

DECIPHERING THE LETTERBOX FORAGE SPECIES LEAFLETS

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Introduction

Farmers are bombarded with an enormous quantity of promotional material, farming newspapers, and circulars which arrive in their letterbox on a regular basis. Buried amongst all the brochures the farmer will invariably find a few glossy leaflets showing various pasture species and cultivars that are available to the New Zealand pastoral sector. The number of cultivars available, particularly ryegrasses, has increased dramatically in recent times. Currently, there are approximately 190 pasture cultivars available and marketed in New Zealand. So the decision of which species and cultivar to sow is a daunting task.

Just like choosing a new car!

The act of choosing a pasture cultivar to sow is sometimes complex, especially given that there are so many choices. Many farmers will put the decisions into the “too-hard-basket” and simply ask their seed agent to just give them a “good cheap mix”. Farmers have spent around \$400/ha, spray cultivation etc to get to this stage, so get to the point of perhaps trying to save some money. But is this wise? Would you do this when purchasing a new vehicle or when selecting which sire to use?

Just like selecting sires or vehicles the process can be made simple. When buying a vehicle you decide what you are going to use it for, how it is going to be used and then you find the most cost efficient option. The same principle applies to selecting forages. That is, identify what the forage will be used for and how it will be used. It is just a matter of eliminating unsuitable species and cultivars to narrow down the choices until you have a forage which suits your system, management and environment.

Are the new pasture cultivars any good?

In New Zealand we are fortunate in that we have some of the best plant breeders in the world and as a result have some extremely good plant material available. Research has shown that there are many benefits to sowing a new pasture: increased pasture yield, quality, insect tolerance, utilisation, animal preference, palatability and timing of supply. Increases in one, or preferably all of these areas, will increase animal production and profitability. But are these new pasture cultivars performing as well as the promotional material suggests?

The short answer is yes, but with a very big proviso. Farmers need to be aware of how and where the cultivars have been bred. Luckily for dairy farmers most plant breeding conditions most closely match dairy farm conditions of high fertility, rotational grazing and adequate soil moisture. However those same cultivars are marketed and used in all regions throughout New Zealand. Farmer feedback on sowing new forages is mixed and the most common complaints are around lack of persistence or poor performance.

Lack of persistence

Lack of persistence of new pastures maybe as a result of complete failure within the first year (establishment) and so is not a fault of the new cultivar, or, a reversion back to native pasture and weeds, usually due to poor management or a lack of soil fertility or moisture. New forages must be managed differently to established pastures, particularly in the first 12 months. All plants are better able to survive if they have adequate soil fertility, moisture and are protected from extreme defoliation.

Why do new cultivars require higher soil fertility?

As already stated most new forage cultivars have either been bred in the Manawatu or in Canterbury. These sites typically have naturally high soil fertility, good soil structure and for grass forages nitrogen fertiliser is applied to compensate for the absence of legumes. So the short answer is yes, new cultivars do require moderate to high fertility and will perform better the closer you can mimic the environment in which they were bred. Farmers also need to be aware that many of the new perennial ryegrass cultivars are tetraploids. These types of cultivar are naturally darker in colour. It is difficult to assess whether there is a potential nutrient deficiency. The plants may look dark green and “healthy” although in actual fact could be suffering from nitrogen deficiency. Therefore it is more important to perform herbage tests on tetraploid pastures when assessing plant health and soil fertility.

So what's important in selecting forage seed mixtures?

The main aim in sowing a new forage is to increase animal production. In the first instance forget about the cultivar name, there is little difference between ryegrass cultivars provided the correct type of ryegrass is selected. Animal production differences between cultivars mainly lie with the endophyte level and type, flowering date and plant growth habit. When selecting which cultivar to sow use the following weighting: endophyte type 60%, flowering date 15%, plant growth habit 15%, and then worry about which cultivar.

Do endophytes have any impact in Southland?

Southland farmers are actually lucky that they experience cold temperatures in winter because these sometimes objectionable wintry conditions mean that there are very few plant pests tough enough to withstand the cold! In the balmy climate of Northland, farmers battle continuously with numerous pests which invade and reduce pasture production and persistence significantly. Unfortunately most pastures that were sown in Southland during the 1980's and 1990's contained the wild endophyte. This was due to two main reasons, 1) lack of understanding of the impacts of the endophyte toxins and 2) that most seed lines sold during this period inadvertently contained the wild endophyte. As a result many pastures in Southland that are more than 6 or 7 years old will be limiting animal performance.

So if pests are not an issue for Southland then do novel endophytes have their place in the south? The answer is YES And NO! Confused? Hopefully, the following will help. Firstly, it is important that farmers are aware of what an endophyte is, how animal/plant interactions are influenced by endophytes and secondly what differences these endophytes make to a farming system.

