

GROWING 501 CHICORY



WE KNOW WHAT IT TAKES



GROWING 501 CHICORY

The best results for any forage crop come from an integrated, best practice approach that considers all agronomic inputs.

We've worked with technical specialists in seed, nutrients and weed and pest control to help make it easier to capture the full benefit of including spring-sown chicory into your on-farm feed system.

If you are considering 501 Chicory and would like to know more, talk to your local Farm Source team today, or call us on 0800 731 266.

Supported by:





CONTENTS

4. **Four great reasons to grow 501 Chicory**
Low cost summer crop, providing more protein, with environmental benefits, and knocks out your weeds and pests too.
8. **Crop nutrition**
A good fertiliser programme is essential to help the crop deliver its potential.
9. **Weed and pest control**
Example of a weed and pest control programme to allow chicory to establish more quickly.
10. **Why 501 Chicory?**
More milk solids from its faster establishment and higher DM yield.
11. **Tips for success**
How many hectares should you grow and how to achieve a high-yielding crop.

1. LOW COST, HIGH QUALITY SUMMER FEED

We believe most farmers can grow 501 Chicory for 14 c/kg DM.

Keys to growing 501 Chicory:

1. Cropping paddocks that won't grow well over summer.
2. Achieving a high crop yield.

In most situations chicory can provide animals with 12 t DM/ha, versus an old pasture supplying only 5 t DM/ha. This gives chicory a 7 t DM/ha advantage, and a 14 c/kg DM cost, as shown in the table below.

Cost of growing 501 Chicory with different yield advantages:

		Cost of 501 Chicory ¹
Extra feed grown from 501 Chicory (over old pasture it would replace) ²	9 t DM	11 c/kg DM
	8 t DM	12.5 c/kg DM
	7 t DM	14 c/kg DM
	6 t DM	17 c/kg DM
	5 t DM	20 c/kg DM

¹ Assuming \$1,000 cost to grow chicory crop (direct drilled). ² Estimated 501 Chicory yield less the estimated loss of pasture DM.

The greater chicory's yield advantage over the runout pasture, the cheaper it is per kg DM.

Chicory is not only much higher yielding, it's also much better quality feed as shown on the next page.

2. SUMMER PROTEIN — WHEN COWS ARE SHORT

Ever wondered why cows often run to the chicory paddocks in the dry of summer? It is because they know what their nutrient requirements are, and are craving protein!

Anything that's stays very green and leafy in summer is higher in protein, so chicory provides a consistent, grazed crude protein source when things are hot and dry on farm.

When crude protein levels in pasture drop off, 501 Chicory consistently has protein levels above 20%, helping meet the nutritional requirements of milking animals ($\geq 18\%$) or growing stock ($\geq 15\%$) through this period.

	ME (MJME/kg DM)	Crude protein (%)
501 Chicory	12.5-13	20-26
PKE	11-11.5	14
Summer pasture	9.5-10.5	13-18

For most farm systems, chicory is likely to be the cheapest form of protein available over the summer and early autumn, and much cheaper than protein sources that arrive on a truck.



3. ENVIRONMENTAL GAINS

501 Chicory offers a range of important environmental benefits:

- It doesn't need insecticide sprays (unlike brassica crops).
- Its deep tap root makes it much more resilient and drought tolerant than pasture in summer, lessening the risk of over-grazing other paddocks.
- Nitrate leaching research has shown heifers grazing chicory urinated more frequently without increasing urinary output, or urinary N, potentially reducing N loading and subsequent nitrate leaching from soil¹.
- 501's root system, up to 1.5m deep, improves soil structure, mines deep soil N and can recover excess soil N left after winter-grazed crops².
- It's ideal for effluent blocks with high soil levels of N and potassium (K), as it soaks them up more efficiently than turnips or maize. These nutrients are then re-distributed more evenly around the farm via the cows³.
- It establishes well from minimum tillage or direct drilling, and can be renewed into autumn pasture the same way, reducing soil cultivation and associated risk of soil N and P loss, and protecting fragile soils.
- Facial eczema spores are much lower than on ryegrass pastures, reducing the need to intervene with your animals⁴.

