

final report

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Prepared by: Graeme Ward
Department of Primary Industries, Victoria
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Demonstration projects for on-farm practical methane management strategies: Victoria

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Abstract

The project was established and conducted to support the transition of outcomes of the applied research and development activities in the national RELRP program to the dairy, sheep and beef industries in Victoria. Six extension activities consisting of 2 service provider meetings, 2 field days at DPI Hamilton and 2 at Terang, attended by a total of 312 participants were conducted during 2010 and 2011. The majority of attendees (45%) were from the agricultural service and agribusiness sectors, 34% from extension and research and 21% were farmers. Two field campaigns measuring methane emissions from grazing sheep and lactating dairy cows using OP-FTIR methodology were also conducted with Wollongong University. The major outcome of the project has been the up-skilling and improved knowledge of agricultural service and agribusiness staff in greenhouse gas emissions from agriculture and their mitigation. This legacy provides an influential foundation for progressively extending this information into the broader sheep, dairy and beef industries and will ultimately influence more farmers than a project of this nature would achieve directly.

Executive summary

The “Demonstration projects for on-farm practical methane management strategies: Victoria” project was established and conducted to support the transition of outcomes of the applied research and development activities in the Reducing Emissions from Livestock Research Program (RELRP) to the dairy, sheep and beef industries in Victoria. By engaging agricultural service providers, agribusiness, extension and research officers and farmers, their understanding of farm greenhouse gas issues, mitigation options, and on-going research was improved.

Six extension activities were attended by 312 participants in south west Victoria during 2010 and 2011. These activities were two major dedicated field days conducted at DPI Hamilton; one dedicated field day and one joint field day with the 3030 project at DemoDAIRY, Terang; and service provider meetings at Colac and Warrnambool. Twenty four presenters spoke at these extension activities, with 6 from the wider RELRP program. The DPI Hamilton field days attracted 95 in 2010 day and 65 in 2011. The dairy industry targeted DemoDAIRY field days attracted a higher proportion of agribusiness personnel servicing the dairy industry. Similarly, the targeted service provider meetings held in Colac and Warrnambool were attended largely by dairy industry agribusiness personnel.

The majority of attendees (45%) were from the agricultural service and agribusiness sectors. 34% of attendees were from the agricultural extension and research sectors, and 21% were farmers. Results from the field day evaluation sheets indicated that participants consistently rated the days as being well worthwhile, well run and of value to them with mean assessments consistently being above 7.5 on a score of 1 – 10 (0=poor, 5=average, 10=excellent). Between 94% and 100% of participants stated that they were more knowledgeable about the subject matter being presented as a result of attending the activity.

The second component of the project consisted of 2 open path fourier transform infrared spectroscopy (OP-FTIR) field campaigns measuring methane emissions from grazing sheep (Hamilton) and dairy cows (DemoDAIRY, Terang). The campaigns were successfully conducted in collaboration with Dr Frances Phillips, Centre for Atmospheric Chemistry University of Wollongong during November – December 2010. These being part of a wider RELRP activity to measure methane emissions from grazing livestock in the field at a number of the project demonstration sites around Australia. Outputs from these campaigns included refining the technique for sheep and lactating dairy cows and data on emissions from these livestock grazing plantain and perennial ryegrass. Another important outcome was the training of science and technical staff in the conduct of, and methodologies of, open path methane emission measurement experiments. This knowledge was subsequently used to conduct further field methane measurement campaigns as part of the MAADI project.

The most important outcome of the project has been the up-skilling and improving the knowledge of staff from the agricultural service and agribusiness sectors in greenhouse gas emissions from agriculture and their mitigation. As next users of this knowledge who will ultimately influence far more farmers a project of this nature can achieve directly, this is considered to be an effective and successful outcome of the project. Similarly, some of the new research information presented at these activities has been incorporated into DPI extension programs on greenhouse gas emissions and mitigation.

The project was moderately successful in attracting farmers to extension activities. Together with other feedback, this indicates that at the present time, the issue of greenhouse gas emissions and their mitigation are not a high priority for farmers and as such are not attracted to attend such activities dealing with greenhouse activities per se.. However the up-skilling of the agricultural service and extension sectors is

an important step in progressively extending this information to the broader dairy, sheep and beef industries.

Background

There has been considerable national and international investment in research to reduce methane emissions from livestock. Until the late 1990s this has largely been directed at incremental increases in productivity, recognising that methane essentially represents energy lost from production systems. Adoption has been market-driven and at the time of the commencement of the program, no practical, cost-effective technologies or practices have been discovered that give a substantial reduction in emissions while maintaining productivity. The Reducing Emissions from Livestock Research Program aimed, through an integrated Research, Development and Demonstration program, to achieve Australia's Farming Future outcome: Primary producers are equipped with the knowledge, tools and strategies to manage their emissions including the ability to respond to the commercial imperatives arising from emissions trading. In order for the Program to show that research outcomes could be developed for commercial applications, and to promote uptake by the industry, demonstration projects and sites were established in a number of states. These projects were to engage with livestock producers, advisors, agribusiness and state government to ensure that the research was directed to practical on-farm practices and measures. These projects were to assist in the commercial development and promote farmer acceptance and adoption of on-farm mitigation strategies from the Program

The Victorian project brought together and utilised several existing dairy, sheep and beef research sites including the 3030 project at DemoDairy, Terang and Evergraze at DPI Hamilton to cover the key livestock commodities. It was also designed to bring the strategies for reducing methane production together with related research on adaptation, nitrous oxide and soil carbon management to extend to a farm system through access to existing DAFF funded research projects.

Project objectives

To support the transition of outcomes of the applied research and development activities in the Reducing Emissions from Livestock Research Program through demonstration of practical commercial abatement applications, with particular emphasis on the outputs of projects conducted in dairy, sheep and beef systems.

Methodology

This project linked in with and utilised two existing Department of Primary Industries, Victoria research and demonstration projects in the ruminant livestock feedbase area. The first being the dairy industries "Project 3030: Increasing profit by 30% through consuming 30% more home grown forage", with a farmlet study that was being conducted at DemoDAIRY, Terang. The second being the "Evergraze – more livestock from perennials" project for the sheep and beef industries with a major experimental site at DPI Hamilton.

The major component of the project was the conduct of a series of extension activities for producers, service providers, agribusiness, extension and research personnel and farmers. These extension activities were designed to raise the awareness of broader greenhouse gas issues in agriculture, the research that is being conducted in this area with particular emphasis on methane abatement in the ruminant livestock industries, and the research being conducted in the broader Reducing Emissions from Livestock Research Program (RELRP) program. In so doing, these activities were designed to assist in the transition of outcomes from the

applied research and development activities of RELRP to industry. Two service provider workshops targeting agricultural service providers and agribusiness staff were conducted. One field day (Terang, 2010) was run in conjunction with the annual 3030 project field day at DemoDAIRY. The remaining three field days; DPI Hamilton 2010 & 2011 and DemoDAIRY 2011, were conducted as stand alone RELRP days. Examples of topics covered included feed conversion efficiency of livestock at the 2011 Hamilton day– which allowed the methane story to be introduced; and factors driving south west Victoria’s rainfall at the two service provider workshops.

