EARLY SOWING PAYS OFF

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Future Drought Fund

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Hart Field Site Group

Key messages

- **Early sowing in dry years can risk small rain events that trigger germination without enough follow-up moisture for emergence.**
- **Understanding how different rainfall amounts affect germination, emergence and recovery helps growers decide whether to wait, re-sow, or manage patchy crops through the season.**

Hart's time-of-sowing trials are helping uncover how much early sowing decisions—and the weather that follows—can influence crop establishment and yield. Research Officer Kaidy Morgan said, 'In our first year we had a wet start, and time of sowing turned out to be more important than soil moisture,' she says. Early sown wheat and canola had lower establishment but no yield penalty. Early sowing helped crops make better use of growing season rainfall to build biomass and set up yield potential.

'But in dry conditions, those earlier sowing dates seem to be more risky,' Kaidy said. 'This year we've had small events—around 2 to 3 mm—which is enough to start germination, but not enough to get the crop out of the ground.'

Hart is running a simulated rainfall trial to understand the impact of various rainfall amounts on crop emergence, growth uniformity, and yield.

After dry sowing on a clay loam soil, plots were hand-watered with 5, 10, 15, 20, or 25 mm of water, to simulate different rainfall events. Soil moisture was monitored for eight weeks to track how long a single rainfall event could support crop growth.

'Conditions were perfect for this kind of trial,' says Kaidy. 'Unfortunately, that meant no follow-up rain, so we've been able to see the true impact of a single rainfall event.'

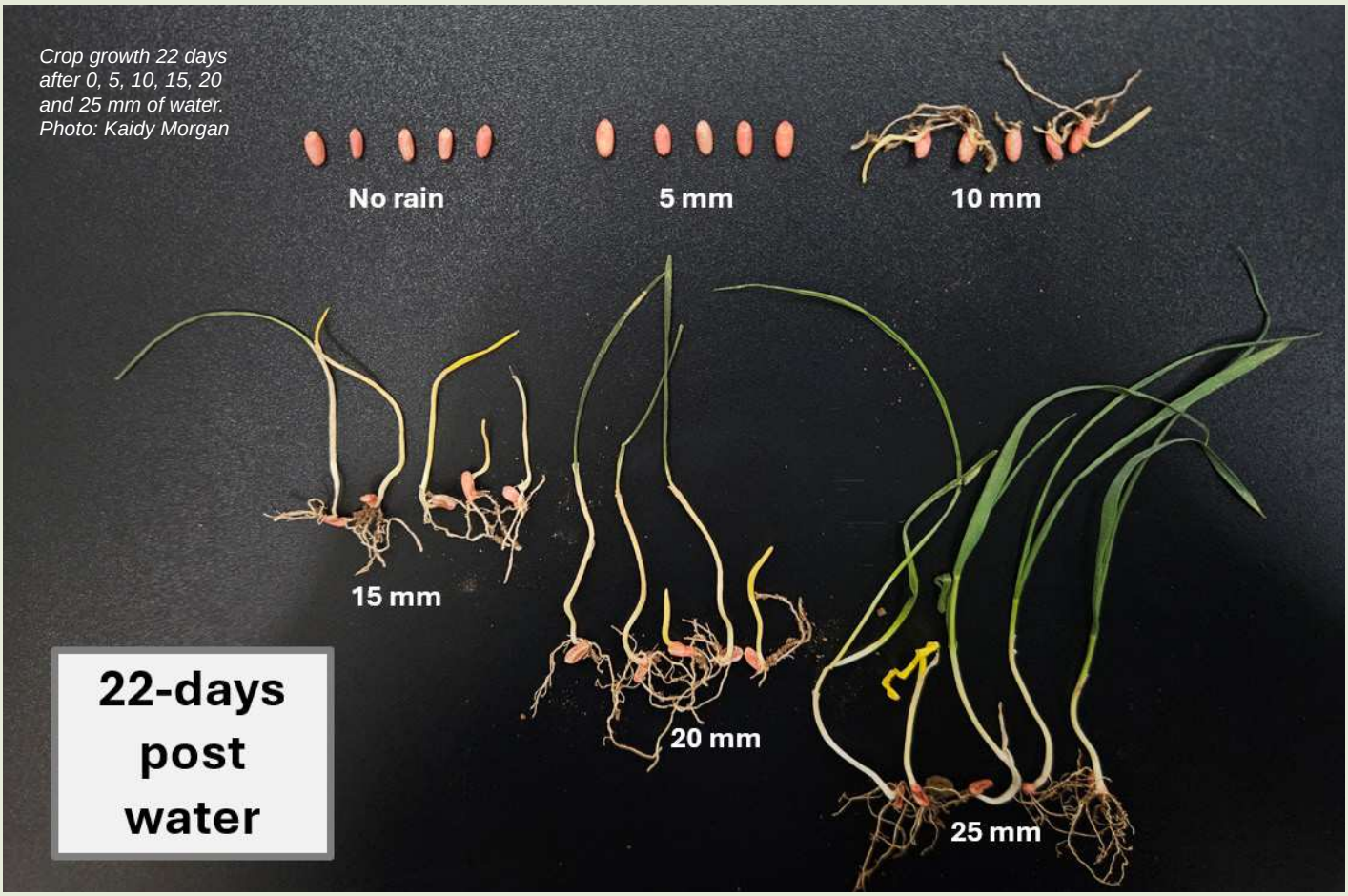
In the 5 mm treatment, there wasn't enough water to trigger germination. 'That was similar to what we saw last year,' Kaidy says, 'where the seed sat dry in the soil for six weeks.' Despite the delay, last year's canola established just as well as crops sown later, once rain arrived. Note due to the dry season, all treatments had low yield.

