Rewards of Early Sown Canola at Xantippe

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Key Messages

- All six early sown canola varieties were higher yielding than all later sown ones.
- As expected, Emu and Battalion flowered much earlier than 44Y27, Invigor 4022P, R4520P and GT53, especially when they were sown early.
- 44Y27 sown early had the longest flowering and was the highest yielding variety in this trial.

Aim

To evaluate and demonstrate the benefits of very early sowing of canola.

Background

A tropical cyclone system (Charlotte) from 26-30 March 2022 brought significant rainfall to the region, with 114mm falling over a 3 day period in the Dalwallinu region. These weather events may be becoming more common as changes to climate see more late tropical low systems coming through further south and as such providing a non-traditional season break.

A small plot trial was implemented in Xantippe to support grower decision-making when presented with early sowing canola opportunities such as this. The first time of sowing (TOS1) treatment was sown on the 5th April 2022. The second time of sowing treatment (TOS2) was sown on the 6th May 2022.

The following varieties were used in the trial:

- Emu is an early-maturing (3) Glyphosate tolerant hybrid canola with TruFlex® (TF)
- Battalion is an early-maturing (3.5) Glyphosate tolerant hybrid TruFlex® canola with Clearfield® tolerance. (TF+CL)
- Pioneer 44Y27 is an early-mid (4) maturing Glyphosate tolerant hybrid canola. (RR)
- Invigor R4022P is an early-mid (4) maturing Glyphosate tolerant hybrid canola with TruFlex®. (TF)
- Invigor R4520P is an early-mid (4.5) maturing Glyphosate tolerant hybrid canola with TruFlex®. (TF)
- GT53 is a mid-maturing (5) Glyphosate tolerant hybrid canola. (RR)

Trial Details

Trial Location	Todd Carter property, Xantippe
Plot size & replication	1.5 m x 10.15 m, 6 varieties x 3 replications
Soil type	Sandy loam
Paddock rotation	2021: Wheat, 2020: Lupin 2019: Wheat
Sowing date	TOS1: 05/04/2022, TOS2: 06/05/2022
Sowing rate	7.8 kg/ha
Fertiliser	5/4/2022: 70 kg/ha Urea 100 kg/ha Macropro Xtra 23/6/22: 60L/ha Flexi N
Herbicides, Insecticides & Fungicides	5/4/2022: 2 L/ha Roundup Ultramax, 1 L/ha Rustler 100 g/ha Lontrel 750SG 800 mL/ha chlorpyrifos 150 mL/ha Bifenthrin 400 ml/ha Flutriafol on fert 15/4/22:

	1L/ha Crucial 50ml/ha Alpha Cypermethrin 250SC 21/5/22 1/5L/ha Crucial 50ml/ha Alpha Cypermethrin 100EC 10/09/2022: 100g/ha Mainman 150ml/ha Affirm
Harvest Date	TOS1: 19/10/2022, TOS2: 07/11/2022

