ANNUAL REPORT FOR THE YEAR ENDED 30 JUNE 2011

CHAIRMAN'S REPORT

Collier Isaacs, Chairman, DEEResearch Ltd.

DEEResearch objectives and achievements

DEEResearch was incorporated in 2001 to:

- coordinate and provide efficient management of industry-good research in the deer industry, principally in the production (on and near farm) sphere
- enable research to be systematically planned in a manner aligning with the industry's short-term needs and long-term strategic goals
- illustrate the deer industry's commitment to research for the purpose of leveraging other funding sources, including government funding.

To these ends, DEEResearch funds a mix of long-term strategic science programmes and short-term tactical research projects in line with priorities and needs identified after consultation with industry participants. In 2010/11 the approximate split between strategic and tactical funding allocation was 87:13.

Strategic investments acknowledge that once we understand the underlying biological systems of importance to the industry (such as forage growth, deer reproduction and deer growth), we will be able to identify critical points in the production chain where improvements are needed or which present the opportunity to optimise outputs.

Tactical investments acknowledge that once a specific opportunity for improvement is identified, targeted research should elucidate the optimum vehicle or mechanism for a grower, producer or processor to bring about that change.

I am pleased to report the following achievements against these objectives.

Strategic investments

Progress continued to be made by AgResearch and its sub-contractors (mainly Massey University) on the *Venison Supply Systems* (VSS) programme that was co-funded by Landcorp Farming Limited ($100,000 p.a.) and the then Foundation for Research, Science and Technology (FRST) ($1.4 million p.a.). The 2010/11 year was the fourth of the six-year programme. Outcomes of the VSS in 2010/11 are noted in Table 1, of which highlights were as follows.

- The genetic heritability of eye muscle area was found to be 0.29 and a DEERSelect Meat Yield module thereby developed to calculate breeding values from ultrasound and CT eye muscle scanning data.
- The Deer Progeny Test Project (DPT) was launched. This project will build on the VSS's sire selection programme by improving genetic linkage between commercial herds, gathering extensive trait data and using ViaScan® technology at processing plants to record yields of the main primal cuts. The project has been designed to enable genetic selection for meat yield and other traits – such as reproductive performance – to be made, thereby enabling swift productivity gains to be made through genetic improvement. The DPT is strongly backed by industry in the form of cash and in-kind contributions from Alliance Group, Landcorp Farming and breeders. Industry input into its strategic direction is secured by participation on the steering committee established for this project.
- AgResearch staff made more than 30 presentations at Focus Farms during the year.
- Concept was proven in deer of a saliva antibody test developed for sheep ('CarLA') and a new serum ELISA test, for the detection of deer lungworm and gastrointestinal worms.

Towards the end of the year, changes to science investment policy at the Ministry of Science and Innovation (which is the successor to the Ministry of Research, Science and Technology and the Foundation for Research, Science and Technology) means that Crown Research Institutes such as AgResearch have the freedom to apply some core funding as they see fit to deliver their core purpose. DEEResearch worked closely with AgResearch to ensure that the VSS would continue to be funded by AgResearch at the same ratio to DEEResearch funds as previously (3:1) in 2011/12 and provisionally for the following year. This result was aided by AgResearch viewing its relationship with the deer industry as a model partnership for undertaking research to meet the needs of industry participants.

The deer industry benefits immensely from AgResearch's maintenance of a talented and dedicated team of technicians, scientists, statisticians and veterinarians specialising in the genetics, physiology, nutrition, health and epidemiology of farmed deer. It is important to the achievement of DEEResearch's objectives that this key relationship continues to be nurtured. During the 2010/11 year there was a concerted push by DEEResearch's shareholders to develop a whole-of-industry approach to productivity improvement, which the parties recognise would inevitably involve research projects.

DEEResearch maintained its investments in research programmes commissioned by the three consortia in which it is a venture partner, namely **Johne's Disease Research Consortium**, **Pastoral Genomics Research Consortium** and the **Pastoral Greenhouse Gas Research Consortium**. Besides DEEResearch's annual $169,000 investment in these consortia, they collectively receive funds of more than $7.4 million from other funding organisations and research providers (excluding the Crown's contribution).

