

2nd Governance Council Meeting of Venison Supply Systems Programme

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Presentation outline



1. Introduction (Funding and Objectives)
2. Project updates 2007/08
3. Variances on milestones 2007/08
4. Outputs 2007/08
5. Planned milestones for 2008/09
6. New projects starting 2008/09
7. Issues

1. Introduction

FRST Contract C10X0709 “Venison Supply Systems” 10 Oct 2007 – 30 Sept 2013

\$1.5 M (GST incl.).....FRST
\$0.46 M (GST incl).....DEEResearch
\$0.12 M (GST incl).....Landcorp

Total \$2.08 M per annum



“Venison Supply Systems”

Team of 9 FTE's
(‘full-time
equivalents’).....FRST
speak

In reality only 4 people
are >80% funded within
the VSS programme

About 15 others across
AgR and the
Universities have
varying contributions to
the programme (10-
80% funded)



“Venison Supply Systems”



“To improve the biological and economic efficiency of the NZ venison industry, thereby enhancing long-term financial and environmental sustainability”

“The Productivity Strategy”



Objectives



1. Venison market supply systems
 - * overcoming seasonal constraints
 - * maximising growth performance
 - * reducing management costs
2. Enhanced on-farm productivity from venison systems
 - * improving technology/knowledge adoption
 - * reducing the impacts of parasitism
3. Environmentally responsible deer systems
 - * mitigating environmental damage issues
 - * maximising performance on high-country systems
 - * moderating industry impacts of land-use change

2. Project Reporting



- (a) Genetics of seasonality
- (b) Physiology of seasonality (oestrous cyclicity)
- (c) Rumen development and calf growth
- (d) Immuno-castration and liquid N2 pedicle suppression
- (e) Parasitology
- (f) Extensive deer systems
- (g) Urine sensors for deer
- (h) Focus Farms
- (i) Venison quality



(a) Genetics of seasonality



Database of conception date on approximately 1700 animals established, with quality DNA stored

Analysis indicates a heritability for adults of 0.16...why has this dropped from 0.41 (drought, late joining ???).

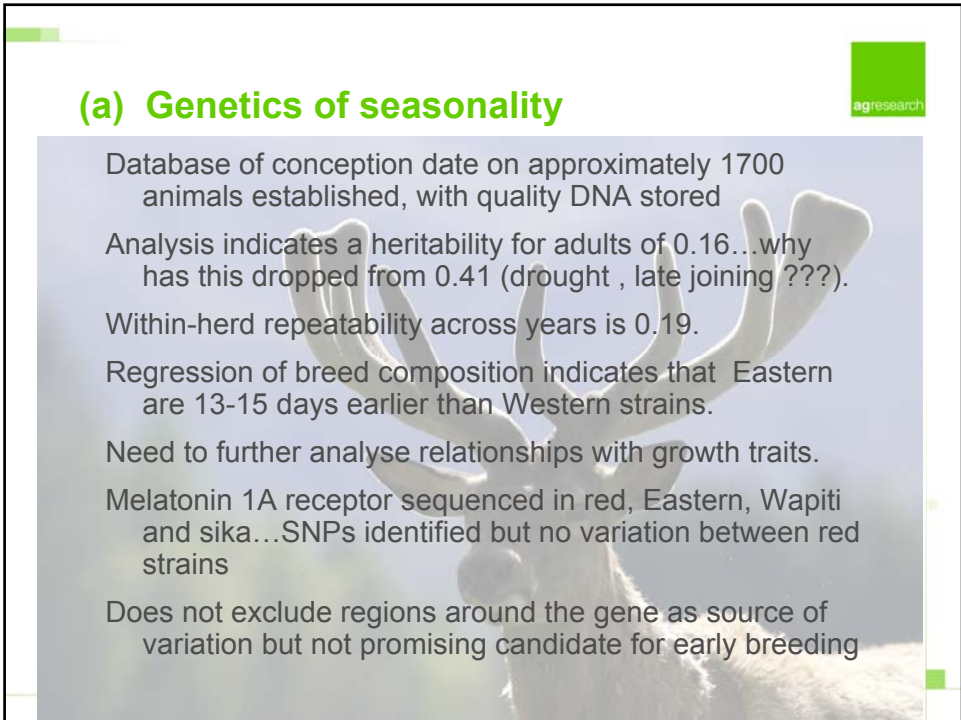
Within-herd repeatability across years is 0.19.

