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Rural Industries Research and Development Corporation

Deer Research in Progress at June 2008 and Projects Completed in 2007-08

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Deer R&D Program

RIRDC Innovation for rural Australia

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In submitting this report, the researcher has agreed to RIRDC publishing this material in its edited form.

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Foreword

This year RIRDC has produced Research in Progress, June 2008, which contains short summaries of continuing projects as well as those that were completed during 2007–2008 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 the Deer R&D Program. It contains all entries from continuing and completed Deer research projects funded by RIRDC in 2007–2008 and previous years.

The objective of the Deer R&D Program is to improve industry performance in four key areas where the industry has identified problems at both whole-of-industry and sector-specific levels.

This research was funded from industry revenue that is matched by funds provided by the Australian Government.

This report is an addition to RIRDC's diverse range of over 1800 research publications, which are available for viewing, downloading or purchasing online through our website:

- downloads at www.rirdc.gov.au/fullreports/index.html
- purchases at www.rirdc.gov.au/eshop

Peter O'Brien
Managing Director
Rural Industries Research and Development Corporation

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Project Title	**Velvet antler use in animals**
RIRDC Project No.:	PRJ-002253
Start Date:	1/02/2008
Finish Date:	31/12/2008
Researcher:	Mr Chris Tuckwell
Organisation:	Deer Industry Association of Australia
Phone:	(08) 8523 3500
Email:	cdt@bigpond.net.au
Objectives	1. Review available literature related to velvet antler use in animals. 2. Develop and undertake a market research study on velvet antler for dogs and horses similar to the research study undertaken in Canada in 2001 and 2002 (Sawchuck 2003). The study will include provision of free samples of velvet antler supplement to selected dog and horse owners, who in return for their free sample, will provide data about their dogs and horses, the results of using velvet and their buying preferences for health products. The work will be undertaken in association with a specialist equine veterinarian and a specialist greyhound veterinarian. 3. Develop a promotional brochure related to the use of velvet antler for animals.
Current Progress	A review of the limited available literature was undertaken prior to the development of project protocols, trial design and dog and horse dose rate schedules. In conjunction with cooperating veterinarians, a research protocol was developed to assist veterinarians assess animals prior to including them in a treatment regime, collect data from owners during the treatment period and for veterinarians to reassess animals at the end of the treatment period. An application to AQIS to import velvet antler powder and tablets was finally obtained in February 2008. After ongoing discussion with AQIS import documentation was accepted and product finally arrived in Australia in April 2008. Data collection forms, supporting documentation for owners and velvet tablets have been distributed to a specialist equine veterinarian and two other veterinarians who will work with dogs. One of the original cooperating veterinarians retired in February 2008 and we are negotiating with an alternate veterinarian to become involved with the project and provide velvet tablets to dogs that meet project criteria. As veterinarians have only had velvet supplies for less than one month and they need to have access to animals that show lameness symptoms required by the project, we have no results to date.

Project Title	**Establishment of a Deer Industry Database**
RIRDC Project No.:	PRJ-002343
Start Date:	1/03/2008
Finish Date:	30/04/2009
Researcher:	Solange Shapiro
Organisation:	Deer Industry Association of Australia
Phone:	03 5596 2323
Email:	shapiros@bigpond.com
Objectives	1. To establish the number of deer farms and deer farmers producing venison and velvet for the domestic and export markets throughout Australia. 2. To establish the number of different deer species being farmed throughout Australia. 3. To establish the number of deer farmers velveting antler and cross referencing this with the existing NVAS database. 4. To establish a database of deer industry levy payers as per the legislation.
Current Progress	This project is progressing well, with all the milestones being met on time. Requests for deer farmer lists from RIRDC, the Levies Management Unit and the National Velvet Accreditation Scheme (NVAS) have been made, and all parties have furnished lists. These farmer lists have been consolidated with the existing DIAA list and edited in consultation with DIAA representatives in each state, to cull the names of farmers who are known to have left the industry. The survey forms and the accompanying letter jointly signed by DIAA and RIRDC have been prepared and approved by RIRDC and the DIAA project reference group. These have been posted to everyone on the consolidated database of known farmers. The return of the replies will allow the refining of the database An advertisement has been prepared for placement in agricultural newspapers in each state, and the reference group has approved the content. The advertisement will be placed in the rural newspapers throughout June.

