

# GROWING 501 CHICORY

**WE KNOW WHAT IT TAKES**



# GROWING 501 CHICORY

This booklet explains the benefits of including spring-sown chicory in your on-farm feed management plan.

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.

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# 1. LOW COST, HIGH QUALITY SUMMER FEED

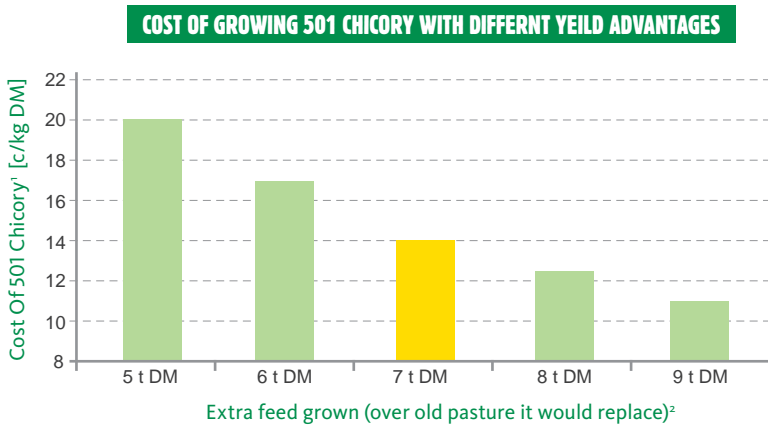
We believe most farmers can grow 501 Chicory for 14 c/kg DM.

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 12t DM/ha, versus an old pasture supplying only 5t DM/ha. This gives chicory a 7t 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:



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.

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

## 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!

Crops that stays very green and leafy in summer are higher in protein. Chicory is one of these crops and provides a crude protein source when it is 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:

- 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 crops<sup>2</sup>.
- 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 soil<sup>1</sup>.
- 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 cows<sup>3</sup>.
- 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.
- 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 animals<sup>4</sup>.

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

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

<sup>3</sup> 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/~firc/workshops/11/Manuscripts/Perks\\_2011.pdf](http://www.massey.ac.nz/~firc/workshops/11/Manuscripts/Perks_2011.pdf)

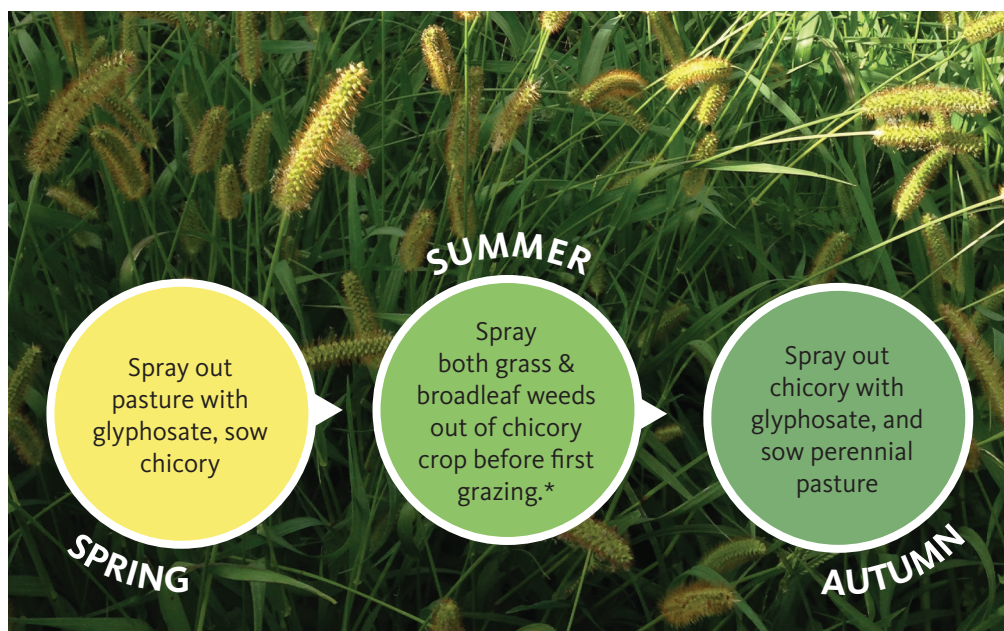
<sup>4</sup> DairyNZ (2013). *Chicory management*. DairyNZ Farmfact 1-72b.