- The high quality of the Johne's Disease Research

Consortium's work was praised by the Ministry of Science and Innovation. That Ministry also recommended that the consortium improve its focus on on-farm delivery. I am pleased to note that the consortium took heed of this recommendation when planning its strategy for 2011/12 and beyond, which includes development of best practice Johne's disease management guidelines for use by the deer industry.

- Pastoral Genomics Research Consortium ran successful field trials of its cisgenic drought-resistant ryegrass cultivars in Florida. The consortium must now decide whether to apply for regulatory approval for field trials in New Zealand. DEEResearch supports research aiming to increase commercial options and outcomes for farmers, especially where the aim of the research is to enable good-quality pasture production in challenging environments without greater reliance on chemicals for additional nutrients or pest or disease control. DEEResearch nevertheless considers that research methods must not limit producer choices, such that containment of trial crops during any research trial is paramount.

Tactical investments

DEEResearch continued to invest in shorter, tactical research projects. In the venison processing sphere, DEEResearch decided to commission a project to determine whether alternative carcass stimulation techniques successfully used in the sheep industry for improved control during carcass dressing and improved lamb tenderness could be translated to venison (with appropriate modifications). The 2010/11 year saw DEEResearch tender for a research provider and negotiate the contract for this work, the majority of which will be undertaken in 2011/12.

Communications

DEEResearch's communications provide an important means of engaging with DEEResearch industry participants. Communication channels included the website **www.deeresearch.org.nz**, articles in *Deer Industry News* and presentations by researchers at numerous Focus Farm field days, industry seminars and conferences. In particular, the commencement of the Deer Progeny Test project undertaken under the VSS was signalled to industry by a seminar given by one of its conceivers, Dr Mandy Bell, at the 2011 Deer Industry Conference in Timaru.

The Deer Branch of the New Zealand Veterinary Association included extensive discussion of the results of DEEResearch-commissioned research projects at its annual conference in May/June 2011. This is an important forum in which scientists and veterinarians active in the deer industry can share their knowledge and observations and learn of recent research outcomes. Maintenance of deer health, especially by the on-farm implementation of disease prevention strategies, is vital to improving productivity and DEEResearch readily acknowledges the importance of professional veterinarian expertise to the industry.

Administration costs and project management represented about 1.5 percent of DEEResearch's total expenditure. These costs are kept to a minimum by administrative functions being provided by Deer Industry New Zealand.

■ **More detail is available from DEEResearch or on www.deeresearch.org.nz**

Acknowledgements

I thank all of my fellow directors for their time, dedication and support in ensuring DEEResearch continues to deliver its objectives for the industry's benefit. I would like to thank Margot Buick and Peter Benfell, both formerly of AgResearch, for their contributions to DEEResearch during their tenure as directors. They resigned at the end of the 2011 year. I welcome Jason Archer and Tom Richardson, both of, and appointed by, AgResearch, in their stead.

Research in 2010/11

In the 2010/11 year, DEEResearch budgeted for investment of $660,000, and made actual research expenditure of $597,840. This expenditure was funded by the Deer Industry New Zealand Research Trust.

Seven projects were undertaken in 2010/11 as described in Table 1, of which two were completed (described in *italics*).

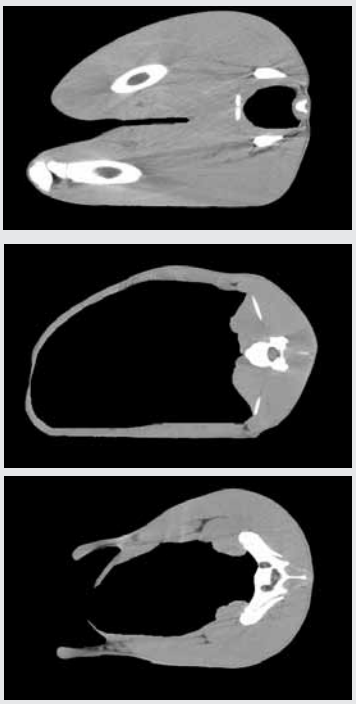
Copies of all final reports for completed projects are available on the DEEResearch website. For more detailed information on DEEResearch and the programmes

Table 1: Summary of goals and projects.