Regression of breed composition indicates that Eastern are 13-15 days earlier than Western strains.

Need to further analyse relationships with growth traits.

Melatonin 1A receptor sequenced in red, Eastern, Wapiti and sika...SNPs identified but no variation between red strains

Does not exclude regions around the gene as source of variation but not promising candidate for early breeding



Genetics of seasonality continued ...

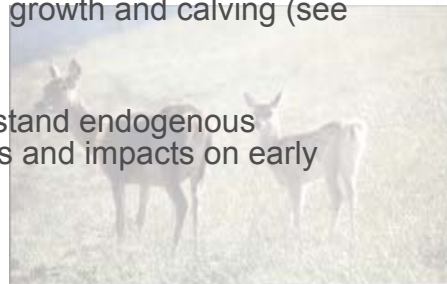
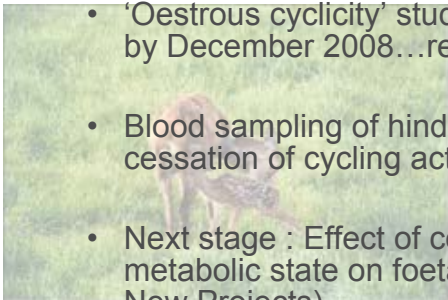


- Re-strategise the programme based on recent technology developments.
- Establish phenotype and DNA resources which allow quantitative genetics on conception date and other traits (e.g. eye muscle area scans, Johne's Disease resistance, etc) (see New Projects).

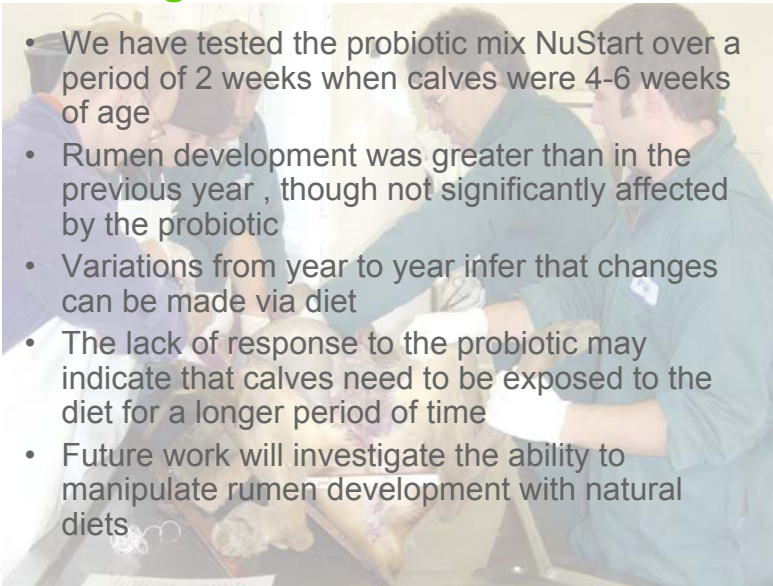
(b) Physiology of seasonality



- 'Oestrous cyclicity' study is on-track for completion by December 2008...reporting by March 2009
- Blood sampling of hinds is continuing until cessation of cycling activity (November 2008)
- Next stage : Effect of conception date and hind metabolic state on foetal growth and calving (see New Projects)
- Basic research to understand endogenous ('internal') cycles of hinds and impacts on early breeding



(c) Rumen development and calf growth



- We have tested the probiotic mix NuStart over a period of 2 weeks when calves were 4-6 weeks of age
- Rumen development was greater than in the previous year, though not significantly affected by the probiotic
- Variations from year to year infer that changes can be made via diet
- The lack of response to the probiotic may indicate that calves need to be exposed to the diet for a longer period of time
- Future work will investigate the ability to manipulate rumen development with natural diets