Project Title	**Communication & Information Programs for the Aust Deer Industry**
RIRDC Project No.:	PRJ-002508
Start Date:	1/03/2008
Finish Date:	30/05/2010
Researcher:	Solange Shapiro
Organisation:	Deer Industry Association of Australia
Phone:	03 5596 2323
Email:	shapiros@bigpond.com
Objectives	To achieve widespread dissemination and use of R&D information by the deer industry by: 1. Deer R&D Newsletter Publication and distribution of the RIRDC Research Newsletter four times a year to all those on the Deer Industry Database listing as well as those that request it through RIRDC or the DIAA. 2. Deer Industry Website The creation of a more interactive intuitive website replacing the existing DIAA web site, the creation of a simple but more up-to-date design which maximises information access and encourages the uptake of the results of research undertaken by the RIRDC Deer R&D Program. Links to RIRDC, other relevant domestic and international websites will be maintained and new ones developed.
Current Progress	This project is progressing well, with all the milestones being met on time. RIRDC Newsletter The first copy of the RIRDC Newsletter under this project (Autumn Issue) has been prepared and printed, and will be distributed by the end of May. Andrew Cowan assembled the content of the newsletter in consultation with the RIRDC Deer Program Manager; with articles being supplied by RIRDC and Andrew's own sources. The distribution list was developed by consolidating the existing RIRDC list with lists supplied by the LMU and the DIAA. This list will be further refined when the Database Project is complete. **Website** The new website designer has been appointed and contracted to complete the work. As a first task, she has managed to gain access to the existing website to edit some incorrect entries as well as removing the names of people no longer in the industry. A thorough face to face briefing session has resulted in a full understanding by both parties of the requirements of the DIAA and the parameters of website design. Following that briefing, the designer has developed a detailed site map in consultation with the DIAA, and will now be working on the general design and 'look' of the site.

Project Title	Scholarship - Timothy McRae
RIRDC Project No.:	PRJ-000553
Start Date:	01/08/2004
Finish Date:	31/03/2008
Researcher:	Timothy McRae
Organisation:	University of Sydney
Phone:	02 6365 7770
Email:	tmcrae@csu.edu.au
Objectives	What methodological processes appear to be significant in developing an industry endorsed strategic plan for the case situation of the Australian venison industry and what are their perceived strengths and limitations?
Background	The broad aim of the research was to develop and implement an industry endorsed strategy that identified choices for growth for all sectors and participant levels of the Australian farmed venison industry, through a portfolio of improved business opportunities and tailored change management strategies.
Research	Outcomes and results for the Australian venison industry: where the case study results from the process undertaken to develop a strategic plan for the Australian venison industry are discussed. Outcomes and results from the strategic process: where the results from the methodological processes undertaken in developing a strategic plan are documented and discussed.
Outcomes	As a result of the strategic process utilised, a final industry endorsed strategic plan was achieved for the Australian venison industry. The successful endorsement of the plan by industry was largely due to the process utilised and the methodology undertaken. The key feature of the process was the constant validation of research outcomes with industry participants. The constant validation and feedback from industry contributed significantly to the success of both the strategic process and strategic plan for the Australian venison industry. The synergies between the results from the analytical process, relationship process and external factors ensured a positive outcome for the strategic process. The combination of the three processes ensured that the strategic process was robust, flexible and investigative.
Implications	The process of developing successful endorsement of a strategic plan for the Australian venison industry relied upon the synergy between analytical and relationship methodologies. The relationship methodology undertaken by the researchers formed a critical process in this development since the researchers believed it was imperative that a positive professional relationship was created with key industry players during the research process. At all stages in the development of the endorsed strategic plan, the researchers attempted to gain as much industry feedback and opinion as possible. This resulted in the researchers regularly consulting with industry stakeholders about the emerging direction of strategy. In turn, this facilitated establishment of

	ownership and the successful endorsement of the strategic plan. The overwhelming endorsement of the final strategic plan by the Australian venison industry provided evidence, at least in a case study approach, that a coordinated strategic process can be successful.
Publications	McRae, T.B, Cox, R.J, and Watson G.K, *A situation analysis of the Australian Venison industry*, Australian Farm Business Management Journal, Vol. 3, no. 1, pp 76-85. Cox, R.J, Watson, G.K, McRae, T.B, and Cunial, C.M, *An Industry endorsed strategic plan for the Australian venison industry*, Australian Farm Business Management Journal, Vol. 3, no. 2, pp 14-25. Cox, R.J, Watson, G.K, McRae, T.B, and Cunial, C.M, *Opportunities and limits to the future of the Australian farmed venison industry*, Extension Farming Systems Journal, Vol. 2, no. 1, pp 15-26. Watson, G.K, Cox, R.J, McRae, T.B, and Cunial, C.M, Development of change management initiatives for the Australian venison industry, Extension Farming Systems Journal, Vol. 2, no. 1, pp 81-90.

Project Title	Australian Foodservice Market Access Strategies for Commercial Venison
RIRDC Project No.:	PRJ-002628
Start Date:	1/11/2007
Finish Date:	30/04/2008
Researcher:	Wayne Street
Organisation:	Hahndorf Venison Supply
Phone:	03 54281488
Email:	wayne.street@streetryan.com.au
Objectives	The overall aim of this project is to offer integrated venison Alliance supply chains a marketing model that addresses key issues that currently limit foodservice market access in the eastern states for Australian domestically produced venison. Specifically the research objectives are: 1. To examine and document the underlying rationale for the unresponsive domestic venison demand experienced by the current distribution and marketing techniques used in the Australian population centres of the eastern states as opposed to the successful marketing models used in populated centres of Adelaide and Perth 2. Collate the collected data into meaningful verified information for logical analysis of recent history, current situation and future projections of Australian domestic venison consumption trends 3. Use of the verified information to assist in identifying, developing, documenting and testing new and innovative marketing strategies for accessing the eastern markets of Australia in a professional manner that will optimise the overall profitability and present opportunities of cost efficiencies for all stakeholders within a commercially structured venison supply chain. 4. To validate the developed strategies through commercial testing for industry uptake.
Research	The proposed was clearly defined into two components and is composed of two stages. Stage 1 involved initial development, confirmation of initial development, and final development: • review of current venison industry and like industries marketing strategies • collate relevant past and present market intelligence • apply new findings • analyse the information • verify the accuracy information • produce benchmarks • develop a documented market plan strategy • initial commercial validation process

