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The Deer Industry's Productivity Strategy: a five-year vision

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ABSTRACT

Advances in deer farming productivity have been muted in relation to other livestock industries but the potential for dramatic improvement clearly exists. An industry working group has developed a productivity strategy closely aligned with the venison industry strategy that emphasises extending the four-month consumption demand of the traditional game season to a 12-month chilled supply of high-value retail product. Underpinning this, the productivity strategy targets two basic outcomes; more calves conceived, born earlier and surviving to sale, and heavier prime animals supplied earlier in the season. Productivity targets include a 2% annual increase in survival to sale over the next five years and a 2.5% annual individual growth rate increase. Emphasis is on capturing genotype advantages in growth and seasonality, and determining aspects of seasonal nutrition and the potential of new forage cultivars to add to this potential for growth. Productivity success must be measured in economic indices (carcase returns per hectare, cost of production per kilogram of dry matter consumed and per hectare economic performance) and the planned timing of carcase harvest against a variable seasonal schedule. Productivity improvements are best illustrated in clear practical situations provided by focus farms to inspire technology uplift and practical feedback from farmers and researchers.

Keywords: Deer; productivity; venison, strategy; growth; focus farm; improvement.

INTRODUCTION

Large scale commercial farming of deer began in New Zealand in the early 1970s, and New Zealand remains the world's largest and most advanced deer farming industry. Today there are an estimated 1.6 million deer with the majority being farmed for venison while velvet antler and the co products from venison production remain important revenue streams. (The national velvet herd is estimated at about 109,000 mixed age stags at 30 June 2006). Yet despite this population growth since its inception, the deer industry has struggled to achieve any increases in "real" productivity gains (increased birth rates and survival rate to slaughter or reproduction, or increased liveweight gain from birth to slaughter or reproductive maturity) particularly over the last 10 years. This is in stark contrast to other major livestock industries (sheep, beef, dairy) and other primary industries such as kiwifruit that have achieved basic productivity gains on a number of fronts, gaining 24-30% plus in productivity over the past 15 years.

For venison production systems calves are born in late spring (November) and typically premium prices for the predominant European venison markets are paid in September and October according to specified weight ranges. Premium chilled schedule paid for 50-65 kg carcasses can be up to \$2.50 per kg higher than the late off-season

frozen venison returns when young deer are 14 to 16 months old. The price is also significantly reduced for animals that are over or under the desired weight and outside of the four months that allow exporters to ship product to supply the traditional European game season demand. The reality is that the industry average carcase weights have remained at ~54 kg for years, somewhat influenced by the drive to meet early production targets at premium chilled schedule and somewhat because of indifferent management and achievement of better growth.

For farmers there are essentially two on-farm challenges to overcome in order to meet these market conditions:

1. Traditional NZ farm pasture growth and quality is not optimally timed to coincide with the natural timing of calving and subsequent weaning, thereby affecting survival, lactation and early liveweight gains in late summer at autumn, which can have a significant flow-on effect.
2. Deer are highly seasonal in growth, predetermined by photoperiod responses, and tend to lose body condition over winter or have only limited growth, further compromising the ability to achieve target weights for premium prices.

A further fundamental hurdle for deer farming in general has been identified (from deer industry surveys in 2005 and 2006) as a very low weaning percentage (80% or lower of fawns weaned to hinds mated).

Although these constraints have been known within the industry for some time, historic high returns and excellent profitability have masked this general mediocre performance and difficulties in farming practices (McFarlane, 2005). For example the promotion of low input, low maintenance systems may have also contributed. In contrast, however, the leaders in deer production report excellent growth rates, weaning performance and dramatic productivity with new genetics, rapid spread of these in stud and commercial herds and strong profitability in spite of the recent difficult years the industry has been through.

These low and unsustainable returns have highlighted the deficiencies in the biological production system and the vulnerability of a limited seasonal demand. These issues complicate achieving long-term growth and sustainability as the industry's key goal.

The industry has developed and committed to a 5 year venison marketing strategy (Deer Industry New Zealand, 2005) to diversify markets by expanding the traditional consumptive season, moving more to retail outlets, and establishing presence in new geographical and consumer areas. While this may over time reduce the timing hurdles for farmers, biological constraints will remain as major obstacles for long-term growth.

