Trial Title: SBT22-810 Periodic harvest of sugar beet and fungicide interaction

Centre: Morley **Trial Code:** SBT22-810 **Variety:** Wren

Objective: To determine the growth rate and yield benefit of sugar beet treated during the late summer and autumn with and without a triazole and strobilurin fungicide programme

Background: In 1997 a long-term study was initiated at Morley to examine the relationship between yield and lifting date in sugar beet; this is known as the 'periodic lift study'. Between 2007-2018 the monthly comparisons of adjusted yields were carried out either following, or in the absence of, a summer fungicide regime (using triazole based products). For 2019-2023 monthly lift timings have been condensed into 3 timings throughout the campaign (September, November and January).

Summary: In 2022 the programme was based on either a one or two spray programme of Angle (azoxystrobin and difenoconazole), with an additional three-spray programme, including Caligula (fluopyram and prothioconazole) applied late September (Table 1). T1, T2 and T3 fungicides were applied on 28/07/22, 01/09/22 and 26/10/22 respectively. All inputs were as the Morley farm crop with the exception of fungicide applications.

- In 2022 *cv* Wren was drilled on 24/03/22. This variety has moderate disease resistant ratings with 5.2 for rust, 5.2 for powdery mildew and 6.6 for cercospora. Establishment for sugar beet in 2022 was challenging due to the very dry spring. The weather then continued to be unfavourable for sugar beet with the heat wave in the summer which is indicated in the yields with the highest yielding treatment being treatment 5 (T1, November lift) which presented a modest yield of 66.0 adjusted tonnes/hectare compared with the highest yield in 2021 of 109.94.

- This year, following the loss of cyproconazole, the programme was based on Angle (azoxystrobin and difenoconazole) applied at the full dose rate (1.0L/ha) on 28/07/22 and 01/09/22 comparing a one and two spray programme for each lift date plus an untreated. Caligula (fluopyram and prothioconazole) at the full dose rate (1.2L/Ha) was applied on 26/10/22 as a third fungicide only for the last lift date. The lift dates were, 28/09/22, 17/11/22 and 04/01/23.

- At each lift timing the untreated plots were assessed for green leaf area, *Uromyces betae* (rust), *Cercospora beticola* (leaf spot) and *Peronospora farinose* (downy mildew). These are assessed by estimating the total % of each of the total leaf area. In what was generally a low disease year, There was no downy mildew or cercospora recorded. Rust did appear in the autumn with high levels being seen on the untreated plots (20-90%), as expected, lower levels were seen where the treatment was only a T1, and no rust was seen where a T3 was applied until late autumn and the infection levels were low.

- 2022 also saw the appearance of the beet moth (Scrobipalpa ocellatella) which infected large areas of beet in East Anglia. This trial had a large infestation with 88% of plants affected by October, although at this stage of the year, the damage was localised to the crown and the caterpillars soon disappeared allowing some new growth to develop.

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- Figure 1 shows the yield from each lift date for all the treatments. This year, the higher yields came from the November lift, the January lift having suffered from the very cold spell of weather in December 2022. There is no benefit in this particular year from the fungicides within the first two lift dates which is due to the low disease pressure. There does appear to be a benefit of the T2 and T3 programme in the later lift over the T1 programme, but this benefit is not shown when compared to the untreated, so we have to be sceptical of this result and consider the difficult conditions and variability of the crop.

- There is a difference in sugar percentage (Figure 2) with the first lift being significantly higher than the latter two, again, the third lift date this year suffered from the poor weather. There was no difference in the K levels and no difference within the lift dates for NA levels although the untreated in the January lift was somewhat higher than the other treatments. There was a difference in the AN results with the November lift untreated being significantly different to the other treatments within the lift date. This was not repeated in the other lift dates.

Figure 1. Yield shown (t/ha) across three lifting dates v fungicide treatments.