	• first major review. Stage 2 involved the commercial implementation of the documented Marketing Plan: 1. On-site research to validate initial findings. 2. Completion and analysis.
Outcomes	The project has delivered on these objectives through objective analysis of existing data and studies, a structured survey of foodservice outlets in five Australian capital cities, and workshops and discussions with industry participants.

Projects completed in 2007—2008 – Supply chain efficiency, quality management and value adding

Project Title	Fallow Venison Development Program
RIRDC Project No.:	PRJ-000873
Start Date:	15/06/2007
Finish Date:	5/05/2008
Researcher:	Chris Tuckwell
Organisation:	National Fallow Alliance
Phone:	(08) 8523 3500
Email:	cdt@bigpond.net.au
Objectives	Establish a pilot program to investigate an integrated approach to overcoming constraints to improving the demand and returns for fallow deer venison by: • developing and testing new smallgoods and frozen fallow deer products • assessing the impact of an automated carcase lifter/skin puller and boning room chiller extension on abattoir throughput and carcase quality • assessing the impact of an associated marketing and promotion campaign for fallow deer venison.
Background	A large percentage of the National Fallow Alliance's (NFA) venison currently enters the market through wholesale distributors. While the NFA wants to continue development of its wholesale markets, it also intends to take advantage of the higher returns achieved from the retail market by aggressively developing its retail market (restaurants, hotels, etc) and increase the proportion of its venison that is sold directly to retail clients. Available data clearly highlights the proportion of carcases sold as trim and the relatively high percentage of trim that is sold as low value pet food. Increase in demand from the hospitality and smallgoods markets will significantly improve returns for all sections of the alliance chain. This approach can be facilitated by an upgrade of abattoir facilities that will reduce processing costs and improve meat quality.
Research	Methodology involved: • piloting new smallgoods and frozen products to assess consumer interest and potential demand • testing the impact of a new lifter/skinner and boning room extension in the Alliance's abattoir • piloting a fallow venison marketing and promotion campaign • evaluating the outcomes to assess the extent to which the expected benefits have been realised.
Outcomes	Project outcomes include: • an understanding of consumers' preferences for a new range of venison smallgoods and frozen products • a substantial increase in the demand and associated value of NFA venison products

- a significant reduction in fallow deer killing costs and an improvement in meat quality and shelf life
- improved understanding of the effectiveness of an integrated program of product development, marketing and promotion on the demand and returns for fallow deer venison.

One of the most significant factors that demonstrate the success of this project is the small but demonstrable increase in profitability of all sectors of the National Fallow Alliance.

Access to improved skinning and chilling facilities in the abattoir have resulted in an increase of $8.00 per head paid directly to NFA producer members and a measurable increase in the average quality of carcases and meat produced by the abattoir.

As a direct result of the marketing program and the associated increased demand for fallow venison products the wholesale price of venison cuts sold to the market has increased by an average of about 25% since December 2007. The increase has been distributed to all NFA members and resulted in:

(i) An average increase of $4.00 per head paid to NFA producer members as a result of marketing programs.

(ii) A reduction in wholesale price of $0.20/kg (equivalent of $1.00/head) to the NFA retail member.

(iii) An increase in return of $3.00/head to the processor/wholesaler member.

Implications

The presentation of promotional information concentrating on secondary cuts of fallow venison developed by this project has seen the retail sale of such products double since December 2007 while the retail demand for primary cuts has remained constant.

This improvement in demand for value added secondary cuts of venison was a particular target outcome for this project.

Another direct outcome of the project research has been an increased awareness and acceptance of fallow venison by consumers that is demonstrated by increased sales of value added products made from secondary cuts of fallow venison at two selected gourmet food outlets in South Australia.

Finally, the demand for smallgoods developed and promoted by this project has seen the volume of trim consigned to pet food reduced by half since the project began.

All of these factors will continue to improve farmer returns and encourage renewed interest in the fallow deer industry by demonstrating improving and farmer returns and stability of domestic market demand.

Publications

- Fallow Venison Recipe Book.
- Two Fallow Venison promotional brochures.
- One Fallow Venison Smallgoods promotional brochure.
- One Fallow Venison Gourmet products promotional brochure.

A PowerPoint7 presentation for use with NFA marketing programs.

