

Nitrogen-use planning

Nitrogen fertiliser is a valuable resource for most New Zealand pastoral farms, whether dairy or drystock. Additional pasture grown by the use of nitrogen fertiliser typically costs less per kilo of dry matter than other supplements.

However, nitrogen fertiliser use is often reactive, rather than planned. This can result in its use being less than optimum. Developing an annual plan for nitrogen fertiliser use will help maximise the gains from this valuable resource.

Benefits of nitrogen planning

Developing a nitrogen plan requires some initial work at the start of the year, but it can result in a number of benefits, including:

- A steadier feed supply
- Less need to bring in feed at critical times
- Reduced stress for staff and stock
- Greater chance of fulfilling the farm's production potential

Farmers who have a nitrogen plan for the forthcoming year are in a much better position to apply nitrogen fertiliser well before a feed deficit. This is a significant advantage, as pasture requires sufficient time to respond to nitrogen fertiliser.

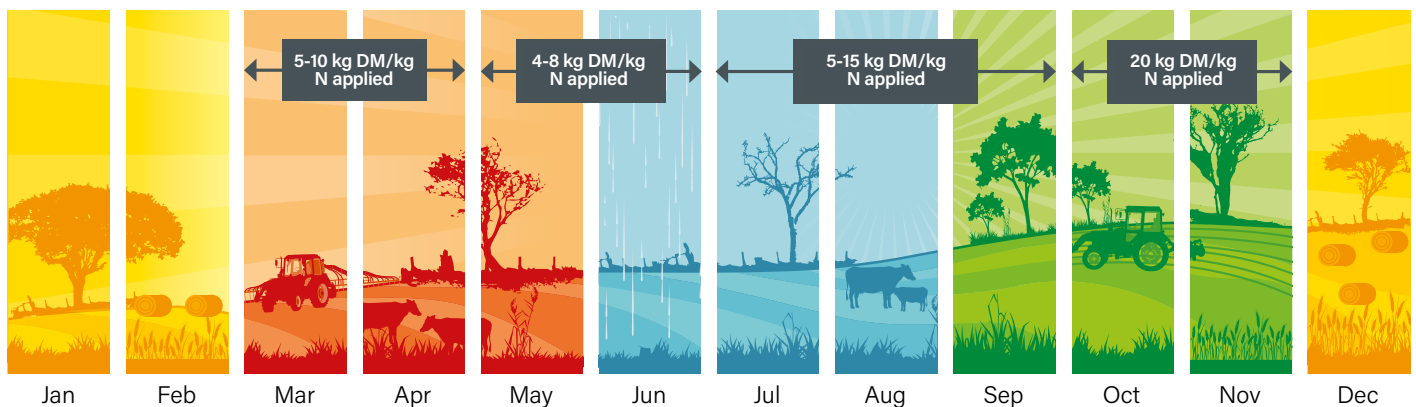


Figure 1: Typical pasture response rates to nitrogen fertiliser, by season. Actual rates will depend on farm-specific conditions

Developing a nitrogen plan

The following steps can be used to develop a nitrogen plan for any type of pastoral farm.

- Plot grass growth (or typical DM/ha levels) on a month-by-month calendar
- Add in the average monthly soil temperature and soil moisture data for the farm
- Mark in critical feed times, e.g. mating, lambing or calving, weaning
- Identify feed deficits - compare the critical feed needs to grass growth or typical DM/ha levels
- Identify times when extra conserved feed could be generated. Consider whether you need to plan for a particularly long, cold winter or dry summer
- Mark in times when there are other needs for nitrogen, e.g. for new pasture or crops
- Soil test to see if existing soil nitrogen levels can meet demand especially for forage crops (e.g. available N test).
- For each feed deficit or nitrogen application need, determine the best time to apply nitrogen fertiliser and rate to use. Take into account the estimated nitrogen response (kg DM/kg N applied) and the time it will take to achieve this response. Select a product that will deliver the necessary amount of nitrogen, reduce the risk of nitrogen loss and/or supply other production-limiting nutrients at this time

Technical tips

- **Pasture growth rates** - these are best measured, rather than estimated. If plate meter readings have been used to monitor pasture growth in previous years, these will provide an ideal basis for the nitrogen plan. Where pasture growth is not routinely measured, estimates may be obtained from reliable

sources, e.g. local monitor farms, DairyNZ, Dairy NZ Facts and Figures Booklet, Beef + Lamb New Zealand, etc.

