

Final Technical Results Report

Investigating late winter and early spring cereal cropping opportunities for grain growers following autumn waterlogging – South-Western Australia

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REPORT SENSITIVITY

Does the report have any of the following sensitivities?

Intended for journal publication	YES ☐ NO ☒
Results are incomplete	YES ☐ NO ☒
Commercial/IP concerns	YES ☐ NO ☒

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ABSTRACT

The South Coast grain growing region of Western Australia is prone to waterlogging events that severely impact grain production.

This one-year investment aimed to provide growers and advisers along the South Coast of WA with greater confidence to make decisions on whether to sow a cereal crop later in the growing season (late winter, early spring) after crop failure, or inability to seed, due to early season waterlogging. It also aimed to provide some data on what varieties and nitrogen fertiliser strategies might be required for later sown crops.

Four small plot trials, with similar treatments and trial designs, were implemented along the South Coast of WA in 2022. Two of these were located in the Albany Port Zone (Green Range and Needilup) and two in the Esperance Port Zone (Munglinup and Condingup). Each trial site included:

- Three times of sowing (late August, mid-September, Late-September)
- Two wheat (Vixen and Scepter) and three barley varieties (Maximus, Planet and Rosalind)
- Two nitrogen treatments (High - 80 units of nitrogen, Low - 40 units of nitrogen)

The trials implemented demonstrated that crops can be successfully established in late winter and early spring when conditions are favourable, with barley yields as high as 7 t/ha harvested at the Munglinup trial site with a late-August sowing date. The trial data also showed that main season and shorter season varieties, for the most part, yielded similar to each other. Results relating to nitrogen treatments were variable, most likely due to the 'all up front' application and the leaching that occurred due to above-average rainfall received.

EXECUTIVE SUMMARY

Background

The South Coast grain growing region of Western Australia is prone to waterlogging events that severely impact grain production. Waterlogging can reduce wheat yields in this region by up to 37% (Zhang et al, 2004). In the Albany Port Zone in 2021 and Esperance Port Zone in 2021 and 2022, large areas of crops remained unplanted well into July and August. This was due to crop failure or highly waterlogged soils making the paddocks non-trafficable for seeding machinery/equipment.

This one-year investment aimed to provide growers and advisers along the South Coast of WA with greater confidence to make decisions on whether to sow a cereal crop later in the growing season (late winter, early spring) after crop failure, or inability to seed, due to early season waterlogging. It also aimed to provide some data on what varieties and nitrogen fertiliser strategies might be required for later sown crops.

Methodology

Four small plot trials, with similar treatments and trial designs, were implemented along the South Coast of WA in 2022. Two of these were located in the Albany Port Zone (Green Range and Needilup) and two in the Esperance Port Zone (Munglinup and Condingup). Each trial site included:

- Three times of sowing (late August, mid-September, Late-September)
- Two wheat (Vixen and Scepter) and three barley varieties (Maximus, Planet and Rosalind)
- Two nitrogen treatments (High - 80 units of nitrogen, Low - 40 units of nitrogen)

The trials sown by experienced trial providers and were monitored throughout the growing season. Measurements for each treatment across each time of sowing included:

- Plant establishment (plants/m²)
- Growth stages
- Harvest yield (t/ha)
- Grain protein (%)

Results & Discussion

The trials implemented at Green Range, Needilup, Munglinup and Condingup demonstrated that crops can be successfully established in late winter and early spring when conditions are favourable. The wet weather conditions along the South Coast in 2022 meant that each time of sowing at each site was seeded at, or close to, field capacity.

Table 1 gives an overall summary of the outstanding yields received for the first time of sowing and a percentage of this yield achieved for the subsequent sowing dates, which were also good.

Table 1: The table shows percentage of TOS 1 yield achieved in the subsequent sowing dates for each trial site.

Crop type & location	TOS 1 Yield	TOS2 as a % of TOS 1 Yield	TOS 3 as a % of TOS 1 Yield
Green Range Barley	4.74	69.6%	46.5%
Green Range Wheat	5.22	72.7%	55.7%
Needilup Barley	2.67	99.04	81.85%
Needilup Wheat	2.87	96.3%	74.85%
Condingup Barley	7.019	78.16%	64.68%
Condingup Wheat	5.205	108.5%	90.30%
Munglinup Barley	6.616	72.90%	52.15%
Munglinup Wheat	5.99	64.86%	34.22%

In regard to variety selection, given the soft, cool finish (except perhaps at the Needilup site), the main season varieties yielded mostly on par with the short season varieties. At the drier and warmer Needilup site, it was much the same story with yields for each time of sowing across all the varieties within 0.5 t/ha of each other. This gives growers further confidence to seed the typically 'on-hand' main season cereal varieties, rather than especially purchasing a short-season variety for a winter/spring seeding. Interestingly, the wheat yielded slightly higher at the Green Range and Needilup sites and the barley yielded better in the Munglinup and Condingup trial sites.

The yield and grain protein data from the high and low nitrogen fertiliser regimes was highly variable, with only a slight positive grain protein trend detected at the Condingup site in response to a higher nitrogen fertiliser rate. The overall lack of response may have been a result of the nitrogen being applied all up-front (at seeding). Given the rainfall that fell between August and December across all sites, much of this may have leached before uptake by plants. It makes the case for split nitrogen applications (particularly in wetter conditions).

Although this investment was extremely successful, there are still some questions around the viability of late sown crops in less favourable conditions i.e., how would they perform with a hotter, drier finish. There are also grower questions around better understanding nutritional requirements, with a split application of nitrogen potentially having a greater impact on yield and grain protein compared the 'all nitrogen up-front' strategy.

Conclusion

The trial sites implemented as part of this project have demonstrated the adaptability of cereal cropping systems along the South Coast of WA. The data gathered from each trial site shows that seeding cereals in late-winter and/or early spring was profitable in the favourable conditions of 2022. This positive result delivers on the GRDC outcome by giving growers and advisers further confidence in late sowing decisions where early season waterlogging has occurred and autumn sowing was not possible (or autumn sown crops failed).

BACKGROUND

The South Coast grain growing region of Western Australia is prone to waterlogging events that severely impact grain production. Waterlogging can reduce wheat yields in this region by up to 37% (Zhang et al, 2004). In the Albany Port Zone in 2021 and Esperance Port Zone in 2021 and 2022, large areas of crops remained unplanted well into July and August. This was due to crop failure or highly waterlogged soils making the paddocks non-trafficable for seeding machinery/equipment.

This was a grower-led investment, whereby growers wanted to know more about the viability of seeding cereal crops in late winter and into early spring. At the commencement of this investment, there was no publicly available data on late sowing of wheat and barley for growers to reference to assist them in deciding a) what to plant in these situations and b) how late they could (profitably) seed. According to Esperance consultant Quentin Knight, some Esperance growers would face this scenario once every five years due to their proximity to the coast and shallow duplex soils, which are prone to waterlogging. He recommended that an independent data set showing the yield potential of the main season wheat and barley varieties compared to shorter season varieties would be an extremely useful tool for growers and advisors. By comparing the two, it would help farmers to confidently decide whether to seed grain on hand (typically main season) or go to the effort to purchase shorter season varieties.

This investment also included varying nitrogen treatments. Growers were keen to also understand the nitrogen nutrition requirements of later sown crops. It was estimated that yields would be somewhat lower than earlier sown cereal crops due to a shorter growing season length.

Four small plot trials (with similar experimental design) were implemented along the South Coast of WA in 2022, two in the Albany Port Zone and two in the Esperance Port Zone. Each trial included three different times of sowing, two wheat and three barley varieties, and two nitrogen treatments. This has generated an initial dataset from four distinct environments from which growers and advisors can reference for years to come.

PROJECT OBJECTIVES

This one-year investment aimed to provide growers and advisers along the South Coast of WA with greater confidence to make decisions on whether to sow a cereal crop later in the growing season (late winter, early spring) after crop failure, or inability to seed, due to early season waterlogging. It also aimed to provide some data on what varieties and nitrogen fertiliser strategies might be required for later sown crops.

GRDC Investment outcome:

By June 2023, all Western Region growers and advisers will have access to trial information on late winter to early spring sown cereals (wheat and barley) on the South Coast of WA to assist in making educated decisions to sow at this time when autumn waterlogging presented, and cereal crops cannot be sown at the traditional times.

METHODOLOGY

Four small plot trials, with similar treatments and trial designs, were implemented along the South Coast of WA in 2022. Two of these were located in the Albany Port Zone (Green Range and Needilup) and two in the Esperance Port Zone (Munglinup and Condingup). Each trial site included:

- Three times of sowing (late August, mid-September, Late-September)
- Two wheat (Vixen and Sceptre) and three barley varieties (Maximus, Planet and Rosalind)
- Two nitrogen treatments (High - 80 units of nitrogen, Low - 40 units of nitrogen)

The trials sown by experienced trial providers and were monitored throughout the growing season. Measurements for each treatment across each time of sowing included:

- Plant establishment (plants/m²)
- Growth stages
- Harvest yield (t/ha)
- Grain protein (%)

The trials were each sown in three 'time of sowing' blocks with 12 randomised wheat treatments and 18 randomised barley treatments. This totalled 90 small plots at each site. The trial design is shown in Figure 1.