Growing Season Conditions

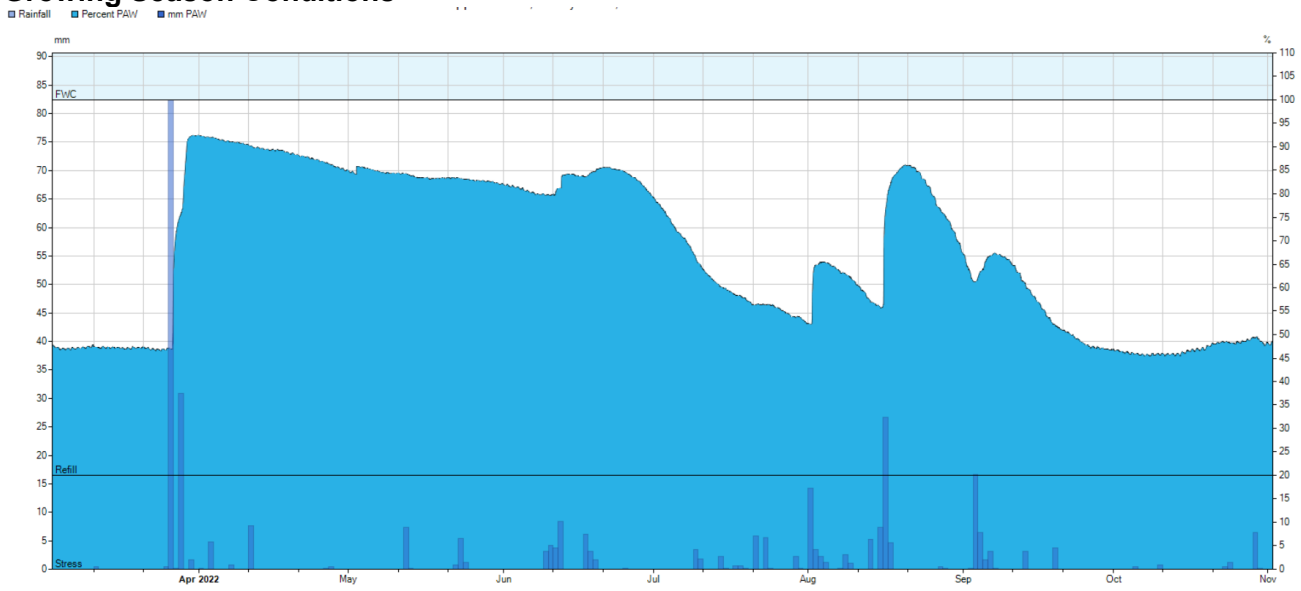

Figure 1. Rainfall and plant available moisture at Xantippe between 1 March and 1 November 2022.

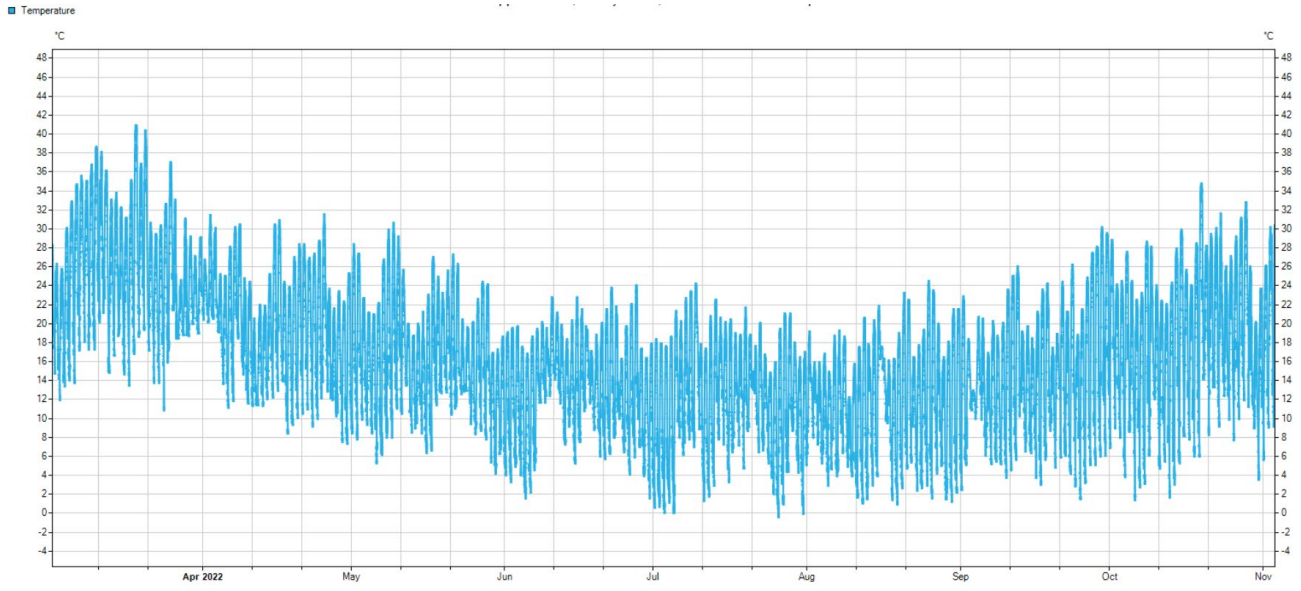

Figure 2. Daily temperature at Xantippe between 1 March and 1 November

Results

Overall establishment was lower for TOS1, possibly due to higher temperatures, however the difference in plant counts was less apparent as the season progressed. The plant establishment was greatest for Battalion and R4520P for the early-sown (TOS1) varieties (Figure 3). Amongst the later sown (TOS2) varieties, Battalion, R4520P, and 44Y27 had the greatest establishment (Figure 4).

