Title: SBT23-820 Periodic harvest of sugar beet and biorepellant interaction

Trial Code: SBT23-820
Centre: Morley
Crop: Sugar Beet
Variety: Stewart
Report author: Nathan Morris

Objective:

To examine the benefit of sugar beet treated with Frass as a biorepellant to reduce aphid transmission of virus yellows.

Background:

In 2023 solid and foliar applications of Frass were applied to sugar beet at Morley to examine claims that the material might act as a biorepellant to insects. Frass is the co-product of farming Black Soldier Flies and contains chitin (14% of frass by weight) which contains nitrogen, phosphorous and potassium as well as iron, calcium, magnesium and zinc. It is suggested that as chitin is also found in insects, plants mistake the high chitin content of frass as a warning of insect attack causing the plants to up-regulate natural defence mechanisms, making them stronger and less palatable to insect pests. It is also suggested that these same mechanisms have effectiveness at reducing plant disease.

Summary:

In 2023, Frass was applied in both solid and liquid forms to sugar beet plants in a randomised block design in addition to a one and two-spray fungicide programme of Angle, (fluopyram and prothioconazole). The solid Frass was applied on 12/05/23 and the foliar application on 07/07/23. The fungicide treatments were applied on 17/07/23 and 23/08/23. All the plots were harvested on January 9 2024.

Treatments:

Treatment	Treatments T1	Treatments T2	Frass	Lift date
Timing	Mid-July	Mid-August (4 week interval)	Post drilling (solid) June (suspension)	January
1	-	-	-	January
2	-	-	Suspension (applied at 20kg/ha)	January
3	-	-	Solid (applied at 1 t/ha)	January
4	Angle @ 1.0 l/ha	-	-	January
5	Angle @ 1.0 l/ha	-	Suspension (applied at 20kg/ha)	January
6	Angle @ 1.0 l/ha	-	Solid (applied at 1 t/ha)	January
7	Angle @ 1.0 l/ha	Angle @ 1.0 l/ha	-	January
8	Angle @ 1.0 l/ha	Angle @ 1.0 l/ha	Suspension (applied at 20kg/ha)	January
9	Angle @ 1.0 l/ha	Angle @ 1.0 l/ha	Solid (applied at 1 t/ha)	January

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Results

In 2023 *cv* Stewart was drilled on 07/04/23. Establishment for sugar beet in 2023 was challenging due to the very dry spring. The weather then settled into being changeable with fortunately the lack of heatwave of the previous year.

All other inputs were as the Morley farm crop with the exception of fungicide and Frass applications.

Figure 1 (below) shows the yield for all the treatments. The untreated rep yielded significantly less than all the other treatments, however, there were no significant differences between the treatments. The highest yield came from the rep with T1 and T2 fungicides and no Frass although there was a trend for higher yields from the T1 fungicide application where the frass was applied both in suspension or solid.

The highest sugar percentage came from the T1 fungicide-only rep which corresponds with the lower root yield but there were no significant differences between any of the treatments.

There was very little virus yellows present this year, so it was not possible to compare treatments.

Figure 1. Yield (adjusted tonnes/ha) shown across nine treatments.

