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NEWSLETTER

Welcome to the February issue of the Crop Science Society of SA newsletter

In this month's newsletter we explore:

- Glyphosate resistant annual ryegrass update- 2020 season
- Novel agronomy strategies for manipulating flower date and yield
- Member recognition: Alan Mayfield
- Grain Producers SA grain marketing workshops
- CSSSA award opportunities

We hope you are keeping well. Please contact us if you have any requests for content or information.

Many thanks
Craig Davis
President, Crop Science Society of South Australia

Glyphosate resistant annual ryegrass update- 2020 season

Peter Boutsalis[1,2], Sam Kleemann[2] and Christopher Preston[1].

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GRDC project code: UCS00020 & UCS00024

Take home messages

- Glyphosate resistance in annual ryegrass continues to increase.
- There are ways to optimise glyphosate efficacy.
- Partner glyphosate with other herbicides to improve weed control.

Incidence of glyphosate resistance

The GRDC continues to support random weed surveys in cropping regions to monitor for changes in resistance levels in key weed species. The methodology involves collecting weed seeds from paddocks chosen randomly at pre-determined distances. Plants are tested in outdoor pot trials during the growing season. Resistance is defined as a sample where ≥20% plant survival was detected in a pot trial. The incidence of glyphosate resistance identified in paddocks in different cropping regions across South Australia (SA) and Victoria (Vic) from random weed surveys is presented in Figure 1.

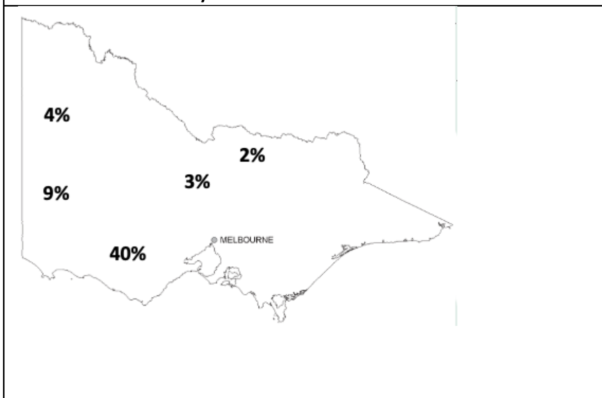
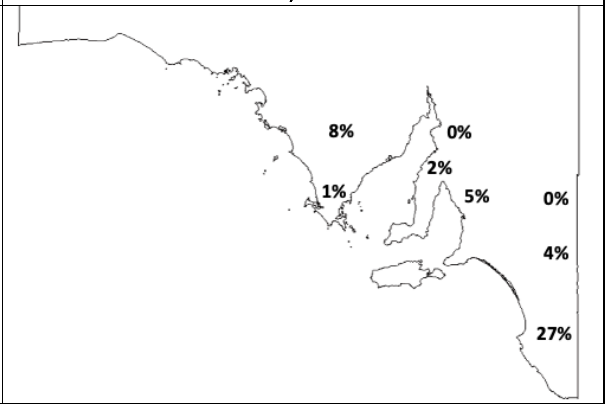
Victorian surveys 2015-2019	South Australian surveys 2017-2019
	

Figure 1. Incidence of paddocks containing glyphosate resistant ryegrass. Resistance is defined as a sample where ≥20% plant survival was detected in a pot trial.

Additionally, Bayer CropScience provides access to a significant database (Resistance tracker, https://www.crop.bayer.com.au/tools/mix-it-up/resistance-tracker) which combines data from commercial testing companies. This tool searches herbicide resistance for numerous weed species by postcode and year, with data collated over the past 15 to 20 years (Example of output displayed in Figure 2a and Figure 2b).

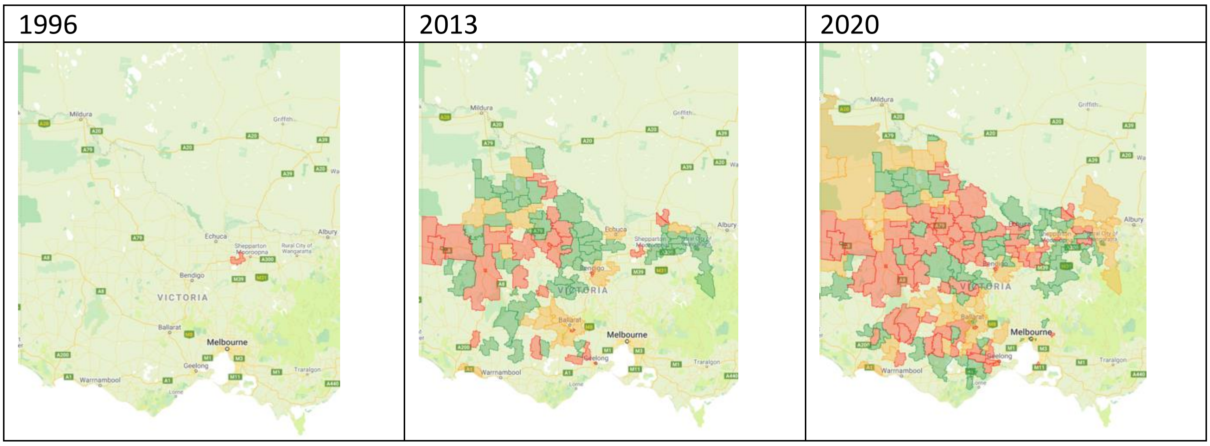


Figure 2a. Occurrence of glyphosate resistance in annual ryegrass in Victoria in 1996, 2013 and 2020. **Dark green shading** = postcode regions where testing has not detected glyphosate resistance in ryegrass, **orange shading** = postcodes where glyphosate resistance is developing and **red shading** = postcodes where resistance has been detected.