As part of the commitment to the agreed venison strategy an industry productivity working group comprising leading farmers, consultants, the New Zealand Deer Farmers' Association (NZDFA) Executive Committee, AgResearch and Deer Industry New Zealand (DINZ) met over 2005-2006 to produce an on-farm strategy and identify the key areas for improving productivity, associated research and planned extension activities. The resulting 'Productivity Strategy' (Deer Industry New Zealand, 2007) complements the existing venison industry strategy and, as both are successfully implemented, this will result in increased on-farm efficiencies, real productivity gains and better, more consistent returns to farmers.

This paper describes the elements of the strategy, the methods/tools employed, key performance measures to assess the success or otherwise of the strategy, and a vision of how the industry will look after the first five years of implementing the strategy.

PRODUCTIVITY STRATEGY ELEMENTS

The strategy's goal is "*to improve deer farmer profitability and industry sustainability through improved growth and reproductive productivity over the next 5 years to 2012.*"

In order to achieve this goal the strategy contains a number of objectives including quantifiable targets or measures, activities and tools to understand productivity processes and indicators of success/achievement, identifying targets met and other co-related benefits. Other underpinning elements of the strategy, are a strongly aligned research and development programme, and a variety of technology transfer mechanisms but principally the NZDFA-based network of Focus Farms planned as technology transfer conduits and active farm performance monitoring units.

Strategy objectives

The objectives are expressed as either improving product return at point of sale (*i.e.* at slaughter) or as on-farm targets of growth and performance. In detail these are expressed as targets over a 5 year plan:

Improving product return at point of sale:

- Increase national survival to sale percentage (by 10%) from a conservatively estimated 75% to 85% by 2012 (based on an 80% weaning percentage).
- Increase carcase weight average by 10% with an increase of 5.4 kg (or 10 kg liveweight at point of sale) by increased growth efficiency by 2012, allowing the same or advanced slaughter production patterns at heavier weights.

Immediate on-farm targets (pre-weaning/hind profitability):

- Improve calving percentage (calves weaned/hinds mated) from an estimated national average of 80% to 90% by 2012 (*i.e.* 10% in total at 2% per year).
- Improve national average weaning weight of mixed sex weaners (as weighed in the first week of March) to ~70 kg from 47 kg (DeerMaster Manual median 1996-1999) through both use of enhanced genetics and targeting greater lactation growth, and summer growth rates.

The working group has identified that a few top performers are already exceeding these targets with advance red deer genetics and its acknowledged

that some well-managed crossbred (red deer X wapiti) venison systems can easily achieve these end points. By translating the targets to seasonal growth periods immediate on-farm targets have been set as:

- Autumn: March-May (90 days) = 300 g/day
- Winter: June-August (90 days) = 100 g/day
- Spring: September-November (90 days) = 400 g/day
- Average over 270 days = 230 g/day

Targeting these seasonal growth objectives should allow the industry as a whole to shift its major productivity objective and have 65% of young deer available for slaughter in the pre-Christmas chilled season in comparison to the current 47%. That will, in turn, allow greater sharing of the chilled season premiums, underpin the initial venison marketing programme and allow greater flexibility on farm to either add variation in land use, or to better manage lactation demands of the next seasons' crop of calves in summer.

However the strategy also relies on further research and extension to ensure uptake. The Industry has had promoted the catch cry "*100 kg weaner by June*", as a signature for investment in new genetics, the promotion of EBV evaluation of growth and maternal traits and a reference to the often missed potential for growth of weaners in autumn. Practical application includes strategic feeding from specialist new herb and grass cultivar pastures and overall better management that incorporates earlier calving, pasture quality control management and use of breeding technology and ultrasonography as management tools related to calving patterns and genetic improvement. The productivity group identified four areas of greatest gain in the short term:

- Calving percentage
- Pre-weaning growth rate of calves
- Genetics
- Integration (other livestock, land uses and labour uses)

While the "*100 kg weaner by June*" has, as yet, no direct premium chilled market return at that date, it does promote the ease and flexibility associated with encouraging calf growth when it is most economic during lactation and autumn. The productivity group believe that if 20-25 % of a herd can get near to that target, less reliance on expensive overwintering systems demanding high growth rates will be needed, and allow farmers to effectively over-winter at reduced costs and set up for final finishing and meeting contracted supply

agreements in the spring. To advance this, and to link productivity, research and technology transfer, a new industry-agreed research and funding approach has been submitted to FRST for funding considerations for the period 2007-2013.

