even at the end, between five and ten per cent of the beet delivered to the four factories had been crowned too heavily than is ideal for maximising yield. These assessments will continue during the 2013/14 campaign.

In addition visual assessments were carried out on loads as they passed through the sampling bays at the four sites. Those loads deemed to be 50% over-crowned will be “flagged” within the growers database. This information will then be passed on to the area managers who can alert the relevant harvester contractor and/or grower. This assessment scheme again will be in place for the coming season. The target is to reduce the amount of over-crowned beet being harvested and delivered, thereby increasing yield.

What can growers do if they harvest beet with too much green material on?

Where this occurred last campaign, growers found that beet left in a clamp for a few days longer than normal had most of the leaf material wilted sufficiently for it to be easily removed by the cleaner loader, therefore maximising the load value and allowing the beet to be accepted at the factory.

Fig. 1 – Percentage of beet over-crowned.
SUGAR BEET STORAGE: Best practice to maximise yield

When growing any crop, caring for it once it has been harvested is essential, until it has been delivered to the customer. Storage is a key part of this process. You will probably have spent between six and ten months growing your sugar beet crop, and it is important to store it appropriately before it is delivered to the factory.

This article covers all the aspects required for good storage of sugar beet, whether at the beginning of the campaign, when sugar beet is stored only for a few days, to later on when longer periods of storage are needed.

Compared to many other crops, very little investment in storage is required for sugar beet as in some cases it can be stored early in the campaign on field headlands; later in the campaign beet may be best kept on a flat concrete base for long term storage. Other ancillary costs will cover the provision for bales, clamp sheets and suitable weights such as tyres etc. However, like all crops, attention to detail in monitoring stores and taking appropriate action is still required to protect and maximise your final yield.

Ideally, the storage of sugar beet should be kept to a minimum on farm, certainly in the early stages of the campaign when temperatures are still quite high and high sugar losses can occur. The ideal approach is to operate a ‘just in time’ harvesting and delivery approach. With good communication between grower, contractor, haulier and British Sugar this can be achieved. The weather can have a great bearing on the progress and quality of harvesting and delivery. The yield of sugar beet can increase by as much as 40% from September to December, therefore, leaving sugar beet in the field for as long as possible before harvesting and delivery makes economic sense and helps to maximise both yields and profits. With the current sugar beet varieties and the wide choice of broad spectrum fungicides it is possible to keep the crop canopy free from disease. A healthy canopy will be more efficient in terms of photosynthesis; and in some seasons with a warm, open autumn, yield improvements could be as much as 0.25 t/ha per day up to the end of October.
The approach to storage of sugar beet will vary depending on the time of harvest. Even if planning to store sugar beet for only a few days or, at the other end of the scale, for three months, you should aim for all sugar beet coming off the harvester to be free of damage or bruising. Beet should also be free of loose green material and excessive loose soil; some soil is advantageous as it protects from bruising whilst handling. With the new whole beet topping system, aim for a white area no bigger than a £2 coin; some green matter is permissible, but not excessive amounts, which cause problems during processing at the factory.

**Early season**

The weather can be still very mild in mid-September. If ground conditions are suitable for harvesting, then the sugar beet ideally needs to be delivered straight to the factory, utilising the ‘just-in-time’ approach. If sugar beet is to be stored in the short term, then clamps should be constructed to give maximum surface area to aid cooling and reduce loss of sugar from respiration. This is best achieved by placing individual tipped loads on a flat area, ideally on concrete or an area of hard standing, with no side walls. Individual loads could be placed on a field headland and then loaded from there. (Ref. 1)

Sugar beet being tipped as individual loads.

**Late season**

At some point in the campaign, it is not possible for all sugar beet to be delivered in a ‘just-in-time’ manner, and sugar beet stores or clamps will need to be constructed.

The traditional way is to build a rectangular clamp and cover it with straw or clamp sheets. With the advent of the Maus self-propelled loader, A-section clamps have come back in favour, particularly as beet can be stored on the headland in the field where they were harvested. The width of the clamp will be dictated by the size of the pickup feeder.

The most popular approach is to make a clamp of tipped loads on an area of concrete or hard standing, using large rectangular bales as retaining walls around the outside to a height of 1.2 m. To aid ventilation, these can be stood on pallets. Aim for a width of 10 m between the retaining bales, with sugar beet being levelled off to a maximum of 2.5 m. Use dumper type trailers and tip the beet, ensuring the top is level, so there are no low areas which could act as frost pockets. When temperatures drop below -2°C clamp sheets should be used to cover the sugar beet to protect from frost. Once temperatures rise the sheets should be rolled back, otherwise there is a danger that as the clamp warms up beet roots will begin to sprout and thus lose sugar.

Sugar beet clamp fully covered.

**In-field**

If temperatures stay cold and beet get frozen, the factory can still process them if delivered before de-frosting occurs as happens in North America, where the winters are long, cold and dry. Problems occur when temperatures suddenly rise and, frosted beet will start to deteriorate. When sugar beet becomes gummy this causes problems at the factory, particularly in the filtration stage (Ref. 2). Although a lot was learned on farm and in the factory during the 2010/2011 campaign, it did illustrate that good communication is essential if affected sugar beet is to be processed in a timely manner. The frost damage chart is based on almost 60 years of data and gives a guide to the severity of root damage which could result.
Ventilation
For traditional clamps, place straw bales on pallets, with the open ends directed to the outside to aid air flow into and out of the clamp, allowing the beet to breath and avoiding any heat build-up which could increase respiration, resulting in sugar loss. If temperatures drop, cover these to prevent frost from penetrating into the clamp. Aim to keep temperatures as low as possible, but above freezing.

Covering
Monitor the weather forecasts and look at information supplied by British Sugar and the BBRO. Be prepared with clamp sheets; and put them on when temperatures drop to below -2°C and remove when temperatures rise.

Frost
Avoid low lying or shady areas for clamp locations, where frost could linger. Do not store frost damaged or deteriorated sugar beet. Communicate with your British Sugar area manager and the factory so that the most appropriate action is taken.

Once harvesting has taken place, look after your crop, plan your lifting and use the most appropriate storage method. Keep monitoring the condition of your beet and take action if required, particularly if severe frosts are forecast. Ensure you have sufficient clamp sheets and put them on when temperatures are likely to fall below -2°C. Likewise, if temperatures rise, fold back the clamp sheets to avoid any loss of sugar through overheating. With good planning, regular communication and appropriate action you can protect your investment, maximise your yield potential and ensure that good quality beet is delivered to the sugar factory.

Sugar beet stores
When looking to construct a suitable clamp for long term storage, the following are factors that need to be considered:

Type of storage clamp
Most clamps are conventional in type but as more self-propelled Maus systems are being used, long narrow clamps are becoming more common.

Location
Utilise the field headlands where practical for the haulier, but if the weather deteriorates be prepared to change. If lorries can stand on hard standing this is ideal. For traditional clamps, again they need to be accessible.

Construction
For traditional clamps, ensure the pad surface is a hard standing, (concrete is ideal), level, free draining and free of debris. Make repairs if necessary and place good quality large bales around the outside. Ensure that there is sufficient storage capacity for your tonnage.

Filling
Aim to fill to a maximum height of 2.5 m, with a level top. Aim not to ‘over-handle’ the beet, as breakages and bruising will result.

Sugar beet still growing in February.

Frost damage chart.

Cross section guide to constructing a sugar beet clamp for long term storage.

