VICKERY BROS.

THE FERTILISER PROFESSIONALS

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SOIL & TISSUE TESTING

Rebecca Stewart

Spring can be a hectic time of the year and this often means some vital monitoring and farm planning can be dropped in the rush. The importance of soil and tissue testing must not be forgotten as high quality pastures rely on nutrient rich soils.

These nutrient rich soils which are clover dominant produce larger weight gains in livestock, resulting in large financial advantages when selling stock anytime of the year.

Soil and tissue testing provides valuable information on the requirements of nutrient and soil ameliorant applications which can greatly assist in the financial planning for the following season.

Now is a good time to walk over your pastures and check their performance in terms of clover & grass production, weed & pest invasion and also livestock growth from the pasture. Paddocks which have any issues need to be investigated further so management decisions can be made to improve their productivity.

There are three basic steps that must be followed if meaningful results are to be obtained from soil/tissue testing. They are as follows;

1. Take representative samples of the soil/pasture for analysis. Soil samples require a full 0-10cm core depth and around 30 cores per sample and leaf tissue tests need around 200grams of plant material)
2. Analyse the soil/plant material using the accepted procedures that have been calibrated against experiments in that/your district (soil/plant type and enterprise)
3. Interpret the results using criteria derived from those calibrated experiments

Samples may be taken by the farmer or by an agronomist, it should then be sent to an accredited analytical laboratory for testing, with test results coming back to an agronomist to interpret and develop recommendations for the farmer.

Macro nutrients like phosphorus, potassium, sulphur and soil pH are best checked by conducting a soil test. A soil test gives a good overview of the major nutrients within the soil which will enable most of the nutrient issues to be rectified. Cation Exchange Capacity (CEC) and Phosphorus Buffering Index (PBI) levels also assist in planning nutrient applications as well as looking at the soils' texture and organic matter to make decisions of nutrient holding and change capacity.

Trace elements like molybdenum, copper, boron and zinc are best check by sampling and testing the plant tissue. Tissue testing can be likened to a blood test and provides valuable insight into specific nutrient status of the particular plant sampled. Molybdenum deficiency can reduce clover and pasture growth considerably in acidic soils which have high iron levels (common for the western district) and should rarely be applied without copper as it can interfere with animals ability to absorb copper. Copper can effect animal health greatly and is best checked in July/August. Low moly pastures often have a good fertiliser history nutrition with adequate levels of phosphorus and potassium. Boron is a complex nutrient as it is necessary for a number of functions within the plant but can become toxic. There is small margin between a boron deficiency and a toxicity so graziers need to be extremely cautious.

Forward thinking and gathering as much information as possible is essential for sound planning and budgeting purposes next season. There is no better time than spring to start your farm nutrient budget.

Speak to your local Vickery Bros agronomist today to start planning your farm nutrient budget and take advantage of our soil testing promotion to be prepared for 2023!

SPRING SOWING PERENNIAL GRASSES, COCKSFOOT & PHALARIS...

Roger Gee

Sowing Cocksfoot & Phalaris varieties in the spring is not very common. In this article I hope to turn that around to why you should consider sowing in spring.

What do we need for strong germination and establishment; A suitable seed bed (fertile & weed free), quality seed (with a high germ test), and sown at the correct depth, with adequate moisture and light.

But the most critical factor often overlooked, is warmth, or more correctly "Thermal Time" (Tt – degrees per day OCd), and "Base Temperature" (Tb – degrees OC), this is the temperature at which development stops, through cold.

Every phase of a plant's development requires a minimum accumulation of temperature before that phase can be completed and the plant can move into the next phase. In effect, the plant senses the temperature every day and adds the average for that day to a running total, up to the total required for each stage of growth.

The diagram shows the minimum number of °Cd needed for each phase. To move from emergence to tillering there must have been a running total of at least 200° Cd (10 days with a mean of 20° C or 20 days with a mean of 10° C). Similarly, from sowing to heading, needs at least 760° Cd.

So, if your mean temperature is 15°C, then the phase from sowing to heading will take at least 50 days (760/15 = 50).

At specific stages in development, there are other factors that can modify some of the effects of temperature. The minor modifiers include drought, nutrition and solar radiation and the major modifiers, photoperiod (hours between first and last light each day) and vernalization (temperatures between 0 and 12° C). These major modifiers influence later growth stages, flowering etc.

Species	Cultivar	Tb (°C)	Tt (°C)	R2 (%)
Perennial ryegrass	Nui	2.4	70	98
	Ruanui	1.4	78	94
Perennial ryegrass	Embassy	1.9	93	91
Italian ryegrass	Paroa	2	73	95
	Moata-	1	90	95
Hybrid ryegrass	Manawa	0	90	95
	Ariki	2.2	74	98
Cocksfoot	Apanui	0	240	93
	Wana	0	319	87
Phalaris	Maru	2.3	110	97
Prairie grass	Matua	1.2	162	98
Tall fescue	Roa	2.1	120	97
Timothy	Kahu	3.5	70	97

This table of New Zealand research - *Charlton et al. 1986*, displays estimates of the base temperature (Tb) and the thermal time (Tt) requirement for germination of herbage grass species.

Note, the thermal time requirements provide an explanation as to why Cocksfoot, Phalaris and Fescue, are traditionally slow emerging species, in the cold months.

In researching this topic several points jumped out at me, so following the science above, we quickly understand why late sown autumn/winter pastures struggle and produce little in the way of quality feed until early spring, due mainly to slow acclamation of Thermal Time.

Then due to the poor growth the pasture ends up getting overrun with weeds, requiring an extra spring weed control.

A full pasture renovation is an investment that requires careful planning with the intention to have a productive pasture for a good number of years. This can be challenging enough when sticking to a traditional autumn sowing in some regions; due to pest and grub attack, it can fail if the winter is cold & wet, or when the paddocks don't handle stock and spray machinery for weed control.

The Advantages of spring sowing:

- More time to do thorough soil preparation
- Improved soil temperatures & daylight hours
- Spring sowing can give excellent results, with fast establishment and early vigour
- Better options to control germinating weeds
- Lower risk of pugging, often associated with autumn/winter sown stands

A couple of disadvantages to be mindful of:

- Moisture stress - no guarantee rainfall
- Weed & Summer grass invasion, (sound establishment should out-compete most weeds)
- Insect attack destroying emerging pasture
- Forage crops, offering higher yield on a smaller area

But early spring sowings can be very successful, and a great alternative where rainfall is high and/or irrigation is available, provided the sowing takes place early spring; or at least by mid-September, then by the time the seedlings emerge the temperatures are rising, and development is rapid with ample soil moisture and warmth.

Like to know more, talk to one of the team at Vickery Bros on how we can help with your pasture sowing needs.

References: Food and Agriculture Organisation of the UN, Rome, 2000; UVED – Plant Growth Architecture & Production Dynamics, Thermal Time; AgNote – AG0712 Phalaris. Kevin Reed, Hamilton, 1999; Tasmanian Institute of Agriculture – Hispanic Cocksfoot factsheet; Base temperature and thermal time requirements for germination and emergence of temperate pasture species, New Zealand Journal of Agricultural Research, 2010.

Minimum heat sums for developmental phases