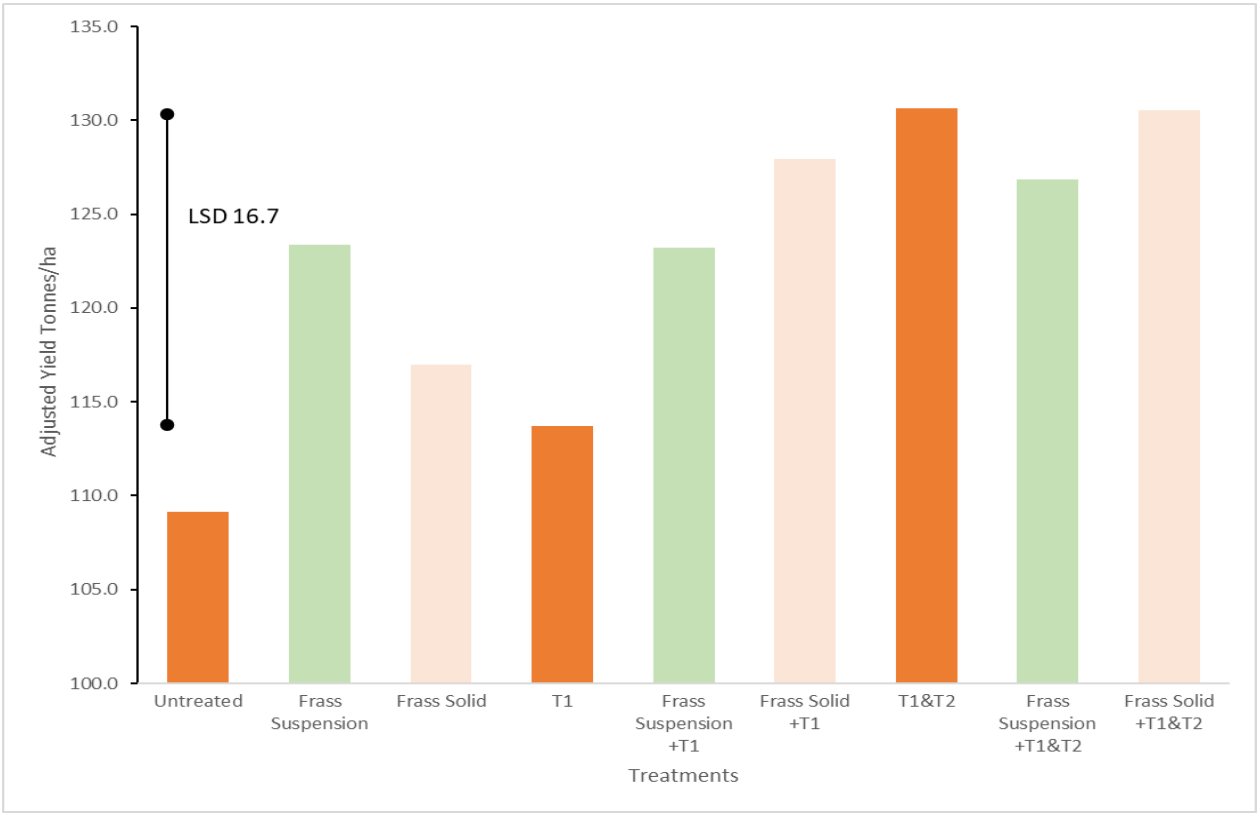

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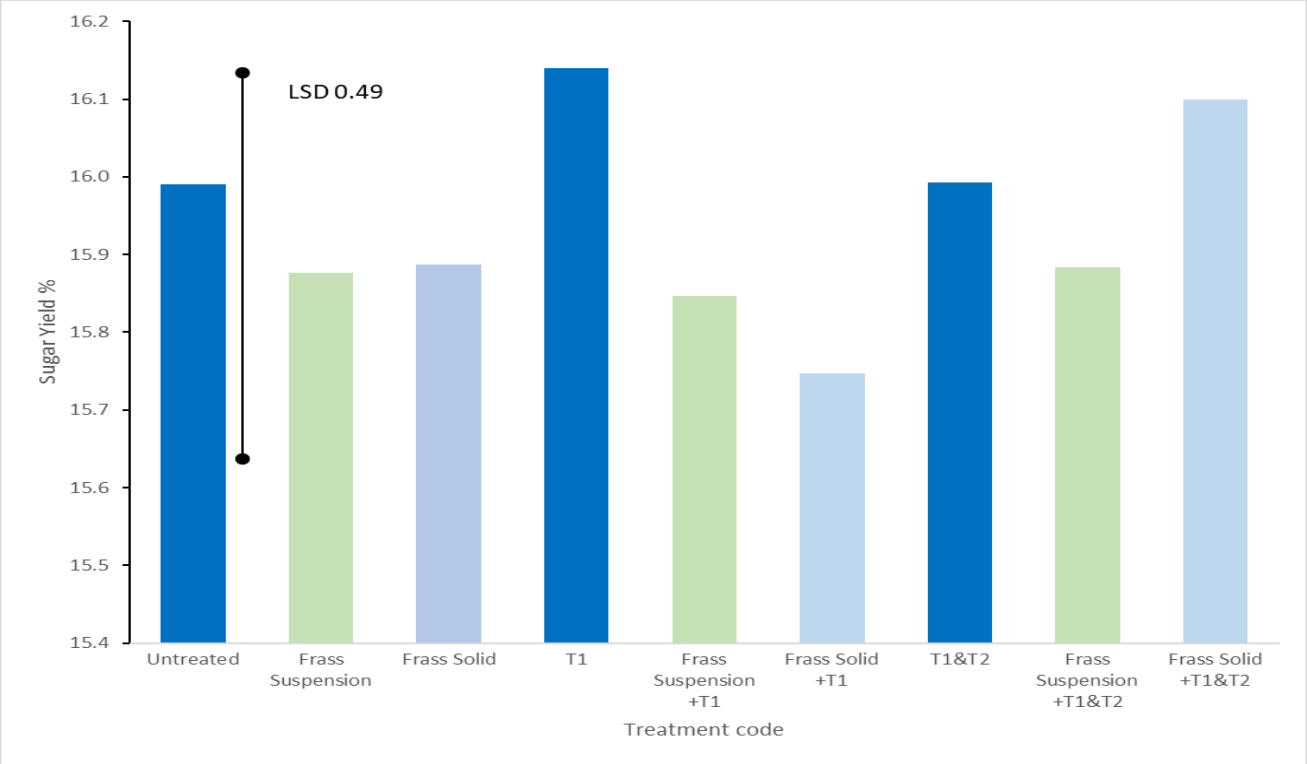
Figure 2. Percentage sugar across nine treatments.



Appendix

Field details

Trial Code	SBT23-820
Trial Centre	Morley
Trial Location	Morley
Crop	Sugar beet
Previous Crop	Winter rye
Soil Texture	Sandy loam
Soil Series	Ashley series
Soil Analysis	N/A
Soil Mineral Nitrogen	N/A
Total N/ha applied	120 kg N/ha
Drill Date	07/04/23
Seed Rate	1.2 Unit/ha
Drilled Plot Dimensions	3m x 10m (farm crop)
Replicates	3
Harvest Date	Various (as treatments)

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