NZ GRASSLAND ASSOCIATION
Fuelled by Science, Tempered by Experience

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Ray Brougham Award winner 2021 - "The career that I wasn't sure I wanted"

Dr Alison Popay, AgResearch

In awarding the Trophy to Alison, John Caradus (chair of the Trust) stated that the unique ecology of New Zealand pasture systems needs unique researchers. They need to have a grounding in the wider ecological principles such as population dynamics, also understanding the fundamental drivers of the physiological responses of our pests. When building knowledge to develop biological control the New Zealand pastoral system is unique because it is built on forest soils and incomplete ecosystems, while providing new pest challenges to imported grasses and legumes. Alison Popay has spent a career developing this expertise, with particular emphasis on the essential symbiosis between ryegrass and its endophytes, and the role of this interaction with the ecology of our ruminant-grazed pastures.

As well as a dedicated and impactful science career, Alison has been fully engaged in the development and delivery of messages for industry through her roles in the Plant Protection Society and the New Zealand Grassland Association.

It was the post DDT era when I emerged from university in 1974. DDT had been banned in NZ in 1968 and the effects of that were appearing on farms with some massive outbreaks of insects such as grass grub causing severe damage in many parts of the country. As a result, there was a need for entomologists.

I had no formal training in entomology and apart from knowing that insects had six legs had not really taken an interest in them. I had, however, done my mini honours thesis on *Locusta migratoria* which lived in the sand dunes in coastal Manawatu – and yes this is the same species which from time to time causes havoc in various parts of the world when they all club together to strip crops of their vegetation. On the basis of this I applied to MAF for one of two positions to be an entomologist. When asked at the interview if I had collected insects as a child, I had to confess that I hadn't but did keep frogs and lizards (and pet lambs and a dog). Clearly there was a dearth of real entomologists on offer because I did get one of the positions.

And so on 10th February 1975 I began my career with MAF, spending the first 3 months or so at Ruakura learning not only about insects but also about their diseases or at least specifically the diseases of grass grub. Dr Irv Hall was a visiting invertebrate pathologist from the USA and he had found grass grub here were infected with protozoan diseases, such as *Mattesia* and *Nosema.* As a result, grass grub largely became the focus of my first 9 years in the job based in Palmerston Nth.

There was a lot of freedom then in how we did our work; and I don't remember having to justify my existence in the same way that occurs now. Management of research was on a regional basis and priorities were set in annual meetings with farm advisors. More importantly it was recognised that long term research was important. My work indicated that it was possible for natural diseases to regulate grass grub populations to manageable levels, but, to achieve this, farm management practices had to change to preserve the spores in the soil so that they

were available to infect the next generation. In particular soil disturbances such as cultivation exposed spores on the surface to sunlight and reduced the concentrated pockets of spores where infected larvae had died. It became apparent that DDT which had been used liberally across New Zealand had all but eliminated these diseases. However, the replacement organophosphate insecticides, although less persistent than DDT, were no less toxic to grass grub or the other soil inhabitants. Grass grub infected with disease were more susceptible to these insecticides than uninfected individuals which meant they died prematurely before the disease had fully replicated within the larva. Again, the end result was reduced amounts of inoculum in the soil to infect the next generation.

I really enjoyed this period of work probably because the research was providing all new information. Under the inimitable Bill Kain, it was also a very collegial group who worked in "Batchelor House". Friday nights were legendary to which only a few outsiders were party to – Jim Esson was about the only DSIR person who came on a regular basis and Gavin Sheath, then doing his PhD at Massey, was also a regular. Looking back what I lacked, however, was a mentor who could help me to become a better scientist and write papers in particular. It wasn't that I couldn't write – I just wasn't sure that my work was worthy of publication in anything other than for local consumption (and there were always more samples to be processed!).

In mid-1984 I had a 'pregnant pause' in my career, producing two of my three offspring, although I retained a foot in the research door by being the editor for the NZ Plant Protection Society.

By this time research was seen as more of a business; that is there had to be some value in it for the taxpayer. Fair enough, but, in many ways, it seemed to quash the blue skies research that opened up new avenues to explore. I wasn't sure that I wanted that sort of career anymore and was starting to explore other options when Dr Oliver Sutherland at DSIR offered me a position. That position would be investigating the effects of endophyte on insects, replacing Jenny Dymock who was moving north. I was able to negotiate for a part-time position and so in October 1988 I resumed my career as a scientist.