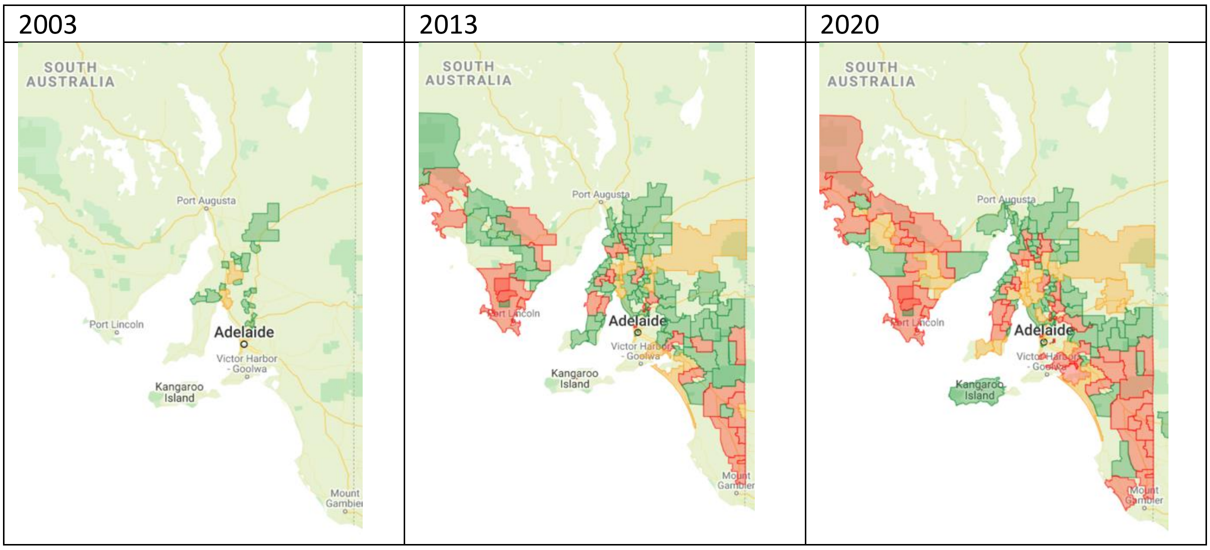


Figure 2b. Occurrence of glyphosate resistance in annual ryegrass in South Australia in 2003, 2013 and 2020. **Dark green shading** = postcode regions where testing has not detected glyphosate resistance in ryegrass, **orange shading** = postcodes where glyphosate resistance is developing and **red shading** = postcodes where resistance has been detected.

2020 season

The early break in 2020 across most southern cropping regions resulted in an opportunity for knockdown weed control. Multiple applications of glyphosate and paraquat were possible targeting multiple flushes of weeds, in particular ryegrass from early autumn prior to sowing. Plants surviving following glyphosate application from Western Australia (WA), SA, Vic and New South Wales (NSW) were sent to Plant Science Consulting for testing using the Quick-Test method to verify whether herbicide resistance had contributed to survival in the field.

The data presented in Figure 3 indicates that 43%, 70% and 78% of ryegrass samples sent from SA, Vic and NSW in 2020 respectively, were confirmed resistant to glyphosate. This highlights that in most cases, glyphosate resistance has contributed to reduced control in the paddock.

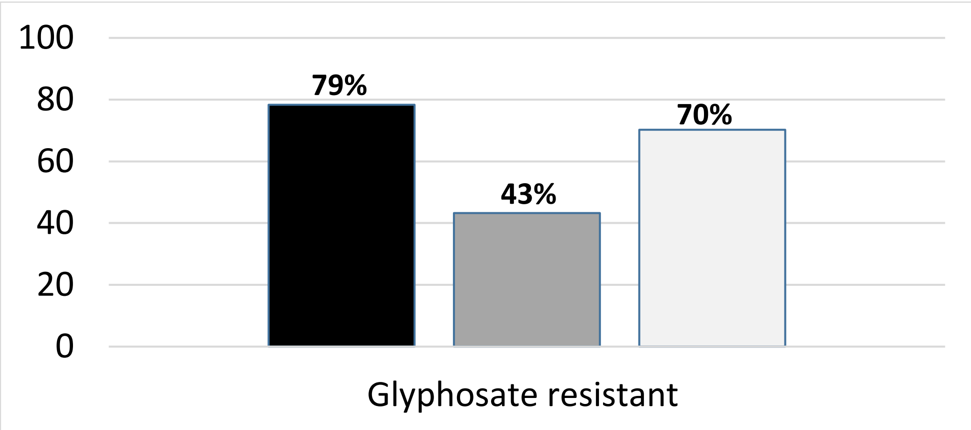


Figure 3. Percent (%) resistance to glyphosate confirmed in farmer ryegrass samples originating from 83 New South Wales, 37 South Australian and 74 Victorian cropping paddocks treated with glyphosate in autumn 2020. Testing conducted by Plant Science Consulting using the Quick-Test.

Discrepancy between resistance testing and paddock failures to glyphosate
In some cases, plants that have survived glyphosate application in the paddock are not resistant. Reasons for the discrepancy between paddock observations and a resistance test result can include poor application, application onto stressed plants, incorrect timing, sampling plants that were not exposed to glyphosate or a combination of the above.

Evolution of glyphosate resistance
Glyphosate was first registered in the 1970s and rapidly became the benchmark herbicide for non-selective weed control. Resistance was not detected until 1996 in annual ryegrass in an orchard in southern NSW (Powles *et al.* 1998). Only a few cases of resistance were detected in the following decade (refer to Bayer Resistance Tracker). The fact that it required decades of repeated use before resistance was confirmed indicated that the natural frequency of glyphosate resistance was initially very low. At the current time there are over a dozen species that have developed resistance to glyphosate in Australia (https://www.croplife.org.au/resources/programs/resistance-management/herbicide-resistant-weeds-list-draft-3/). The most important species are ryegrass, sowthistle, barnyard grass and feathertop Rhodes grass. Ryegrass and sowthistle will be discussed further within this paper.

There are several contributing factors for the increasing glyphosate resistance in ryegrass with generally more than one factor responsible. Reducing rates can increase the development of resistance particularly in an obligate outcrossing species such as ryegrass resulting in the accumulation of weak resistance mechanisms to create individuals capable of surviving higher rates. This has been confirmed by Dr Chris Preston where ryegrass hybrids possessing multiple resistance mechanisms were generated by crossing parent plants with different resistance mechanisms.