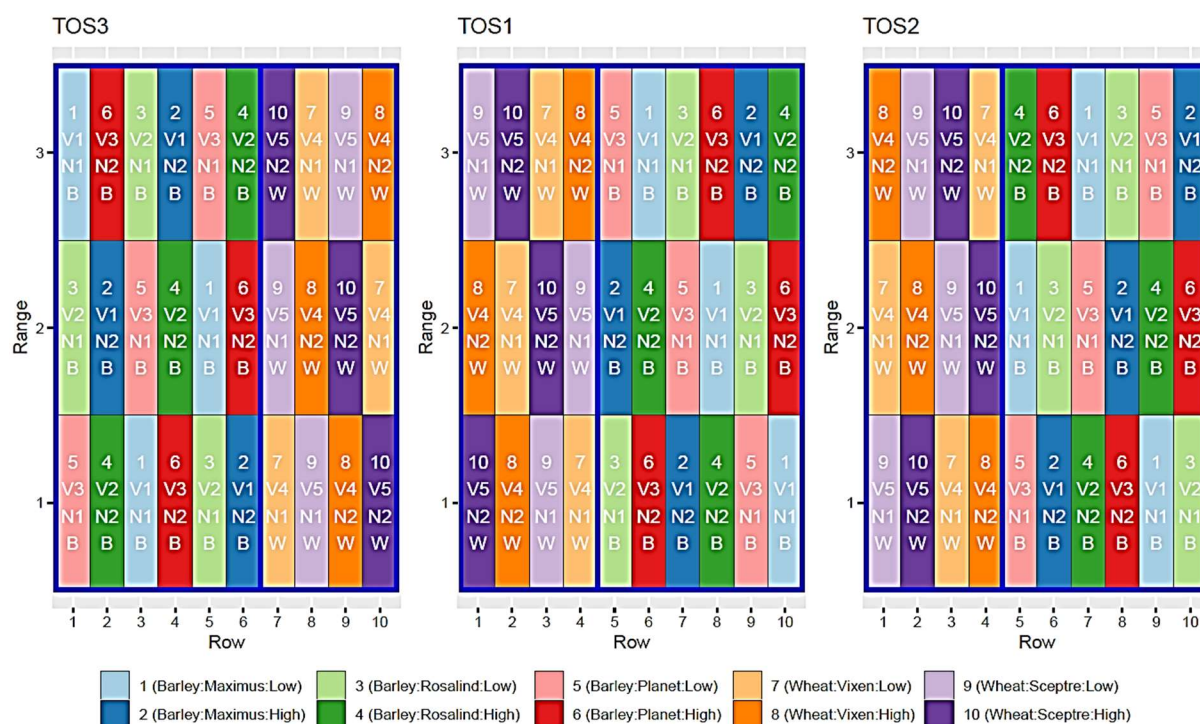


Figure 1: Example of the trial design for each time of sowing.

Statistical Analysis

The trial design was approved by SAGI West. The harvest yield and grain quality results were also analysed by SAGI West and are provided as Appendices to this report.

LOCATION

Site #	Latitude (decimal degrees)	Longitude (decimal degrees)	Nearest town
Trial Site #1	-34.62342	118.39275	Green Range
Trial Site #2	-33.950344	118.707132	Needilup
Trial Site #3	-33.763808	123.07385	Condingup
Trial Site #4	-33.671532	120.8222303	Munglinup

If the research results are applicable to a specific GRDC region/s (e.g. North/South/West) or [GRDC agro-ecological zone/s](#), indicate which in the table below:

Research	Benefiting GRDC region (select up to three)	Benefiting GRDC agro-ecological zone	
Investigating late winter and early spring cereal cropping opportunities for grain growers following autumn waterlogging – South-Western Australia	Western Region Choose an item. Choose an item.	☐ Qld Central ☐ NSW NE/Qld SE ☐ NSW Vic Slopes ☐ Tas Grain ☐ SA Midnorth-Lower Yorke Eyre ☐ WA Northern ☐ WA Eastern ☐ WA Mallee	☐ NSW Central ☐ NSW NW/Qld SW ☐ Vic High Rainfall ☐ SA Vic Mallee ☐ SA Vic Bordertown-Wimmera ☐ WA Central ☒ WA Sandplain

RESULTS

Rainfall

Rainfall received between August 2022 and December 2022 for each of the trial sites was above average (Figure 2). The Condingup site was the wettest, receiving 400mm of rainfall in this period. The Needilup site (further inland) was the driest by more than half, receiving a total of 179mm for this same period.

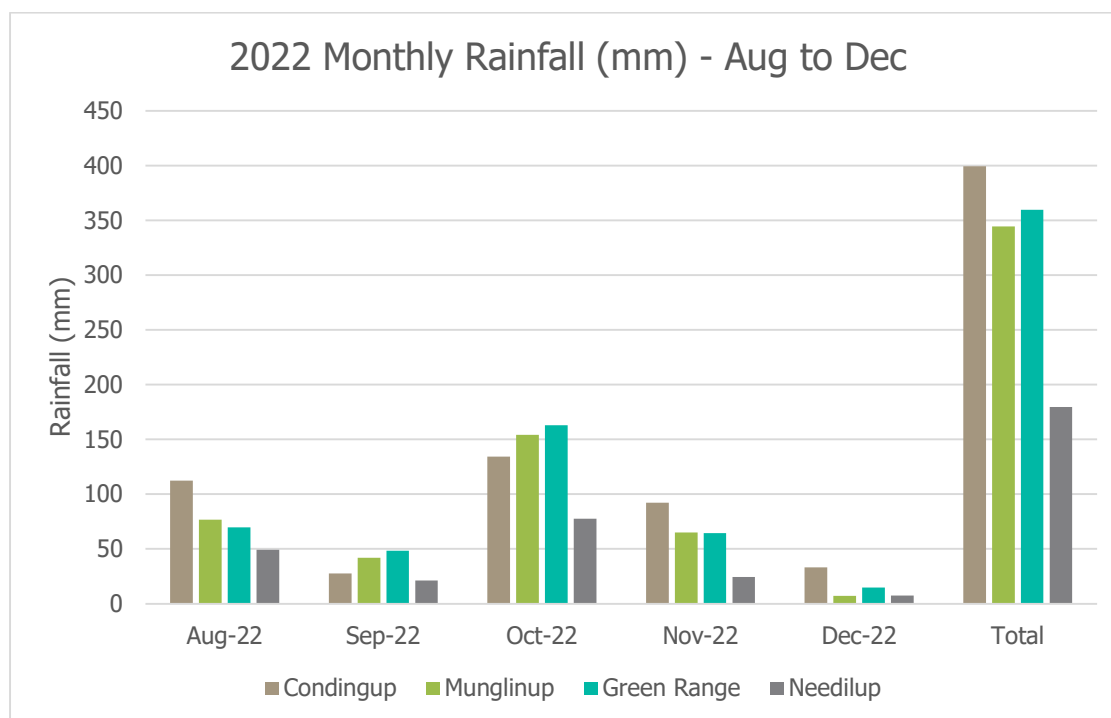


Figure 2: Monthly rainfall at each of the trial sites for the months between August 2022 and December 2022.

Plant Establishment

At the Green Range trial site, plant counts were adequate across all treatments and times of sowing with limited variability (Figure 3). At the Needilup site, although plant counts were good in general, plant counts were noticeably higher in the second time of sowing (Figure 4). At Munglinup, plant counts were generally higher in the third time of sowing treatments (Figure 5), and in reverse for the Condingup site where higher plant counts were observed for a number of treatments in the first time of sowing (Figure 6). In general, plant counts were probably lower than optimal at the Munglinup site for the first and second time of sowing. Plant counts were generally adequate at the Condingup site.

Across all trial sites, plant counts did not seem to correspond to higher yields.

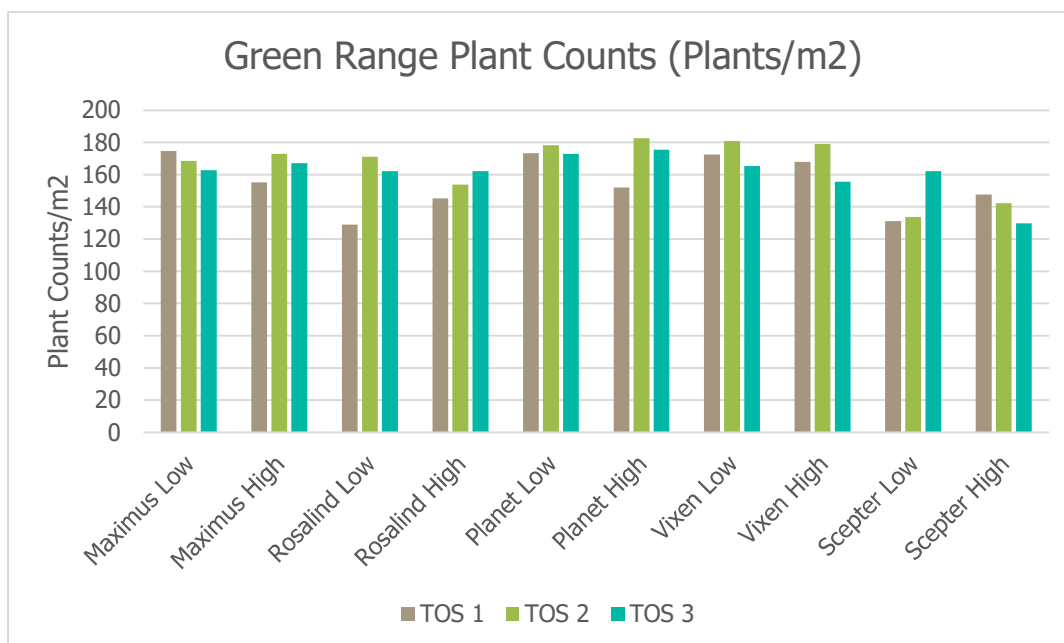


Figure 3: Average plant counts (plants/m²) for each treatment across each TOS at the Green Range trial site, 2022.