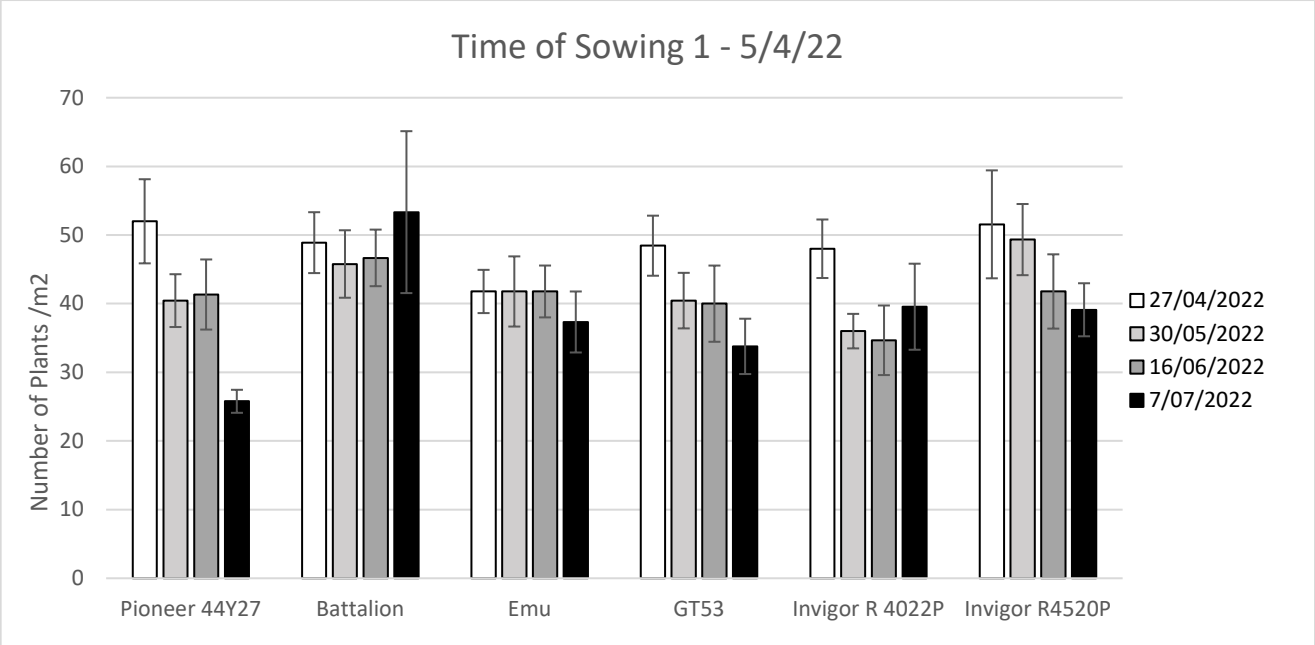

Figure 3. The crop establishment of six early sown canola (TOS1) varieties measured between 27 April and 7 July 2022 at Xantippe. Error bars represent ± SEM

