

**FACTSHEET**

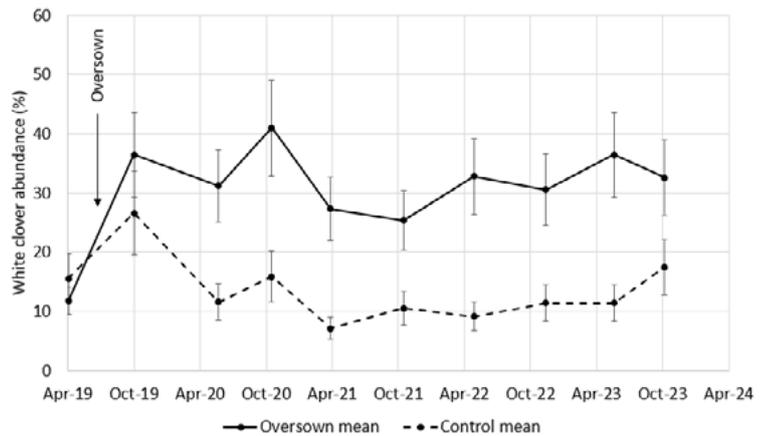
# White clover establishment and persistence on hill country

December 2023

The contribution of white clover to the quality of summer-dry hill country pasture in New Zealand is well documented.

A 2019-2023 study in Gisborne showed that oversowing white clover in hill country could more than double a pasture sward's clover content AND maintain higher levels over 4 years - see graph.

The key to the clover's strong establishment were seed treading and reducing resident pasture competition throughout the establishment phase.



This factsheet provides a step-by-step guide to help you maximise the establishment and persistence of white clover oversown on hill country:

- 1 Selecting the areas to oversow.
- 2 Establishing white clover within existing summer-dry hill country pasture.
- 3 Ongoing management to ensure the clover's long-term persistence.
- 4 Financial benefits.



## SELECTING AND PREPARING AREAS

SEASON	PLANNING	TIP							
<b>AUTUMN</b> (one year prior to sowing date)	1. How many hectares you are willing to tackle? Specifically, consider your: <ul style="list-style-type: none"> <li>• Expected loss in feed supply after sowing, and</li> <li>• Ability to amass sufficient stock for trampling in seed.</li> </ul>	<i><b>Tip:</b> Don't be overly ambitious. You are better to oversow fewer paddocks and give them the attention they need to establish successfully.</i>							
	2. Which specific paddocks will you sow? <ul style="list-style-type: none"> <li>• If possible, select paddocks without persistent weed problems. If this is not possible, deal with the weeds now, before your herbicide options become limited by the introduction of clover to the sward.</li> </ul>								
	3. Select areas where white clover is most likely to persist: <ul style="list-style-type: none"> <li>• South and east aspects of rolling to steep contour, targeting areas with low resident clover content, for maximum benefit.</li> <li>• In summer moist regions, you can also include west aspects.</li> <li>• Note: North aspects are typically too dry for white clover. However, consider using annual clover on these areas. See B+LNZ Factsheet 180 "Using Subterranean Clover" <a href="http://www.beeflambnz.com/knowledge-hub/PDF/using-subterranean-clover.pdf">www.beeflambnz.com/knowledge-hub/PDF/using-subterranean-clover.pdf</a></li> </ul>								
	4. Check soil fertility levels are suitable for clover and make any necessary fertiliser adjustments. <table border="1" data-bbox="475 981 1062 1115"> <tbody> <tr> <td><b>Olsen P</b></td> <td>On sedimentary/ash soil - at least 20</td> </tr> <tr> <td></td> <td>On pumice - at least 35</td> </tr> <tr> <td><b>Sulphur</b></td> <td>At least 10</td> </tr> <tr> <td><b>pH</b></td> <td>At least 5.8</td> </tr> </tbody> </table>	<b>Olsen P</b>	On sedimentary/ash soil - at least 20		On pumice - at least 35	<b>Sulphur</b>	At least 10	<b>pH</b>	At least 5.8
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<b>WINTER/SPRING</b>	5. Control spring growth to avoid rank pasture. This makes it easier to reduce pasture cover, prior to oversowing.								