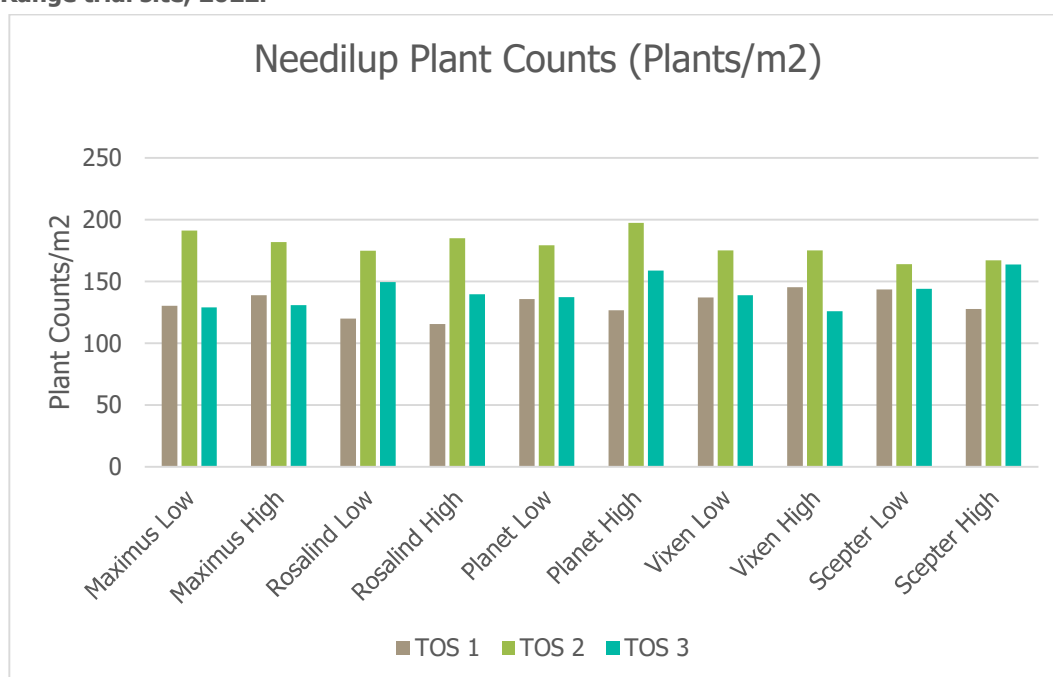


Figure 4: Average plant counts (plants/m²) for each treatment across each TOS at the Needilup trial site, 2022.

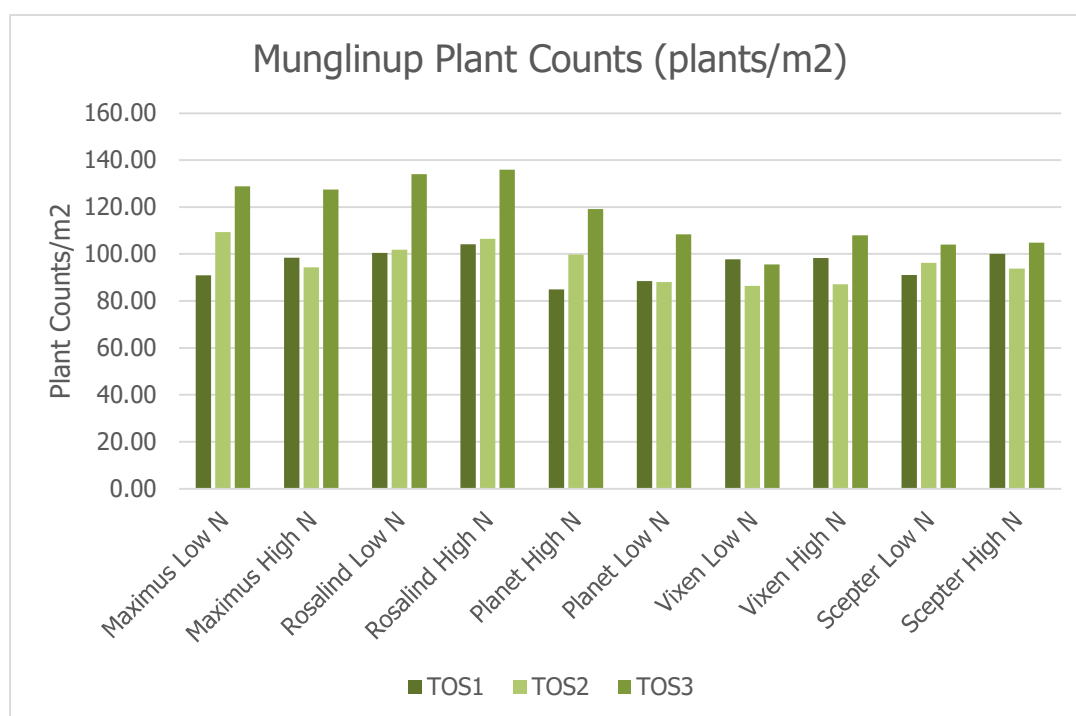


Figure 5: Average plant counts (plants/m²) for each treatment across each TOS at the Munglinup trial site, 2022.

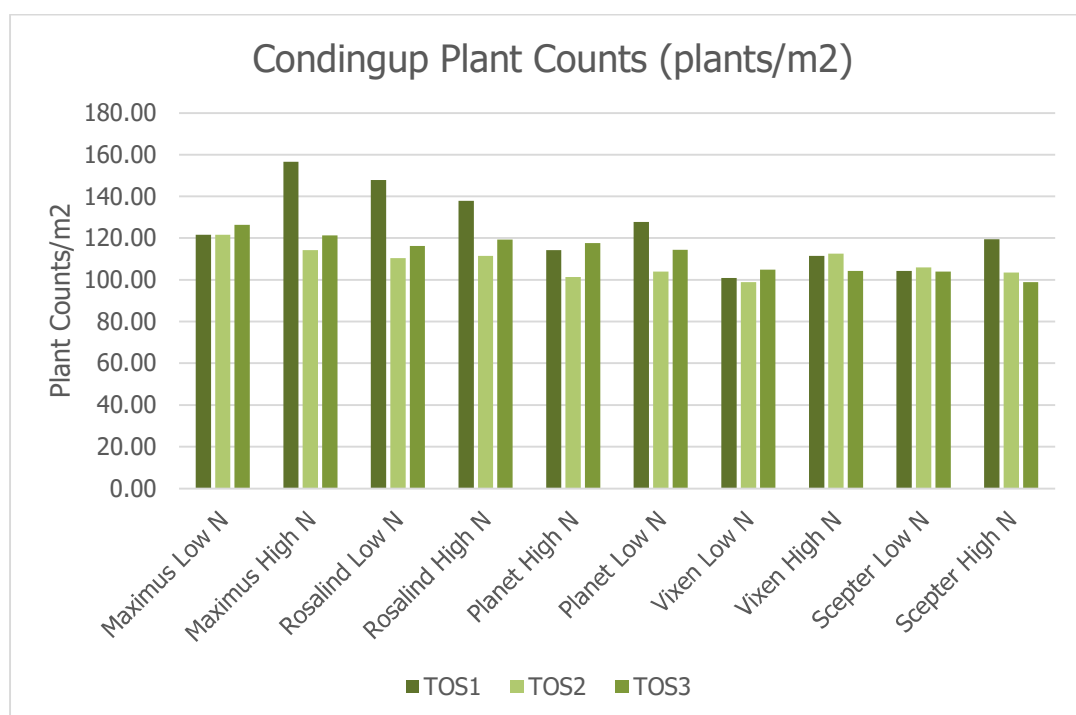


Figure 6: Average plant counts (plants/m²) for each treatment across each TOS at the Condingup trial site, 2022.

Growth Stages

Growth stages recorded at two dates during the growing season are presented in Figures 7-10 for each trial site. The growth stages are variable in that, it would have been assumed that the shorter season varieties would have matured quicker and vice versa for the main season varieties. It seems that Maximus barley caught up with Rosalind barley and Scepter wheat, in most cases, was not far behind Vixen wheat. This was not the case for Planet barley, which was behind in growth stage for most sites in comparison to the other two barley varieties.