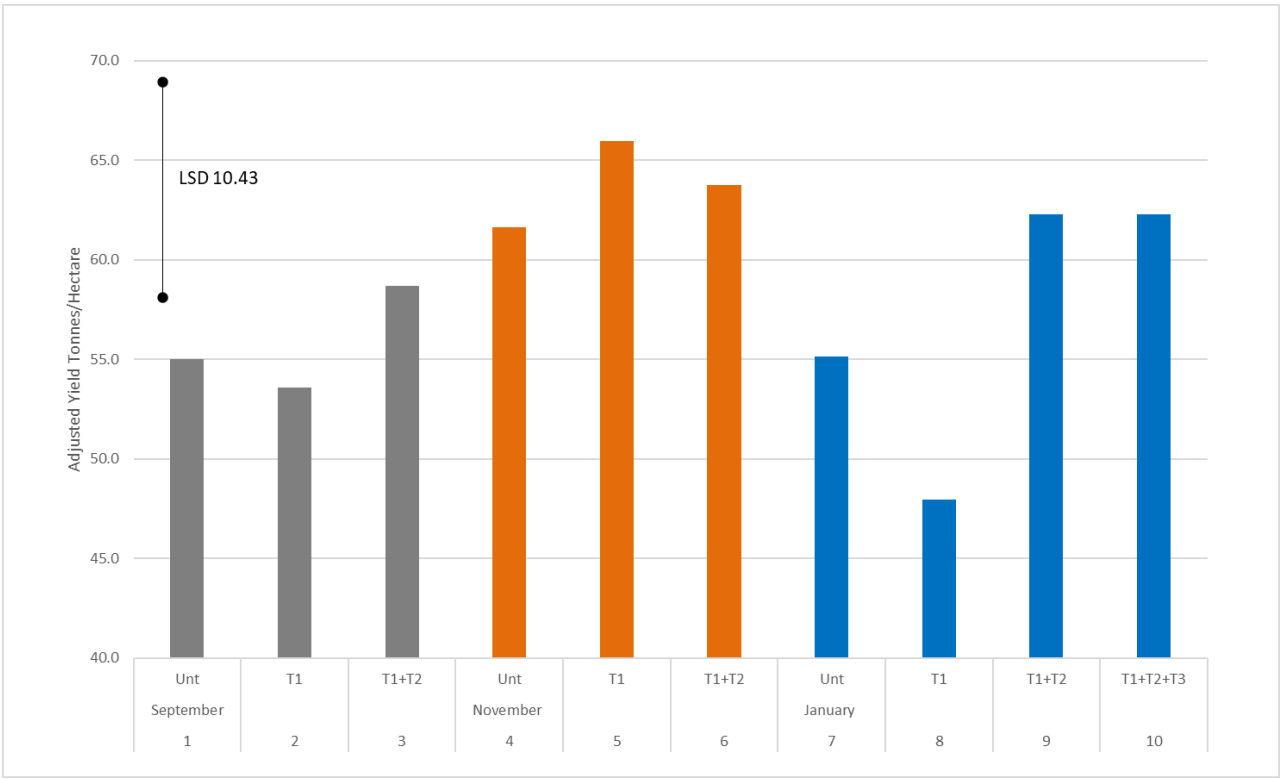

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Figure 2. Percentage sugar across three lifting dates v fungicide treatments.

