

Glengarry Small Farm Pasture Trial

Summary November 2013

Background

The trial was designed to help inform smallholders about soil, pasture and livestock nutrition by demonstrating a range of non-intensive methods of improving an infertile and run-down pasture.

The trial was implemented by John and Julie Scarratt, at Loop Rd Glengarry, using their own equipment. The results are quite different to 'mainstream' pasture renovation by commercial graziers as no seed drill or break crop were used. Consequently, the outcome has been patchy in sections, and many pasture weeds remain. However, these outcomes present good opportunities for learning more about the pitfalls and benefits of pasture renovation, pasture weeds, fertility and more.

Map of Trial Layout



Description of treatments

1. Control, no changes made
2. Sprayed with glyphosate, ploughed, fertilised, sown with dryland blend
3. Sprayed with glyphosate, fertilised, sown with dryland blend
4. Ploughed, compost added, sown with dryland blend
5. Compost added, sown with dryland blend
6. Compost added, sown with dairy blend
7. Compost added, ploughed, sown with dairy blend
8. Sprayed with glyphosate, fertilised, sown with dairy blend
9. Sprayed with glyphosate, ploughed, fertilised, sown with dairy blend

Detail of Treatments

Nutrient additions

Compost – Dulverton compost added at 4 tons/Ha rate.

Fertiliser – Impact Fertiliser blend added at 250kg/Ha rate. Blend was 14% Nitrogen, 16% Phosphorus, 11% Potassium, 1% Sulphur as well as trace amounts of copper and molybdenum

Pasture seed mixes:

DRYLAND BLEND - TPJONES Tas dryland Blend sown 20kg/ha @\$117 per ha inc GST

50% Victoca ryegrass (perennial)

25%Wintas ryegrass (perennial)

10% sub clover (annual)

5% uplands cocksfoot (perennial)

5% huia white clover (medium leaf size perennial)

5% Arrotas clover (annual)

DAIRY BLEND - High production blend with novel endophytes and low aftermath heading. 25kg/ha @ \$288.54 per ha inc GST

40% impact 2 ryegrass (perennial diploid)

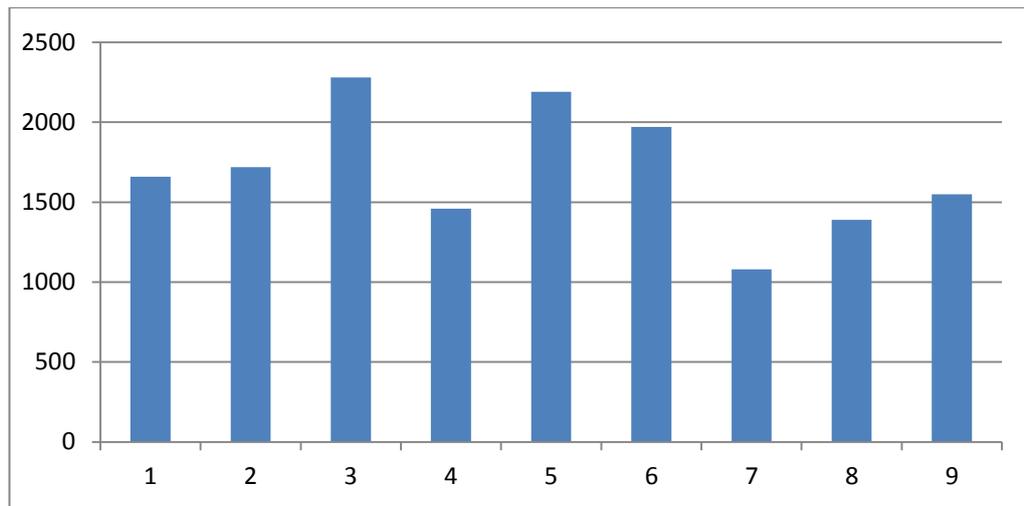
40% Bealey ryegrass (perennial tetraploid)

12% Astred red clover (stoloniferous perennial)

