Mallee Farmer

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Featuring

Growing lentils in the Mallee.

Seasonal climate information for Victoria.

An overview of soil carbon in the Mallee.

A case study on integrating forage shrubs into mixed farming systems.

Monitoring wind erosion and land management in the Victorian Mallee.

And much more.

mallee
catchment management authority

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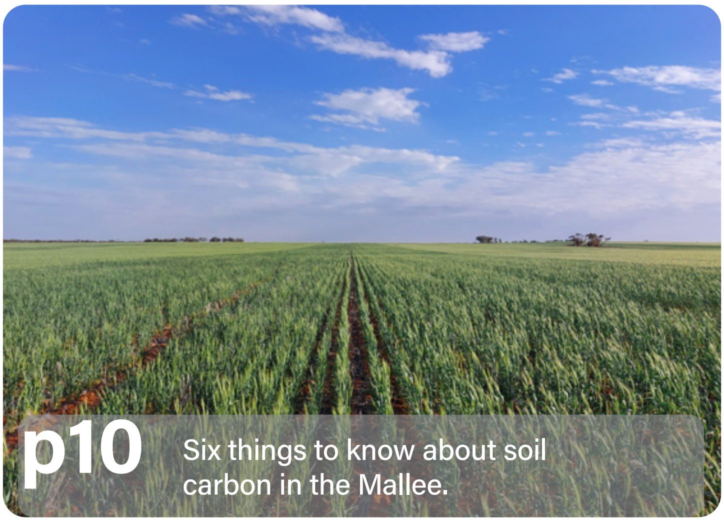

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Australian Government | mallee catchment management authority

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Acknowledgement of Country
The Mallee CMA acknowledges and respects Traditional Owners, Aboriginal communities and organisations. We recognise the diversity of their cultures and the deep connections they have with Victoria's lands and waters. We value partnerships with them for the health of people and country.

The Mallee CMA pay their respects to Elders past and present, and recognise the primacy of Traditional Owners' obligations, rights and responsibilities to use and care for their traditional lands and waters.

Chair's Report

Welcome to the Mallee Farmer – your insight into the latest dryland farming research, training, trends and programs in the Mallee.

Regular readers will have noticed the recent lull in production of the Mallee Farmer, but you can now look forward to two editions each financial year, thanks to Australian Government funding from the Natural Heritage Trust under the Climate-Smart Agriculture Program.
In this edition we cover a range of important topics including:

- How land management practices and satellite imagery are monitored and used to assess levels of ground cover likely to offer soil protection during summer and autumn throughout the Mallee. It's all part of a collaborative project underway between Mallee CMA and Agriculture Victoria.

- The value of grazing sheep on stubble and how to do this effectively.

- Seasonal climate risk information – predictions and analysis according to Agriculture Victoria.

- The shrubs that have been found to reduce farm business risks and improve the predictability of feed supply on mixed farms in southern Australia; and

- An overview of what soil carbon looks like in the Mallee region, and what goals we could set for managing it.

It is wonderful to see the Mallee Farmer continue to be an interesting, diverse and informative publication. Thank you to everyone who has contributed to this edition. We greatly appreciate the support of numerous government agencies, researchers, the Mallee community, and you – the reader. If you have feedback on this edition, or thoughts on how to improve this publication, don't hesitate to send the Mallee CMA team an email at info@malleecma.com.au

Until next edition,

Allison McTaggart
Chair
Mallee Catchment Management Authority.

Season update and 2024 harvest wrap up

By Sandy Pollington, AGRIvision Consultants

2024 was certainly a year that kept us on our toes.

Record-breaking summer rainfall meant abundant stored subsoil moisture setting us up well for the season ahead. A dry start and late break, at the end of May for most, resulted in areas of patchy crop establishment and plants germinating in colder than average conditions. The dry, cold start had other implications for early crop growth, including reduced activity of certain pre-emergent chemistries meaning variable weed control, and slower plant growth rates. There were limited windows of opportunity for early post-emergent sprays without compromising crop safety. Early winter rains, while not substantial, were welcome and growers remained positive for the rest of the season.

The season progressed with the usual early growing season activities, though top-dressing nitrogen rates were cut back as the goal posts shifted. Come spring, a high-pressure system in the middle of Australia deflected any tropical rains from heading our way. The dry spell, coupled with a series of major frost events, saw the season rapidly turn off. Though temperatures from BOM suggested a minimum of -2 degrees in September at Swan Hill and -2.9 degrees at Hopetoun, actual temperatures in the paddock were reportedly much lower.

Both the length of these events, up to 5 hours and longer in some places, and the number of consecutive days with sub-zero minimum temperatures, caused un-recoverable damage in wheat, barley, and canola. Frost damaged wheat in the northern Mallee averaged 0.5 t/ha, canola 0.2-0.6 t/ha and barley that had 4 t/ha potential only yielded 0.4 t/ha. Stem frost and heads frosted during flowering caused the biggest yield reductions. Lentils experienced significant vegetative frost, capping yield potential and reducing grain quality. Where frost events were less severe, recovery of all crops was hampered by lack of moisture.

Rainfall received in October (12 – 86 mm) came too little, too late for most. Later sown barley and lentils in the south may have seen minor benefit in grain-fill, but not enough to recover earlier set yield. The late rain caused re-growth in canola and lentils, which created a few headaches for windrow timing and desiccation. A large portion of the 2024 crop was harvested before the rains in November, with anything harvested after seeing quality issues at receival. Grain yields across the Mallee were highly variable. Dryland wheat ranged from 0.5 - 2.5 t/ha, barley 0.5 - 6 t/ha, lentils 0.2 - 2 t/ha and canola 0.2 – 2.5 t/ha. Water use efficiencies were remarkably high, given that crops received just shy of 100 mm GSR.

Though growers saw their fair share of losses last season, they were not without a few wins along the way. Deep sown canola and lentils, into the moisture band, worked well with early root development prior to cold growing conditions and improved exploration of the soil profile. A proactive stripe rust strategy, with Flutriafol upfront and timely in season fungicide applications, paid dividends, even in a dry spring. Paddock improvements, through ripping in targeted zones (e.g. hardpans) or renovating wheel tracks, variable rate gypsum and nitrogen applications have resulted in net productivity gains. A slight increase in phosphorus rates over the past couple of wet years has positioned growers well for capitalising on yield potential.

Rain during harvest saw many growers switching over from the header to the sprayer, or running both concurrently where capacity allowed. Early control of small weeds required only a single pass, but most situations where weeds were well established required a double-knock. Summer grass weed populations have taken off on he back of two wet summers, particularly windmill grass and feathertop rhodes grass.

A drier February has meant a lower weed pressure, predominantly late-emerged heliotrope and some harder to control weeds such as annual fleabane, skeleton weed and sowthistle which have survived earlier sprays. These late summer sprays have been ideal situations for optical spot sprayers with a sparse distribution of weeds across paddocks or weeds confined to wheel tracks.

We enter the 2025 season in a similar position to last year, with a good supply of sub-soil moisture and awaiting an opening rain. There will be paddocks from last year with nitrogen left over, even under cereals and plans have been adjusted accordingly. Varieties gaining popularity across our footprint are Shotgun and Tomahawk CL wheat, Thunder lentils, Maximus CL and Neo CL barley. The focus is really on efficiency gains with timely operations, tailored nutrition plans, and being prepared to pivot when conditions change to make the most of opportunities.

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Jason Brand presenting to farmers.
Photo: Frontier Farming Systems

Lentils in the Mallee: Variety options and weed management

By Jason Brand and Michael Moodie, Frontier Farming Systems

Introduction
Lentils continue to increase in area within the northern and central Victorian Mallee. Understanding the best variety to grow and opportunities to manage challenging weeds are critical for the ongoing success of growers.

Frontier Farming systems through the GRDC funded Pulse Development and Extension project established field trials at Nutrien's Kulwin trial site in 2024 to:

a. Demonstrate the best lentil varieties suitable for Mallee growers on sandy loam soils.
b. Compare the efficacy of herbicide packages for the control of a range of weeds in the Mallee in herbicide tolerant lentils, specifically focussing on use patterns with metribuzin in the new metribuzin and 'IMI' tolerant lentil GIA Metro.

A. Lentil Varieties
Background
Despite being a significant crop (for many grower's lentils encompass up to 25% of their sowing area), there are few NVT sites representing this region. Understanding the performance of a range of varieties on a sandy loam soil type in the Victorian Mallee will help to build confidence and understanding of lentil varietal performance in the low rainfall zone.

Key Observations
- GIA Lightning highlighted its advantage on a sandy soil and in dry seasons, while GIA Thunder continues to show its broad adaptability.
- A new large seeded late flowering breeding line surprises and shows future potential.

Detailed Results
Establishment and growth throughout the season were excellent given the dry season. It appeared that the lentils were able to develop root systems that tapped into the subsoil moisture. In spring there were several vegetative and reproductive frost events (Check out a video here: https://www.agriknow.com.au/trial/50).
A later reproductive frost killed a few flowers and developing seed, impacting yield potential.

Grain yields of up to 1.67 t/ha were excellent considering seasonal conditions (Figure 1). GIA Lightning (1.67 t/ha) and GIA Thunder (1.62 t/ha), again showed their adaptability to Mallee conditions, having the highest yield, slightly greater than ALB Terrier (1.56 t/ha). GIA Lightning appeared to be one of the best varieties to continue growing after the frost events and reflower and set pods. A new later flowering and maturing, large seed breeding line, ALB2321 (1.49 t/ha), shows a lot of promise.

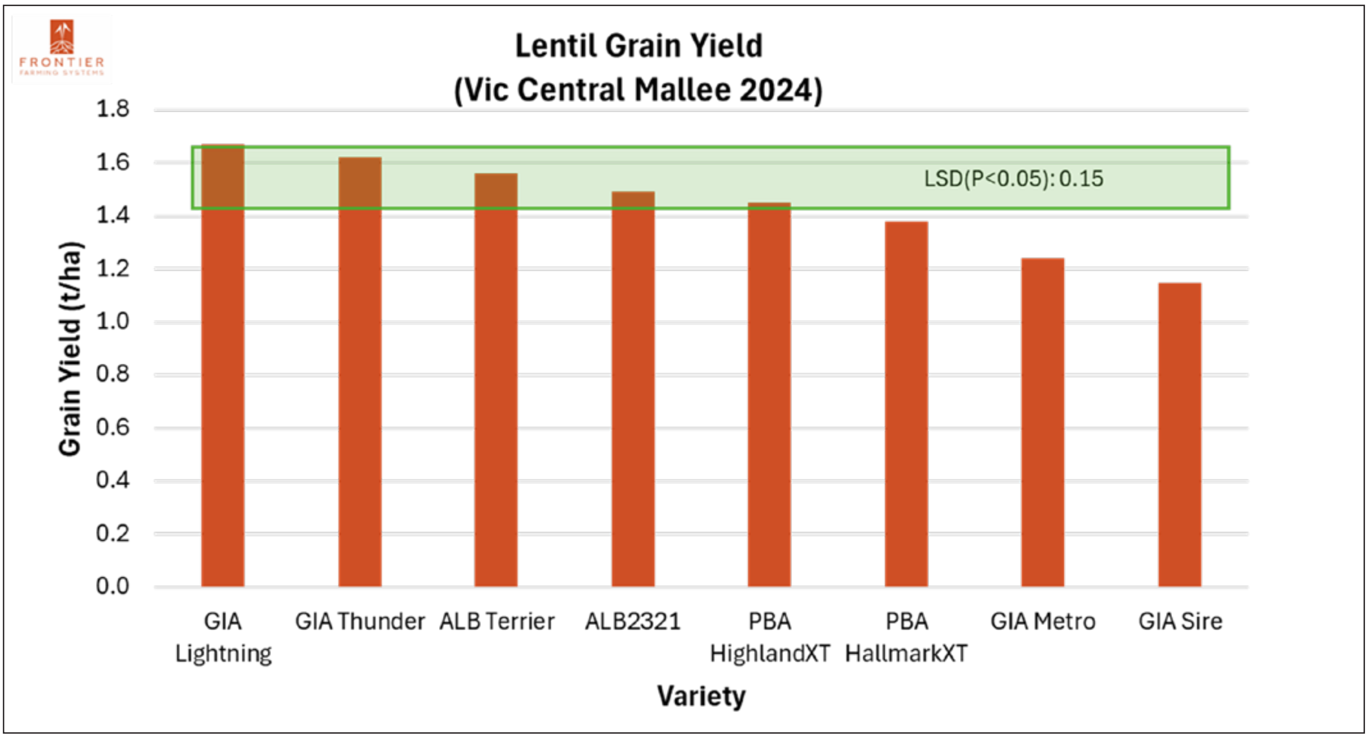

Figure 1. Grain yield (t/ha) of lentil varieties at Kulwin (central Mallee) in 2024.

This type of flowering and maturity may broaden the harvest window for growers willing to grow two varieties. Spreading the harvest window may help prevent issues, such as pod drop, and seed discolouration associated with delayed harvest. Consistent with previous observations GIA Metro (1.24 t/ha) was about 25% lower yielding than GIA Thunder, but the ability to control problem weeds with Metribuzin may make this a viable option in high weed burden situations. The frost damage and short plant height meant that GIA Sire (1.15 t/ha) had lowest yields.