Projects completed in 2007—2008 – Supply chain efficiency, quality management and value adding

Project Title	Improved knowledge constraints to acceptance of value-added venison products – Phase I
RIRDC Project No.:	PRJ-000913
Start Date:	30/08/2007
Finish Date:	5/07/2008
Researcher:	Ailsa Page
Organisation:	Alpine Valleys Venison Alliance
Phone:	03 9687 7400
Email:	ailsa@apmarketingworks.com.au
Objectives	To identify the factors that constrains entry into retail space of value-added venison products. Research will include primary and secondary research relating to retailers' expected deliverables from their suppliers, including existing and new product development, packaging and marketing support. Final steps involve developing a generic marketing support strategy, new product development and testing procedure as a case study for use by other venison alliances and other new food industry businesses.
Background	Alliance venison sales are well established in food service and farmers' market sectors, but not in Melbourne retail space. Approaches to potential retailers have indicated reluctance to take up the products due to perception that they will be a 'hard sell' without marketing and consumer education support.
Research	Objective 4 – Primary research into consumers' attitudes to products and marketing messages (presented in trial marketing point of sale material). Objective 5 – Develop market support package and present to retailers. Obtain retail support for Alliance product range. Objective 6 - Monitor effectiveness of marketing material and products over six months. Objective 7 – Generic marketing and new product development strategy as Powerpoint presentation, articles, case study etc. for release into venison alliance and general small food manufacturers' market place.
Outcomes	Objective 4 : Completed 20th November • action plan for consumer research developed including dates for tastings and survey sessions held at four retail outlets premises • research tool developed and procedure to introduce research project to customers developed • 81 surveys were collected and approximately 150 people involved in taste testing • marketing materials and new packaging trialled • report compiled by Consultant and delivered to Alliance members. Objective 5: Completed March 2008 • retail customer target list has been consolidated.

	• pricing structures have been determined • discussions are taking place however may need to leave until less busy for retailers • meeting with designer, NE Venison and consultant took place to finalise new packaging and image • delays with designer being on holidays in Summer • meeting with retailers in Melbourne and Victoria held • research previously gained advised that the most preferred form of marketing activity by retailers was taste testing • due minor problems with new packaging style under development to meet retailers expectation, new sales pitches for more outlets was put off until problems rectified. Objective 6: Completed April 2008 • developed sales procedure to monitor sales and detect marketing support required • list of questions developed for retailer feedback • procedure developed for how often to make contact with retailer • sales results and feedback compiled and reported to Alliance. Objective 7: Completed April 2008 final report developed outlining generic strategy using lessons and information gleaned throughout this research project • PowerPoint presentation developed • media release/magazine article written • final report submitted to Alliance and RIRDC.
Implications	Improved communications between producers (butchers), wholesalers, retailers and end consumers on how to best meet consumer requirements. System established to approach new retail outlets and develop market for venison smallgood products.
Publications	Media Release – Breaking into Metro Retail. Powerpoint Presentation – Retail Distribution Expansion Project.

Projects completed in 2007—2008 – Supply chain efficiency, quality management and value adding

Project Title	Meeting Regional Abattoirs Requirements for Aust. Domestic Processing of Deer
RIRDC Project No.:	PRJ-002630
Start Date:	1/11/2007
Finish Date:	30/04/2008
Researcher:	Wayne Street
Organisation:	Hahndorf Venison Supply
Phone:	03 54281488
Email:	wayne.street@streetryan.com.au
Objectives	The aim of this project is to meet an industry recommended research need identified by the Hahndorf Venison Alliance's (the Alliance) endorsed Commercial Alliance Business Plan (CABP) to broaden opportunities for deer slaughter facility access in a way that offers structured venison supply chains opportunities to introduce economic efficiencies and market development strategies The fulfill this required industry need, the proposed research core objective will be to: • locate and examine the current accreditation status and the level of applied best practice principals of regional domestic listed abattoirs throughout South Australia and the south western districts of Victoria • determine the level of commercial deer industry links with abattoirs within the study region • discover the criteria required to be met that will encourage continued commercial industry links The information delivered will support the measurement of the economic impact of how increases or restrictions to slaughter floor access will influence the specific commercial market development strategies of a venison supply chain. • are currently accredited to slaughter deer, slaughtering deer and comply with industry best practice • are currently accredited to slaughter deer, slaughter deer but require upgrading to meet industry best practice • are not accredited to slaughter deer but may comply with industry best practice with minor upgrading of an existing facility for the addition of deer to an accreditation • are not accredited to slaughter deer but may comply with industry best practice with major upgrading of existing facilities for the addition of deer to an accreditation. The research will provide current situation analysis and fundamental information of venison industry expectations for the continued access to Australian domestic slaughter facilities in addition to that required to open new opportunities.
Background	The national meat hygiene regulations that have been developed, adopted and legislated through AS 4696:2002 Australian Standard for the Hygienic Production and Transportation of Meat and Meat Products for Human Consumption – SCARM Report No 80, have eliminated the