Research goals and projects	Duration	Notes and key findings
Goal: New technologies for wealth creation		
1.16 Pastoral genomics	2001/02 – 2013/14	Work commissioned through a pan-pastoral industries consortium (see www.pastoralgenomics.com)
Goal: Deer health and welfare		
7.01 Johne's disease research consortium	2008/09 – 2012/13	Work commissioned through a pan-pastoral industries consortium (see **www.jdrc.co.nz**) • 34% of deer herds found to suffer from clinical disease, this primarily being due to a particular sub-strain of Type C *MAP* that differs from the sub-strain of Type C *MAP* primarily infecting dairy cattle. • Studies into the molecular basis of deer susceptibility to Johne's disease implicate a disregulated inflammatory response to infectious challenge. In terms of the genetic basis, deer that show resistance up-regulate approximately 250 genes, although precise linkages between these genes and the inflammatory response to disease challenge have not yet been demonstrated. • Research commissioned to investigate extent to which resistance to Johne's disease is heritable with a view to developing a DEERSelect module to enable selection of deer demonstrating a degree of resistance.
10.01 Parasite control in farmed deer – the way forward	*2010/11*	*Contribution to research by Elk & Wapiti Society Parasitism Research, principally funded by Sustainable Farming Fund* • *Moxidectin delivered by drench and injectable routes in combination was only Moxidectin therapy to provide satisfactory parasite kill rates (95% or greater). Moxidectin delivered by either or the two routes alone proved unsatisfactory at parasite control.*
Goal: Sustainable production and the environment		
1.03 Methane mitigation	2001/02 – 2011/12	• Pan-pastoral industries consortium: **www.pggrc.co.nz** • 60–70% dinitrogen oxide reduction in trials of nitrification inhibitors, with the potential for commercial dinitrogen oxide reduction of 10–15%.

Table 1 (continued)

8.02 Venison carbon footprinting	*2008/09 – 2010/12*	*Final report received and under consideration by the deer industry.*
Goal: Productivity gains, accelerated learning and technology transfer, deer health and welfare, sustainable production and the environment		
7.02 Venison supply systems	2007/08 – 2012/13	• The first year of the hind feed intake trial was completed. It demonstrated for the first time that pregnancy does not mitigate photoperiod-induced reductions in feed intake of red hinds, i.e. both pregnant and non-pregnant hinds showed the same reduction in feed intake over winter. This outcome is relevant to ongoing studies into the effects of earlier conception dates on foetal viability and growth.
		• The genetic heritability of eye muscle area was found to be 0.29 and a DEERSelect meat yield module thereby developed to calculate breeding values from ultrasound and CT eye muscle scanning data.
		• The Deer Progeny Test (DPT) Project was commenced with artificial insemination of more than 800 hinds at AgResearch's Invermay farm and Sally and Ross Stevens' Whiterock Station in Canterbury (pictured below). This project builds on the VSS's sire selection programme by improving genetic linkage between commercial herds and gathering extensive trait data. It will also use ViaScan technology at processing plants to record yields of the main primal cuts. The project will therefore enable meat yield and other productivity gains to be made through genetic improvement. The project is strongly backed by industry in the form of cash and in-kind contributions from Alliance Group, Landcorp Farming and breeders and industry input into the strategic direction of the project is secured by industry participation on the project's steering committee. • Genotyping of 384 deer from 30 farms using >200 SNPs was carried out. The results suggested that, with further genetic information on production traits provided by the DPT project, development of a SNP chip that may be used to develop genomic breeding values is possible. • Over 200 SNPs were validated as DNA markers and were used in a pilot study to generate parameters for determining genetic relatedness between deer from different farms, breeds, crossbreeds and families within a farm.
		• Work progressed towards development of a learning package on lactation and calf growth, principally by the trialling of field day presentations on winter feeding of hinds, principles of feeding on pasture, control of feed quality during summer, energy and protein balances in diet to maintain lactation.
		• Liquid nitrogen applied to pedicle sites of young red and red/wapiti stags was shown to prevent antler growth without affecting usual growth rates; a follow-up study to assess welfare implications of the treatment was commenced.
		• Two new Focus Farms were selected and set up and social science researchers commenced interviews of attendees and benchmarking of Focus Farm field day outcomes with a view to making recommendations for optimisation of VSS outputs. AgResearch staff made more than 30 presentations at Focus Farms during the year.
		• Using culture of parasite larvae and PCR, the identification and distribution of parasite species on 59 farms has been done.
		• Studies into the relative pathogenesis of different parasites have been completed and presentations on parasite management and anthelmintic resistance given at Focus Farm field days.
		• Concept was proven in deer of a new saliva antibody test developed for sheep ('CarLA') and a new serum ELISA test to detect deer lungworm and gastrointestinal worms, both using antigens of sheep parasites. Results were encouraging compared with traditional test methods (faecal egg counts for gastrointestinal parasites and faecal larval counts for lungworms) and the mode of sample collection much easier. A deer-specific antigen of gastrointestinal worms has been identified and incorporated into a deer-specific ELISA for comparison in terms of specificity and sensitivity with the sheep ELISA.
		• Fieldwork for modelling hind calving behaviour using GPS collars fitted to hinds was completed.
9.01 Southland Focus Farm	2010/11 – 2011/12	Field days were held at which presentations were made by farmers and AgResearch researchers on optimising commercial returns by integrating breeding and finishing operations and different species of livestock.