B. Effective use of metribuzin tolerant lentil genetics for rotational weed control

Background

A new lentil variety, GIA Metro, combining Metribuzin ('MET') tolerance with the imidazolinone ('IMI') tolerance was released in 2022. Metribuzin has been registered for in-crop application up to the 6th node, specifically in this variety. Despite having a yield gap of 20-30% compared with the highest yielding varieties, like GIA Thunder, it has potential to help control difficult to manage weeds in lentils like Turnip Weed, Spiny Emex, Medic, Capeweed, Milk Thistle, and Prickly Lettuce, particularly where resistance to Intercept® exists or on soil types where use of residual Group 5 herbicide products can cause significant crop damage, even at suboptimal rates.
It could also help reduce reliance on the imidazoline herbicides which can result in residues limiting cereal or canola varieties that can be grown for following crops in the rotation.

Key Observations

- GIA Metro showed no visual herbicide damage from metribuzin at any application rate and time tested.
- The highest label rate of Metribuzin (380g/ha) applied at the 4N stage can provide adequate weed control.
- Intercept® can cause visual damage with a reduction in biomass, particularly in dry and cold seasons.

Detailed Results

Despite good subsoil moisture from summer rainfall, 2024 proved challenging due to dry conditions throughout most of the season. There were patchy opening rainfall events in May, which resulted in slightly variable germination and establishment. No significant diffe ences between the varieties or herbicide treatments were noted in initial plant establishment.

Following establishment, the Metribuzin applied post sowing, pre-emergent (PSPE) at 180g/ha in GIA Thunder caused necrosis of leaves and plant death. Approximately 50% of the plot died, which is consistent with the NDVI readings (0.12 cf. 0.26 in the Nil treatment; Figure 2). It is important to note that the NDVI reading would also pick up the weed population. Both treatments with Metribuzin incorporated by sowing (IBS) showed almost no crop damage early. In GIA Metro, Metribuzin applied PSPE or 4 node (4N) caused no damage. In both GIA Metro (NDVI 0.17 or 0.18 cf. 0.24 in Nil) and GIA Thunder (NDVI 0.18 cf 0.26 in Nil) the treatments with Intercept® applied at 4N caused significant stunting of growth and chlorosis in leaves indicative of Group 2 herbicide damage (Figure 2). Visually, biomass in these plots was reduced by about 30%.

The trial was in an area of the paddock with the primary weeds being Turnip and Medic. Sow Thistle, Prickly Lettuce, Skeleton Weed and Amsinkia were also present sporadically throughout the trial area. In untreated plots the average weed density was 15 and 16 plants/m2 for GIA Metro and GIA Thunder, respectively (Figure 3). The low rate of Metribuzin (140 g/ha) applied IBS, reduced this to 10 plants/m2 in GIA Thunder. The rate of 180g/ha applied PSPE, reduced the weed density to 9 plants/m2 in GIA Thunder and 6 plants/m2 in GIA Metro.

The higher number of weeds observed in GIA Thunder was possibly due to reduced competition, as 50% of the

Lentil varieties at the Kulwin trial site, 2024.
Photo: Frontier Farming Systems

Field trials at Kulwin, 2024.
Photo: Frontier Farming Systems

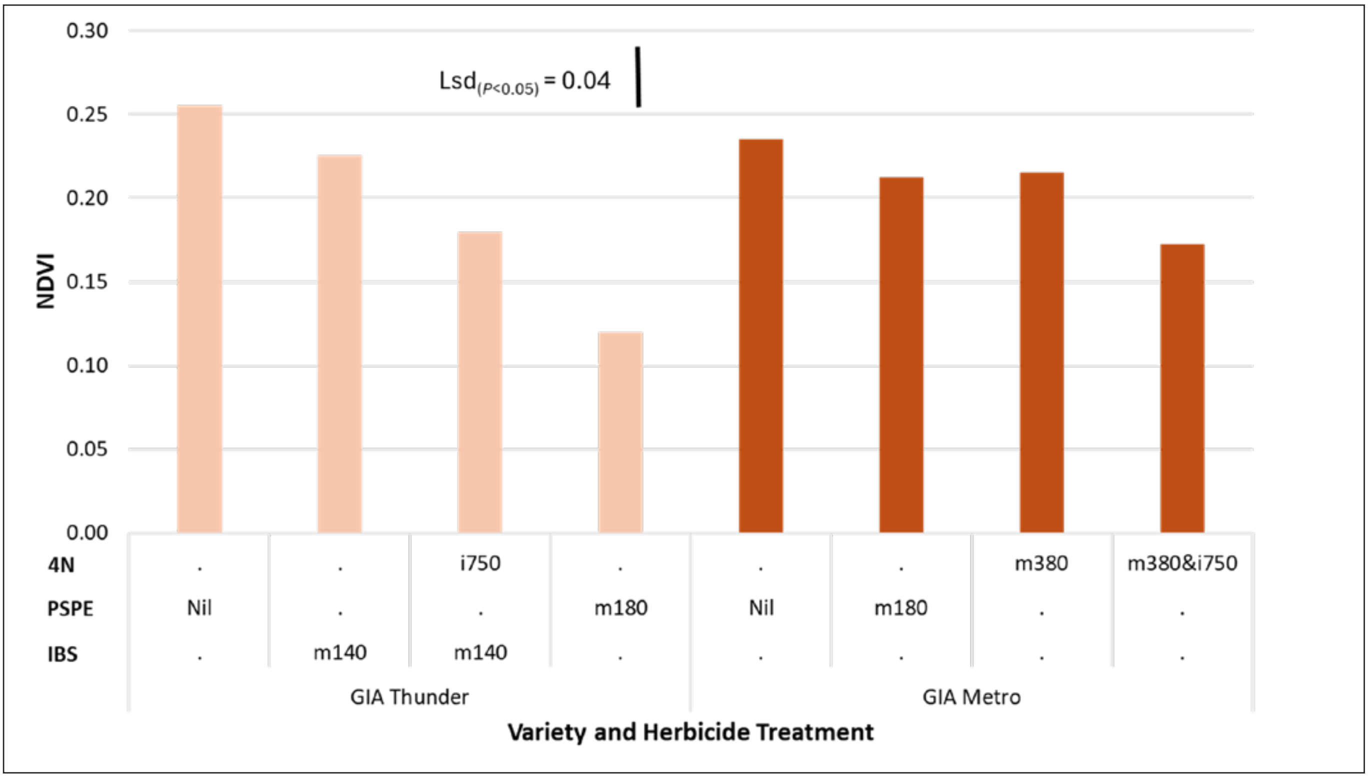

Figure 2. NDVI (August 11) of plots where herbicide treatments had been applied to GIA Thunder and GIA Metro at Kulwin (central Mallee) in 2024. See Table 1 for a description of treatments.

lentil plants were killed, where-as in GIA Metro there was no crop damage resulting in increased weed competition.

The Metribuzin (380 g/ha) applied 4N, reduced weeds to 4 plants/m2 in GIA Metro, while the addition of intercept® at 4N resulted in a further reduction to 1 plant/m2. In GIA Thunder, the low rate of Metribuzin applied IBS, followed by intercept® at 4N eliminated weeds.

Due to the very dry conditions (GSR 96mm) and location of the trial on the slope of a sandhill, grain yield was below the estimated potential of 0.93 t/ha (Figure 4). Also, only the first 2 replicates were analysed for grain yield as replicates 3 and 4 had yields less than 100kg/ha as they were further up the slope of the sandhill.

Please treat results with caution. Across the replicates the average yield dropped from 0.73 t/ha in replicate 1 to 0.26 kg/ha in replicate 2 and 0.03 t/ha in replicates 3 and 4. For GIA Thunder, the highest average yield was 0.67 and 0.66 t/ha in the treatments with metribuzin applied IBS. Grain yield was reduced by 35% with the PSPE application of metribuzin at 180g/ha. The Nil treatment also appeared to show a slight yield loss, which could be expected due to weed competition. In GIA Metro the highest yield was 0.61 t/ha (about 10% less than the highest yield treatment in GIA Thunder; Figure 4). Similar to GIA Thunder, but more significant, the Nil treatment showed a yield loss of 45%. However, unlike GIA Thunder, Intercept® appeared to reduce grain yield (35% less in the treatment with Metribuzin (380g/ha) applied 4N).

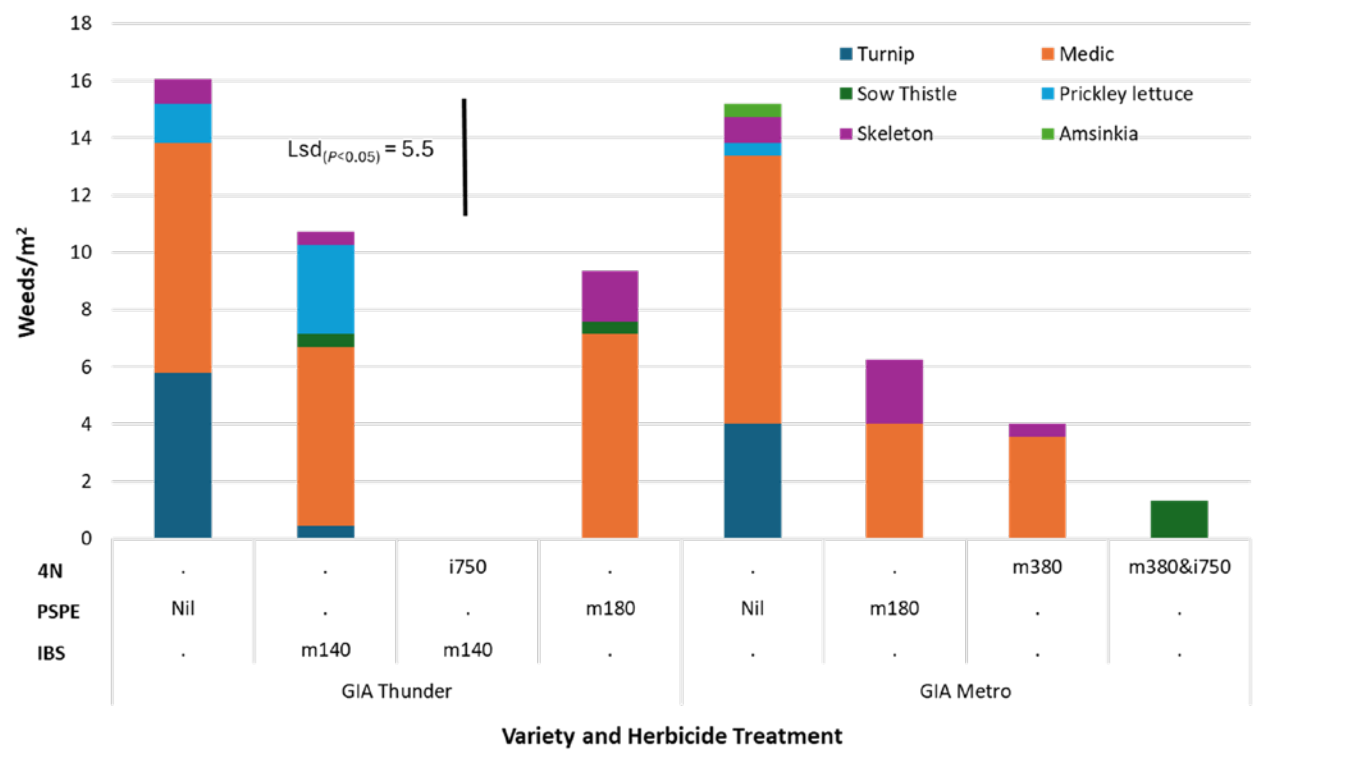

Figure 3. Number of weeds (12 September) in herbicide treatments applied to GIA Thunder and GIA Metro at Kulwin (central Mallee), in 2024. Segments of bars indicate the number of each of the weed types present. Lsd is for comparison of the total number of weeds only. See Table 1 for a description of treatments.

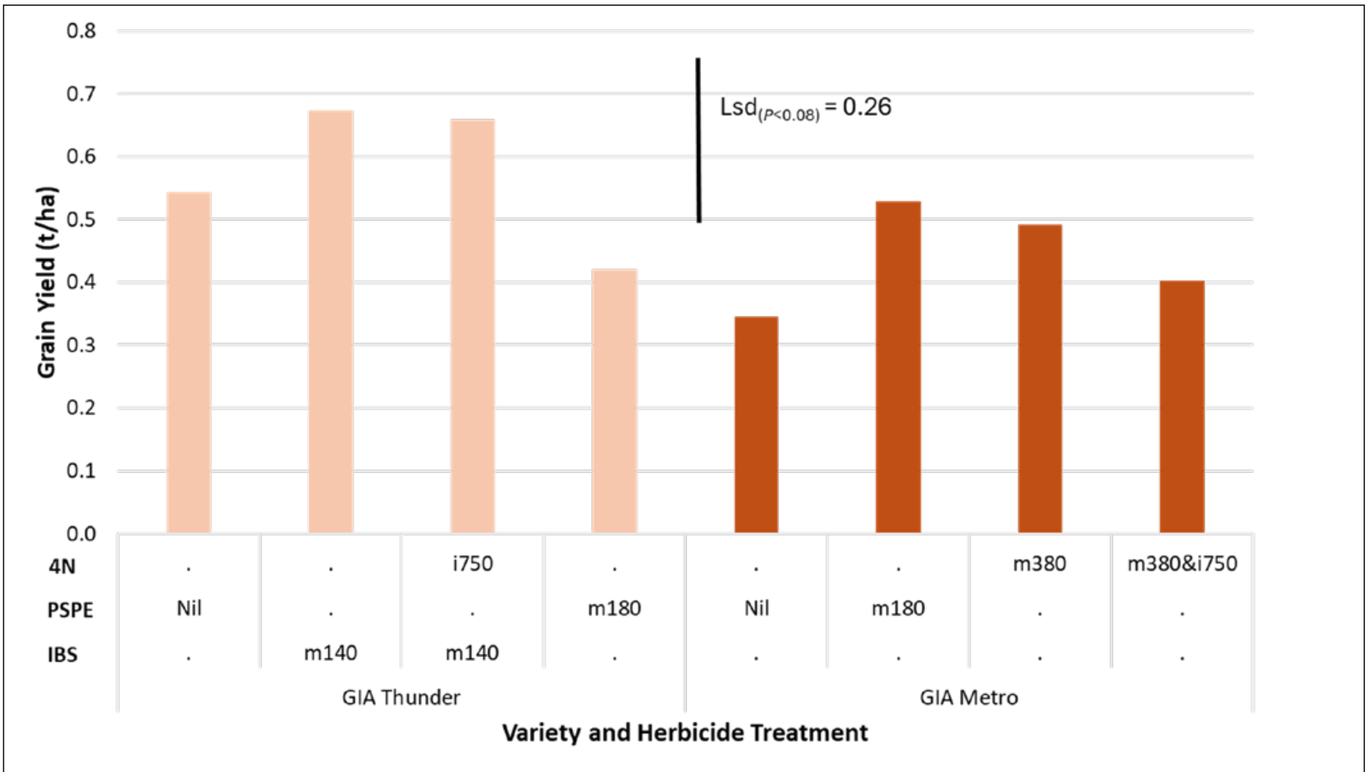

Figure 4. Grain yield of GIA Thunder and GIA Metro in herbicide treatments applied at Kulwin (central Mallee), in 2024. Any bars outside of the box are significantly diffe ent from the maximum yielding treatment in each variety.
See Table 1 for a description of treatments.