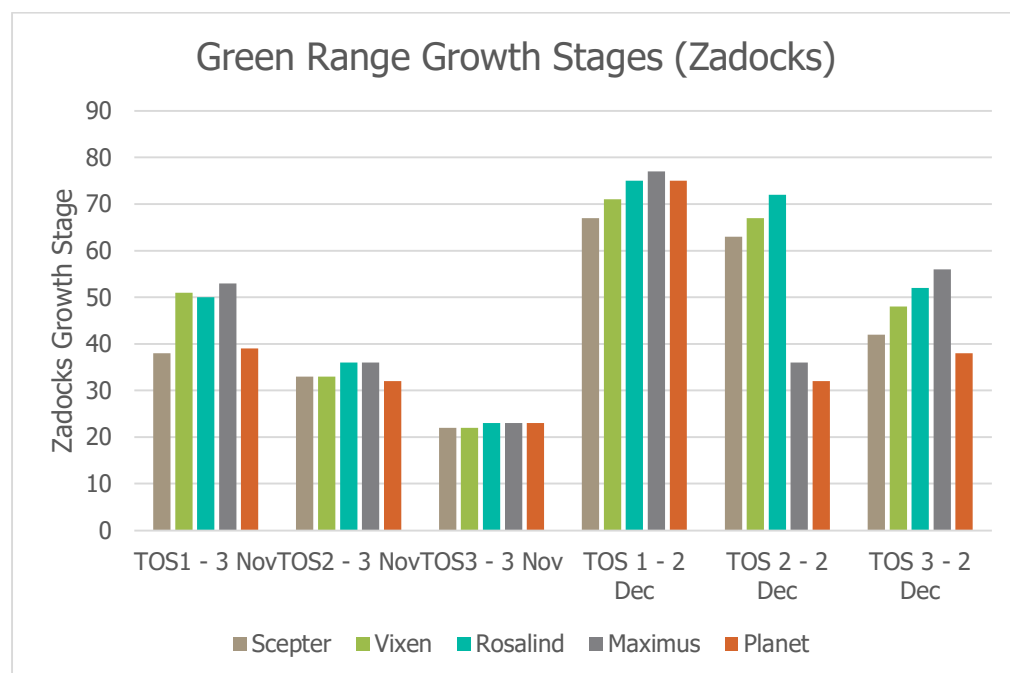


Figure 7: Average growth stage for each variety at two dates (3 Nov & 2 Dec) within the growing season at the Green Range trial site, 2022.

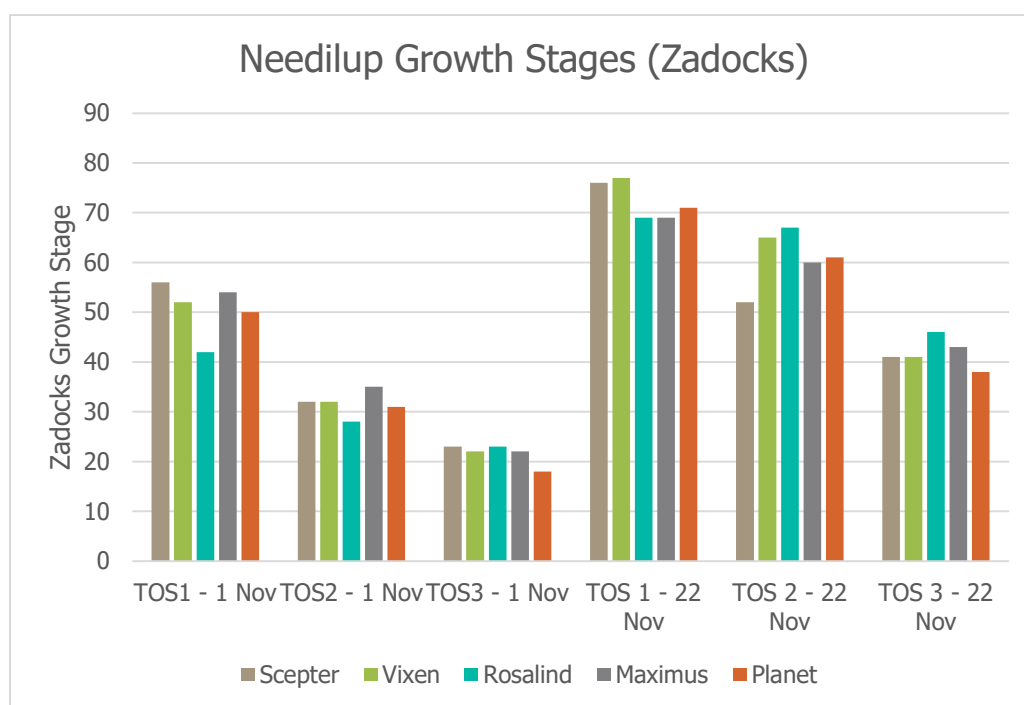


Figure 8: Average growth stage for each variety at two dates (3 Nov & 2 Dec) within the growing season at the Needilup trial site, 2022.

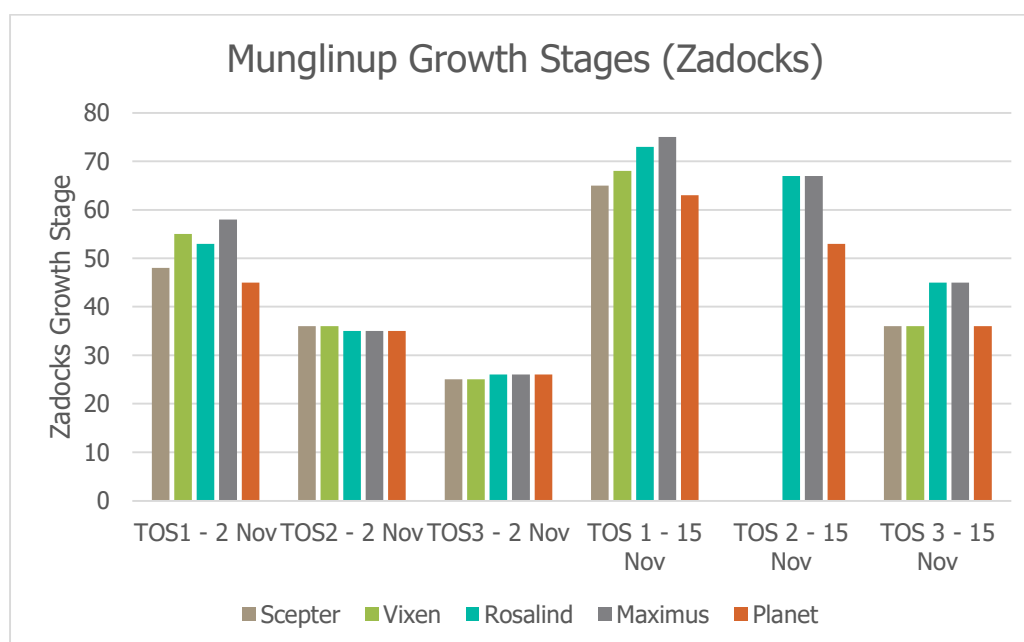


Figure 9: Average growth stage for each variety at two dates (2 Nov & 15 Nov) within the growing season at the Munglinup trial site, 2022.

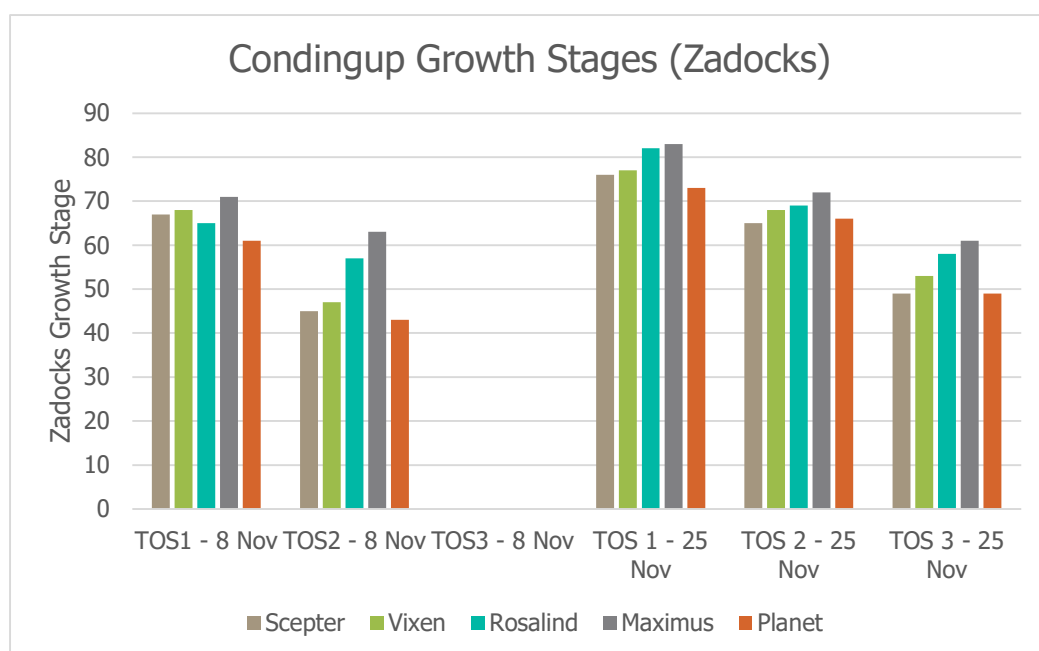


Figure 10: Average growth stage for each variety at two dates (8 Nov & 25 Nov) within the growing season at the Condingup trial site, 2022.

Yield Results

At the Green Range trial site, there was a strong decreasing trend in yield with the later times of sowing across all varieties and nutrition treatments (Figure 11). In some cases, the yield difference between the second and third time of sowing was minimal i.e., Maximus (L), Rosalind (L) and Scepter (L). It is likely that in these treatments the second time of sowing yield was held back by limited nitrogen. It should also be noted that there was some bird damage in both the second and third times of sowing, mostly in the Rosalind and Maximus plots.

