



NewsLetter No: 4 December 2004

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New trans-Tasman methane research project

** Only whole cow calorimeters in the Southern Hemisphere installed at DPI Ellinbank, Victoria*

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** Latest GIA research news*

**Hello everyone and welcome to the 4th
'Greenhouse in Agriculture' newsletter!**

by Dr Richard Eckard, Science Leader, GIA Program -
Australia

The big news this year for Australia's 'Greenhouse in
Agriculture' (GIA) program has been the launch of the new
trans-Tasman Methane research project.

Back in February 2004, the Victorian government agreed to
develop collaborative research projects with AgResearch and
Dexcel in New Zealand. This new joint Methane research
initiative will deliver on this agreement.

The other big news was the opening of the only functional
whole cow calorimeters in the southern hemisphere at the
Victorian Department of Primary Industries in Ellinbank - this
equipment will be used as part of the Trans-Tasman project in
2005 - see main story in this Newsletter.

As the GIA program has expanded, we have a number of new
team members to introduce to you in this Newsletter, as well
as details on the launch of the National Industry Liaison Panel.



*Richard Eckard, Science
Leader, GIA Program*



*These new calorimeters at the
Victorian DPI Ellinbank Research
Centre will be used for the Trans-
Tasman joint greenhouse
research project.*

**Newest calorimeters in Southern
Hemisphere ready for research**

by Dr Richard Eckard and Sue Keirnan

The only functional whole cow calorimeters in the
Southern Hemisphere have now been custom built at
the Victorian Department of Primary Industries (DPI)
research centre at Ellinbank. This new equipment will
be used in 2005 as part of the joint Victoria and New
Zealand Methane Research project.

Methane is a powerful form of energy – just light it
and find out!

It stands to reason therefore that, if this energy is
just escaping as a waste gas, then this is a 'loss' of
potential farm production - as well as a contributor to
unpredictable weather and reduced rainfall being
recorded around the world.

The main aim of the joint project will be to help
farmers reduce methane losses from their ruminant

cattle whilst improving productivity - a WIN-WIN solution.

Tackling the problem of constructing these calorimeters has meant harnessing research expertise from the Victorian DPI and the University of Melbourne in Australia, as part of the national 'Greenhouse in Agriculture' (GIA) program under the CRC for Greenhouse Accounting, together with Prof. David Beever from the UK.

The calorimeters have been designed for both methane and energy balance studies that investigate optimum diets and feeding strategies for dairy cattle.

So what is a Calorimeter and does it work? In plain English, a calorimeter is a large sealed and climatically controlled chamber that is large enough to accommodate a whole cow. It can be used to accurately measure gasses from the air pumped in, and then the amount of methane and carbon dioxide breathed out by a cow in response to various diets.

When experiments are in progress, the cow is fed, watered and milked whilst inside this chamber. There are windows on the calorimeters so that the cows can still socialise.

As a result of this new facility, greenhouse researchers from AgResearch and Dexcel in New Zealand have now joined forces with the GIA methane team, as part of a new trans-Tasman collaborative project.

Why is the research is needed?
Both Victoria and New Zealand have conducted extensive research to measure methane emissions from a range of ruminants to date, but mostly using a field-based technique called the Sulphur hexafluoride (SF6) method. The method involves placing an evacuated collar around a cow's neck that continually samples methane from just above its nostrils (see past newsletters).

However, to date there have been no studies published that calibrate the SF6 method against the 'gold standard' calorimeter method. To ensure that scientists and farmers alike have confidence in the research results, it is therefore important to ensure alignment of the SF6 method against the methane calorimeter method.

The new Joint Methane project will compare these two methods at Ellinbank over the next 12 months.

The data gathered from the new calorimeters will be compared against earlier field data collected by the GIA Methane team and the New Zealand team. The combined information will then used to develop on-farm management practices that will benefit our environment, and help Victorian and NZ dairy farmers produce milk more efficiently.