Table 1. Herbicide Treatments applied at Kulwin in 2024 to determine eff ctive use of Metribuzin tolerant lentil genetics for rotational weed control.

Herbicide Treatment	Variety	Application Time[1], Herbicide[2] and Rate		
		Incorporated by sowing	Post Sowing Pre-emergent	4 Node
Nil	GIA Thunder GIA Metro	Nil		
m180(PSPE)	GIA Thunder GIA Metro		Metribuzin (750 g/kg) @ 180 g/ha	
m140(IBS)	GIA Thunder	Metribuzin (750 g/kg) @ 140 g/ha		
m140(IBS) f/b i750(4N)	GIA Thunder	Metribuzin (750 g/kg) @ 140 g/ha		Intercept® @ 750g/ha + Hasten @ 1%
m380(4N)	GIA Metro			Metribuzin (750 g/kg) @ 380 g/ha
m380(4N) f/b i750(4N)	GIA Metro			Metribuzin (750 g/kg) @ 380 g/ha & Intercept® @ 750g/ha + Hasten @ 1%

[1]Application times: Incorporated by sowing applied May 23; Post Sowing, Pre-Emergent applied May 24; 4th Node applied July 22 (Note: in treatments with Metribuzin and Intercept – they were applied in separate applications on the same day, not together in one mix).
[2]Intercept® (imazamox 33 g/L + imazapyr 15 g/L); Hasten® (Ethyl and Methyl Esters of Canola Fatty Acids (704 g/L) and non-ionic surfactants (196 g/L).

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Six things to know about soil carbon in the Mallee

By Nick Paltridge, Mallee Sustainable Farming (MSF)

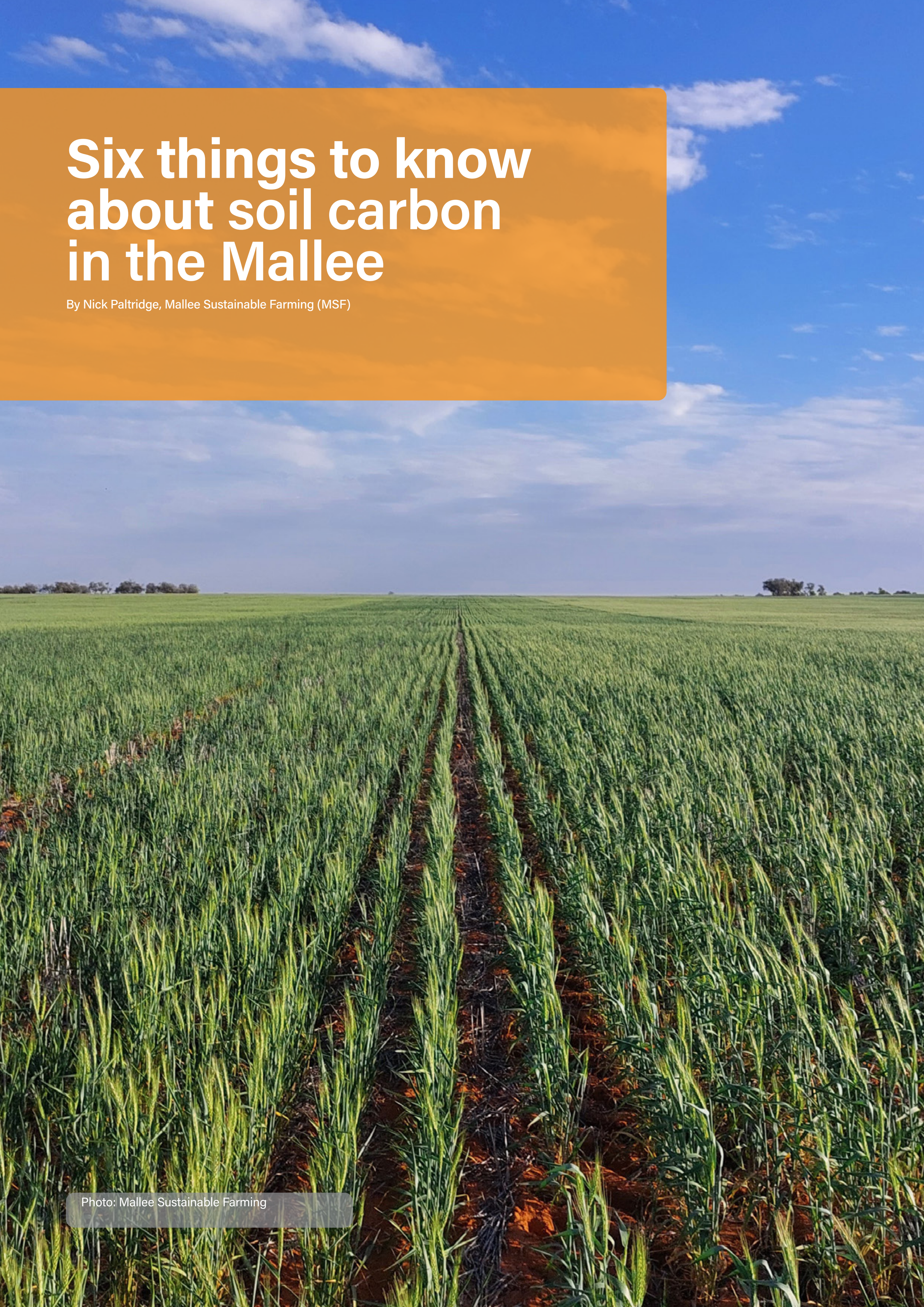


Photo: Mallee Sustainable Farming

Soil carbon is a hot topic in agriculture, but what does it really mean for farmers in low-rainfall areas like the Mallee?

This article provides an overview of what soil carbon looks like in our Mallee region, and what goals we should have in managing it.

1. Soil Organic Carbon (SOC) is naturally low in Mallee soils, and highly variable
SOC is a component of soil organic matter derived from previous plant growth.

It is critical for soil health, contributing to nutrient cycling, water retention, and overall soil structure. In the Mallee, SOC levels are relatively low (< 1%) because:

i) low and variable rainfall conditions mean less plant growth, so less carbon is drawn into the system

ii) soils are generally sandy, with minimal clay content, leading to more rapid breakdown of organic matter in the soil, quickly returning fixed carbon to the atmosphere.

In the sandy soils typical of the Mallee, SOC concentrations are highest in the top 10cm (generally in the range 0.3% to 0.75%) and decrease with depth. The total amount of SOC in the topsoil (0-30 cm) is typically around 2 to 8 tonnes of soil carbon per hectare (0-30cm). SOC levels vary with topography and soil type, so intensive sampling across diffe ent soil types is required to accurately measure SOC stocks. In a dune swale system, as is typical in the Mallee, soils are zoned into diffe ent soil types (e.g., dunes, mid-slopes and flats), then samples are taken from diffe ent depths at multiple sites within each zone to estimate SOC stock. The more samples you take in each zone, the more reliable the measurement will be.

2. Protect the soil carbon you have
The first and most realistic goal in carbon management in Mallee soils is actually to minimise carbon loss! When paddocks are eroded by wind, a lot of what blows away is organic matter because it is lighter than the mineral soil (sand, silt and clay). Maintaining as much ground cover as possible to reduce erosion losses is one of the most important things a land manager can do: no-till seeding, avoiding overgrazing, and avoiding burning of crop residues are all essential for good carbon management. Research has shown that maintaining at least 50% cover decreases wind erosion – use this as a minimum, not an aspirational target.

3. Building soil carbon is possible, but takes a long time
Sequestration rates are low, and you may not be able to detect the improvement!

Any management technique that leads to more biomass improves carbon inputs to the soil, and is likely to be positive for not just yield, but also soil carbon over the long term (> 10 years). Key approaches that may improve carbon stocks include:

- liming to overcome acidity
- better nutrition (conventional or organic fertilisers)
- deep ripping of compacted sandy soils to improve root depth and moisture availability
- claying (clay spreading or delving) of sands >30cm deep to improve water and nutrient holding capacity and to protect SOC from breakdown
- growing perennial plants (e.g. perennial pastures), where possible, and using rotational grazing to maximise root biomass.


Photo: Mallee Sustainable Farming

In the Mallee, growing as much biomass as possible, and maintaining as much groundcover as possible, are two key strategies to maximising soil carbon.
Photo: Mallee Sustainable Farming

A 2010 review of the impacts of improved management suggested average sequestration rates of around 0.2 to 0.3 tC/ha per year after the management change. However, it is noted that some of the approaches listed above may actually lead to greater emissions or carbon losses in the short term. In the Mallee environment, sequestration rates may be well below that range due to relatively low biomass production and the lack of protection for carbon in sandy soils. Sequestered carbon can also be lost in dry years where there are minimal carbon inputs but continued breakdown of SOC. A drying and warming climate may make it more difficult to build soil carbon in future, due to less consistent inputs and higher respiration rates. Detecting small changes in carbon stock requires intensive soil testing, especially in variable soils, so it may take many years before changes can be detected. Thus, while improvements in soil carbon may be possible after soil improvement, results are not guaranteed. The major benefit from soil improvement may well be improved productivity.

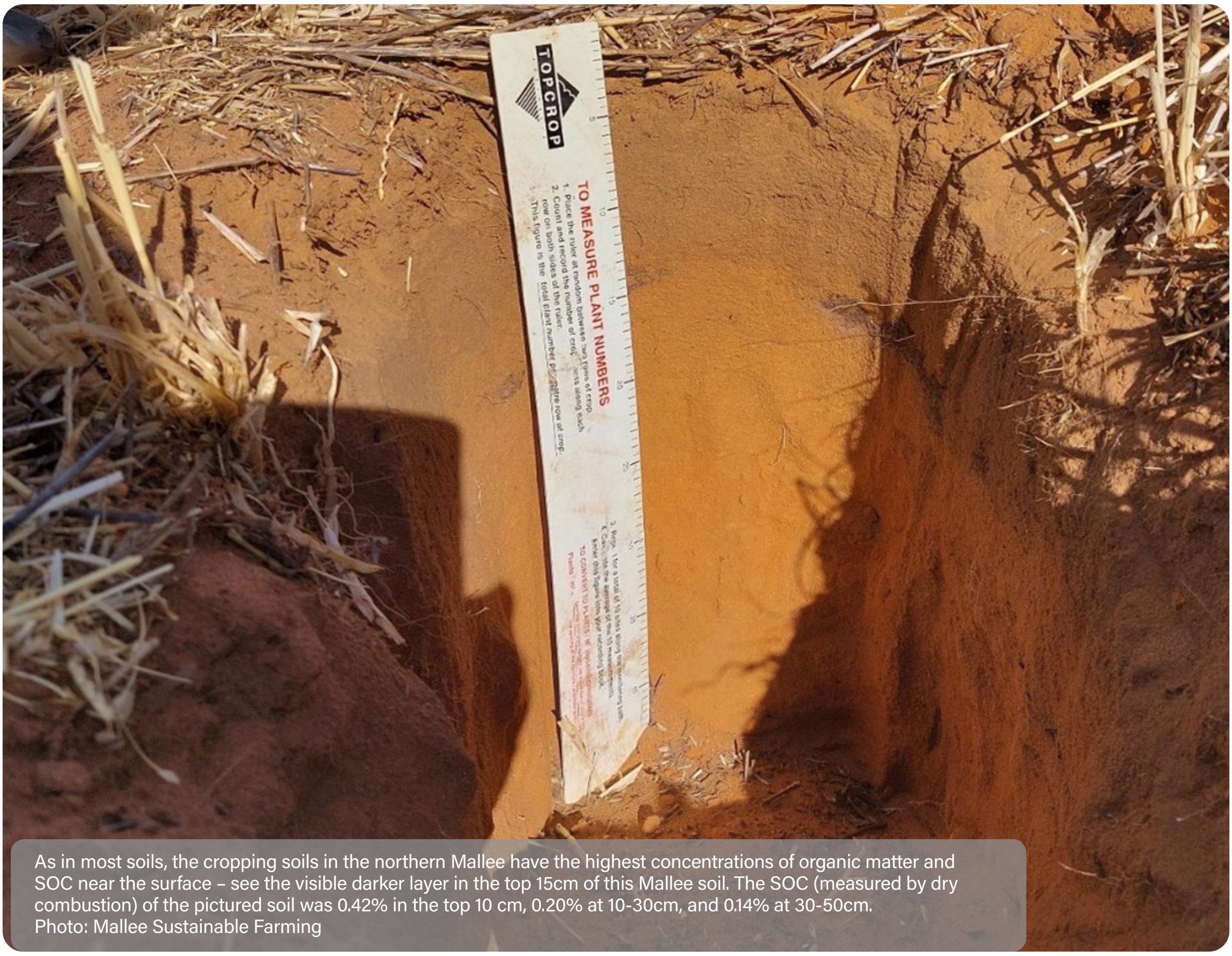
4. Registering a soil carbon project in the Mallee

The Australian Government's Clean Energy Regulator has developed methods to monitor and recognise soil carbon sequestration in agricultural soils. Registering projects takes considerable investment in time and soil testing, and projects need to be run for a minimum of 25 years. Most soil projects registered so far are in higher rainfall zones and involve perennial pastures and rotational grazing. The viability of soil projects in the Mallee may improve as further techniques are identified to sequester carbon, or as new ways are developed for measuring changes.