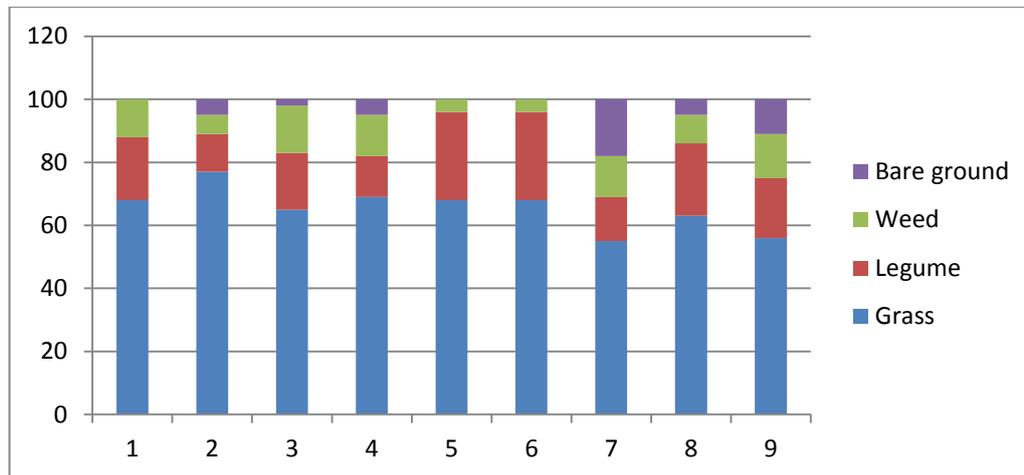
8% Quest white clover (perennial large leaf)

September 2013 monitoring results

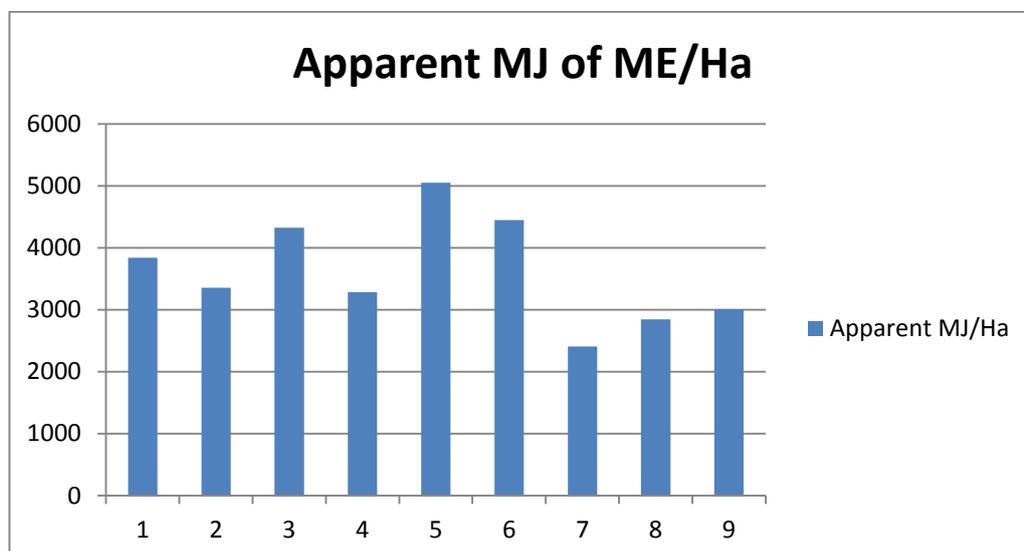
Apparent kg dry matter per hectare between treatments, i.e. how much pasture grew in each patch



Pasture composition % between grass, legume, weed and bare ground



Apparent megajoules of metabolisable energy per hectare, i.e. how much livestock-digestible energy was grown in each patch



How to take a soil test, and how to interpret it

Soil testing is the best way to measure the relative fertility of soil, and identify missing nutrients. For example, the initial soil test for the trial site showed very low levels of phosphorus were available in the soil for plants.

To take a soil test, dig or core around 20 sub-samples from around the paddock, avoiding taking sub-samples from areas of abnormal fertility like stock camps, dung patches, gateways etc. Pasture soil testing in Tasmania has historically only used the top 7.5 centimetres of the soil. Pick out particles of plant matter or stone, and combine the sub-samples thoroughly to form an average sample of the entire paddock. Insert the sample into a zip-lock bag with your preferred lab's info form filled out, then express post to the lab. If there is a significant delay between sampling and posting, keep the sample refrigerated.

When you've received the results of your soil test, interpreting the results isn't very difficult. Tests will give numbers and percentages, but also an indication for each nutrient of whether its status is low, high or about right.