The field measurement of methane emissions from grazing livestock using OP-FTIR techniques were conducted at DemoDAIRY, Terang and DPI Hamilton. The DemoDAIRY field measurement campaign utilised commercial lactating dairy cows from the same DemoDAIRY herd that the 3030 farmlet cows were drawn from and grazed on adjoining paddocks. The Hamilton sheep campaign was conducted utilising stock from the Evergraze project on paddocks adjoining the Evergraze proof site. The full methodology of the techniques used in this component have been presented in the milestone reports of the allied project: B.CCH.1036 “Open-path FTIR project: University of Wollongong”, by Dr Frances Phillips.

Results and discussion

Detailed descriptions and evaluations of the project activities are contained in a number of milestone reports submitted during the course of the project (Table 1).

Table 1. Reporting of descriptions and evaluation reports of project activities in milestone reports

Milestone Report	Activities Reported On
4	Colac and Warrnambool service provider meetings 3030 Field Day at DemoDAIRY
6	2010 DPI Hamilton Field Day OP-FTIR field measurement campaigns
8	2011 DemoDAIRY Field Day
FINAL	2011 DPI Hamilton Field Day (as appendix 1)

a). Summary of extension activities

Six extension activities were attended by 312 participants in south west Victoria during 2010 and 2011. These activities were two major dedicated field days conducted at DPI Hamilton; one dedicated field day and one joint field day with the 3030 project at DemoDAIRY, Terang; and service provider meetings at Colac and Warrnambool. Twenty four presenters spoke at these extension activities, with 6 from the wider RELRP program. The DPI Hamilton field days attracted 95 in 2010 day and 65 in 2011. The dairy industry targeted DemoDAIRY field days attracted a higher proportion of agribusiness personnel servicing the dairy industry. Similarly, the targeted service provider meetings held in Colac and Warrnambool were attended largely by dairy industry agribusiness personnel.

Table 2. Summary of the date of and number of participants attending the six extension activities conducted in south-west Victoria during 2010 and 2011 as part of RELRP “Demonstration projects for on-farm practical methane management strategies: Victoria” project

Activity Number	Date	Description	Number of Participants
1	9 August 2010	3030 Project Field Day - DemoDAIRY, Terang	45
2	9 August 2010	Service Provider Meeting - Colac	20
3	10 August 2010	Service Provider Meeting - Warrnambool	37
4	11 November 2010	RELRP Field Day - DPI Hamilton	95
5	12 May 2011	RELRP Field Day - DemoDAIRY, Terang	50
6	27 October 2011	RELRP Field Day - DPI Hamilton	65
TOTAL			312

The data used in the analysis was collected from attendance and participant evaluation sheets completed at each event. The largest category of people attending the agribusiness sector (Table 3). This group consisted of a diverse range of professionals servicing the agricultural sector including dairy factory field officers, farm consultants, seed and fertiliser company representatives, bank and finance staff, local government and from the agricultural education sector.

The engagement of this number of agribusiness personnel is one of the major successes of this project. Agribusiness personnel are influential in extending new information about new technologies to the farming and broader agricultural sectors through their clients. It more efficient and effective for projects such as this to engage with agribusiness rather than engaging with farmers directly.

The second major group that was engaged by this project were the agricultural extension and research group. This group was composed of predominantly government extension officers in the grazing industries and greenhouse gas abatement/sustainable agriculture area. This group is an important target audience and next users of the information delivered by this project due to their role in developing and delivering new material to the farming community. This was particularly so for the 2011 field days where new research information coming out of the broader RELRP and other greenhouse gas programs was presented. Some of this new information is being incorporated into new extension material and programs. The number of farmers attending the activities of the project was less than expected. Despite extensive and widespread publicity for each of the field days, days only comparatively small numbers of farmers attended. This is likely to be partly due to the days being designed for, and targeted at both service providers and leading farmers.

Table 3. Estimated total number of farmers, extension & research staff and agribusiness personnel attending one of the six extension activities conducted in south west Victoria as part of the “Demonstration projects for on-farm practical methane management strategies: Victoria” project

	Farmers	Extension & Research	Agribusiness	TOTAL
Number Attending	66	106	140	312

b). Speakers and projects promoted in activities

Twenty four presenters participated in the 6 extension activities conducted by the project in south west Victoria during 2010 and 2011 (Table 4). Fifteen different research and extension projects in the area of greenhouse gas research and mitigation; climate change adaptation and soil carbon were showcased. Six different speakers from the national Reducing Emissions from Livestock Research Program (RELRP) presented at the days covering sources of emissions on farm, strategies for reducing emissions and updates on the latest research being conducted in RELRP. Three speakers from the national Nitrous Oxide Research Program (NORP) gave presentations on the NORP research being conducted at DemoDAIRY and Hamilton. Researchers from the national soil carbon research program, Mitigation and Adaptation in the Australian Dairy Industry (MAADI); National Adaptation and Mitigation Initiative (NAMI) as well as a number of other smaller programs in the greenhouse gas emissions area presented at these days. Other areas that were showcased included adapting the farm feed base to a changing climate, feed conversion efficiency in ruminant livestock and the selection of more efficient animals.

Table 4. Speakers and projects presented at the project extension activities

Speaker	Project and/or Subject	Events
Assoc Prof. Richard Eckard – Univ. of Melbourne	Reducing emissions from livestock research program (RELRP)	Hamilton F.D. 2010 DemoDAIRY F.D. 2011
Assoc Prof Philip Vercoe – Univ. of Western Australia	Reducing emissions from livestock research program (RELRP)	Hamilton F.D. 2011
Dr Peter Moate – DPI Victoria	Reducing emissions from livestock research program (RELRP)	3030 F.D., Colac & Warrnambool S.P.
Dr Frances Phillips – Univ of Wollongong	Reducing emissions from livestock research program (RELRP)	Hamilton F.D. 2010
Dr Julian Hill MLA & Ternes Consulting	Reducing emissions from livestock research program (RELRP)	Hamilton F.D. 2011
Dr Deb Turner – Univ of Melbourne	Mitigation and adaptation in the Australian dairy industry (MAADI)	DemoDAIRY F.D. 2011
Dr Brendan Cullen – Univ of Melbourne.	Analysis of climate change impacts on southern grazing systems.	Hamilton F.D. 2010
Kevin Kelly DPI Victoria	Nitrous oxide research program (NORP)	DemoDAIRY F.D. Colac & Warrnambool
Dr Sally Officer DPI Victoria	Nitrous oxide research program (NORP)	Hamilton F.D. 2010
Dr Joe Jacobs DPI Victoria	Project 3030	DemoDAIRY F.D. 2011
Dr Ben Hayes DPI Victoria	Genetic markers for feed efficiency in dairy cows	Hamilton F.D. 2011
Dr Fiona Robertson DPI Victoria	National soil carbon project	Hamilton F.D. 2010
Dr Garry O’Leary DPI Victoria	Modelling adaptation in the grains industry	Hamilton F.D. 2010
Dr Todd Andrews DPI NSW	More beef from pastures project	Hamilton F.D. 2011
Rob Harris DPI Victoria	National adaptation and mitigation initiative (NAMI)	Hamilton F.D. 2010
Zita Ritchie DPI Victoria	Mitigation and adaptation in the Australian dairy industry (MAADI)	Colac & Warrnambool S.P
Dr Lysandra Slocombe DPI Victoria	Climate change implications from new farming systems – methane from lambs	Hamilton F.D. 2011
Natalie Brown Univ of Melbourne	Calculating greenhouse gas emissions from agriculture	Hamilton F.D. 2010
Dr Malcolm McCaskill DPI Vic	Future livestock project – improving resource use efficiency	Hamilton F.D. 2010
Dr Maggie Raeside DPI Victoria	Adaptation and mitigation strategies for high rainfall farming systems	Hamilton F.D. 2010
Clare Leddin DPI Victoria	Reducing emissions from livestock research program (RELRP)	Hamilton F.D. 2011
Sarah Holland-Clift DPI Victoria	Carbon tool kits in agriculture project	Hamilton F.D. 2011
Ivanah Oliver DPI Victoria	National soil carbon project	Hamilton F.D. 2010
Marnie Barber DemoDAIRY	Methane to markets project	DemoDAIRY F.D. 2011