	requirement of meat transfer certificates for cross border meat movements. However, the implementation and enforcement of AS 4696:2002 has seen the closure of many country slaughterhouses due the reluctance of the operators to invest in expensive upgrading to meet national standards. This has resulted in slaughter facility closures and an overall reduction in available slaughter options. The local county slaughterhouses that chose to upgrade to abattoir standard focussed upon the bread and butter traditional livestock slaughtering rather than the more specialised facilities required to process deer. Two known abattoirs that did upgrade as multi species facilities within the proposed research study region have since failed. Many local country slaughterhouses that once offered deer slaughtering options have ceased operating forcing venison farmers to look at alternative slaughter arrangements. In many cases accessing these facilities involves long haul livestock transport. Evidence suggests long haul transport is not conducive to: • carcass quality • animal welfare • cost efficiencies.
Outcomes	The project has addressed the objective by compiling details on suitable abattoir operations, conducting site visits and negotiations, establishing a "hub" network of deer processing abattoirs, and moving towards the establishment of formal entities and agreements for the supply chain.

Projects completed in 2007—2008 – Supply chain efficiency, quality management and value adding

Project Title	Geoffrey Watson Consulting – Consultancy to the Market Focused Venison Alliances
RIRDC Project No.:	PRJ-002694
Start Date:	25/10/2007
Finish Date:	16/06/2008
Researcher:	Geoffrey Watson
Organisation:	Geoffrey Watson
Phone:	(02) 6365 1235
Email:	watson1235@gmail.com
Objectives	To provide expert advice for the Venison Alliances Steering Committee and write a report on the Market Focused Venison Alliances (MFVA) for Industry**.**
Background	The Venison Market Focused Alliance Project is a RIRDC funding support initiative that aims to provide a trigger for the establishment and further development of supply chain and cooperative structures within the Australian Deer industry. Stage 3 of this program addressed development initiatives to improve the commercial viability each of the three Alliances.
Research	Activities were undertaken that supported the role of the Steering Committee as outlined in the above objectives. Activities were also undertaken to research and complete the Final Report covering the entire Market Focused Alliances Project
Outcomes	Part 1: Stage 3 applications and reports of the 3 Alliances were reviewed and Evaluated under Steering Committee guidelines. Part 2: A Final Report to the Deer Industry Association was delivered on time through RIRDC and accepted by DAFF as the Stage 3 funding body It is envisaged that a further rewritten report will be commissioned and released to the industry in August 2008.
Implications	This project has demonstrated the value of stage by stage investment of government funds to assist a small livestock industry facing critical viability problems. The MFVA approach has demonstrated that it can: • even up power imbalances between producers and processors and create avenues for cost savings that are passed onto all operators in an alliance • offer new marketing initiatives for adding customer value in terms of improved product specifications to producers and processors and develop new products that can create new markets and address problems of how to value-add to secondary cuts • create new relationships with retailers and the food service industry and develop marketing and promotional materials that can increase the demand for Australian Venison on Australian and overseas dinner plates • on the producer front which was of particular interest in this program: • cost savings passed onto producers of 12.5% have been reported by one Alliance once regional abattoir options are fully implemented.

	Price increases to producers from 16% to 24% have been reported by another Alliance together with a 50% reduction in the proportion of carcases being sent to lower priced pet food. It is possible to foresee that the support funding provided to it under this program will be repaid within the next three and half years if current operating conditions continue • a third Alliance foresees price increases for its producers once the strategies actioned under this initiative come into full operation.
Publications	Watson, G.K. 2008. Final Report To The Deer Industry Association Of Australia, The Rural Industries Research And Development Corporation, The Department Of Agriculture Fisheries And Forestry. Confidential, unpublished, 31st May.

Project Title	**Study of the relationship between body condition score, carcass composition and consumer perception of venison quality**
RIRDC Project No.:	UWS-18A
Researcher:	Dr Robert Mulley
Organisation:	University of Western Sydney
Phone:	(02) 4570 1438
Fax:	(02) 4570 1383
Email:	r.mulley@uws.edu.au
Objectives	• 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 have 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	Mulley R., Hutchison C, Flesch J., Wiklund E. and Nicetic O. (2006) Venison Quality - The relationship of body condition score with consumer perception. RIRDC Publication No 06/043. 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. 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 for batter kottkvalitet. Rangifer Report 10, pp. 99-104 (in Swedish with English abstract).

Project Title	Optimum weaning time of fallow deer in southern Australia
RIRDC Project No.:	SAR-41A
Researcher:	Dr Phil Glatz and Dr Yingjun Ru
Organisation:	South Australian Research and Development Institute
Phone:	(08) 83037786
Fax:	(08) 83037689
Email:	Glatz.phil@saugov.sa.gov.au
Objectives	• Improve growth rate of weaners during weaning; • Improve profitability of deer farming.
Background	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. 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.
Research	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. 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.
Outcomes	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.
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.

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
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Objectives	• 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	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 NaCI/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.
Research	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.
Outcomes	• 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.