References
Targeted application of herbicides to control weeds in sugar beet and vegetables

Restricted herbicide approval criteria have reduced product availability such that, in sugar beet and, particularly, in vegetables the options for controlling weeds are becoming increasingly limited. Control of weeds is important because of the implications for crop yield, uniformity and quality, and also because, in the case of volunteer potatoes, lack of control can present a rotational bridge for diseases such as blight.

Introduction

Our Horticulture LINK project, part-funded by BBRO, investigated how image analysis could be used to detect weeds and to guide targeted herbicide application in vegetables and sugar beet. We developed and field-tested two modes of operation namely:

- a) Spot treatment of individual large weeds such as volunteer potatoes
- b) Localised conventional spraying of patches of smaller weeds

We also conducted preliminary experiments in detecting and spot treating weed beet using stereo machine vision.

Spot and patch treatment were conducted using a Garford Farm Machinery 6 m experimental front-mounted disc-steered machine with three forward-facing cameras, each viewing a 2 m width of ground (Pic. 1). Images from the cameras were analysed to determine crop row position and:

- in spot-treatment mode, the position of individual weeds based on a combination of colour, plant size and position with respect to the crop row;
- in patch-treatment mode, the position and size of weed patches based on an assessment of green leaf material between crop rows.

In spot-treatment mode, weed positions were identified and then defined by polygons and tracked as they progressed down the image (Pic. 2). The operator was able to set...
both minimum weed size to be treated and percentage of weed area sprayed. Nozzles needed to operate rapidly and produce a spray pulse with minimum drift and splash. The nozzles developed for the project generated an oscillating liquid stream that broke up in to very large (1.2 mm) droplets. Because the spray characteristics required when treating single large weeds and patches of much smaller weeds could not be achieved with a single nozzle design, a cartridge system was developed (Pic. 3) that enabled two different tips to be fitted, depending on application requirement:

- the ‘Alternator’ nozzle tip using the oscillating liquid stream to treat large weeds as spots;
- an ‘Even-Spray’ tip used when spraying small weeds occurring in detected patches.

**Spot- and patch-spraying field trials**

Field trials were conducted over three seasons to determine levels of weed control and crop damage when operating at speeds up to 5.0 km/h in spot-spraying mode. We also measured spray deposits on both target weeds and adjacent crop plants and quantified residues in crop plants within, or adjacent to, treated spots. As weeds were large, glyphosate was used at the maximum field rate (4.0 L/ha) to give high levels of kill of difficult to control weeds and to represent a worst-case condition in terms of crop damage and residue levels. When using tank mixes of selective herbicides on smaller weeds, mixtures and doses were chosen that ranged from those that would be acceptable for overall crop spraying to those that were likely to check the crop to unacceptable levels if sprayed overall. In onion and leek crops in 2010 and 2011 around 95% control of volunteer potatoes was achieved when using either selective or non-selective herbicides with little or no crop damage. Weed kill was more rapid and complete when using glyphosate with crop damage only marginally greater than when using selective herbicides.

A trial conducted in 2012 examined the control of mugwort (*Artemisia vulgaris*) in a crop of leeks. The first series of treatments applied a tracer dye. Analysis of spray per unit weight on the target weed showed approximately two orders of magnitude greater than on crop plants growing within a 150 mm radius. In a second trial, glyphosate treated weeds were staked and, at harvest time, surviving crop plants adjacent to the marking stakes were cut and sent for residue analysis. Results showed no detectable residues. This information, together with spray deposit data and comparable results from other crops, was used to support a successful application for an ‘Extension of Authorisation for Minor Use’ (EAMU) for spot and inter-row application of glyphosate.

In 2012, a beet crop with a moderate weed population including volunteer potatoes was both spot sprayed with glyphosate and patch treated with a conventional selective herbicide tank mix. Potato detection was hampered by relatively small volunteer potatoes compared with the beet plants such that control was between 50 and 78%, although little beet damage was recorded. Patch spraying conducted at 6 km/h showed that levels of weed control in the inter-row region within the patch were comparable with those achieved by overall spraying of selective herbicides.

**Economics**

A cost-benefit analysis was made, based on experimental data, knowledge of engineering costs and general farm economic information derived from Nix (*Ref. 1*) and partner growers. The analysis was implemented as a spread sheet that is available from the authors on request.

It was assumed that the precision-spraying technology developed in this project would be implemented as an additional capability to a 6 m vision-guided band sprayer of an existing commercial design. Three different scenarios were compared. The first was the current situation. The second was an anticipation of a situation in the near future when it is expected that several important herbicides will have been lost from the vegetable sector (e.g. linuron, which is already banned in many European countries, and ioxynil, both due for review in 2016). In this scenario, there is increasing use of inter-row cultivations, some use of hand labour and some crop loss due to bad weed infestation. These were compared against a third scenario in which the new sprayer was used in spot-spray mode to control problem broadleaved weeds such as potatoes, and in band-spray mode for general weed control.
Results showed the proposed strategy would be broadly comparable or slightly more cost-effective than current weed control strategies in vegetables, but indicates a 40% saving over the projected near-future situation. Existing herbicide programmes in sugar beet generally achieve adequate weed control and so, despite a saving on herbicide, the proposed strategy would be 14% more expensive overall compared to the current situation. However, if more herbicides are lost the proposed strategy might be expected to yield a 14% benefit.

This economic analysis did not include any potential further savings from patch application or benefits from reduced phytotoxic effects.

**Stereo-vision detection and spot treatment of weed beet**

Whilst some weed beet would be detected during spot treatment, a significant proportion may be missed due to later emergence or within-row growth. The next opportunity for detection is by differential height at stem extension. Stereo-vision uses disparity between two images taken from slightly displaced viewing points to estimate range from the camera. Weed beet detection is a challenging application for stereo-vision due to the lack of clear geometric features viewing a green plant against a background of other green plants. However, its non-contact nature makes it attractive in principle.

We constructed a stereo camera comprising two high resolution (1024 by 768 pixel) imagers placed 12.0 cm apart. Software was written to post-process these images and generate depth images. Picture 4 illustrates the general reduction in brightness from bottom to top of the image due to camera poise. The brighter patch in the centre of the image is due to a tall weed beet plant. As this image illustrates, stereo vision showed some promise, but the stereo-analysis algorithms require further refinement if the technique is to progress to a practical sensing technique.

Experiments were also conducted in which pulses of a 2.0% solution of glyphosate were manually directed at the base of weed beet simulating application to plants that had been pushed forward by a rubbing bar. Results from these experiments were inconsistent. Some of the weed beet showed significant effects (visible signs of die back) due to the spray application, others showed small or insignificant effects (changes of colour of the plant from which it would be expected to recover). We observed no correlation between the level of control and weed size or the quantity of leaf at the plant base.

**References**


**Conclusions**

- Computer-vision based techniques are capable of detecting large broadleaved weeds at early crop growth stages.
- Spot application with glyphosate controlled broadleaved weeds including potatoes with low levels of crop damage.
- Patch application received little agronomic testing, but showed promise from an engineering perspective.
- Economic analysis suggests that a multi-purpose spot and band sprayer will become cost effective in vegetable and sugar beet crops as more herbicides are withdrawn.
- Detection and treatment of weed beet using stereo-vision showed promise, but significant additional work on both detection and treatment would be needed prior to commercial development.
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Seed production

As we write this article, harvesting of hybrid seed for the 2014 UK sugar beet crop is still several weeks off in the seed production areas in the South of France and Northern Italy. It has been delayed by the unusually late spring but at the same time plant breeders are preparing to sow the stecklings this autumn.

Stecklings are effectively small sugar beet plants about the size of a small parsnip, and are vernalised by the cold winter temperatures before being harvested in the spring in the same way as carrots.