Other factors that can select for glyphosate resistance by reducing efficacy include:

1. Using low quality glyphosate products and surfactants.
2. Mixing glyphosate with too many other active ingredients resulting in antagonism, particularly in low water volumes.
3. Using low quality water, particularly hard water. Glyphosate is a weak acid, and therefore, binds to positive cations (e.g., magnesium, calcium and bicarbonate) that are in high concentration in hard water (i.e., >200 ppm),
4. Applying glyphosate during periods of high temperature and low humidity, resulting in the rapid loss of glyphosate in solution from leaf surfaces, thereby reducing absorption.
5. Applying glyphosate onto stressed plants can reduce translocation. Maximising glyphosate efficacy relies on translocation to the root and shoot tips. While this occurs readily in small seedlings, in larger plants, glyphosate is required to translocate further to the root and shoot tips to provide high levels of control.
6. Shading effects that reduce leaf coverage resulting in sub-lethal effects.
7. As glyphosate strongly binds to soil particles, application of glyphosate onto dust covered leaves can reduce efficacy.
8. Application factors such as speed, nozzle selection and boom height can reduce the amount of glyphosate coverage.
9. A combination of the above factors can reduce control, thereby increasing the selection for resistance.

Optimising glyphosate performance

The selection of glyphosate resistance can be reduced by considering the points mentioned previously. Additionally, there are a number of important pathways to follow to improve glyphosate performance including:

1. Avoid applying glyphosate under hot conditions. A trial spraying ryegrass during the end of a hot period and following a cool change was conducted in October 2019. Ryegrass growing in pots was sprayed at 8am, 1pm and 8pm with temperature and Delta T recorded prior to each application. Control of well hydrated plants ranged between 0% and 40% when glyphosate was applied during hot weather (30 to 32.5°C) and high Delta T (14 to 16.7) with the lowest control achieved when glyphosate was applied at midday (Figure 4). In contrast, glyphosate applied under cool conditions just after a hot spell resulted in significantly

greater control (65%-80%), indicating that plants can rapidly recover from temperature stress provided moisture is not limiting, e.g., after rainfall.

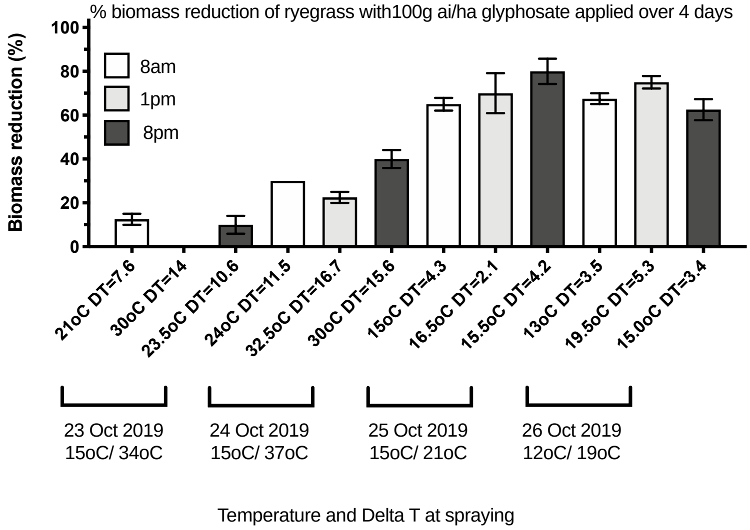


Figure 4. Effect of temperature and Delta T on glyphosate for ryegrass control.

2. Improving water quality and glyphosate activity by using ammonium sulfate (AMS). The addition of AMS has several functions. One is to soften water by combining to positively charged ions such as magnesium and calcium common in hard water. The negative charged sulphate ions combine with the positive cations preventing them from interacting with glyphosate and reducing its solubility and leaf penetration. Additionally, AMS has been shown to independently improve glyphosate performance, as the ammonium ions can work with glyphosate to increase leaf uptake. In a pot trial conducted with soft water, AMS was shown to significantly improve control of ryegrass with 222ml/ha (100g ai/ha) of glyphosate 450 (Figure 5). As a general rule, growers using rainwater (soft) should consider 1% AMS, if using hardwater (i.e., bore, dam water), 2% AMS is recommended. The addition of a wetter resulted in a further improvement in control.

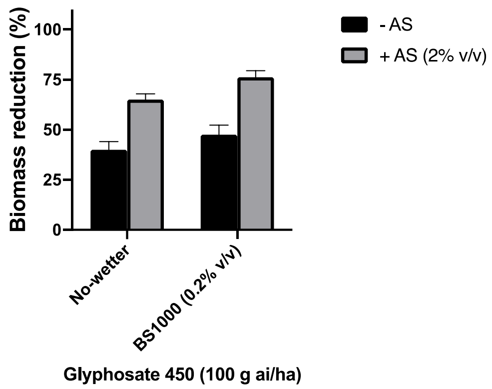


Figure 5. Effect of ammonium sulfate (AS) and wetter (BS1000) on glyphosate performance for ryegrass control.

3. Herbicide activity can vary at different growth stages. In a pot trial investigating the effect of glyphosate at four ryegrass growth stages (1-leaf to 4-tiller), good control was achieved at the three older growth stages but not on 1-leaf ryegrass (Figure 6). Most glyphosate labels do not recommend application of glyphosate on 1-leaf ryegrass seedlings because they are still relying on seed reserves for growth. Consequently, very little glyphosate moves towards the roots.

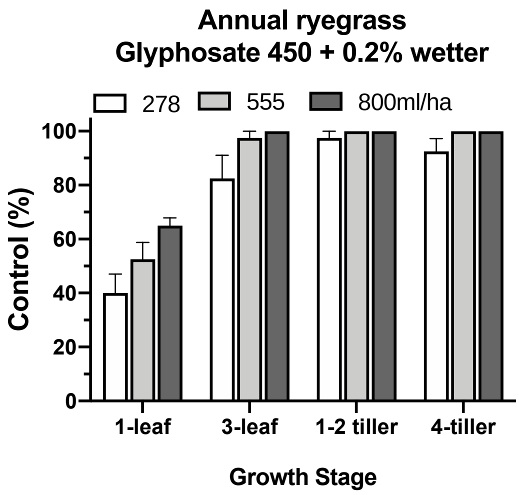


Figure 6. Effect of ryegrass growth stage on glyphosate activity.

