Chicory establishment (1-72a)

Introduction
This Farmfact is based on NZ trials and experiences growing the chicory cultivar Choice under dairy cow grazing. Other chicory cultivars may have different requirements. This Farmfact focuses on establishment; for management guidelines see Farmfact 1-72b.

Key points
- Spring sowing is preferred as plants develop quickly, and reproductive stems will not grow until the following spring.
- Establishment is best when seed is sown in warm soils (12°C) at <10 mm depth.
- Weeds should be eliminated before sowing as there are few suitable post-establishment herbicides.
- Chicory can grow on a range of soils; however it performs best on free draining soils.

Characteristics of chicory
Chicory grows throughout New Zealand however; it is best suited to dairy farm situations where the amount and quality of summer feed limits milk production. Chicory plants have a deep tap root which supports growth through dry conditions.

Chicory is a multi-graze crop and can be incorporated into a rotational grazing system through its active growing months, September to May. During this period it yields 8-16 t DM/ha (average = 10.6 t DM/ha).

Chicory has high tolerance to insect pests and provides dairy farmers with an alternative to turnips in areas where insect damage is a problem. Its regrowth potential also provides more grazing flexibility compared to turnips. Milk responses to chicory in summer have been measured at similar levels to turnips (40 g MS/kg DM).

Chicory performs best and will persist longer when grown in free draining soils and is highly responsive to nitrogen, particularly when grown without companion clover.

Growing chicory on an effluent area can remove large amounts of nitrogen and potassium which will be redistributed around the farm by grazing cows. This reduces the risk of nutrient leaching and metabolic disorders resulting from excessive potassium.

Uses of chicory
1. Special purpose crop
This is the recommended way to utilise chicory in a dairy farm system as it is a high yielding, high quality summer crop. Spring sowing reduces the amount of reproductive stem in the first summer/autumn which increases quality and ease of crop management. When sown as a special purpose crop, paddocks with suitable soil types and convenient locations can be selected. Management can also be tailored to meet the requirements of the chicory plant.

A special purpose crop also provides an opportunity to break weed and insect cycles (e.g. black beetle, clover root weevil) before pasture renewal. For example, undesirable grasses (e.g. yellow bristle grass) can be eliminated as grass-specific herbicides can be used.
Recommended seed mix is 4-6 kg/ha chicory and 3 kg/ha clover or 4-8 kg/ha chicory if sown without clover.

2. Grass/clover/chicory mixed pasture

Chicory can be added to a pasture/clover mix at 1-4 kg/ha or oversown into new pasture before grazing in the spring. Oversowing in spring suits pastures sown in the autumn that require thistle spraying in their first winter. Due to the highly palatable nature of chicory it will likely be preferentially grazed, reducing its persistence.

Establishment

Chicory is more sensitive than ryegrass to sowing depth and soil temperature. It establishes best when sown into warm soils (12°C) at less than 10 mm depth. Spring sowing is preferred as plants develop quickly, and reproductive stems won’t grow until the following spring.

Planning is important as sowing chicory too early means young plants may be damaged by frost while sowing too late runs the risk of dry conditions reducing plant establishment and survival.

Sowing after cultivation using a roller drill is recommended. Pre-emergence insecticide and treated seed are also recommended. Chicory can be successfully established by direct drilling following herbicide application, however; careful attention is required to ensure the sowing depth is no greater than 10 mm and slug bait should be used.

While broadcasting seed is the simplest and cheapest technique, it reduces chicory plant establishment, increasing weed invasion and reducing yield. The increased cost of direct drilling compared with broadcasting, is more than compensated for by the increased yield.

Chicory should not be planted following a lucerne crop as they harbour root diseases which affect chicory persistence.

Weeds should be thoroughly eliminated before sowing as there are few suitable post-establishment herbicides for chicory. Certain weeds can be controlled in the early stages of establishment with flumetsulam-based herbicides at recommended rates.

Withholding periods for residual hormone herbicides (e.g. clopyralid, aminopyralid, dicamba) must be adhered to as chicory is very sensitive to these herbicides.

Chicory grows on a range of soil types, however silt loams with good summer water-holding capacity, and that aren’t prone to waterlogging are best. Heavy clays and poorly drained soils are not recommended because treading damage and fungal disease affects the crown and root, reducing persistence. Chicory can tolerate acidic soils; however the optimal pH is 5.6 to 6.2.

Soil fertility requirements are as for ryegrass/clover pastures. Nitrogen fertiliser (e.g. 35 kg N/ha) improves establishment of chicory. Compound fertilisers such as DAP also improve establishment, especially when direct drilling.

Chicory should be first grazed no earlier than the seven leaf stage (i.e. plants have seven fully grown leaves). This is normally 8 weeks after spring-sowing and ensures that plants have well-developed tap roots to improve survival through the growing season.