Almost immediately these are resown in seed beds of alternating 6 rows of females (♀) (Pic. 1 – F1 male sterile hybrids that don’t produce pollen), 2 rows of male pollinators (♂) (Pic. 2) and 2 bare rows for wheelings in a standard 6:2:2 pattern (Pic. 3). The earlier vernalisation forces these plants to bolt and then set flowers.

Successful pollination depends on good pollen production and perfect timing, so that the female is receptive at the same time as the male is flowering to maximise seed yield (this is called Nicking). It is also important to prevent pollen from surrounding crops contaminating the seed so the crops are regularly and thoroughly inspected to prevent related species fertilising the crop. Spinach beet, red beet, wild beet, Swiss chard are all potential contaminants. For the same reason the two rows of multigerm pollinators are destroyed once they have finished flowering.

This field-based production is the basis of next year’s hybrid seed crops, but seed yields can be variable and after cleaning and polishing usually only 25% of the harvested seed will be usable.
Lower volumes of elite breeding material are produced on a smaller scale.

It takes ten years to bring a new line with novel trait combinations in hybrids to market and, unlike most hybrid crops, sugar beet requires three separate crosses (Fig. 1) to produce commercial monogerm hybrid sugar beet seed.

Traceability and quality control are essential throughout this process to ensure varieties remain pure. Seed quality is paramount and so we must ensure that we can segregate and keep separate all seed lots during production and processing of the different traits and varieties; everything is barcoded throughout and samples screened at each and every stage through a variety of tests. For instance tests for the Holly Gene (Rz1) for rhizomania resistance or for bolting levels use DNA-based tests and there are others for physical and biological seed quality.

**UK trait requirements**

Whilst sugar content is the primary objective, agronomic traits such as bolting resistance, rhizomania resistance and latterly beet cyst nematode tolerance all figure strongly in the ‘must have’ list for UK growers.

As a global player in sugar beet seed operating in over 50 countries, producing in excess of 350 varieties, we’re fortunate to have an eagle eyes view of the traits that all these markets demand. As genetics must also adapt to changes in environment and management practice, we constantly monitor and invest in research in these elements. This assists us in our selection, helping us to understand how pests, diseases and farm practice are evolving. For the UK this means we can learn from others and, to a large extent, anticipate the evolution and future need of a range of traits.

For the UK, the trait requirements are relatively well defined.

**Rhizomania resistance**

Rhizomania resistance is now standard for all UK varieties, but our experience in France, Netherlands, Spain and America demonstrate we can’t be complacent about the disease – it will continue to change and mutate. In these markets we have seen more aggressive strains of rhizomania identified, for which we have developed enhanced rhizomania resistance with varieties such as Magistral. Similar strains have been identified in the UK since 2007 (e.g. the AYPR strain) but they remain confined to a limited number of fields primarily on the Suffolk coastal strip. Recent work has confirmed that it has been in the UK for at least 20 years.
Beet cyst nematode tolerance
Beet cyst nematode is a growing threat and changes in cropping, particularly increasing oilseed rape within beet rotations, will make this a greater threat in the future.

Rhizoctonia resistance
If the maize acreage increases in a similar way to parts of France, then rhizoctonia will be a consideration for UK growers in the medium term.

Cercospora resistance
Cercospora leaf spot remains a significant potential threat to the UK crop and, with the problem widespread in northern Europe, the UK has so far managed to escape damage from this disease, helped no doubt by the isolation of the English channel.

Both cercospora and rhizoctonia remain well below a commercial threshold in the UK at this time, but both pathogens need continual monitoring.

Future traits and technologies in the pipeline?
Because the timescales for getting new material to market are very long, decisions to invest in and develop such traits need to be well planned and, therefore, encompass a multi-disciplinary approach to integrate research, breeding, production and commercial knowledge. Commercial delivery may be in 10-20 years’ time; this means it will often be the next generation who benefit from innovations developed today. As such there is a strong ethos of stewardship within our business to ensure there is a continuous pipeline to deliver growth into the future.

There are an increasing number of technical approaches to deliver such traits that use conventional, mutation or biotechnology solutions. This is given added momentum by our work on genomics. Here we are continuing to decipher the sugar beet genome using SESVanderHave lines. This will offer opportunities to discover genetic factors governing some of the key traits. Advances in measuring the phenotypes combine to aid more sophisticated data analysis and storage. These tools accelerate delivery in these areas compared to even ten years ago. However for traits produced using biotechnology techniques, market introduction will depend on them being economically, politically and physically deliverable and desirable for the market, for breeders, producers and processors.

Our global pipeline must navigate a number of key steps, from discovery of the trait, verifying its proof of concept, development, breeding and ultimately through to commercialisation (Table 1).

Some of these traits that are in the public domain are outlined below, whilst others, by their nature, need to remain confidential at this early stage. Broadly, such traits\(^1\) can be defined into three categories:

Reduced inputs
The next generation of traits focuses on reducing the footprint of the crop by increasing efficiency of water (WUE) and nitrogen use (NUE). Several candidates for these specific traits have been discovered and are currently in the early stage of evaluation or development. These offer the potential to dramatically improve the efficiency of production, whilst reducing environmental impact.

Pests and diseases
Pests and diseases remain the biggest threat to the crop. With uncertainties surrounding fungicides, nematicides and seed treatments in the future, the relevant pests and diseases remain a primary target and new genetic solutions are constantly being sought and developed. Traits offering viral resistance to problems such as Beet Necrotic Yellow Vein Virus (BNYVV (rhizomania)), Beet mild yellowing virus (BMYV) and, for other countries, Beet curly top. Other traits are targeted at fungal resistance to fungal diseases such as cercospora, powdery mildew and leaf spot.

Sugar production
Increased sugar yield and novel chemical building blocks offer scope to change the dynamics of the market from the incremental increases seen with current breeding. Whilst Roundup Ready\(^8\) is one of the most frequently cited and adopted biotech traits in the wider market, its introduction and rapid adoption in sugar beet, in particular with SESVanderHave varieties in the USA, has also shown the great potential of biotech traits in the beet crop. With a broad portfolio of potential genetic solutions that can match the need of the UK market, SESVanderHave commits itself to continue to contribute to the competitiveness of the UK sugar beet.

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\(^1\) Roundup Ready is a registered trademark of Monsanto.

\(^8\) Trait generated by conventional breeding using DNA markers, or mutation breeding or actual biotech traits.

Table 1 – SESVanderHave trait pipeline.

<table>
<thead>
<tr>
<th>Trait pipeline</th>
<th>Phenotype</th>
<th>Discovery</th>
<th>Proof of concept</th>
<th>Early development</th>
<th>Advancement</th>
<th>Deregulation</th>
<th>Pre-commercial</th>
<th>Commercial</th>
<th>Market</th>
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</thead>
<tbody>
<tr>
<td>Roundup Ready</td>
<td>Herbicide</td>
<td>Confidential</td>
<td>Medium</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Low nitrogen input</td>
<td>Medium</td>
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<td></td>
<td></td>
<td>Water use efficiency</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BNYVV virus resistance</td>
<td>Virus R</td>
<td>High</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BMYV virus resistance</td>
<td>Virus R</td>
<td>High</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Beet curly top resistance</td>
<td>Virus R</td>
<td>High</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cercospora - fungal resistance</td>
<td>Fungal R</td>
<td>Medium</td>
<td></td>
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<tr>
<td>Powdery mildew - fungal resistance</td>
<td>Fungal R</td>
<td>Medium</td>
<td></td>
<td></td>
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<tr>
<td>Leaf spot - fungal resistance</td>
<td>Fungal R</td>
<td>Medium</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Confidential</td>
<td></td>
<td></td>
<td></td>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugar yield</td>
<td>Sugar</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Chemical building blocks</td>
<td>CBB</td>
<td>Very High</td>
<td></td>
<td></td>
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</table>
By Dr. Aiming Qi,
Independent Data Analyst,
Dr. Eric Ober,
Rothamsted Research – Broom’s Barn
and Prof. Keith Jaggard,
Independent Adviser

Updating the BBRO/ Broom’s Barn sugar beet growth model

Introduction
The description and analysis of the sugar beet crop using mathematical modelling has been for many years an important part of sugar beet research. A sugar beet crop growth simulator was initially developed with the financial support from the British Beet Research Organisation (BBRO) and its predecessor. It used observations on crops at Broom’s Barn from 1980 to 1991, and was then adapted to a wider range of conditions using observations from elsewhere in the UK and from Germany in the early 2000s. The model simulates total crop growth and sugar yield using inputs of soil texture, daily temperature, rainfall, solar radiation and evapotranspiration.