CT (computer tomography) images/slices of a whole live ~12 month old male deer. The imaging was done by INNERVision (AgResearch Landcorp joint venture) sited at Invermay. Data from this type of image has been used for the "primal cut" (shoulder loin and hind leg) breakdown in the meat module for the economic indexes in DEERSelect and associated breeding values.

underway please see **www.deeresearch.org.nz**

Current year's programme – 2011/12

Funding for 2011/12 totals $712,000 and was directed towards seven specific projects and a small unallocated pool of $21,000. After the start of the 2011/12 year, DEEResearch provisionally decided to allocate $20,000 of that unallocated pool towards project 10.03 (Foetal Wastage).

The total funding pool is greater than in 2010/11 owing to the accrual of $52,000 allocated to processing research from 2010/11.

Table 2: Funding allocations, duration of projects and the DEEResearch goals to which projects are directed

Project	Status (duration)	Funds ($000)	Goal alignment
1.03 Methane mitigation	Ongoing (ends 30/06/2012)	35	• Sustainable production and the environment
1.16 Pastoral genomics	Ongoing (ends 30/06/2014)	34	• New technologies for wealth creation
7.01 Johne's disease research consortium (includes project 4.02)	Ongoing (ends 30/06/2013)	100	• Deer health and welfare
Venison Supply Systems 1. Deer Progeny Test (DPT) and DEERSelect 2. Deer parasitology 3. Reproductive productivity: foetal wastage in R2 hinds 4. Reproductive productivity: hind intake and foetal growth 5. Early growth of deer 6. Hill and high country venison systems 7. Inhibiting antler growth 8. Gaining traction from science	Ongoing (ends 30/06/2013)	408	• Productivity gains • Sustainable production and the environment • Support for post-grad costs • Accelerated learning and technology transfer
8.02 Venison carbon footprinting	Ongoing (ends 30/06/2010)	10	• Sustainable production and the environment
9.01 Southland Focus Farm	Ongoing (ends 30/06/2012)	10	• Productivity gains • Sustainable production and the environment • Accelerated learning and technology transfer
10.01 Alternative carcass stimulation systems	Ongoing (ends 31/08/2012)	94	• Market access and development
10.03 Foetal wastage	Not yet started: funding contingent on co-funding being secured from other sources and satisfactory full research proposal	20	• Deer health and welfare
Discretionary	Unallocated (annual)	1	• Tactical/strategic support
	TOTAL	**712**	

The joint venture agreement for Pastoral Greenhouse Gas Research Consortium is due to expire in June 2012. In view of the advent of the Emissions Trading Scheme for the agricultural sector, DEEResearch supports extension of the Consortium for another five years in order to continue research aimed at mitigating farm methane and nitrous oxide emissions, so long as projects do not overlap with research undertaken by the New Zealand Agricultural Greenhouse Gas Research Centre.