In the 10 mm plots, about 90 % of seeds had germinated but not emerged after 3 weeks.

With 15 mm of water, half of the crop emerged, while the other half had germinated and not emerged.

'It needed another follow-up rain to bring the rest up,' Kaidy said. 'Without it, the crop ends up at different growth stages, which can cause problems later in the season.'

The team expected the 20 and 25 mm irrigation treatments to perform best, but after a few weeks the crop had run out of water. 'We went out one day expecting to see green plants, but they had brown leaves.



Crop growth 22 days after 0, 5, 10, 15, 20 and 25 mm of water. Photo: Kaidy Morgan

Key takeaways

- **Dry sown cereals can remain viable for up to six weeks after seeding.**
- **Dry sown pulses risk nodulation failure as rhizobia are sensitive to dry conditions.**
- **It does not take much rain to trigger germination but successful emergence depends on follow-up moisture.**
- **Early sowing limits weed control options. A backup plan is important in case the pre-emergent herbicide fails.**

Deciding when to begin sowing is an important and difficult call growers make each season, particularly in dry conditions. The right timing can make the most of limited rainfall and set the crop on track, but sowing too early or late can result in poor emergence, weed pressure, or re-sowing. In recent years, more growers have been starting their seeding programs earlier, with part and sometimes all of the program sown into dry soil to spread risk and manage workloads.

Dry sowing works because seeds can start germinating even when moisture is low. Once in the soil, they absorb small amounts of water and may begin germinating, but without follow-up rain seedlings can stall or die. Some seeds swell and sit dormant until conditions improve.

It's important to distinguish between sowing date and emergence date. A crop dry sown in late March that doesn't emerge until mid-April behaves like a mid-April sowing. The risk comes when crops emerge very early, such as late March, when fast-developing varieties may flower too soon and lose yield. Choosing a variety with maturity suited to the expected emergence window is critical.

How long can seed survive in dry soil?

Wheat and canola seed can remain viable in dry soil for at least six weeks. Pot trials found (McDonald 2024) 80 % germination after six weeks, though delayed emergence was common, with 13 % germinating but not emerging after two weeks. This rose to 16 % by four weeks and 25 % by six weeks.

A separate field trial on clay loam soil at Hart showed that canola still established successfully, even when the seed sat in dry soil for six to seven weeks before it rained.

Lentil seed can remain viable in dry soil for several weeks, but the main risk is nodulation failure. Rhizobia in peat-based inoculants are highly sensitive to dry conditions, especially on acidic soils or when mixed with fungicide or trace element dressings. If no rain falls within two to three weeks, nodulation is likely to be poor.

How much rain is needed to trigger germination?

This depends largely on soil texture, which influences infiltration, water-holding capacity, and evaporation.

Loam and clay loam soils typically require 15 to 20 mm of rainfall in a rainfall event to wet the seed zone sufficiently for reliable emergence.