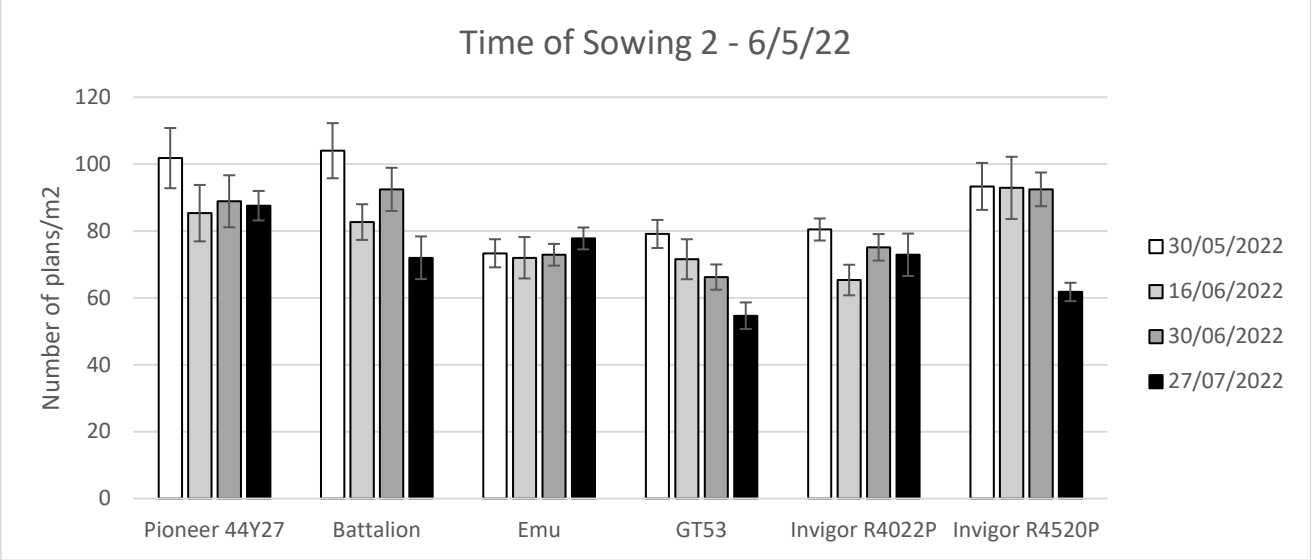

Figure 4. The crop establishment of six canola (TOS2) varieties measured between 30 May and 27 July 2022 at Xantippe. Error bars represent ± SEM

General observations on weed and pest numbers were made throughout the season. The main weeds noted were wild radish and annual ryegrass whilst bromegrass and capeweed were less common. Generally, TOS2 had more weeds. Some mice damage was noted and the whole paddock was baited on 4th May. Diamond Black Moths were noted on 30 May and chewing damage was observed on 16 June. The entire paddock was sprayed with insecticide on the 10th September.

The flowering phenology (% of flowering plants) was recorded weekly from 1 June 2022 until 28 September 2022. Emu and Battalion started flowering in late May and were in full flower earlier than

any other variety for TOS1 (Figure 5). The phenological differences were less pronounced between the varieties for TOS2 (Figure 6).

