

Growing long season wheats on the south-coast of WA

Nathan Dovey, CEO, SCF

KEY POINTS

- Early autumn rainfall provides an opportunity to establish crops much earlier than currently practiced in the southern high rainfall zone (HRZ) of WA.
- Winter wheat can be sown from late March to mid-April, depending on soil moisture conditions.
- Stirlings to Coast Farmers research has shown that winter wheat (E.g., Illabo and DS Bennett) sown early, can grow equivalent yields to spring wheat like Trojan and Sceptre, planted at their usual time.
- Winter wheat has much less risk from frost damage when sown earlier compared to spring wheat due to their vernalisation requirements.
- Early sown winter wheat can provide valuable grazing opportunities for mixed farmers in the southern HRZ of WA, with minimal yield penalties.



FIGURE 1: Photo of the second time of sowing at the Kendenu plot trial in 2018. The photo was taken on August 15, 2018.



FIGURE 2: Farm-scale long season wheat trial at Perillup, WA in 2017. This was the highest yielding farm-scale trial grown in the project between 2016-18. Seeding date was April 27.

Introduction

Balancing time of sowing for wheat has always been a compromise between seeding too early and risking frost damage or too late, which risks drought and heat damage. Winter rainfall is declining, and season breaking rains are inconsistent, making it is hard to know when to seed. Despite winter rainfall decline, southern growers, often get opportunities to sow early through summer and early autumn rainfall events.

Winter wheat has a vernalisation requirement, which means the plant needs a certain period of cold temperatures before they will develop past tillering. At early sowing dates, winter wheat will flower more uniformly than spring wheat. When spring wheat, such as Sceptre, is sown early, it flowers early, which means it has a high risk of frost damage. Winter wheat sown in late March will not flower much later than when planted in April. SCF secured funding through the Royalties for Regions, Agricultural Innovation Fund, to investigate if winter wheat could provide benefits to cropping systems in the southern high rainfall zone of WA.

Winter wheat provides an opportunity to extend the sowing window for a grower's whole seeding program. By starting to

seed earlier, when conditions allow, more crops are going to be planted within their optimal sowing window, which means all crop yields will increase. SCF conducted a combination of small plot trials, with two times of sowing, and broad-scale farmer trials between 2016-18. The research was conducted on a range of wheat maturities from slow winter types (DS Bennett) to fast spring types, like Sceptre. Trials covered a range of seeding times, which enabled SCF to explore which maturity types suited the environment on the south coast of WA.

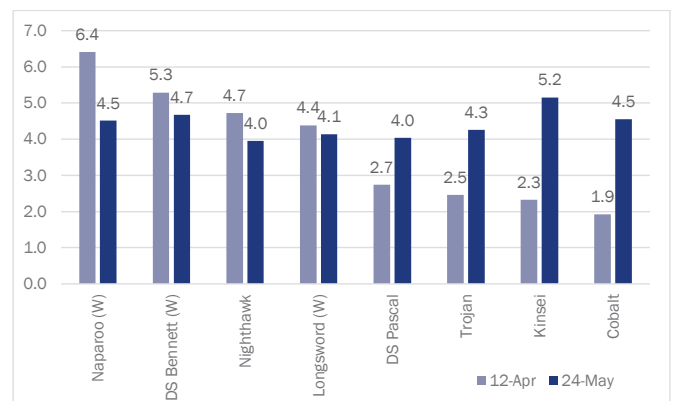


FIGURE 3: Small plot yields for the 2018 long season wheat trial located at Kendenu, WA. The first time of sowing (TOS) was April 12, and required 13mm of irrigation to ensure germination. The second TOS was May 10, 2018. (W) indicates a winter-type maturity.

TABLE 1: Summary of grain yields from the broad-scale long-season wheat trials in 2018. Sites encountered a range of environmental conditions, including frosts. (W) indicates a winter wheat variety. Means followed by the same letter or symbol do not significantly differ ($P = 0.05$, LSD)

Location	Perillup	Kojaneerup	West Kendenup	South Stirlings
Sowing Date	April 27	May 4	May 9	April 12
GS Rainfall	414mm	221mm	362mm	256mm
ADV.0008 (W)	6.7ab			3.4a
Cobalt	4.3d	3.6b	4.6b	
DS Bennett (W)	7.3a	3.3bc		3.3a
DS Pascal	5.5bc	3.2c	3.7d	1.3b
Kinsei	5.8bc		4.3bc	
Longsword (W)	5.1cd	3.3bc	4.2c	3.3a
Ninja			4.0cd	
Trojan		2.7d	4.3bc	
Planet Barley		4.8a	6.1a	

TABLE 2: Summary of small plot trial data for Stirlings to Coast Farmers long-season wheat project between 2016-18. Displays average yields for the winter and spring type wheats over two different sowing dates.