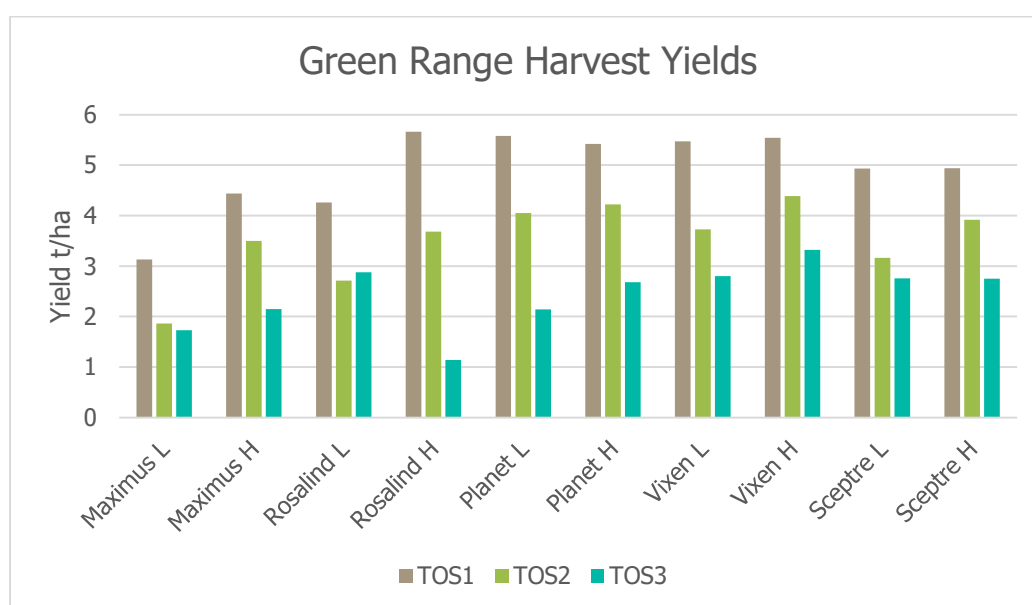


Figure 11: Average harvest yields for each treatment across each TOS at the Green Range trial site, 2022.

The average cereal yields for the Needilup site were significantly lower than all other sites (Figure 12). This site did not receive the rainfall between August and December that the other three sites received. Interestingly at this site, the first and second time of sowing treatments were much similar in yield compared to the third time of sowing, and overall, there was only approximately a 1 t/ha yield difference between the highest and lowest yields across all treatments and sowing times.

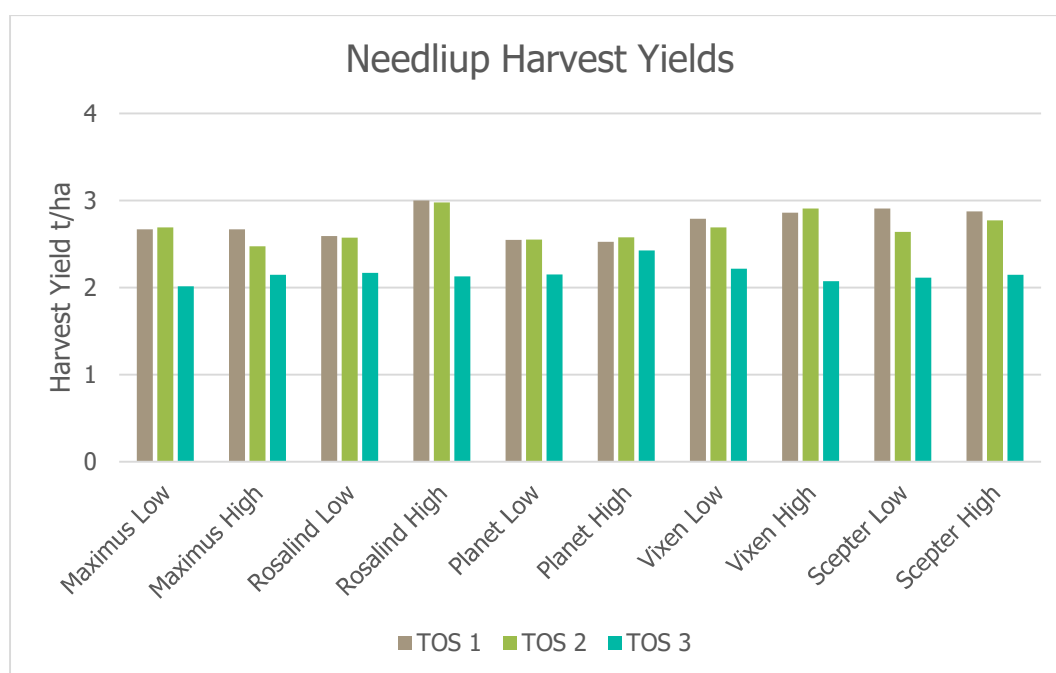


Figure 12: Average harvest yields for each treatment across each TOS at the Needilup trial site, 2022.

Similar to the Green Range site, the yields at the Munglinup trial site significantly decreased with later time of sowing (Figure 13). Yields overall were impressive with the Maximus and Rosalind barley achieving in excess of 7 t/ha. There did not seem to be an impact of the high and low nitrogen fertiliser strategies on yield at this site.

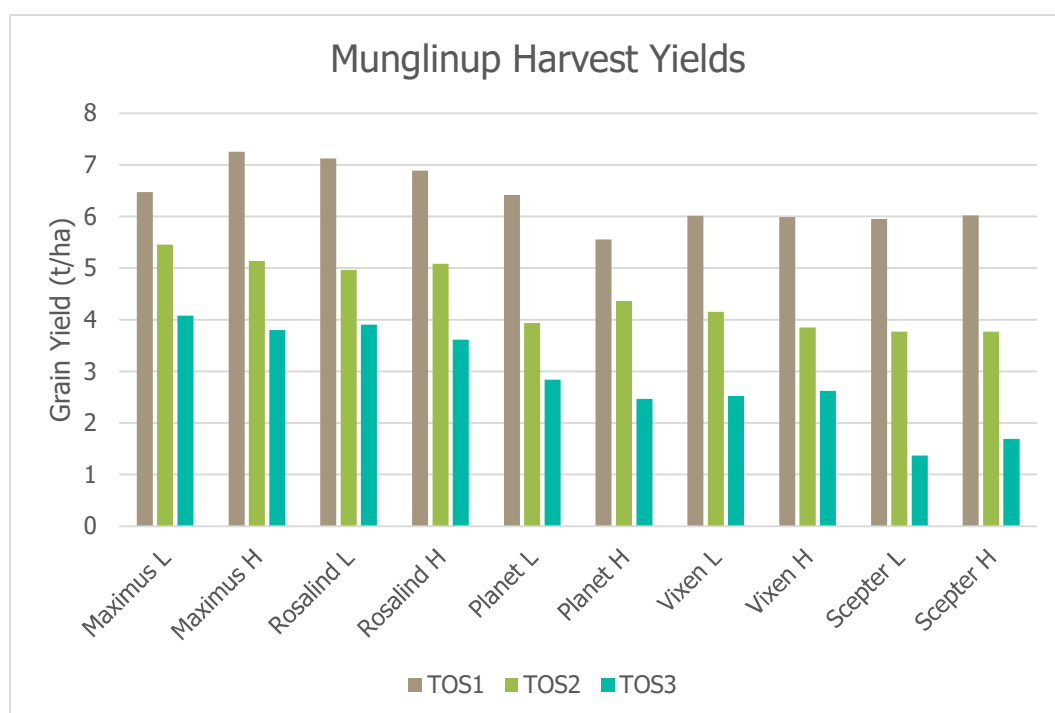


Figure 13: Average harvest yields for each treatment across each TOS at the Munglinup trial site, 2022.

At the Condingup trial site, average yields for Maximus and Rosalind barley significantly decreased with each later time of sowing (Figure 14). These two varieties also achieved the highest yields of the trial. The Planet Barley and the wheat varieties yielded less overall, but also showed much less variance between time of sowing dates. Again, the high and low nitrogen strategies did not seem to impact on yield greatly.

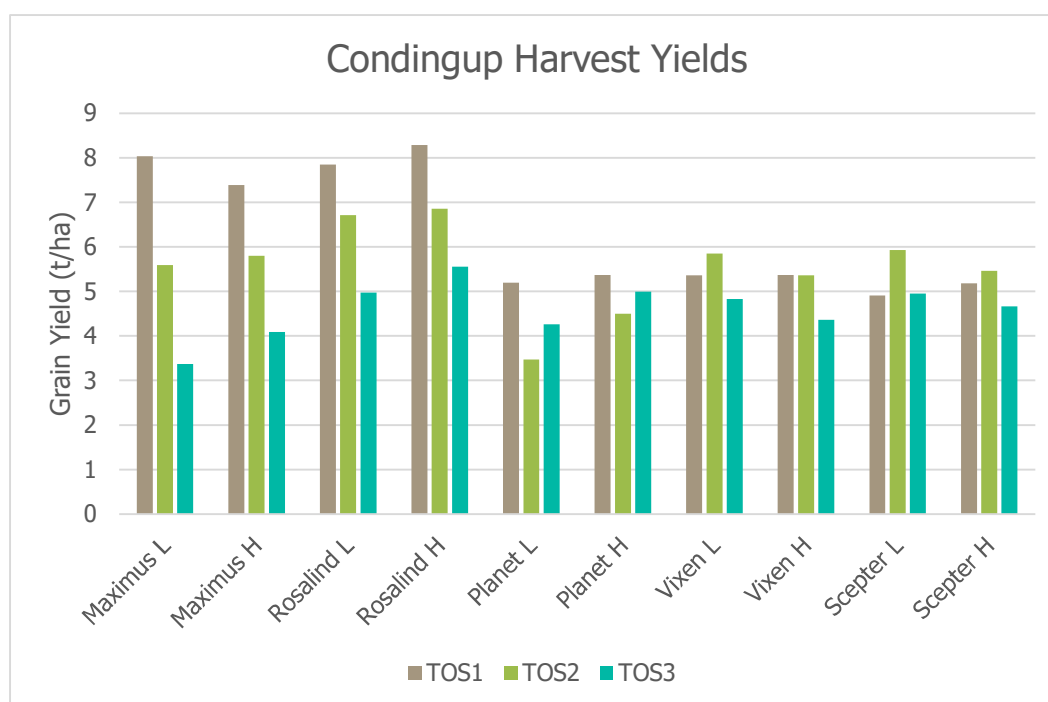


Figure 14: Average harvest yields for each treatment across each TOS at the Condingup trial site, 2022.