## ESTABLISHMENT

SEASON	PLANNING	TIP
<b>SUMMER</b> January – March	1. Use sheep or cattle to graze the pasture down to 700-1000kgDM/ha. This reduces competition from existing pasture, while the clover establishes.	<i>Tip: Cattle tend to be more effective at dealing with poor quality rank summer pastures. Don't underestimate the importance of reducing pasture covers to maximise seed coverage at the time of oversowing.</i>
<b>AUTUMN</b>	Post the autumn rains, but before winter sets in: 2. Ensure soil moisture is adequate. You need to have received at least 25mm of rain in the past two weeks.	
	3. Apply herbicide to check the existing pasture (e.g. Paraquat at 400g/ha or Glyphosate at 700g/ha).	<i>Tip: When is the right time to apply herbicide? Once the pasture is actively growing after the clean-up grazing and autumn rain.  N.B. The herbicide's label will include a buffer zone width, so waterways are protected.</i>
	4. Aerial broadcast sow the white clover seed at 6-7kg/ha of insecticide-coated seed (Include slug bait, if required).	<i>Tip: This relatively high rate ensures: a) good coverage of seed to rough terrain and b) strong initial clover populations that are less prone to selective grazing.</i>
	5. To tread seed lightly into the soil, muster a large flock of sheep across the area about 10 times.	
<b>WINTER</b>	6. For the first grazing, lightly graze, but only if: a. Clover plants have more than four sets of trifoliate leaves, and b. Overall pasture cover is more than 1500-2000kgDM/ha.	
	7. Aim to leave at least 2000kgDM/ha cover.	<i>Tip: Ideally, this first grazing should be with cattle. If you have no option but to use sheep, graze them for short periods only. This is because sheep preferentially graze clover plants and, if left too long on the sward, will eat out the clover.</i>
<b>SPRING</b> September	8. Graze lightly with cattle. Again, try and avoid using sheep. As tempting as it may be, do not set stock with ewes and lambs during this first spring.	
October	9. A moderate grazing, with the goal of ensuring sun reaches younger clover plants.	
November/ December	10. Another moderate grazing.	<i>Tip: Over spring and summer, aim to maintain pasture covers at 1500-2000kgDM/ha. In spring and early summer, in particular – when emerging white clover can be shaded out by rampant grasses – avoid long rotations.</i>

## ONGOING MANAGEMENT

SEASON	PLANNING
<b>SUMMER</b> January – March	1. Graze on a long (e.g. 35-45 day) rotation. Be sure to only graze lightly, leaving at least 1500kgDM/ha.
<b>AUTUMN</b> March – May	2. Examine the white clover plants to see if the stolons are on the ground surface or elevated. If elevated, pasture cover is likely too high. Use cattle (not sheep) to reduce cover.
	3. Continue to only graze lightly, leaving at least 1500kgDM/ha.
<b>WINTER</b> June – August	4. Graze the pasture down to 700-800kgDM/ha in early winter to remove dead grass.
<b>SPRING (one year later)</b> September	5. Assess the white clover content by walking across the paddock. Do you stand on a white clover plant at each step?  <b>YES</b> Carry on, following the steps above for on-going management. Once clover is established in the second year, you can resume set stocking sheep in spring, but cover <b>MUST</b> be maintained above 1200kgDM/ha.  <b>NO</b> Can you identify why the clover has not established? Take the time to answer this question, before considering re-sowing.

## FINANCIAL BENEFITS

A 2020-released study “Quantifying the value proposition for white clover persistence on a New Zealand summer-dry hill-country farm” based its fieldwork and Farmax modelling on a Gisborne summer-dry 1400ha (effective) sheep and beef farm, “Tangihanga”.

