



Australian Government
**Rural Industries Research and
Development Corporation**

RIRDC Completed Projects in 2005 - 2006
and Research in Progress as at June 2006

Sub-Program 2.7

DEER

Rural
Industries
Research &
Development
Corporation



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Foreword

This year RIRDC has produced *Completed Projects in 2005 - 2006 and Research in Progress as at June 2006 - Deer* which contains short summaries of continuing projects as well as those that were completed during 2005 - 2006 for all of the Corporation's program areas.

The complete report on all the programs is only available in electronic format on our website at <http://www.rirdc.gov.au>.

The following report is a hardcopy extract covering sub-program 2.7. It contains all entries from continuing and completed Deer research projects funded by RIRDC. This program aims to foster an Australian deer industry as a highly profitable and efficient mainstream agricultural enterprise.

This report is an addition to our extensive catalogue of over 1500 research reports of projects supported by RIRDC. Please contact us for the latest publications catalogue or view it on our website.

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Peter O'Brien

Managing Director

Rural Industries Research and Development Corporation

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Completed Projects – Improve on farm production efficiency

Project Title	Study of the relationship between body condition score, carcass composition and consumer perception of venison quality
RIRDC Project No.: Researcher: Organisation: Phone: Fax: Email:	UWS-18A Dr Robert Mulley University of Western Sydney (02) 4570 1438 (02) 4570 1383 r.mulley@uws.edu.au
Objectives	<ul style="list-style-type: none"> • Characterise the biochemical and physical attributes of deer carcasses for body condition scores 2, 3 & 4 (commercial grades) to increase consumer confidence and quality of supply. • Develop industry best practice for post slaughter management of carcasses to enhance the three major quality components of venison, being tenderness, juiciness and flavour. • Determine the impact of supplementary feeding on the eating quality characteristics of venison.
Background	An earlier RIRDC project No. UWS-16A (The Nutritional Requirements of Pregnant and Lactating Red and Fallow Deer) developed a body condition scoring system (BCS) for fallow deer in order to aid quality assurance at the production and processing level. This system provides a common language, which can be used by farmers, processors and marketers to describe carcass characteristics. This work identified a gap in the research in linking on farm production to meat quality. Understanding the relationships between live animal body condition, slaughter techniques and post slaughter carcass management are critical elements for quality assurance of meat.
Research	Fallow deer (bucks and does) and red deer (stags) were analysed for meat quality attributes, both biochemical and sensorial. The attributes examined were pH, fat, moisture, juiciness, colour, tenderness, flavour and overall liking. Meat was analysed according to body condition, feed type (pasture vs. grain), sex and post-slaughter hanging techniques (Achilles hung or pelvic suspension). The research results were utilised to make recommendations to industry on optimal pre and post slaughter management techniques.
Outcomes	Fallow deer does had better meat quality attributes than fallow deer bucks. Grain-fed animals had no significant improvement in meat quality over pasture fed animals, despite a perceived difference in flavour which did not affect overall liking. Pelvic suspension proved to be able to eliminate any differences or variability in pre slaughter condition of animals i.e. BCS 2 animals performed as well in tenderness and juiciness ratings as animals of BCS 4.
Implications	There is no obvious benefit in farmers holding animals back from slaughter until they achieve higher BCS, if pelvic suspension is used. Cull does are valuable in terms of venison quality, being more tender and juicy than bucks. The finishing of animals on grain would appear to be counter productive. Pelvic suspension proved to be an extremely beneficial tool. Meat quality was significantly improved in all cases using this

technique. Given the lack of availability of other meat quality enhancing techniques such as electrical stimulation; pelvic suspension or Tenderstretching is a technique that the industry should seriously consider adopting.

Publications

Hutchison C, (2004) Relationship of Body Condition Score and Carcass Composition to Consumer Perception of Venison Quality, *Deer Industry Association of Australia, Biennial Conference, April 2004, Mt Gambier, SA*

Hutchison C.L., Mulley, R.C. and Nicetic, O. (2002) The relationship of body condition score and venison quality characteristics in fallow deer (*Dama dama*). *5th Int. Deer Biology Conference, Quebec City, Canada.*

Hutchison C.L., Mulley, R.C., Flesch, J.S & Nicetic, O. (2004) The relationship between body condition score and venison quality, in farmed, entire and castrated Fallow deer bucks (*Dama dama*) *Australian Society of Animal Production Conference, July 2004.*

Hutchison, C.L. (2004) Venison quality characteristics in commercial grade fallow deer (*Dama dama*). *Innovations Conference, University of Western Sydney.*

Sims, K.L, Mulley, R.C., Hutchison, C.L. & Wiklund, E. (2004) Post slaughter management of fallow deer (*Dama dama*): Effect of pelvic suspension method on meat tenderness. *Deer Industry Association of Australia, Biennial Conference, April 2004, Mt Gambier, SA.*

Sims, K.L., Wiklund, E., Hutchison, C.L., Mulley, R.C. and Littlejohn R.P. (2004) Effects of pelvic suspension on the tenderness of meat from Fallow Deer (*Dama dama*). *50th Int Congress of Meat Sci and Tech, Helsinki, Finland.*

Wiklund, E., Hutchison, C., Flesch, J., Mulley, R. & Littlejohn, R.P. (2004) Colour stability and water-holding capacity of *M.longissimus* and carcass characteristics in Fallow deer (*Dama dama*) grazed on natural pasture or fed barley. *Rangifer (In Press).*

Wiklund, E., Mulley, R.C., Hutchison, C.L. and Littlejohn, R.P. (2004) Effect of carcass suspension method on water holding capacity of Fallow deer (*Dama dama*) and lamb meat (*M.Longissimus*). *50th Int Congress of Meat Sci and Tech, Helsinki, Finland.*

Wiklund E. (2005) Slaktkroppshantering för batter kottkvalitet. *Rangifer Report 10*, pp. 99-104 (in Swedish with English abstract).