The model worked well; it simulated yields closely and matched actual yields across a wide range of environments and soils. Therefore, it was an important crop management and research tool, used in numerous studies. However, beginning in 2008, the simulated yields produced by the model were consistently smaller than manually harvested yields, and predicted national yields did not match actual yields across a wide range of environments and soils. It was clear that the simulator needed an update with re-calibration for today’s varieties and agronomic practices. This article describes that re-calibration, which took place during 2011.

Experiments, crop growth measurements and weather data
Experiments were located on four fields chosen to represent soils on which beet is commonly grown (Table 1). All were sown with XBEET treated seeds of the rhizomania partially-resistant variety (KWS-Rosalinda). Four experiments were rain-fed whilst one, on the sandy loam soil at Broom’s Barn, was irrigated. The five experiments each received standard inputs of fertiliser, herbicides and pesticides. The irrigated experiment received ten 25 mm applications of water between 9th May and 3rd October to ensure that the soil moisture deficit was never more than 25 mm.

Four replicate samples of all the plants growing on areas of 4 m² were hand dug from each crop every fortnight from 26th May to 26th October. The percentage of ground covered by green crop canopy was measured on each of these harvest dates using a spectral-ratio meter. Weights of fresh and dry foliage, and storage roots were measured on each occasion. Roots were washed, weighed and passed over a set of saws to produce a fine pulp (brei) at the Broom’s Barn tarehouse. Roots from the first two harvests were too small for the tarehouse saws so these were chopped to a fine pulp with an industrial food processor. All the brei samples were sealed in plastic bags, immediately frozen and then stored until analysed for sugar concentration using standard tarehouse procedures.

Table 1 – Trial details.

<table>
<thead>
<tr>
<th>Site/trial</th>
<th>Grid ref.</th>
<th>Soil type</th>
<th>Sowing date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Broom’s Barn (Irrigated)</td>
<td>TL752656</td>
<td>Sandy loam</td>
<td>26-Mar-11</td>
</tr>
<tr>
<td>2. Broom’s Barn (Rainfed)</td>
<td>TL752656</td>
<td>Sandy loam</td>
<td>26-Mar-11</td>
</tr>
<tr>
<td>3. Cavenham</td>
<td>TL765690</td>
<td>Sandy</td>
<td>17-Mar-11</td>
</tr>
<tr>
<td>4. Littleport</td>
<td>TL620867</td>
<td>Peaty loam</td>
<td>08-Mar-11</td>
</tr>
<tr>
<td>5. Holbeach</td>
<td>TF380279</td>
<td>Silt loam</td>
<td>28-Mar-11</td>
</tr>
</tbody>
</table>

Results
Seedling establishment of all the trial crops was good and plant populations were mostly in the range of 90-110,000/ha. These populations are typical of commercial practice and are sufficient to achieve maximum yield, meeting the input requirements of the model for running the simulations.

Measurements of crop canopy cover are shown in Fig. 1. The old model accurately described canopy development for sites where the water supply was adequate (the irrigated crop at Broom’s Barn and the sites on silty or peaty soils at Littleport and Holbeach). However, in the other two trials the early part of the growing season was so dry that the nitrogen was not washed into the soil. The model cannot take this into account, so in reality the simulation was better than actual.
The observed trend in partitioning of total dry matter into sugar is shown in Fig. 2. The old model was able to accurately describe this relationship for today’s crop. The slight discrepancy at Littleport and Holbeach may be attributed to the large, lush canopy of both crops. Therefore, the model components that accurately described canopy growth and dry matter partitioning were retained in the new model.

Fig. 3 shows the measured sugar yield for each trial. The range and mean yields in total dry matter and sugar for the last harvest are given in Table 2. As expected, the old model under-predicted the total dry matter yield, especially as the season progressed. Consequently, the simulated sugar yields were also smaller than the observations. Changes were made to other parts of the model to improve the simulation. These are described below.

**What has changed?**

The old Broom’s Barn growth model was built using growth and yield data from varieties that were rhizomania-susceptible, whose seeds did not receive the XBEET treatment, and whose foliage was not protected by fungicides. Since the 1980s, when the old model was first calibrated, the thermal time needed from sowing to 50% crop emergence has reduced from 140 degree days (°Cd) to about 90°Cd (Ref. 1). Measurements, made in these experiments, of seedling emergence as a function of thermal time reinforced the value of 90°Cd required for 50% crop emergence. Therefore, this parameter was changed to 90°Cd in the re-calibrated model.

The model simulations are very sensitive to the efficiency with which the canopy intercepts light energy and converts it to dry matter. The conversion efficiency of the plants is strongly influenced by the intensity and duration of water stress and by the decay as the canopy ages. Beet crops are particularly drought-tolerant, as was shown by the record yield achieved after prolonged dry periods in 2011. As a result, we adjusted the effect of water stress on the potential radiation use efficiency to 42% of its possible value, as was estimated in earlier studies by Werker and Jaggard (Ref. 2). Today’s wide-spread use of ‘stay-green’ fungicides has maintained healthier foliage later in the growing season than was the norm in the 1990s and the early part of the last decade. Therefore, we adjusted the parameter that describes the effect of canopy age on the decay of radiation use efficiency so that it is now 50% of its old value (Ref. 3): the model now builds a canopy that stays greener for longer, which is more typical of today’s crops.

After these adjustments, the re-calibrated model simulated total dry matter growth and sugar yield accurately for all five crops as the agreement between the observed and simulated dry matter production and sugar yield shows in Fig. 4. The model also accurately predicted the yields obtained from weekly sample digs collected by British Sugar staff from 2008-2011 (Fig. 5).
The significant shifts in the parameters within the model are a useful basis for analysing the outcome of recent changes to variety performance and agronomic practice. A surprising result was that, since the 1980s, varieties have not improved in the partitioning of total dry matter to sugar. Yield improvements have come as a result of either extra biomass and/or because more root dry matter is being apportioned to sugar. Have beet breeders reached a maximum limit in the ratio of sugar yield to total dry matter production—or can breeders push plants further?

Table 2 – The range and mean total dry matter (tops plus roots) and sugar yields for each trial at the last harvest on 26th October, 2011.