c). *Feedback from participants*

At the conclusion of, or during each activity an evaluation form was distributed feedback from the participants was sought. Participants consistently rated the days as being well worthwhile, well run and of value to them (Table 5) with mean assessments consistently above 7.5 on a score of 1 – 10 (0=poor, 5=average, 10=excellent). Between 94% and 100% of participants stated that they were more knowledgeable about the subject matter being presented as a result of attending the day.

Table 5. The participants mean score (0 – 10) (0=poor, 5=average, 10=excellent) of their overall rating of the day, the value of the day to them; the program & content of the day and the percentage who felt that they were more knowledgeable about the subject matter as a result of attending the day

Activity	Overall Rating (0 – 10)	Value to Participant (0 – 10)	Program & Content (0 – 10)	More knowledgeable (%)
Colac Service Provider	7.7	7.5	7.6	100
Warrnambool Service Provider	8.2	7.5	8.0	100
Hamilton 2010 Field Day	8.7	8.8	8.5	95
DemoDAIRY 2011 Field Day	8.3	8.0	8.2	95
Hamilton 2011 Field Day	8.3	8.1	8.2	94

There was some negative feedback that some papers were too technical in content and pitched at too high a level for the audience, particularly for some of the scientist's presentations at the two service provider workshops. However the level of scientific knowledge amongst the agribusiness service provider audience varied widely and that some of the presenters did not adequately adapt their presentations to suit the audience.

On the evaluation sheets for each of the events conducted, participants were asked about what topics they would like to know more about and what should be covered at future field days. There were no new suggestions of future topics indicating that the content was appropriate. When participants were given the choice of topics on greenhouse gas mitigation and other carbon issues generally scored lower than the other, more production orientated subjects. For example, at the Hamilton 2011 field day, less than 50% of respondents indicated that they would like to learn more about calculating and reducing farm greenhouse gas emissions, whilst 80 – 100% indicated that they would like to learn more about improving feed conversion efficiency and improved management of livestock. This trend was particularly pronounced for the farmer respondents who showed comparatively low interest in knowing more about or in attending field days on farm greenhouse gas issues, yet were very keen to learn more about improving feed conversion efficiency in livestock. These results suggest that interest amongst farmers is low in the need to understand the science behind

greenhouse gas emissions and their mitigation. Service providers and agribusiness on the other hand appear to be more receptive of, and more motivated, to acquire more knowledge in these areas.

d). Open path – FTIR field measurement campaigns

Two open path fourier transform infrared spectroscopy (OP-FTIR) field campaigns measuring methane emissions from grazing sheep (Hamilton) and dairy cows (DemoDAIRY, Terang) were successfully conducted in collaboration with Dr Frances Phillips, University of Wollongong during November – December 2010 as part of the project. Dr Phillips from the Centre for Atmospheric Chemistry at the University was contracted by MLA as part of the wider RELRP project to conduct a number of these field campaigns to measure methane emissions from grazing livestock in the field at a number of the project demonstration sites around Australia.

The full report on, and the results from, these two field campaigns are contained in a separate report to MLA from Dr Phillips. The major outcomes from these two field campaigns in south west Victoria were:

- In the Hamilton trial the OP-FTIR methodology was refined and validated for using the technique for grazing sheep.
- At Hamilton comparative methane emissions data was collected for sheep grazing the forage herb, plantain compared to perennial ryegrass pasture.
- At Terang methane emissions from dairy cows in mid lactation grazing mature perennial ryegrass based pastures in early December were measured.
- DPI science and technical staff were trained in the open path measurement technique and the requirements for establishing and conducting open path field measurement experiments.

This last point was particularly valuable and proved to be very useful in assisting both DPI and University of Melbourne staff to establish and conduct subsequent methane field measurement campaigns as part of the Mitigation and Adaption in the Australian Dairy Industry (MAADI) project. Three field campaigns measuring methane emissions from dairy cattle grazing either chicory or perennial ryegrass were subsequently conducted on DemoDAIRY using both lasers and OP-FTIR equipment as part of the MAADI project.

Conclusions

The “Demonstration projects for on-farm practical methane management strategies: Victoria” project has been successful in raising the awareness of the livestock industries, of farm greenhouse emissions and existing and potential new strategies to reduce methane emissions from ruminant livestock. The project has also increased the awareness of research being conducted into these areas by RELRP and other programs. The attendances at, and the feedback from the extension activities conducted as part of the project indicate that the agricultural service, agribusiness and extension sectors are the most receptive to, and interested in, new information in these areas. The project was moderately successful in attracting farmers to extension activities. Together with other feedback, this indicates that at the present time, the issue of greenhouse gas emissions and their mitigation are not a high priority for farmers and as such are not attracted to attend such activities dealing with greenhouse activities per se. However the up-skilling of the agricultural service and extension sectors is an important step in progressively extending this information to the broader dairy, sheep and beef industries

Appendix 1

Evaluation Report RELRP Hamilton Field Day, 27 October 2011.

“A taste of the future”

– Feed conversion efficiency for profit and reduced emissions.

The program

The morning session was in a seminar format with five presentations on methane emissions from livestock and feed conversion efficiency in sheep and cattle:

1. “Feed efficiency in beef cattle: Fact or Fiction” - Dr Todd Andrews, Primary Industries, NSW.
2. “Reducing emissions from livestock : Its all about efficiency” - Associate Professor Phil Vercoe, University of Western Australia.
3. “New ways to choose dairy bulls and heifers that are high producers and require less feed” Dr Ben Hayes, Biosciences Research, DPI Victoria.
4. “Lamb efficiency – getting 20 miles/gallon from your lambs.” Dr Lysandra Slocombe and Nick Linden, DPI Victoria.
5. “Carbon in livestock systems.” Clare Leddin, DPI Victoria.

For the afternoon session, the participants were divided into three groups and rotated through three different stations. These afternoon presentations were of a more practical and informal nature and intended to give the audience a better understanding of how methane and other carbon emissions on farm can be reduced:

1. Screening sheep for methane emissions – demonstration of the “butter-box” technique. Associate Professor Phil Vercoe.
2. Rumen bugs – how methane is produced and can we reduce it? Dr Julian Hill, Ternes Consulting.
3. Emissions calculators: - benchmarking your farm enterprise. Sarah Holland-Clift and Chris Gerbing, DPI Victoria.

Field day evaluation

A written field day evaluation sheet was distributed to all attendees at the end of the morning seminar session – our previous experience has been that the return rate is considerably lower if they are distributed at the end of the day. The sheet sought to capture information about those attending the day, together with their options on the quality and content of the day and each presentation; the usefulness of the information presented; and their preferences on the subject matter for future days. No evaluation of the afternoon practical sessions was conducted as the evaluation sheets were distributed and collected prior to the lunch break.