¹ Cheng et al. (2015). Dairy heifers grazing pasture, chicory and plantain in autumn. *Proc New Zealand Soc of Animal Production* 75: 70-73.

² Lucci et al. (2015). Can a deep-rooted spring crop recover winter-deposited urine nitrogen? *Journal of NZ Grasslands* 77: 167-172.

³ Perks, M.J. (2011). Can chicory be used to reduce nutrient loading on the effluent block? In *Occasional Report No. 24 Adding to the knowledge base for the nutrient manager* (pp. 1-8). Retrieved from http://www.massey.ac.nz/~flrc/workshops/11/Manuscripts/Perks_2011.pdf

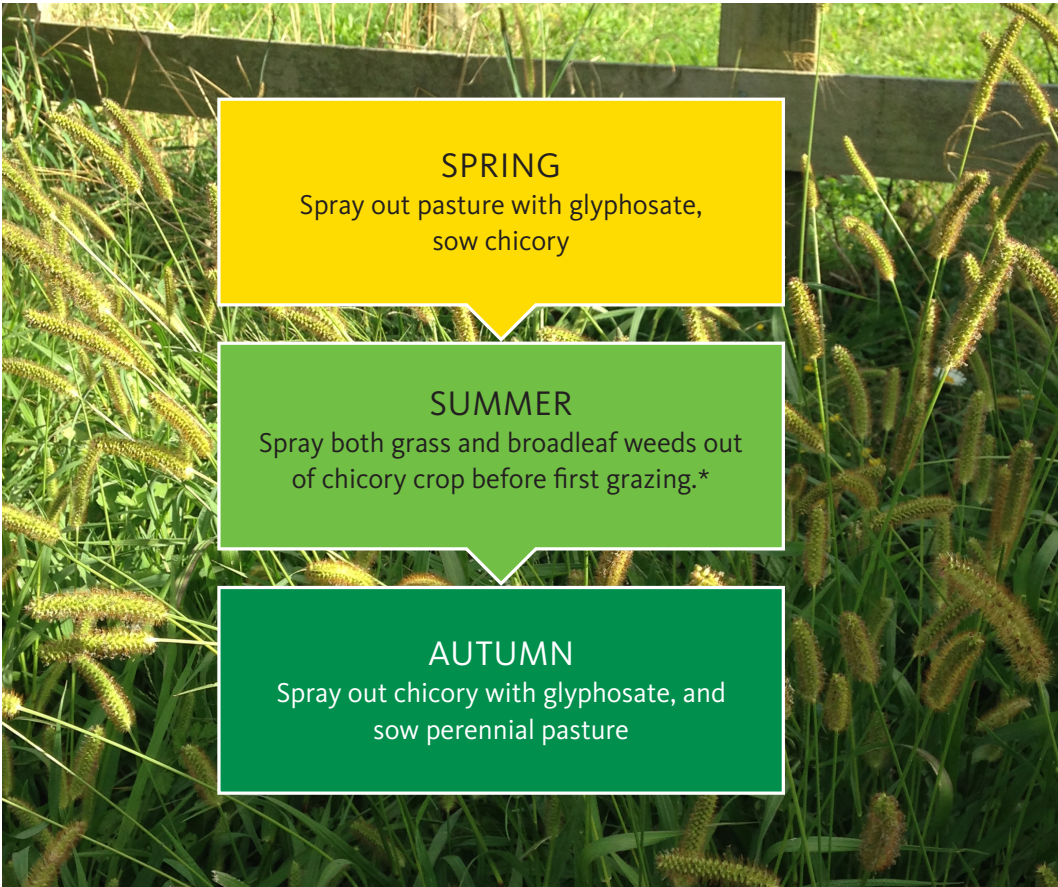
⁴ DairyNZ (2013). *Chicory management. DairyNZ Farmfact 1-72b.*

4. KNOCK OUT WEEDS AND PESTS

Among others, Yellow Bristle Grass and black beetle are serious issues in some areas.

Yellow Bristle Grass can dominate pastures over summer, reducing feed quality and pasture persistence. An effective way to clean this out of paddocks is using a chicory crop with a triple spray programme, as in the diagram below. This programme also controls other problem weeds, giving your new pasture the best start in autumn.