<table>
<thead>
<tr>
<th>Site/Trial</th>
<th>Total dry matter</th>
<th>Sugar yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Mean</td>
</tr>
<tr>
<td>Broom’s Barn (Irrigated)</td>
<td>31.9-33.6</td>
<td>32.9</td>
</tr>
<tr>
<td>Broom’s Barn (Rainfed)</td>
<td>26.6-28.9</td>
<td>27.6</td>
</tr>
<tr>
<td>Cavenham</td>
<td>22.6-28.5</td>
<td>25.6</td>
</tr>
<tr>
<td>Littleport</td>
<td>33.5-37.9</td>
<td>36.3</td>
</tr>
<tr>
<td>Holbeach</td>
<td>36.7-39.7</td>
<td>37.8</td>
</tr>
</tbody>
</table>

Fig. 4 – The relationship between the observed and the simulated total dry matter production (A) and sugar yield (B) by the re-calibrated model for all five crops. EF, RMSE and MAE are indicators for the model’s goodness-of-fit and represent the efficiency of the model, the root mean squared error and mean absolute error, respectively.
We then looked at the thermal time required from sowing to 50% crop emergence and verified that XBEEET-treated seeds accelerated crop emergence, which benefits yield. Additionally, in the old model water stress imposed a larger effect on canopy efficiency than is now observed. This was especially apparent in 2011, so the model was re-calibrated to correct for these effects. We had also hypothesised that radiation-use efficiency declined more rapidly in response to the age of the canopy in the old model compared with today’s crop, and this was supported by the measurements in these trials. This suggests that the use of modern fungicides with ‘stay-green’ qualities has maintained better canopy health throughout late summer and autumn, an important period of yield accumulation.

**Future challenges**

In the past the BBRO/Broom’s Barn beet growth model has been a useful tool for yield prediction, for providing advice to business and growers, and for addressing research questions. The re-calibrated model can continue these functions, but may also become the cornerstone of a new decision support system, providing growers with a simple, user-friendly, web-based program to determine the benefit of various management options (Ref. 4). For instance, during the course of the season, levels of irrigation or harvest dates can be manipulated to observe the predicted effect on final yields, along with other ‘what if’ scenarios. As a research tool, the model, combined with some knowledge of crop physiology and modelling, can answer questions that otherwise would require expensive and time-consuming field trials.

Improvements in agronomy and varieties will lead to higher sugar yields in the future, and the model will need to be re-calibrated again. Any physiology-based crop model has to evolve in order to accurately describe the important changes responsible for increased yields. This can be done by monitoring the annual performance of the model against yields of standard, high-performance crops, such as the control varieties in the Recommended List trials. The advantages of using these data are that:

- the varieties will always be up-to-date;
- the crops are managed using high-quality, current agronomic practices;
- the yields are taken from experimental plots to a well-defined protocol;
- the data are already being collected for another purpose, so there is no additional expense.

If this monitoring is done, the simulated yield may be greater or smaller than is actually produced. If this difference is greater than 5%, the reasons for the discrepancy should be investigated in discussion with the variety trial managers. A correction to the model will be warranted if it regularly predicts too little sugar yield: it is proposed that an underestimation of more than 5% in two consecutive years is the criterion for a new re-calibration. If and when this happens, it may be necessary to include additional plots alongside the variety trials in the third and fourth year so that the necessary data can be collected to re-align the model.

**Conclusions**

A detailed series of measurements were made on well-managed crops grown on a range of soil types and conditions. These data were used to update the BBRO Broom’s Barn sugar beet growth model. After applying changes to the rate of crop emergence, sensitivity to water stress and efficiency of the canopy, the re-calibrated model once again accurately estimated the growth and yield of commercial sugar beet crops. No changes were required for the model components describing canopy evolution or, surprisingly, partitioning dry matter into sugar. The newly re-tuned sugar beet model should prove a useful implement in the research and development toolbox and, in future, as the engine of a web-based farm management system.

**References**


**Acknowledgements**

We thank both Mr. Peter Pask and Mr. Richard Thompson for allowing us to monitor their beet fields. We also thank technical staff at Broom’s Barn for collecting and processing crop samples and weather data. The weekly sampled sugar yields were kindly provided by British Sugar.
Industry feature

US Red River Valley growers’ report from World Association of Beet and Cane Growers (WABCG) conference in India

As we looked out of the tour bus windows at India’s cane country, our first impression was that the past and the future were having a massive head-on collision. Workers cut cane by hand with long knives and transport it on carts pulled by camels and water buffalo. A camel cart driver talks on his smart phone as he merges into traffic that includes cars, buses, cattle, brightly coloured tandem trucks, bicycles, auto-rickshaws and pedestrians.

India entered the sugar export market for the first time in 1957. Today, most of India’s 50 million sugar farmers are growing around two acres of sugarcane each, with little mechanisation, yet this South Asian country has a huge impact on world sugar supplies.

India is the world’s second largest sugarcane producer behind Brazil, producing 27.96 million tons of sugar in 2011. India also exported 2.84 million tons of sugar the same year, making it the world’s third largest net exporter.

My husband Roy and I grow sugar beet near Grafton, North Dakota and we travelled to India to attend the 11th Annual World Association of Beet and Cane Growers Conference (WABCG) held 21st to 26th March in New Delhi. This event is held every three years and alternates between sugar beet and sugarcane growing countries. The WABCG is the only international organisation which brings together national and regional associations of sugar beet and sugarcane growers at the world level. It has 31 member associations and associates from 27 member countries. It unites five million sugarcane growers and 650,000 sugar beet growers from five continents into a single forum.

Role of WABCG

The goal of the WABCG conference is to facilitate the first-hand exchange of information about advancements and issues in the sugar sector, and to strengthen the professional representation, both nationally and internationally, of beet and cane growers.

“The WABCG allows these farmers and their representatives to discuss the issues facing them all,” said William Martin, NFU, Sugar Board Chairman who has served as president of the WABCG for the past three years. “We are all there to help understand how we can improve the lot of those at home.”

Intake of sugar cane.

Storage of finished sugar.
mill house, processing and pan boiling areas, packing site and refinery. Conditions were much more primitive here. We saw exposed PTO shafts and sprockets, steep stairways with no railings and barefoot employees working with vats of boiling sugar.

After processing, the sugar was put into 110 pound bags and transported on workers’ backs to a waiting cart. The bags were then stacked by hand into a warehouse.

Conference highlights

The WABCG conference in New Delhi started with presentations on the future of the European Union Sugar Regime after 2015, ethanol production in Brazil and world sugar trade flows. Delegates also heard commentary from economists and growers, and received a general overview of the Indian sugar sector. P. Chengal Reddy, the Secretary General of the Consortium of Indian Farmers Associations (CIFA), spoke to delegates about the sobering plight of Indian sugar farmers. Sugar comprises much of India’s national economy yet sugar farmers are marginalised by Indian society, under the caste system. This, combined with crop failure and low prices, results in high suicide rates each year. According to Mr. Reddy, many of India’s sugar farmers are illiterate, uneducated, and unequipped to deal with the governmental policies that determine their fate. They have no cooperatives to give them a voice or representation, which leaves them at the mercy of the millers. Growers do not own the factories where their sugarcane crops are processed, and there is constant tension with factory management. Indian farmers
have huge debt loads and do not receive timely guaranteed payments for their crops. They also lack mechanisation but are unable to gain access to modern equipment and technology. Mr. Reddy said sugar is the only industry in India that is given a monthly quota for its sale of sugar. Therefore, the industry has no control over its sugar inventory or cash flows. As a result, efforts are underway by CIFA to deregulate the sugar sector and organise farmers into groups and committees that are recognised by the Indian government and factory management.

Mr. Reddy’s presentation highlighted how crucial it is for sugar growers to have solid political representation and a strong collective voice.

The RRVSGA is currently the only group from the United States that belongs to the WABCG.