Completed Projects - Develop international and domestic markets for Australian venison and develop supply chain management programs

Project Title	Deborah Moffat - Presentation of LBP-1A “A domestic market positioning strategy for Australian Venison” findings
RIRDC Project No.: Researcher: Organisation: Phone: Fax: Email:	LBP-2A Ms Deborah Moffat Loulaki Blue Pty Ltd (02) 9938 3399 (02) 9938 3399 deborah@loulakiblue.com
Objectives	<ul style="list-style-type: none"> To present the key messages from RIRDC Project LBP-1A: “A domestic market positioning strategy for Australian Venison” to industry.
Background	<p>As part of the RIRDC program for the development of an industry endorsed strategic plan for the Venison Industry Deborah Moffat from Loulaki Blue joined Rod Cox, Geoff Watson and Tim McRae from Charles Sturt University to meet with industry representatives in South Australia and Orange, NSW. Sessions were held in three locations with representatives from throughout the supply chain to hear first hand the results of RIRDC program LBP – 1A, and the proposed direction of the industry strategic plan.</p> <p>Sessions included an overview of the objective of the market research, methodology and feedback from chefs, food service industry representatives and potential domestic consumers on:</p> <p>Market awareness of the product, range of uses and image Key attributes of venison Opportunities identified in the limiting Factors Report A possible new image and positioning for venison.</p>
Research	<p>Session Details Date: Tuesday 25 October 2005 Location: Hahndorf Venue: Hahndorf Hill Winery</p> <p>Date: Wednesday 26 October 2005 Location: Balhanna Venue: Balhanna Hotel</p> <p>Date: Tuesday 29 November 2005 Location: Orange Venue: Charles Sturt University, Orange Campus.</p>
Outcomes	The response to the presentation of the market research findings of RIRDC project LBP – 1A was very positive. Some session participants found that the findings confirmed their beliefs that the industry needs to become more market aligned. For others it was their first opportunity to hear feedback from existing and potential consumers of their product about the factors that drive demand.
Implications	As the industry continues to attempt to encourage change and a greater

market focus, this approach of ongoing engagement and communication will be vital to ensure their buy-in for the new initiatives being proposed.

Publications

N/A

Current Projects - Improve the profitability of the Australian industry for all stakeholders

Project Title	Facilitate industry development
<p>RIRDC Project No.: Start Date: Finish Date: Researcher: Organisation: Phone: Fax: Email:</p>	<p>DIP-16A 01-Dec-2005 30-Nov-2006 Mr Chris Tuckwell Deer Industry Projects & Developments Pty Ltd (08) 8523 3500 (08) 8523 3301 cdt@bigpond.net.au</p>
<p>Objectives</p>	<p>To assist development, expansion and confidence in the Australian deer industry by:</p> <ul style="list-style-type: none"> • Reviewing existing promotional material and providing a detailed summary of available pamphlets, original art work etc • With consideration of the final report from the RIRDC funded project US-103A, developing a new Five Year Plan for the Australian Deer Industry • Undertaking ongoing maintenance and regular updating of deer industry databases • Undertaking regular interpretation and reporting of deer industry statistics.
<p>Current Progress</p>	<p>The review of existing promotional material is almost complete. A final review of archival material is proposed for the future that will coincide with the relocation of the Deer Industry Bookshop.</p> <p>The new Five Year Plan for the Australian Deer Industry has been developed by the RIRDC Deer Program Manager. Assistance with the development has been provided as requested.</p> <p>Venison statistics are being collected but continue to be difficult to collect from some processors.</p> <p>The collection and dissemination of industry statistics is ongoing and information is reported through the deer industry magazine and RIRDC newsletter as it is available.</p>

Current Projects - Improve the profitability of the Australian industry for all stakeholders

Project Title	Development of venison alliances
RIRDC Project No.: Start Date: Finish Date: Researcher: Organisation: Phone: Email:	WAT-1A 01-Feb-2006 31-May-2006 Dr Geoffrey Watson Dr Geoffrey Watson (02) 6365 1235 laurenwatson@bigpond.com
Objectives	<ul style="list-style-type: none"> • Design and document an R&D project to test the hypothesis that industry facilitation and support for the establishment and operation of venison supply chain alliances using the PIRD model can improve returns for venison producers through improved supply chain organisation and transparency and greater focus on production system planning to meet market specifications.
Current Progress	<p>Steering Committee Guidelines:</p> <ul style="list-style-type: none"> • Completed in the PLANNING GUIDELINES DOCUMENT FOR MARKET FOCUSED VENISON ALLIANCES submitted to RIRDC, April 2006. <p>Stage 1 “Kick-start Workshops” application forms /guidelines for applicants and Steering Committee:</p> <ul style="list-style-type: none"> • Completed as above. <p>Procedures for necessary activities prior to conduct of the alliance “Kick-start Workshops”:</p> <ul style="list-style-type: none"> • Completed as above. <p>Briefing the industry about this project:</p> <ul style="list-style-type: none"> • Completed via power point presentation - industry workshop, Melbourne, 26/02/06. <p>Stage 2 application forms / guidelines for applicants and Steering Committee:</p> <ul style="list-style-type: none"> • Yet to be developed due to the current schedule of only assessing the Kick Start Workshop applications in mid May 2006. An extension until 16th June 2006 is requested. <p>Designing the application forms and guidelines for applicants seeking Stage 3 funding:</p> <ul style="list-style-type: none"> • Yet to be developed as above. An extension until 16th July 2006 is requested. <p>Providing assistance with applying for Industry Partnership Program of the Australian Government:</p> <ul style="list-style-type: none"> • Undertaken as requested, with IPP application submitted.

