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DRILLING DECISIONS: SECURING A HEALTHY START TO YOUR BEET CROP

Following the wet 2019 winter it was no surprise that spring drilling in 2020 did not get off to a good start. We are of course, all aware of the issues that followed in what was an unsympathetic 2020 growing season compounded by Virus Yellows. But 'out of adversity comes opportunity', so what have we learned about our conventional approach to cultivations and drilling, and what could we do this year to improve seed beds and establish beet crops for maximum potential and resilience?

Flexible crop rotations

As we wade through another challenging autumn and winter for the establishment of cereal crops, we find that rotations and harvest plans continue to shift to allow every weather window to be utilised. This inevitably means that for some fields it will not be possible to optimise ploughing, cultivation, and even base fertiliser dressings options. Remember to keep a track of your changing plans and identify the 'blind spots'.

Whilst selecting fields for autumn cereals will have provided some relief from a second year of intense spring activity, we must still be careful to plan for the fields that are as yet unplanted. Increased inputs may be required to do remedial or intermediate tillage to get the beet seedbeds required for prompt spring drilling. If you are left with fields that remain uncultivated, or with less than desired finishes, a flexible approach is required. Cultivation practices intended for the autumn should not be the default for early spring and will not yield the same result.

- Tailor your approach to each field/scenario
- Spread the risk with multiple approaches
- Consider the full process, what, how and when will your next step be and in what conditions

Don't lose sight of the basics!

Whilst BBRO's advice continues to develop around drilling and crop establishment with the new pressures we face, it has always been focused around targeting the earliest drill date where conditions are suitable. Whilst drilling date is important for optimising light interception throughout the season, the focus should be on maximising the speed of crop development and maintaining canopy vigour with the aim of reaching the 12 leaf stage; a key target to mitigate the impact of aphid migration.

Providing soil conditions are suitable and no cold spells are forecast, drilling can begin as soon as conditions come right after 1st March to maximise yields. Ideally you want:

- 1 A level seed-bed**
- 2 Good soil structure; to retain moisture and provide good seed to soil contact**
- 3 pH levels of 6.5 -7**
- 4 Moisture at depth (preferably between 2cm -3cm depth)**
- 5 Soil temperature at depth in excess of 3°C**

Don't miss the opportunity to drill early if it arises BUT do ensure you use a variety which is suitable for early drilling. You can find this information on the Recommended List of sugar beet varieties. Any variety with a red 'X' should not be drilled before mid-March due to the higher risk of bolting. If you want to find out more about bolting, refer to Georgina Barratts article on pages 28 & 29.

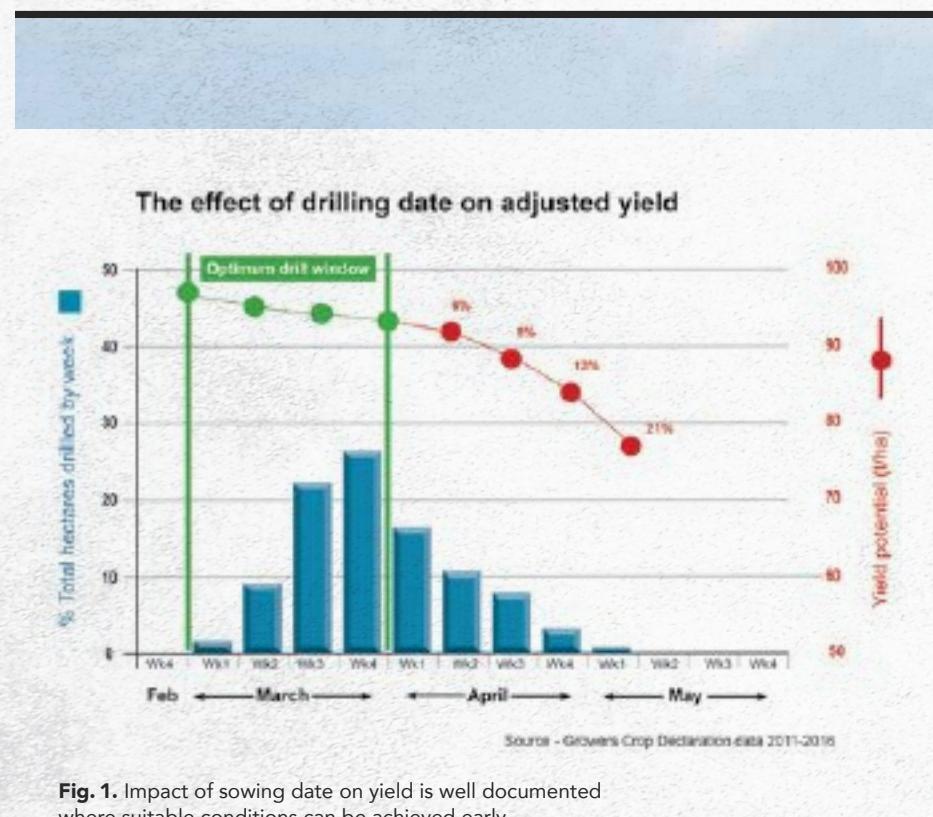


Fig. 1. Impact of sowing date on yield is well documented where suitable conditions can be achieved early

One consequence of the rapidly drying seedbeds and massive spring workload of 2020 was a large range in drilling dates. Drilling date has therefore been a point of discussion and where it has been possible to compare virus symptoms at different drill dates, it has been observed that virus symptoms appeared less in later drilled crops, prompting growers to ask "If I drill late will I miss the aphid migration?" However, if we look at the aphid migration in 2020 as shown at Brooms Barn in Suffolk, the aphids migrated earlier than anticipated and ahead of the long-term average with numbers also reducing far sooner and more abruptly than normal. With this in mind, a delayed drilling strategy may have reduced aphid pressure in 2020 however, in a typical year it would have caused a major negative impact, incurring losses in both yield potential and additional, magnified losses through virus.

