

New Zealand bred certified chicory

Choice was bred in New Zealand by AgResearch Grasslands, the breeders of the original forage chicory, Grasslands Puna. **Choice** was bred from true perennial chicory parents under grazing evaluations and selected for high drymatter production, improved cool season growth, disease tolerance and recovery after grazing.

- A long-lived chicory with strong persistence
- Certified chicory variety
- Superior disease tolerance
- Improved drymatter production
- Ideal for short term 'finishing' or dairy pastures



Characteristics

Perenniality	Cool season growth	Growth habit	1000 seed weight (grams)	Suggested sowing rate (kg/ha)
Perennial	Medium	Erect	1.2	1-3 pasture mix 8-10 pure stand

Uses of chicory

There are two main ways that chicory is used:

1. **Mixed with a grass/clover pasture** – this is the most common use of chicory because it requires very little change to pasture establishment and management practices. It is an easy way to increase animal production from a pasture. Seed is mixed at the rate of 1 to 3 kg/ha, depending on the content required.
2. **As a special purpose crop** – this requires different establishment and management practices to grass pastures. It is however, a more effective way of increasing animal performance because it provides a greater amount of high quality feed over summer. Seed is sown at 8 to 10 kg/ha, often with the addition of red and white clover.



Production

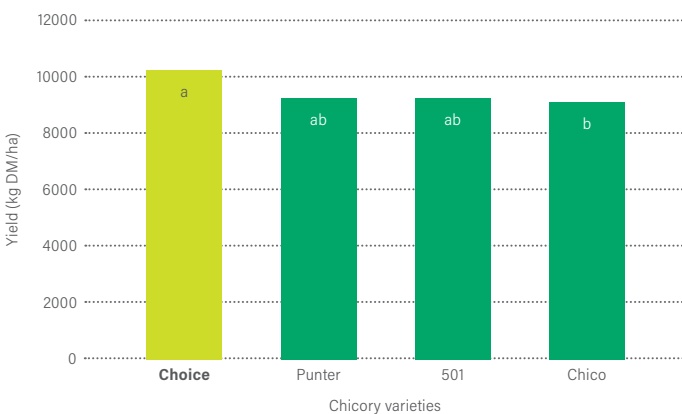
Choice is a proven fast-starting variety that is high yielding and a profitable 6-month summer crop. Through our extensive trialling system and on-farm use, our farmers have confidence that **Choice** is a reliable performer, as shown in Figure 1. **Choice** was bred from true perennial chicory parents under grazing evaluations (including dairy) and selected for high drymatter production, disease tolerance and recovery after grazing. We have not seen annual type chicories have a statistical yield advantage for first grazing over perennial type chicory, and **Choice** over many years has met expectations for time to first grazing.

Some other chicory cultivars (spadona's) are shorter lived by nature due to being susceptible to diseases and plant populations tend to thin drastically, especially in wetter environments (see photo on right). **Choice** is a longer-lived chicory due to its strong perenniality and disease tolerance, therefore in desired situations with fertile and free draining ground **Choice** can be used as a two year crop (as shown in Figure 2).



Spadona type chicory on the left, **Choice** on the right showing tolerance of leaf disease.

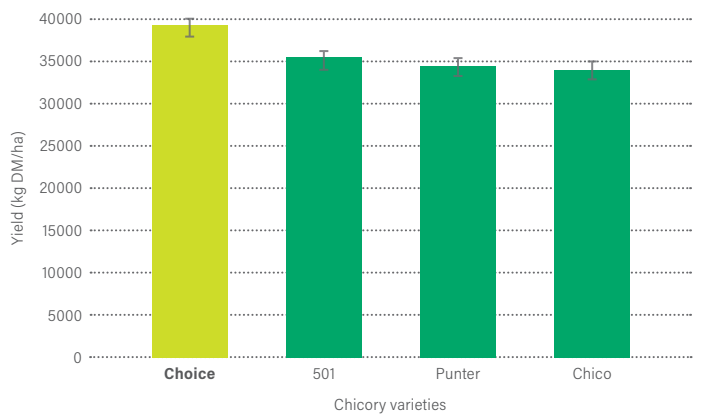
Figure 1. Yield (kg DM/ha) summary of four upper North Island trials from 2013-2019 over 7 month period (Oct to April)



Statistical Significance:

Letters that are different indicate a statistical different while the same letter indicates no difference.