Current Projects - Develop international and domestic markets for Australian venison and develop supply chain management programs

Project Title	Scholarship - Timothy McRae
RIRDC Project No.: Start Date: Finish Date: Researcher: Organisation: Phone: Email:	US-132A August 2004 August 2006 Timothy McRae University of Sydney 02 6365 7770 tmcrae@csu.edu.au
Objectives	<ul style="list-style-type: none">• The purpose of this study is to detail the process of developing a successful strategic plan for the Australian Venison Industry.
Current Progress	<p>A Masters of Philosophy (Rural Management) thesis detailing the processes undertaken in developing a strategic plan for the Australian venison Industry is on schedule to be completed by the end of August 2006. An Industry endorsed strategic plan for the Australian venison industry was submitted to RIRDC in December 2005.</p> <p>The thesis details the strategic processes undertaken by the research team and highlights the critical factors for the successful endorsement of the plan by industry. It outlines the significant role that both analytical and relationship methodology played in the development of the plan, along with detailing the importance the researchers placed on constantly taking strategic options back to the industry for validation.</p>

Completed projects prior to 2005-2006 - Improve on farm production efficiency

Project Title	Optimum weaning time of fallow deer in southern Australia
RIRDC Project No.: Researcher: Organisation: Phone: Fax: Email:	SAR-41A Dr Phil Glatz and Dr Yingjun Ru South Australian Research and Development Institute (08) 83037786 (08) 83037689 Glatz.phil@saugov.sa.gov.au
Objectives	<ul style="list-style-type: none">• Improve growth rate of weaners during weaning;• Improve profitability of deer farming.
Background	<p>The Mediterranean environment is characterised by wet cold winters and hot dry summers. The herbage availability for grazing deer under such an environment fluctuates with the season, resulting in a low availability of green feed in autumn and winter, a surplus of green feed in spring, and a dry feed period in summer/autumn. Deer in these regions fawn in December and January. Most deer farmers allow fawns to stay with does until natural weaning occurs, but a few farmers wean fawns in May-June. Very few farmers wean their fawns in March.</p> <p>A common question has been posed by deer farmers attending the field days at Roseworthy and at meetings of the South Australian Deer Farmer Association. The farmers question whether they should wean their deer later during May or June to reduce the stress during weaning and to improve performance during the grazing season or should they wean in March to allow does to recover their body conditions for the next reproduction cycle.</p>
Research	<p>An on-farm trial comparing early weaning versus late weaning is being conducted on the Bilby Deer Farm in South Australia. Does were first weighed in November 2003. During 2004 does were weighed in March, May, July, September and November. Fawns were weaned early in March and compared with weight of fawns, which were weaned later in June 2004.</p> <p>In March body weight of does in the early weaned treatment were about 4 kg heavier than does in the late weaned treatment but by May this difference was only 0.7 kg. In September 2004 there was no differences observed in the weight of does on the early and late weaning treatments. Early weaned fawns were 4-5 kg heavier in March and 2 kg heavier in May compared to the late weaned fawns. However in September 2004 there was no difference in the weight of fawns whether they were weaned earlier or later in the year. The body weights of does were similar at the start of the experiment and after the experiment had been completed their body weight was also similar.</p>
Outcomes	<p>The advantages of early weaning were apparent early in the season. However by the end of the season there appeared to be no benefits from early weaning.</p>

Implications

It is suggested that deer farmers undertake a small trial on their own farms to determine if early weaning is beneficial or not, ensuring that handling is kept to a minimum.

Publications

Y. M. Bao*, Y. J. Ru, P. C. Glatz and Z. H. Miao. (2004) The influence of weaning time on deer performance. *Asian-Aust. J. Anim. Sci.* 17:569-581.

Completed projects prior to 2005-2006 - Improve on farm production efficiency

Project Title:	Effect of salt intake on feed intake and growth rate of fallow and red weaner deer
RIRDC Project No.:	SAR-26A
Researcher:	Dr Yingjun Ru
Organisation:	South Australian Research and Development Institute
Phone:	08 83037787
Fax:	08 83037977
Email:	ru.yingjun@saugov.sa.gov.au
Objectives	<ul style="list-style-type: none">• To examine the effect of salt intake in drinking water and feed on feed intake and growth rate of fallow and red deer under grazing conditions,• To disseminate research outcomes to deer farmers by field days, fact sheets, seminars, workshops and scientific publication,• To improve profitability and sustainability of the deer industry.
Background	<p>Over 70% of the total land surface of Australia is arid and semi-arid with only one quarter of the sheep and cattle population using it for grazing. The forage on this land is mainly bushes (e. g. mulga and bladder saltbush), which have a high salt content. An important source of water for grazing animals in the arid zone is underground water with a high salt content. There is evidence that the concentration of total soluble salts in bore water is 10000 to 15000 ppm and sometimes higher in Australian states except for Queensland and the Northern Territory. Salt content in water in summer increases due to evaporation from water troughs and could have a significant impact on animal production by reducing feed intake and influencing other physiological functions. Research on grazing sheep indicates that a content of 13000 mg NaCl/L in drinking water reduces the size of the microbial population and metabolic activity of sheep and 15000 mg NaCl/L decreases feed intake. This high level of salt in the drinking water often causes a reduction in lamb live weight gain and wool production, and can also cause diarrhoea, fly-strike and higher mortality. However, there is no evidence which indicates whether deer production is influenced by high salt intake either in the feed and water in these regions.</p>
Research	<p>To assess the effect of salt level in feed or drinking water on feed intake and growth rate of red and fallow weaner deer, four experiments were conducted over 3 years. The effect of salt level in feed and drinking water on feed intake, water intake and growth rate of fallow and red weaner deer were examined.</p>
Outcomes	<ul style="list-style-type: none">• The experiments demonstrated that when fresh water is available fallow deer can tolerate a salt level of 3% in feed while body weight gain is not affected when salt level in feed is up to 6% for red deer (weaner). There is no reduction in feed intake when salt level in drinking water is 1.2% for fallow deer and 0.8% for red deer.• The data on the tolerance of red and fallow weaner deer to salt level in feed and drinking water can be used as a guideline by deer producers to maximise the profitability of deer farming by reducing the risk of excessive salt intake by grazing deer.• Deer farmers should monitor the health and behaviour of their deer regularly and test the salt level in drinking water and forage to eliminate the risk of excessive salt intake.

Implications

The data obtained in this study can be immediately adopted by the deer farmers as guidelines for preventing excessive salt intake during the season. Farmers should not feed fallow deer feed/forage containing over 3% salt even if fresh water is available. The salt level in drinking water should be lower than 1.2% for fallow weaner deer and 0.8% for red weaner deer to avoid any reduction in feed intake. To achieve cost-effective venison production, deer farmers need to regularly test the salt levels in drinking water and forage on their farm, especially in dry, hot summers in southern Australia. Farmers also should be careful when using the salt tolerance level of sheep or other livestock species as guidelines for managing red or fallow deer due to the difference in species ability to cope with excessive salt intake.