Projects completed prior to 2007-08 – Improve the profitability of the Australian industry for all stakeholders

Project Title	Industry statistics
RIRDC Project No.:	DIP-17A
Researcher:	Mr Chris Tuckwell
Organisation:	Deer Industry Projects & Developments Pty Ltd
Phone:	(08) 8523 3500
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Objectives	To assist development, expansion and confidence in the Australian deer industry by: 1. Ongoing maintenance and regular updating of deer industry databases. 2. Regular interpretation and reporting of deer industry statistics.
Background	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.
Research	Project methodology included: 1. Maintenance and regular updating of: • industry contact lists • statistics related to venison and velvet production • contact with and provision of industry data to State and Federal government agencies • the NVAS database software. 2. Regular and open reporting of market and other information to industry and related agricultural interests.
Outcomes	The ongoing development of the Australian deer industry will continue to be dependant on a planned approach to Research and Development that is based on accurate and up-to-date industry statistics. The project has provided objective collection, interpretation and dissemination of market information.
Implications	Statistics continue to show the generally depressed nature of the industry as well as the significant improvement in velvet antler return. They also suggest areas that may be important considerations for future research and development emphasis.
Publications	Tuckwell C. (2007). Deer Industry Statistics. RIRDC Project No. DIP-17A.

Projects completed prior to 2007-08 – Improve the profitability of the Australian industry for all stakeholders

Project Title	Facilitate industry development
RIRDC Project No.:	DIP-16A
Start Date:	01-Dec-2005
Finish Date:	30-Nov-2006
Researcher:	Mr Chris Tuckwell
Organisation:	Deer Industry Projects & Developments Pty Ltd
Phone:	(08) 8523 3500
Fax:	(08) 8523 3301
Email:	cdt@bigpond.net.au
Objectives	To assist development, expansion and confidence in the Australian deer industry by: • 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.
Background	Encouragement of consumers to consider products of the Australian deer industry must be supported by objective promotional material that highlights the positive aspects of the products and provides information about their ideal preparation. Updates of promotions material could link well with current research undertaken at the University of Western Sydney. The exiting Five-Year Deer Industry Research and Development Plan covers the period 2000-2005. A new plan that identifies appropriate, up-to-date, industry supported key objectives for R&D investments is necessary. The plan will be aimed at supporting the profitable development of the Australian deer industry. 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.
Research	Project methodology included: Undertaking a review of existing promotional material and provide a detailed summary of available pamphlets, original art work etc. With consideration of the final report from the RIRDC funded project US-103A and in consultation with industry stakeholders, develop a new Five Year Plan for the Australian Deer Industry. Maintenance and regular updating of: • industry contact lists • statistics related to venison and velvet production

	• contact with and provision of industry data to State and Federal government agencies • the NVAS database software. Regular and open reporting of market and other information to industry and related agricultural interests.
Outcomes	Future deer industry development and promotional programs will rely on production and promulgation of appropriate promotional material. Cost effective production of new material and reproduction of existing material such material will be dependent on knowledge about and availability of existing material and previously developed art work. This project has catalogued available information. With consideration of available up-to-date information including that from the RIRDC project US-103A input was provided during the development of a new Five-Year Deer Industry Research and Development Plan will be developed. The project continued objective collection, interpretation and dissemination of market information.
Implications	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.
Publications	Tuckwell C. (2007). Facilitate Industry Development. RIRDC Project No 07/174.

Projects completed prior to 2007-08 – 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
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Objectives	• Analyse the costs of production, and set benchmarks as industry standards. • Address the production issues of meeting carcase 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 bench marking, feeding deer to meet carcase specifications and marketing deer at the optimum time. By implementing the research into nutrition deer farmers are able to meet carcase 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 bench marks 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	Tuckwell, C. (1998) Australian Deer Industry Manuals RIRDC Publications.

Cameron G. (2005) Research Uptake by Deer Farmers pilot program Research Publication No. 05/127.

Beatson, N. Campbell, A. & Judson, G. (2000) Deer Industry Manual New Zealand Deer Master Project South Canterbury & North Otago Branch NZDFA.

Prograze ® NSW Agriculture.

BizCheck for Red Meat ® Enterprise Health Check® Meat and Livestock Australia.

Projects completed prior to 2007-08 – Improve the Profitability of the Australian industry for all stakeholders

roject Title:	Deer Production Handbook and Industry Statistics
RIRDC Project No.:	DIP-9A
Researcher:	Chris Tuckwell
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Objectives	Specific objectives were to continue the improvement of deer farmer profitability by: • 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	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. 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.
Research	Project methodology included: • 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. • 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. • 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. • Maintenance of deer industry contact lists, venison statistics and velvet statistics. • 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.
Publications	Tuckwell C. (2004). Deer Production Handbook and Industry Statistics. RIRDC Publication No. 04/042.

