NZ GRASSLAND ASSOCIATION
Fuelled by Science, Tempered by Experience

GRASSLAND NEWS www.grassland.org.nz

August 2012
ISSN 1179-4216

A note from the President

Jacqueline Rowarth

As the last chords of the Olympic anthems die away, the dollars are already being counted in various countries. The cost for New Zealand's 13 medals is $180 million – that's the amount of Government money supporting high performance sport programmes over the last 4 years.

It doesn't include the amount of money from the participants themselves, their partners, not their parents over the last decades. Nor does it include the downtime from people glued to the Olympics.

That category of people excludes farmers, of course. They were milking, drafting, moving stock, checking ewes… whatever was required to keep their businesses running and the economy humming.

The non-farmer downtime will certainly have had an impact on productivity, because the feel good factor which comes later is short-lived and rarely enough to offset the downtime during the event.

The worst cost, however, has yet to be felt – and it lies in the young people now inspired to give sport their all for the next few years. This is significant because now is the time of Careers evenings at schools all around the country.

Twice gold medallist 22 year old Russian gymnast, Evgeniya Kanaeva, has put in over 46,000 hours for her medals – she has practised 8 hours a day since she was six years old. She was superb, but others had put in similar time and effort… and didn't achieve the glory.

Is this a sensible model for our children?

For Britain the feel good factor is already being exploited for future generations of athletes. Even before the closing ceremony took place, the Games' chief organizer Sebastian Coe warned "It's a limited window, it's not something that you are going to be able to continually remind people about once you get two or three years down the track. I think these memories will be indelible but the way that you really leverage 100,000 to, say, 400,000 more people playing that sport off the back of every medal is clear." And just in case it wasn't clear, he went on to state "It takes political energy, predictable levels of funding, we have to ensure that we have school sport alive and kicking and that we have a healthy network of clubs out there… and we do have to make the most of that."

Substitute agriculture and science for sport, and the words apply. Yet we are still missing direct signals to our young about where they might have rewarding careers with some lasting and positive impact – not the 10-14 days of feel-good caused by a medal.

It is no coincidence that at the same time world food prices are increasing, employment following degrees in 'agriculture, biosciences and veterinary medicine' is high. The UK Higher Education Statistics show the results of taking a degree associated with knowledge that the world needs. In New Zealand the salary packages being offered to agricultural graduates are worth considerably more than those offered to other graduates.

Market forces are at work and graduates are in demand in core areas of human needs. These students have a global passport for work – but we need them here. That means we need the political energy, predictable levels of funding, and school science alive and kicking. We need the healthy network of Young Farmers Clubs out there, too, as well as associations such as Grassland promoting ideas and interaction between all sectors of the Primary industries.

In fact, we need what the UK is promoting for sport for activities that really matter.

What the world needs is sustainably-produced food.

The message about market forces and salary package rewards in agriculture needs spreading as fast as possible before Olympic fever strikes home. The real heroes are those on the land – they bring in the money to the country and without them there would be little money to support the sports.

Reminder: Invoicing for 2012/13 membership is due and all members should have received an invoice. However we may have an incorrect postal or email address - we would appreciate you updating this by emailing eo@grassland.org.nz

NZGA celebrates 80 years

SPONSORED BY AGRESEARCH

'Is soil biology a can of worms?'

Jacqueline Rowarth, Tony Parson and Warwick Lissaman

It is human nature to want something more. Lotto survives on it and all the advertising around 'because you deserve it' is part of the drive. Suggestions that 'holidays put back what life steals from you' encourage the concept that if we don't watch out we'll lose because somebody will do us down.

In primary production the pressures are on farmers in terms of increasing food production and yet reducing environmental impact: sustainability is the requirement.

Suggestions that conventional farming methods, focussed on 'intensification' are causing difficulties must be considered, but statements about improvements are not always based on the necessary evidence: a proposed alternative must be compared with a conventional method in a way that gives a definitive answer. There are some very serious questions to resolve and although the answer to almost any question is 'it depends'… almost always the question needs to be refined to identify the context.