(d) Immuno-castration and pedicle/antler suppression



- Immuno-castration study is on-track...investigating the effects of anti-GnRH immunisation on weaner stag growth and antler development
- Liquid nitrogen suppression of pedicle/antler development (see New Projects) ...promising developments with sika deer in China
- Genetics of late pedicle initiation...phenotype recording of male weaners on Landcorp nucleus herds underway

(e) Parasitology



- The programme is on-track with its projects but has been beset with difficulties in securing a PhD student
- Pakistani student with his own stipend is undergoing the final 'paper-chase' with Massey and should be on campus by 30 September...fast track him into trial work starting in January 2009
- No word back from Jonna Swanson about continuation of her studies. Decision of Friday 15 August about ongoing analysis of her data.

(f) Extensive deer systems



- Haycock Station study on-track following the recovery of all GPS collars from hinds after calving...only one collar failed. Spatial data downloaded and presently being analysed.
- A summer intern (Otago University) to re-visit vegetation transects to evaluate biodiversity changes later this year.
- Experimental work programme will be initiated on WhiteRock Station (Canterbury focus farm) in 2008 with baseline monitoring of vegetation in September at 550-850m asl...not previously grazed by deer.
- Interview of 20 SI high-country farmers to examine benefits and challenges of deer systems in these environments to be conducted in December 2008 ...collaboration with Social Science Group (see New Projects).

(g) Urine sensor for deer



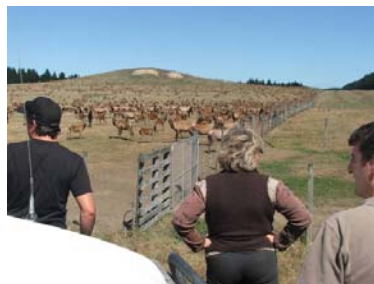
- This project has encountered considerable technical difficulties
- The **'No-Go'** point has been reached....it is beyond the resources available to successfully develop and implement a urine sensor for deer
- Reallocation of resources to be decided (see later)



(h) Focus Farms



- The establishment of four Focus Farms has been achieved.
- All farms have held field days...with over 400 attendees in total



Focus Farms continued



The SFF Focus on Deer project has been reviewed

- * 70% of farmers interviewed had attended a field day
- * >90% had made changes based on field days and newsletters
- * regular attendees (30%) had made 4.6 changes on-farm
- * occasional attendees (40%) had made 3.2 changes on-farm
- * newsletter readers only (20%) had made 2.0 changes on-farm
- * two-thirds of changes were environmental

Focus Farms continued



Further SFF projects have been confirmed

- * Whiterock (Sth Canterbury)...nitrogen on tussock
- * The Steyning (Hawkes Bay)...carbon footprinting
- * Otago/Southland.....tools for parasite management

(i) Venison Quality



Question : As we alter production systems do we also alter product quality?

Does venison quality change as we push for high-growth performance in stags?

- * stags slaughtered in June (7 mths) or Dec (13 mths) at 50kg carcass weight
- * no difference in dressing %
- * slightly more fat in slow growers (but still lean)
- * slow growers had higher meat pH values (pre-slaughter handling issues) and shorter sarcomere lengths
- * no other differences in meat quality attributes

221 consumers tasted samples from each group

- * overall, flavour of venison from faster growing stags was preferred but there were no differences in tenderness and juiciness detected

Conclusions : relatively minor effects of growth rate on venison quality

3. Variances on milestones



Urine sensor for deer

- This project will be terminated
 - Successful completion is beyond the resources available due to technical issues
 - Re-allocation of the resources is under consideration
- (a) Expansion of Objective 3 theme from “Extensive deer systems” to “Effects of land-use change on venison supply systems”...incorporate ‘Use of N in high-country”
- (b) New programme on Reproductive Efficiency under Objective 1....focus on reproductive performance of yearling hinds and measures of efficiency in adult hinds

4. Outputs for 2007/08 (1 July 2007 – 30 June 2008)



A total of 70 outputs reported (FRST annual report)

- * 3 theses submitted (and passed)
- * 8 client reports (e.g. DEEResearch/Landcorp)
- * 18 peer-reviewed science journal/conference papers
- * 14 field-day/industry conference presentations
- * 16 articles in industry magazines (e.g. TDF , DIN)
- * 3 Intouch items (internal AgR magazine)
- * 1 press statement (Lincoln lactation work)
- * 2 NZ/Australian technician exchanges (GPS)
- * 4 DEEResearch/Governance reports
- * 1 Russian conference!