A double knock strategy is defined as the sequential application of two weed control tactics to combat the same weed population. The most common double knock strategy is glyphosate followed by paraquat. It has been widely adopted to prevent or combat glyphosate resistance, particularly in ryegrass. The first 'knock' with glyphosate is aimed to control most of the population with the second 'knock' (paraquat) intended to kill any individuals that have survived glyphosate. In the presence of glyphosate resistance, paraquat applied one to five days following glyphosate was shown to provide optimum control in trial work conducted by Dr Christopher Preston (Figure 7). The timing depends on weed size and growing conditions, with three to five days required to maximise glyphosate activity. After a week (depending on environmental conditions) glyphosate resistant plants treated with glyphosate can stress, resulting in the absorption of less paraquat, reducing control with the second tactic. If growing conditions are poor or plants large, the stress imposed by glyphosate maybe further delayed.

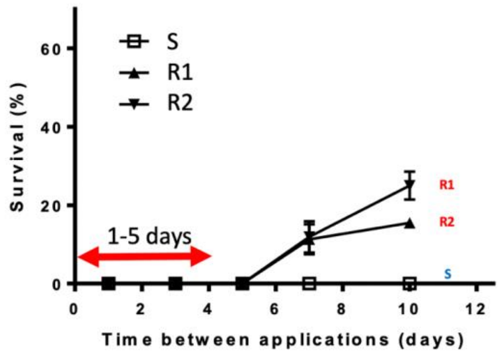


Figure 7. Double knock timing and its effect on ryegrass survival rate. Glyphosate applied onto a susceptible (S) and two glyphosate resistant ryegrass biotypes (R1 and R2) followed by paraquat 1, 3, 5, 7 and 10 days after application (DAA). (Source: Trial work conducted by Dr Christopher Preston (The University of Adelaide)).

4. All clethodim and certain glyphosate products are recommended for use in glyphosate-tolerant canola varieties. Many populations of ryegrass with resistance to clethodim, glyphosate and both herbicides have been confirmed. In a recent pot trial, ryegrass populations with resistance to clethodim, glyphosate and both herbicides were tested with a tank mix of 1.15L/Roundup Ready® PL and 500ml/ha Clethodim EC240. This combination was confirmed effective in most of the populations tested with control averaging 95% compared to 73% and 79% for standalone glyphosate and clethodim, respectively (Figure 8).

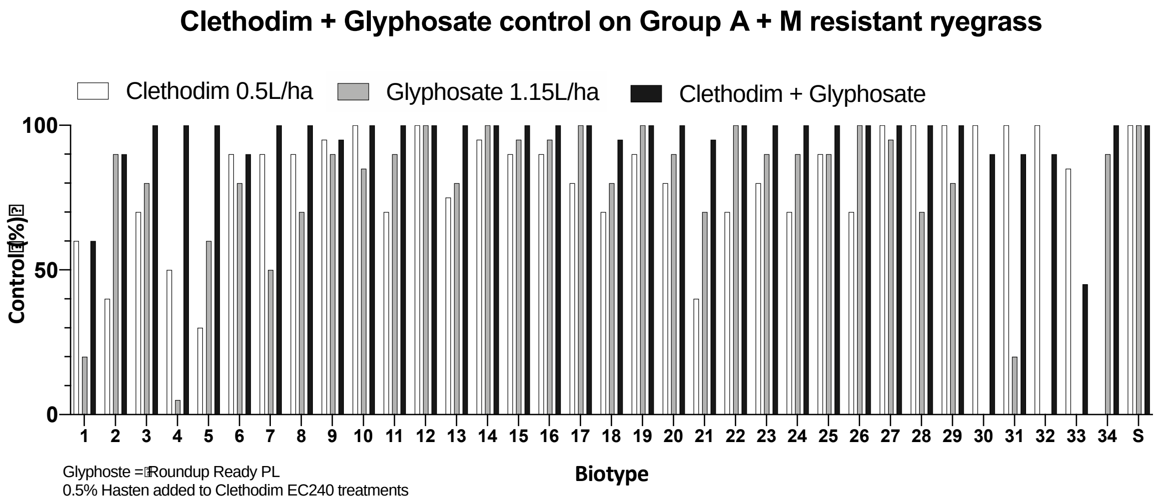


Figure 8. Control of cyclohexanediones (DIMs)- and glyphosate- resistant ryegrass with tank-mixed Clethodim and Roundup Ready® PL herbicide.

Summary

In the southern cropping zone, glyphosate resistance in ryegrass continues to increase as indicated by random weed surveys across the region and the Bayer Resistance Tracker database. The early break in autumn 2020 resulted in the targeted testing of about 200 ryegrass populations prior to sowing with over half confirmed resistant to glyphosate. Although it took about 20 years after the registration of glyphosate for the first case of resistance to be confirmed, in the past 10 years there has been an exponential rise in the number of confirmed cases. Decades of strong selection pressure resulting from repeated use, coupled with application under suboptimum conditions has played a major role in the exponential rise. More efficient use of glyphosate combined with effective integrated weed management (IWM) strategies is required to reduce further increases in resistance.

Acknowledgements

The information for the random weed surveys was undertaken as part of GRDC project UCS00020, and therefore, is made possible by the significant contributions of growers through the support of the GRDC, the author would like to thank them for their continued support.

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Novel agronomy strategies for manipulating flower date and yield

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Take home messages

- *Mechanical defoliation and removal of main stem apices during early stem elongation was reliably able to 'reset' (slow down) development of early sown quick – mid spring wheat.*
- *Yields of reset quick – mid spring wheat were comparable to early sown winter wheat.*
- *The reset strategy requires fine tuning but differs* from dual purpose research and current grazing recommendations.
- *If slowing crop development is successful, growers may only require one cultivar and can still spread sowing dates, or plant early irrespective of seasonal break timing, and then manipulate phenology to better match the season.*
- *The reset strategy should complement breeding and may not be suitable for the lower rainfall zones and some seasons.*
- *Alternative strategies should be pursued that delay development without reducing biomass in lower rainfall environments.*
- *New management strategies could also apply to other crops and be* used in more agro-ecological zones.
- *Hormone application showed little ability to speed up development under field conditions.*

Background

The timing of autumn rainfall which allows germination is variable, and spring cultivars popular in the Southern region have a narrow period during which they must germinate in order to flower during the optimal period. Growers need access to a range of genetic and management tools to more reliably ensure optimal flowering times are achieved and widen available sowing windows. The ability to manipulate wheat development in-crop using applied hormones or chemical and mechanical defoliation in southern Australia was evaluated. Interventions sought to either slow development in precocious crops that germinate before their optimal time or accelerate the development of slower developing cultivars that germinate later than is optimal.

