

CHICORY AND PLANTAIN

Chicory and plantain are both useful forage crops for dairy and dry stock operations. Chicory has a deep tap root, which lets it survive drought conditions far more effectively than shallow-rooting species such as ryegrass. Plantain's coarse, fibrous root system helps it to respond quickly after summer-dry conditions. Used as part of a pasture mix, both chicory and plantain are a useful feed source when pasture quality is poor. Chicory can also be used as a stand-alone crop. Both forage crops can be used as part of a pasture renewal program and thanks to their high-quality feed profile, they deliver good results when used for finishing stock or for milk production.

If the plantain or chicory crop is going to grow to its potential and deliver the desired benefits, then good management is essential. This includes the following steps:

PREPARE THE Paddock WELL

correcting any problems with the land, e.g. drainage issues, acidic soil pH, poor fertility

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SELECT A CULTIVAR

suited to your system's requirements

PLANT IN SPRING

or when soil temperature is at least 12°C

USE A STARTER FERTILISER

at sowing

[SEE PAGE 3](#)

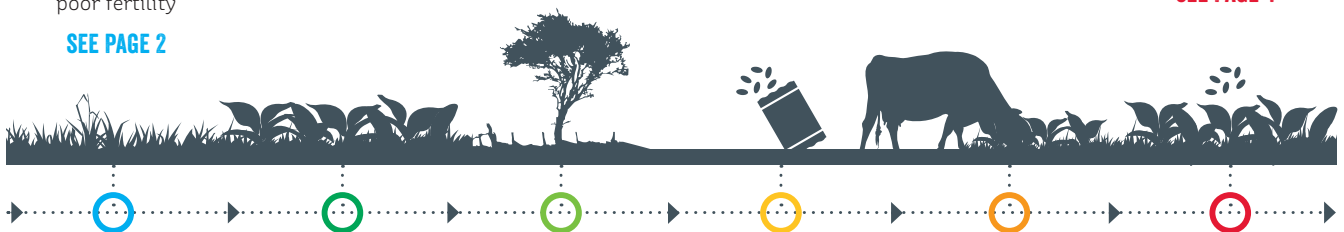
FIRST GRAZE

the crop before it reaches 7-leaf stage

APPLY

nitrogen fertiliser after grazing, to maximise leaf regrowth

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BEFORE SOWING

Chicory and plantain are both tolerant of a wide range of soil types, pH and fertility; however, they do not perform well in heavy clay soils or in conditions that are prone to waterlogging. The tap root of chicory allows it to access nutrients from deeper in the soil, compared to ryegrass or clovers. Nonetheless, chicory crops are best if sown into land that has soil fertility equivalent to that needed for permanent pasture. If either crop is to be used as part of a pasture renewal cycle, any soil fertility issues should be remedied prior to planting.



What
Soil test.



When
At least 6 months before sowing; if possible, 12 months before sowing.



Why
Soil pH has an impact on crop performance. Chicory and plantain prefer a pH between 5.6 and 6.2, although plantain will tolerate conditions either side of this. If soil pH needs adjusting, lime needs to be applied - it will take at least 6 months to have an effect on soil pH. Soil testing early also allows sufficient time to correct the nutrient levels with a suitable base fertiliser.



How
Use a 150 mm augur. Soil test a transect (line) across the paddock. Avoid 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.



TEST	TARGET LEVELS
pH	5.6-6.2
Phosphorus (Olsen P)	20-30
Potassium (QTK)	>8
Sulphur (sulphate-S)	>10
Magnesium (QTMg)	>8

TABLE 1

Target soil test results for growing chicory and plantain. If levels are lower than this, address with lime and/or base fertiliser applications.

PRODUCTS

Lime

Choose a good-quality ag-lime. As a rule of thumb, it takes 1 tonne lime/ha to raise the soil pH by 0.1 unit. So if soil pH is 5.4, apply at least 2 tonne lime/ha. To achieve the desired pH throughout the top 150 mm of the soil, the lime may have to be incorporated by cultivation.

Base fertiliser

The actual product needed and the rate to be applied will depend on soil test results. However, products in the Superten range are generally suitable, as they supply most of the nutrients needed to support crop growth. Alternatively, products from the Pasturemag or Pasturezeal G2 range could be considered.

AT SOWING



What

Use a starter fertiliser.



When

At sowing.



Why

Plants require an adequate supply of nutrients in order to grow well. If these nutrients, particularly P and N, are placed close to the seed, then seedlings will establish strongly and rapidly. Good growth during the early part of the crop's lifecycle plays a significant role in ensuring the crop meets its potential.



How

Drill with the seed (in a separate box). Make sure there is no direct contact with the seed. Alternatively, broadcast fertiliser then incorporate into the soil just before sowing. If broadcasting, a higher application rate will be required.

Chicory

Research has shown that insufficient N can decrease the leaf area of chicory shoots and that 12 days after sowing, the dry mass ratio in plants grown with low N was one third of those grown with higher N levels.