- **Soil temperature and moisture levels** - these are best measured on farm. Ensure when measuring soil temperature it is done at the same time every day, ideally at 9am. However, if records are not available, estimates may be obtained from reliable sources, e.g. local monitor farms
- **Soil tests for nitrogen reserves** - a Total N soil test, which only needs to be done once every five years, will identify areas of high, medium and low soil nitrogen reserves. My Pasture Planner, a specialist software package, can then be used to help identify the best rate of nitrogen fertiliser to use and the best time to apply it
- **Nitrogen response rates** - the time needed to achieve a full response could vary from 3 to 14 weeks, depending on soil temperature, soil moisture, plant growth rate, available nitrogen in the soil and rate of nitrogen applied (see Table 1 and Figure 1). If Total N soil test data is available, My Pasture Planner can be used to predict the likely response rate of the pasture

Pasture growth rate	Pasture growth (kg DM/ha/day)	Response rate (kg DM/kg N applied)	Time for full response (weeks)
Slow	10	5	10-14
Moderate	20-40	10	6-8
Fast	50-70	15	5-6
Rapid	80	20	3-4

Table 1: Impact of pasture growth rate on response to nitrogen fertiliser (from DairyNZ Farmfact 7.1)

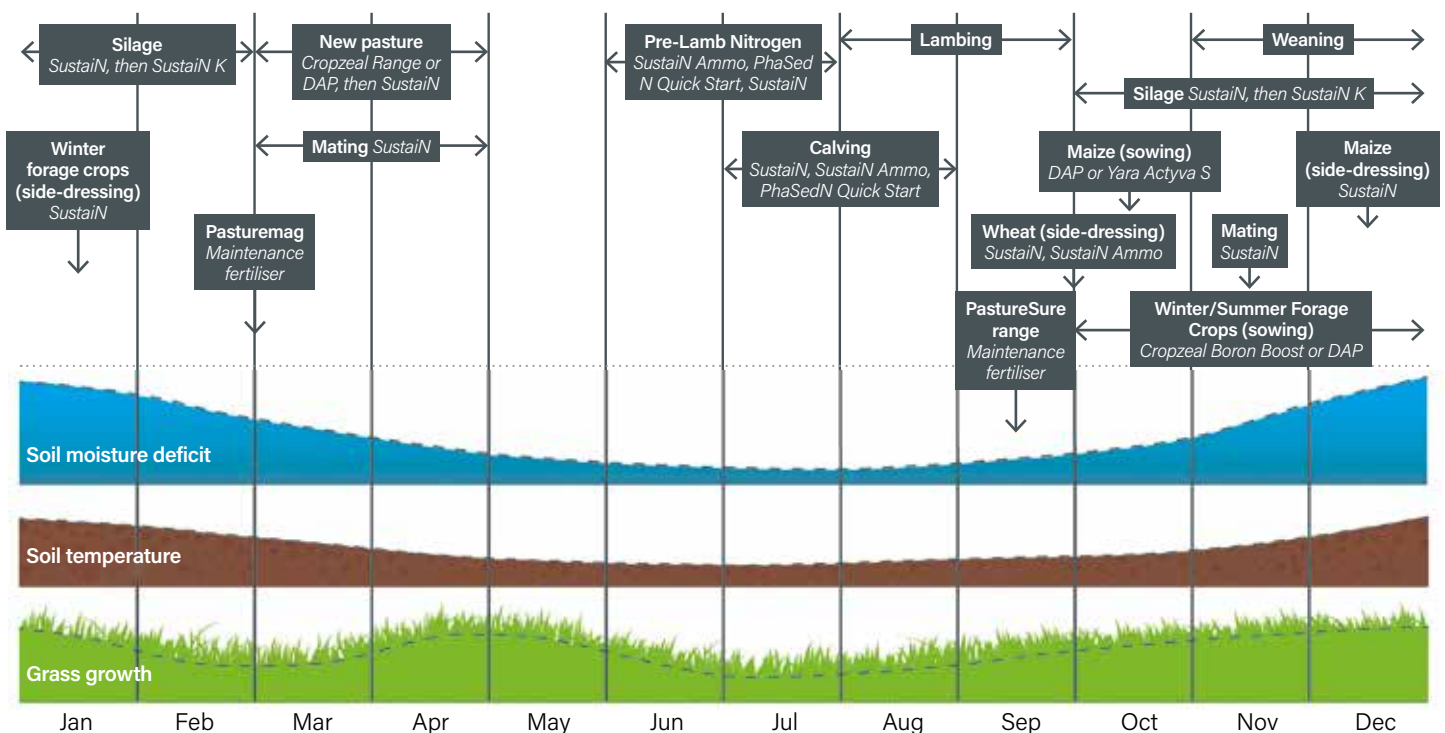


Figure 2: A stylised example of an annual nitrogen plan, showing relevant farm conditions and farm activities that require the support of nitrogen fertiliser