New National Industry Panel comes together to tackle greenhouse issues in Australian agriculture

by Sue Keirnan and Traci Griffin

A new National Industry Liaison Panel (NILP) was established in mid 2004 to provide regular information and discussion forums for greenhouse researchers, agricultural industry groups, policy agencies (both State and Federal), and Australia's natural resources management community.

The new panel will fill a current gap in access to relevant information about greenhouse management in Australian agriculture. It will also provide a feedback mechanism between each of the panel members and industry groups.

The first forum attracted representatives from the Grains Research and Development Corporation, Cotton Research and Development Corporation, Fertiliser Industry Federation of Australia, LandCare Australia Council, Australian Greenhouse Office, Victorian Department of Primary Industries, Victorian Greenhouse Strategy Group, and the Department of Agriculture Western Australia.

Traci Griffin, Richard Eckard and Frances Phillips, from the CRC for Greenhouse Accounting and Victorian DPI, were able to use the opportunity provide a first hand insight into the progress of GIA's research work.

Feedback from participants endorsed the need for type of research being undertaken by the GIA Program, and also the value to be gained from holding regular national forums.

The next NILP forum is scheduled for March 2005. For more information, contact Traci Griffin, Tel (02) 60304596/Email: Traci.Griffin@dpi.vic.gov.au



Jo Lane (left), DPI, Horsham, Victorian and Dr Louise Barton (right), University of Western Australia, Plant Sciences.

New GIA Project Team Members

by Dr Richard Eckard and Sue Keirnan

As the Greenhouse in Agriculture Program has expanded we welcome the following new team members:

Dr LOUISE BARTON, Plant Sciences, University of Western Australia.

Louise completed her PhD on 'Denitrification in the upland soils of a forested land treatment system', through the Department of Earth Sciences, University of Waikato / Forest Research, Rotorua, New Zealand.

She then worked for three years with Landcare Research, Hamilton, NZ on quantifying and understanding regulation of nitrous oxide emissions from agricultural soils, defining greenhouse emission factors and developing strategies to minimise emissions.

For the last three years, Louise has worked for UWA and joined the GIA project in October 2004.

Louise will be assisted by Mr DAVID GATTER, Technical Officer, Dept Agriculture, Western Australia.

David graduated with a Diploma in Horticulture from Massey University, New Zealand in 1980 and joined the GIA program in November 2004.

Other new team members to be profiled in our next newsletter:

Dr WILL GATES, Victorian DPI, Rutherglen. Will recently joined the Victorian DPI at Rutherglen from CSIRO Adelaide and is an experienced and well published soil scientist. Will now leads the GIA site at Rutherglen investigating "Nitrous Oxide from Grain Production Systems"

JO LANE - Evaluation, Victorian DPI, Horsham. Jo replaces Kate Nichols who is moving on to another project.

New Open Path Laser and FTIR project

by Rich Eckard and David Griffith

A new partnership has been formed between of the GIA team from the University of Wollongong, University of Melbourne and CSIRO Atmospheric Research to investigate 'Innovative New Technologies for Measuring Greenhouse Gas Emissions in the Field'. The technologies to be trialed include an Open Path Laser and FTIR spectroscopies for measuring methane, nitrous oxide and ammonia emissions. As at September 2004 the equipment has been ordered for the first field measurements to start in summer 2005.

The new equipment is jointly funded by the Australian Greenhouse Office, the University of Wollongong and the University of Melbourne.

Contact: Deli Chen, The University of Melbourne, Tom Denmead, CSIRO Land and Water and David Griffiths, University of Wollongong.



An example of an Open Path Laser system, as used by Tom Denmead in Canada, showing a tower of laser transmitters on the left and reflectors on the right.



An automatic chamber, designed by CSIRO Atmospheric Research, for measuring nitrous oxide losses from pastures and crops.

