White Clover

Benefits of white clover

Incorporating white clover in grassland swards has the potential to reduce costs, improve profitability and reduce greenhouse gas emissions (**Tables 1** and **2**).

Target

Over a five-year period, aim to have white clover in 100% of your paddocks (at a minimum average annual sward clover content of 20%).

Table 1: What white clover does and its benefits.

How does white clover save on chemical N?	Benefits
White clover fixes nitrogen (N). N fixation is the process whereby white clover can fix N from the atmosphere and make it available for plant growth, thereby reducing the requirement for chemical fertiliser N.	✓ Can increase growth compared to grass-only swards. ✓ Increased animal intake in summer and autumn. ✓ Increased milk production and liveweight gain. ✓ Increased N fixation. ✓ Lower requirement for N fertiliser application in summer.

Table 2: Reducing greenhouse gas emissions and impact.

How white clover works to reduce emissions?	Impact at farm level	Impact on the environment
Incorporating white clover into grassland reduces the demand for chemical N. Therefore, if there is less chemical N fertiliser spread, there is less nitrous oxide being emitted into the air. Using white clover achieves a reduction in nitrous oxide emissions by lowering the chemical N fertiliser use (by up to 100kg N/ha on dairy farms).	On dairy farms, research has shown that using white clover can increase milk solids production by 20-48kg/cow/year and increase net farm profit by €108-305/ha. Profitability also increased by 14% for the grass-white clover system, when compared to a 'conventional' system.	Using white clover can reduce nitrous oxide emissions by up to 40% due to reduced chemical N fertiliser application. Clover will help to reduce the carbon footprint of the farm and more importantly, reduce total greenhouse gas (GHG) emissions from the farm.

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Blueprint: four-year white clover plan

Year 1
Reseed 10% and oversow 20%

Year 2
Reseed 10% and oversow 20%

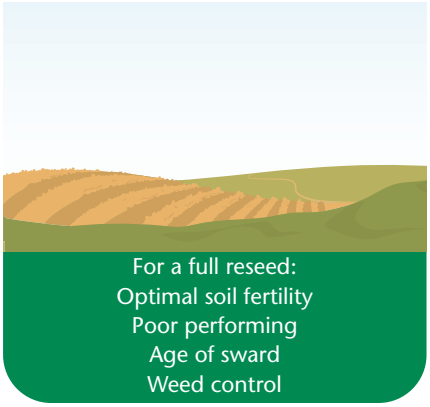
Target: 100% of the farm with 20% clover swards. Use a combination of re-seeding and over-sowing.

Year 3
Reseed 10% and oversow 20%

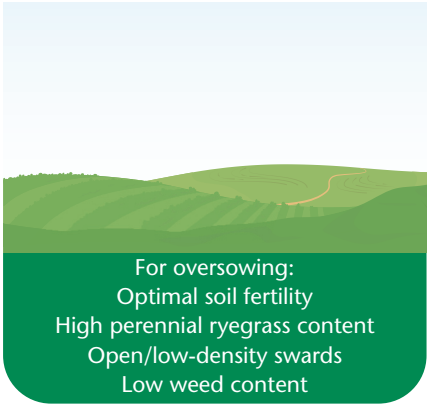
Year 4
Reseed remaining 10% and any ground that clover didn't establish on

Whether oversowing or reseeding, remove weeds before establishing clover. Any paddocks that are not suitable for oversowing in the first year should have any issues corrected (e.g., improve soil fertility, spray weeds) and be oversown the following year.

How to select paddocks for clover



For a full reseed:
Optimal soil fertility
Poor performing
Age of sward
Weed control



For oversowing:
Optimal soil fertility
High perennial ryegrass content
Open/low-density swards
Low weed content

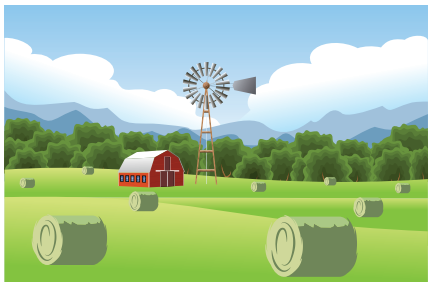
Soil fertility is critical for clover

>6.3
Soil pH

Index 3+
Soil phosphorous (P)

Index 3+
Soil potassium (K)