5. Planned milestones for 2008/09



- See Board papers
- On-going and new projects over the period from 1 July 2008 to 30 June 2009.
- Clarification and issues????????

6. New projects starting 2008/09



(1) Foetal growth in relation to conception date and hind metabolic state (Objective 1 : Physiology of seasonality)

Aim : to understand seasonal metabolic processes in red deer hinds that influence foetal growth and reproductive efficiency

- * hinds seemingly modify gestation length to 'foil' our attempts to advance conception dates
- * every 10 days advancement translates to only 5-6 days calving advancement
- * hinds exhibit a seasonal, but poorly understood, metabolic cycle entrained by photoperiod that leads to winter inappetance (???)

Hypothesis : Advancing conception date compromises foetal growth rate by misaligning the last third of pregnancy with the hinds endogenous metabolic cycle (ie. winter inappetance)



- Measure foetal growth trajectory (ultrasonography and CT Scanning) for varying conception dates (60 day spread)
- Measure changes in hind basal metabolism by assessing physiological indicators (e.g. glucose clearance test ; liver function metabolites, etc)
- Correlate with calving date (gestation length) and birth weight



(2) Liquid nitrogen suppression of pedicle/antler development in young stags



- Application of liquid nitrogen to pedicle site can impede/suppress development of the pedicle and subsequent antler within the first year
- Non-invasive , easy application and low welfare cost
- Preliminary work on sika deer in China by Chunyi Li is very promising
- Proof-of-concept in red deer to be undertaken this year (August/September).



(3) Productivity and issues survey of high-country farms



- We are seeing a rapid change in land-use driven by the dairy industry expansion
- Deer, sheep and beef systems are being translocated from fertile, lowland , intensively managed farms to hill/high country regions
- Extensification started before the dairy boom but has gained more momentum
- Identified >60 SI high-country properties (above 300m ASL) farming deer, often with >2000 deer
- What are the issues for the industry in terms of venison supply systems?
- We plan to conduct a comprehensive interview of 20 high-country deer farmers to gain insights into their productivity and environmental challenges
- 5 farms in each of 4 regions (Southland/Te Anau Basin, West/Central Otago, North Otago/South Canterbury, and North Canterbury)

(4) Seasonality genetics



Re-strategise programme based on recent technology developments

- (1) Partially sequence the deer genome to develop 1000-2000 SNP markers useful for linkage analysis, breed composition and parentage...and to understand genome structure and requirements for full SNP-chips (currently 60,000 SNPs required)funding and IP issues (eg LIC participation).
 - (2) Create 3-generation resource for genetic mapping....used to confirm and validate SNP markers, and understand genetic order
- Aim is to develop resources to underpin SNP-chip genomic selection in deer
 - Note...This will not deliver genomic selection within this programme...additional investment required
 - Fast Forward Fund is a possible avenue
 - Strategy...Don't aim to pioneer genomic selection...follow behind dairy, beef and sheep!!!

7. Issues and Opportunities



- (1) Recruitment of post-graduate students
- (2) Fast Forward Fund

Post-grad students



- Recruitment of post-graduate students is proving to be very difficult
- However, it is the mainstay of our collaboration with the Universities
- Despite best efforts by everyone , the situation is not improving (reflects issues around science as a career for New Zealanders)
- We are heavily reliant on overseas students
- This is creating delays on milestone delivery and disruption to the contracting process

NZ Fast Forward Fund



- New science and development investment fund...government led fund
- High-level governance = government + industry partnership with 1:1 funding ratio
- Core partners signed up include MWNZ, Fonterra, MIA, PGG-W, DairyNZ, Zespri, etc....where is DINZ?
- Themes...Food Innovation and Sustainability
- Programmes will be large , multi-party, long term.....heavy industry involvement
- Research , development and education...emphasis on development
- Where is the DEER INDUSTRY placed to tap into this fund?
- How will the DEER INDUSTRY source co-funding?