GIA Research Snapshots

By Sue Keirnan, Kevin Kelly and Frances Phillips

Nitrous Oxide Loss from Irrigated Dairy Pastures - Kyabram Site:

The data to date show that nitrous oxide losses are usually higher 2-3 days after a flood irrigation event, and remain high for 1-2 days, after which they returns to background levels. The impact of the grazing or fertilisation is quickly diminished over subsequent irrigation events, suggesting that soil nitrogen is quickly depleted.

An obvious focus for future research is on managing the two main factors under our control; namely water and nitrogen inputs.

Recent international research has demonstrated potential for nitrification inhibitors to reduce nitrous oxide losses from urine.

Coupled with the recent emphasis on efficient water use, it appears that a priority for the next phase of the research would be to compare the nitrous oxide losses from spray versus flood irrigated pasture systems, and develop practical methods for using nitrification inhibitors.

Contact: Kevin Kelly and Frances Phillips

Nitrous Oxide Emissions from Grains - Rutherglen:

Latest trends in so far are showing that nitrous oxide losses are significant following each rainfall event and differences are between cultivation and fertilisation treatments. However, experiments are now showing that nitrous oxide emissions are highly variable and episodic.

Contact: Will Gates and Fiona Barker-Reid

GIA Scientists Out 'n' About

by Traci Griffin and Sue Keirnan

Peter Grace presented the Cotton project to the CRDC and Cotton CRC's Farming System Forum on Crop Nutrition at Narrabri (29th November). This is a two day forum with 100 advisers and growers in attendance.

Will Gates (GIA Rutherglen) and Traci Griffin (GIA Marketing and Communications) presented the nitrous oxide emissions from dryland wheat work at Rutherglen to the DPI Victoria State TopCrop team 9th December.

Fiona Barker-Reid (GIA Rutherglen) has been spreading the GIA word across the student world. Over the past few months, she has presented a number of talks including Sydney University environmental students and Wollongong TAFE students about the GIA's project history, various research technologies employed and recent project achievements. Fiona also caught up with local school students to explain what causes Greenhouse and ideas for reducing emissions.

Fiona also presented a GIA project overview and research update at a Soil and Water Conference in Melbourne that provoked a few questions from the floor!



Dr Peter Grace, Queensland University of Technology, discusses the Cotton project onsite at Narrabri, with Dr Bill Slattery, Australian Greenhouse Office and Project Collaborator, Dr Ian Rochester from the Australian Cotton CRC.

GIA branches out to Western Australia

by Dr Bill Porter, Dr Louise Barton and Sue Keirnan



Drs Klaus Butterbach-Bahl and Ralph Kiese, next to the automatic chambers installed at the Narrabri (Cotton) site.

The GIA Program has established a new research site at Northam, that will measure nitrous oxide losses from the WA Grains industry.

Mr Fran Logan MLA, Chair of the WA Government's Greenhouse Strategy Committee launched the new project, in Perth, in October this year. Straight after the launch, a workshop was also run, with representatives from the CRC for Greenhouse Accounting GIA team, to plan experiments and characteristics of the primary research site.

The WA Grains project is headed by Drs Bill Porter, DAWA, and Louise Barton, UWA, with technical support from David Gatter.

New automatic chambers have been recently constructed and delivered by our German collaborators, Drs Klaus Butterbach-Bahl and Ralf Kiese, from the Institute for Meteorology and Climate Research, Garmisch, Germany. In November 2004, Klaus and Ralph installed their chambers at the Narrabri (Cotton) and new WA sites, and trained the local staff in their use.

Other partners in WA Grains project are Curtin University's Centre of Excellence in Cleaner Production, that specialise in lifecycle analyses of the grains industry; DAWA's Land Resource Assessment group that specialises in spatial analysis based on their large database of WA land characteristics; and the UWA's Soil Biology team.

Major investors into the WA project are the Department of Agriculture Western Australia (DAWA), the Grains Research and Development Corporation and the Australian Greenhouse Office.