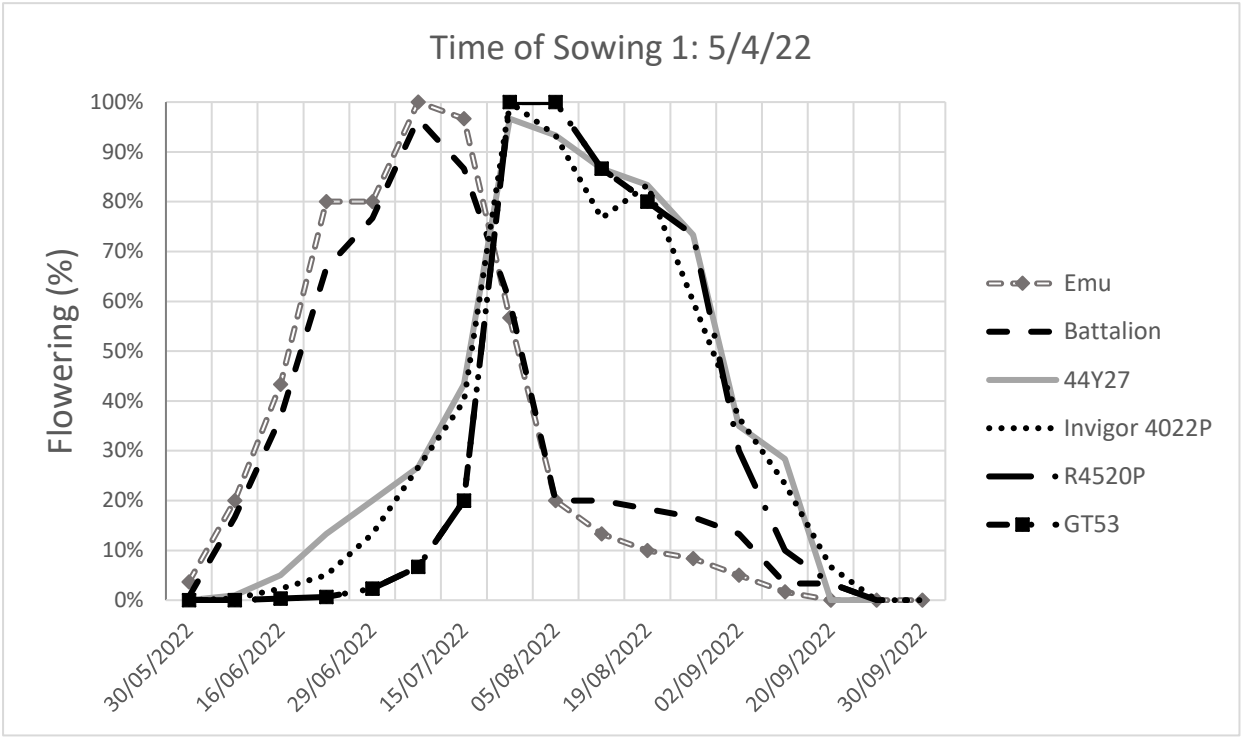

Figure 5. The flowering phenology of early sown (TOS1) six canola varieties differed. Emu and Battalion varieties were in full flower much earlier than GT53, Invigor 4022P and R450P. The ^{ab} represents statistical difference ($P<0.05$) according to the two-way ANOVA test and Least Significance Test posthoc test.