Variety selection



Large leaf varieties – silage

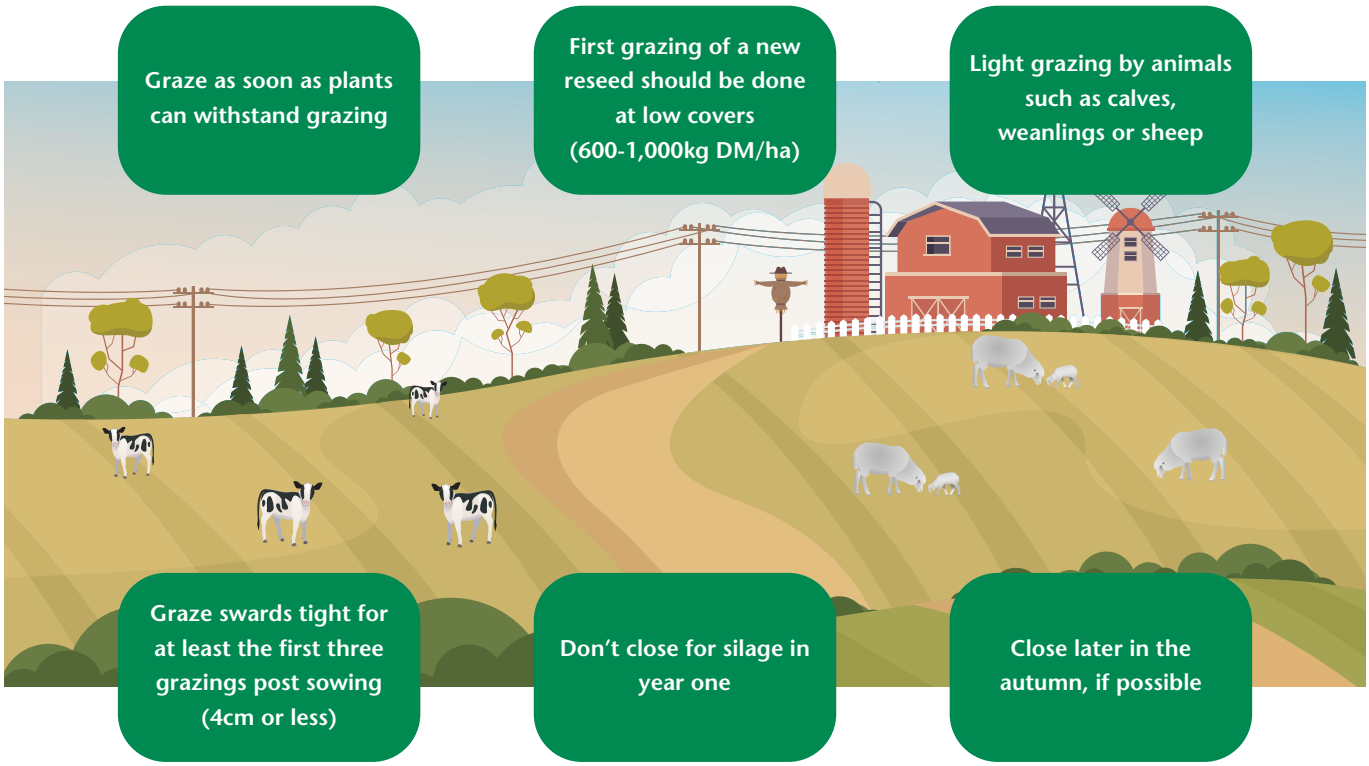
Medium leaf varieties – grazing cattle

Small leaf varieties – grazing sheep

White Clover

Table 3: Establishment.	
Reseeding	**Oversowing**
1. Reseed in April, May, June. 2. Spray-off the old pasture a minimum of seven to ten days before cultivating. 3. Prepare a fine, firm seedbed. 4. Use Irish Recommended List for varieties. 5. Sowing rate per ha: Cattle – 3.5-5.0kg of medium leaved clover; or, Sheep – 5.0-6.0kg of small leaved clover. 6. Don't sow clover below 10mm. 7. Apply 40kg N/ha at reseeding. 8. Apply P and K fertiliser as required. 9. Roll well. 10. Apply 25kg N/ha four to six weeks after sowing.	1. Oversow in April or early May 2. Broadcast onto the sward or stitch in. 3. If broadcasting with a fertiliser spreader: mix clover seed with 0:7:30 fertiliser and only add white clover to the spreader when you are in the field to avoid white clover seed settling at the base of the spreader. Do a maximum of 1ha at a time (to avoid seed settling) and spread in two directions across the field. 4. Stitching in white clover seed with a drill/harrow: stitching must be used for oversowing sheep-grazed swards. 5. Oversow directly after grazing (≤4cm post-grazing sward height) or after cutting for surplus bales. 6. Sow at a rate of 5.0-6.0kg of white clover seed/ha. 7. Soil contact post oversowing is one of the most crucial factors affecting germination. Roll paddocks post sowing to ensure soil contact. 8. Apply watery slurry (if available) – ideally around 2,000 gallons/ac. Reduce N fertiliser post oversowing to 15kg N/ha (12 units N/acre) per rotation for two rotations to reduce grass growth.

Post-sowing management – full reseed or over-sowing



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Grazing management

Spring

Target early spring grazing – benefits white clover growth.
Avoid poaching/damaging swards.
Be flexible – use on/off grazing, graze wetter paddocks in drier weather, etc.
Target post-grazing sward height of 3.5cm.

Midseason

Maintain pre-grazing covers of 1,300-1,600kg DM/ha (8-10cm).
Target post-grazing height of 4cm.
Chemical N fertiliser to be reduced on swards with good clover content (25%+, see **Table 4**).

Autumn

Follow normal procedure for building grass/closing paddocks.
Post-grazing height of 3.5-4.0cm.
Avoid poaching/damaging swards.
Be flexible during difficult weather.
Reduce chemical N fertiliser use.

Table 4: Fertiliser application on grass-white clover swards.

	N fertiliser application (kg N/ha)	
	Dairy swards	Beef/sheep swards (up to 2.0LU/ha)
Early February	28	20
Mid March	28	
April (second rotation)	28	20
Early May (third rotation)	9	12
Late May (fourth rotation)	9	
June (fifth rotation)	9	12
Early July (sixth rotation)	9	
Late July (seventh rotation)	9	12
August (eighth rotation)	9	
Mid September	12	14
Total	**150**	**90**

Bloat prevention

High risk for bloat: hungry animals; wet mornings; very lush pasture; and, high white clover content.

Avoid switching between grass-only and grass-white clover swards, as much as possible.

Keep post-grazing height at 4cm, not below.

During risky periods, graze a small area of the paddock for the first two to three hours.

Provide anti-bloating agent in the water.

Check animals after initial turnout and regularly for first three hours of grazing.

The Signpost Programme is a collaborative partnership of farmers, industry and State agencies, working together for climate action.
For more information please visit: www.teagasc.ie/signpost.