5. The main benefit of maximising soil carbon in the Mallee is likely to be better production and reduced 'emissions intensity'

The main benefit of maximising soil carbon levels (or minimising soil carbon losses) in the Mallee at this stage is likely to be better production, achieved through better nutrient cycling, better water and nutrient retention and better soil structure – and this benefit accrues whether you measure the change or not!

By growing more with similar inputs, emissions intensity (emissions per unit of product) is likely to reduce. This figure can be calculated using freely available greenhouse gas emissions calculators. Keeping track of improvements in emissions intensity may improve future market access if buyers of agricultural products look to reduce emissions associated with their products.



As in most soils, the cropping soils in the northern Mallee have the highest concentrations of organic matter and SOC near the surface – see the visible darker layer in the top 15cm of this Mallee soil. The SOC (measured by dry combustion) of the pictured soil was 0.42% in the top 10 cm, 0.20% at 10-30cm, and 0.14% at 30-50cm.
Photo: Mallee Sustainable Farming

6. Steps to take right now

- Minimum tillage
- Maintain soil cover for as long as possible
- Overcome soil constraints to increase biomass, applying inputs where practical and economically viable
- Add clay to sandy soils
- Use a GHG calculator to work out emissions intensities for grain and livestock production, and keep records over multiple years
- Keep track of technical developments that may make soil carbon sequestration more viable in future.

Conclusion

On most Mallee farms, optimised soil carbon management is about protecting the carbon you've got, and maximising plant growth to support production, carbon inputs, soil health and nutrient cycling. Maximising yield per unit of input often reduces emissions intensity, which is a win in itself for you and the environment.

Do look out for upcoming Carbon Farming Outreach sessions that will be run in the Mallee in 2025, with a focus on why emissions reduction is important, and what actions farmers can take to measure and improve emissions performance.

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Resources and further information:

Greenhouse Gas Accounting tools
https://www.piccc.org.au/resources/Tools

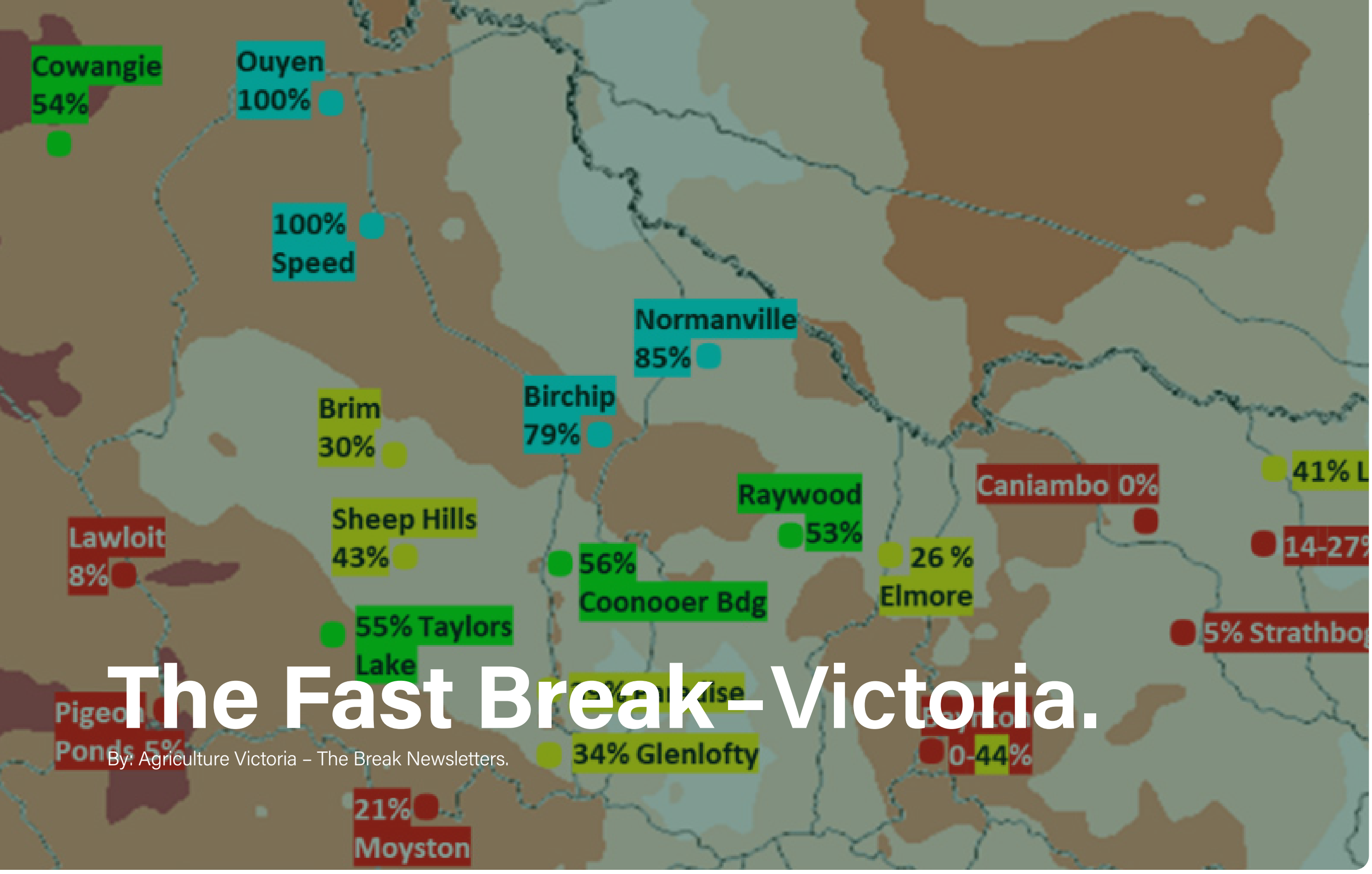
Mallee Sustainable Farming webinar on soil carbon management in the NSW Mallee
(see https://msfp.org.au/our-projects/)

The Soil Hub
https://soilhub.com.au/
Amelioration and Mitigation Options
https://soilhub.com.au/amelioration-options/

How to test in field – videos and factsheets
https://soilhub.com.au/how-to/

This article was written by Mallee Sustainable Farming, using content from a webinar delivered by Dr Karl Andersson and Dr Amanda Schapel on 'Opportunities for Soil Carbon Management in SW NSW.'

Mallee Sustainable Farming



The Fast Break – Victoria.

By: Agriculture Victoria – The Break Newsletters.

The Fast Break newsletter details oceanic and atmospheric climate driver activity over the last month and summarises three month model predictions for the Pacific and Indian Oceans, rainfall and temperature for Victoria.

Seasonal climate risk information for Victoria
Volume 20 | Issue 2 | 4 March 2025
In summary:

- Drier and warmer conditions over February see the western half of Victoria in a parched state.
- Oceans to our tropical north have been warmer and are generating a lot of cyclone activity, but none of this extra moisture has made it to Victoria to date.
- The Pacific Ocean still exhibits some La Niña-like behaviour but this would not historically aff ct Victorian autumn rainfall.
- Pressure positioning south-west of Victoria is sending most weather systems away from the state. This pattern needs to change for the season to kick off.
- Rainfall predictions are neutral for rainfall and warmer for temperature.

A significantly wetter February in east Gippsland saw soil moisture rise and perennial pastures using the available soil water. The rest of the state received average to drier rainfall and stored soil moisture was stable. A few perennial pastures used some soil water to keep themselves alive but not provide any growth. Northern cropping paddocks are wetter at depth, while southern pastures exhibit dry profiles at many locations.

The Pacific Ocean is continuing its demise from an attempt at La Niña. Stronger easterly trade winds in the western Pacific holding warmer water in the Coral Sea and less cloud at the Date Line are still reminiscent of La Niña-like behaviour. Pressure patterns, however, are not, with normal air pressure at Darwin. Nearly all climate models are predicting normal to slightly cooler temperatures to persist in the central Pacific. Warmer temperatures have developed in the eastern Pacific due to reversed trade winds in that zone, but these are not consistent with the underlying cooler water.

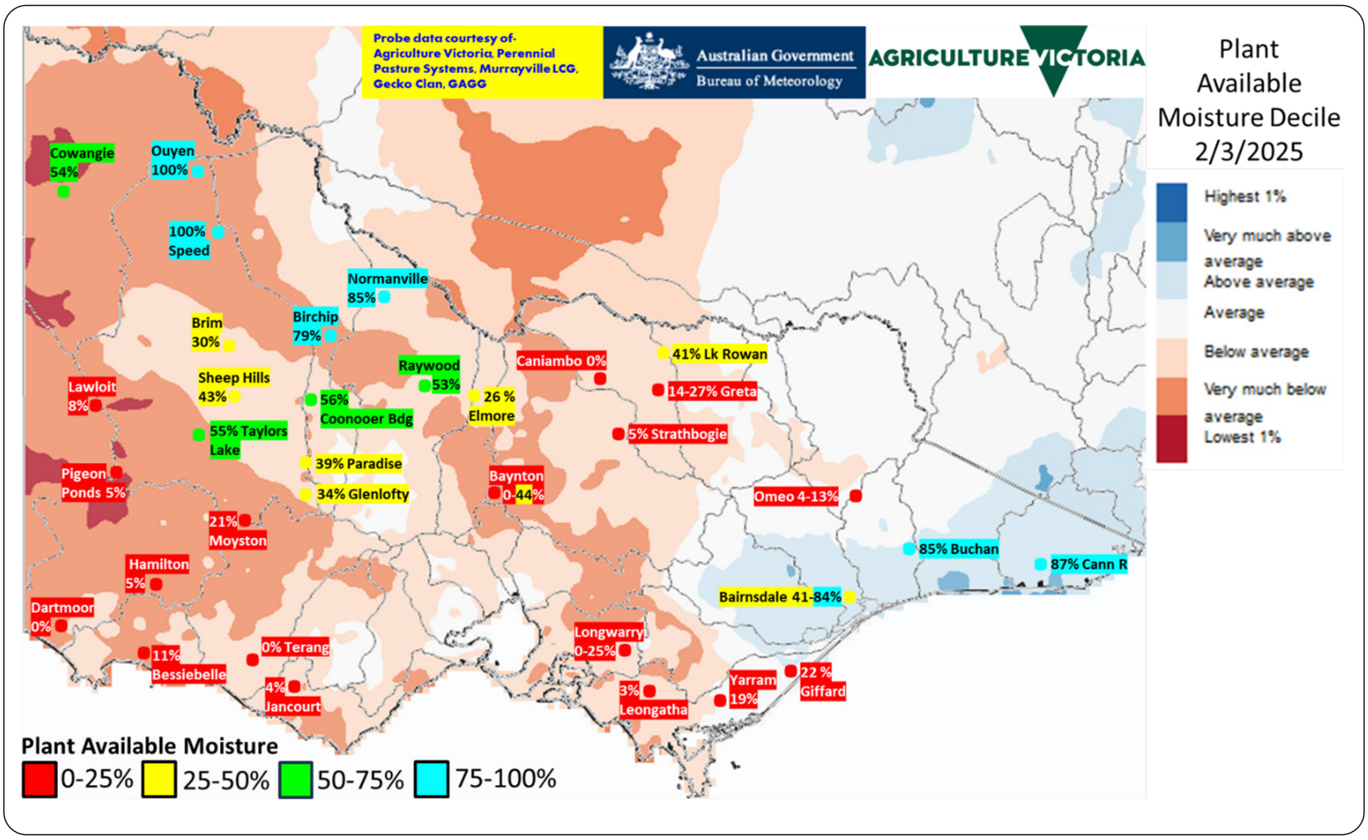
Ocean temperatures have normalised in the Coral Sea to our north-east due to cyclone activity but remain much warmer to our north and north-west. Nearly all models predict this warmth to continue. The eastern Indian Ocean has been an active cyclone generator this season – all but one have hit land. Most are being steered further out to sea by the easterly flow from high pressures to the south. Cyclone breakdown is an unreliable but possible moisture source for the autumn break.