Projects completed prior to 2007-08 – Improve the Profitability of the Australian industry for all stakeholders

Project Title:	Generic Investment Proposal Development
RIRDC Project No.:	DIP-12A
Researcher:	Chris Tuckwell
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Objectives	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	To expand and consolidate the deer industry there is a need to attract new investors. 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. 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.
Research	Project methodology included: **Part A** 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 **Part B** 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.
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.

Projects completed prior to 2007-08 – 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
Organisation:	Kondinin Group Inc. PO Box 913 Cloverdale WA 6105
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Objectives	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	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. 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.
Research	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. 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.
Outcomes	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.
Implications	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.
Publications	Kondinin Group Farming Ahead, March 2004, pp42-57, “Deer farming in Australia – Research Report”.

Projects completed prior to 2007-08 – Facilitate adoption of improved production technologies

Project Title	Venison Quality Assurance
RIRDC Project No.:	DIP-11A
Researcher:	Chris Tuckwell
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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: • 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: • 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 • 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 • Assessment and testing of the software during its development by selected industry representatives • 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.
Publications	Tuckwell C. (2004). Upgrade of Deer QAMA Software RIRDC Publication No. 04/172.

Project Title	Dissemination of results of research projects - 2
RIRDC Project No.:	DIP-15A
Researcher:	Chris Tuckwell
Organisation:	Rural Industry Developments Pty Ltd PO Box 1105 Gawler, SA, 1105
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Objectives	To continue the improvement of deer farmer profitability by: • 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: • 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.

Projects completed prior to 2007-08 – 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
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Objectives	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	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). 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. 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.
Research	We have investigated the functions of this gene at both the cellular and molecular level. 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. These cells were then either transiently non-virally transfected with hDACC-7 or its vector (mock-transfected) using methods already established in our laboratories. The transfected cells were then grown in the calcium alginate biomatrix beads in readiness for the subsequent transplantation operations. 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. Animals were euthanased at eleven weeks post-surgery, joints dissected out and examined macroscopically, photographed, and osteochondral slices,

	encompassing the defects, cut with a fine band saw. 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.
Outcomes	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).
Implications	Although the outcome of this study failed to demonstrate that DACC-7 transfected chondrocytes exhibited *superior* 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.

Project Title:	**Dissemination of results of research projects**
RIRDC Project No.:	DIP-13A
Researcher:	Chris Tuckwell
Organisation:	Rural Industry Developments Pty Ltd PO Box 1105 Gawler, SA, 1105
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Objectives	To continue the improvement of deer farmer profitability by: • 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	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.
Research	Project methodology included: • 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	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. 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. 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. 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

Project Title	Deborah Moffat - Presentation of LBP-1A "A domestic market positioning strategy for Australian Venison" findings
RIRDC Project No.:	LBP-2A
Researcher:	Ms Deborah Moffat
Organisation:	Loulaki Blue Pty Ltd
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Objectives	To present the key messages from RIRDC Project LBP-1A: "A domestic market positioning strategy for Australian Venison" to industry.
Background	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. 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: • 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.
Research	Session Details Date: Tuesday 25 October 2005 Location: Hahndorf Venue: Hahndorf Hill Winery Date: Wednesday 26 October 2005 Location: Balhanna Venue: Balhanna Hotel Date: Tuesday 29 November 2005 Location: Orange Venue: Charles Sturt University, Orange Campus
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.

Projects completed prior to 2007-08 – 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: **Organisation:**	Chris Tuckwell Rural Industry Developments Pty Ltd PO Box 1105 Gawler, SA, 1105
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Objectives	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	Project methodology included: 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.
Publications	Tuckwell C. (2005). National Velvet Accreditation Scheme Database Development. RIRDC Publication No. 05/122.

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
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Objectives	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. The research aims to provide feedback from potential consumers on: • 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	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 *'Development and Implementation of an Industry Endorsed Venison Strategic Plan for Delivering Future Growth'* (US-130A) as reported in *'Identification of Growth Limiting Factors'* (Limiting Factors Report). The research undertaken in this project on potential domestic consumers represents new information and feedback for the industry. 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.
Research	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. This was followed by a quantitative study involving 151 consumers

	in a guided questionnaire response.
Outcomes	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. The report identifies a number of potential target markets for venison. The most promising is the 'top end' restaurant market.
Implications	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. 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. 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.

Projects completed prior to 2007-08 – 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	• 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.
Publications	Bhaskaran S. (2005). Marketing Venison Products – Trademark and country-of-origin influences and effects. RIRDC Publication No. 05/137.