Methods

Experiments were conducted at five locations in South Australia (SA) (**Error! Reference source not found.**). Three germination dates were targeted, defined here as time of sowing (TOS) 1, 2 and 3. TOS1 was mid-April which is optimal for winter cultivars in all environments and too early for quick developing spring cultivars. TOS2 was early to mid-May (depending on site) which is optimal for quick developing spring cultivars in most SA environments. The TOS3 was early June which is considered too late for all cultivars. The Hart site had only an early and late planting date. Sowing dates and site locations are outlined in **Error! Reference source not found.**.

Genotypes were selected based on three contrasting development patterns. A winter cultivar suited to earlier sowing was either the quick winter Longsword^A at Minnipa, or the mid-quick developing Illabo^A. The very slow developing spring cultivar Nighthawk^A was used, it has a facultative vernalisation and strong photoperiod requirement, which makes it suitable for earlier sowing. The well adapted quick - mid developing spring wheat Scepter^A was sown at all sites.

Experiment 1 included defoliation treatments. A chemical anionic acid and mechanical defoliation (using a mower to remove the emerging apex) treatment were imposed to a locally adapted fast spring cultivar sown early when the crop reached Zadoks growth stage 31 – 32 (Terminal spikelet). This is known as the reset strategy.

Experiment 2 included hormone treatments; gibberellic acid and 6-Benzyladenine (Cytokine) applied to locally adapted mid - quick spring, slow spring and winter wheat cultivars that germinated either early, optimally or late. These treatments were applied at both the 5-leaf stage and the onset of stem elongation.

Table 1. Site locations, GPS coordinates and corresponding sowing dates.

Site Location	**Sowing Date**		
	TOS1	**TOS2**	**TOS3**
Hart	16/4/19	NA	3/6/19
Minnipa	17/4/19	7/5/19	4/6/19
Loxton	15/4/19	10/5/19	4/6/19
Giles Corner	18/4/19	16/5/19	6/6/19
Cummins	15/4/19	14/5/19	14/6/19

Experiment 1 results - flowering time and yield responses to defoliation

Flowering dates of the quick - mid spring cultivar sown in mid-April varied from 11 August at Hart to 6 September at Giles Corner and flowered before optimal flowering periods at all sites (**Error! Reference source not found.**). The winter cultivar sown mid-April flowered seven days later than optimum at Minnipa, four days later at Cummins, 16 days later at Loxton, one day later at Giles Corner, and eight days earlier at Hart.

Mechanical defoliation had a significant effect on flowering time, but the chemical defoliation did not (NS Fpr>0.05) (not presented). The effect of mechanical defoliation ranged from nine-day delay in flowering date at Giles Corner to 18 days at Hart. The mean effect of defoliation was a 13 day delay in time to flower across all sites; however this only shifted flowering to be within the optimum flowering period (OFP) defined by Flohr *et al.* (2017) at Minnipa, and still too early at the other sites.

Table 2. Anthesis dates of the quick - mid cultivar Scepter[A] across all sites in 2019 and in response to defoliation (*Mechanical defoliation and removal of main stem apices during early stem elongation using a mower)* from the mid-April germination date in experiment 1.

Site	Quick – mid Spring flowering date	Defoliated quick - mid Spring flowering date	Defoliation effect in days delayed to flowering	Winter cultivar control flower date	Optimal flowering date#
Minnipa	14 Aug	25 Aug	-11	2 Sep*	25 Aug
Cummins	22 Aug	02 Sep	-11	24 Sep	18 Sep
Loxton	18 Aug	03 Sep	-17	25 Sep	9 Sep
Giles Corner	6 Sep	15 Sep	-9	27 Sep	26 Sep
Hart	11 Aug	29 Aug	-18	16 Sep	24 Sep

#Optimal flowering dates were derived for these locations from Flohr *et al.* (2017), *Longsword[A]

Grain yield responses

The reset spring strategy (mechanical defoliation of the early sown quick – mid spring cultivar) was the highest yielding treatment at Cummins and Minnipa, and similar to either the quick – mid spring sown at optimal or the highest yielding treatments at all other sites. Importantly compared to the untreated quick - mid spring sown early, the reset strategy yielded 1.5t/ha higher at Cummins, 0.8t/ha higher at Giles Corner, 0.4t/ha higher at Hart and Minnipa, and not significantly different at Loxton. Compared to the practice of early sown winter wheat the mechanical reset strategy yielded 0.7t/ha higher at Cummins, 0.5t/ha higher at Hart, 0.4t/ha higher at Minnipa, and was not significantly different at the other sites. The yield of the reset strategy was greater than the late-sown quick- mid developing spring at all sites except Loxton. Chemically defoliated treatments yielded similarly to the untreated early sown quick – mid spring cultivar in all environments (Table 3).

Table 3. The yield response to management combinations of an early sown quick – mid spring untreated and defoliated compared to a winter cultivar sown early, quick – mid spring sown at optimum, and quick – mid spring sown late at all locations. Letters indicate significant difference within a site.

Management Combination			Environment				
Sow Date	Cultivar	Treatment	Cummins	Giles Corner	Loxton	Hart	Minnipa
TOS1	Quick – mid spring	Untreated	3.7d	5.1b	0.6bc	2.3b	2.7b
TOS1	Quick – mid spring	Mech Defoliation	5.2a	5.9a	0.8ab	2.7a	3.1a
TOS1	Quick – mid spring	Chem Defoliation	3.6d	5.0b	0.4c	2.2b	-
TOS1	Mid – winter	Untreated	4.5c	5.5ab	1.1a	2.2b	2.7b
TOS2	Quick – mid spring	Untreated	5.6b	5.3b	0.6bc	-	2.5b
TOS3	Quick – mid spring	Untreated	4.3c	5.2b	1.0a	1.8c	2.1c
Environment			<0.001				
Management			0.003				
Environment x Management			<0.001				

Across all sites the benefit of the reset strategy compared to the mean yield of a quick – mid spring sown early was 0.4t/ha and was not significantly different to the quick – mid developing sown on time (May) (Figure 1). The yield of the winter cultivars sown early (TOS1) were not significantly different to the quick – mid spring sown on time (TOS2) but were 0.6t/ha less than the quick – mid cultivar when both were sown at TOS2, and 0.8t/ha less when both were sown at TOS3.