What is an endophyte?

An endophyte is a naturally occurring fungus which grows between plant cells in both ryegrass and tall fescue. The endophyte benefits the plant by producing toxins which discourage herbivores (insects and grazing animals) from eating the plant. The plant pays back the endophyte by allowing the endophyte to reproduce via its seed. The relationship is therefore mutualistic.

The toxins that endophytes produce mostly have negative impacts to animal performance. Table 1 summarises the toxins produced from the endophyte and the effect these toxins have for both plant and animal.

Table 1: Endophyte toxins and effects

Endophyte toxin	Effect
Peramine	Protects plant against insect damage
Ergovaline	Reduces liveweight gains Causes heat stress by constricting blood vessels
Lolitrems B	Causes ryegrass staggers

What is a “Novel” endophyte?

Novel endophytes have been selected for enhanced animal production and insect tolerant traits. They are often described as “safe” and “semi-safe” endophytes. Twenty years ago there were only two types of endophyte to choose from, either nil or wild type. There are now several novel endophyte types to choose from, with differing levels of infection. The farmer now has numerous choices and it is important that they are aware of which type of endophyte suits their particular farming environment. The number of endophyte options available for use in pastoral farming is only likely to increase with time.

Advantages of using a novel or nil endophyte pasture in Southland

Novel or Nil endophyte pastures have numerous animal production advantages over a wild type endophyte pasture. This is because they do not contain the toxins which reduce animal performance and are also more palatable to stock. The animals therefore consume more and have higher production than animals grazed on pasture containing wild type endophytes.

In most situations in Southland a Nil endophyte pasture can be used because there are low numbers of pasture pests that impact and limit production. Of the Novel endophyte options the AR1 and AR37 endophyte looks to provide the best advantages, especially if the preliminary findings with AR37 prove a tolerance to grass grub and porina. The novel endophytes containing ergovaline to deter Black beetle infestations are of little or no use in Southland.

Trials in the North Island have shown that cows that have been grazed on a novel endophyte ryegrass pasture will produce approximately 9% more milk solids than cows grazed on a wild type endophyte pasture. Ryegrass staggers and heat stress symptoms are also eliminated from dairy cows grazing a novel endophyte pasture.

Flowering date and growth type impact

Cultivars can vary greatly in their timing of production during the spring period. This largely depends on flowering date. Earlier flowering cultivars will usually produce more herbage in early spring than later flowering types. However, herbage quality of early-flowering types will decline more rapidly in late spring. Conversely, late flowering cultivars will start growth later but will maintain their quality for longer. It is important not to mix flowering dates as this will prolong seed head production.

Erect type ryegrasses are best suited to cattle and rotational grazing whereas prostrate types are best suited to sheep and continuous grazing.

How do I get unbiased and independent information?

It is a feat in itself that farmers have the time to wade through all the various species and cultivars which are touted as the latest and greatest to reach the pastoral market. But to make an educated and well informed choice from this commercialised and promotional material is near impossible. These glossy brochures will show the farmer some exciting possibilities for their pastures, and comes with an impressive and persuasive array of graphs and numbers.

Commercial interests versus farmer need!

The forage breeders of New Zealand and the forage material available to New Zealand farmers can be ranked first class. However, farmers shouldn't lose sight of the fact that although there is a large amount of complex science behind these forage cultivars, the bottom line is that the forage breeders and marketers have commercial interests to protect and profits to make.

Which sources are impartial?

There are a few places that farmers can seek out independent advice of which forage species to sow before talking to the seed agent or retailer. Farmers should actively seek out impartial sources of information and make a more informed decision about which forage species to use.

NZ Plant Breeding and Research Association (NZPBRA)

The NZPBRA represents all of the major forage breeding companies in New Zealand. This organization carries out numerous trials around New Zealand comparing various cultivars from the different companies. This unbiased trial system is known as the National

Forage Variety Trials (NFVT), and gives impartial annual, seasonal and regional yield data. There is a wealth of information to access (free of charge) via the website www.nzpbra.org.

New Zealand Grassland Association (NZGA)

The NZGA has been operating for 75 years and creates an extension link between science and pastoral farming. The annual conference and its proceedings provide peer-reviewed articles of all aspects of grassland farming and agricultural research. The proceedings often contain plant and animal production data for trials performed at various locations around NZ testing various forage species. This information is accessible to NZGA members from the website www.grasslands.org.nz.

Unfortunately information from both of the above sources is usually historic, as many of the cultivars reported on have already been in the market for some time before any meaningful long term data is available. A further problem is that many of the new cultivars are not included in any of the trials reported on.