One of the best things about 501 Chicory is while cows love it, black beetle hate it. As long as you spray the grass weeds out of your chicory, black beetle will pack their bags and leave. This means no insecticide spray is required once the crop is established.



**A further grass weed spray may be required if a subsequent germination of yellow bristle grass occurs. Seek specific herbicide advice for your situation.*

BEST PRACTICE CROP NUTRITION

For a chicory crop to grow to its potential and deliver the desired benefits, a good fertiliser programme is essential.

Soil test at least 6 months before sowing, if possible 12 months before. Soil pH has an impact on crop performance and if lime needs to be applied it takes at least 6 months to have an effect.

Use a 150 mm auger. Soil test a transect (line) across the paddock, avoiding areas that are not typical of the paddock, e.g. fence lines, stock camps and urine patches. Samples can be collected in either autumn or spring. Do not sample within 3 months of applying fertiliser or lime, or when soil is saturated.

Target soil test results for chicory:

Test	Target levels
pH	5.6 - 6.2
Phosphorus (Olsen P)	20 - 30
Potassium (QTK)	>8
Sulphur (Sulphate-S)	>10
Magnesium (QTMg)	>8

Example of a chicory fertiliser programme*:

When	What	Product
At sowing	Drill fertiliser with the seed (in a separate box) or broadcast and soil incorporate just before sowing. Make sure there is no direct contact between the fertiliser and the seed.	DAP is recommended as it supplies N and P, both often used supplying N and P, both critical to early crop growth. Apply at 150 kg DAP/ha if drilling with seed, or 250 kg DAP/ha if broadcasting. OR Apply Cropzeal 16N at a rate of 250 - 300 kg/ha if soil potassium is low (Quick Test <4) or if the chicory is following another crop.
3 - 4 weeks post sowing	Apply post-emergence fertiliser N.	Sustain or Nrich Urea at a typical application rate of 30 kg N/ha.
After grazing	Apply nitrogen after grazing in spring and summer, while plants are actively growing.	Sustain or Spring fertiliser (with Nitrogen) or Sustain + K

*This will vary between situations. If in doubt seek advice from your Farm Source TSR or Ballance Nutrient Specialist.

WEED AND PEST CONTROL

A good programme controls competing weeds and damaging pests, allowing chicory to establish more quickly with less risk of failure. This includes the steps covered in this example:

Example of weed and pest control programme*:

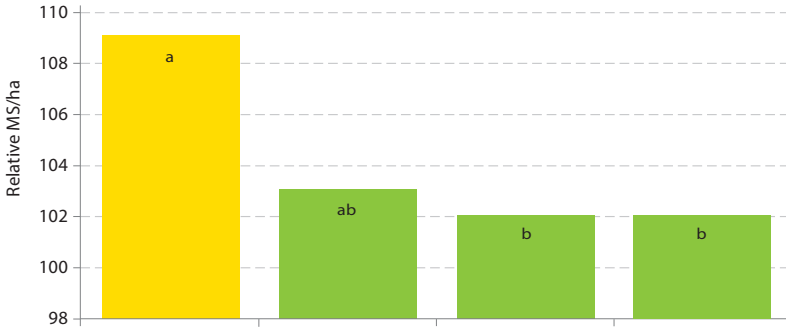
When	What	Product
At sprout of old pasture	<p>Crucial rate based on hardest to kill species – old pastures need 3.6L/ha for Browntop, Couch, Paspalum, Mercer grass, Kikuyu.</p> <p>Pulse Penetrant improves the penetration/uptake of Crucial - ensures control of ryegrasses.</p> <p>Dew 600 for springtail control with nil stock withholding period - spray and graze 3 days later (other insecticides 7 day WHP).</p>	<p>Crucial™ (2.4-3.6 L/ha) +</p> <p>Pulse® Penetrant (100 ml/100L water) +</p> <p>Dew™ 600 (400 ml/ha)</p>
At sowing	Use treated seed. No-tillage broadcast SlugOut for slug control.	SlugOut® at 10kg/ha
As soon as the 4 th leaf begins to emerge on the chicory plants (typically 3-4 weeks post sowing)	<p>Valdo 800WG – a range of broadleaf weeds (some weeds such as plantain will not be controlled).</p> <p>SeQuence – annual grass weeds (typically 0.5L/ha) and some perennial grass weeds (1.0L/ha on large perennial grasses).</p> <p>Bonza – oil adjuvant to improve the performance of the herbicides.</p>	<p>Valdo® 800WG (65g/ha) +</p> <p>SeQuence® (0.25-1.0L/ha) +</p> <p>Bonza® (500ml/100L water)</p>

**This will vary between situations. Please check product label before application. If in doubt seek advice from your Farm Source TSR.*

WHY 501 CHICORY?