PRODUCTS

DAP

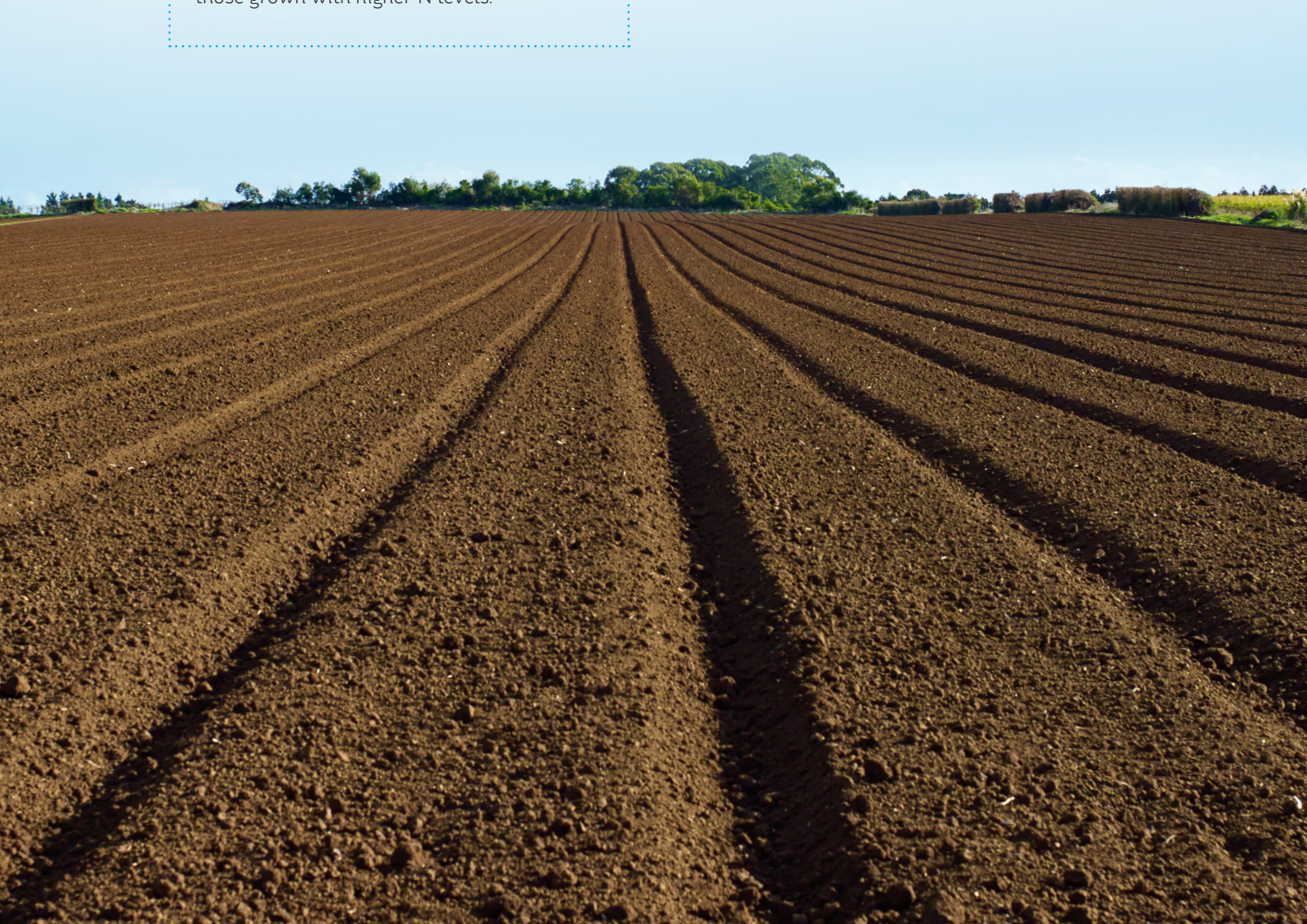
DAP is often used as a starter fertiliser, as it supplies both N and P, the two nutrients most critical to early crop growth. Typical application rates are around 150 kg DAP/ha if the drill has a fertiliser box, or 250 kg DAP/ha if broadcasting.

Cropzeal 16N

If soil potassium levels are low (<Quick Test 4), or if the plantain or chicory is being sown into a paddock that has come out of another crop, Cropzeal 16N may be a suitable starter fertiliser. It is a useful general purpose starter fertiliser supplying N, P, K and S. The typical application rate is 250-350 kg/ha.

POST-EMERGENCE N

Three to four weeks after the crop has been planted, apply post-emergence fertiliser N. A typical rate of application is 30 kg N/ha, either as SustaiN or Nrich Urea.



AFTER GRAZING



What

Apply nitrogen.



When

After grazing in spring and summer, while plants are actively growing. An application may also be made after winter, to boost growth before the first grazing of the spring.



