

# NZ GRASSLAND ASSOCIATION

Fuelled by Science, Tempered by Experience

GRASSLAND NEWS

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## President's Welcome

Warren King

Is it too late to say Happy New Year? I trust you all found time over the holidays to relax and reflect on 2019, and to recharge the batteries for what's ahead. It has been a challenging start to 2020 already – Hamilton has had less than 10 mm of rain so far this year. It's been dry most everywhere and is even tougher up north. We might have been here before, but it doesn't make it any easier.

One of the objects of NZGA is to "foster progress in all matters relating to grassland" and one way we do this is to provide travel awards. In conjunction with the NZ Grasslands Trust and the Ellett Trust, six awards were made to support travel to the International Grasslands Congress/International Rangelands Congress in Nairobi later this year (<http://2020kenya-igc-irc.rangelandcongress.org/>).

IGC only happens every four years and a joint IGC/IRC Congress only happens once in a blue moon so it's a pretty cool opportunity. There were 24 applications, from a range of backgrounds and industries, which made

the final selections a challenge for the panel tasked with the role. We are pleased to announce the successful applicants were:

- Elena Minnee (DairyNZ)
- Edith Khaembah (Plant & Food Research)
- Laura Keenan (Agricom)
- Lydia Cranston (Massey University)
- Ben Trotter (Agricom)
- James Robertson (Fonterra)

Congratulations! One of the key criteria that the applications were assessed on was the ability of the candidate to bring new knowledge gained at the Congress and deliver that to the broader agricultural community in NZ. We are already looking forward to your reports appearing in this newsletter later in the year.

Nga mihi,  
Warren

## Animal Protein and the GHG confusion

Jacqueline Rowarth<sup>1</sup> and Graeme Coles<sup>2</sup>

<sup>1</sup>Jacqueline has a PhD in Soil Science, has been vegetarian for decades and is a past-President of NZGA.

<sup>2</sup>Graeme has a PhD in Food Science, is an omnivore and has published papers and books on the nutritional qualities of proteins.

*"Without routine access to animal source foods, it is highly unlikely that evolving humans could have achieved the unusually large and complex brain, and being large, active and highly social primates"*

[Milton, K. 2003. The critical role played by animal source foods in human (*Homo*) evolution. *The Journal of Nutrition* 133: 38865-38925.]

Farmers are custodians of vital knowledge that will bring the world and its population through the food security and climate challenges of the next fifty years with flying colours...

This article has been written to explain some of the misconceptions, sloppy analysis and careless reporting in

the debate on diet and what the population should or shouldn't be eating to save the planet. Our hope is that by having some facts at the ready, pastoral sector professionals at all points from the soil through to saliva, will be able to explain the important role they play in providing vital nutrients to a growing population with minimal impact... that choosing the non-animal path could result in increased human impact, which is the opposite of what is claimed with veganism and Veganuary .

### The Problem for the World

The most pressing need for the world's population is to achieve a decrease in greenhouse (GHG) emissions while ensuring everybody has adequate nutrition. Critical for this is a supply of essential amino acids from high quality protein. For the global population, a plant diet cannot achieve what is required because there is not enough land, water and other resources available.



NZGA for over 80 years

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Of further note is that a plant diet contributes significantly to GHG when food systems as a whole are considered from atmospheric N-fixation (via legumes or the Haber-Bosch process) through to human excretion.

Simply - one half of an identical twin pair on an omnivorous diet with sufficient essential amino acids to meet requirements, and the other twin on a plant-diet with sufficient essential amino acids... and the plant-twin will excrete twice as much nitrogen as the omnivore twin. This is because to overcome poor protein quality and gain all the essential amino acids needed, the plant-twin will eat twice as much protein. The surplus non-essential amino acids will be broken down for energy within the liver and the excess N will be eliminated from the body.

Plant-based diets cause consumers to create more GHG than omnivorous diets. Assertions to the contrary defy biology and are tantamount to unicorns pooping rainbows.

### **Why do people appear to believe that a plant-based diet is better for the environment?**

The environmental claim is based on various pieces of research, most of which have been challenged and some of which have been discredited.

The FAO 2006 document 'Livestock's Long Shadow' created waves around the world. It implicated animal agriculture as being a major driver in GHG emissions with the calculation that livestock agriculture produced 18% of global emissions, and that 'Livestock was doing more to harm the climate than all modes of transportation combined'.

The analysis was flawed – the authors had used a complete life cycle for meat (emissions from fertiliser production, converting land from forests to pastures, growing feed, and direct emissions from animals (eructation and manure) from birth to death including deforestation) whereas the transport emissions were calculated on exhaust from vehicles. Although the authors admitted their mistake, the damage was done. They have since stated that direct emissions from transportation versus livestock can be compared and amount to 14% versus 5%, respectively.

Greenpeace International recommended in 2018 that diets were reconsidered for health and environment. Reductions in meat and dairy consumption <sup>(1)</sup> were suggested – not a complete removal of animal products from the diet. The take home message was that land which could be used for growing food for direct human consumption should be, with animal products coming from land that wasn't suitable for anything but pasture.