The Southern Annular Mode has not been a feature of climate this summer and becomes less reliable over autumn.

The Madden–Julian Oscillation cloud wave traversed northern Australia in the first third of February and is not predicted to return until the last third of March. The MJO can be a potential moisture source.

Pressure strength was not a feature over Victoria with average to lower pressure. Pressure positioning, however, has been slightly further south of normal, sending weather systems south and leading to long periods of stable weather.

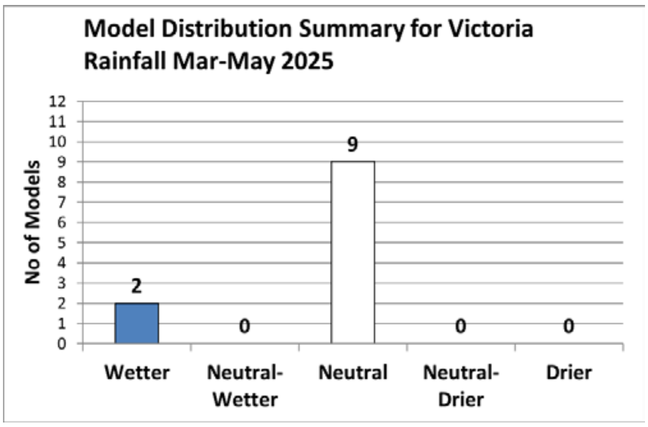
The assessment of 12 climate models for Victoria is neutral for rainfall (plan for anything). Temperatures are likely to be warmer for the next 3 months.



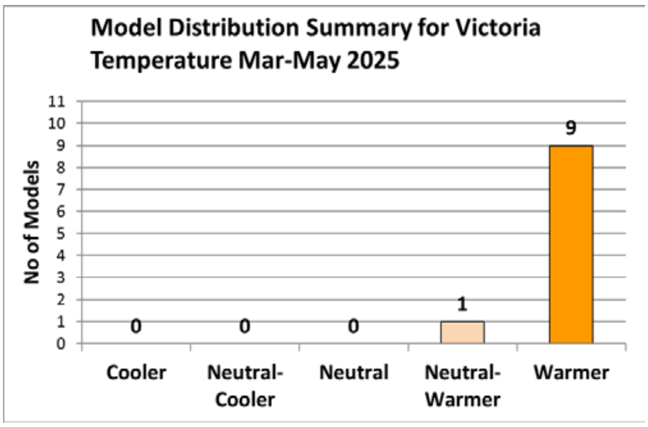
Soil moisture
Plant available moisture decile – 2 March 2025
The BoM Australian Water Outlook (AWO) deciles for perennial pasture are ranked decile 1 in most of the western third of Victoria. The central third is ranked decile 1 to 3. The eastern third is ranked normal in the upper Murray and wetter at decile 9 to 10 in east Gippsland. The soil moisture probe values are essentially unchanged in most paddocks, with a few perennial pasture paddocks using moisture to keep plants alive. Northern cropping values are generally greater than southern pasture values. The Longwarry chicory declined 13 percentage points from 38% to 25% and the Buchan perennial pasture increased 61 points from 24% to 85%.

Soil moisture probe data can be accessed in real time at Agriculture Victoria's soil moisture monitoring website: https://extensionaus.com.au/soilmoisturemonitoring/.

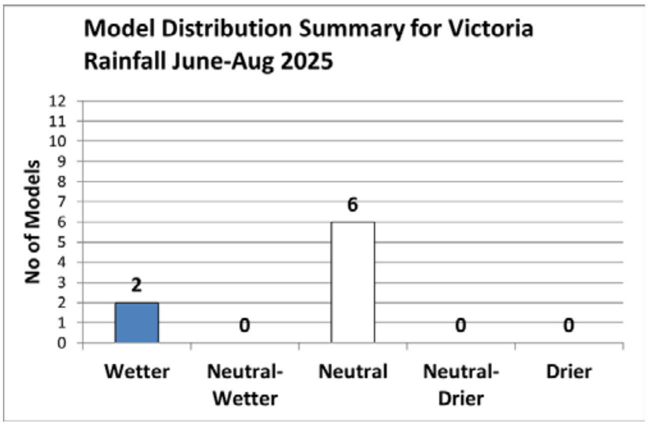
Probes from Agriculture Victoria, Dookie Land Management Group, Gecko Clan, Perennial Pasture Systems, Gippsland Agriculture Group, Murrayville Landcare and Riverine Plains Inc. networks.



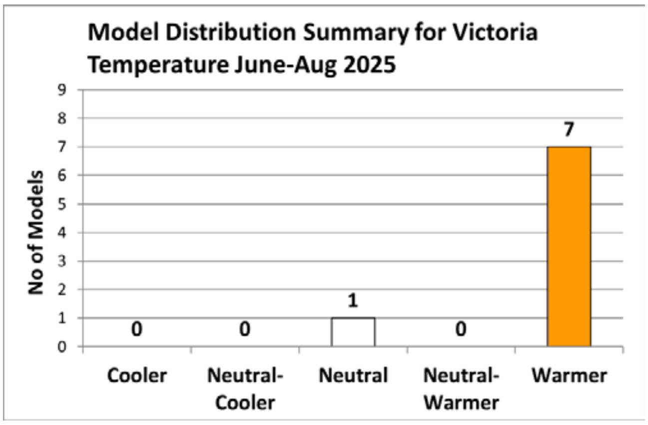
Model distribution summary for the next 3 months.
Predicted rainfall: March to May 2025
Predictions for March to May – the outlook from 11 global model forecasts is neutral for rainfall across Victoria.



Predicted temperature: March to May 2025.
Predictions for March to May – the outlook from 10 global model forecasts is for likely warmer across Victoria.



Model distribution summary for the next 4 to 6 months.
Predicted temperature: June to August 2025.
Predictions for June to August – the outlook from 8 global model forecasts is for likely warmer across Victoria.



Predicted temperature: June to August 2025.
Predictions for June to August – the outlook from 8 global model forecasts is for likely warmer across Victoria.

To view the full seasonal update, or if you would like to subscribe to The Fast Break newsletter, visit: https://agriculture.vic.gov.au/support-and-resources/newsletters/the-break

For further information, contact:
Dale Grey, Agriculture Victoria
Email: the.break@agriculture.vic.gov.au

Image references
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AGRICULTURE VICTORIA

Maintain ground cover to protect soils

By Clem Sturmfels, Land Management Extension Officer, Agriculture Victoria

Isolated dust storms recently are a reminder of how fragile some of our soils are.

They are also a good reminder there is still time to prevent this damage by de-stocking more vulnerable areas of the farm. While dust storms contain mostly mineral materials, they also contain significant quantities of organic matter, one of the most valuable components of our soils.

Leaving stock in a paddock for an extra couple of weeks to make use of remaining water supplies can be all it takes to expose the paddock to the risk of wind erosion.

Dust storms or wind erosion occur when the speed of the wind at the soil surface exceeds the forces holding soil particles in place. Typically, soil particles exist as a small pea sized peds or aggregates.

As these peds or aggregates break down the soil becomes more vulnerable to erosion.

Once the process of wind erosion starts it can be nearly impossible to stop as the larger sand grains bounce and roll across the soil surface stripping remaining vegetation and smashing (or sand blasting) the soil in front of them.

The most vulnerable areas are those with lightly textured soils, little groundcover and shelter belts and topography that exposes them to high wind speeds. Lighter textured soils are those containing a high proportion of sand with little or no clay.

Wind erosion can start anywhere the soil has been disturbed, such as in gateways, along tracks and around water troughs.

The key to preventing wind erosion is to maintain as much ground cover as possible and avoiding disturbing the soil. Aim for 80% cover in pasture paddocks and 60% cover in crop stubbles. Ground cover also helps moderate temperature extremes in soil and retains moisture.

Maintaining good ground cover will reduce the risk of wind erosion but will also reduce damage to pastures and assist with a faster recovery following the autumn break.

Bare soil is also more susceptible to oxidation and microbial activity that can release stored carbon as CO_2. Building the soil carbon levels back up can take years in drier climates. Soil carbon is a valuable soil resource as it improves soil structure, increases water retention and nutrient availability.

When groundcover levels are low the only practical way to reduce the risk of wind erosion is to remove livestock to other paddocks or place stock in a stock containment area.

Further information on support available can be found at www.agriculture.vic.gov.au/dryseasons or by calling 136 186.

AGRICULTURE VICTORIA

Monitoring wind erosion and land management in the Victorian Mallee

By Darryl Pearl, Grains Industry Officer, Agriculture Victoria, and Kathryn Sheffield, Senior Research Scientist, Agriculture Victoria

Photo: Agriculture Victoria

Key messages:

- The Monitoring Wind Erosion and Land Management in the Victorian Mallee project, is a collaboration between Agriculture Victoria and Mallee CMA.
- Land management practices and satellite imagery are monitored and used to assess levels of ground cover likely to offer s il protection during summer and autumn throughout the Mallee.
- Observations from 2024 are presented in conjunction with relevant observations from the previous year to highlight key diffe ences and important points.
- Low Growing Season Rainfall (GSR) was a key feature of 2024, with most locations having decile one to 3 GSR. Rainfall from November 2023 to January 2024 created good stored soil moisture, making a significant diffe ence to crop yields in 2024 based on GSR alone.
- Total Vegetation Cover (TVC) for the region in December 2024 was above 60% of the area of most land systems. The Millewa was the exception with only 31-35% of the land system having a TVC above 0% as well as areas of the Central Mallee, Raak, and Boigbeat.

Roadside observations

Rainfall from November 2023 to January 2024 in the northern Mallee resulted in high levels of soil moisture for sowing in March 2024. Rainfall over the growing season was varied across the region with most locations having at least 5 out of the 7 months at decile 4 or lower. The northern and central regions of Ouyen, Murrayville and Werrimull had good rains in October of 29 mm or better compared to only 4.4 mm at Hopetoun.

Frost in September and October impacted seed development and in some cases also damaged plant stems.

The 2024 autumn roadside survey showed that 85% of paddocks had good ground cover from standing undisturbed stubble while 11.6% of paddocks were covered with either pasture or weeds. Signs of erosion were observed in 5% of paddocks surveyed compared to 4.5% in 2023 with small increases occurring in the moderate susceptibility zones.

The 2024 spring roadside survey recorded a 3.7% increase of paddocks in a cropping rotation with 51 more paddocks in rotation compared to 2023; 71.4% would be harvested compared to 78.1% in 2023. The number of paddocks cut for hay dropped by one to 47 paddocks. The number of paddocks classed as failed (not harvestable) went from 1 in 2023 to 90 in 2024. The increase in failed paddocks was due to the low Growing Season Rainfall (GSR) rainfall and frost.

A follow-up survey in spring was used to help remove the number of unknown paddocks that are a result of the varying crop stages/maturity occurring over the region at the time of the first survey. The main spring transect data collection occurred between 23-27 September and a follow-up inspection of the paddocks classed as unknown management was undertaken 11-14 of November 2024, which resulted in a decrease of 52 unknown management paddocks when compared to 2023.

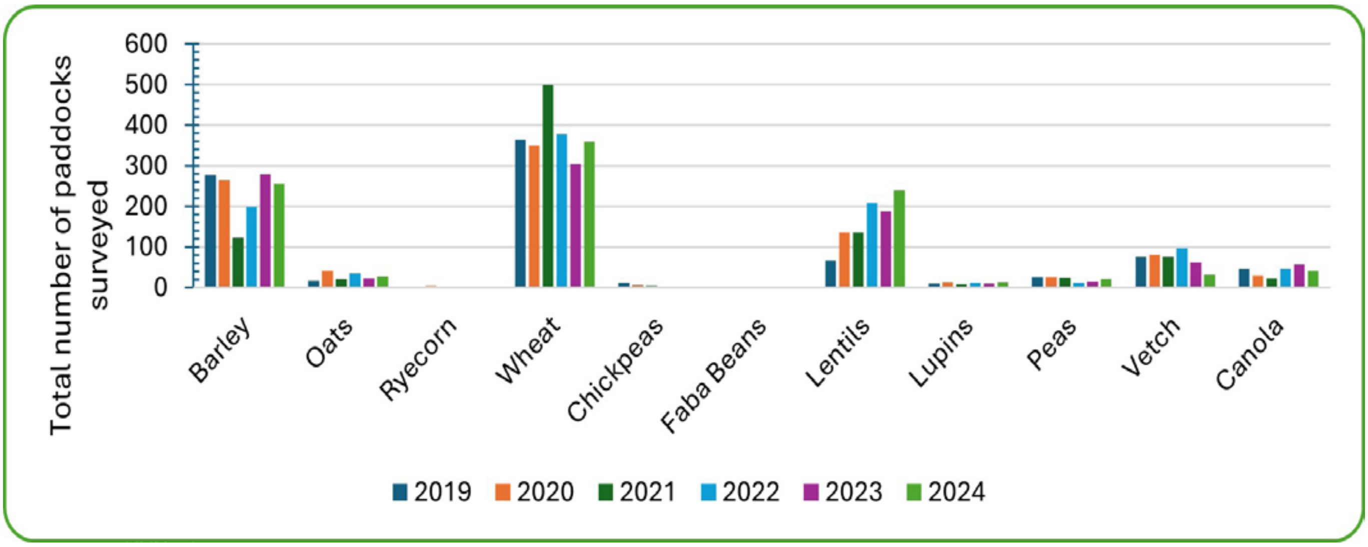

Figure 1: Comparison of the number of paddocks per crop type being grown in 2019-2024 spring Mallee transects.