Chicory is best grown as a 6-month crop, so an annual type cultivar like 501 Chicory is most suitable, because it will outyield some perennial types. 501 Chicory is very fast establishing, and can give up to one full grazing more over the season, providing greater milksolids (MS) production.

Modelled Chicory MS production (Relative to trial mean = 100).



Data based on yield info from the combined trial analysis of Cambridge 11-12, and Canterbury 12-13. 2 trial lines have been removed from the graph. Assumptions used were: ME of chicory is 12 MJ ME/kg DM and 132 MJ ME to produce 1kgMS.

501 Chicory's extra yield is predicted to produce an extra 7% kg MS, giving an additional income of \$325/ha (based on \$6.50/kg MS) over chicory b.



TIPS FOR SUCCESS

How many hectares should you grow?

Chicory/cow to be fed	Area of chicory to sow	Daily area of chicory
3 kg DM/day	3 ha/100 cows	0.15 ha/100 cows
4 kg DM/day	4 ha/100 cows	0.20 ha/100 cows
5 kg DM/day	5 ha/100 cows	0.25 ha/100 cows

**Based on a 20-22 day round with pre-graze covers of 3,000 kg DM/ha and post graze residuals of 800 kg DM/ha*

11 TIPS FOR SUCCESS

A high-yielding crop means low c/kg DM costs. Here's how to achieve this:

1. Sow early (as soon as soil temps are 12°C and rising).
2. Sow 501 Agricote treated seed at 8-10 kg/ha for a straight sward; or 6-8 kg/ha of 501 plus 6 kg/ha of coated Morrow red clover for a mixed sward.
3. Chicory seed is very small so ensure it is sown shallow (never deeper than 1 cm). Pay close attention to depth control when direct drilling.
4. Sow with the right fertiliser - see page 8 for details.
5. Effluent paddocks give best yields and are often closer to the shed meaning less distance to walk for the milkers.
6. Roll, roll, roll. Good seed to soil contact will speed up germination.
7. Apply nitrogen fertiliser during the active growing season to maintain good growth rates.
8. Control weeds, and by doing so control insect pests too. For best results, see page 9 for details.
9. Graze at Red Band gumboot height down to 3-4 cm.
10. Don't spray the crop out too late in autumn. New pastures take priority – they must go in early enough to give them the best start.
11. Don't keep the crop for a second summer. It might look great in autumn, but it will open up in winter, and go to seed next summer reducing yield and quality.

CONDITIONS: The sale of these goods is made strictly on the basis that Fonterra Farm Source, RD1 Limited and the vendor of the goods disclaim all liability, whether express or implied and whether in contract, tort or otherwise, for any loss, damage, claim or injury arising from the result produced by the goods or any failure of the goods to produce a desired result where such result or failure is attributable to any act or omission of the purchaser or any factor beyond the control of Fonterra Farm Source, RD1 Limited or the vendor, including without limitation, purchaser negligence, the storing and sowing of the seed, time of sowing, cultivation, soil conditions, weather conditions, third party intervention and all acts of God. If Fonterra Farm Source, RD1 Limited or the vendor of the goods is found to have any form of liability for any breach of any obligations imposed on them by law, then the purchaser agrees that liability is limited to replacement of such goods or damages not exceeding the original retail price of the goods. Fonterra Farm Source, RD1 Limited and the vendor shall not be liable for any consequential, indirect or special damages or loss of any kind whatsoever including without limitation loss of profits, whether arising from the goods, the result produced or intended to be produced, or from any other cause whatsoever. For specific advice in relation to your farm needs, please consult your local Fonterra Farm Source Technical Sales Rep.