Last year's IPCC reports did not say become vegan. It said "Balanced diets, featuring plant-based foods, such as those based on coarse grains, sustainable legumes, fruits and vegetables, nuts and seeds, and **animal-sourced food in resilient, sustainable and low GHG emission systems**, present major opportunities for adaptation and mitigation while generating significant co-benefits in terms of human health." Even so, position papers such as the "Save the Planet" diet proposed by the EAT-Lancet Commission have failed to recognise population health realities. These plant

-based diets require consumers to eat a significantly greater amount of dietary energy than is good for health, in order to obtain enough of all other nutrients. Only an animal-based diet can solve this problem.

### **The FAO position now**

Research from the FAO reported in 2017 that 86% of livestock feed globally is not human-edible. In a paper published in *Global Food Security (Livestock on our plate or eating at our table?)* Dr Anne Mottet, Livestock Development Officer at FAO, and co-authors showed that grazing livestock contribute directly to global food security by producing a greater amount of highly valuable nutrients for humans, such as high-quality proteins, than they consume. Calculations of the global average indicate that grazing cattle need only 0.6 kg of protein from human-edible feed to produce 1 kg of protein in milk and meat, which is of much higher nutritional quality than the originally consumed protein. Dr Mottet's research indicates that somewhere between 7 and 13% of beef production comes from feed lot systems, yet most of the concerns about GHG are based on this small percentage.

Of further interest is that 'out of the 2.5 billion ha needed for animal production, 77% are grasslands, with a large share of pastures that could not be converted to croplands and could therefore only be used for grazing animals'. Note that these grasslands in New Zealand support considerable soil carbon and biodiversity – not as much of the latter as native forests, but certainly more of both than arable areas where soil disturbance is part of production. Note also that arable land can be used to produce grazeable biomass between crops, and during fallow periods needed to restore soil structure – indicating a role for animals.

### **The Calculations**

Of further importance in the claims is what is, or rather isn't, included in the diet calculations.

They do not include the GHG cost of the supplements that are required for humans to remain healthy while on a vegan diet.

They do not consider the GHG implications of the replacements for materials other than food that traditionally come from animals – leather, wool, tallow, sinews. We can replace leather shoes or wool suits with those made from materials such as cotton, linen or bamboo, but that means more land under cultivation. Or they could be made from 'synthetic' materials which usually involve the petroleum industry.

Of further importance is general misunderstanding of the bioavailability of protein. Plants have evolved a myriad of mechanisms to protect their proteins from animal predation. These are termed 'anti-nutritional factors' – the nutrients appear to be present but can't be accessed by the digestive system. In order to overcome those barriers, humans apply external treatments such as fractionation, soaking, heating, acidification, fermentation and pulverisation. Treatment takes time and energy, and causes losses, which increases the greenhouse gas emissions

associated with the food. Soybeans, for instance, which are generally considered to be the best large-scale plant-protein source <sup>(2)</sup>, have high concentrations of dietary trypsin inhibitors, oestrogen mimics and tannins. The result is that only a portion of the soybean protein is digestible; the estimate is approximately 73% in comparison with 80-100% from animal proteins.

### The New Zealand Case

New Zealand pastoral farming produces animal protein (meat and milk) for fewer GHG emissions per unit of protein than other countries currently manage. The Paris Climate Agreement emphasised decreasing GHG without compromising food production<sup>(3)</sup>. Poorer performance in other countries affects us through, for instance, temperature and sea level rises. New Zealand is part of the physical, chemical and biological globe and cannot isolate itself through policy.

### The Future

Nutrition company Cargill's March 2019 Survey "Feed4Thought" found that more than two thirds of people surveyed in four different countries intended to maintain or increase their consumption of animal protein this year. Although 80% were interested in exploring plant-based or

alternative sources of protein, they weren't intending to drop the animal component of their diet. In addition, 93% of them considered animal protein was an important part of a healthy (and delicious) diet, and 80% of them believed that animal protein could be part of an environmentally friendly diet. The facts allow them to do so with a clear conscience.

New Zealand has already provided a model of efficiency and effectiveness. The model has both advantages and disadvantages, but has been created within the local context of climate, soils, pests and markets. Other countries will need to adapt the model to suit their own context, but their adaptation will be easier because of the foundation provided by New Zealand – fueled by science and tempered by experience.

<sup>(1)</sup> Relative to current excessive intakes.

<sup>(2)</sup> Potatoes produce relatively large amounts of high(ish) quality protein, but it is associated with so much starch that to get enough essential amino acids from spuds, it is necessary to eat 3.5 kg/day, providing 3255 Calories (not counting the butter added)"

<sup>(3)</sup> The jargon is that food production needs to be **uncoupled** from GHG emissions.

## Napier Conference and NZ Grassland Trust Awards

Each year at the Annual Conference the NZ Grassland Trust presents awards for exceptional contributions to grassland farming.

These are three awards that are specific to each conference region - two farmer and a regional award.

This year in addition they presented the inaugural David Scott Award. Finally, there is the premiere award - the Ray Brougham Trophy, to someone who has made an outstanding national contribution throughout their career.

