Variety Selection

Key Points:

▶ Using key information from the BBRO Recommended List is essential to help you make your variety choice.

▶ Select varieties with specific traits you require (these include bolting/BCN, Rhizomania and herbicide tolerance as well as partial tolerance to virus.

▶ Use variety ratings on foliar diseases to help make tactical selection in cases of high disease pressure and late harvesting situations.

As well as the RL trials, BBRO has its own variety trials programme assessing variety interactions with factors such as; disease, fungicide, virus and harvesting date. Results will be accessible via the BBRO website.

When deciding on a variety, a good place to start is with what you grew last season. What grew well on different soil types, establishment rates, early canopy vigour and the level of foliage disease and yield at different harvest dates. If you are not sure, aim to mark-out varieties in the field and monitor their performance this year and use our selection criteria on page 10.

Variety traits and selection

When selecting which variety to grow there is an increasing range of genetic traits to consider. This information can be found in the Recommended List of sugar beet varieties on the BBRO website.

Making sure you select the right variety for a given field or block of land is an important tactical decision and will have an impact on your final yield. Whilst root yield, sugar content and bolting are the key characteristics, other pest and disease traits are just as important, especially as changing weather patterns and loss of pesticide options makes their control more challenging.

Traits are briefly summarised as follows along with a decision-making chart. BBRO has a large programme of on-going work assessing additional variety traits. This includes virus yellows, BCN, drought and harvest date suitability.

Bolting

Sugar beet is a biennial plant that will only become reproductive (i.e. produce a flower, or as it is usually referred to in beet "a bolter") once it has been exposed to low, vernalising temperatures (for bolting) and long days (for seed production). Temperatures between 3 and 12°C are the critical temperatures for vernalisation, with temperatures in the mid-range having greatest effect and those towards 12°C the least. As a rule-of-thumb around 40 days of vernalisation (where temperatures during the 24 hours are within this range) are required for beet to bolt. Vernalisation can start before the beet emerge; therefore, depth of drilling can have an effect on bolting. In some instances, high temperatures immediately after a cool vernalising day can neutralise this (devernalisation).

Early sown bolting (ESB) trials are sown separately to the main RL trials and are drilled sequentially from the last week of February to the 5th of March. The ESB figures are the number of bolters recorded from these earlier sowings for the last three years and should be used as a guide to compare varieties by growers sowing early and / or where high vernalisation (periods of cold) is expected.

Vernalisation data is provided in the supplementary table of the RL data on the BBRO website.

Establishment

Growers can use the establishment figures when calculating the seed rate required to produce their target plant population. In practice, the differences recorded between current varieties in trials are relatively small and those less than 3.4% are not statistically significant in the 2022 RL. In addition, growers need to consider that 'establishment' will vary between years (typically in the range 84 to 90%).

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6

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AYPR strain of rhizomania

Since 2007, some AYPR rhizomania strains have been identified at a few sites which continue to be monitored and breeders have developed varieties with enhanced resistance genes to the AYPR strains found at these sites. Yields of the AYPR varieties are determined in the normal RL trials, which are carried out in non-infested situations.

BCN

Beet cyst nematode (BCN) tolerant varieties are listed for use under BCN infested conditions but have yields suitable for use in non-infested fields.
The traits are currently based upon breeders' submissions the BCN varieties could be listed as resistant, tolerant or light tolerant to BCN infection. Only tolerant types are currently listed and marketed. These types can produce higher yields than conventional varieties under these conditions and cause lower multiplication of the nematode population compared to conventional varieties.

Foliar Disease

The current foliar disease data do not indicate tolerance or resistance, but simply leaf infection. The data in the RL table are ratings for Powdery mildew and Rust whilst those in the supplementary table are recorded as percentage leaf infection, including Cercospora.

Variety testing now include untreated and fungicide-treated trials to show the varietal performance under the natural infection of diseases. There are seasonal variations These results should be treated with reserve as the data tends to be variable. The three-year data table therefore provides a broader perspective on disease susceptibility.