Sandy soils may respond to as little as 10 mm but also dry out more quickly, increasing the risk of seed desiccation if follow-up rainfall is delayed.

Germination can begin with only a few mm of rain, but without enough moisture to support continued shoot growth, seedlings may stall before emergence or emerge unevenly. This is more likely in soils prone to crusting or sandier soils that dry out faster.

Why is emergence staggered when dry sowing?

After light rain, crops on sandy soils emerge first because moisture reaches the seed zone more easily. Heavier soils like loams and clays need more rain to wet the seed zone. This can result in delayed or uneven emergence, with seedlings in heavier soils sometimes taking two to three weeks longer to appear.

What is the impact of a false break?

A false break—when a small rainfall event triggers germination but isn't followed by enough moisture for full establishment—can pose several risks, including:

- Seedling death if germination occurs but emergence fails.
- Staggered or uneven emergence, complicating crop management.
- Failure of pre-emergent herbicides to activate or work effectively.
- Herbicide leaching into the seed zone, damaging seedlings.
- Breakdown of rhizobia inoculants, especially in pulses, if emergence is delayed more than two to three weeks.

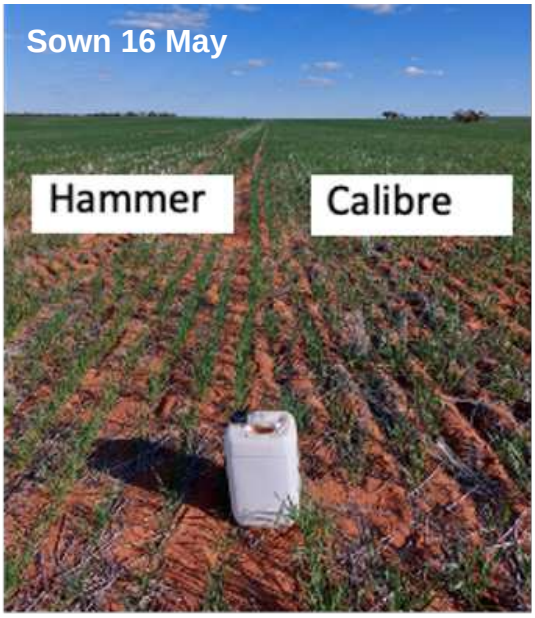
At Giles Corner in 2024, crops sown in April emerged after 25 mm of rain and survived a long dry spell. On heavier soils, the seeds germinated but did not emerge.

Weed control when early sowing

Sowing before the autumn break often means missing the knockdown window, and pre-emergent herbicides become crucial. Their reliability under dry conditions depends heavily on rainfall and soil type. Without enough rain to incorporate and activate the herbicide, control can be patchy or fail altogether. Products with longer residual activity and lower solubility—such as Sakura® or TriflurX®—are generally more reliable under these conditions.

Seeder setup also matters. Knife-point and press-wheel systems provide good seed–herbicide separation and reduce crop injury. Selecting cleaner paddocks and

Early sown wheat (top) vs later sown wheat (bottom). Photo: Mallee Sustainable Farming



a follow-up weed management plan are key to managing risk. See the pre-emergent herbicide case study.

Sowing depth

Sowing into a moisture band can give crops a head start, but patchy or deep moisture can delay or reduce emergence. Success depends on knowing your soil type, moisture profile, and seeder capability. For more on matching sowing depth to moisture conditions, see the sowing depth case study.

Frost risk-trade off

Early sowing can boost yield potential but increases frost risk at flowering. Match sowing time with variety maturity to keep flowering outside the frost window. Staggering sowing across varieties or mixing maturities within a paddock can reduce risk. Tools like the Crop Flowering Calculator can help identify optimal sowing dates for different regions and varieties.

Murray Plains Farmers

Key messages

- **Timely sowing generally leads to higher biomass and better yields, with early establishment often paying off even in dry years.**
- **It's better to plan for yield than to delay sowing to avoid frost, which is unpredictable. Late-sown crops are more likely to suffer from early heat and dry finishes.**
- **Sow a touch deeper to limit the risk of false break.**
- **Lentils require careful weed management.**

Adrian Bormann farms 2200 hectares about 20 km north-west of Mannum, on South Australia's Murray Plains.

Adrian typically starts sowing in mid-April and doesn't wait for a season break. 'From a de-risking perspective, the risk is not putting it in the ground,' he said. 'Even dry sowing seems to do better than waiting.'