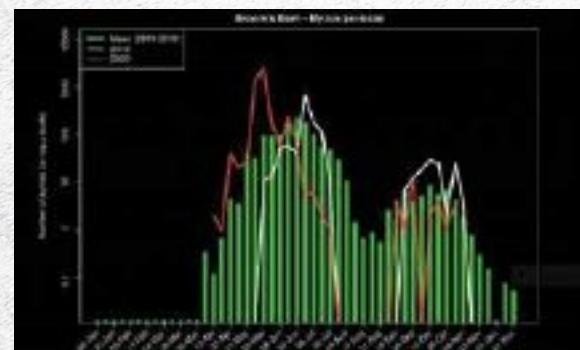


Fig. 2. Aphid population monitored at Broom's Barn in 2020

It is also important to differentiate between drilling and emergence date, in many cases with dry seedbeds and further prolonged lack of rainfall, the crop was very slow to emerge with poor vigour. To provide an example of this the BBRO BYC fields showed up to a 25-day delay in actual emergence over the average and predicted figures, thus taking poorly developed crops into the peak of the aphid migration. The unusually early aphid migration coupled with a slow-moving crop, resulted in high virus levels and severity. Whilst Fig 2 only shows a snapshot and single point in the UK, it does show that conditions in 2020

were not normal and BBRO would continue to advise for sowing in the earliest suitable window.

Delaying drilling to wait for seedbed conditions to improve of course, is a calculated risk but if weather forecast indicates a window with some certainty, it may be an opportunity to get seed into better conditions allowing rapid germination and canopy establishment. There are many examples of crops drilled later into an improved seedbed overtaking the earlier drilled crops with poor seedbeds, leading to patchy emergence and slow growing plants. The faster developing plants will have the advantage of getting to mature plant resistance quicker and possibly, albeit relatively untested, being more resilient to stresses and therefore virus. However, be aware that there is a limited window in which to wait before the yield loss of late drilling outweighs any advantage. Drilling after mid-April carries a yield penalty of 4 adjusted t/ha per week on average.

Drilling into the detail

To ensure maximum plant development and resilience, you must be fleet of foot. Prepare your cultivations strategy and make sure equipment is in place to produce the seedbed required as weather opportunities occur, ensuring the emphasis is on retaining soil moisture ahead of drilling. Ideally the target for retained soil moisture is 2 – 5cm at drilling depth, however, this is proving more and more difficult to achieve with climate extremes but it is one of the more crucial points to getting the crop off to the best possible start.

The final process is clearly drilling, and observations from 2020 show how critical it was to ensure seed is placed into moisture. Fig 3 shows that drill depth can have an immediate impact on speed of establishment and the importance of adjusting drill depth and pressure to suit each seedbed. Once the target seed depth has been identified and adjusted for, it is equally crucial to ensure it is achieved consistently to avoid uneven establishment. Whilst both of these things are often associated with the drill performance it is important to remember it is also a consequence of the seedbed preparation and both need to be optimal to achieve the best results.



Fig. 3. Example of the impact of drill set up on speed of emergence



Fig. 4. Example of inconsistent seedbed (moisture) producing variable emergence

Check your drill

All that preparation can soon be wasted if you have not also checked your drill.

Poorly maintained drills can lead to uneven plant establishment, erratic seed spacing and seed depth. A well-maintained drill will really help you to achieve an even plant stand to ensure maximum yields. Book a test with your local provider.

When drilling it is unfortunately not a case of 'one size fits all' take time to set-up your machine and check performance regularly.

1 Seed spacing

Ideal spacing is 15 to 18cm for 50cm row widths and 17 to 20cm for 45cm rows. Aim for a minimum of 1.25 units/ha; use a higher rate in poor seedbed conditions

2 Drilling depth

Before drilling starts, set all units to the same depth. Seed should be placed into moist soil, ideally drilled between 2cm and 3cm deep. Check drilling depth regularly as it will vary within fields as well as between each field

3 Drilling speed

Optimum drilling speed is between 5 and 8kph (3 to 5mph).

4 Depth vs down pressure

Ideally depth should be set for soil moisture, with the pressure adjusted secondary, to allow row unit to achieve consistent depth

5 Clod pushers

In dry soil conditions increase penetration depth and soil movement by adding extra weights or adjusting the depth control

6 Soil coverers

Soil coverers may need to be adjusted to throw more or less soil depending on conditions

For more information on Drill maintenance, set-up and testing providers please see the BBRO Sugar Beet Maintenance guide for more details (<https://bbro.co.uk/publications/drill-maintenance/>).