Who attended the day

A total of 39 evaluation sheets were completed and returned out of the 65 people attending the day. Not all questions were answered on some of the returned sheets. The largest category of people attending the day were from the agricultural advisory and research group (41%) (Figure 1), followed by farmers (23%), agribusiness (13%), agricultural education (13%) with 10% of respondents not stating their occupation.

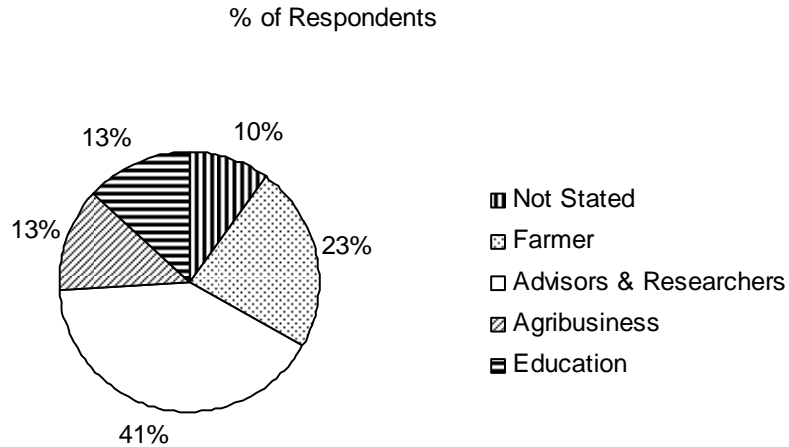


Figure 1. Occupations of those people who attended and returned the field day evaluation sheet.

Overall assessment of the day

Attendee’s were asked to rate the overall quality, value and satisfaction levels of different aspects of the day on a scale of 1 to 10 (with 1 = poor, 5 = average and 10 = very good). Mean ratings for all aspects of the day were well above average with attendees giving an overall rating for the day of 8.3 (Figure 2), the program 8.2, the management of the day 8.9 and the display stands 8.1. The value of the event in improving their knowledge and confidence in the area was rated at 8.1.

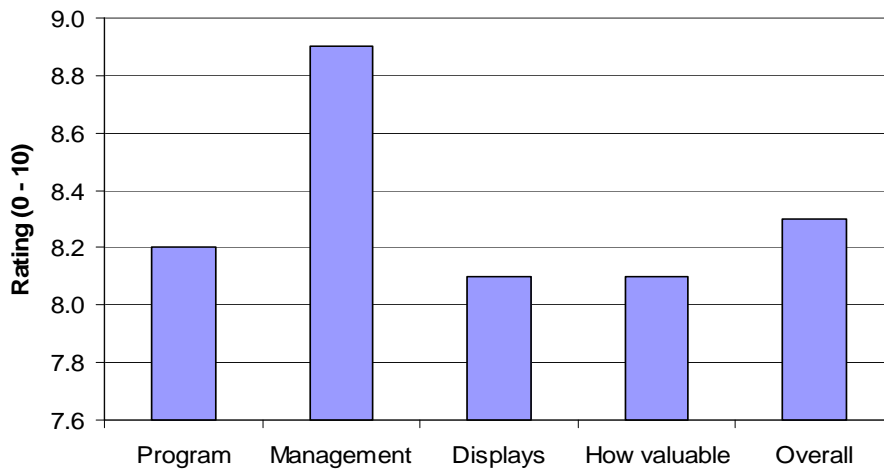


Figure 2. The mean ratings (on a scale of 1 to 10) from the 39 respondents, of the program, the management of, the displays, their overall assessment of the day and how valuable the day was to them.

Seminar sessions

All speakers in the morning seminar session were well received by the audience, with above average ratings for both the content & presentation (Figure 3) and the value of their papers (Figure 4). Ben Hayes paper on his research into new methods to choose dairy bulls and heifers that are high producers and require less feed received the highest mean ranking for content and presentation of 8.5 (on a scale of 1 – 10), closely followed by Phil Vercoe’s, paper on reducing methane emissions from livestock at 8.3. The feed conversion efficiency papers in livestock were slightly less well received with Todd Andrews beef paper scoring 7.8 whilst the sheep paper presented by Lysandra Slocombe on behalf of Nick Linden scored lowest at 7.1. Clare Leddin’s presentation on her work modelling carbon in livestock systems received a mean rating of 7.4.

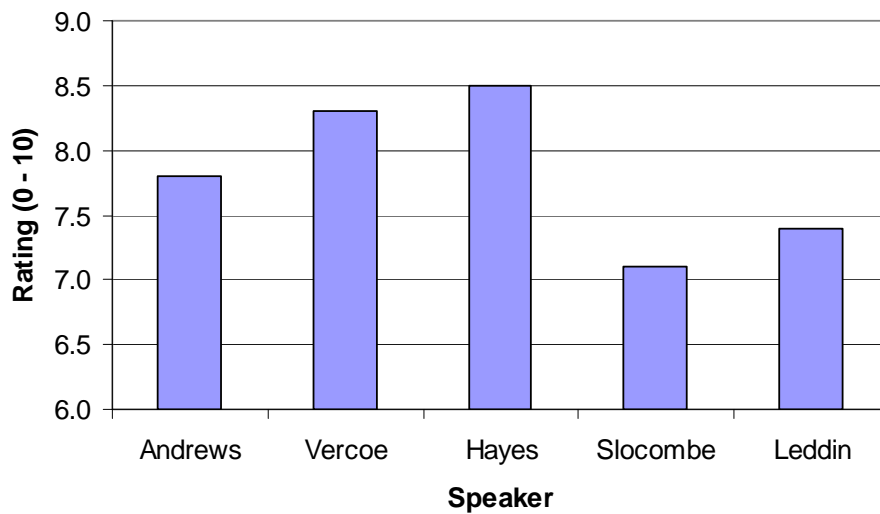


Figure 3. Attendees mean rating of the content and presentation of the “Feed efficiency in beef cattle” (Andrews); “Reducing methane emissions from livestock” (Vercoe); “New ways to choose dairy bulls and heifers” (Hayes); “Feed conversion efficiency in growing lambs” (Slocombe); and “Managing carbon in livestock systems” (Leddin) papers.

The value of the presentations to those attending the field day had similar trends with Phil Vercoe and Ben Hayes both having equal top ratings of 7.8 (on a scale of 1 – 10), followed by Lysandra Slocombe with 7.6 and Todd Andrews and Clare Leddin both with ratings of 7.4.

