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DoloZest® News

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Eco-Logic Soil Improvement Ltd

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Rapid recovery after the dry

Throughout spring soil temperature readings from the monitor and other clients' properties were 1–2°C lower than normal. A few fine sunny days were followed by cold wet conditions from the south and previously encouraging growth suddenly slowed.

For dairy properties where grazing intervals of 30 days or longer had been maintained and there was supplement to feed, stock produced well. Sheep and beef properties where longer pasture covers had been maintained throughout winter it was reported that mature animals had maintained their condition and young stock had generally thrived.

Mid-December brought about a sudden change here in the Bay of Plenty, with northerly conditions prevailing and a rapid increase in daytime temperatures.

Throughout most of January day temperatures reached 30°C and during the night seldom dropped below 20°C.

Pastures don't generally appreciate rapid changes in conditions, and grass growth figures dropped to well below the average for January, particularly on non-irrigated country. The press predicted droughts and some areas have suffered from drier and hotter than normal conditions.

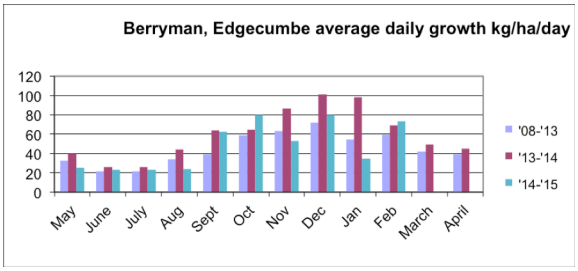
Although not uniformly, significant rain fell in late January in the Waikato and Bay of Plenty with following showers providing sufficient moisture for strong February growth.

A common comment has been that stock have performed well even where feed was brown. Provided animals are able to cool off overnight, and they have a gutful of feed and plenty of fresh water, dry conditions cause few issues.

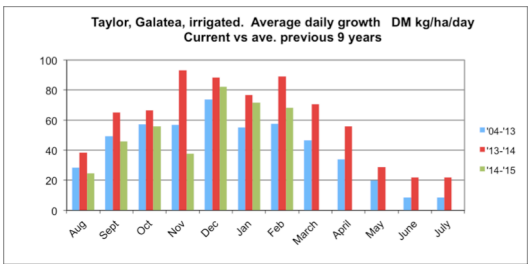
Once rain does arrive, the feed value and palatability of standing pasture deteriorates rapidly and supplement is required if animals are to maintain weight and continue to produce at a satisfactory level. Silage or balage made from high quality pasture is an ideal feed at this time.

To build pasture covers maintaining an initial grazing interval of 30 days works well. Growth rates of around 70kgDM/ha/day recorded for February means that a little over 2,000kg of cover is obtainable at the end of 30 days.

Berryman, Edgecumbe kgDM/ha/day	'08-'13	'13-'14	'14-'15
May	33	40	25
June	21	26	23
July	22	26	23
Aug	34	44	24
Sept	39	64	62
Oct	59	65	80
Nov	63	86	53
Dec	72	101	80
Jan	55	98	35
Feb	59	69	74
March	42	49	
April	39	45	



Taylor, Galatea kgDm/ha/day	'04-'13	'13-'14	'14-'15
Aug	28	38	25
Sept	49	65	46
Oct	57	66	56
Nov	57	93	38
Dec	74	88	82
Jan	55	77	71
Feb	58	89	68
March	47	71	
April	34	56	
May	20	29	
June	9	22	
July	9	22	



During the first 10 days after sufficient rain arrives for strong growth pasture recovery is slow, but gains momentum over the next ten days with the greatest increase coming between 20 and 30 days. It is as pasture growth slows at the end of the rapid growth phase that energy levels build, with brix levels moving from 6 or 7 to 10+.

Steadily pushing the grazing interval out to 60 days and longer allows a wedge of feed to be built prior to growth slowing as soil temperatures drop toward 10°C signalling the onset of winter. Predicting autumn growth is aided by daily monitoring of the soil temperature.

There are a number of strategies available should there be excess feed going into winter. However that's seldom a consideration on highly stocked properties, and long feed that has stopped growing is ideal winter tucker for mature animals.

A recent newspaper article by Gwynne Dyer contained the following, *"We know far more about the amount of oil there is globally and how long those stocks will last than we know about how much soil there is," said John Crawford, director of the Sustainable Systems Program in Rothamsted Research in England. "Under business as usual, the current soils that are in agricultural production will yield about 30% less by around 2050.*
The United Nations Food and Agriculture Organisation estimates that 25% of the world's soils currently under cultivation are severely degraded. And the only way to access new, undamaged soil is to deforest the rest of the planet…."