Table 1 is a concise summary of the impact of the second and third time of sowing dates in relation to the yields achieved in time of sowing one. All average yields for each crop type were below the first time of sowing averages, with the exception of the wheat at Condingup. In Condingup, 112mm of rainfall fell in August impacting the first time of sowing (waterlogging). It should also be noted that the second and third time of sowing at the Green Range site was also impacted by waterlogging.

Table 2: The table shows percentage of TOS 1 yield achieved in the subsequent sowing dates for each trial site.

Crop type & location	TOS 1 Yield	TOS2 as a % of TOS 1 Yield	TOS 3 as a % of TOS 1 Yield
Green Range Barley	4.74	69.6%	46.5%
Green Range Wheat	5.22	72.7%	55.7%
Needliup Barley	2.67	99.04	81.85%
Needliup Wheat	2.87	96.3%	74.85%
Condingup Barley	7.019	78.16%	64.68%
Condingup Wheat	5.205	108.5%	90.30%
Munglinup Barley	6.616	72.90%	52.15%
Munglinup Wheat	5.99	64.86%	34.22%

Grain Protein

Grain protein at all sites ranged between 9 and 14%. Green Range protein % was lower than the other sites, particularly for the Planet barley and the wheat varieties (Figure 15). At this site, grain protein did not significantly differ with increased nitrogen application, however, the increase in protein was noticeable in the lower yielding third time of sowing treatments (Planet barley and wheat). This points the higher yields diluting the protein %, making a case for increasing nitrogen fertiliser rates in the earlier sown treatments.

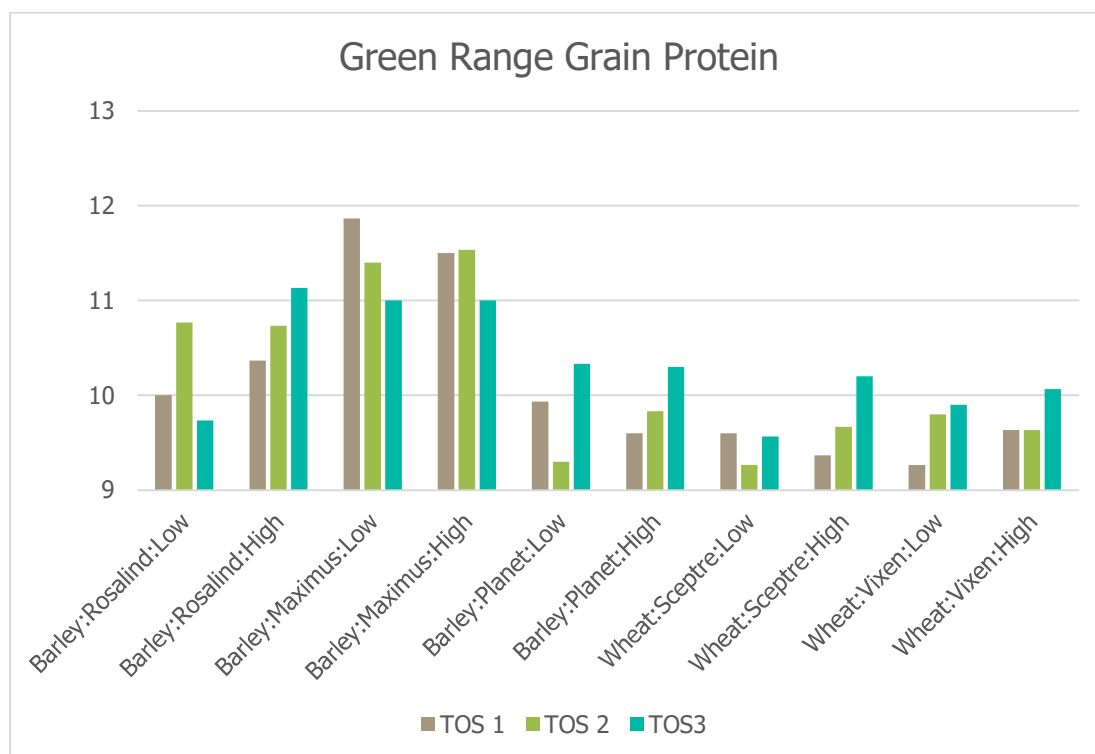


Figure 15: Average grain protein (%) for each treatment across each TOS at the Green Range trial site, 2022.

Average grain protein at the Needilup trial site was between 10 and 13%, with variable results between the high and low nitrogen fertiliser rates (Figure 16). It was somewhat apparent in the wheat that the third time of sowing had higher protein than the first and second. This was not a trend that carried through to the barley.

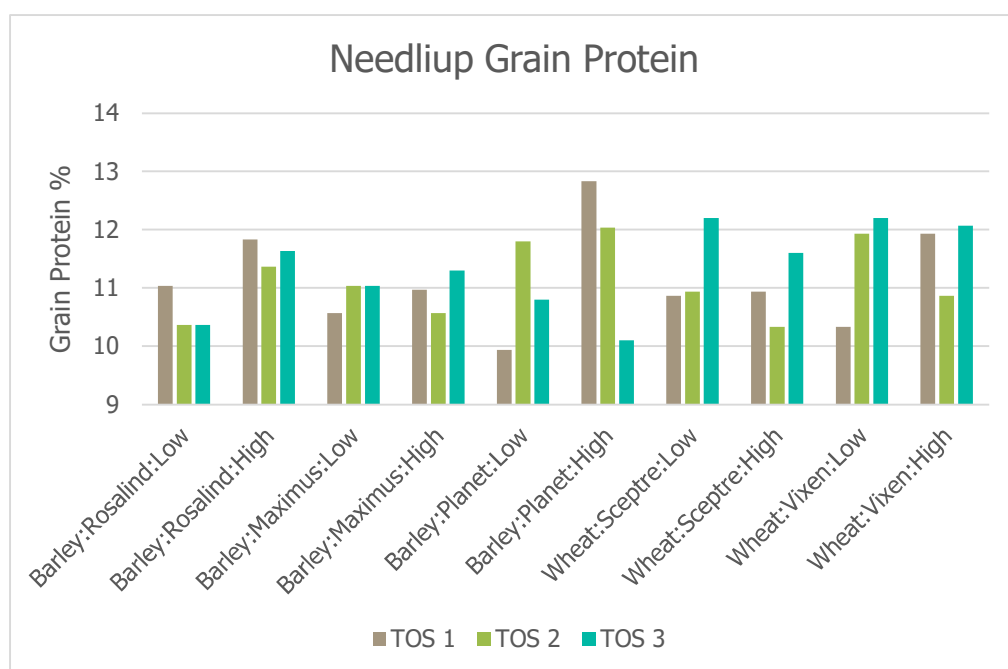


Figure 16: Average grain protein (%) for each treatment across each TOS at the Needilup trial site, 2022.

Grain protein at the Munglinup site ranged between 10.5 and 13.4% (Figure 17). The higher grain protein levels were typically in the second time of sowing, with the exception of the high nitrogen fertiliser treatments for Maximus, Rosalind and Planet. This may be due to the lower yields in the second time of sowing compared to the first time of sowing. Although this then doesn't explain why protein was then lower in the third time of sowing, where yields were lowest across the board.

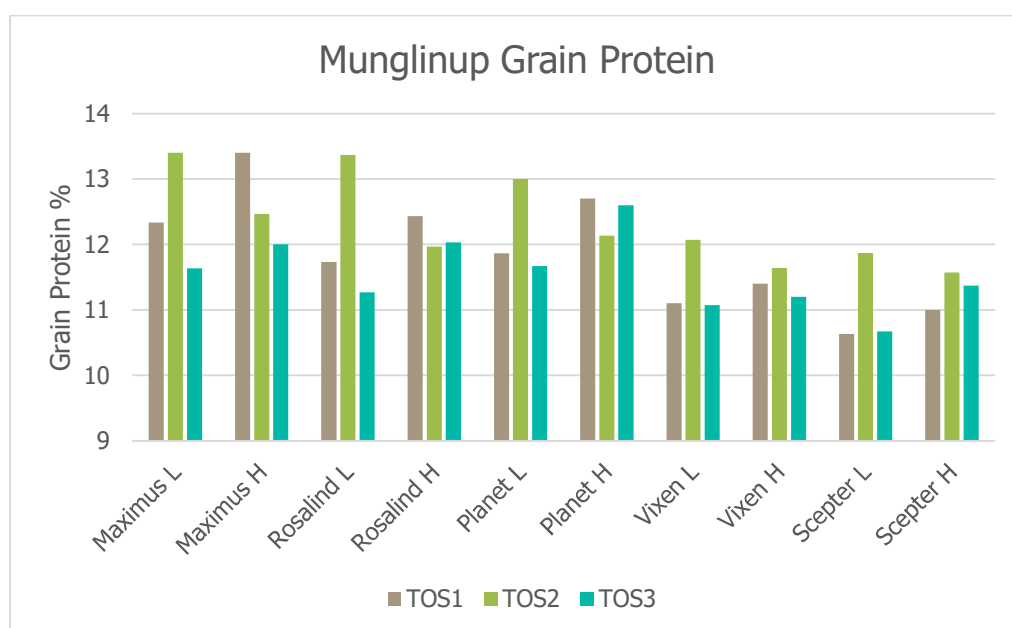


Figure 17: Average grain protein (%) for each treatment across each TOS at the Munglinup trial site, 2022.