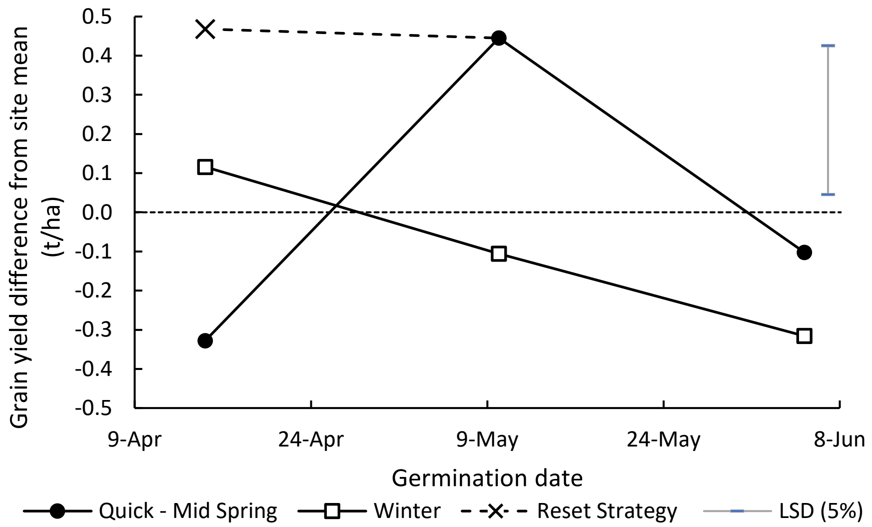

Figure 1. Mean grain yield responses of the quick - mid cultivar Scepter and slow developing winter wheat to germination date and the defoliation treatment (X) applied to Scepter[A] sown early at Minnipa, Tarlee, Cummins, and Loxton in 2019.

Experiment 2 results - flowering time and yield responses to hormones

The effect of cultivar and sowing date x site interactions were greater and more significant than any hormone treatment for both grain yield and flowering date (data not shown). There was no significant effect of the hormone treatments on grain yield, despite a TOS x cultivar x treatment interaction for biomass and a site x treatment interaction for harvest index (data not shown). The largest effect on grain yield was consistent with the flowering date responses, in that there was a TOS x cultivar x site interaction. At Cummins optimum yields were achieved from flowering times around 19 September which corresponded to a quick – mid spring wheat sown on 10 May, 24 September at Loxton, and 23 September at Giles Corner (Figure 4).

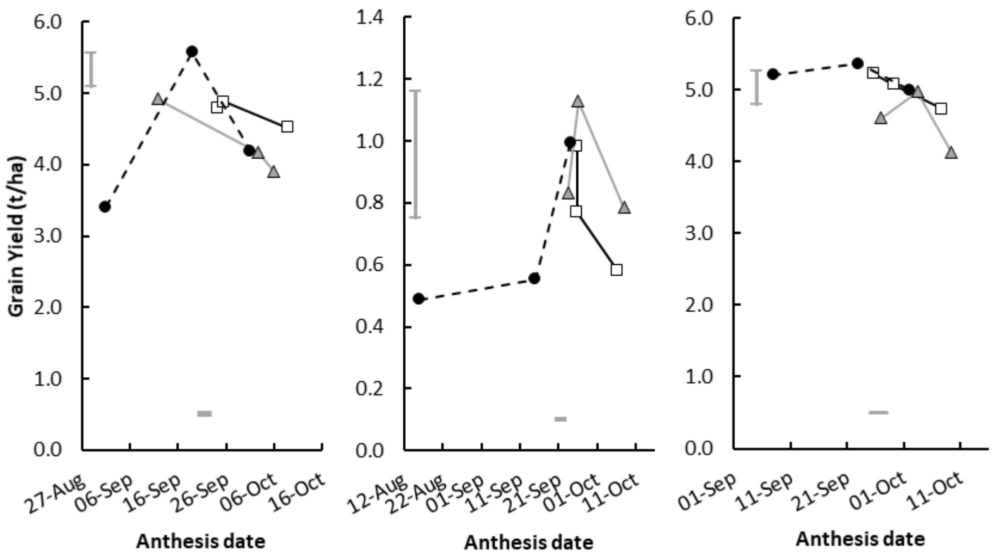

Figure 4. The relationship between flowering date and grain yield in response to sowing date (each progressive data point represents TOS1, TOS2, and TOS3) and cultivar ● fast spring, □ mid-fast winter, and the ▲slow spring across all three sites A) Cummins (left), B) Loxton (centre), and C) Giles Corner (right). The vertical grey bars indicate the LSD (5%) for grain yield, and the horizontal grey bars are the LSD for flowering time.

Discussion and agronomic considerations

1. The reset strategy has the following advantages: seed of a smaller number of cultivars is required, and it is more robust than winter wheat if germination ends up being late. The newer generation of winter wheats evaluated in these experiments are now capable of yielding similarly to quick – mid developing wheat sown at its optimal time (10 May). This means that if germination opportunities occur in April, growers can achieve yields similar to well adapted spring cultivars sown on time (Porker *et al.* 2019). However, there are some downside risks.

When the winter wheat emerged in May it suffered a significant 0.55t/ha yield penalty (compared to a quick – mid at optimal), and a 0.75t/ha yield penalty from June emergence. This highlights the downside risk of a winter wheat in southern environments if it germinates after 1 May which is likely under ‘dry sowing scenarios’. The likelihood of germinating rains increases substantially in May to June in SA, increasing the risk and difficulty to match crop development speed with an optimum germination and establishment date in winter cultivars. Compared to the emergent practice of early sown winter wheat, the mechanical reset strategy yielded either higher or similar at all sites. This is an important finding as it means that growers can achieve similar to greater yields as with an early sown winter cultivar without the downside risk of a yield penalty from delayed emergence or the need to have multiple cultivars. If validated over sites and seasons, the reset strategy could be an alternative method for stabilising flowering time and yield that does not require growers to keep multiple cultivars.