Humus is naturally able to build most rapidly under intensively grazed pasture. But it is our view that when pasture growth is mainly driven by regular inputs of fertiliser nitrogen, carbon and humus can be depleted, resulting in declining production.

Under a DoloZest/CalciZest based total nutrient programme physical soil structures improve, more total dry matter is produced with steadily increasing amounts of dead root, dung and urine being broken down to form humus.

More carbon dioxide is removed from the atmosphere, with the carbon being sequestered in the soil providing higher quality feed and a more even spread of growth throughout the season. Perhaps the term **'generational farming'** best describes the process.

The unique mix of selected beneficial fungi and bacteria in DoloZest and CalciZest provide many of the benefits enjoyed by ESI clients. These boosted nutrient packages ensure soil conditions are optimum for natural growth.

It's not easy to accurately count soil microbes and be able to know which of the introduced fungi and bacteria are active at any time but the improvement in yield and quality indicate increased mycorrhizal activity.

The following article by the highly respected rural writer Sue Edmonds provides an insight into life in the soil.

THE MAGIC UNDERGROUND
by Sue Edmonds

While technology and chemistry have done great things in helping us feed an ever-expanding world population, since the 1950's we've tended to ignore much of what Mother Nature had been doing over the last 400 millions years or so, particularly the underground stuff.

In a world of instant gratification, people have come to think that it is absolutely necessary to spread chemicals on the land to make things grow. And because some of what we spread actually slows down or stops Nature's processes, we then use more and more to achieve either the same or less growth. Urea is a prime example. Over the last decade usage has climbed and climbed, but many growth measurements of pasture have risen initially and then relapsed back to earlier levels or less. And when the stuff is costly to make, and the price for our products drops, it's an expensive habit.

Fifty years ago my then new husband introduced me to the word 'mycorrhiza', a group of fungi which have been around a very long time, and which he proved had a lot to do with how well our Pinus radiata forests grow, as they take up nitrogen from the air and provide it to the trees.
If you ask most people what mycorrhizae are you mostly get blank looks. I knew them then as 'fungal socks' which attach themselves and grow to cover tree roots.

These days I know there are two kinds. Ectomycorrhizae, which grow on the outside of mainly tree roots, and the much more important kind, Endomycorrhizae, which insinuate themselves as spores inside the outer cortex layer of most other land plants (about 80% of species).

The latter expand their reach by growing threadlike 'hyphae' which spread through the roots and through the surrounding soil.

But mycorrhizae aren't predators, they are sharers. Once installed they set up a 'symbiotic' relationship with the host plant. They receive carbon and plant sugars, and in return they feed the plant with nitrogen, scavenged from the air and the soil. In many cases they also unlock other chemicals such as phosphate and make them available to the host plants. Recent research has even shown that the hyphae from one plant can feed another different plant as well with the locked up chemicals.

While ectomycorrhizal research was going on 50 years ago, most of the work on endomycorrhizae has been much more recent - beginning in the mid-80s. And it wasn't until the mid-90s that a further major breakthrough was found, and that was 'glomalin'. The name was taken from the genus name for most mycorrhiza, Glomeromycota. This is a sticky substance which grows on the hyphae, and appears to be responsible for most of the scavenging, the products of which then get passed through the hyphae to the plant.

But glomalin is cleverer than just that trick. Very recent research has focused on what the stickiness does. Firstly it attracts iron, and under a microscope it often is a browny colour from the iron absorbed. But secondly it has been found to be hydrophobic, so it doesn't dissolve in rainwater, but floats as a scum on the surface. And the stickiness helps the soil, sand and clay particles stick together, improving soil texture, and water retention.

Salt fertilisers such as urea tend to kill off mycorrhizae. So frequent and sustained heavy doses mean that both soil and plants are missing out on the benefits that these symbiotic fungi provide. No free nitrogen. Far less carbon transferred from plants to soil, where it can be locked up for many years, even centuries. And no glue to hold soil particles together, so rainfall just keeps travelling through, rather than being retained in topsoil to benefit plants.

We know that urea also discourages clover plants from fixing nitrogen in nodules. So if clover isn't storing its own nitrogen, and the mycorrhizae have been killed off, then the only benefits from urea will come from what can be grabbed by pasture plants as it passes through the soil. And we all know by now that much of it does just pass by, because it is ending up in our watercourses and groundwater. And with no glomalin that soil just gets more and more porous.