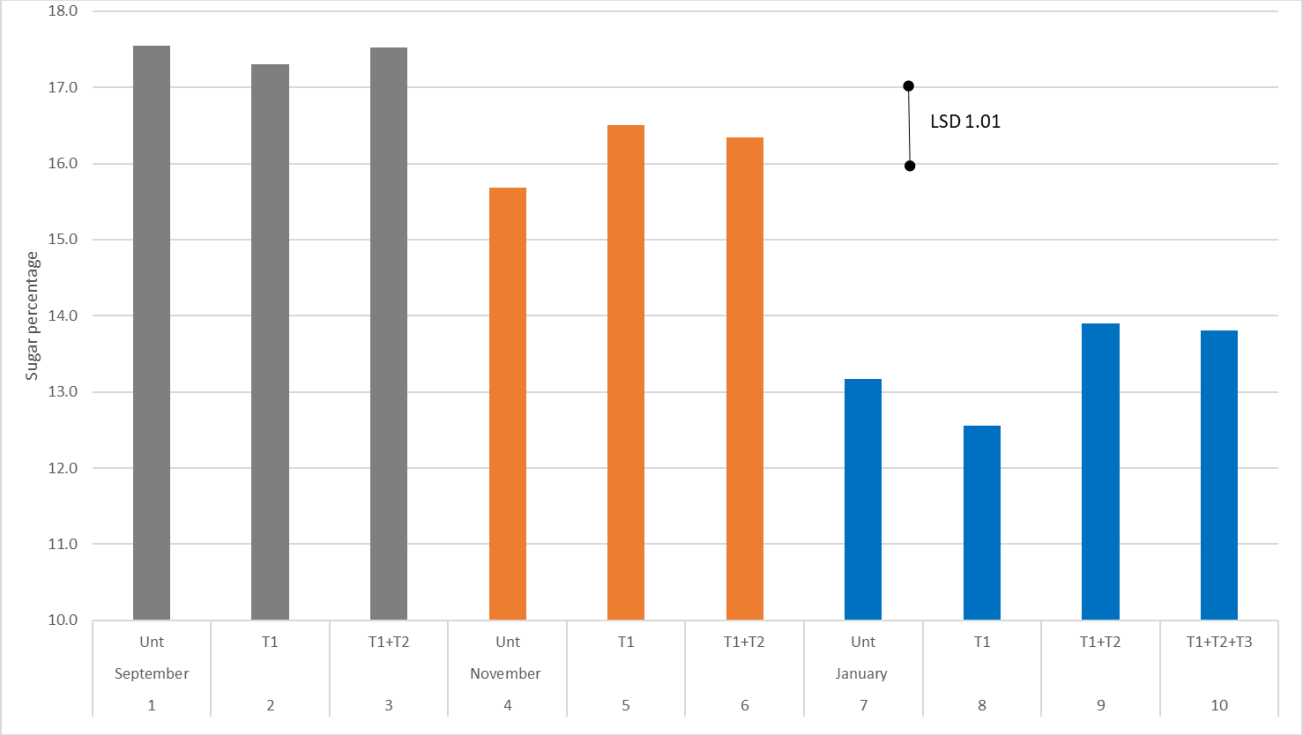

Table 1. Treatment List

TRT	Treatments T1	Treatments T2	Treatments T3	Lift dates
	Mid July	Mid August (4 week interval)	Late September (6 week interval)	***Third Week of (or as close to)***
1	-	-	-	September
2	Angle @ 1.0 l/ha	-	-	September (One spray programme)
3	Angle @ 1.0 l/ha	Angle @ 1.0 l/ha	-	September (Two spray programme)
4	-	-	-	November
5	Angle @ 1.0 l/ha	-	-	November (One spray programme)
6	Angle @ 1.0 l/ha	Angle @ 1.0 l/ha	-	November (Two spray programme)
7	-	-	-	January
8	Angle @ 1.0 l/ha	-	-	January (One spray programme)
9	Angle @ 1.0 l/ha	Angle @ 1.0 l/ha	-	January (Two spray programme)
10	Angle @ 1.0 l/ha	Angle @ 1.0 l/ha	Caligula @ 1.2 l/ha	January (Three spray programme)

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Field details

Trial Code:	SBT22-810
Trial Centre:	Morley
Trial Location:	Morley
Crop:	Sugar Beet
Previous crop:	Winter wheat
Soil type:	Sandy Loam
Total N/ha applied:	91 kgN/ha
Drill date:	24/03/22
Seed rate:	1.1 Unit/ha
Drilled plot size:	3m x 10m
Replicates:	3
Harvest date:	Various as treatments

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