In 2025, the farm received just 50 mm of rainfall by the end of June, with scattered light falls and a late break around 20 May. Despite the dry start, crops were generally looking good.

Lentils

Around one third of the farm is typically sown to a break crop, either canola, vetch, lupins or field peas. Lentils have only been widely grown in the Murray Plains region for the past two to three years, and growers are still experimenting to understand their fit. Canola has traditionally been the go-to break crop, but lentils offer a

legume option with potentially greater drought resilience and lower input costs.

‘We’ve only just started growing them,’ Adrian says. ‘But the newer varieties are more resilient, and we’re learning how to grow them better. They hang on surprisingly well in a dry spell and require fewer inputs than canola.’

In 2024, the Murray Plains Farmers group ran a lentil time of sowing trial comparing three sowing dates—10 April, 2 May and 21 June—across three varieties: Highland, Lightning and Thunder. The 2024 season was extremely dry and the trial highlighted how hardy lentils can be in a dry season.

The early-sown plots were hit by frost but still produced useful biomass. ‘It wasn’t measured,’ Adrian said, ‘but you could easily have cut it for hay. That’s something to keep in mind for early-sown lentils. If you have biomass, you have a backup option.’

He noted that lentils don’t offer much flexibility when it comes to frost risk, but they can reflower after a frost depending on timing. ‘This year, nothing grew until the end of May,’ he said. ‘But I’d generally try for early establishment to get biomass.’

Weed management proved a challenge when Adrian trialled lentils for the first time in 2024, when hosting a lentil vs canola trial. Despite using pre-emergent herbicides, the lentils were heavily affected by weeds, with the dry season limiting herbicide uptake. Adrian noted that he had underestimated the weed burden in the paddock. The trial also raised questions about groundcover levels post-harvest. Lentils leave less stubble than canola, increasing erosion risk on light soils. This is something Adrian now factors into crop rotation planning, given the increasing frequency of dry finishes and summer wind events in the region.

Canola

Canola time of sowing trials in 2022 and 2023 gave mixed results. In 2022, the latest sowing date (June 1) gave the highest yield, thanks to favourable rainfall events in October that provided a soft finish and reduced moisture competition late in the season.

However, in 2023, the June sown crops performed the worst. Sowing in mid-May gave the best yield. The early-sown canola was impacted by a false break, leading to staggered germination.

Based on these results, this year (2025) Adrian sowed slightly deeper to avoid a false germination. If only the top few millimetres of soil wet up then dry out again, the deeper-sown seeds are less likely to be affected.

Adrian said the trials over the past three years have reinforced the importance of getting sowing timing right. ‘If you don’t get things in on time, it costs you at the end of the season with lower biomass and lower yield.’

While acknowledging the uncertainty of frost, he prefers to plan for yield rather than fear losses. ‘I don’t have a crystal ball, but anything sown past a certain time is losing yield. Frost might come early or late—we can’t control that. But we’re more likely to get a hot northerly that finishes off a late crop. If you’ve got early biomass, at least you’ve got a hay option if the season cuts out.’

Hart field day, 2024.

We had follow-up rain not long after that, and the crop started to reshoot. It will be interesting to see the impacts of that later in the season and how it affects productivity.'

These trials are helping build a clearer picture of how different rainfall amounts affect germination and survival under dry sowing. 'Everyone is having to dry sow after the last few years,' Kaidy says. 'But if growers understand what to expect—whether it's worth re-sowing, or whether patchy emergence might recover—it can help them make better decisions.'

References

McDonald, G., 2024. A summary of recent experiments on soil moisture, germination and crop establishment. Hart Field Trial Results 2024. Pp 122-128. Available at: https://www.hartfieldsite.org.au/media/2024%20Trial%20Results/Hart_Trial_Results_2024_web.pdf

The project, "*De-risking the seeding program – Adoption of key management practices for the success of dry and early sown crops*" was led by Ag Excellence Alliance. It combined research and on-farm experience to support earlier and more strategic sowing decisions to build drought resilience. The project draws on the expertise and local knowledge of fourteen grower groups across the grain producing regions of South Australia, Victoria, New South Wales and Western Australia. Scan the QR code to find out more.

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Cover photo: *Murray Plains Farmers lentil trial.*