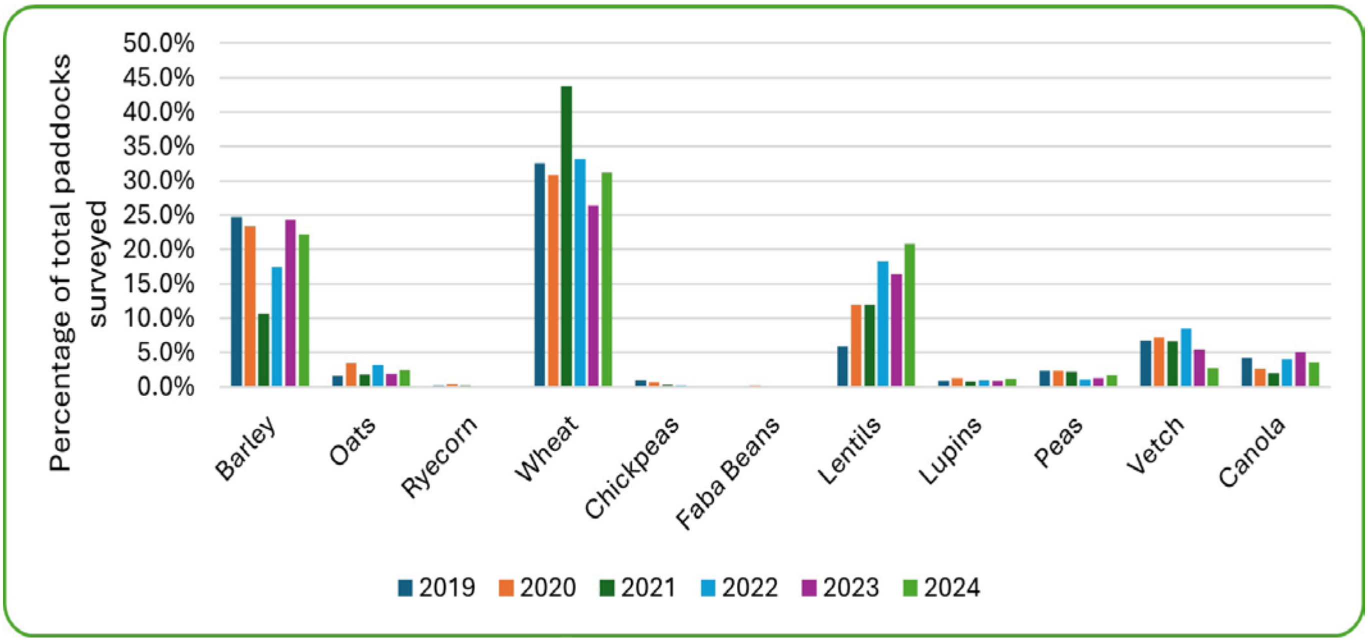

Figure 2: Comparison of the percent of paddocks of crops being grown in 2019-2024 spring Mallee transects.

2024 saw an increase of 46 paddocks classed as cropped compared to 2023. The number of paddocks sown to lentils increased to 240 in 2024 compared to 188 (Figure 1) in 2023. Paddocks sown to barley decreased by 2.1% while wheat increased by 4.8% (Figure 2).

Vegetation Cover Monitoring from Satellites

Vegetation cover maps are produced using imagery from the MODIS satellite on a monthly basis. They are used to calculate the area and quality of cover (whether vegetation is living, dead or senescing) and during spring can also identify cereals, legumes and canola crop types, as well as pasture and bare ground in dryland agricultural areas.

A threshold of greater than 50% vegetation cover has been established nationally as the target to protect soils from wind erosion. Maps in Figure 3 and Figure 4 show areas protected from wind erosion in December 2023 and December 2024 respectively. These maps illustrate the increase in area across the Mallee potentially at higher risk of wind erosion between 2023 and 2024. In December 2023, the area of all land systems across the Mallee considered to have adequate cover to protect from wind erosion was at least 60%. By December 2024, that number had declined to 30% for the Millewa, and to 50 to 60% for the Boigbeat, Raak and Central Mallee land systems. This trend, combined with an increase in lentil crops being grown, highlights the importance of stubble management in the months prior to 2025 sowing to lower wind erosion risks.

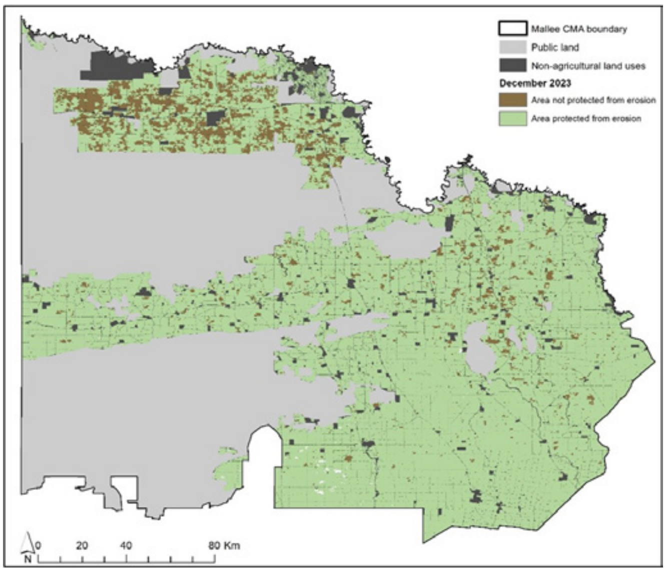

Figure 3: Areas protected from wind erosion (derived from satellite imagery) for December 2023

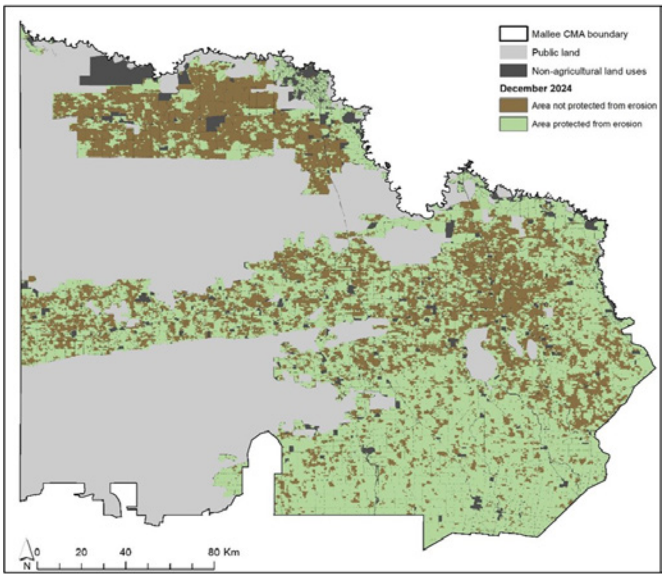

Figure 3: Areas protected from wind erosion (derived from satellite imagery) for December 2023

In Summary
The 2024 season began with good weed control and stored soil moisture which allowed for better than expected yields in a very low GSR year however the amount of stubble remaining in the paddocks has been lighter than normal, which will require good paddock management across the rest of summer. For those managing stock, limiting how much time stock spend in paddocks, particularly legume stubble paddocks or those with light soils, will be vital. The lower vegetation cover observed throughout the Mallee, particularly in the northern and central sections, reinforces the need to monitor and manage paddocks to limit the potential impact of wind erosion in the coming months.

Overall, the number of paddocks cropped has increased from 899 paddocks in 2019 to 990 paddocks in 2024.

Over the 6 years wheat and barley have, as expected, been the main crops in the Mallee however lentils have now expanded to 240 paddocks in 2024, from only 64 paddocks in 2019.

For further information, contact:
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Acknowledgements
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Australian Government | AGRICULTURE VICTORIA

Don’t forget the benefits of farm laneways

By Clem Sturmfels, Land Management Extension Officer, Agriculture Victoria

Farm laneways are a great way to improve farm efficiency and reduce labour requirements.

Laneways can also provide a useful refuge area during natural disasters such as flood, fire and drought.
A good laneway system makes moving stock easier, for rotational grazing or routine stock management like drenching or shearing.

Combining a laneway system with a well-designed all-weather road improves accessibility for feeding out and checking stock, or moving plant or equipment, particularly in wet years.

Careful planning and design are needed to get the best out of a laneway system.

The laneway system design should consider your operational requirements and opportunities. Consider the width and turning circle of your equipment, space for a well-built road, room for a few rows of trees and plenty of room for stock.

Making a laneway at least 20-25m wide works well for most sheep and cattle properties.

Rounding off ight corners in a laneway/road combination allows for travel at a consistent speed around the farm.

Adding regular gateways and a water supply can also allow the laneway to be used as another paddock or holding area, benefiting your property when required in emergencies.

Planning and designing a farm laneway can be done using a large air photo or satellite image of your farm.
Site laneways to access as many paddocks as possible and pick a safe and reliable route across the farm.

Where possible, place laneways on ridgelines to improve drainage and make road construction easier.

Laneways can also be used to establish shelterbelts, woodlots or improve biodiversity. Take care to select species that will benefit the land and allow space to minimise damage to fencing.

Planting trees on the east and south side of your laneway will reduce waterlogging in higher rainfall areas.
For more information, visit the Agriculture Victoria website.

Herbicide strategies for controlling flaxleaf fleabane

By Angus Butterfield, Birchip Cropping Group (BCG)

Flaxleaf Fleabane
Photo: Birchip Cropping Group

Take home messages

- Flaxleaf fleabane is a challenging weed to control, but failing to manage it can have significant economic consequences.
- First spray applications are critical for eff ctive flaxleaf fleabane control – premium herbicide products often deliver better results in the first spray.
- The addition of Dropzone® to a standard summer spray significantly improved control of flaxleaf fleabane, while common mixes such as 2,4-D ester and triclopyr offe ed no additional control over a standard glyphosate mix.
- Glyphosate and Terrad'or® may not be needed to control flaxleaf fleabane, and excluding these products could significantly reduce costs.

Background

The presence of flaxleaf fleabane (Conyza spp.) weed is steadily increasing across key agricultural regions in Australia. Since the adoption of no-till farming systems, flaxleaf fleabane control has become increasingly challenging across key cropping regions in Australia. There are seven diffe ent fleabane species in Australia, however flaxleaf fleabane is the most prevalent (Walker et al. 2012). It is a wind-borne surface germinating weed with natural tolerance to glyphosate that thrives in low competition situations (Daniel 2015). The weed has a high reproductive capacity and each plant is capable of producing up to 110,000 seeds (Wu 2012).

Herbicide strategies often fail to control weeds eff ctively, posing a threat to agricultural productivity. In the past, soil disturbance through tilling was a successful method of control. However, the shift to no- or low-till farming means there is now a heavy reliance on knockdown herbicides. Residual herbicides such as clopyralid provide excellent control (Brill et al. 2012), however these herbicides are not ideal for rotations incorporating pulses. Knockdown herbicides are most eff ctive when applied to flaxleaf fleabane at the rosette or seedling growth stage. However, emergence occurs at temperatures between 10°C and 30°C, meaning the weed can emerge under an established crop in the spring when it cannot be targeted at early growth stages (Walker et al. 2012). Once the plant elongates, its hairy, narrow leaves and thick cuticle reduce herbicide penetration, further complicating control (Wu 2012).

Aim

To identify optimal herbicide options for first and second sprays in a double-knock strategy.
To investigate the efficacy of camera sprayer rates and evaluate the economic impact of these chemical mixes.

Paddock details

Location:	Jil Jil
Summer rainfall (November-March):	150mm
Paddock history:	Lentil stubble

Trial details

Target weed species:	Flaxleaf fleabane
Treatments:	refer to Table 1 & Table 2
Spray dates:	First spray 9 February, Double knock 16 February
Replicates:	Three

Method

Two field trials were established to compare the efficacy of herbicide strategies, as outlined in Table 2. These strategies were imposed on a weed-infested site located at Jil Jil, in the Mallee (– 35.869551, 142.982099). At the time of trial establishment, fleabane plants were pre-flowering and 5-10 cm tall. Both field trial designs were a randomised complete block with three replicates. The site contained a large population of the weed at an advanced growth stage. First spray herbicide options compared various Group 4 herbicides to a glyphosate mix (outlined in Table 2), and all treatments were sprayed with a mixture of paraquat 250 2000ml/ha, Terrad'or® 20g/ha and Hasten 1% seven days after first spray.

Table 1. The European Weed Research Council (EWRC) rating scale for weed control 1.

EWRC score	Effic cy (weed kill)	Weed control (%)
1	Complete kill	100
2	Excellent	99.9-98
3	Very good	97.9-95
4	Good-acceptable	94.9-90
5	Moderate but not generally acceptable	89.9-82
6	Fair	81.9-70
7	Poor	69.9-55
8	Very poor	54.9-30
9	None	29.9-0

[1] This table is recreated from Dear et al. (2003).

Second spray herbicide options included diffe ent herbicide mixing partners with paraquat, as well as simulated camera sprayer treatments (outlined in Table 3). Treatments for the trial were determined by researchers and local agronomists.

First spray applications were applied on 9 February 2024, followed by a second spray application completed seven days after the initial spray. Both trials were scored using the European Weed Research Council (EWRC) scale (Dear et al. 2003) (Table 1) on days 4, 7, 14, 21 and 28 after the last herbicide application. A lower EWRC score indicates higher efficacy of herbicide control (i.e. weed death). Scores were taken in-field and based on whole-plot assessments. Data from the two trials was analysed separately using one-way ANOVA in Genstat 22nd edition.