Until fairly recently the most used name for mycorrhizae was 'vesicular arbuscular mycorrhizae'. Vesicules are the tiny storage sacs which grow on the hyphae. It has now been found that not all mycorrhizae make them, so the VAM label has been reduced to AM or AMF for arbuscular mycorrhizal fungi. Arbuscules are the minute threadlike clusters, like bonsai trees, which grow between and within the cells of plant roots, and provide the trading mechanisms back and forth.

With such delicious names, and immensely useful roles in plant growth and soil texture, can we really go on flinging on urea with impunity? After all, Nature can do it for free, which must be a benefit when farm expenses go up and product prices plunge. And if, instead of urea, we use fertiliser mixes which include mycorrhizae and other soil 'goodfellers', mightn't that help clean up our waterways too. We know it's all the fault of cow urine, but if they aren't eating so much nitrogen in pasture, they won't be pushing it out the other end.

Clover growth

Although climatic conditions varied widely throughout the country clover growth over late spring and summer was generally significantly less than usual, which may have directly affected animal performance as clover contains more calcium and energy than grass, and is more digestible.

This is likely to mean that less nitrogen has been fixed over the last 5 months however as there is a pool of 5,000– 15,000 kg/ha of nitrogen in the root zone of established pasture, growth throughout autumn winter and early spring is unlikely to be affected.

Total annual uptake of nitrogen for high performing pasture during a season is less than 500kg/ha with much of that being recycled in dung and urine throughout the year. Significant quantities of N are known to be fixed direct from the atmosphere so growth over winter and early spring will again be dictated by soil temperatures.

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Magnesium

A vital macro-nutrient

The mineral magnesium is required for numerous important metabolic and cellular reactions. While half of our body's magnesium is stored in our bones, its most vital role relates to the function of our nerves, muscles and heart.

Insufficient magnesium is involved with tremors, muscle spasms, cramps and many aspects of coronary artery disease (including angina, arrhythmias and hypertension). Magnesium directly or indirectly affects the function of the heart due to its relationship with the potassium, sodium and calcium concentration in cells and their surrounding fluids.

Low magnesium levels are widespread throughout the world and can be attributed to a number of health problems, particularly cardiovascular disease. The World Health Organisation attributes one in three global deaths to this problem.

Our body cleverly absorbs magnesium from food when our levels are low. This absorption takes place towards the end of our small intestine. Malabsorption may be a problem if someone has concerns in this area. This is when food alone may not address a magnesium deficiency and further supplementation may be required.

Most forms of magnesium are absorbed to some degree but the effectiveness of the supplement is only as good as the type of magnesium it contains, with some having better absorption rates than others. Magnesium bound to the Krebs cycle intermediates (such as malate, succinate and citrate) are usually preferable to oxide, sulfate and chloride. The Krebs cycle is the body's way of generating energy within the cell and magnesium bound to actual components of this cycle are better absorbed, used and tolerated. Aspartate is another beneficial form that leads directly into the Krebs cycle."(Caution needs to be applied when taking high doses of magnesium as this can lead to Diarrhoea).

What is the Krebs cycle?

The Krebs cycle is a complicated series of reactions that occurs in our cells. It is the main part of the process the body uses to generate energy from carbohydrates, proteins and fats.

A 2005 small animal study compared ten organic and inorganic magnesium salts. It was shown that magnesium gluconate showed the highest bioavailability. It is however a form that provides a very low elemental amount (the actual amount of magnesium present).

Magnesium citrate showed very positive uptake by the body and is often the preferred form to use for supplementation. It is bound to citric acid which is recognised and assimilated well by the body. In fact the Krebs cycle is sometimes referred to as "the Citric Acid cycle" because of its role in energy production. Vitamin derived cofactors are also required for energy production. A mix of B vitamins is vital for addressing low energy levels.

Foods high in magnesium include raw unsalted nuts and seeds, dark green leafy vegetables and whole grains. Magnesium is easily lost during the refining of foods (especially grains) and the levels of magnesium in our food chain appear to be reducing.

A high calcium intake from milk may also reduce the absorption of magnesium, as it combines with the calcium, vitamin D and phosphorus in the milk.

If you have a pre-existing heart condition or are on prescribed medication, please seek advice from your health practitioner. Magnesium is however considered a safe, well tolerated, vitally important, but sadly often missed mineral.

Regards,

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