### Farmer Awards

#### *John and Judy Bayly - Cricklewood Angus Stud*

John has made an outstanding contribution to pastoral farming in the Wairoa/East Coast region. The family owns several properties on the East Coast (over 17,000ha). He has made a great contribution to corporate governance as well as a behind the scenes benefactor in many local projects. In addition, John is well known for his Clydesdale horses and his on-farm museum of horse drawn carts.



Photo: Gisborne Herald 2019

#### *Ivan and Sue Knauf - Wairua Farm*

Ivan and Sue own and operate Wairua Farm, a dairy/dairy support/beef rearing irrigated farm in the Maraekakaho District west of Hastings. Highly productive System 4/5 dairy farm milking 1600 cows and employing 12 staff.

Ivan was the dairy farmer representative on the TANK Collaborative Stakeholder Group that looked at proposed new rules to manage water quality and quantity for the Tūtaekurī, Ahuriri, Ngaruroro and Karamū (TANK) catchments.



The property has also been successful in the East Coast Ballance Farm Environment Awards-winning the Water Force Integrated Management, Hill Laboratories Harvest, Ballance Agri-Nutrients Soil Management and the LIC Dairy Farm Awards.

### Regional Award

#### *Maurice Gray - research technician*

Maurice's career started in Masterton with the Department of Agriculture in 1968. He moved to Gisborne in 1973 and worked for 19 years with MAF's Field Research division. He

then moved to Havelock North where he was stationed at the Poukawa Research Station 1992. Although made redundant in 2004 he continues working from Poukawa to the



present day.

He was the convenor for the Napier NZGA conference in 1999 and was on the LOC again for 2020. He is still working and conducting field trials at the age of 77!

### The David Scott Award

This award is presented to a current NZGA member who is early in their career, whether in research, agribusiness or farming. The winner receives funds for travel with the purpose of advancing leadership and/or knowledge that will benefit hill or high country farming.



The inaugural winner is **Holly Phillips**, currently a technical specialist for PGG Wrightson Seeds and undertaking her Masters research at Massey University.

Holly will receive \$3000 to assist with her travel in attending one of these conferences

### Ray Brougham Trophy

#### Dr Gavin Sheath

Gavin has been a leading figure in New Zealand pastoral research for more than 40 years and is recognised for his work on pasture management and sustainable farming systems. His research career started in 1972 as a District Scientist in the Department of Agriculture based at Invermay. After completing his PhD at Massey University in 1978, he shifted to Whatawhata Research Centre and worked for MAF Technology and then AgResearch through until 2011 (39 years). He then moved into private consultancy and continues to provide services to a range of organisations.



The influence of soil fertility, climate and grazing on pasture stability and grazing management research on the stability,

## NZGA Links

Call for papers Invercargill 2020 [here](#) and due Friday 14 Feb NZGA membership can be paid online [here](#). Note that membership is overdue.

NZGA Journal Vol 80 and 81 are online [here](#)

improvement and efficient use of hill country pastures were a focus of his ongoing research. This research helped in the development of principles and recommendations for more efficient use of hill pastures.

Gavin had an active interest in extension and actively participated in study groups of farmers and agribusinesses throughout New Zealand on topics of farm system development, sustainability and added-value. He received an NZGA award for Technology transfer in Pastoral farming in 2004 and the New Zealand Royal Society Science & Technology Medal for taking science to the community in 2001.

He led the establishment of new research capability teams (e.g. Social Systems, Mathematical Modelling) that were unique to AgResearch and New Zealand research institutions at the time and was also a key player in the development of a range of on-farm decision support tools.

Gavin was at the forefront of engaging with Māori economic authorities, long before this was fashionable, to encourage their participation in agricultural R&D and to increase adoption of relevant innovations to improve the economic outcomes for Māori. This led to widespread involvement with Māori agribusinesses including roles such as: Chair of Business Advisory Group for Wairarapa Moana Incorporation and Wi Pere Trust; Programme Manager of Whai Hua's dairy products PGP programme; Project Manager of Miraka's Healthy Rivers Submissions; and as a judge for the Ahuwhenua Trophy.

Gavin's influence has extended far beyond his research and into a range of Governance roles. This has included governance of various research and development programmes including:

- Director of NZ Greenhouse Gas Consortium Board;
- Member of Pastoral 21 Committee;
- Member of Deer Industry P2P and Dairy Goat Co-op Research Committees;
- Chair of the Dairy NZ/MBIE Pillars Programme.

His involvement in the NZGA has been second to none! Throughout his career he has published more than 30 NZGA papers, was on the NZGA executive for a decade resulting in being NZGA President in 1985. He was a NZ Grassland Trust trustee for 33-years from 1985 to 2018 and was the Chair of the Trust from 2013 to 2017.

For his services to the Association, he was made an Honorary life member in 2001. Gavin was the Oceania representative on the International Grassland Congress Continuing committee from 2001-2008 and was the IGC Chair from 2005-2008 during which time he was heavily involved in organising the IGC in China.

The videos of keynote speakers from the Napier conference are online [here](#)

[Managing the dry](#)– revisit an NZGA newsletter with tips from Dr David Stevens and Graham Kerr