Results and interpretation

First spray herbicide options - Trial 1

Glyphosate alone (Table 2, Treatment 8) provided poor control of fleabane (68.3 % control at 28 days).

The addition of Group 4 herbicides to a glyphosate mix, commonly used over summer fallow, displayed mixed results: 2,4-D ester, Starane® and triclopyr (Treatments 4, 5, 6 and 7) were not significantly diffe ent to glyphosate alone, whereas the addition of 2,4-D amine, dicamba and a 2,4-D ester/dicamba mix (Treatments 1, 2, 3) significantly improved control of fleabane. Dropzone®, a 2,4-D amine formulation, provided the highest control (98.3%).

Cost per hectare for the optimal options (Treatments 1 to 3) were in the mid- to high-cost range, relative to the less eff ctive options, reinforcing the importance of proactive weed management.

Table 2. Herbicide efficacy results showing EWRC, weed control % 28 days after application and cost of first spray treatments.

Trt No.	Treatment	Rate (g or ml/ha)	EWRC1	Weed Control (%)	Cost ($/ha)2
1	AMS Triclopyr 600 Dropzone® Glyphosate VC-700	1% 100 1100 2000 0.25%	1.6a	98.3	55.9
2	AMS Dicamba 2,4-D Ester 680 Glyphosate VC-700	1% 500 350 2000 0.25%	5b	85	55.3
3	AMS Triclopyr 600 2,4-D Amine 450 Glyphosate VC-700	1% 100 1200 2000 0.25%	5b	83.3	52.5
4	AMS Triclopyr 600 Dicamba Glyphosate VC-700	1% 100 150 2000 0.25%	5.3bc	80	49.7
5	AMS Triclopyr 600 2,4-D Ester 680 Glyphosate VC-700	1% 100 500 2000 0.25%	5.3bc	76.7	51.1
6	AMS Triclopyr 600 Starane® Glyphosate Uptake	1% 100 500 2000 0.5%	5.3bc	76.7	61.6
7	AMS Triclopyr 600 Glyphosate VC-700	1% 100 2000 0.25%	6bc	70	47.1
8	AMS Glyphosate VC-700	1% 2000 0.25%	6.6bc	68.3	43.6

[1] Data is shown as the mean of three replicates. Superscript letters indicate significant differences. $P<0.001$, LSD = 1.154, CV = 12.9 %. LSD = Least Significant Difference (P = 0.05), CV = Coefficient of Variation.
[2] Costs are based on product information at the time of application. Double-knock spray is included in cost.

Second spray herbicide options - Trial 2

High paraquat rates (camera sprayer rates) combined with Terrad'or® and amitrole T (discontinued) at 500ml/ha, achieved 93% control (Table 3, Treatments 1 and 3). However, high rates of amitrole T (Treatment 7) decreased efficacy, resulting in significantly lower control. Including eff ctive Group 4 herbicides in the paraquat-Terrad'or® mix (2,4-D amine and Starane®) produced strong results (90% control) even without glyphosate in the second spray.

This highlights two key points: the importance of Group 4 herbicides in the first spray, and that glyphosate may not be essential for flaxleaf fleabane control. Given the high price of glyphosate ($15.7/ha including AMS and VC-700), adopting this strategy could significantly reduce costs. However, this may not be the case for other summer weeds, so growers must consider the whole weed spectrum before taking this approach. The addition of Group 4 and 14 herbicides (Treatments 9, 10, 11) with standard paraquat rates did not give better control than a paraquat stand-alone double knock. This suggests growers are getting less value from using 20g/ha of Terrad'or® on flaxleaf fleabane, given the cost of Terrad'or® at $14.7/ha.

Table 3. Herbicide efficacy showing EWRC, weed control % 28 days after application and cost of second spray treatments.

	First Spray		Second Spray				
Trt No.	**Product**	**Rate (g or ml/ha)**	**Product**	**Rate (g or ml/ha)**	**EWRC[1]**	**Weed Control %**	**Cost ($/ha)2**
1	AMS Triclopyr 600 Glyphosate VC-700	1% 100 2000 0.25%	Triclopyr 600 Paraquat 250 Amitrole T Terrad'or® Hasten	150 4000* 500 40* 1%	2 a	93	72.6
2	2,4-D Amine 450 Starane® Uptake	2000 500 0.5%	Paraquat 250 Terrad'or® Hasten	2000 20 1%	4 ab	90	53
3	AMS Triclopyr 600 Glyphosate VC-700	1% 100 2000 0.25%	Paraquat 250 Amitrole T Terrad'or® Hasten	4000* 500 40* 1%	4.6 bc	83	69.1
4	AMS Triclopyr 600 Amitrole T Glyphosate VC-700	1% 100 5000* 2000 0.25%	Paraquat 250 Terrad'or® Hasten	2000 20 1%	5.6 cd	78.3	135
5	AMS Triclopyr 600 Glyphosate VC-700	1% 100 2000 0.25%	Paraquat 250 Voraxor® Hasten	2000 100 1%	6 d	72.8	58.2
6	AMS TriAMS Triclopyr 600 Glyphosate VC-700	1% 100 2000 0.25%	Paraquat 250	2000	6.6 d	66.7	32.5
7	AMS Triclopyr 600 Glyphosate VC-700	1% 100 2000 0.25%	Paraquat 250 Amitrole T VC-700	4000* 5000* 0.25%	6.6 d	66.7	135.3
8	AMS Glyphosate VC-700	1% 2000 0.25%	Paraquat 250	2000	6.6 d	66.7	28.9
9	AMS Triclopyr 600 Glyphosate VC-700	1% 100 2000 0.25%	Paraquat 250 Terrad'or® Hasten	2000 20 1%	6.6 d	66.7	47
10	AMS Triclopyr 600 Glyphosate VC-700	1% 100 2000 0.25%	Paraquat 250 Triclopyr 600	2000 100	6.6 d	66.7	36
11	AMS Glyphosate VC-700	1% 2000 0.25%	Paraquat 250 Terrad'or® Hasten	2000 20 1%	7 d	61.7	43.6

[1] Data is shown as the mean of three replicates. Superscript letters indicate significant differences. P<0.001, LSD = 1.154, CV = 12.9 %. LSD = Least Significant Difference (P = 0.05), CV = Coefficient of Variation.

[2] Costs are based on product information at the time of application. Double-knock spray is included in cost.

Commercial practice and on-farm profitability
It is crucial for growers to continue effo ts to control flaxleaf fleabane and reduce weed seed banks, particularly because the weed populations can increase rapidly due to their prolific seed reproduction.

Findings from these trials indicate the first sprays were more critical for controlling fleabane than the second. Farmers should consider using premium products in their first spray rather than in the second spray.

Premium options such as Dropzone® in the first spray phase, combined with eff ctive knockdown strategies, deliver the most eff ctive results, whereas many common mixes such as 2,4-D ester and triclopyr did not enhance control over a standard glyphosate mix. In addition, the control provided by paraquat was only improved by using increased camera sprayer rates.

Reducing reliance on costly products such as glyphosate and Terrad'or® is possible under specific conditions, providing significant savings for growers.

For further information, contact:
Angus Butterfield, Birchip Cropping Group (BCG)
Email: angus.butterfield@bcg.org.au

Resources and further information:
Daniel R (2015) Farming systems strategies to manage fleabane and feathertop Rhodes grass.

available at:
https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2015/07/farming-systems-strategies-to-manage-fleabane-and-feathertop-rhodes-grass [Accessed 2 July 2024].

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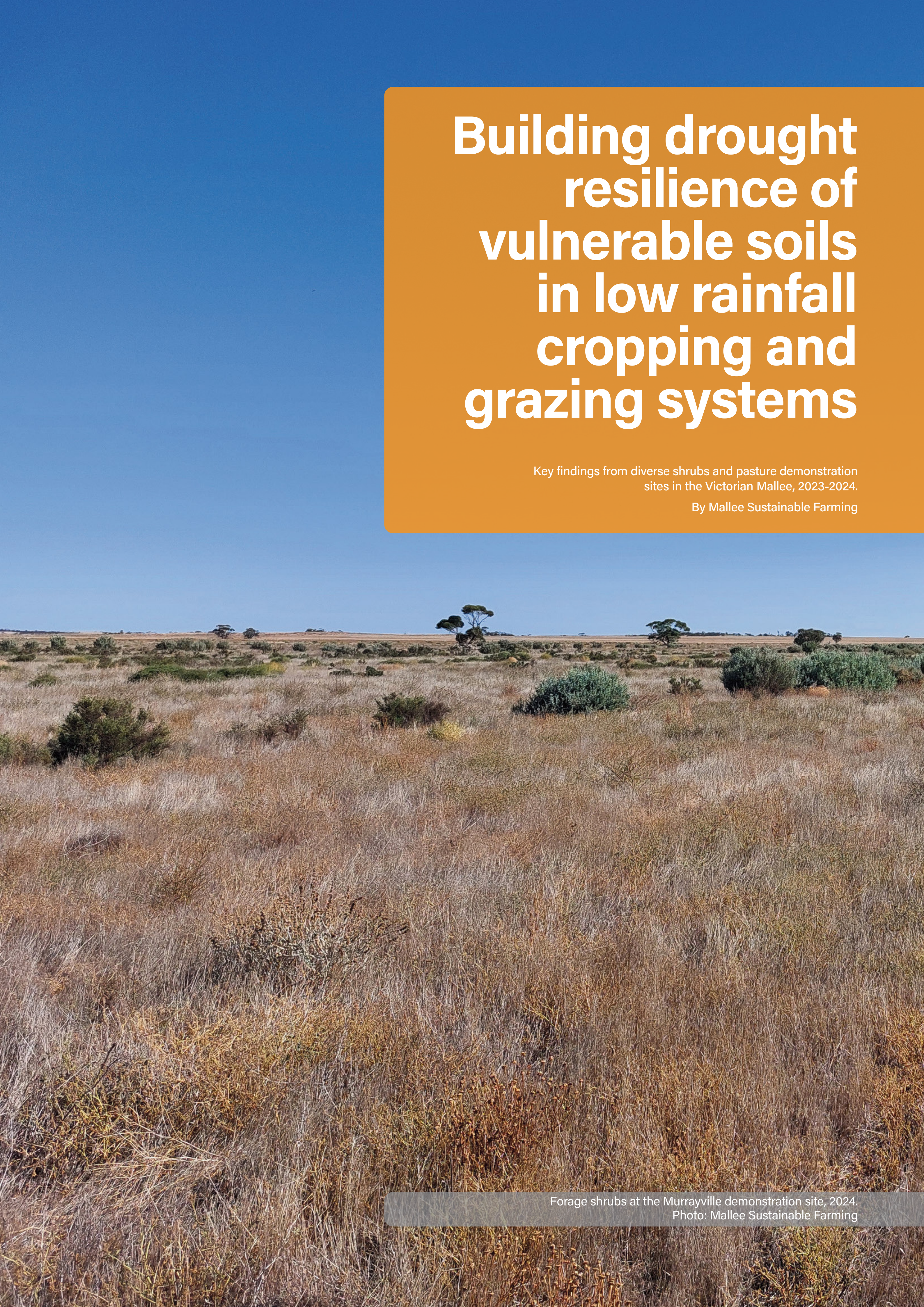
Acknowledgements
This trial was funded by the Hugh Williamson Foundation. Thanks to Pat Conlan (Elders Swan Hill) for advice on herbicide use and to growers Jon Haslam and Scott Anderson for hosting the BCG trials on their properties.

Building drought resilience of vulnerable soils in low rainfall cropping and grazing systems

Key findings from diverse shrubs and pasture demonstration sites in the Victorian Mallee, 2023-2024.

By Mallee Sustainable Farming



Forage shrubs at the Murrayville demonstration site, 2024.
Photo: Mallee Sustainable Farming

Key Messages

- Three existing diverse forage shrubs/pasture demonstration sites were monitored for shrubs survival and pasture production during 2023-2024.
- Old Man saltbush and Silver saltbush showed the best survival, and appear the best option for a mixed shrub planting to complement pasture in the Victorian Mallee.
- Other more palatable and less vigorous species such as Ruby saltbush and Tar bush should only be grown when excellent weed control is achieved before planting, and the site is set up for short duration/high intensity rotational grazing.
- The broadcasting of medic in the inter-row space between shrubs was a successful way of augmenting native pastures, leading to the production of around 2 t/ha of good quality pasture to accompany approx. 1 t/ha of edible shrubs biomass per year.
- Mixed shrubs/pasture stands are likely to be able to support around 50 ewes/ha for one month each year (500 ewes for a month on a typical 10 ha site) avoiding the need to feed those stock grain and hay; the grazing value (avoided costs of supplementary feeding) may be around $3,400 per 10 ha site per year.
- With material costs around $8000 to $10,000 per 10 ha site, set up costs can be recovered after only 3-4 years of improved grazing.
- Additional benefits are likely to include reduced erosion across the farm, better water balance, improved biodiversity and better drought resilience.

Introduction

Perennial forage shrubs have been shown previously to reduce farm business risks and improve predictability of farm feed supply on mixed farms in southern Australia1. Benefits include growing more feed and having shrubs as 'living haystacks' to fill feed gaps or allow deferred grazing of pastures in autumn.

Environmental benefits include improved biodiversity, better water use in the landscape (reducing salinity risks) and reduced grazing pressure elsewhere on the farm.