So began my love affair with fungal endophytes of grasses. I had always regarded myself as an ecologist and the myriad of interactions involving these obligate symbiotic fungi and their hosts was an endless fascination for me! I worked with the chemist Daryl Rowan, but also less directly with others such as Lester Fletcher, Syd Easton, Garry Latch, Brian Tapper, Geoff Lane and David Hume and then with the advent of CRIs, Olly Ball. I gained an appreciation of the value of interdisciplinary research. Without those collective inputs, there is no doubt that the endophyte story would not have evolved into the success it became.

The hunt was on for an endophyte that was less toxic than the Wildtype so we were screening endophytes collected mainly from ryegrass in Europe. One day in 1990, is now particularly memorable. Mike Christensen, another very clever but at that time under-appreciated DSIR colleague, told me that he had this endophyte that produced none of the known alkaloids (i.e. peramine, ergovaline and lolitrem B) and it might make a good control in my experiments. By that time, we knew that peramine deterred adult Argentine weevil and lolitrem B caused ryegrass staggers, but the jury was still out on ergovaline. We set up an experiment with the endophyte and duly found that it had no effect on adult feeding or oviposition, but astonishingly it reduced larval damage to almost nothing. This endophyte was AR37 (or AK47 as CEO of AgResearch, Andy West, subsequently nicknamed it after it was found to provide protection from several other major pasture pests). It was thoroughly tested before its commercial release in 2008 and has been a huge success.

Endophytes exposed me to the commercial world as they became big business for the seed companies. Within my own organisation there were suspicions that the results we were getting with AR37 were too good to be true and my data came under extra scrutiny while some of the seed company people accused me of bias. It wasn't a comfortable place to be at times but I knew the data we had on AR37 was robust.

In retrospect, this career has turned out to be just what I wanted. There is still much to learn about endophytes but I am pleased to be able to say that my publication record has improved considerably. Being awarded the Ray Brougham Trophy has certainly been a highlight. We have yet to find the perfect endophyte; that is one that provides good protection of its ryegrass hosts against insects but with no adverse effects on livestock. This doesn't really surprise me as the adverse effects on grazing herbivores whether they be the six legged or four legged variety is all part of the package of advantages that the endophytes confer on their host in exchange for protection and sustenance. It is an extraordinary relationship – nature is wonderful!

This was my first International Grassland Congress (hopefully many more to come), and it really was a once in a lifetime experience for a young scientist like me. I had never been to Kentucky, USA, before, and I was amazed by such great weather, roads with 5+ lanes, and thousands of UTEs the size of a Fonterra milk truck carrying one single person around.

It was a long week, full of shared knowledge, surprising encounters, fascinating studies and, more importantly, pasture people talking about pasture! There were many different topics discussed, but I'll highlight a few. The conference days were structured as follows: one general big talk at the beginning of the day (keynote speaker), followed by oral presentations (volunteer speakers and thematic sessions) going on simultaneously in up to 8 different rooms, and during the coffee breaks - with no real coffee provided - poster presentations were going on. By the middle of the week, on Wednesday, the conference tours took place, with groups going to Kentucky, Ohio and Indiana farms, research institutes and (the lucky ones) distilleries.

During the IGC23, many New Zealander studies were presented. The NZ Plantain programme group presented a whole thematic session, and other NZ researchers presented about using endophytes, clovers, brassicas, genetically modified grasses, hill country pastoral systems and grassland and forestry integration. On Tuesday, I gave an oral presentation on the initial findings of my Ph.D. research. I discussed using diverse pastures of complementary species (DPCS: *Lolium perenne, Bromus valdivianus, Dactylis glomerata* and *Trifolium repens*) and the leaf stage as a management tool for New Zealand's dairy systems. I also had the last-minute chance to present two posters from Embrapa (equivalent to AgResearch in Brazil), as unfortunately, the authors (one of them being my first boss, and also my mom) could not make it to the USA. Those posters discussed the strategic use of Pigeon pea (*C. cajan*) intercropped to the pastures as an alternative for the dry season in Brazilian tropical livestock production systems.