Publications

Ru, Y. J., P. C. Glatz and Z. H. Miao (2000). Impact of salt intake on red and fallow deer production in Australia (A Review). *Asian-Australasian Journal of Animal Science*, 13, 1779-1787.

Ru, Y. J. M. Fischer, P. C. Glatz, W. K. Peng and Y. M. Bao (2003). Effect of salt level in the feed on performance of red and fallow weaner deer. *Asian Australasian Journal of Animal Science* (submitted)

Ru, Y. J., M. Fischer, P. C. Glatz and Y. M. Bao (2003). Effect of salt concentration in water on feed intake and growth rate of fallow weaner deer. *Recent Advances in Animal Nutrition in Australia*. Vol. 14, pp. 1A.

Ru, Y. J. and P. C. Glatz (2004). Effect of salt level in feed and drinking water on performance of red and fallow weaner deer. Proceedings of Australian Deer Industry Biennial Conference, Mount Gambier, South Australia, Australia.

Completed projects prior to 2005-2006 - Improve the Profitability of the Australian industry for all stakeholders

Project Title: Improving Deer Industry Profitability through Research Uptake – Pilot Project	
RIRDC Project No.:	CAM-1A
Researcher:	Gaye Cameron
Organisation:	G Cameron
Phone:	03 5983 2030
Fax:	03 5983 2030
Email:	camerongaye@hotmail.com
Objectives	<ul style="list-style-type: none"> Analyse the costs of production, and set benchmarks as industry standards. Address the production issues of meeting carcass specifications and weaning percentages. Assist farmers to market their products at the optimal time.
Background	Although RIRDC has funded research for deer farming in the past, some farmers have not availed themselves of this information and others have not put the information into practice. This program was planned to assist farmers to take up the research findings so that deer farmers would become more profitable.
Research	A survey was conducted to identify the knowledge and skills that might be addressed to improve production which would lead to more profit. We identified three areas to improve profitability, business benchmarking, feeding deer to meet carcass specifications and marketing deer at the optimum time. By implementing the research into nutrition deer farmers are able to meet carcass specifications. Farmers were encouraged to monitor growth rates in order to market stock when prices are at a premium.
Outcomes	After identifying the skills required farmers were invited to join a discussion group. Discussion groups have been the best method of improving production and profitability in other grazing industries. Group meetings followed a simple format of sharing farm activities and past experience as well as introducing new research information. The meetings were held on farm where members could see practical examples and demonstrations. The program ran over two years. Farmers looked at the quantity and quality of the pasture they produced and how they might utilize more pasture. The program followed the annual deer production cycle, this included monitoring condition scores to maximise conception rates. Discussion group members were encouraged to participate in a business analysis workshop. This encouraged producers to look at cost of production. Although only a small number supplied data for the analysis we now have some business benchmarks for the industry.
Implications	The awareness of the availability of research information and programs to assist deer farmers to become more profitable has increased. Members in the discussion groups have new skills and are enthusiastic about continuing to implement research results.
Publications	<p>Tuckwell, C. (1998) Australian Deer Industry Manuals RIRDC Publications</p> <p>Beatson, N. Campbell, A. & Judson, G. (2000) Deer Industry Manual New Zealand Deer Master Project South Canterbury & North Otago Branch NZDFA</p> <p>Prograze® NSW Agriculture</p> <p>BizCheck for Red Meat® Enterprise Health Check® Meat and Livestock Australia</p>

Completed projects prior to 2005-2006 - Improve the Profitability of the Australian industry for all stakeholders

Project Title: Deer Production Handbook and Industry Statistics	
RIRDC Project No.:	DIP-9A
Researcher:	Chris Tuckwell
Organisation:	Rural Industry Developments Pty Ltd PO Box 1105 Gawler, SA, 1105
Phone:	08 8523 3500
Fax:	08 8523 3301
Email:	cdtuckwell@bigpond.com.au
Objectives	<p>Specific objectives were to continue the improvement of deer farmer profitability by:</p> <ul style="list-style-type: none">• Assisting the commercial application of research results by producing a Deer Production Guide that presents up-to-date technical information and findings of research in a practical and readable form.• Production of the Deer Production Guide as a PDF file that can, in the future, be linked by hypertext to an annotated bibliography maintained as separate file on a CD-ROM (Note: This project did not budgeted to undertake hypertext linking of documents).• Ongoing collection, interpretation and reporting of deer industry statistics and databases.
Background	<p>The Australian Deer industry continues to pursue broad community acceptance as a profitable, sustainable Australian Livestock industry. However Australian deer farmers have been slow to adopt improved livestock management, handling technologies and pasture management identified by various research projects. This is in part due to information not being effectively communicated to existing and intending producers. This book will be part of the Industry's ongoing assistance to deer producers that will improve the profitability of their enterprises by understanding existing and new technologies. The book covers a wide range of topics including comprehensive information on industry origins, transport, nutrition, reproduction, pasture management, health, quality assurance programs, handling, body condition scoring, venison production, velvet production, animal selection and the future for the industry. This practical, ready reference manual will provide deer producers with easily accessible information that will encourage efficient and profitable deer management.</p> <p>The expansion of the industry in Australia will also continue to be dependent on objective collection, interpretation and dissemination of positive market information as well as the development of marketing and production strategies based on accurate records.</p>

Research

Project methodology included:

1. A review of deer research from Australia and throughout the world, to produce a practical easy to read summary of technologies known to improve enterprise and industry sustainability and profitability.
2. The production of 2,000 copies of a book of about 300 pages involved a review of each section of the book by appropriately qualified referees selected for their technical competence and expertise in particular fields
3. The Deer Production Guide is provided to RIRDC and the DIAA as a PDF file that will allow future linking, by hypertext, to an annotated bibliography maintained as separate file on a CD-ROM by a software specialist
4. Maintenance of deer industry contact lists, venison statistics and velvet statistics.
5. Regular and open reporting of market and other information to industry.