The area oversown was low fertility and contained a sward of diverse pasture species typical of hill country in the region. Capital fertiliser was applied in the year prior to oversowing, to raise soil P levels closer to optimum.

The total cost to introduce white clover across the 712ha of south and east-facing moderate and steep areas selected was modelled at \$28,400 annually for 10 years. The objective of the 10-year timeframe was to ensure a persistent improvement in pasture composition, such that new livestock enterprise/s could be added to the overall farming system.

The study estimated that, once white clover was established across the whole 712ha, spring and summer forage consumption increased by 17%. See table. For the case study property, this enabled a six-month bull finishing enterprise to be added into the farm system, generating 32% more carcass weight production. This, in turn, led to a 49% improvement in the farm system Earnings Before Interest and Tax (EBIT).

### Production & financial comparison: “nil” vs “high” white clover content

	Tangihanga Base	Tangihanga Clover	
<b>Livestock enterprises</b>			
Mixed age breeding ewes	9252	9252	
Trade lambs (Nov–May)	3000	3000	
Grazed cows (Nov–Apr)	204	204	
Heifer finishing (Calves-R2)	252	252	
Steer finishing (Calves-R2)	303	274	
Trade bulls (Oct–April)	0	1300	↑ 17%
<b>Pastures</b>			
Nitrogen boost (kg DM/ha)	760	400	
Pasture eaten (kg DM/ha)	7230	8450	
<b>Animal production</b>			
Carcass produced (kg/ha)	212	280	↑ 32%
Wool produced (kg/ha)	53	52	
<b>Farm financials</b>			
Sheep revenue-purchases (\$)	1,239,767	1,204,243	
Cattle revenue-purchases (\$)	419,111	727,503	
Farm working expenses (\$)	968,911	1,022,107	
Total farm expenses (\$)	1,024,964	1,078,080	
Economic farm surplus (\$)	633,914	853,666	
Farm profit before tax (\$/ha)	310	462	↑ 49%

## RELATED RESOURCES

Research paper: Quantifying the value proposition for white clover persistence on a New Zealand summer-dry hill-country farm. Dodd, M.B.; Tozer, K.N.; Vogeler, I.; Greenfield, R.; Stevens, D.R.; Rhodes, T.; Quilter, S. (2020). [www.nzgajournal.org.nz/index.php/JoNZG/article/view/2973](http://www.nzgajournal.org.nz/index.php/JoNZG/article/view/2973)

B+LNZ Factsheet 106 “Production and persistence of dryland pastures”

[www.beeflambnz.com/knowledge-hub/PDF/production-and-persistence-dryland-pastures.pdf](http://www.beeflambnz.com/knowledge-hub/PDF/production-and-persistence-dryland-pastures.pdf)

B+LNZ Factsheet 112 “Pasture mixes for dryland farming systems”

[www.beeflambnz.com/knowledge-hub/PDF/pasture-mixes-dryland-farming-systems.pdf](http://www.beeflambnz.com/knowledge-hub/PDF/pasture-mixes-dryland-farming-systems.pdf)

B+LNZ Factsheet 178 “Annual legumes enhance animal production from summer dry pastures”

[www.beeflambnz.com/knowledge-hub/PDF/annual-legumes-enhance-animal-production-summer-dry-pastures](http://www.beeflambnz.com/knowledge-hub/PDF/annual-legumes-enhance-animal-production-summer-dry-pastures)

“Fertiliser use on New Zealand sheep and beef farms”. Fertiliser Association of New Zealand.

<https://www.fertiliser.org.nz/Site/resources/booklets.aspx>

### More information

For further information freephone Beef + Lamb New Zealand on 0800 BEEFLAMB (0800 233 352) or email [enquiries@beeflambnz.com](mailto:enquiries@beeflambnz.com) or visit [www.beeflambnz.com](http://www.beeflambnz.com)

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