2. The yield advantage of resetting crops was of greater magnitude in the higher yielding seasons (in field and simulation experiments) and similar to control treatments in the lowest yielding seasons. Growers to increase yields in the low rainfall regions, will likely require other solutions that can flower optimally without comprising biomass. Breeding faster developing winter cultivars that flower optimally from later establishment dates is one solution that needs to be pursued (Hunt *et al.* 2019b). Longsword[A] is the only fast winter cultivar currently commercially available, and feed classification of this variety will prevent widespread uptake by grain growers.
3. Our field studies only had capacity for one defoliation date, at one intensity level (cut at ground level). While we demonstrated this was effective in slowing down the development, more field experiments need to be conducted to determine the optimum timing and defoliation intensity.
4. These strategies all cost money and add another operation to farm logistics but could be offset by the value of grazing or making silage (too early to cure hay). In contrast to defoliation, hormone treatments had little effect on flowering time and yield under field conditions. Previous studies have demonstrated both gibberellic acid and 6-benzyladenine can alter plant development by directly influencing reproduction and floral initiation in winter cereals, particularly through vernalisation and photoperiod pathways (Razumov, 1960; Barabas and Csepely, 1978; Al-Jamali *et al.* 2002; Pearce *et al.* 2013).
   However, most of these experiments were conducted under glasshouse conditions, or were sprayed continually at more frequent intervals which are impractical interventions for field operations.
5. This resetting strategy challenges current agronomic recommendations as it differs from dual purpose research and grazing recommendations. Traditional defoliation timing in Australian spring wheats has been recommended to occur prior to the onset of stem elongation to avoid damaging the emerging apex, however these recommendations were always suggested in relation to late sown crops.

Spring wheat cultivars sown on time usually incur a yield penalty when defoliated (Latta 2015, Frischke *et al.* 2015). This reset strategy is different as it deliberately tries to remove the apex in plants that are sown three weeks earlier and have emerged before their optimum date.

6. In our experiments chemical defoliation did not significantly delay flowering time and yields were similar to the untreated control. This was likely due to limited leaf burn and the desiccation effect of the acid under cold and wet winter conditions in SA. Further experiments should evaluate other chemical desiccants that are known to have a greater impact on leaf area in cereals.

Conclusion

The ability to speed up or slow down crop development within season unlocks new management possibilities not previously explored in annual grain crops. Hormone application showed little ability to speed up development under field conditions. Defoliation and removal of main stem apices during early stem elongation was reliably able to reset development of precocious spring wheat and increase yield relative to untreated controls. Yields of reset spring wheat were comparable to early sown winter wheat, meaning growers only require one cultivar and can still spread sowing dates substantially. The reset strategy needs to be fine-tuned and evaluated over sites and seasons, but if results are repeated this approach would be transformative as it offers growers the ability to plant early, irrespective of seasonal break timing and then manipulate phenology to better match the season. The approach may not be suitable for the lower rainfall zones and alternative strategies for this zone must be pursued, such as faster developing winter wheats that will maximise biomass production but flower on time from both early and late germination. New management approaches such as this *complement breeding programs and are potentially a relatively low-cost adaptation tool for growers in a warming and drying climate. It could also apply to barley, used in more agro-ecological zones and doesn't have the same downside under late emergence as winter wheat.*

Acknowledgements

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Allan’s enduring contribution to grains industry recognised

The contribution of Crop Science Society Life Member and agronomic consultant Allan Mayfield to the Australian grains industry has been officially recognised with the Grains Research and Development Corporation (GRDC) 2021 Southern Region "Recognising and Rewarding Excellence" Award.

Voted upon by the GRDC Southern Region Panel, the award acknowledges Dr Mayfield’s long-standing input and commitment to the nation’s grains industry.

The award was presented to Dr Mayfield, of Clare (South Australia), by GRDC Southern Region Panel chair John Bennett at this week’s GRDC Grains Research Update in Adelaide.

“There are many words to describe Allan – but effervescent, efficient, spirited, generous, hard-working, motivated, knowledgeable, unpretentious and considerate are right at the top,” Mr Bennett said.

Dr Mayfield grew up on a farm at Kimba on Eyre Peninsula and took an interest in farming and agronomy from an early age.

After graduating with a Bachelor of Agricultural Science and a PhD in Plant Pathology, he worked with the then South Australian Department of Agriculture on plant disease research and then went on to work in crop protection at Clare before starting his own consultancy business in 1991.

“Supporting growers with their decision making and helping to make a difference on-farm and in the hip pocket has been one of Allan’s constant passions,” Mr Bennett said.

“The challenge of overcoming ever-evolving constraints has been a driving force behind his fierce desire to extend new knowledge and understandings from research into application in the paddock. He has been a tireless collector and disseminator of information, fervently promoting best practice and methods of pushing farming frontiers.”

Dr Mayfield’s selfless commitment to improving farming systems and the fortunes of grain growers saw him become one of the pioneer members of the Hart Field Site Group, where he served as the research manager for 10 years and, along with fellow agronomist Barry Bull, laid the foundations for the now popular and professional Hart Field Day.

Having seen the potential of precision agriculture early on in the movement, Dr Mayfield also worked with Southern Precision Agriculture Australia as a research co-ordinator.

He recently stepped down after eight years in the scientific officer role at the South Australian Grain Industry Trust. SAGIT Chair Max Young paid tribute to Dr Mayfield at the time – saying his contribution to the Trust, and the industry as a whole, had been substantial.

Dr Mayfield was a GRDC Southern Region Panel member from 2003 to 2011. This role enabled him to act as an influential interface between the organisation and its grower levy payers.

"The value that Allan brought to the Panel and the GRDC more broadly was enormous. His insights, knowledge and close working relationships with growers and the research community helped to inform many impactful GRDC investments in research, development and extension," Mr Bennett said.

Dr Mayfield's expertise is broad and includes agronomy of temperate broadacre crops and pastures, particularly crop protection; using precision agriculture techniques to assess and manage production variability of crops; project management and evaluation; and grower group facilitation.