Outcomes

The 'Deer Farming Handbook' that provides up-to-date practical information on all aspects of deer farming has been printed and is available. The handbook provides Australia's deer farmers with easy access to information that will improve the average performance of Australian deer herds. The Handbook promotes the Deer Industry's National Velvet Accreditation Scheme, provides advice on why it exists, what is involved in obtaining accreditation and how to seek accreditation. It also promotes the Deer Industry's Quality Assurance program, its benefits and how people should seek and maintain accreditation. The 'Deer Farming Handbook' demonstrates the improved returns from improved quality and highlights links that improvement in quality to the adoption of quality assurance program principals and practices. The database of industry venison and velvet statistics has continued its development and statistical data has been collected and reported to industry during the year and in this report

Implications

This report highlights again that the future of the current industry is inextricably linked to demand from international markets over which it has little control and to its ability to produce and market quality assured products that consistently meet consumer specifications. Although other reports have highlighted this fact, to survive, Australia's deer farmers need to receive relatively high returns, compared to other livestock species, for the meat they produce. Keys to consistently high returns include: (i) reducing direct competition in markets; (ii) the development and adoption of Quality Assurance programs that guarantee clients consistently receive product that meets all their specifications, and (iii) boutique marketing in high value markets suited to the scale of production.

Completed projects prior to 2005-2006 - Improve the Profitability of the Australian industry for all stakeholders

Project Title: Generic Investment Proposal Development	
RIRDC Project No.:	DIP-12A
Researcher:	Chris Tuckwell
Organisation:	Rural Industry Developments Pty Ltd PO Box 1105 Gawler, SA, 1105
Phone:	08 8523 3500
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Email:	cdtuckwell@bigpond.com.au
Objectives	<ul style="list-style-type: none"> Specific objectives were to develop a business investment plan for the Australian Deer Industry that can be used to attract large corporate and financial institution investment into deer farming and to seek investment on the basis of the proposal.
Background	<p>To expand and consolidate the deer industry there is a need to attract new investors.</p> <p>The Deer Industry Association has approached some superannuation funds that have advised they may be interested in such an investment (superannuation funds invest about 5% of their funds in agribusiness investments) but require a full business plan for evaluation by an independent review company. The plan would need to provide details of a complete purchase/lease package for a large commercial deer enterprise including land, equipment, animals and management.</p> <p>The total cost of such an investment is likely to be at least \$4 million and will require a complete ten-year financial plan. The enterprise is envisaged as a velvet and venison operation to achieve a dual income stream to offset market fluctuations in each commodity.</p>
Research	<p>Project methodology included:</p> <p>Part A</p> <p>A review of deer industry statistics from RIRDC funded deer industry development projects and other appropriate papers. Develop a draft business investment plan for consideration by appropriate industry representatives Amend the draft plan as required and complete development of the Investment Proposal Develop a PowerPoint © presentation for use with the proposal</p> <p>Part B</p> <p>Develop a dossier of information that can be made available to financial institutions assessing deer enterprise development applications In association with industry leaders present the proposal to selected investment groups Provide the proposal to the DIAA to actively seek investment on the basis of the Plan. The investment proposal package will be provided to leaders of the Deer Industry Association of Australia to allow them to actively seek investment in the industry using the plan developed by this project.</p>

Outcomes

To provide the Australian Deer industry with an investment proposal developed with supportable objective data that encourages new investment in the industry and provides a basis for much needed industry growth. Investment in commercial properties that manage large deer herds will enhance the total industry, as it will strengthen the supply base for venison marketers and velvet processors.

The project's Principal Research Officer, in association with industry leaders present the investment proposal to selected financial institution (s) to encourage their investment in the Australian deer industry. These presentations will also be used by to train and give confidence to industry leaders to provide presentations to other institutions in the future.

Implications

This report highlights that the future of the Australian deer industry and new investment in it, is strongly linked to programs of market development. Investors seek opportunities that are market pulled rather than production pushed.

Advice from investment analysers suggests an investment proposal such as the one developed by this project is unlikely to successfully attract investment given the relatively high value of the Australian dollar and the fact that the proposers of the investment (DIAA) are not offering hands-on involvement and continual interest in the investment project.

Completed projects prior to 2005-2006 - Improve the Profitability of the Australian industry for all stakeholders

Project Title: A complete guide to deer farming in Australia	
RIRDC Project No.:	KDI-26A
Researcher:	Pamela Horsley– Kondinin Group
Organisation:	Kondinin Group Inc. PO Box 913 Cloverdale WA 6105
Phone:	08 9478 3343
Fax:	08 9478 3353
Email:	pamelah@kondinin.com.au
Objectives	<ul style="list-style-type: none"> This project aims to research and report on every area of the Australian deer industry. The report is aimed at farmers interested in farming deer, either as an entirely new enterprise or in conjunction with their existing livestock enterprises.
Background	<p>With an estimated gross value of about \$7 million, it is surprising that very few Australian farmers know much about deer farming and the domestic and export opportunities for venison and velvet.</p> <p>This report was written to provide a clear, informative introduction into deer farming in Australia. It covers areas such as latest production methods and technologies, general deer husbandry, marketing options, economics, getting started, breed options, integration with other livestock and farming enterprises and processing.</p>
Research	<p>The report topics have been thoroughly researched with continuous consultation with industry experts, including Mr Chris Tuckwell, the RIRDC Deer Research Manager and representatives from the Deer Industry Association of Australia.</p> <p>Case studies have been conducted on existing deer farmers including how and why they got involved in the industry and how they have integrated deer farming with their existing enterprises.</p>
Outcomes	<p>The slow growth of the industry has hampered the development deer farming in Australia, but this report shows despite this there are still some large, well-established deer farm operating very successfully. The case studies indicate farms producing both velvet and venison are the most viable, but farmers looking to enter the industry should consider things like location of abattoirs, potential markets and species selection.</p>
Implications	<p>This report will be an invaluable tool for farmers looking to get involved in the Australian deer industry as it provides clear, easy-to-read, practical information on all aspects of the industry.</p>
Publications	<p>Kondinin Group <i>Farming Ahead</i>, March 2004, pp42-57, "Deer farming in Australia – Research Report".</p>

Completed projects prior to 2005-2006 - Facilitate adoption of improved production technologies