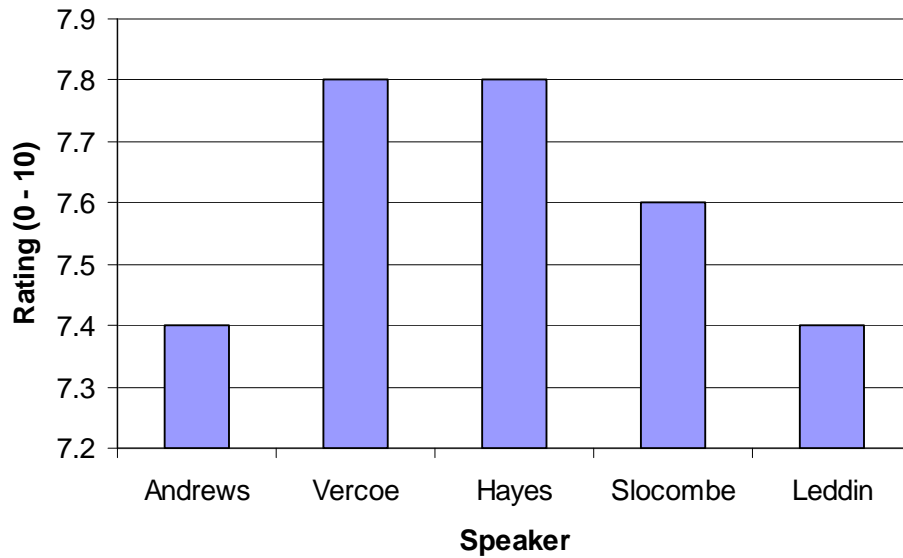


Figure 4. Attendees mean rating of their assessment of the value to them of the “Feed efficiency in beef cattle” (Andrews); “Reducing methane emissions from livestock” (Vercoe); “New ways to choose dairy bulls and heifers” (Hayes); “Feed conversion efficiency in growing lambs” (Slocombe); and “Managing carbon in livestock systems” (Leddin) papers.

How much more knowledgeable were attendee’s

Those attending the field day were asked that as a result of attending the day, to rate how much more knowledgeable did they feel they were in the areas of feed conversion efficiency, methane emissions from livestock and ways to reduce methane. All those who completed the evaluation sheet felt that now had a better knowledge of feed conversion efficiency in livestock, with 54% saying that they were much more knowledgeable and 46% saying that they were more knowledgeable (Figure 5).

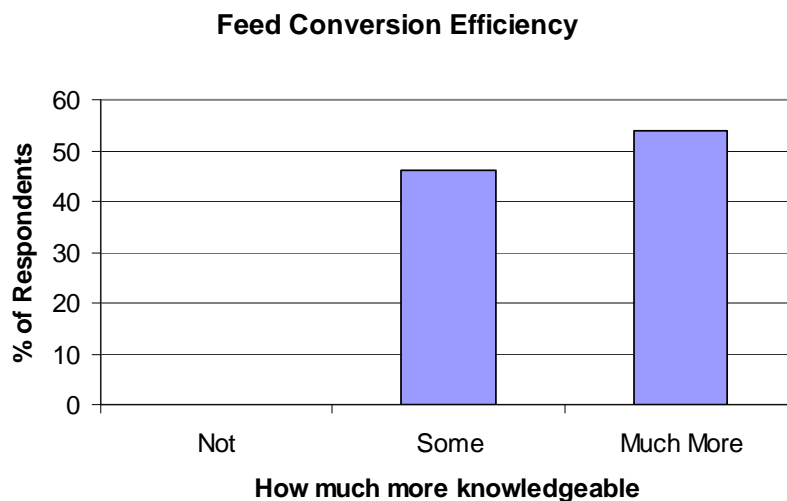


Figure 5. The percentage of respondents to the field day evaluation sheet who felt that they were more knowledgeable about the feed conversion efficiency of livestock as a result of attending the field day.

Fifty six percent of respondents felt that they were more knowledgeable and 38% much more knowledgeable about methane emissions from livestock. Five percent felt that they were no more knowledgeable about this area as a result of attending the day.

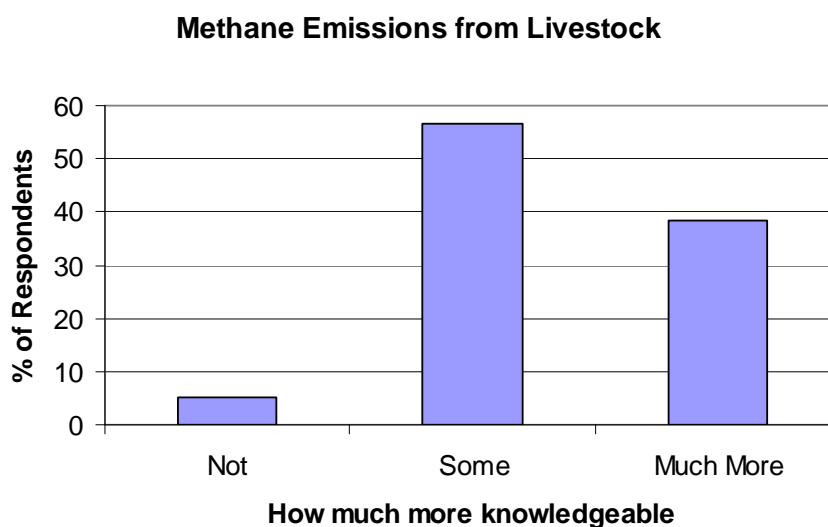


Figure 6. The percentage of respondents to the field day evaluation sheet who felt that they were more knowledgeable about methane emissions from livestock as a result of attending the field day.

Topics for future field days

As part of the evaluation of the day, respondents were asked what topics they would like to learn more about at future field days. Six options were listed for respondents to consider:

- Genetic selection of livestock for improved feed conversion efficiency and reduced methane emissions
- Feeding and management for improved feed conversion efficiency and reduced methane emissions
- Potential new technologies for reducing methane emissions and improving feed conversion efficiency
- Calculating your farm's emissions
- Strategies to reduce farm emissions
- Suggest other topics

The feeding and management of livestock for improved feed conversion efficiency and reduced methane emissions was the most popular topic nominated by all groups of respondents for future field days (Figure 7). All the farmer respondents, 80% of agribusiness and 75% of advisors and researchers nominated this area as something they would like to learn more about at future days. The genetic selection of livestock for improved feed conversion efficiency and reduced methane emissions was less popular with the advisors & researchers and agribusiness scoring 50% or less interest. However, 88% of farmers were interested in learning more about this area. New technologies were of less interest again to farmers with 63% interested, but of more interest to agribusiness with 80%. There was comparatively less interest from all groups on information for calculating farm emissions or in reducing farm emissions with only 50-60% of respondents in all groups nominating these areas.