Figure 2. Chicory production over 16 months in the Waikato (kg DM/ha). Sown in spring 2013



Standout points from current Choice research and experience

For sheep and beef systems:

- **Choice** is a uniform, high quality summer forage with metabolisable energy (ME) ranging between 11.5-13.0 MJ ME/kg DM
- Average lamb liveweight gains of around 250 grams/head/day are achievable with ranges from 220 to 400 grams/head/day
- High dressing out percentages in lambs and cattle
- Faecal egg counts are reduced in lambs grazing chicory compared with perennial ryegrass
- Chicory carries lower spore counts for facial eczema, and potentially supports lower concentrations of zearalenone.
- Carrying capacities have ranged from 40-70 lambs/ha with an average of 40 on dryland and 55 with irrigation or summer rainfall
- Chicory is a good source of minerals particularly (Zn, Cu, Mg, P, Ca, K)

For dairy systems:

- Spring sown summer crops of **Choice** with or without clover average around 11 t DM/ha ranging from 8 to 15 t DM/ha in 6-7 months
- As a summer crop, **Choice** is a very high quality feed source with ME's of 11.5 to 13.0 MJ ME/kg DM and crude proteins of 22% to 27% at a time when unirrigated ryegrass can contain both low ME and low crude protein
- When pasture quality is poor (below 10 ME) feeding **Choice** at 20-40% of the diet can increase milksolids production by 17%*
- Chicory is a responsive species to high fertility and is well suited to effluent paddocks where the deep taproot and high summer growth rates make it ideal for utilising surplus nutrients
- Chicory is an ideal break crop, reducing insect pest build up and providing an opportunity to control difficult weed grasses such as yellow bristle grass

* Lee & Minneé. (2012). DairyNZ Technical Series, August 2012. Chicory and plantain – your questions answered.

Sowing date comparison

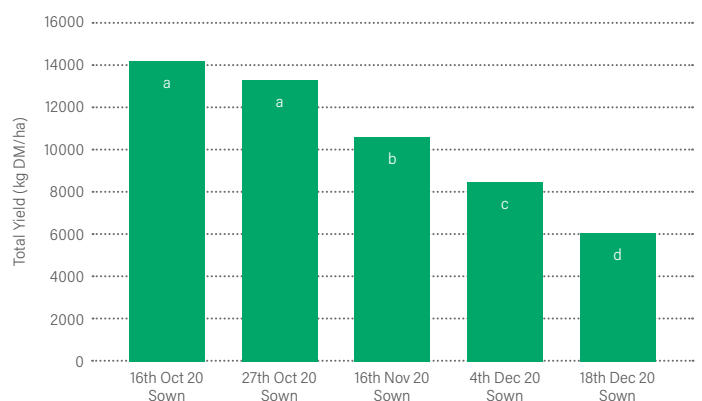
In addition to running yield trials between cultivars, Agricom has also been looking into other aspects such as different sowing dates of **Choice** and how this effects the total yield grown (kg DM/ha) to maximise production. Figure 3 shows sowing **Choice** in October provides the highest drymatter production taken up until end of April.

The key points found from sowing Choice in October:

- Early first grazing (early-mid December) to boost milk production when ryegrass quality is low from seed head development
- Maximises number of grazings; 6-8 grazings from an October sowing versus only 2-3 grazings from a late sowing

The take home message here is aim to sow chicory by mid-October, as there could be up to a 50% loss of yield (kg DM/ha) by planting in December.