Project Title	Venison Quality Assurance
RIRDC Project No.: Researcher: Organisation: Phone: Fax: Email:	DIP-11A Chris Tuckwell Rural Industry Developments Pty Ltd PO Box 1105 Gawler, SA, 1105 (08) 8523 3500 (08) 8523 3301 cdt@bigpond.net.au
Objectives	To continue the improvement of the Australian Deer industry Quality Assurance program by upgrading the existing Deer QAMA software program that will improve the capability of the software and in particular provide deer farmers with a previously unavailable ability to: <ul style="list-style-type: none"> • Record, store, report and analyse data related to animal body weights • Record, store, report and analyse data related to velvet antler production • Undertake some statistical analyses of body weight and velvet weight data.
Background	The project sought to improve the original Deer QAMA program. Suggested improvements will assist enterprise management and are also likely to make the program more attractive to international markets.
Research	Project methodology will included: <ol style="list-style-type: none"> 1. Discussion and negotiation of the requirements for the upgrading of the software of industry representatives with the project's principal researcher and a computer-programming specialist 2. Employing a computer-programming specialist to design and produce an upgraded version of the Deer QAMA software program, under the direction of the Principal researcher 3. Assessment and testing of the software during its development by selected industry representatives 4. Designing the program to allow for future upgrading or amendment should that become necessary.
Outcomes	The `Deer Quality Assurance Management and Analysis' (Deer QAMA) has been rewritten to allow easier recording, storing and reporting of all information that must be maintained by all businesses accredited by the Deer Industry QA program.
Implications	The upgraded Deer QAMA program helps provide credibility and audibility of the Australian Deer industry QA programs that is required by the marketplace while simplifying the requirements of data entry by users.

Completed projects prior to 2005-2006 - Facilitate adoption of improved production technologies

Project Title	Dissemination of results of research projects - 2
RIRDC Project No.: Researcher: Organisation:	DIP-15A Chris Tuckwell Rural Industry Developments Pty Ltd PO Box 1105 Gawler, SA, 1105 (08) 8523 3500 (08) 8523 3301 cdt@bigpond.net.au
Phone: Fax: Email:	
Objectives	To continue the improvement of deer farmer profitability by: <ul style="list-style-type: none"> • Expanding the series of seminars undertaken during 2003/2004 to disseminate information and encourage uptake of results of research • The ongoing collection, interpretation and reporting of deer industry statistics and servicing the Venstat program.
Background	The Australian Deer industry continues to pursue broad community acceptance as a profitable, sustainable Australian Livestock industry. However Australian deer farmers have been slow to adopt improved livestock management, handling technologies and pasture management identified by various research projects. This is in part due to information not being effectively communicated to existing and intending producers. The seminar series during 2003/2004 based on The Deer Farming Handbook (DFH) produced by RIRDC project DIP-9A provided people with comprehensive information on industry origins, transport, nutrition, reproduction, pasture management, health, quality assurance programs, handling, body condition scoring, venison production, velvet production, animal selection and the future for the industry. The success of the first seminar series led to a second series of seminars based on the book. The seminars provided deer producers with a practical interpretation of results of research to encourage efficient and profitable deer management. The expansion of the industry in Australia continues to be dependent on objective collection, interpretation and dissemination of positive market information as well as the development of marketing and production strategies based on accurate records like those reported here.
Research	Project methodology included: <ul style="list-style-type: none"> • Promotion of the new DFH and the practical interpretation and application of research findings contained within it. • Updating and amendment of visual aids and training information from information contained in the DFH to run seminars that provide practical interpretations of production related deer research from Australia and throughout the world. • Development was undertaken in consultation with other industry specialists • Maintenance of deer industry venison statistics and velvet statistics with regular and open reporting of market and other information to industry and related agricultural interests.

Outcomes

A previously developed set of seven PowerPoint © presentations and associated sets of seminar participant notes were developed for use with the seminars. Notes provide links to relative sections in the DFH. As well, an improved spreadsheet was developed to assist people understand some of the nutrition research and more easily and efficiently estimate feed requirements of their stock.

The database of industry venison and velvet statistics has continued its development and statistical data has been collected and reported to industry during the year and in this report

Implications

Seminars conducted as part of this project have demonstrated that Australian deer farmers clearly thought that they benefited from the seminars and felt that they were better able to understand the information presented and were more likely to implement new technologies and management practices on the basis of their new understanding. Seminar results also suggest only a small percentage of deer farmers are aware of results or RIRDC funded research. It appears the seminars are a valuable tool for promoting, explaining and encouraging the adoption of RIRDC funded research projects.

Statistics not only continue to show the depressed nature of the industry but suggest areas where correct application of research results may help improve the long term prospects for the industry.

Completed projects prior to 2005-2006 - Facilitate adoption of improved production technologies

Project Title	Restoration of Cartilage by Novel Gene Therapy	
RIRDC Project No.:	MAT-1A	
Researchers:	Dennis White 16 Denham Avenue, Denham's Beach 2536	Prof. Peter Ghosh Institute of Bone & Joint Research University of Sydney and Royal North Shore Hospital
Organisation:	Matrix Gene Pty Ltd 16 Denham Avenue Denham's Beach 2536	
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Objectives	<ul style="list-style-type: none"> The ultimate objective of the present study was to evaluate the potential of a recently discovered gene DACC-7 as an appropriate means for transfecting chondrocytes or mesenchymal stem cells which when transplanted into the cartilage defects would result in a successful repair. 	
Background	<p>Articular cartilage has little capacity to spontaneously repair the defects caused by traumatic injuries or necrosis which, if untreated, will eventually lead to osteoarthritis (OA).</p> <p>The medical management of OA has achieved limited progress in the past decades; the drugs currently available suppressing the symptoms rather than improving the underlying pathology responsible for the symptoms.</p> <p>More recently researchers have focused on transplantation procedures that offer the potential to repair and restore a new matrix in cartilage defects. By this means it is anticipated that the on-set and/or progression of OA will be ameliorated.</p>	
Research	<p>We have investigated the functions of this gene at both the cellular and molecular level.</p> <p>The protocol used for these studies consisted essentially of dissecting articular cartilage and bone marrow from 4 month old NZ white rabbits and establishing colonies of chondrocytes and mesenchymal stem cells in primary monolayer cultures.</p> <p>These cells were then either transiently non-virally transfected with hDACC-7 or its vector (mock-transfected) using methods already established in our laboratories.</p> <p>The transfected cells were then grown in the calcium alginate biomatrix beads in readiness for the subsequent transplantation operations.</p> <p>Three circular osteochondral defects were created in the patella-femoral groove of both joints of a group of female 3-4 month old NZ white rabbit siblings, into which was transplanted either the biomatrix control, the biomatrix containing the seeded transfected chondrocytes or MSC. One of the defects was left unfilled to serve as a non-treated control.</p> <p>Animals were euthenased at eleven weeks post-surgery, joints dissected out and examined macroscopically, photographed, and osteochondral slices,</p>	