Why

Nitrogen is a key driver of plant growth. Applying N helps the crop reach its agronomic potential. Low levels of N will adversely affect leaf development. However, applying too much N is not economic and risks causing harm to the environment. If the plantain or chicory crop is sown with clover, fertiliser N will still be needed, as the legume will not return sufficient N to the soil to fully support crop growth.

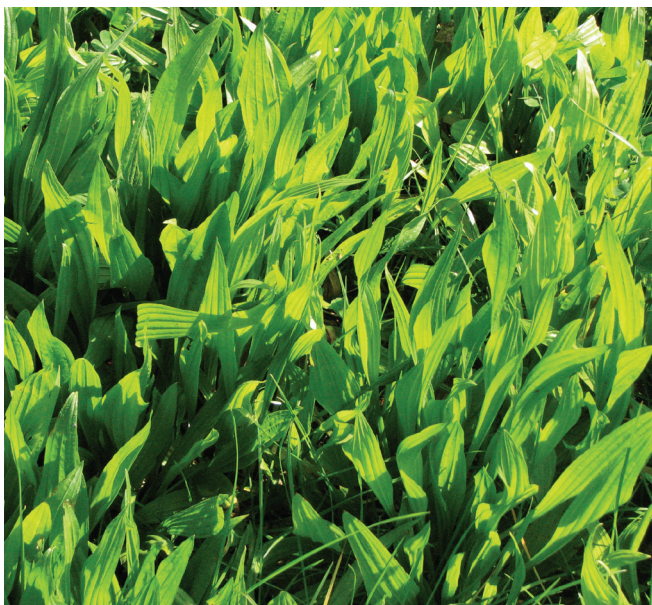


How

Soil test to 60 cm depth to determine the amount of available N in the soil. If soil available N levels are high (>200 kg N/ha), it may not be necessary to apply post-grazing N. However, normal practice would be to use 2-4 applications of N over spring and early summer; the application rate would typically be 40 kg N/ha. If growing conditions are particularly good (e.g. if the crop is under irrigation), an application of 30 kg N/ha could be made after each grazing.

Plantain

Fertiliser N applied to pure stands of plantain will promote growth, but if the plantain is part of a mixed pasture, other species may respond more rapidly, which will have the effect of suppressing plantain growth.



PRODUCTS

Sustain

Sustain is the product of choice when conditions favour volatilisation, i.e. whenever rain (5-10 mm within 8 hours of application) is not certain. Sustain reduces N loss by volatilisation, which is a particular risk under hot conditions, especially if the soil is moist. Reduced volatilisation means that more of the N applied is retained in the soil, where it can be used by plants.

Nrich Urea

If adequate (5-10 mm) rainfall is expected within 8 hours of the N application, then Nrich Urea may be used. When sufficient rain falls, urea is washed into the soil, where it is considerably protected from loss by volatilisation.

IMPROVING YIELD

AgResearch scientists have shown the value of fertiliser N applications to chicory grown on a sandy loam soil. Applications of 50 kg N/ha after cutting (to simulate grazing) resulted in greater dry matter yield than untreated control crops. However, if excess N was applied, crop yield was depressed, and the crop went to seed.

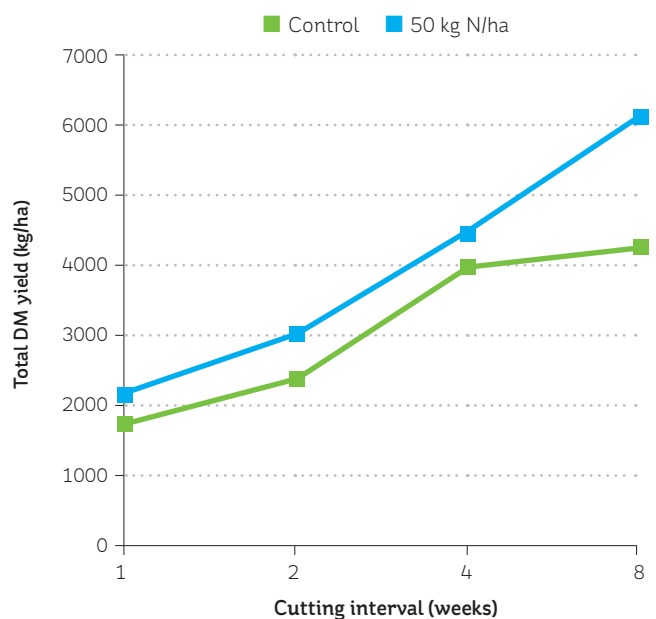


FIGURE 1

Chicory response to a single spring application of 50 kg N/ha in comparison to no N. From Clark et al. (1990), Growth rates of 'Grasslands Puna' chicory (*Cichorium intybus* L.) at various cutting intervals and heights and rates of nitrogen, NZ J Ag Res., 33: 213-17