In determining its research programmes for 2011/12 and beyond, DEEResearch has committed to taking into account as closely as possible recommendations arising out of the Productivity Improvement Programme (PIP). Resourced by Deer Industry New Zealand and steered by a Leadership Group. The PIP is run by a group of people collectively interested in all aspects of the deer industry. Under the programme, different investment opportunities for achieving Deer Industry New Zealand's venison strategy of "more deer, heavier earlier and better" are identified and analysed (in a robust and systematic manner) in terms of their potential contribution towards that strategy.

It is anticipated that this initiative will guide investment – including research – in productivity improvement. DEEResearch acknowledges that it is well placed to contribute to desired industry outcomes by commissioning fit-for-purpose research to meet the programme's needs and assisting where it can in implementing the outputs of that research.

Directors

As at 30 June 2011 the Board of DEEResearch Ltd comprised:

An independent Chairperson appointed by the other directors

Collier Isaacs: Chief Executive Officer of FarmIQ Systems Ltd; collier.isaacs@farmiq.co.nz

Two directors appointed by AgResearch

Jason Archer: Portfolio Leader – Meat and Fibre Paddock-to-Consumer; Jason.archer@agresearch.co.nz

Tom Richardson: Chief Executive Officer, AgResearch; Council Member of Waiariki Institute of Technology, Director of Science NZ, SIDDC, AgR (Johne's Disease research Consortium) Ltd, AgR (Meat Biologics Consortia) Ltd, AgR (Pastoral Genomics Consortia) Ltd, AgR (PPGR Consortia) Ltd, Celentis Ltd, Covita Ltd, Encoate Holdings Ltd, Epigen Ltd, Farmax Ltd, Genetic Engine Holding Company, Grasslanz Technology Limited, Paraco Technology Limited, Phytagro NZ Ltd; tom.richardson@agresearch.co.nz

One director appointed by the New Zealand Deer Farmers' Association

Noel Beatson: Director of Deer Records NZ Ltd, Director of Deer Reproduction Services Ltd, Veterinary Surgeon with Rural Veterinary Services, deer farmer; nbeatson@es.co.nz

One director appointed by Deer Industry New Zealand

Mark O'Connor: CEO, Deer Industry New Zealand; Director of VARNZ Ltd; Director of Johne's Management Ltd; Director of Johne's Disease Research Consortium; Member of the Animal Health Board Representatives' Committee; Member of the Stakeholder Reference Group of NAIT Ltd; mark.oconnor@deernz.org

One director appointed to represent venison processors and exporters

Kelvin Ashby: Plant Manager Alliance Group Ltd; kelvina@alliance.co.nz

One director appointed to represent universities

Frank Griffin: Head of Department and Professor of Microbiology and Immunology, University of Otago; Director of the Disease Research Laboratory; Member of

Scientific Advisory Group for the Johne's Disease Research Consortium; Member of the Johne's Disease Investigation Programme (USA); Member of PARATBTools Consortium (EU); Associate member of New Zealand Veterinary Association Deer Branch; hod.microbiology@stonebow.otago.ac.nz

An extract from the financial statements of DEEResearch Limited for the period to 30 June 2011 is set out below for general information purposes only. A full set of audited financial statements and the audit report issued on 24 November 2011 is available on request from **info@DEEResearch.org.nz**

Accounts

DEEResearch Limited
Statement of Financial Performance
For the Year Ended 30 June 2011