Again, grain protein at the Condingup trial site was somewhat variable (Figure 18). It was highest in the Maximus barley treatments, with the first time of sowing for this variety achieving a grain protein of 13.65%. The grain protein levels for the other varieties of wheat and barley hovered between 10 and 12%. At this trial site there also seems to be some overall grain protein benefit to the high nitrogen fertiliser rates for most treatments.

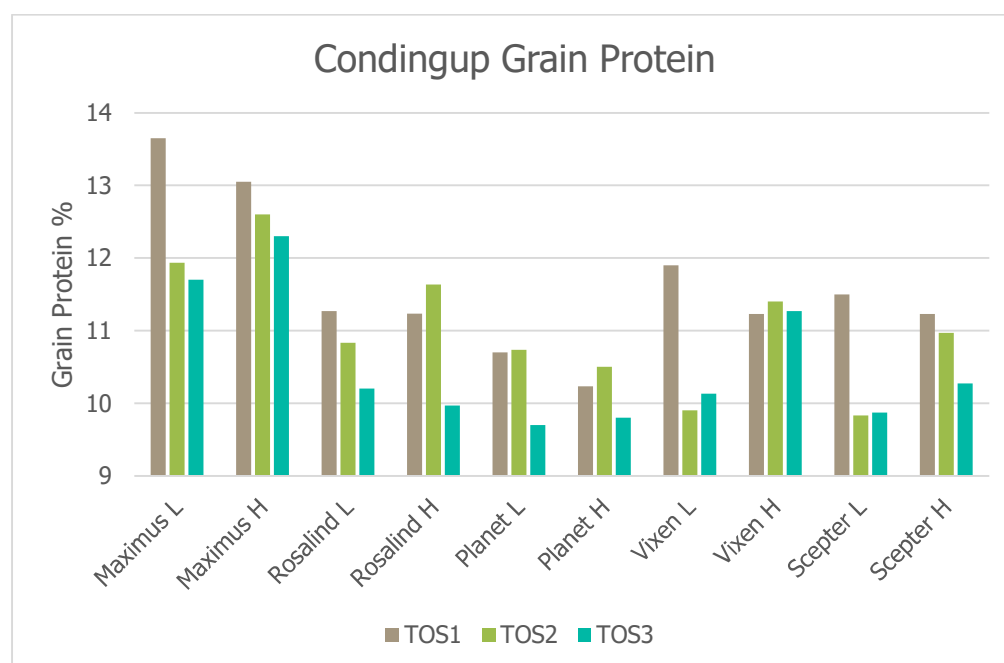


Figure 18: Average grain protein (%) for each treatment across each TOS at the Condingup trial site, 2022.

DISCUSSION OF RESULTS

The trials implemented at Green Range, Needilup, Munglinup and Condingup demonstrated that crops can be successfully established in late winter and early spring when conditions are favourable (Figure 19). The wet weather conditions along the South Coast in 2022 meant that each time of sowing at each site was seeded at, or close to, field capacity.

The environmental conditions at all sites (albeit less rainfall at Needilup) resulted in ideal growing conditions across all three times of sowing, where a mild finish allowed grain fill to continue into December without heat stress. If anything, some of the treatments experienced waterlogging, for example the first time of sowing at Needilup and Condingup and the third time of sowing at Green Range.



Figure 19: Mugnglinup TOS1 (L), taken on the 2 November 2022 & Green Range TOS1&2 (R) taken on the 3 November, 2022.

Albany Port Zone

Crop establishment was good for both sites across all times of sowing. Of note, the plant numbers were notably higher in the second time of sowing at Needilup. The waterlogging at first time of seeding and the drier conditions at the third time of seeding at this site explains this somewhat. Overall plant numbers did not impact on yield.

In regard to growth stages, the Planet Barley and the Maximus barley for the second time of sowing at the Green Range site were quite behind the Rosalind barley and wheat varieties. It was also the case for Planet Barley in the third time of sowing, and Maximus seemed to have caught up to Rosalind at this later timing.

At Green Range each crop type yielded exceptionally well, with both the Rosalind and Planet barley slightly out yielding the Vixen and Scepter wheat. The ability to achieve >5t/ha from an August 24th seeding highlights the adaptability of these crop types to short season lengths. The yield penalty between the first time of sowing and the third time of sowing was 54.5% in barley and 44.3% in wheat. This yield penalty may have been caused somewhat by the early waterlogging experienced in

the second and third time of sowing plots (Figure 20). Rosalind and Planet barley outperformed Maximus across all three times of sowing. The strong early vigour of these two varieties allowed for early biomass accumulation which ultimately dictated the crop yield. Whilst the wheat cultivar yields were relatively similar across all times of sowing.



Figure 20: Green Range TOS3, taken on the 3 November 2022.

Notably the first time of sowing showed no grain protein response to the higher input package for both wheat varieties, and only a minimal response in the barley varieties. Given all the nitrogen was applied up front, it is likely the additional nitrogen was leached out of the system before the plants were able to utilise it due to rainfall received after each time of sowing.

The grain yields at Needilup were lower than those at Green Range across all times of sowing. This was largely due to the combination of waterlogging conditions at seeding for the first time of sowing, coupled with the significantly warmer finish to the season, compared to Green Range. This warm finish triggered grain set before adequate levels of biomass could be produced to drive yield. The resulting yield differential between each time of sowing was minimal compared to Green Range, with only yield penalty of between 15-25% between the first and third time of sowing.

Similarly, to Green Range there was very little protein response between the high and low input packages, however protein as a whole was higher at the Needilup site across nearly all varieties and times of sowing. This higher level of grain protein was likely a heat stress response to the sharp finish to the season.

Esperance Port Zone

At both the Munglinup and Condingup sites the first time of sowing was relatively waterlogged, Condingup more so (Figure 19). Crop establishment (plants/m²) was slightly less than optimal at the Munglinup site and adequate at the Condingup site. This did not seem to impact on yields with the Munglinup site achieving the highest yields of all four trial sites implemented in the project.



Figure 21: Condingup first time of sowing (L), taken on the 12 September 2023 (evidence of waterlogging) & Munglinup (R), taken on the 8 September (waterlogging not so evident).

In regard to growth stages, the Maximus and Rosalind Barley was ahead of both the wheats and Planet barley for all times of sowing by late November, early December 2022. There was not so much difference in growth staging between Scepter and Vixen wheat and it was the same for Maximus and Rosalind.

Maximus and Rosalind barley were also the higher yielding varieties in both Esperance port zone trials, particularly for the first and second times of sowing. Unbelievably, average grain yields for Maximus and Rosalind barley exceeded 7 t/ha for the first time of sowing (late-August). Wheat yielded better in the second time of sowing at Condingup, in comparison to the first time of sowing. This may have been due to waterlogging impacting the first time of sowing somewhat (significant rainfall was received in August at the Condingup site, Figure 20).

Albeit variable, grain protein % was generally higher for the two Esperance sites compared with the Albany trial site. At the Munglinup site, there appeared to be some increased protein response in the second time of sowing, particularly in the wheat. At the Condingup site there appeared to be a slight response to the increase nitrogen fertiliser across the site. Overall, the variability of grain protein at the Esperance sites probably.

CONCLUSION

The trial sites implemented as part of this project have demonstrated the adaptability of cereal cropping systems along the South Coast of WA. The data gathered from each trial site shows that seeding cereals in late-winter and/or early spring was profitable in the favourable conditions of

2022. This positive result delivers on the GRDC outcome by giving growers and advisers further confidence in late sowing decisions where early season waterlogging has occurred and autumn sowing was not possible (or autumn sown crops failed).

In regard to variety selection, given the soft, cool finish (except perhaps at the Needilup site), the main season varieties yielded mostly on par with the short season varieties. At the drier and warmer Needilup site, it was much the same story with yields for each time of sowing across all the varieties within 0.5 t/ha of each other. This gives growers further confidence to seed the typically 'on-hand' main season cereal varieties, rather than especially purchasing a short-season variety for a winter/spring seeding. Interestingly, the wheat yielded slightly higher at the Green Range and Needilup sites and the barley yielded better in the Munglinup and Condingup trial sites.

The yield and grain protein data from the high and low nitrogen fertiliser regimes was highly variable, with only a slight positive grain protein trend detected at the Condingup site in response to a higher nitrogen fertiliser rate. The overall lack of response may have been a result of the nitrogen being applied all up-front (at seeding). Given the rainfall that fell between August and December across all sites, much of this may have leached before uptake by plants. It makes the case for split nitrogen applications (particularly in wetter conditions).

Although this investment was extremely successful, there are still some questions around the viability of late sown crops in less favourable conditions i.e., how would they perform with a hotter, drier finish. There are also grower questions around better understanding nutritional requirements, with a split application of nitrogen potentially having a greater impact on yield and grain protein compared the 'all nitrogen up-front' strategy.

IMPLICATIONS

There are numerous positive implications as a result of this investment, in addition to a management tool to avoid early-season waterlogging. By giving growers and advisers the confidence to sow crops later in the growing season i.e., late winter and early spring, it opens a range of possibilities to manage climate variability, of which we'll likely see more of going forwards.