## 4. KNOCK OUT WEEDS AND PESTS

Amongst 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	Test	Target levels
pH	5.8-6.2	Sulphur (Sulphate-S)	>10
Phosphorus (Olsen P)	20 - 30	Magnesium (QTMg)	>8
Potassium (QTK)	>8		

Example of a chicory fertiliser programme\*:

AT SOWING	
What to use	Product
Use 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 critical to early crop growth. Apply at 150 kg DAP/ha if drilling with seed, or 250 kg DAP/ha if broadcasting.  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	
What to use	Product
Apply post-emergence fertiliser N.	SustainN or Nrich Urea at typical application rate: 30 kg N/ha.
AFTER GRAZING	
What to use	Product
Apply nitrogen after grazing in spring and summer, while plants are actively growing.	SustainN or Spring fertiliser (with Nitrogen) or SustainN +K (Targeting a rate of 25-30 kg N/ha)

\*This will vary between situations. If in doubt seek advice from your Farm Source TSR or Balance 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\*:

AT SPRAYOUT OF OLD PASTURE	
What to use	Product
CRUCIAL <sup>®</sup> , rate based on hardest to kill species – old pastures need 3.6L/ha for Browntop, Couch, Paspalum, Mercer grass, Kikuyu.	CRUCIAL <sup>®</sup> (2.4-3.6 L/ha) +
Pulse <sup>®</sup> Penetrant to improve the penetration/uptake of CRUCIAL <sup>®</sup> - ensures control of ryegrasses.	Pulse <sup>®</sup> Penetrant (100 ml/100L water) +
Dew <sup>™</sup> 600 for springtail control with nil stock withholding period - spray and graze 3 days later (other insecticides 7 day WHP).	Dew <sup>™</sup> 600 (400 ml/ha)

AT SOWING	
What to use	Product
Use treated seed. No-tillage broadcast SlugOut <sup>®</sup> for slug control.	SlugOut <sup>®</sup> at 10kg/ha

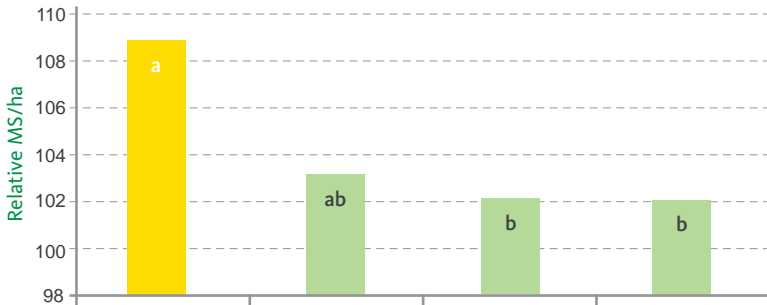
ONCE THE 4 <sup>TH</sup> LEAF BEGINS TO EMERGE (TYPICALLY 3-4 WEEKS POST SOWING)	
What to use	Product
Valdo <sup>®</sup> 800WG – a range of broadleaf weeds (some weeds such as plantain will not be controlled).	Valdo <sup>®</sup> 800WG (65g/ha) +
SeQuence <sup>®</sup> – annual grass weeds (typically 0.5L/ha) and some perennial grass weeds (1.0L/ha on large perennial grasses).	SeQuence <sup>®</sup> (0.25-1.0L/ha) +
Bonza <sup>®</sup> – oil adjuvant to improve the performance of the herbicides.	Bonza <sup>®</sup> (500ml/100L water)

\*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*

- 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 - 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.

Information supplied by Barenbrug



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