	<p>encompassing the defects, cut with a fine band saw.</p> <p>Histological sections were prepared from these blocks and stained with H&E and Toluidine Blue prior to examination and scoring to ascertain the extent of repair using a published scoring system. The protocol for this study was approved by the Animal Ethics Review Committee of the CSIRO Molecular Sciences Division, North Ryde, Sydney and establishing colonies of chondrocytes and mesenchymal stem cells in primary monolayer cultures.</p> <p>These cells were then either transiently non-virally transfected with hDACC-7 or its vector (mock-transfected) using methods already established in our laboratories.</p> <p>The transfected cells were then grown in the calcium alginate biomatrix beads in readiness for the subsequent transplantation operations.</p> <p>Three circular osteochondral defects were created in the patella-femoral groove of both joints of a group of female 3-4 month old NZ white rabbit siblings, into which was transplanted either the biomatrix control, the biomatrix containing the seeded transfected chondrocytes or MSC. One of the defects was left unfilled to serve as a non-treated control.</p> <p>Animals were euthenased at eleven weeks post-surgery, joints dissected out and examined macroscopically, photographed, and osteochondral slices, encompassing the defects, cut with a fine band saw.</p> <p>Histological sections were prepared from these blocks and stained with H&E and Toluidine Blue prior to examination and scoring to ascertain the extent of repair using a published scoring system. The protocol for this study was approved by the Animal Ethics Review Committee of the CSIRO Molecular Sciences Division, North Ryde, Sydney.</p>
Outcomes	<p>The macroscopic appearance of the joints showed a high level of healing in all defects irrespective of the treatment used. However, the most consistent repair response was obtained for defects filled with DACC-7 transfected mesenchymal stem cells (MSC).</p>
Implications	<p>Although the outcome of this study failed to demonstrate that DACC-7 transfected chondrocytes exhibited <i>superior</i> cartilage healing capacity to other treatments this research has provided critical information which demonstrated that the DACC-7 gene could stimulate pro-chondrocyte division at a higher level than mock transfected cells. Although the underlying mechanism is not clear, the cell division could be precisely controlled as shown in the cell proliferation assay. Therefore, DACC-7 has therapeutic potential for cartilage repair.</p>

Completed projects prior to 2005-2006 - Facilitate adoption of improved production technologies

Project Title:	Dissemination of results of research projects
RIRDC Project No.:	DIP-13A
Researcher:	Chris Tuckwell
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Phone:	08 8523 3500
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Email:	cdtuckwell@bigpond.com
Objectives	<p>To continue the improvement of deer farmer profitability by:</p> <ul style="list-style-type: none"> • Developing and managing a series of seminars to disseminate information and encourage uptake of results of research • Liaising with a representative of the Kondinin group to assist their RIRDC project to increase interest in the deer industry • The ongoing collection, interpretation and reporting of deer industry statistics and servicing the Venstat program
Background	<p>Australian deer farmers have been slow to adopt improved livestock management, handling technologies and pasture management identified by various research projects. This is in part due to information not being effectively communicated to existing and intending producers. The Deer Farming Handbook (DFH) produced by RIRDC project DIP-9A provides a practical, ready reference manual to improve the profitability of deer enterprises by improving understanding of existing and new technologies. This project aimed to provide a series of seminars based on the book, covering a wide range of topics including nutrition, reproduction, pasture management, health, quality assurance programs, handling, body condition scoring, venison production, velvet production, animal selection and the future for the industry. Seminars will provide deer producers with a practical interpretation of results of research that will encourage efficient and profitable deer management. The expansion of the industry in Australia will also continue to be dependent on objective collection, interpretation and dissemination of positive market information as well as the development of marketing and production strategies based on accurate records.</p>
Research	<p>Project methodology included:</p> <ul style="list-style-type: none"> • Promotion of the new DFH and the practical interpretation and application of research findings contained within it. • Development of visual aids and training information from information contained in the DFH to run a series seminars to provide practical interpretations of production related deer research from Australia and throughout the world. • Development was undertaken in consultation with other industry specialists. • Liaison with a representative of the Kondinin group to assist their RIRDC project to increase interest in the deer industry • Maintenance of deer industry venison statistics and velvet statistics with regular and open reporting of market and other information to industry and related agricultural interests.

Outcomes	<p>A set of seven PowerPoint © presentations and associated sets of seminar participant notes were developed for use with the seminars. Notes provide links to relative sections in the DFH. As well, a spreadsheet was developed to assist people understand some of the nutrition research and more easily and efficiently estimate feed requirements of their stock.</p> <p>The database of industry venison and velvet statistics has continued its development and statistical data has been collected and reported to industry during the year and in this report</p>
Implications	<p>Seminars conducted as part of this project have demonstrated that Australian deer farmers clearly thought that they benefited from the seminars and felt that they were better able to understand the information presented and were more likely to implement new technologies and management practices on the basis of their new understanding. On the basis of this finding it appears the seminars are a valuable tool for promoting, explaining and encouraging the adoption of RIRDC funded research projects.</p> <p>Statistics suggest that given the relatively stable price received in domestic markets and an apparent demand that peaks in the winter months in Australia, the domestic markets appear to offer market opportunities for the Australian industry</p>

Completed projects prior to 2005-2006 - Develop international and domestic markets for Australian venison and develop supply chain management