Such opportunities include:

- The option to spray out a pasture paddock and seed to a late sown cereal crop when there is an over supply of fodder in early Spring that cannot be adequately utilised by stock.
- The option to delay seeding to completely avoid frost windows.
- The option to sow a late sown cereal and then cut it for whole top silage (if grain yield potential looks low).
- The option to seed late when the break of the season is also delayed.
- The option to undertake soil amelioration in winter/spring (when soil moisture is optimal) and seed a late cereal crop for some stubble cover over summer to limit erosion.

RECOMMENDATIONS

The data generated as part of this investment was widely welcomed by growers and advisers in the South Coast Region of WA. Although the late sown cereals were very successful in 2022, there is a general acknowledgement that 2022 was a very favourable season. Many growers are keen to understand how cereal crops sown late into adequate moisture may yield when the season finish is warmer and drier. Knowing this, will add to grower confidence.

In addition, nitrogen strategies and starter compound fertiliser strategies were raised as further areas of research by growers. They are keen to understand if split applications of nitrogen are better than a single, at seeding, application, and whether starter compound fertiliser can be reduced or omitted where failed cereals crops were sown in the autumn (are these nutrients still available in the soil?).

REFERENCES

Heping Z, Turner N, Poole M (2004) Yield of wheat and canola in the high rainfall zone of south-western Australia in years with and without a transient perched water table. *Australian Journal of Agricultural Research* **55(4)**, 461-470.

APPENDIX A & B: SAGI West Statistical Reports for Albany & Esperance Port Zones

GLOSSARY AND ACRONYMS

Below is a sample abbreviations and acronyms list. Be sure to include all abbreviations and acronyms that appear in the report.

TOS	Time of sowing
N	Nitrogen
HRZ	High Rainfall Zone
mm	Millimetres
t	Tonnes

EXTENSION & COMMUNICATION

SEPWA

SEPWA Newsletter Articles:

1. October 2022 Edition - New project trials cereals for waterlogged areas (see attached)
2. March 2023 Edition - Late Cereal Sowing Proves a Success in the Esperance Port Zone (see attached)

The SEPWA Newsletter is a quarterly high spec hard copy publication that is sent to 400 recipients

SEPWA enews:

24/11/22 - Late sown cereals stand up to waterlogging

SEPWA's enews is a monthly offering that goes to 426 email inboxes

SEPWA Socials:

Twitter and Facebook posts were made in November 2022 regarding crop progress

SEAR Socials:

Tweets during site visits to illustrate crop progress

ABC Radio:

- November 2022 - Recorded with ABC Geraldton and stimulated following GRDC's media release from 10/11/22 the project. Sorry Lizzie they didn't tell me the date it go played but I know it did as I had 3 growers ring me after hearing it to talk about the project.

Field Walk:

Friday 9th September – Beaumont-Condungup Field Walk (flier attached)

There were 40 attendees at this site, including 32 growers (there is some movement between grower attendees during this field day due to Beaumont being located in the medium-low rainfall zone and Condungup being in the high rainfall zone).

BEAUMONT - CONDINGUP FIELD WALK AGENDA

**Friday 9th
September
2022**



Thanks to Rabobank & Intergrain
for supplying some refreshments &
lunch.



ITINERARY

10 AM - Start

Meet at Viridis' Yupiri property just
opposite Lyndon Mickel's driveway,
Parmango Rd

10.05 AM - 11.05 AM

SEPWA Barley Variety Trial & InterGrain
IGB 1944 Barley Launch - Greg Warren,
Rachel Minett & Georgia Trainor

11.10 AM - 12.00 PM

SEPWA Canola Trial - Greg Warren, Rachel
Minett

12.10 PM - 1.40 PM

Viridis' Yupiri Property Sheds, Muntz Rd
-Tree Line Ripper, Jack Hassall
-QuickDraw Spray Tender System, Jack
Hassall
-LUNCH (Depart 1.40pm)

2.30 PM - 3.20 PM

SEPWA/GRDC Later Cereal Sowing Trial,
Warakirri Cropping's Property, Fisheries Rd
(very end of the bitumen, turn right) - Con
Murphy & Greg Warren

3.45 PM - 4.30 PM

DPIRD Canola Nutrition Trial, Fowler's
Willyama Property, Muntz Rd - Jeremy Curry

4.45 PM

Fowler's Chatham Property Shed, Fisheries Rd
Chemical Residues in Grain,
Steven Tilbrook, CBH

BBQ SUNDOWNER

Fitzgerald Biosphere Group

Field Walk:

16 September 2022, FBG Spring Field Day. It included a visit to the trial site.

45 grower and industry attendees.

Newsletter articles:

2 x 'Sustain a Bulletin' newsletter articles (August 2022 and May 2023).

FBG Socials:

Twitter and Facebook posts were made throughout the project regarding crop progress.

FBG - Fitzgerald Biosphere Group
Published by Maddy Wylie · 19 September 2022 ·

Thank you to everyone who attended and/or presented last week's Spring Field Day.

Unfortunately, the weather gods were not overly kind that day, but hopefully attendees were able to take away a thing or two from the day...

Highlights included Crawford Taylor and his presentation on sustainability measures in the banking space, Wayne Birch and his mice analysis, an update on the joint GRDC-funded late seeding trial at Dave Turner's, and an update on new and emerging cereal varieties from Georgia Trainor, Intergrain.

Rabobank [Farmanco Grains Research and Development Corporation InterGrain Cereal Breeding Stirlings to Coast Farmers](#)



FBG - Fitzgerald Biosphere Group
Published by Maddy Wylie · 24 August 2022 ·

Late seeding trial update- first of 3 different TOS in yesterday thanks to the Nutrien Ag trials team, with a small plot trial being hosted by FBG at Needilup.

The aim of this new GRDC funded project is to give growers in the Albany (other site at Green Range) and Esperance (sites at Munglinup & Condingup) port zones some data around late sowing options for wheat and barley in years with a soggy autumn/winter.

Part of a project coordinated by [Stirlings to Coast Farmers](#), and working in partnership with [Grains Research and Development Corporation](#), Nutrien Ag, SEPWA and South East Agronomy Research.

https://twitter.com/agro_brad/status/1562021807510523904

<https://www.fbg.org.au/.../investigating-late-winter-and...>



FBG @FBG_Jerramungup · 6 Oct 2022

Checking out Late Sowing Trial at Needilup on another wintry spring day - includes optional extra safflower and novel pasture mix

@GRDCWest @Stirlings2Coast @agro_brad



Stirlings to Coast Farmers

Field Walk:

21 September 2022, SCF Spring Field Day (Eastern). The trial site was visited and information presented by Dan Fay (SCF) and the host grower, Jeremy Walker. It was attended by 56 growers and industry.

SCF Socials:

Twitter and Facebook posts were made throughout the project regarding crop progress.

SCF Trials Review Booklet

The project findings will be printed in the 2022 SCF trials review booklet – this booklet is freely available on the SCF website and is mailed in hard copy to all members.

Newsletter Article:

SCF 'Focus' Newsletter – Winter Edition 2023, project findings and key learnings. This newsletter is emailed out to over 90 farming businesses in the Albany port zone and industry sponsors. It is also freely available on the SCF website.



SCF DOUBLE SPRING FIELD DAYS 2022

EASTERN

SOUTH STIRLINGS HALL
5 SOUTH STIRLING RD
21 SEPTEMBER
7:00AM - 11:15AM

WESTERN

KENDENUP COUNTRY CLUB
BEVERLEY ROAD
29 SEPTEMBER
10:00AM - 5:30PM

All welcome! SCF Members are strongly encouraged to bring a friend free of charge.

7:00am	Optional Brekky & Cuppa
7:30am	Hop on Bus
8:00am	CSBP urea inhibitors trial
8:45am	Managing net blotch & fungicide resistance in barley
9:20am	Bayer Mateno Complete trial
10:15am	Nutrien Summer cropping, late sown cereals trial & Irrigation
11:15am	Return back to South Stirlings Hall

10:00am	Registration
10:15am	AGM
11:00am	Confinement Feeding Panel
11:45am	Gold Sponsor's Update
12:30pm	Lunch (provided)
1:15pm	Hop on Bus
1:45pm	Summit fertilizer P x Mn trial
2:45pm	Prestons Pacific Seeds Canola trial & GGA Legumes profitability
5:00pm	Future Drought Fund- update
5:15pm	Sundowner with Biosecurity Update

A bus will be available and is encouraged to be used for the field portion of the day for biosecurity reasons.

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You Retweeted



Brad Westphal @agro_brad · Nov 3, 2022

The @GRDCWest Late Sowing Trial is growing quickly. Photos of the 3 times of sowing. The recent rain is not helping the latest TOS. Who thought planting cereals on 29th September would get waterlogged. @SEAgroResearch @Stirlings2Coast @NutrienWAagri @SEPWA_ag



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You Retweeted



Brad Westphal @agro_brad · Sep 14, 2022

Perfect start to the year. A few knocks, full profile of moisture and almost feels like May. First TOS is up and away and 2nd is in the ground. Late Sowing Trials at Green Range and Needilup with @GRDCWest @Stirlings2Coast @FBG_Jerramungup @SEPWA_ag @SEAgroResearch



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Groundcover Article, Date Published 10 November 2022.

<https://groundcover.grdc.com.au/innovation/industry-insights/late-sown-cereals-stand-up-to-waterlogging>

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