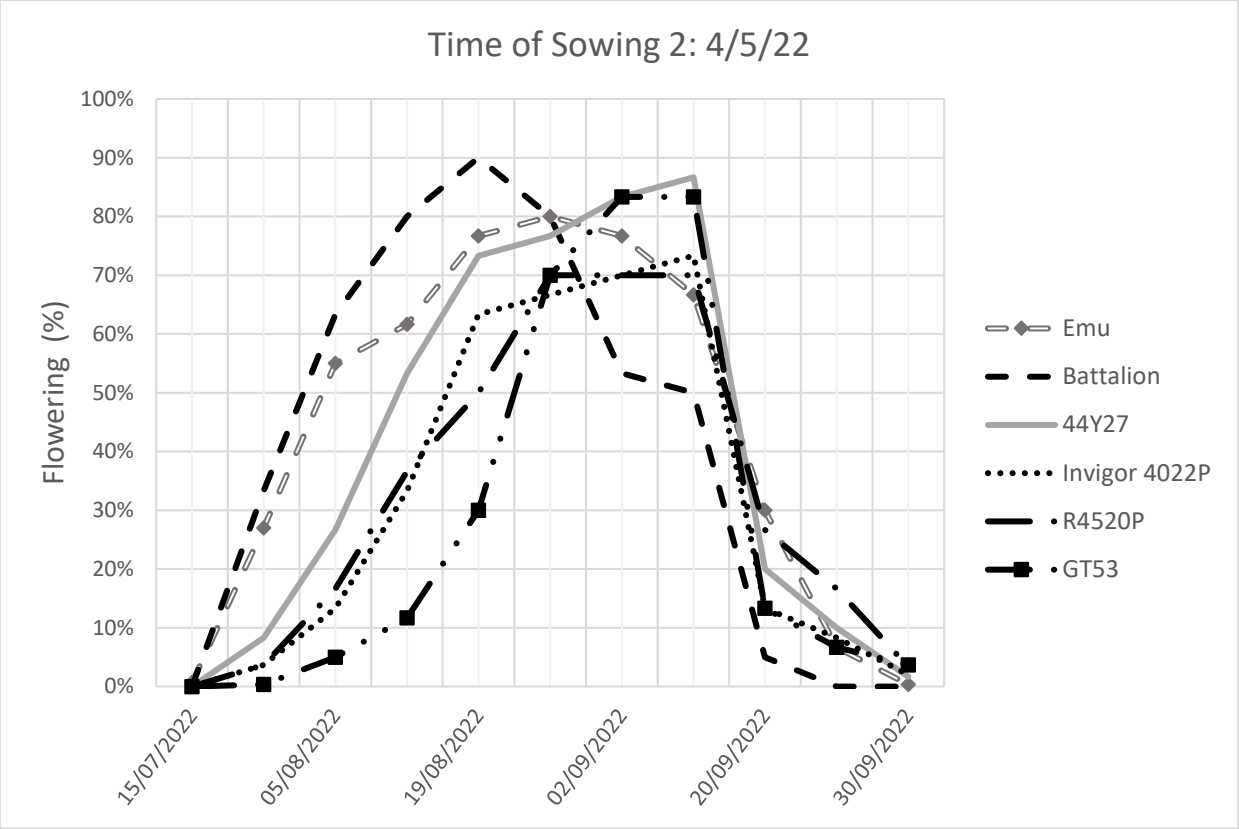

Figure 6. The difference in flowering phenology was less pronounced between the later sowing (TOS2) in comparison to TOS1. Emu, Battalion, and 44Y27 flowered statistically at a different time compared to GT53, Invigor 4022P, and R4520P. The ^{ab} represents statistical difference ($P<0.05$) according to the two-way ANOVA test and Least Significance Test posthoc test.

All varieties were higher yielding at TOS1 than TOS2. At TOS1, 44Y27 yielded the highest and had the longest flowering time. GT51 was the second highest yielding, despite being later to start

flowering and earlier to finish flowering than 44Y27.44Y27 flowered for approximately 49 days in TOS1, compared to GT53 which flowered for approximately 39 days (25%-75% flowering).

In TOS2 there was no difference in yields between varieties.

Table 2. Yield and quality analysis of Canola sown at 2 times at Xantippe 2022. The [ab] represents statistical difference (P<0.05) according to the one-way ANOVA test and Least Significance Test posthoc test.

Variety	Yield (t/ha)	Protein	Moisture	Oil	Large admix (%)	Admix (%)
Time of Sowing 1 - 5/4/22						
44Y27	3.02[a]	19.87	5.47	46.80	0.49	1.01
GT53	2.93[ab]	18.50	5.60	45.00	0.35	0.72
Battalion	2.63[bc]	21.00	5.20	46.23	0.37	1.17
Emu	2.60[bcd]	22.77	5.10	46.60	0.55	1.41
Invigor_4022P	2.50[cd]	19.30	5.37	47.83	0.46	0.85
R4520P	2.41[cd]	20.67	6.23	44.13	1.16	1.72
Time of Sowing 2 - 6/5/22						
GT53	1.86[a]	19.83	5.00	46.83	0.48	0.66
R4520P	1.83[a]	19.95	5.35	46.25	0.47	0.80
Battalion	1.82[ab]	19.90	5.30	46.47	0.41	0.55
44Y27	1.80[ab]	19.67	5.20	46.07	0.36	0.70
Emu	1.78[ab]	20.80	5.15	47.40	0.46	0.96
Invigor_4022P	1.64[b]	20.77	5.13	45.70	0.35	0.67

Comments

Yield data in this trial suggests that sowing any variety in early April would have outperformed any variety sown in early May.

Straight thermal varieties like Emu flowered significantly earlier in TOS1 when compared to TOS2. This is due to quicker accumulation of temperature when sown earlier into a warmer environment. Thermal varieties require a set number of degree days for growth, whilst other lines require vernalisation. Canola varieties have a varying degree of thermal and vernalisation requirements, and their phenology adjusts accordingly.

The nearby weather station & moisture probe showed quite a few cooler days at the beginning of June, July, and the end of August (Figure 2). Plant available water dipped in mid-July and was variable over August (Figure 1).

There was a seeding rate calculation error made at TOS1 and it was sown at nearly 8kg/ha. This rate would have been expected to produce plant counts much higher than what was measured, so it is likely that there was some plant mortality as a result of higher temperatures at the start of April. The decision was made to sow TOS2 at the same higher rate for the sake of experimental consistency. This returned higher plant counts than TOS1, suggesting less plant mortality with slightly lower temperatures at TOS2 than TOS1. Potentially, the higher plant count had an impact on the final yields of TOS2.

Furthermore, a calculation error led to extra N fertilizer being applied to Rep 1. This did not appear to have any influence on yield or quality, suggesting nutrition was adequate for this site.

The Liebe Group will be implementing this trial again in 2023 if an early rainfall event occurs.

An in-season field walk was held on 22 June 2022 to view both the early sown canola trial as well as Jackie Bucat's co-located DPIRD trial on canopy management. This had great attendance of 17 people participating in the afternoon session in the paddock.

Acknowledgments
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Peer review
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