Over the years he has fulfilled many additional roles – including chairman of the Grain Legume Handbook Committee, leader of the Eastern Grain and Graze Research Advisory panel and a member of the Crop Science Society Programming Committee. He was Director of Farm Management 500, chairman of GRDC's SA adviser Updates, and chairman of GRDC Cropping Expos for SA.

He has been involved in numerous project reviews and study tours – many associated with the GRDC.

As a recipient of a Churchill Fellowship in 2002 to study high-yielding wheat production systems in New Zealand and Europe, Dr Mayfield gained a more international perspective on production methods and developed many international collaborations. More recently he contributed to an Australian aid project promoting zero till in North Africa.

In addition to being a Churchill Fellow, he is a life member of the Crop Science Society of SA and a Fellow of the Australian Institute of Agricultural Science and Technology.

"He has also been a prolific contributor to research, papers and publications, and continues to be actively involved in the organisation and conduct of various workshops, courses and collaborations – all while supposedly being retired," Mr Bennett said.

The GRDC Recognising and Rewarding Excellence Award is not the first honour to be bestowed upon Dr Mayfield. For example, he was named SA Citizen of the Year in the 2020 Australia Day honours in recognition of his voluntary contribution to charity, tourism, his community, the environment and agriculture.

"But it is his important input into the grains industry that we specifically acknowledge today," Mr Bennett told the hundreds of growers, advisers and researchers in attendance at the Grains Research Update. "We thank Allan for his decades of effort, commitment and contribution. He has helped shape this vibrant grains industry of ours."

In accepting the award, Dr Mayfield said that in addition to working with growers, one of the "quiet passions" of his life had been nurturing young people into the industry "because they are the future of the industry".

"When you see so many young people at events such as the Hart Field Day that gives me great encouragement for the future of agriculture," Dr Mayfield said.

Caption: Allan Mayfield (left) receives the GRDC 2021 Southern Region Recognising and Rewarding Excellence Award from GRDC Southern Region Panel chair John Bennett. Photo: GRDC

Grain Producers Grain Marketing Workshops.

Grain Producers SA will be hosting a full day of FREE interactive sessions tailor made to assist grower's understanding of trade and market access barriers, requirements, and diversification opportunities. Growers will have the opportunity to engage with industry experts on everything from how to best manage phytosanitary barriers to trade, to tips on diversifying grain markets.

Registration is FREE but limited due to COVID-19 restrictions with lunch and refreshments provided.

- **Yorketown**, 16 February, Yorketown Progress Association Hall
- **Balaklava**, 17 February, Balaklava Sports Club
- **Tailem Bend**, 23 February, Tailem Bend Football Club
- **Naracoorte**, 25 February, Naracoorte Town Hall

Market Ready 9.00am-12.30pm

Facilitated by former Executive Director of Biosecurity SA at PIRSA, Will Zacharin, the Market Ready workshop will highlight the perspectives of exporters, storage and handlers, researchers and developers, agronomists and local farmers' knowledge regarding on-farm grain hygiene practices and specifically their obligations under the Grain Industry Market Access Forum's Industry Management Plan.

Market Ready is an initiative of the South Australian Grain Market Access Group. It is delivered by Grain Producers SA with the support of the Federal Government's Agricultural Trade and Market Access Cooperation Program.

Learn more about GPSA's Market Ready campaign here.

Beyond the Silo 1.00pm-5.00pm
The Beyond the Silo workshop features Thomas Elder Markets Analyst, Andrew Whitelaw, who will discuss world market dynamics and global grain outlooks, including on-farm diversification strategies to target emerging markets. This workshop will also cover key trade rules governing grain contacts and provide an overview of the Australian Grain Industry Code of Conduct.

Beyond the Silo is run in partnership with Grain Trade Australia and proudly supported by the SA Government, Regional Growth Fund.

Learn more about GPSA's Beyond the Silo campaign here.
More details can be obtained from

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Crop Science Society Awards opportunities

Tony Rathjen Student Contribution Award

The Tony Rathjen Student Contribution award has been created by the SA Crop Science Society in memory of the late Professor Tony Rathjen. Tony was a founding member of the Crop Science Society and believed strongly in a vibrant interaction between researchers and farmers. During his long career, Tony was an influential mentor to many students and greatly encouraged innovative thinking and student participation in the debate of agricultural issues.
The Crop Science Society is centred around a monthly newsletter and meeting, which brings the broad agricultural community together for the dissemination of relevant new research, technical advice and emerging issues involved with crop production.
The Tony Rathjen award is designed to encourage students to present their research in a media that is immediately accessible to farmers, as well as to continue his legacy of student participation in the Crop Science Society and the agricultural community.

- Students are encouraged to prepare an article for the Crop Science Society Newsletter. All student articles published in monthly newsletters will receive $100.
- The recipient of the main Tony Rathjen Student Contribution will be decided in June and announced at the AGM in July. The student who prepared the best article that highlights excellent agricultural research combined with innovative thinking will be awarded $500. The recipient will present their research at a Crop Science Society meeting.

We encourage students to become affiliated with the CSSSA and make use of the society to assist and publicise their research
Here is more information on the application process and article guidelines, for the Tony Rathjen Student Contribution Award.

Duncan Correll Crop Science Society Awards.

Applications are invited for members to apply for a grant to attend conferences, field days, study tours or any other matter which will benefit the Crop Science Society. Awards are normally limited to $1000 per year.

Applicants will be reviewed by the President and members of the Crop Science Society Travel sub committee, who are ineligible while serving in this capacity.
Recipients of travel awards are required to provide a written report to the Crop Science Society committee within six weeks of returning from the conference or tour including a short two page summary of major findings. They are also asked to give a short presentation at a future Crop Science Society meeting.

Applications should detail reasons for travel and how the travel will benefit the society. Applications can be forwarded to the secretary in writing and should be received at least two months prior to using the award.

John Both Award for excellence in in-field crop research.

In recognition of the late John Both, the Crop Science Society established an award in 2019 for significant contribution to crop protection through in-field crop research.
Nominations are invited from members to recognise a researcher that practices in-field research that has demonstrated significant and enduring contribution to crop science.

The award will consist of

- A certificate to be presented at a Crop Science event along with an emblazoned item of clothing.
- Media coverage of the winner.

https://www.cropsciencesocietysa.com.au/awards-scholarships/