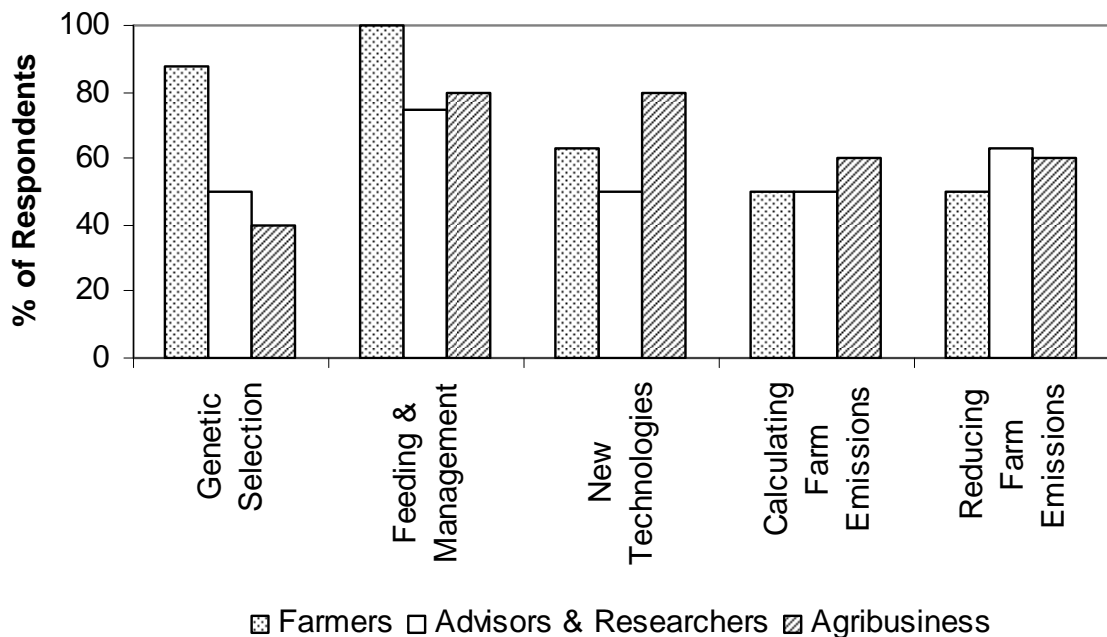


Figure 7. The percentage of farmer, advisors & researchers and agribusiness respondents who indicated that they would like, at future field days, to learn more about genetic selection, feeding and management and new technologies for reducing methane emissions. Also the percentage interested in calculating and reducing farm emissions.

Discussion

The attendance at, and the results of the participants evaluation of the day demonstrated that the “A Taste of the Future” – Feed conversion efficiency for profit and reduced emissions field day held at DPI Hamilton on 27th October 2011 was a successful RELRP project activity. Those attending the day rated all aspects of the day including the program, the management of and their overall assessment of the value of the day as well above average.

Given our experience of earlier farmer field days conducted as part of the RELRP program and on the advice of DPI extension staff working in the greenhouse gas mitigation area, the program for this day was designed and promoted to have primarily a productivity/production focus. This was then used as a lead in to introduce the broader methane production from ruminant livestock subject area and then discuss potential mitigation strategies. Given the potential linkages between feed conversion efficiency in ruminants and methane emissions, especially in the area of emissions intensity, this was a logical combination. Despite this and the hoped for attractiveness of information on feed conversion efficiency in livestock to production orientated producers, the attendance at the day was not as high as was hoped for.

It appears from the evaluation that such RELRP field days at this stage are most attractive to and are best attended by next user professionals rather than by end user producers at this stage. Interest in and attendance by farm advisors, extension officers and researchers was high with this group making up 41% of those attendee’s who completed the evaluation form. Agri-business staff showed moderate interest with 13% of respondents. However, it was notable that the large group of seed and fertiliser company representatives and agronomists who have attended previous greenhouse gas mitigation and climate change field days were not present at this

field day. The number of farmers attending the days was comparatively low at 23% of respondents which is considerably lower than other recent production focused field days, such as the “Evergraze” days held recently at DPI Hamilton. This is despite extensive promotion and publicity including the mail distribution of 15,000 field day flyers to farmers and good pre-field day media coverage. Unfortunately, the field day clashed with a special store cattle sale in Hamilton and with a “Southern Farming Systems” cropping field day also held near Hamilton that afternoon – both unknown and unforeseen at the time this field day as being planned. Whilst these other events may have taken some potential attendee’s, the comparatively low number of farmers attending this field day is significant. It possibly indicates that farmer interest in priority for farm greenhouse gas abatement is still not high. This is supported by the results of the evaluation sheet question on preferred topics for future field days. Both the areas of “calculating farm emissions” and “reducing farm emissions” were least popular with less than 50-60% of respondents from all categories indicating that they wanted to learn more about these areas compared to 80-100% for ‘improved feeding and management’.

Media Coverage

Warrnambool Standard, "On the Land" section.

www.standard.net.au

THURSDAY, November 3, 2011 ON THE LAND - 3

Methane reduction bid

Research looking at sheep's gas output

By STEVE HYNES

GRAZING animals naturally produce methane, but reducing the quantity can result in improved production.

Associate Professor Phil Vercoe from the University of Western Australia told a gathering of farmers and service providers at Hamilton last Thursday that methane typically accounted for seven per cent of the energy consumed by a grazing animal.

"That's seven per cent of the energy the animal has had to find, eat and digest, kissed goodbye as gas. It's seven per cent of the feed that you have worked to provide," he told a Department of Primary Industries field day on feed conversion efficiency last Thursday.

Associate Professor Vercoe, a researcher with the federal government's Reducing Emissions from Livestock Research Program (RELRP), told delegates that methane, manure, urine and heat were the main components of energy that the animal had not turned into meat or fibre.

He said tackling the causes of methane production offered the possibility of significantly reducing this

component of the animal's waste. "There really is no negative to reducing methane emissions because we can improve our productivity and at the same time address the problem of greenhouse gas emissions."

Associate professor Vercoe said microbes in the rumen of the animal were responsible for methane production.

While this was a natural process, there was potential to reduce the amount of methane produced by manipulating the animal's diet, manipulating the types of microbes in the rumen and manipulating the animal itself through breeding and management.

He said research into the effects of diet included the choice of forage, plant breeding and the use of dietary supplements.

Research is being conducted into vaccination to manipulate the microbial profile in the rumen.

Associate Professor Vercoe also highlighted the difference between total emissions and emissions intensity — the latter being a more meaningful measurement because it measured the emissions per unit of produce. He used the example of increasing lambing rate as a way of reducing the emission intensity.



Associate Professor Phil Vercoe with a methane capture chamber, used to measure emissions from individual sheep.

1110279500 Picture: STEVE HYNES

"The breeding flock that is producing your lambs will produce a bubble of methane. They will produce that maintenance level of methane regardless of the number of lambs they produce. "If you do something

that increases the number of lambs produced, that bubble of methane is spread across more kilograms of production. The emissions-intensity is reduced."

Field day delegates were shown

a method developed by the RELRP to measure the methane output of individual sheep, using an enclosed chamber to contain the animals for one hour, after which the air inside is sampled and analysed.

Hamilton Spectator, "Farming Focus"

www.aphis.gov.au

HAMILTON SPECTATOR Saturday November 5 2011 23



REDUCING METHANE ON FARM THROUGH EFFICIENCY



IAN WHITING

REDUCING methane emissions on farm through feed efficiency can have a dual benefit by increasing farm profitability and improving environmental outcomes.

This was the underlying message to the 65 industry body representatives and farmers at the Department of Primary Industries (DPI) 'feed conversion efficiency for reduced emissions' field day.

Associate professor of the School of Animal Biology, WA, Dr Phil Vercoe is a rumen microbiologist and said the rumen was the centre of where methane was generated in animals.

"It is a great complex microbial soup that is responsible for generating that methane and obviously it depends on what they eat and how much they eat, but the microbes are the ones that really generate it," he said.

Dr Vercoe said reducing emissions was all about efficiency.

"Improve efficiency of the animal through feed and genetics means animals capture more from feed for production and improved efficiency through management means reduced emissions and increased profitability so reducing methane emissions has dual benefits," he said.

Dr Vercoe said there was a national program called Reducing Emissions from Livestock Research Program.

"This is where just about anyone who has had an interest in the rumen and methane production is looking at three different technologies to reduce enteric methane emissions.

1. Manipulate the animal through breeding and management. "Can we change the animal in some way, so is it a heritable trait can we breed in some way or make breeding decisions that help us reduce methane?"