On the issue of carbon (C) in soils, it is inescapable that the amount of C which can be sustained in the soil is determined by two things – the rate of input of C and the longevity, i.e., the residence time in the soil of each of the many forms. Longevity is increased by low temperature and high water (low oxygen) content. This is exemplified by the fact that cold wet bogs slowly accumulate massive C content, despite low C inputs; draining the bog (allowing oxygen) leads to C loss. Some rock/mineral bases physically protect (increase longevity) of soil C. To answer the questions about whether managements change soil carbon requires knowledge of what is being changed in terms of inputs and longevity: how do new treatments affect either and in what direction?

a) Is soil carbon loss caused by the addition of mineral fertiliser nitrogen?

Research from the United States (Mulvaney et al. 2009) is often touted as showing that urea results in a decrease in soil carbon when it replaced farmyard manure. Of course it did in his research. If the two were compared at the same nitrogen (N) input, farmyard manure contains and adds both N and C. Urea contains only N. Mulvaney's work did not address the question of whether urea N is a better/worse source of N for building soil C.

b) Can fertiliser nitrogen build up soil carbon?

Increased N inputs (of any source) leads to increased plant growth. This in turn leads to increased C inputs (e.g., as shoot and root litter and excreta cycling), and so eventually an increase in soil C. There is no definitive evidence that different forms of N supplied give better boosts to plant growth and soil C inputs, nor that the form of N supplied *per se* alters the longevity of C in the soil. Soils high in N (by whatever means) and so with low C:N ratio will have a lower longevity of C that those of high C:N ratio, but this does not say one form of N 'fertilisation' is worse than another.

One major problem is in confusing the use of fertiliser N with the issue of intensity of harvesting (off-take of C and N) that often accompanies it. Whether the system is organic or 'conventional', increasing the animal numbers (or cutting alone), this in itself will reduce inputs of the ungrazed plant parts and C and N to the soil, and reduce soil C. It is not valid to compare low intensity dry stock farming with intensive dairy farming and imagine that the difference is to do with the form or amount of fertiliser applied.

c) Can addition of carbon make a difference to soil carbon?

Adding C from an offsite source immediately raises the fact that while it may benefit the fields it is applied to, it is a loss from some other location; this is comparable to 'displacement accounting'. Whether the carbon is from 'wholesome sounding' calf bedding or chicken manure, or is palm kernel from an intensive oil producing plantation, the answer to whether it will make a difference is 'Yes', because C inputs have been increased where the C is received.

Whether there is the prospect of increasing soil C in New Zealand by this or any means is still questionable. New Zealand agricultural soils have relatively high C by global standards, and, because they are slightly acid, are dominated by humates. The high soil C reflects long standing inputs from high vegetation cover (in contrast with, for instance, Australia and USA). New Zealand soils are typically low in N and phosphorus (P). As we add these (from whatever source) we have increased plant growth, and soil C, but greater plant off-take has reduced both. So far this has led to overall little change in soil C. There are concerns that even greater off-take of C in animal products might deplete C in the grazed system, and that there may be limits to how much more we can replace that C by further stimulating plant growth with N input.

The question of whether we can add C directly, to remedy this, and if so, what form it should take, is under investigation.

The form of carbon (and its C:N balance) added will affect its longevity, and that of other C and N in the soil. Incorrect applications could be counterproductive.

Adding a labile source of C such as glucose or molasses can stimulate biological activity, but if the supply is not sustained the increased population of micro-organisms will decompose existing organic matter. This is termed 'priming' and is a serious possible hidden pitfall of adding extra C that needs more research.