To date, most shrub plantations in the Mallee have been based on Old man saltbush, with limited other species or pastures grown. While these plantings are highly drought resilient, palatability and feed intake can be low due to the high salt content. Growing a mix of shrub species in an alley farming system, with pasture grown in-between, increases the range of nutrients and minerals available in feed, increases feed intake, and reduces the chance of any one shrub species being lost to pests and diseases. However, diverse forage shrubs and pasture plantings have not yet been adopted at scale on farms in south-eastern Australia.

The present project examined the performance of three previously established diverse shrubs and pasture demonstration sites in the Victorian Mallee. Two of the sites, at Wargan and Patchewollock, had been planted to a mix of Old man saltbush, Ruby saltbush and Tar bush in 2022. Another older site, planted in 2015 at Murrayville, was also monitored to follow the survival of these same three species plus Silver saltbush, River saltbush and Rhagodia. The focus of the work was to:

1. Identify which forage shrub species survive best in NW Victoria.
2. Investigate benefits and costs of forage shrub/pasture plantings, and likely impact on whole farm feed supply.

Results Summary

1. Shrub survival

At Wargan and Patchewollock, where new mixed species shrubs stands were established in 2022, Ruby saltbush showed the best overall survival rate (58%), while establishment of Tar bush and Old Man saltbush was more variable (38-50%). Data from both sites are shown in Table 1. At the time of writing (June 2024), Old Man saltbush plants at these sites were ready for grazing, but Ruby saltbush and Tar bush were still too small to be grazed (for example, see Figure 1). Shrubs at Wargan and Patchewollock appeared to struggle with weed pressures, probably due to unseasonally wet spring and early summer conditions in both 2022 and 2023. If possible, future effo ts to establish diverse shrubs plantings should begin with knockdown weed control the year before establishment to reduce the weed seed bank.

At the older site planted at Murrayville in 2015 (Figure 2), valuable data was obtained on long term survival of a wider range of species, with Silver saltbush and Old Man saltbush showing the best long term persistence (50-60%), and River saltbush, Tar bush, Ruby saltbush and Rhagodia surviving at around 30-40% (Table 2). The loss of approximately half the shrubs across the site was likely due to a combination of drought and grazing pressure over the period 2018-2020, when the site was regularly grazed. The lower survival of River saltbush, Tar bush, Ruby saltbush and Rhagodia was likely due to the lower vigour, lower tolerance of weeds, and higher palatability of these species.

Table 1. Shrubs survival at the Wargan and Patchewollock sites to June 2024.

	Wargan	Patchewollock	Average
Ruby saltbush	49%	68%	58%
Old Man saltbush	60%	39%	50%
Tar bush	50%	25%	38%

Figure 1. Shrubs site at Patchewollock. By autumn 2024, some Old Man Saltbush plants were well established (A), a few Tar bush plants had grown above their tree guards (B), and many Ruby saltbush plants were still not well enough established to tolerate grazing (C).

Figure 2. The Murrayville demonstration site, pictured in early 2024, provides an opportunity for farmers to see six diffe ent forage species growing in Mallee conditions.

2. Productivity, benefits and costs

Forage shrubs planted in rows with pasture strips in-between have been shown previously to produce around 1 t/ha of edible biomass per year, with productivity driven primarily by rainfall and soil type, and the feed produced high in protein (>20%) and minerals. In this project, medic seed was broadcast in the inter-row space between shrubs, and successfully thickened up pasture stands (for example, see Figure 3). Pasture testing showed it is possible to produce around 2 t/ha of pasture in-between shrub rows each year, with pasture of moderate to good quality in spring (7.5% crude protein, metabolisable energy 9.0 MJ/kg DM), and low in quality in autumn (5.2% crude protein and metabolisable energy 5.1 MJ/kg DM).

On a per hectare basis, the combination of 1 t/ha of shrubs biomass and pasture at 2 t/ ha was calculated to supply around 50 adult sheep a good quality ration for 1 month each year (i.e., a 10 ha site could be expected to support 500 ewes for 1 month). Younger stock would require supplementary grain and hay for growth.

Producers hosting the new shrubs sites of this project indicated they plan to use shrubs in the autumn, when paddock feed is depleted, and when stock would otherwise need to be contained and fed grain and hay at a cost of at least $1.70/ewe per week. Thus, the economic value of grazing a 10 ha shrubs/pasture stand was estimated at $3,400.

As at 2024, the material costs for a 10 ha shrubs/pasture site were around $8000 to $10,000, depending on labour requirements and water availability. Costs would therefore be recovered in sheep enterprises after around 3-4 years of improved grazing. Additional benefits are likely to include reduced erosion across the farm, better water balance, improved biodiversity and better drought resilience.

Table 2. Long term shrub survival data from the Murrayville demonstration site, 8 years after planting.

Shrub type	Numbers planted	No' plants surviving	Survival %
Silver saltbush	200	132	66
Old Man saltbush	280	136	49
River Saltbush	40	16	40
Tar bush	240	83	35
Ruby saltbush	378	44	35
Rhagodia/ Mallee saltbush	160	44	28
Total	**1298**	**542**	

Implications for commercial practice

Based on the site sown in 2015, mixed plantings of Silver saltbush and Old man saltbush appear to offer he best combination of survival, vigour and palatability in the Victorian Mallee. Such stands would offer any of the benefits of a mixed planting (feed and mineral diversity, lower salt levels than Old Man saltbush alone), without the complications of having large diffe ences in time to maturity, hardiness and palatability.

Based on results from the 2015 site, and the more recent sites, the less vigorous and more palatable Ruby saltbush and Tar bush should only be included at sites with excellent weed control history (at least two knockdown sprays to deplete the weed seed bank), and the potential to graze using high intensity/short duration rotational

Figure 3. By spring 2023, medic pasture had established well across the Wargan site, significantly boosting forage production.

grazing. This would require the site to be set up with multiple smaller paddocks to allow stock to be quickly rotated through diffe ent paddocks. Farmers must also be prepared to wait longer to first grazing, since Ruby saltbush and Tar bush take longer to mature. If sites have high weed pressures or are subjected to longer periods of low intensity grazing, Ruby saltbush and Tar bush should not be included.

Regarding productivity and contribution to the overall feedbase of a typical Mallee farm, a 10 ha planting is likely to provide enough feed to support around 500 grown sheep for 30 days each autumn, with costs recoverable after around 3-4 years of grazing. This is a highly useful contribution to overall farm resilience and profitability. However, typical mixed farms in the Mallee often have around 1000 ewes, may want to run sheep in smaller mobs (especially if ewes are lambing), and will often want to run sheep on mixed shrubs plantings for more than 30 days. It is therefore likely that most farmers going into shrubs will need to set up multiple small (5-10 ha) paddocks to allow rotational grazing to occur, and to allow a large proportion of the flock access to high quality forage for one to two months each year. This would allow shrubs to support sheep in autumn, in a typical feed gap, but would also open up the possibility of putting sheep on shrubs at other times of year when groundcover may be low.

Fast Facts

- Silver and Old man saltbush appear to offer he best combination of survival, vigour and palatability in the Mallee.
- Diverse shrubs produce around 1 t/ha of high quality forage per year (protein >20%, and high mineral content).
- Complementary pasture in the inter-row space grows at around 2 t/ha per year, and is lower in protein but higher in energy.
- A 10 ha shrubs/pasture site can support around 500 ewes for 1 month each year, worth approx. $3,400 in avoided feeding costs.
- Material costs for setting up a 10 ha shrubs/ pasture site are around $8,000 - $10,000, so set up costs can be recovered after 3-4 years.
- To maximise shrub survival and early vigour, comprehensive weed control should be undertaken before planting (at least two knockdown sprays).
- Where multiple shrub species are grown in a shrubs planting, short duration/high intensity rotational grazing must be practiced to prevent more palatable species from being grazed out.

Australian Government
Department of Agriculture, Fisheries and Forestry
Future Drought Fund
mallee catchment management authority
Mallee Sustainable Farming

This project is supported by the Mallee Catchment Management Authority, through funding from the Australian Government's Future Drought Fund.

The Carbon Farming Outreach Program

By Cameron Flowers, Sustainable Agriculture Facilitator, Mallee CMA

Photo: Mallee CMA

What is carbon farming?
Carbon farming is a land management approach that increases the carbon captured from the atmosphere through photosynthesis and other natural processes that are already occurring on farms. The goal of carbon farming is to increase the efficiency of these natural processes in capturing carbon through a range of agricultural methods that aim to store carbon in the soil and vegetation.

Carbon farming can have the added benefits of increasing farm productivity, benefiting biodiversity and increasing resilience to drought. It can also provide additional income sources and reduce on-farm emissions.

The Carbon Farming Outreach Program
Mallee CMA, in partnership with Agriculture Victoria, is delivering the Carbon Farming Outreach Program in the Victorian Mallee to assist farmers and land managers to make informed decisions on carbon farming and outline how they could benefit from moving to a low carbon future.

The program will be delivering free training across the region, with local experts providing resources and information to understand:

- Benefits and risks for carbon farming
- Changes coming to Australian markets and supply chains
- How to calculate emissions and carbon storage
- Options to reduce emissions and store carbon
- Carbon markets and carbon farming opportunities

Workshops will be running at locations across the Mallee during July and August 2025.

Register your interest by scanning the QR code below:

For further information, contact:
Cameron Flowers, Sustainable Agriculture Facilitator, Mallee CMA
Phone: 0427 509 663
Email: cameron.flowers@malleecma.com.au

Acknowledgement
Delivered with funding support from the Commonwealth of Australia through the Department of Climate Change, Energy, the Environment and Water under the Carbon Farming Outreach Program.

Setting Strategies for Farm Business Success

Want to build a stronger, more productive and effective farm business management strategy?

If you answered yes, then Agriculture Victoria has the workshop for you!

These 2-day workshops led by Gavin Beever will examine aspects that help make an effective farm business strategy.

Topics:

- Financials.
- Farm resources.
- Human relationships.
- Setting business goals.
- Climate risk and natural resource management.
- Latest in AgTech and;
- Tools and skills that will get you to where you want to go.

Presenters:

- Gavin Beever, Principal Consultant, Cumbre Consultants.
- Dale Grey, Seasonal Risk Agronomist, Agriculture Victoria.
- Brendan Williams, Managing Director, Autonomous Ag.

Workshops:

Underbool.

Location: Underbool Bowling Club, Reservoir Road, Underbool
Date: Monday 30 June and Tuesday 1 July 2025
Time: 8.30 for 9am sharp start – 3pm
Registration:

To secure your place, book at: trybooking.com/1373360

Ultima.

Location: Recreation Reserve (Ultima Football Club Rooms), Culgoa - Ultima Road, Ultima
Date: Thursday 3 and Friday 4 of July 2025
Time: 8.30 for 9am sharp start – 3pm
Registration:

To secure your place, book at: trybooking.com/1373360

Lunch and snacks provided.
A follow up one day workshop with Gavin will be held, 6 to 8 months after this 2-day workshop to review actions and any issues and solutions.

Gavin Beever
Photo: Agriculture Victoria

More about Gavin
Gavin Beever has over 35 years' experience in Farm Business Management and Planning. Gavin has worked with farmers on programs to improve on farm management skills, having delivered similar programs across diffe ent industry groups over the past years.

As part of his experience in the cropping industry Gavin worked with Wimmera farmers on MEY Check, a project that helped farmers work towards maximising crop profitability. He has also been the Technical Coordinator for the MLA Business Skills and Best Practice program and the Edge Network Business workshop series.

Alongside his consulting work Gavin and his family run a farming business across several properties that includes a cattle stud, a cropping program and contracting for sowing, harvest and hay making.

For further information, contact:
Darryl Pearl - Phone: 0417 432 711
Email: darryl.pearl@agriculture.vic.gov.au
or Roger Harrower - Phone: 0407 729 024
Email: roger.harrower@agriculture.vic.gov.au

The Farm Business Resilience Program is supporting farmers to build stronger, more productive agricultural businesses. Visit: agriculture.vic.gov.au/FBRP

The Farm Business Resilience Program is jointly funded through the Australian Government's Future Drought Fund and the Victorian Government's Future Agriculture Skills Capacity Fund.

Australian Government
Department of Agriculture, Fisheries and Forestry
Future Drought Fund

What is a Sustainable Agriculture Facilitator (SAF)?

Sustainable Agriculture Facilitators (SAFs) support climate-smart, sustainable agriculture outcomes across 52 NRM regions.

SAF's engage with and assist farmers, community groups and agriculture industries to work together in support of sustainable agriculture outcomes in the Mallee. This includes supporting natural resource management, biodiversity and carbon markets, and practices which reduce emissions and build climate resilience on farm.

In the Victorian Mallee, the SAF role is performed by Cameron Flowers from the Mallee Catchment Management Authority (CMA).

What can a SAF do for me?
Your local SAF works to facilitate partnerships and connections, supporting the delivery of sustainable agriculture projects in the Mallee.

This can include assisting with events, supporting promotional and engagement activities, connecting stakeholders, and engaging with First Nations peoples and organisations.

Who funds the SAF program?
The SAF network is funded by the Australian Government through the Natural Heritage Trust's Climate-Smart Agriculture Program, building on the valuable work of the preceding Regional Agriculture Landcare Facilitators.

For more information contact:
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Sustainable Agriculture Facilitators are supported by the Australian Government through funding from the Natural Heritage Trust under the Climate-Smart Agriculture Program.

Australian Government
mallee catchment management authority

MalleeFarmer

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