Year	Variety	TOS 1	TOS 2	Seeding Date	Location
2016	Winter	6.87	5.79	TOS 1- 28 April	Kendenup
2016	Spring	6.97	6.02	TOS 2- 26 May	Kendenup
2017	Winter	5.29	4.86	TOS 1- 20 April	Manypeaks
2017	Spring	5.23	5.46	TOS 2- 10 May	Manypeaks
2018	Winter	5.36	4.44	TOS 1- April 12	Kendenup
2018	Spring	2.84	4.39	TOS 2- May 24	Kendenup

Discussion

- Winter wheat yields were comparable or better than spring wheat when sown early (April 12, 20 and 28th) in our research.
- Winter wheat yields were significantly higher than average spring wheat yields when sown on April 12, 2018. The yield difference was likely due to frost events damaging spring wheat yields, while not affecting the winter varieties.
- Sowing earlier only resulted in higher yields in 1/3 years for spring varieties. The first sowing date in 2017, was April 28, which is not much earlier than standard grower practice in southern WA.
- Sowing earlier resulted in higher yields for winter wheat in all three seasons (2016-18).
- Our limited data from sowing earlier than April 12 suggests there can be a penalty from seeding winter wheat too early. Critical factors to consider are variety season length and soil moisture.

Conclusion

- SCF research shows winter wheat can be sown earlier without the risk of frost damage yet still yield competitively with spring wheat sown at their standard time. Sowing earlier provides an opportunity to spread the seeding window out, which means planting more hectares in the ideal sowing window. Planting more hectares in the optimum seeding window will increase whole-farm yields and profits.
- In 2018, we experienced multiple frost events at the Kendenup plot site, and this showed the value of seeding winter wheat early (April 12) compared to spring varieties. Winter wheat has a stable flowering time regardless of the sowing date because they require vernalisation (cold period) before they develop beyond tillering.
- Winter wheat is an opportunity crop to take advantage of early soil moisture. Even in perfect conditions, winter wheat is not likely to exceed a grower's total spring wheat program.

Key terms

- **WINTER WHEAT:** Winter wheat requires a vernalisation period for them to progress beyond the tillering phase. For example, DS Bennett, Naparoo, Longsword
- **VERNALISATION:** Induction of the plant's flowering process due to prolonged exposure to cold temperatures.
- **SPRING WHEAT:** Wheat that does not require vernalisation which means it can be sown in the autumn so it can flower in spring—for example, Mace, Sceptre, Trojan, DS Pascal.
- **PHOTOPERIOD:** This refers to the time that a plant is exposed to light in 24 hours.
- **OPTIMAL FLOWERING TIME:** Defined as the time that minimises the combined risk of frost and drought/heat stress and therefore maximising grain yield.

Tips for growing winter wheats

1. Ensure there is adequate soil moisture for even germination. Ideally, moisture to last until the autumn seasonal break.
2. SCF research indicates the ideal sowing time for southern WA is April 7-21.
3. Sow into a paddock with a low weed burden because ryegrass will germinate too late to be controlled in the knockdown.
4. Use robust pre-emergent herbicide and fertiliser package at seeding.
5. When planning to graze, growers should seed a minimum of 100kg/ha to maximise early-season biomass for feed.
6. Apply nitrogen after grazing to maximise the re-growth of the crop.

TABLE 3: Examples of wheat varieties and sowing windows on the south coast of Western Australia

	Winter wheats	Slow Maturing Spring Wheat	Mid-Maturing Spring Wheats	Fast-Maturing Spring Wheats
Sowing Window	Mid-March - Mid April	Mid-April- Late April	Late April- Mid May	Mid May onwards
Variety Examples	DS Bennett Longsword Naparoo Revenue	Beaufort DS Pascal Nighthawk	Kinsei Magenta Rockstar Trojan	Cobalt Corack Mace Sceptre

This project was made possible through the support of the Department of Primary Industries and Regional Development's Grower Group Development Fund



Department of
Primary Industries and
Regional Development