William Martin felt that farmers’ participation was a main topic of the New Delhi conference. “Farmers’ participation, or not, in the chain beyond the farm gate was fascinating,” he said. “There is always a tendency to imagine that other peoples’ systems are much more attractive than one’s own, but we had the chance to explore some of the different models and why farmers choose them.”

Mr. Martin also felt it was extremely valuable to hear how other countries view their future prospects. “From the traditional Brazilian claim that they stand ready to supply all the world’s needs, to the real challenges and opportunities in the emerging economies of the Pacific Rim, we all have much to learn,” he said. “It is clear that we are all becoming more affected by global markets, even in countries and regions traditionally insulated from them. Farmers cannot assume that these things are not their concern.”

**WABCG Presidency**

The WABCG presidency alternates between representatives from sugar cane and sugar beet producing countries. Roy Sharma, a sugar cane grower from South Africa, will be succeeding William Martin.

“I am looking forward to my term,” Sharma said. “I intend to promote the organisation and make it accessible to as many sugar and ethanol producers as possible.”

Mr. Martin said it had been an honour to serve as WABCG president for the past three years. “I have had the chance to speak on behalf of sugar farmers around the world, and to try to ensure that their needs are understood,” he said. “I think I understand more than I did before about the different circumstances faced by farmers in different countries. I certainly understand even more clearly that, underneath, we are all the same, wherever we farm.”

(Note: the editor is grateful to the author for granting permission to reproduce this article.)
West, after the event – UK pauses for thought...

The recent explosion at West, in Texas, serves to remind us that operators and users of all nitrogenous fertilizers, especially those based on ammonium nitrate, need to remain ever vigilant towards housekeeping and fire precautions in their storage areas.

Whilst there has been no formal conclusive communication from the US authorities investigating the West incident, it is known that there was an explosion, approximately 20 minutes after the first reports of a severe fire in a grain store, which was also holding approximately 30 tonnes of ammonium nitrate fertiliser. Poor housekeeping and the presence of combustible materials in the fertiliser storage area were thought to have been the main cause, although the building also stored machinery.

The explosion was caused by no more than a lorry load of fertiliser but it had the explosive equivalent of about 15 tonnes of TNT. Owing to the close proximity of the storage facility to the local town which, over the years, had encroached on the site’s boundary, the effects on the community were catastrophic. Fifteen people were killed outright, and over 200 were injured. The blast left a crater 27 m in diameter and 3 m deep where the fertiliser store had been located. A mile of mainline railway track was blasted out of position and required replacement. There was significant damage to property off-site, including a school, a nursing home and an apartment block which was demolished in the blast.

West Fertiliser Co. carried less than $1m liability insurance, so the city authorities are now in the process of suing both the operator, West Fertilisers, and the supplier of the fertiliser, CF Industries, for damages.

What are the risks associated with the storage of ammonium nitrate fertiliser?

All ammonium nitrate based fertilisers, are stable materials under normal conditions but fire can turn it into a bomb.

Oxidiser

Ammonium nitrate based fertilisers themselves are not combustible but ammonium nitrate is a strong oxidiser. Therefore, the risk of fire arises primarily from the presence of combustible materials such as stored fuels or packaging, parts of handling equipment (e.g. the fuels, lubricants and hydraulic fluids used therein) and combustible materials used in the construction of the store or bays.

Experience shows that fires start in combustible materials that are inappropriately stored near the fertiliser, or in mobile plant e.g. fork lift trucks, loading shovels and vehicles, or other associated equipment or fixed plant e.g. belt conveyors. Other sources of ignition include electrical faults and hot work e.g. welding or grinding.

What can users do to improve on farm safety with ammonium nitrate fertiliser?

Whilst storing ammonium nitrate in the barn with other materials and equipment may help enable security, it presents a serious safety risk in the event of a fire. Therefore, growers should consider how they might store it without exposing it to any risk of fire or cross contamination whilst also securing it from the risk of theft or misuse.

So what are the implications for the UK?

The potential risks from mishandling ammonium nitrate and, indeed, other high nitrogen fertilisers are well known. However, the relatively small quantities of fertiliser involved in the West incident which involved no more than a lorry load, and the huge amount of...
Ten Point Plan

✘ Do not store fertiliser where there is public access
✘ Do not leave fertiliser in the field overnight
✘ Do not store fertiliser near to, or visible from the public highway
✘ It is an offence to sell an ammonium nitrate fertiliser without the proper certification (detonation resistance certificate)
✔ Always purchase fertiliser from a FIAS approved supplier
✔ Do retain and file all fertiliser delivery notes
✔ Do, wherever possible, and with regard to HSE safety guidance, store fertiliser inside a locked building or compound
✔ Do fully sheet fertiliser when outside and regularly check to ensure the stack has not been tampered with in any way
✔ Do carry out regular stock checks
✔ Do report any stock discrepancy or loss to the police immediately

This plan has been produced in collaboration with farmers unions and the police and may change. Please refer to www.secureyourfertiliser.gov.uk

resulting damage to third party life and property, has caused a re-think within the Health and Safety Executive.

Enforcement agencies will clearly require information and assurances on the locations in the UK of similar sites, the quantities stored there, and the proximity to third parties; also on the standards of storage, specifically the avoidance of incompatible materials and the risk of fire.

AIC (Agricultural Industries Federation) fertiliser sector discussions with HSE indicate that they consider that FIAS accredited sites, are likely to present a reduced risk. FIAS looks not only at security, but also housekeeping and safety considerations, and reports non-compliance using the same methodology and standards as HSE. The conclusion is that FIAS sites probably represent less of a risk of poor standards than other sites, and non-FIAS sites therefore present the greatest theoretical risk.

HSE are therefore drawing up lists of non-FIAS registered premises thought to contain small but significant, quantities of fertiliser that may present a risk, and will be targeting these for enforcement purposes.
First Holmer Terra Variant chaser for UK sugar beet

The first Holmer Terra Variant systems tractor sugar beet chaser has been sold in the UK to Wickham Beet Harvesters of Bredfield near Woodbridge. The new machine, replaces a Holmer Terra Transport, bought by the forward looking Wickham Beet group two years ago.

The extreme wet conditions experienced last year produced considerable market interest in alternatives to tractor and trailer beet carting. The Wickham Beet Harvester group praised the performance of their existing Holmer Terra Transport, a converted harvester, during 2012, describing the machine as ‘vital to their harvesting operation’ during the difficult conditions of that season.

Their new Holmer Terra Variant TVWA offers many advantages including a maximum speed of 40 km/h, greater manoeuvrability and improved operator comfort. Mechanical axles with differential locks drive the four equal size 1050 x 32 flotation wheels, and 4-wheel steering plus crab operation combine to provide outstanding agility in the field in all conditions with minimal soil impact.

Power is provided by a Mercedes-Benz V6 428 hp engine, driving through a Twin Disc gearbox with 12-forward, and 4-reverse gears. The purpose built Holmer demountable sugar beet tank’s capacity is 35 cubic metres; dual moving floors converge, meeting the discharge elevator from both sides for fast unloading.

A multi-purpose systems tractor, the Terra Variant can quickly change operation; demountable bodies are available for slurry injection, cultivation and other functions.

At the rear, a 3-point linkage with powerful hydraulic services is standard equipment.

The Wickham Beet Group has also ordered a brand new Holmer Terra Dos T3 Eco, the group’s fifth Holmer harvester, for 2013, to work together with the Terra Variant.

New and factory refurbished Holmer Terra Variant sugar beet chaser machines are available from £170,000.

In the UK, sales, service and parts for Holmer products is provided Standen-Reflex of Ely, Cambridgeshire.