Figure 3. Total accumulated yield (kg DM/ha) until the end of April 2021, from five sowing dates between the 16th of October 2020 and the 18th of December 2020, for Choice chicory in the Waikato



Statistical Significance:

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Additional Data

The Australian paper "Evaluation of chicory cultivars and accessions for forage in south-eastern Australia" by Guangdi et al., (2010) shows that **Choice** is one of the most productive and persistent types of chicory available and supports our knowledge of the cultivars breeding and usage in New Zealand.

Table 1: Predicted herbage yield (t DM/ha, back transformed) & predicted plant frequency (% , back transformed) from five sites in New South Wales, Victoria & South Australia

Cultivar	Herbage Yield			Plant Frequency		
	Predicted Overall Mean (Transformed)	Rank	Confidence Level	Combined Predicted Means (Transformed)	Rank	Confidence Level
Chico	61.08	5	0.989	3.42	17	<0.001
Choice	66.22	1	0.999	4.64	3	0.046
Commander (501)	62.36	4	0.999	3.87	12	<0.001
Grasslands Puna	58.82	7	NA ^B	4.94	2	NA ^D
Grouse	64.51	3	0.999	3.91	8	<0.001
Lacerta	64.67	2	0.999	3.77	13	<0.001
Puna II	59.55	6	0.768	5.12	1	0.848
SA38488	37.14	15	<0.001	3.90	10	<0.001
SA38500	33.03	18	<0.001	3.45	15	<0.001
SA38589	33.67	17	<0.001	3.61	14	<0.001
SA38627	30.83	20	<0.001	2.73	21	<0.001
SA38955	31.41	19	<0.001	3.42	16	<0.001
SA38972	28.14	21	<0.001	2.84	20	<0.001
SA39000	36.65	16	<0.001	3.87	11	<0.001
SA39435	50.60	8	0.008	3.31	19	<0.001
SA39441	43.22	12	<0.001	4.25	7	<0.001
SA39442	42.85	13	<0.001	4.52	5	0.009
SA39444	37.24	14	<0.001	4.30	6	<0.001
SA39449	48.33	9	<0.001	3.91	9	<0.001
SA39452	47.26	10	<0.001	3.40	18	<0.001
SA42961	44.50	11	<0.001	4.55	4	0.014

Adapted from Guangdi et al., (2010). Evaluation of chicory cultivars and accessions for forage in south-eastern Australia. *Crop and Pasture Science*, 61(7), 554-565.



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Example Mixes Include:

PURE SWARD

Requires different establishment and management to grass pastures. It is however the most effective way of increasing animal performance as it provides a greater amount of high-quality feed over summer to supplement the animals diet.

Choice chicory	8-10 kg/ha
Total	8-10 kg/ha

HIGH PERFORMANCE GRASS/CLOVER MIXED PASTURE

Great option when using short term pastures and wanting to increase animal performance on a pasture based system. Requires very little change to pasture establishment and management. Ideal for run-off's where growing out young stock or taking off supplement i.e. silage.

Mohaka AR37 tetraploid hybrid ryegrass	16 kg/ha
Choice chicory	2 kg/ha
Relish red clover	5 kg/ha
Attribute white clover	3 kg/ha
Total	26 kg/ha

FINISHING MIX

Requires similar establishment and management to a pure sward of chicory but can be more suitable as 18-24 month crop due to the clover content.

Choice chicory	6 kg/ha
Relish red clover	4 kg/ha
Attribute white clover	3 kg/ha
Total	13 kg/ha

OVERSOWN/UNDERSOWN INTO PASTURE

Good establishment can be achieved by spreading seed at 1-3 kg/ha just prior to grazing in spring or undersowing into pasture after grazing. This suits grass pastures planted in autumn without chicory which require thistle spraying in the first winter, or running out/open pastures to fill in gaps.

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