	2011 $	2010 $
Research Income		
Deer Industry New Zealand Research Trust - Research Joint Ventures	169,000	169,000
Deer Industry New Zealand Research Trust - Research Other	415,565	424,160
Deer Industry New Zealand Research Trust - Project Management	13,275	50,442
JRG2	-	9,713
AgResearch Limited	1,205,000	1,262,000
Other Income - Administration Funding		
Deer Industry New Zealand	7,438	8,250
AgResearch Limited	7,438	8,250
Sundry Income	14	-
Total Income	**1,817,730**	**1,931,815**
Less Expenditure		
Research Expenditure		
Funded by FRST through AgResearch	1,205,000	1,262,000
Research Projects - Joint Ventures	169,000	169,000
Research Projects - Other	415,565	433,874
Project Management	13,275	50,442
Total Research Expenditure	1,802,840	1,915,316
Interests in joint ventures		
Share of Net Assets of Unincorporated Joint Ventures	21,468	15,245
Administration Expenditure		
Chairman's Fees	6,000	6,000
Audit Fees	7,365	8,116
Sundry Expenses	1,525	583
Subsidiary Companies Loans forgiven on amalgamation	-	2,512
Total Administration Expenditure	14,890	17,211
Communication Expenditure		
Annual Report	-	1,800
Total Communication Expenditure	-	1,800
Total Expenditure	**1,839,198**	**1,949,572**
Net Result Before Taxation	**(21,468)**	**(17,757)**
Taxation	-	-
Net Result After Taxation	**(21,468)**	**(17,757)**

DEEResearch Limited

Statement of Movements in Accumulated Funds
For the Year Ended 30 June 2011

	2011 $	2010 $
Opening Accumulated Funds	**68,434**	**6,108**
Net Result After Taxation	(21,468)	(17,757)
Total Recognised Gains and Losses	(21,468)	(17,757)
Adjustment on Amalgamation of Subsidiaries - Equity Share of JV assets	-	80,083
Closing Accumulated Funds	**46,966**	**68,434**

DEEResearch Limited
Statement of Financial Position
As at 30 June 2011

	2011 $	2010 $
Share Capital	120	120
Retained Earnings	46,846	68,314
Accumulated Funds	**46,966**	**68,434**
Represented by:		
Current Assets		
Cash at Bank	1,856	1,673
Related Party Receivables	159,532	154,547
Share Capital Due	120	120
Total Current Assets	**161,508**	**156,340**
Current Liabilities		
Accounts Payable	10,687	11,942
Related Parties Payables	147,225	140,802
Total Current Liabilities	157,912	152,744
Non Current Assets		
Share of Assets of Pastoral Genomics Research Consortium	24,460	28,940
Share of Assets of Pastoral Greenhouse Gas Research Consortium	25,710	38,802
Share of Assets of Johne's Disease Research Consortium	120,120	143,040
	170,290	210,782
Non Current Liabilities		
Share of Liabilities of Pastoral Genomics Research Consortium	13,490	20,980
Share of Liabilities of Pastoral Greenhouse Gas Research Consortium	29,430	34,604
Share of Liabilities of Johne's Disease Research Consortium	84,000	90,360
	126,920	145,944
Net Assets	**46,966**	**68,434**

Research expenditure by project for the twelve months ended 30 June 2011	**Code**	**Actual spend to Jun 2011**
1. SUSTAINABLE PRODUCTION AND THE ENVIRONMENT		
Methane mitigation	1.03	$35,000
2. DEER HEALTH AND WELFARE		
Johne's Disease Research Consortium	7.01	$100,000
3. NEW TECHNOLOGIES FOR WEALTH CREATION		
Pastoral genomics	1.16	$34,000
4. VENISON SUPPLY SYSTEMS ((relates to Goals 1, 2, 3, 4, 5)		$408,000
1. Early breeding and optimising feed requirements ($152,000)	7.02	$152,000
2. Focus Farms and parasitology ($196,000)		$196,000
3. Extensive system benefits ($60,000)		$60,000
5. OTHER		
Southland Focus Farm	9.01	$4,515
Discretionary		$3,050
SSF project elk & wapiti society parasitism research	10.02	$1,000
Deer Progeny Test	12.01	$2,050
TOTAL RESEARCH EXPENDITURE		**$584,565**