For more information please contact:
Alex Mathias, Office 01353 666200, Mobile 07836 541559,
Email a.mathias@standen.co.uk
**Centurion MAX in a class of its own**

Based on the active ingredient clethodim, the graminicide Centurion MAX has received UK registration and is described as an important and exceptional herbicide to reach the market. Dr. Stephen Moss of Rothamsted Research, a renowned expert in weed control, particularly black-grass, says “It’s great to see a new herbicide that gives effective control of resistant black-grass in oilseed rape.”

Dr. David Stormonth of Interfarm explains that Centurion MAX is recommended for the control of black-grass, annual meadow-grass, wheat volunteers and barley volunteers in winter oilseed rape and sugar beet. “One of the special attributes of Centurion MAX is that although it is an ACCase inhibitor product, it is active on strains of black-grass that are resistant to other ACCase products.

He explains that clethodim is unusual in that it is less affected by target site resistance than other ACCase inhibiting herbicides. However David points out that Centurion MAX must be used wisely in a black-grass control strategy. “For example, in oilseed rape it will be extremely important to use it in a programme with herbicides with different modes of action such as propyzamide or carbetamide. Such products should be used either in mix or after Centurion MAX. This way any survivors from a clethodim treatment should be removed by the other herbicide, thus preventing or reducing any seed return.”

Dr. Stormonth says that that the recommended dose rate is 1 litre per hectare. “This is the effective dose for Centurion MAX, regardless of target weed.” It will control black-grass and cereal volunteers from the 3 leaf stage to 5 tillers, with annual meadow-grass from 3 leaves to tilling.

Centurion MAX contains 120g/L clethodim formulated as an emulsifiable concentrate and packed in a 5L container. Its recommended for use post-emergence in winter oilseed rape and sugar beet to control black-grass, annual meadow-grass and cereal volunteers. It is applied at a dose rate of 1 L/ha in 200-400 litres of water and at a fine or medium spray quality. In winter oilseed rape it can be applied from the 4 true leaf stage and in sugar beet from cotyledon stage. One application can be applied per crop and the latest time of application in oilseed rape is before stem elongation and in sugar beet before row closure. Centurion MAX has no LERAP.

For further comment and information, please contact Dr. David Stormonth, Technical Manager, Interfarm UK Ltd. on 01354 741414 or 07818 036506 (mobile) Interfarm UK Ltd., Kingham’s Place, 36 Newgate Street, Doddington, Cambridgeshire PE15 0SR Tel: 01354 741414 Fax: 01354 741004 e-mail: sales@interfarm.co.uk
news

BBRO Root Losses Calculator

The BBRO have developed a new online Root Losses Calculator available via the British Sugar Beet Portal.

To use the calculator go to www.bsonline.co.uk. Once logged on, click on the ‘Tools’ menu on the left then ‘Root Losses Calculator’.

Input your root breakages (the total must be greater than 20) into the yellow fields and your estimated root yield. Then click on the ‘Calculate’ button.

To measure your root breakages use the template supplied in this issue and shown in the photo below.

If you have any problems accessing the British Sugar Beet Portal please contact the Agriculture Help Desk on 0870 240 2314.

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To order please contact the Agriculture Help Desk on 0870 240 2314
A new generation takes charge at Strube

On 1st September 2013, the reins were handed over to a new generation of management at Strube as Dr. Hermann-Georg Strube stepped down.

"After 45 years as CEO, the time has come to hand over the reins to the next generation," in the words of Dr. Hermann-Georg Strube as he bade farewell to the assembled staff in Söllingen. "I am both proud and grateful that my daughter Sina Isabel joined the management team in 2007, which means that since 1877, five generations of our family will have been responsible for running our group," he pointed out. His wife Eva-Maria Strube is also leaving after more than forty years of service with the company.

The management responsibilities of existing CEO Sina Isabel Strube will shared by her husband Dr. Christian Putensen-Strube and Dr. Christoph Hauser. Thus the tradition of being a family-run business will enter a new phase, while at the same time a senior employee will be promoted to a management role for the first time in the company's 136-year history.

Dr. Hermann-Georg Strube assumed control of Strube’s commercial operations in 1972, and, with the help of research expertise and innovation, turned the plant-breeding business into a successful, globally operating seed company which now employs a workforce of more than 350. Today, sugar beet, wheat, sunflowers, sweetcorn and peas are cultivated from its seeds in 35 different countries. Although the 75-year-old would now like to spend more time with his family and his equestrian pursuits, he and his wife Eva-Maria Strube will maintain their strong links with the company, both in a representative role and as part of its day-to-day operations.

The new management team at Strube (l to r): Dr. Christian Putensen-Strube, Sina Isabel Strube, Dr. Christoph Hauser.
BBRO grower support groups (soil management)
Starting in September the area managers at Bury factory are organising field discussions with small grower groups. These discussion groups are specifically looking into soil management and techniques to maintain good soil structure. All the area managers have been training through the summer to enhance their skills on soil cultivation techniques. The grower groups will be organised to meet on around three occasions over the autumn and winter to share how different farms manage soils, involve third party experts, as well as visits to manufacturers and dealers of equipment to encourage the sharing of best practices. Area managers have contacted growers within their factory areas to invite participation and if any others would be keen to learn more about soil management techniques please speak to your area manager. The BBRO has obtained external funding for these groups.

Factory projects and maintenance

Combined heat and power plant maintenance (jet engine)
Since the end of the campaign the gas turbine has been removed from site and sent to Holland for a major refit. This work is required every six years and is a very delicate operation as the gas turbine is worth several million pounds (see Pic. 1). In order to be able to operate the juice run, the manufacturers lease a replacement to Bury factory, fully installed. As this is a highly sophisticated piece of engineering it is transported to GE workshops in an air-tight specialised container on a full air-suspension lorry trailer. The engine is fully stripped down, checked, parts replaced and the interior ‘hot’ section is renewed. Full testing is completed in late August when our own engine is reinstalled at Bury ready for the campaign start.

Beet hopper replacement
Another extensive project this summer has been the complete replacement of the beet hopper in the factory. This hopper is the holding area for the beet prior to being sliced. The new design has incorporated some novel features and is now fully enclosed to improve the cleanliness of the area during operation (see Pic. 2). It is also slightly larger, with improved monitoring of operations. This enables the loading shovel driver on the flat pad to have clear information so he can determine how fast to push beet off the flat pad. The entire building had to be dismantled as the old hopper was an integral part of the building structure.

Projects for further factory improvement
As a result of the difficulties highlighted last campaign with carbonation and filtration of the juice, two projects for next year have received approval. Starting in the autumn a new carbon dioxide gassing tank will be built to supplement the carbonation station. This will give benefits in allowing longer juice retention time and greater control of particle size, which is critical in seasons when the beet are difficult to process. The gassing tank will be ready for testing at the end of the 2013/14 campaign and fully operational by the start of the 2014/15 season. Also in this same part of the factory the ‘go ahead’ has been given to completely replace the general purpose (GP) filters. The current capacity of this area has been low relative to factory throughput. The new filters will be an improved design and double the current capacity. The new station will be operational for the start of the 2014/15 campaign and the design is similar to those operated at Wissington factory.

Beet end maintenance
As a result of the high dirt tares last campaign the beet end (beet-to-juice processing) part of the factory took considerable wear and tear. There has been an increased level of maintenance done in this area to replace pipework, pumps and steelwork on the overhead flume. The stone washer, which was very unreliable last campaign, will be completely replaced next off-season.