2. Manipulate the diet through the forage, plant breeding, diet supplements and secondary components. "The feed itself, what sort of supplements are available to modify microbial soup and types of feed? There is a lot work going on there".

3. Manipulate the rumen through biological contact, vaccination or chemical control. "Perhaps some of those technologies if we can really target with a vaccine those organisms there is potential to really reduce it significantly and all of the others have some potential to contribute to reducing the methane," he said.

Dr Vercoe said some of the management things

were achievable on farm now.

"It is about decisions that people can make now about improving efficiency of their system and they are management things, what decisions you make about getting more product per unit of the breeding flock. They are things anything you can do on that front that will reduce the amount of methane produced per unit of selling."

Todd Andrews, beef cattle officer with NSW Department of primary industries (DPI) based in Scone in the Hunter Valley, said providing feed was the largest recurring cost for beef producers. He has been involved in a long term project where they are breeding feed efficient cattle so selecting for growth rate and increased feed conversion rate.

"We had a herd in Trangie in central west NSW, the weaners were selected for high efficiency so that is low net feed intake, achieving average weight gains but eating less feed to do it. That study has been going on for around 15 years in the last couple of years we have taken high and low efficiency animals (the weaners) and put them into feedlots and what we have found that average daily gain didn't differ between the high and low efficiency animals but the amount of feed required to achieve 1.5 kilos per day was significant less in the high efficiency animals and a saving of \$53 per head over 150 days feeding period. So significant gains and marbling wasn't affected," he said.

Mr Andrews also presented data that showed crossbreeding could also create efficiencies.

"That is only looking at the first cross cow and there is more efficiency to be made using a different breed of bull again so a three way cross calf. So you are looking at extra growth of up to 50 percent extra weaning weight so it is quite significant in terms of profitability but again in terms of producing that extra beef for running the same cow and her feed intake and methane emissions are the same, there are efficiencies to be made right across the board," he said.

Mr Andrews said he has been working with a group of producers looking to improve efficiencies in their system.

"Because that ultimately leads to profitability and as we demonstrated this morning generally profitability is linked with efficiencies and as you become a more efficient beef producer you are also producing less methane so it is a win, win, win situation."

Dr Ben Hayes, Associate Professor at La Trobe University, leads up a group of dairy geneticists and is using genomes to predict feed conversion efficiency.

Dr Hayes said what they are trying to achieve is faster rates of genetic gain for the traits that contribute to profitability.

"Feed is a really big cost in dairying and we have had hints in the past that there is quite a lot of variation in how much feed you need to get

a litre of milk out. But we have never been able to pin that down and we have never been able to come up with a way of really making good selection decisions on that until this DNA marker technology came along.

"So the project we have just done which has taken five years, is tie up that feed conversion efficiency, the measurement of it with the DNA marker panels so we can now predict with perhaps a moderate degree of accuracy how feed conversion efficient an animal would be just by taking a tail hair sample and extracting the DNA out of that and running it across one of these panels," he said.

As they move into the future Dr Hayes said they would look to improve the accuracy.

"The more accurately we can do it the greater the rate of genetic gain will be and the greater profitability from really good feed conversion efficiency will be.

"One of the main drivers of emissions is how much a cow eats, if you reduce the amount a cow needs to eat to produce the same amount of milk, you reduce emissions."

The Carbon Farming Initiative is coming from the Federal Government and Clare Leddin Farm Assistance Researcher, DPI, Warrnambool said it was a program that was available to all farmers in Australia.

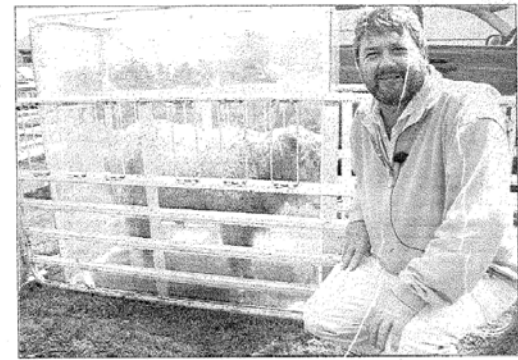
"Obviously the government is wanting farmers to help out in Australia meeting its (emissions) targets and the farmers need to take that and then make a business decision to see whether they can incorporate that into their enterprise.

"At the moment and there are tools out there for dairy farmers, sheep and beef farmers who can start looking at what their emissions are from their farm.

"There is a tool to calculate emissions where they enter information about their farm how many cows, how many sheep, what they feed them how big their farm is then those tools will say Okay this is what your emissions look like and some of the tools also go on where you can experiment with some of the things you might like to try like changing the feed of the animal," she said.

Ms Leddin reinforced the dual benefit to farmers.

"Within options available to farmers to reduce emissions there is sometimes benefits to the farm by having a more efficient farming system and your farming system is likely to generate less emissions than a farmer with a less efficient system. So if you continue to make efficiency gains on farm and those gains translate into better profit for your farm that is great and certainly if you are looking at selling carbon offsets there is a lot of sums to do to make sure it is going to be worthwhile."



RUMEN microbiologist, Dr Phil Vercoe, with the 'Butter Box', a short term methane measuring booth they are using to measure methane emissions from sheep. 111102/03

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Hamilton Spectator "Farming Focus"

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Producers get gas on feed efficiency good news story

BUTTER Box methane testers and 2000-cow genetic assessments were among the topics discussed at the Taste of the Future day at Department of Primary

down the stream
& out in the paddock

News from the CMA and DPI



BEN HAYES

Industries Hamilton last week.

The day examined the issue of feed conversion efficiency of sheep and beef and dairy cattle.

Feed is the biggest variable cost in animal enterprises and any improvements in feed management could have a large impact on farmers' bottom-line.

DPI key project manager David Marland said the day provided an insight into how improvements in feed conversion efficiency could not only increase productivity but reduce emissions and increase profits on-farm.

"What we had was a consistent story and a good news story for livestock production of dairy, beef and lambs," Mr Marland said.

"We also heard that there are opportunities in breeding and feeding to improve the conversion of feed for beef, productivity and profitability and that this also decreases the greenhouse gas production per unit.

"It is essentially about trying to capture what is being belched out and turning that loss into productivity.

"It also means that efficient farming is really good farming."

Speakers during the day showed some graphic examples of feed losses through belching of animals through both grain or handfuls of hay.

Taste of the Future brought together experts from across Australia who demonstrated how beef, lamb and dairy producers can make profitable changes to their business now and into the future.

DPI scientist Ben Hayes outlined how dairy cow DNA is being analysed for feed conversion efficient genes using a study of 2000 cows in Australia and New Zealand.

Associate Professor Phil Vercoe, University of Western

ABC Radio Western Victoria, Rural Report Interview with Assoc/Prof Phil Vercoe on the field day outcomes.

<http://www.abc.net.au/rural/regions/content/201110/3350279.htm?site=westernvic>

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ABC Rural Report

Western Victoria and South East South Australia Rural Report, October 28 2011

By Laura Poole and Tim Marshall, Horsham

Wine winners

Tim Marshall

A Shiraz Cabernet using grapes sourced from Robe and Mount Benson took the top prize at the 2011 Limestone Coast Wine Show, collecting four trophies at tonight's awards presentation dinner held just out of Mount Gambier at the Barn Palais.

The 2009 Wolf Blass Grey Label Shiraz Cabernet won the Bill Redman Trophy for Best Wine of Show, with viticulturalist Angela Pomery collecting the Arthur Hoffman Trophy for Viticulturalist of Best Wine of Show.