The international presentations were amazingly enriching; farmers and agricultural scientists are so creative when it comes to thriving through the most varied range of challenges to feed people! One of the keynote speakers, though, brought me some concerns. The title was "Grasslands at the Crossroads", by the National Program Leader of USDA. She was very direct in saying that we (scientists) are not good at communicating with the broad community (mainly the ones in social media) and that farmers are not good at showing how great, sustainable and innovative their farming is. It was a rather direct message that, firstly, got me thinking like… "Look, science is science, I don't write comic books… and farmers are way too busy to be running a TV show on their properties". After a while of reflecting on it, I concluded she was trying to say it's fundamental for scientists to engage with the stakeholders to take our science out of the shelves, in a transdisciplinary approach. And trying to translate that to NZ's reality (and maybe even my home country, Brazil), the message for me was that we need extensionists, on-farm advisors, or whatever you want to call it, to establish that bridge between farmers and scientists, and to "spread the message" of our innovative and sustainable farming.

The most striking feature of the congress was that all around the world, scientists, farmers and extensionists are talking about the diversification of systems. The mentality has shifted from "increasing production" to "increasing diversity while maintaining sustainable production". Even though driven by different purposes (political, environmental or any other), the subject 'diversity' was thoroughly discussed, in terms of plant species, animal species, farming purposes, system suitability, soil types, systems services, environmental constraints, etc.

The overall message for me was that things are getting more and more complex for farmers, and the amount of knowledge that involves pasture-based farming nowadays is HUGE. And, more than ever, it will be a kind of Darwinism process, natural selection of the farmers that are more resilient and able to adapt and keep up with all that's new. The role of associations such as NZGA is crucial, enabling Kiwi farmers as well as young scientists to go to international conferences, and also bringing facts and scientific information to the table with their national conferences, events and newsletters.

I want to thank the New Zealand Grasslands Association for their sponsorship and my supervisors (Ignacio López, Lydia Cranston, Danny Donaghy and Peter Kemp) from Massey University for their support. I also would like the chance to thank you, that's reading this text, for directly or indirectly supporting me to present a little bit of the work that we've been developing in the Manawatu dairy systems to the broader pastoral community.

Rotorua Conference registration is OPEN

The EarlyBird registration is now open for this years conference in Rotorua (14-16 Nov).

The theme this year is ***"The land, the lakes, the people. This is Rotorua"***

All the latest information is on the website here and I will put up the draft programme as soon as it is available. The outline of the programme is similar to most years with science presentations in the morning and afternoon field days. Once again we will be joined by the Agronomy Society and the Animal Production Society so there will be a great range of topics covered.

Field days include a visit to Onuku Māori Lands Trust, an Agronomy tour and a dairy farm.

The easiest way is to register on line here.

You can also download a form, complete your details and email it to me. Download the form on the events page on the website.

The LOC have negotiated a discount on accommodation at the The Rydges hotel as this is where the conference dinner and the AGM are being held. It is some distance from the venue unfortunately. The instructions for the discount are also on the events page. I have put some links to other accommodation there as well.

Earlybird registration closes on Sept 30!

Photo credit: Onuku Māori Lands Trust

NZGA Admin Update

Membership Invoicing

Another reminder that your membership is due. Please check your inbox or junk/spam folder if you haven't seen it.

The executive are always keen for new members to join the Association and word of mouth from current members can be the most effective way. SO tap some workmates who-you think should be members - there are lots of them out there who aren't yet - and encourage them to join as members and attend their first conference.

Your membership needs to be paid to enable you to receive the members rate at conference—and Glenis will remind you!

Video or podcast?

A quick reminder that our YouTube channel is building up a large number of videos, covering a wide range of topics. There are currently 88 videos - key note speakers, Levy orations, Ray Brougham award winners, NZGA presidents musings…

A highlight from the Invercargill conference was the talk given by Tangiroa Walker, Farm4Life. This hub provides education for young dairy staff (or edutainment) designed to appeal and educate. https://www.farm4life.co.nz/.

Or Dave Chapmans Ray Brougham presentation Pasture Productivity - are we gaining?

Dave discusses whether we are making progress with ryegrass breeding and management. He looks at some of NZ's preceding pastoral research and considers the challenges pastoral systems are facing.

Don't want to watch - turn the screen off and call it a podcast; making it great for long trips, plane flights, hours on the tractor - you decide.

Women in Farming and Agriculture Scholarship — Apply by 15 September 2023

It's not too late so get your application in!

Attention women in the farming and agriculture sector! You have an amazing opportunity to secure a partial scholarship worth $1,000 - $5,000 from Women & Leadership New Zealand. This scholarship opens doors to four exceptional leadership and workplace skill development courses specifically designed for you. Don't miss out on this chance to take your career to new heights!

womenandleadership.co.nz/farmingagriculture