RIRDC Deer Research Publications

Title	Publication No.	Cost
Fallow Venison – 38 Inspirational, Delicious Recipes for All	07/193 (2007, 80pgs)	$15
Deer Industry Statistics	07/174 (2007, 27pgs)	$15
Deer Research in Progress	07/014 (2007, 34pgs)	Free
Deer Industry R&D Plan 2006-2011	06/133 (2006, 48pgs)	Free
Venison Quality – The relationship of body condition score with consumer perception	06/043 (2006, 52pgs)	$16
Marketing Venison Products – Trade Mark and Country of Origin Influences and Effects	05/137 (2005, 26pgs)	$16
A Review of Research Uptake by Deer Farmers	05/127 (2005)	Web only
Upgrade of Deer QAMA Software	04/172 (2005, 15pgs)	$16
Effect of Salt intake on Feed intake and Growth Rate of Fallow and Red Weaner Deer	04/054 (2004, 42pgs)	$16
Diagnostic Tests for Johne's Disease in Deer	03/100 (2003, 35pgs)	$16
Velvet Antler: A Summary of the Literature on Health Benefits	03/084 (2003, 35pgs)	$16
Deer Farming in Australia	02/128 (2003, 42pgs)	$16
Australian Deer Industry – Velvet Antler & Venison Co-Products Language & Specifications Guide- Korean Language Edition	02/124 (2002, 64pgs)	$48
Australian Deer Industry – Velvet Antler & Venison Co-Products Language & Specifications Guide- Chinese Language Edition	02/123 (2002, 64pgs)	$48
Energy & Protein Requirements of Fallow Deer Under Mediterranean Environment	02/110 (2003, 58pgs)	$16
Australian Deer Industry – Velvet Antler & Venison Co-Products Language & Specifications Guide- English Language Edition	02/080 (2002, 64pgs)	$48
Australian Velvet Antler & Deer Co-Products – Part B	02/058 (2002, 18pgs)	$16
Performance of Red Deer Calves After Early Weaning	02/010 (2002, 21pgs)	$16
Deer: Quality Assurance, Strategic Alliances & Industry Development	01/120 (2001, 63pgs)	$16
Deer Publications Comprehensive International Biography	01/110 (2001, 98pgs))	Free
Growing Weaner Deer-Overcoming nutritional constraints in SA	01/107 (2001, 17pgs)	$16
Nutritional Requirements for Pregnant & Lactating Red & Fallow Deer	01/095 (2001, 136pgs)	$26
Venison Quality Assurance	01/094 (2001, 36pgs)	$16
Australian Velvet Antler & Deer Co Products	01/085 (2001, 32pgs)	$16
Australian Deer Industry Manual Number 1 (second edition)	01/058 (2001, 35pgs)	$21
Deer Antler-Velvet Research in Australia & Overseas	01/030 (2001, 21pgs)	$16
Development of Niche European Venison Markets	00/172 (2000, 26pgs)	$16
Niche Markets for Venison	00/118 (2000, 19pgs)	$16
Salt intake & Red & Fallow Deer-A literature review	00/108 (2001, 14pgs)	$16
Ecchymosis (Blood Splash) in Deer Carcasses	00/069 (2000, 10pgs)	$16
Eating Qualities of Venison from Red and Fallow Deer	00/049 (2000, 25pgs)	$16
Deer in Queensland	00/019 (2000, 44pgs)	$16
Development of the Deer Industry	99/092 (1999, 84pgs)	$16
Exporting Venison to Israel	99/058 (1999, 13pgs)	$16
Ecchymosis – What causes it?	99/048 (1999, 150pgs)	$21
Adding Value to Venison Forequarters and Trimmings	98/102 (1998, 84pgs)	$16
Second World Deer Farming Congress	98/100 (1998, 35pgs)	$16
Australian Deer Industry Manual – Part 7	98/058 (1998, 54pgs)	$16
Australian Deer Industry Manual – Part 6	98/051 (1998, 42pgs)	$16
Australian Deer Industry Manual – Part 5	98/030 (1998, 10pgs)	$16
Australian Deer Industry Manual – Part 4	98/029 (1998, 20pgs)	$16
Australian Deer Industry Manual – Part 3	98/028 (1998, 25pgs)	$21

Title	Publication No.	Cost
Australian Deer Industry Manual – Part 2	98/013 (1998, 47pgs)	$26
Maintaining Year-Round Production of Quality Venison	98/001 (1998, 87pgs)	$16
Australian Deer Industry Manual Number 1	97/071 (1997)	$26
Venison Market Development Programs Towards 2000	97/032 (1997, 55pgs)	$41
Improving the Marketability of Deer Velvet & Co-products	97/028 (1997, 96pgs)	$16
Manufacturer's Guide to Venison Forequarter	96/008 (1996)	$10
Processing of deer & other farmed game	95/002 (1995, 44pgs)	$10
Domestic Marketing of Deer By-Products	94/004 (1994, 91pgs)	$10
Venison Market Development Plan	92/006 (2003, 98pgs)	$16
Deer Marketing & Production Safety	91/001 (1991, 228pgs)	$10

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DEER

RIRDC Publication No. 08/076

The Australian deer industry is based primarily on breeding temperate deer species (fallow, red deer and elk) for production of venison, velvet antler and venison co-products. The industry has a strong export focus with about 80% of product sold into Asian and European markets.

Production is concentrated in the south-eastern states with some breeding of temperate species in other states and some tropical species (rusa and chital deer) in Queensland. The estimated GVP of the industry for 2006–07 is $2.58 million, 70% from venison and 30% from velvet antler, with some local value-adding.

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