Reducing methane

Tim Marshall

Sheep and cattle account for 11 per cent of Australia's carbon footprint, mainly through the methane they produce.

But reducing the methane animals produce might not just help the environment but also a farmers bottom line.

The University of WA's Prof Philip Vercoe Says methane efficiency is an issue in all ruminant productions systems need to address



Mediaportal Report

27/10/2011

► **Feed options**

Stock & Land, 27/10/11, General News, Page 44

By: None

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► **Lamb scientist gets teeth into efficiency research**

Hamilton Spectator, 22/10/11, General News, Page 38

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20/10/2011

► **Feast of feed information**

Herald Sun, 20/10/11, General News, Page 21

By: None

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► **Limiting emissions**

Stock & Land, 20/10/11, General News, Page 15

By: Terry Sim

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18/10/2011

► **Taste for livestock**

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MEDIA MONITORS


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Stock & Land
27-Oct-2011
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General News
Market: Melbourne
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Size: 38.10 sq.cms
—T—

Feed options

LIVESTOCK producers have a chance to hear from some of Australia's leading scientists about feed management options that could increase profits and reduce emissions.

The Department of Primary Industries (DPI) is hosting A Taste of the Future, a field day looking at feed conversion efficiency of sheep and cattle at Hamilton on October 27.

DPI senior research officer, Al Guerin, Ware said feed was the biggest variable cost in an animal enterprise so any improvements in feed management could have a big impact on farmers' bottom line.

■ Details: Sandra Greenaway,
5573 0971.


MEDIA MONITORS


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Hamilton Spectator
22-Oct-2011
Page: 38
General News
Market: Hamilton VIC
Circulation: 5392
Type: Regional
Size: 345.72 sq.cms
-T-T-S-

Lamb scientist gets teeth into efficiency research

HAMILTON DPI has a new lamb production research scientist in Lysandra Slocombe.

Raised on a prime lamb enterprise near Ballarat, Dr Slocombe has enjoyed a long and diverse career in agricultural research.

Dr Slocombe will be presenting a session on lamb efficiency at the October 27 Taste of the Future conference in Hamilton next Thursday.

The research asks the questions: can lamb producers select for more efficient lambs and do they produce less methane?

Dr Slocombe is working on projects in adapting to climate variability and mitigating greenhouse emissions.

She is also involved in the Information Nucleus flock project, a world first innovation for sheep providing new information about traits and their

genetic makeup to the sheep industry.

Dr Slocombe said the Information Nucleus consisted of a series of flocks totalling 5000 ewes, located at eight research sites in widely differing environments around Australia.

"Each year, these ewes produce progeny by 100 young and proven Merino, maternal and terminal sires," Dr Slocombe said.

"The progeny is being extensively measured and assessed for current and new traits in meat and wool quality, parasite resistance and reproductive."

Dr Slocombe sees lamb as a major Victorian industry and one that continues to grow.

"The challenge for meat and fibre producers is to continually improve their quality and productivity, while maintaining a sustainable and profitable

system," she said.

"Improved knowledge and technology will provide opportunities for lamb producers to better manage their enterprise and produce more efficient lambs."

Before moving to Hamilton earlier this year Dr Slocombe worked on the EverGraze native pasture site at Chilham. She has also worked in sheep genetics in Western Australia, as well as in the beef and wool industries.

Dr Slocombe will be joined by some high profile speakers at A Taste of the Future including:

* Dr Bob Hayes, Dairy Futures CRC and DPI Bandera. Improving feed conversion efficiency and lifetime profitability using genetic markers.

* Associate Professor Phil Vercoe, University of Western Australia novel strategies for reducing methane emissions and

increasing energy for production in sheep and cattle.

* Clare Lendon, DPI, Warrnambool - Managing carbon in livestock systems.

* Associate Professor Phil Vercoe, University of Western Australia - Ruminant ruminates, the types, their function and how we can manipulate them.

A Taste of the Future will be held at DPI Hamilton, Mt Napier Rd on October 27 from 9.30am to 3pm. To register, please contact Sandra Greenaway on (07) 2575 0911 or email sandra.greenaway@dpi.vic.gov.au by Monday, October 24.

This event is supported by the \$28 million Reducing Emissions from Livestock Research Program made up of major research groups across Australia.



LAMB production research... DPI technical officer, Peter Byrne and Dr Lysandra Slocombe at work at the DPI.



News from the CMA and DPI

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MEDIA MONITORS

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Size: 28.10 sq.cms
MTWTFSS-

4. HAMILTON

Feast of feed information

LIVESTOCK producers can learn from the experts about feed management options at a field day in Hamilton.

The Department of Primary Industries is hosting a "Feast of the Field" session on October 27, at the base on Mt Napier Rd, from 9.30am to 4pm.

DPI senior research scientist Graeme Ward said any improvements in feed management could have a big impact on farmers' bottom line.

For register, phone 100 5572 0071.


MEDIA MONITORS


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Stock & Land
20-Oct-2011
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General News
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Circulation: 9247
Type: Rural
Size: 74.10 sq.cms
—T—



Limiting emissions

LOW methane sheep and cattle are on the agenda for a field day at Hamilton next Thursday (October 27).

Just as the Federal Government's carbon tax looks set to be upon us, the Department of Primary Industries has organised a bevy of speakers to show farmers what they can do to limit emissions from their livestock.

DPI senior research scientists Graeme Ward said the A Taste of the Future field day at the DPI Hamilton Centre would show how improvements in feed conversion efficiency can increase productivity, reduce emissions and increase profits on farms.

Keynote speaker Professor Roger Hegarty will outline what farmers can do now to improve herd and flock feed conversion efficiency.

Dr Lyvanda Stoccombe will talk about DPI Rutherglen researcher Nick Linden's latest prime lamb research on genetically selecting sheep for higher feed conversion and if these animals have lower methane emissions.

A Taste of the Future will run from 9.30am to 3pm.



Ararat Advertiser
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General News
Market: Ararat VIC
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Type: Regional
Size: 100.21 sq.cms
-T-F-

Taste for livestock

REGION - Livestock producers have a chance to hear from some of Australia's leading scientists about feed management options that could increase profit and reduce emissions.

The Department of Primary Industries (DPI) is hosting *A Taste of the Future*, a field day looking at feed conversion efficiency of sheep and cattle at Hermit Hill on October 27.

DPI senior Research Scientist Graeme Ward said feed was the biggest variable cost in animal enterprises and any improvement in feed management could have a big impact on the net bottom line.

"This field day will give an insight into how improvements in feed conversion efficiency can increase productivity, reduce emissions and increase profits on-farm," Mr Ward said.

They've brought together experts

from across Australia who will concentrate how beef, lamb and dairy producers can realise profitable changes to their business now and into the future.

"Essentially, feed conversion efficiency is how animals utilise feed and turn it into milk, meat or fibre. For example, in prime lamb production it's looking at how much feed is needed to produce an extra kilogram of meat.

"Our speakers will talk about ways in which producers can have more feed efficient animals which also have the added bonus of producing less methane.

A Taste of the Future will be held at DPI Hermit Hill, M1 Napiers Road on October 27 from 9:30am to 3pm. To register please contact Sandra Greenaway on 08 4383 0911 or email sandra.greenaway@dpi.vic.gov.au by Monday October 24.