Grass litter, naturally cycling to soil in a grazed system, adds 5 to 10 tons of OM (2-4 of C) to the soil each hectare each year. It has a C:N ratio even in well-fertilised paddocks, of approximately 25 to 50:1 (lower if legume). Ruminant dung typically is similar in C:N to the diet eaten. External sources such as horse manure has been measured at 25:1, poultry

at 15:1 and wheat straw anywhere between 100 and 80:1… depending upon growing conditions. Adding externally-supplied organic matter of high C content may well stimulate soil organisms to grow, but in doing so they will 'tie up' (sequester) the extra N they need to match the opportunity from the high C supply. If this occurs, each tonne of humus-carbon will 'lock up' approximately 80kg N, 20kg P and 14kg sulphur. Conversely, 50 kg N stabilised in the soil would be associated with over 600 kg humates. It is questionable if in a grazed context we can add even 1 tonne per hectare of C each and every year, and expect it to be sequestered.

d) Is there anything we can do to alter the fate and longevity of C in the soil?

This is as yet unclear. Different plant species and plant traits (e.g., high sugar, legumes, endophyte presence etc.) do result in different soil organism communities, but there is little evidence at present that this is altering the longevity of carbon in the system. There is much emphasis on the balance of bacteria, archea and fungi, and on a larger scale, worms, but these are decomposers of organic matter and release/lose C. The biological population is largest (and causes greatest respiration from soil) when there are high C inputs. Some soil organisms do make materials that have greater longevity than the ones they 'eat', but as yet our capacity to manipulate/control this is not yet clear, and the potential for bad feedback through locking up of N is still present.

e) Are conventional farmers missing out on something extra?

There is no evidence of this at present, when the confusions we have referred to are stripped away from the claims that are being made. We would ALL welcome any convincing evidence.

f) If we don't add the extras now will farmers be missing out on something in 5 years' time?

The burden of proof lies with the advocates for anything. Scientists and farmers have long term evidence of efficacy and sustainability of conventional systems.

We know that changes in C in soils are slow. This makes them difficult to measure, but in most cases changes are reversible. Long-term research is not the vogue for funders, but the best research from the past showed only very small and slow changes, if any, in soil C in systems sustained under grazing. Research on the long-term phosphate trials (see newsletter December after the Blenheim 2008 conference http://grassland.org.nz/newsdetails.php?newsnum=29) shows that a change in management systems takes some time to have a visible effect because of the buffering capacity of the biological cycle and the obscuring of results caused by seasonal fluctuations. Predictive modelling of processes in soils is perhaps the best insurance given there is no data yet from the future.

g) Where is the best bang for the buck?

Research shows consistently that plant growth occurs in response to available nutrients. This was discussed in the last newsletter. It is notable that many new proposed sources of C and N are considerably more expensive than conventional ones. Farmers are advised to check whether the benefits they see from the new source are any greater per dollar then from the old – but this will take time. Alternatively they could ask serious questions of the seller to provide real evidence of other hidden benefits.

h) What can farmers do on farm to make changes for the right reasons and make the right changes?

Read the material available. Put the new product, technology, cultivar, species or fertiliser to the test. Measure plant growth, measure animal growth, adopt best management practices for stock, read the NZGA newsletters, past proceedings – and come to the Gore conference not only for the latest information but also to tell researchers about your pastoral issues problems, concerns, and future possibilities.

The best future that we can plan is one that we work on together, with practitioners, industry personnel and researchers all examining the limitations and impediments to improving production from different perspectives, and working for the same goal in terms of increases in efficient production and decreased environmental impact.

Gore 2012

What have the LOC planned for Gore? The science presentations will have something for everyone with topics as varied as nitrogen management; forage crops; pasture pests and plant breeding.

There are two field tours covering topics important to intensive dairy and sheep systems as well as a tour across a special property, Leithen Valley, which is a sheep beef and deer operation that is also well known for its trophy hunting activities. For a sneak peak go to http://www.leithenvalley.co.nz/gallery/scenery.html. One evening function will be held at the Mandeville Airport which is the home of the Croydon Aircraft Company.