Choosing the appropriate amount of fertiliser or compost to address deficiencies is best left to an expert advisor. **Adding too much nutrient can cause problems, both for the wider environment and for livestock health.**

Basic info on soil fertility

The main soil nutrients needed for pasture growth are nitrogen, phosphorus, potassium and sulphur. Many trace elements are also required. Most pastures also tend to grow best at soil pH levels around 6 - 6.5. Acidification is a slow, natural process. If your soil's pH is low, this can be corrected by adding lime.

Nitrogen (N) comes for free in limited quantities through soil bacteria, the atmosphere, and in larger quantities through pasture legumes. Legumes like clover and lucerne improve the productivity of pastures by enriching the pasture with free N. N can also be added through fertiliser and compost. It is easily lost from the soil however, so the ongoing N addition from pasture legumes is usually the best way of ensuring a reliable supply.

Phosphorus (P) is often the main limited nutrient in pastures as it doesn't come from the atmosphere, bacteria or legumes. If low, P will need to be added. Fortunately, it isn't very mobile and will stay in the soil for a long time.

Potassium (K) is very important in making hay, as grass stalks contain a large amount of K, and cutting hay removes this from the soil. Like P it may need to be added, but unlike P is it mobile and can be lost from the soil. Feeding out hay is one way to add K to the soil. When adding K through fertiliser, expert advice is recommended as very high levels of K can cause significant animal health issues.

Sulphur (S) is another mobile nutrient than is lost during heavy rainfall or waterlogging. It is often added to pastures through superphosphate fertilisers, which contain S.

Basic info on grasses and legumes

Grass is the main constituent of most pastures, and many different types are available to suit different environments and production systems. In Tasmania's relatively high rainfall, perennial grasses are the best choice for pastures as they maintain ground cover year-round and can respond to rain at any time. Ryegrass is a popular choice in wetter environments, while cocksfoot and phalaris are better suited to dry areas like the midlands.

Legumes (like clover, lucerne and others) are generally under-utilised in Tasmanian pastures. They have higher protein and digestibility levels than grass, and provide the pasture with free nitrogen. However, they usually grow slower than grasses and most need careful grazing management if they are to remain in the pasture in the long-term. Due to their high palatability, they will be selectively grazed out and disappear when under constant grazing.

Basic info on feed values and livestock requirements

Different types of livestock have different nutritional requirements, including at different times of the year. Small livestock (i.e. lambs) need higher quality pasture than bullocks, because they have smaller stomachs and are growing fast. Pregnant and lactating stock also need more and higher quality pasture. It's also worth noting that horses have different requirements to ruminant livestock, and prefer more fibrous feed.

So what is quality? A pasture feed test will tell you the amount of dry matter in a pasture (much can be water), the level of digestibility, protein, fibre and energy. Energy is the key for driving livestock growth and production. Protein is also important for growing stock, but can often be too high, which effectively dilutes the level of energy in their stomach.

Pasture quality also changes through the seasons. In spring, pasture quality will be high, but mostly water, so stock need to eat a lot and might need extra fibre. In late summer, quality will tend to be much lower, and livestock will find it hard to flourish. That's why most farmers ensure their lambs are born in winter or early spring – it's more dangerous at first because of the cold, but at least the lactating ewes and growing lambs will have plenty of high quality pasture to eat. If the lambs are born later, it won't be as cold but they could run out of quality feed as the season dries out.

The simplest way to ensure your pasture quality stays relatively high is to ensure the soil is fertile, and have legumes and perennial, quality grasses. Weedy grasses go to seed early in the season and rapidly lose quality. Grazing management is also important, as most high-quality grasses will quickly decrease in quality as they flower and set seed.

Basic pasture ecology and ecosystem management

In simple terms, pasture ecology is about asking a few questions.

1. What's in my pasture?
2. Why is it lots of this and none of that?
3. Now that I know what and why, how can I change the situation? – If I need/want to.

Pasture is a complex, living and dynamic ecosystem. Making changes in soil fertility or grazing management can result in changes in the pasture. If your pasture is dominated by weeds it could be due to low soil fertility, the wrong type of grasses sown, not enough grazing or too much (this includes by wallabies). If you want your pasture to change, make a change in the management and observe what happens in the short and long term.



Prepared by Adrian James, Regional Landcare Facilitator and CFI Extension and Outreach Officer

NRM North

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