Project Title	National Velvet Accreditation Scheme Database Development
RIRDC Project No.:	DIP-14A
Researcher:	Chris Tuckwell
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Email:	cdt@bigpond.net.au
Objectives	<ul style="list-style-type: none"> To develop an interactive database to record store and report on activities of the National Velvet Accreditation Scheme (NVAS).
Background	Prior to the development of the database produced by this project, limited data records for the scheme were recorded in spreadsheet format. However increasing concern by the AVA about the use of S4 drugs has required that more detailed data about the scheme is recorded and the records are maintained in a format that allows a range of detailed reports to be provided on request of the Chairperson of the Scheme.
Research	<p>Project methodology included:</p> <ol style="list-style-type: none"> 1. Development of an easy-to-use Microsoft Access database that records all information required by the NVAS and allows the existing scheme administrator to produce reports as required. 2. Training of the NVAS administrator in the use of the database.
Outcomes	This project has produced a database that allows recording of required data in a format that provides for a range of required reports. The database allows for future addition of new fields including a future requirement to include National Livestock Identification System (NLIS) numbers.
Implications	This database will assist the NVAS in its ongoing program to ensure consumers of deer velvet and the wider community that adequate animal welfare, product traceability, OH&S standards and other QA standards related to velvet production and harvesting are maintained.

Completed projects prior to 2005-2006 - Develop international and domestic markets for Australian venison and develop supply chain management

Project Title	A domestic market positioning strategy for Australian Venison - A sub-program of RIRDC US-130A
RIRDC Project No.:	LBP-1A
Researcher:	Deborah Moffat
Organisation:	Loulaki Blue Pty Ltd
Phone:	02 9938 3399
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Email:	Deborah@loulakiblue.com
Objectives	<p>The objective of this project was to capture an initial, current snapshot of Australian domestic consumer and food service industry perceptions of venison. This information will assist and facilitate development of an industry strategic plan that is based on satisfying potential consumer requirements and addressing factors currently limiting demand. The information will also identify core attributes of the product that can differentiate it from competitors and thereby identify a compelling positioning for venison around which a new image for the Australian product can be created.</p> <p>The research aims to provide feedback from potential consumers on:</p> <ul style="list-style-type: none"> • Market awareness of the product, range of uses and image • Key attributes of venison • Opportunities identified in the Limiting Factors Report • A possible new image and positioning for venison.
Background	<p>This research project was designed to explore and collaborate the validity of a number of factors identified in Phase 1, Part 1, of the RIRDC program <i>'Development and Implementation of an Industry Endorsed Venison Strategic Plan for Delivering Future Growth'</i> (US-130A) as reported in <i>'Identification of Growth Limiting Factors'</i> (Limiting Factors Report).</p> <p>The research undertaken in this project on potential domestic consumers represents new information and feedback for the industry.</p> <p>The research also included incorporation of questions from the 1996 and 1997 RIRDC funded market research with chefs, undertaken by L. Tume, to enable a point of comparison on usage and factors for increasing demand.</p>
Research	<p>The research comprised a qualitative study encompassing 29 consumers and 6 chefs plus 4 other catering staff of a commercial catering centre through a series of focus groups. An additional 6 chefs were reached through one on one interviews. The chefs selected were from medium level to high-end restaurants and were regular venison users.</p> <p>This was followed by a quantitative study involving 151 consumers in a guided questionnaire response.</p>

<p>Outcomes</p>	<p>Chefs and food service representatives included in the research were all currently using venison and were positively disposed to the product. The overriding factor identified as necessary to increase their existing usage was the need to increase consumer demand. One of the main barriers to increasing customer demand is the very low profile of venison as a red meat among Australian domestic consumers. This concern was also raised by producers and highlighted in the Limiting Factors Report. However, the very positive results from the taste tests, where venison consistently outscored beef indicate that the product has significant potential.</p> <p>The report identifies a number of potential target markets for venison. The most promising is the 'top end' restaurant market.</p>
<p>Implications</p>	<p>The development of a marketing plan to increase the profile of venison and capitalise on the potential of the product should be a priority. The most cost effective marketing approach would focus strategies on identified target markets.</p> <p>It is also suggested that further research be undertaken into the development of recipes for secondary cuts. Education and information regarding this research should be targeted at chefs in mid level restaurants to facilitate the use of these venison cuts into this level. This would assist in the creation of a new market for venison in mid level restaurants.</p> <p>The overriding recommendation is for this latest research be used to assist the development of a comprehensive and staged strategic plan as well as a complementary marketing plan. These plans should recognise the variety of potential target markets and be guided by the need to create a compelling market position for venison based around its identified key attributes. Growing demand for venison will need to be supported by the industry working with all stakeholders – producers and suppliers, chefs and potential Australian domestic consumers.</p>

Completed projects prior to 2005-2006 - Develop international and domestic markets for Australian venison and develop supply chain management

Project Title	Marketing venison products: Trademark and country-of-origin influences and effects
RIRDC Project No.:	VUT-4A
Researcher:	Suku Bhaskaran
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Objectives	<ul style="list-style-type: none"> • To review past studies and analyse the relevance and effectiveness of marketing initiatives focusing on country-of-origin (COO) beliefs and behaviour • To collate and analyse information from past studies that could be used by the Australian venison industry to develop COO based export marketing strategies and tactics
Background	The Australian deer industry has a strong export focus. Nearly 80% of the industry's products are sold into Asian and European markets. Notwithstanding strong competition in export markets, RIRDC believes that there is significant potential to develop export markets for deer products such as venison. The report critically reviews and analyses more than 100 COO studies with the aim of obtaining information that would be useful to the industry in developing venison export marketing plans, strategies and tactics.
Research	Critical review of the literature and analysis of the methodology, context, findings and conclusions in 114 studies on COO based customer beliefs, customer behaviour, marketing strategies and marketing tactics.
Outcomes	The report shows that COO labelling, trademarks and logos combined with appropriate marketing mix (particularly communication) strategies could be useful in market development and market penetration initiatives into some countries and into some market segments in these countries. The venison industry needs to clearly identify the information cues that would generate positive product specific COO beliefs in target markets and develop appropriate marketing mix strategies.
Implications	The report demonstrates the importance of rigorous COO research design (selecting appropriate methods and study contexts) so that marketing strategies and tactics are the outcome of good quality information on target markets and market segments. The report illustrates how the application of inappropriate methodology or study contexts can lead to findings and conclusions that can be misleading. The report provides the Australian venison industry valuable insights regarding COO based customer beliefs and behaviour several countries and for different products.