Registrations will be available online through the website www.grassland.org.nz from early September. If you do not have access to the internet you will be able to call the Executive Officer and organise an alternative.

Student travel fund NZGA is investing in research students by supporting their attendance at the 2012 conference in Gore. Students are invited to apply, giving an estimate of travel and accommodation costs (conference registration will be given, plus membership for the next year) and a brief explanation of why they wish to attend the conference. Successful recipients will be expected to give a short report on the conference experience for the NZGA newsletter. All applications must be approved and supported by the supervisor of the student's research.

Application form http://www.grassland.org.nz/userfiles/files/NZGA%20Student%20travel%20fund%20Application%

Trouble with pasture pests?

"It's a battleground in the farm paddocks of New Zealand," says AgResearch Scientist and project manager Dr Katherine Tozer." Changeable climatic conditions, poor pasture persistence and failure to forecast and implement timely pest management have all led to significant issues with insect pests and weeds throughout New Zealand. PestWebNZ™ gives those waging war against these pests a helping hand."

PestWebNZ™ is a website developed to assist farmers and agricultural professionals to identify and manage pasture pests. It provides independent and up-to-date information on the identification, biology, impact and control of key weed and insect pests relevant to the New Zealand pastoral agricultural sector.

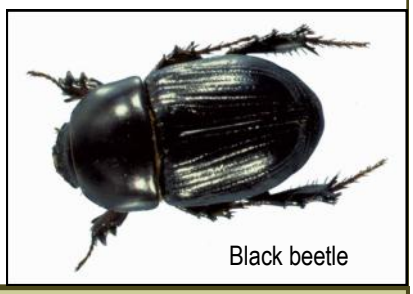
In addition there is an alert function, to warn farmers of pest issues in their region and suggest appropriate management responses.

The project is funded by SFF, Beef + Lamb NZ, DairyNZ, regional councils, ag-chem companies and other agricultural service providers with many using the website in their own communications with farmers.

We aim to have at least 50 pasture-based weeds and insect pests added this year and are working on a mobile application for June 2014.

The growth of mobile devices being used on-farm is opening the door to having identification information available to farmers in the paddock. That information can be used to make identification and control decisions on the spot. It is an obvious development opportunity for PestWebNZ™.

Visit the PestWebNZ™ website at www.pestweb.co.nz



Black beetle

Helping farmers understand climate data

Climate Smart Pastoral Farmers

Tired of trying to make use of climate data? How about a website that helps you interpret what might be happening on your farm?

The Climate Smart Pastoral Farmers SFF project aims to help farmers get and interpret climate data. Farmers who currently undertake weather observations will help us to develop better ways of presenting and describing farm weather and climate risk for improved on-farm decision making.

The website has tools for making more informed farm management decisions by better interpretation and understanding of climate data and information. (http://climate-smartfarmers.wikispaces.com/About+Climate-Smart).

How does this work? The site uses NIWAs virtual climate network which covers the whole country so there is a site within 2.5 km of your farm. It updates weekly NIWA's 15 day forecast to 3 virtual climate sites near Masterton, Dannevirke and Waipawa. Hopefully soon these 15 day forecasts can be automated onto all virtual climate stations but at present these are being done manually for our 3 sites.

The key data from the virtual climate stations are the daily soil moisture deficit, rainfall and 10 cm soil temperature graphs. Soil moisture status and soil temperature are the 2 key drivers of pasture growth. Our website helps farmers to interpret these graphs.

The website is also a data hub for climate information. There is easy access to a range of NIWA data and other sites that have useful information for farmers to enhance decision making, including NIWA's climate database, climate updates, seasonal climate outlook and the virtual climate station network.

More informed decisions should lead to improved and more consistent financial returns for pastoral farmers as they minimise the impact adverse climatic events can have on farm production.

A sample Soil Moisture deficit graph