Photo (above) Early signs of Cercospora

Definitions of susceptibility to pathogens

Susceptible: A variety that becomes infected by a pathogen and shows full symptoms of the disease; significant yield penalties may result.

Tolerant — A variety that is infected by a pathogen to the same extent as a susceptible variety, but expresses little or no symptoms.

Partially-resistant — A variety that is infected by a pathogen, but the pathogen is inhibited in its movement or multiplication.

Complete resistance (immunity) — A variety that is not affected by the pathogen at all.

Multiple resistance — Inclusion of more than one resistance genes to protect against different pests and/or diseases.

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8

Variety traits and selection

ALS herbicide tolerance

The RL includes varieties that are tolerant to specific ALS herbicides (Conviso). The herbicides for use with these varieties were approved by HSE in March 2019 and were available for the 2020 growing season. In the RL trials these varieties were treated with conventional herbicides. It is expected that they will have higher yields when treated with the ALS rather than conventional herbicides. More details of the use of these varieties, including performance when treated with ALS herbicides, are available from the breeder.

Impurities

Impurities of the beet from each yield plot are measured in the tarehouse at Wissington at the same time as sugar content. The measurements use the current industry standard systems used for the commercial crop. These data are provided for information but at present there is no significant difference in impurities between the RL varieties.

Virus Yellows tolerance

Tolerance to any of the three yellowing viruses is not assessed in the RL trials although there are on-going BBRO trials to assess variety susceptivity to virus. The decision on whether to list a such a variety is currently based on breeder's claims. In the case of Maruscha KWS, this has partial tolerance to beet mild yellowing virus.

Guide to variety selection choices

STEP 1: Variety selection
Do you want to select for a specialist trait?

| AYPR resistance | BCN tolerance | CONVISO SMART (ALS herbicide tolerance) | VIRUS Partial tolerance to Beet Mild Yellowing Virus |

STEP 2: Select for drilling date
It is useful to have a variety that is suitable for early drilling when soil conditions allow an early start. If you don't have a suitable variety, use the bolter scores as a guide and aim to plant varieties with higher incidence of bolters last

EARLY before mid-March ⟷ Normal drilling
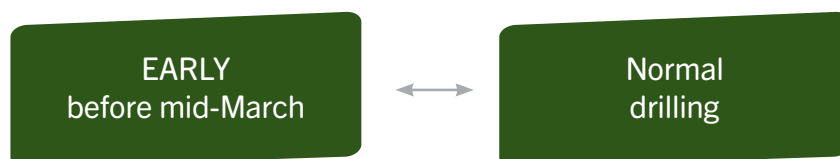
STEP 3: Variety selection
Select for yield and refine your trait selection according to specific field and farm conditions

Sugar Content
This can range from 16.5% – 18.0% . You may want to consider targeting higher sugar content varieties in fields which are likely to be harvested early and/or on land where there is a history of low sugar levels

Plant Establishment
Few significant differences between most varieties and usually a strong seasonal weather effect. It is worth checking the 3-year data sets to ensure you use a variety with consistent good establishment on land where production of a good seedbed is often challenging. Additionally, you can use the establishment figures when calculating the seed rate required to produce their target plant population

Foliar disease susceptibility
This is an important trait for managing foliar diseases, especially on deciding on fungicide programmes and for which varieties to use in higher disease pressure situations such as later harvested crops.
Using the RL 3-year percentage leaf infection values averaged across three diseases (rust, powdery mildew and cercospora) provides a good overall score of foliar disease susceptibility

Canopy vigour and growth habit
Differences in the vigour and growth habit of different varieties can have an agronomic effect. However, differences in growth habit can be specific to soil type and conditions and tend to be more pronounced on lighter and thinner soils compared to more fertile deeper soils.
Limited variety strip trial data shows that varieties with a more low growing habit can help provide better ground cover and weed control.
Varieties with fuller, upright, and more actively growing canopies in late summer (fewer senescing and dead lower leaves) have been linked to better autumn yield production

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10