Topsoil
During the latter part of last campaign a mobile centrifuge unit was installed on the mud line between the factory discharge and the soil ponds. This trial was to identify the impact such equipment could have on reducing future soil pond space requirements and to reduce the time spent on making topsoil. The trial was very successful as it normally takes two years from digging out wet soil to final product ready for despatch. Using the centrifuge reduced this down to six months. Further evaluation of this technology will take place this season (Pic. 3.)

I would like to wish everyone a high-yielding crop and successful campaign at Bury in 2013/14.

Dan Downs
Agricultural Business Manager
2013 Crop progress

This year’s beet crop got off to a slow start; although seedbeds came down much better than anticipated, below the soil was wet and fragile. It is safe to say the prolonged cold conditions after drilling were unseasonal and challenging for development of the crop. The Cantley catchment area has remained very dry for most of the growing season right through into September, so it is surprising how well the crop has continued to grow and remain healthy on most soil types, although the lighter soils have suffered, particularly to the north east of Norwich. On average the root sample digs show Cantley sugar content to be slightly above the company average, and although not unusually high, they indicate the crop is still growing actively.

Cantley factory

Our investment in improved maintenance planning has enabled us to steam and water test more equipment than ever before and in good time for further work identified to be completed in readiness for campaign. We have secured planning permission for new juice tanks and have commenced work to install juice import/export capability to significantly improve factory reliability. We have major projects in progress to install a pre-scalder and additional evaporation capacity which continue to drive down energy usage to improve process efficiency. These multi-million pound investments are planned to come on stream next campaign and demonstrate significant investment in the future of Cantley factory.

Co-products

At Cantley we are able to offer Landscape 20 Topsoil, as well as LimeX45; please call your area manager for details or to place an order. We also have graded stone available (20-40 mm and 40 mm plus) and ash (often used to top off farm tracks etc), details are available from Paddy Barraclough (07769 936994).

Wishing you a successful campaign in 2013/14.

John Emerson
Agricultural Business Manager
The crop has been growing vigorously during August and looks to be in good health at the time of writing. Though the rainfall has been showery in nature over the summer, most growing areas around Newark have had some rain, as well as the heat and sunshine during July. As always some crops have missed the showers and are not looking as good as the rest. We recorded 95 mm of rainfall in total at the factory in July and, at the time of writing, all crops look very well round here.

At present most crops have received their first application of fungicide, which will deliver an average 3.5% yield increase as identified by BBRO work. They have also identified that for later harvesting and/or where there is a risk of rust, a further 5% yield response can be obtained from a second application.

Removal of bolters/weed beet from the field is now essential if any further weed beet built up is to be avoided, with each bolter/weed beet having the potential to set a further 2000 viable seeds.

Factory

Juice refining at Newark was completed during the first week of August, with sufficient juice left to start the sugar end of the factory pre-campaign, with a planned start around the third week in September.

The Energy Reduction/Throughput project over the last two years is reaching completion, with final installations of extensive pipework now finished, and only some final lagging now to complete. The first testing was undertaken during our August Steam Trials, with any potential leakage being identified and remedied ready for campaign start.

Commissioning has now been planned with inbuilt contingencies, and sorted for any remedial work requirements. We are looking forward to this campaign when we can finally use the new falling film evaporators here at Newark, that have been two years in the making.

Co-products

Over 31 kt of LimeX has been sold and dispatched already but there is ample product still on site. This, together with the new campaign production, will mean we have no issues this year with availability and will be able to meet any needs for late summer/autumn applications on farm. Don’t forget the additional fertiliser value when using LimeX for pH correction, or for that matter the soil conditioning properties. Obviously during campaign operations the full benefit of back loads can also be utilised.

The excavation of over 60 kt of soil from the last campaign has been completed and our Gravel Pond storage area is now ready for this season. We have been able to maximise soil conditioning processes during the drier weather this summer and already 25 kt of our Topsoil has been sold from earlier campaigns to a very wide range of customers.

David Dunning
Agricultural Business Manager
In the last addition of the British Sugar Beet Review I commented that the crop was in need of some warm weather to help its development and that is exactly what we have had. Generally the crop canopies are looking very healthy which should stand us in good stead for the coming months. Mildew is just starting to be found in our area and it is vital that every crop receives at least one fungicide treatment as part of a disease control strategy, as well as protecting the canopy for the winter. (Please see BBRO bulletins for the most up to date advice).

Wissettong factory has only received 78 mm of rain in the last 3 months which has left some crops under severe stress on a few occasions. These dry conditions may make early season lifting a challenge without further rainfall. Area managers will be available at the start of the campaign to assist with harvester tests and clamp assessments to help capture as much yield as possible. Please call them if you require this service. Also consider your lifting plans for the season to ensure you have adequate storage for the crop. We would advise that you keep in close contact with your harvesting contractor and haulier at the start of the season to minimise the time between lifting and delivery to the factory. As I write this article root digs for the coming season are just about to commence. The results of these are available to growers on www.bsonline.co.uk

The results of the aphid trapping program run by the BBRO have shown that there has been very little aphid activity in the Wissettong area this season and it has not been necessary to spray given the very low levels recorded. We have seen some areas where Beet Cyst Nematode has affected crop development. Suspect fields can be tested and we do offer a service to all growers to check for the level of infection; this will enable an informed decision to be made as to whether to select BCN tolerant varieties on affected fields. This service is only one part of our comprehensive soil analysis service which can deliver nutrient and pH results very competitively. We would encourage all of our LimeX customers to make sure they book their LimeX requirements early to make the most of the back-loading opportunity during the campaign. Supplies will be limited so please secure your requirements early.

TOPSOIL sales from Wissettong have increased dramatically this season due to British Sugar winning a contract to supply soil to the regeneration project at the Olympic Park in London (see Pic. 1). This project required 34,000 t of quality topsoil to create 11 football pitches on what was the coach park for the games. In all we supplied 1,666 loads of soil to our customer BAM Nuttall.

Factory preparation for the forthcoming campaign has been going well. The juice run was very successful with only one thick juice storage tank now remaining for processing. General maintenance in the factory is now complete, as well as the additional works on the evaporators, juice circulation lines and transport water line. The commissioning of the enhanced Precipitated Calcium Carbonate reactor will be completed early in the campaign.

TOPSOIL sales from Wissettong have increased dramatically this season due to British Sugar winning a contract to supply soil to the regeneration project at the Olympic Park in London (see Pic. 1). This project required 34,000 t of quality topsoil to create 11 football pitches on what was the coach park for the games. In all we supplied 1,666 loads of soil to our customer BAM Nuttall.

Wissettong factory agricultural staff were very pleased to support Open Farm Sunday Events held at Coldham Hall near Wisbech, Holkham Estate near Wells-next-the-Sea and MHS Farms at Thorney (see Pic. 2). All these events were very well attended and provided a great opportunity for us and growers to raise the awareness of the importance of farming in the local community.

TOPSOIL sales from Wissettong have increased dramatically this season due to British Sugar winning a contract to supply soil to the regeneration project at the Olympic Park in London (see Pic. 1). This project required 34,000 t of quality topsoil to create 11 football pitches on what was the coach park for the games. In all we supplied 1,666 loads of soil to our customer BAM Nuttall.

Andrew Dear
Agriculture Fieldstaff Manager
Hate Rhizomania - Love Sandra!

SANDRA KWS

- Special recommendation for AYPR Rhizomania
- Double rhizo resistance – Rz1 + Rz2
- High yield outside of infestation – 99.2%
- Very high sugar content – 18.73%
- Overcome Rhizomania with Sandra KWS

Data Source: BBRO Sugar Beet Recommended List 2014

www.kws-uk.com

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