Interpreting graphs

Some brochures will display graphical information to illustrate their data. And whilst graphs may aid a farmer to interpret the data more easily, these graphs need to be carefully analysed. Check the vertical axis. On some graphs this axis doesn't start at zero. This gives a visual impression that there is a larger difference between cultivars than there really is. For an example of this see Figure 1. This is actual yield data taken from a promotional brochure. The visual yield difference between Cultivar 'A' and 'D' *appears* to be quite large, but the *actual* difference is only 1400 kg DM/ha/year which is not a significant difference over the whole year. Another technique to focus a farmer on one particular cultivar is to use a bright colour in comparison to the others (Figure 1).

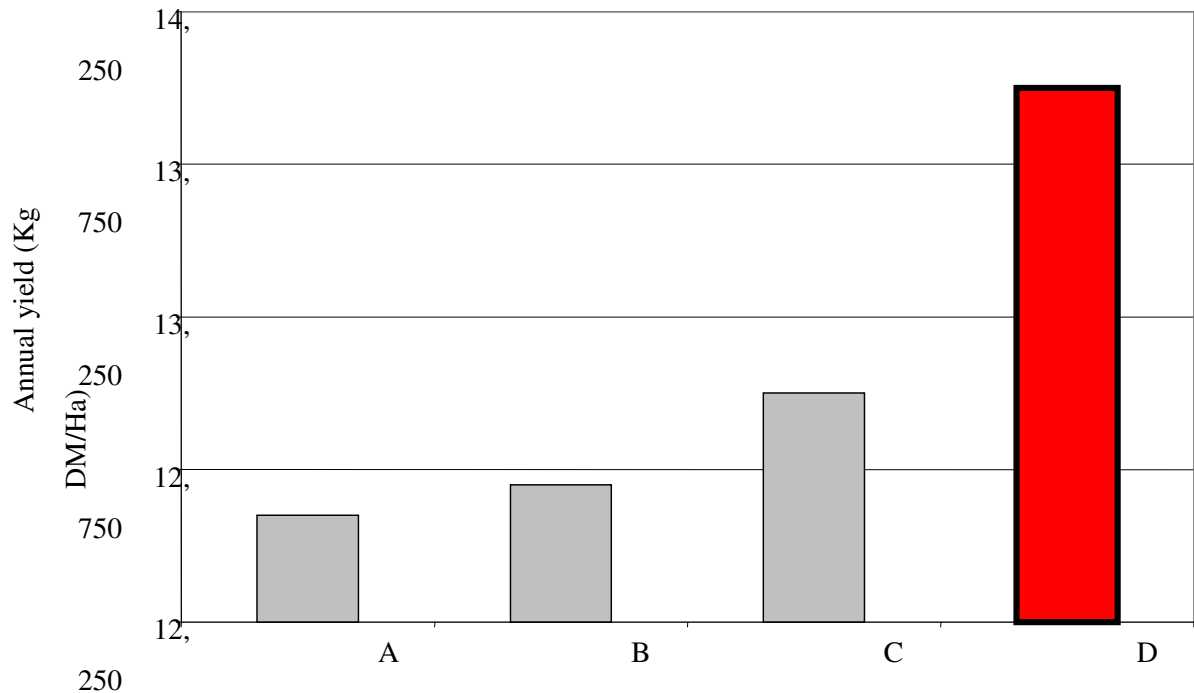


Figure 1: An example of a misleading graph taken from a promotional brochure

Remember these graphs are a great way to compare cultivars but should be interpreted carefully!

ForageMaster decision tool

AgResearch has developed a forage species and cultivar information and selection tool called “ForageMaster” and is currently running regional workshops for dairy farmers. ForageMaster has been funded by Meat and Wool NZ levies. The workshops also cover the use of the tool and topics such as establishment, endophyte options and cost benefit of sowing new forages. The farmer not only gets to take home the ForageMaster tool but also a booklet on the principles of forage selection, establishment and management. The information provided in the tool and booklet represent years of research and is independent and practical that farmers can use to sort out the best forage options for their farm and environment.

Summary

Farmers need to be more proactive in their methods of seed selection when they are sowing new pastures. Seeking impartial advice from seed marketers or glossy brochures may be very difficult from a farmer’s point of view. There are, however, independent sources from which a farmer can access this sort of information. Keeping up to date and understanding the latest pastoral technologies are vital in order to make increases in production.

The task of choosing which cultivar to sow from an ever expanding list can be demystified when farmers understand what each cultivar offers and realise that often there is

little difference between them. What farmers really need to be concerned about is matching endophyte type and level, flowering date and plant habit to their farm management and environment.