Aligned industry-led research and development programme

Concurrent to the development of this strategy, an industry-led research programme has also been formulated by AgResearch and collaborating universities (Otago, Lincoln and Massey) in association with industry consultation coordinated through DEEResearch Ltd. This programme, "*Growing sustainable venison supply systems*", if successful in obtaining funding from FRST (Foundation for Research, Science and Technology) and co-funded by the deer industry, will commence on 1 October 2007 and represents a major shift in how both industry and research providers have approached research and development in deer farming and venison supply systems.

The programme will run for six years and will cover four objectives chosen to reflect the basic information needs of the strategy:

1. Venison market supply systems

This objective will provide technology to increase supply of young animals to the venison market between August and December by focusing on key biological drivers of growth and development in young deer, including genetic and physiological aspects of seasonal breeding, and understanding rumen development and lactation to promote improved calf growth.

2. Enhanced on-farm productivity from venison systems

This objective concentrates on two areas; supporting the Focus Farm network and management of internal parasites. Making use of Focus Farms is expected to allow research information to be made more readily available to farmers while simultaneously providing feedback on the practical uptake/usage of this information.

Internal parasitism is an area of immediate and growing concern within the industry due to reliance on only one effective anthelmintic drench. Parasite resistance to this drench will severely compromise any productivity gains made through other parts of the programme.

3. Environmentally responsible venison systems

A sustainable industry will need to be so on three fronts: economic, environmental and social. This objective addresses the latter two and covers

on-farm mitigation of key water-borne contaminants (a key output from this will be provision of recommended best practices to reduce contaminant levels) and managing extensive deer systems to maintain productivity and biodiversity (providing information on what components in extensive systems can enhance productivity and what management is required to maintain these components).

4. Consistent venison performance

As part of the venison industry strategy to extend the consumptive demand over the whole year in key markets and establish new markets, consistent high quality venison will be required. This objective looks at possible on-farm sources of, and solutions for, venison contamination and in-slaughter premise technologies to reduce contaminants.

A key component of the objective is to revitalise deer farmer field day/seminar and learning programme through the adoption of a Focus Farm concept, using the successful M&WNZ Monitor Farm model for financial and sustainable farming performances adding in a partnership with AgResearch and the universities for technology transfer and extension work through the facilitation of Focus Farms, and the supporting community of interest model.

Focus farms and other technology transfer initiatives

Two Focus Farms already exist in Otago and Southland, funded through MAF's Sustainable Farming Fund. Both properties are large breeding and finishing units with some specific interest in antler production and crossbreeding. These properties are committed to increasing weights and timing of peak venison production, through autumn cropping rotations and better genetics. These projects sit outside the FRST bid, but are key in that they attract specific research inputs from AgResearch in the area of environmental sustainability. These projects are conducted in association with the local regional councils who provide funding, expertise and promotion. Recently, additional interest and funding has been gained to define the impact of parasitism on weaner growth, define the limitation of current diagnostic tools and develop non-drench based management systems. As with the rest of the planned Focus Farms, the system is based on a facilitated community of interest grouping and adoption of the M&WNZ's monitor farm model.

Four more farms are planned initially, two in each island. Deer Industry New Zealand has

committed to the funding offering a 1:1 matching, up to \$15,000 *p.a.* per farm, with the local steering group essentially administered through the local DFA branches. AgResearch have committed to a role both on the steering committee and to provide specialist assistance in the locally supported projects. The Industry believes that for success, the community must take ownership and develop programmes which represent the climatic, production basis, genetics and farm enterprises of its region. As these projects seek to attract farmer support from wide catchments, a satellite field day emphasis on other farm operations in different parts of the regions will also contribute to the technology transfer opportunities and to benchmarking production. At the core, the three-year project will feature the economic fortunes of the Focus Farm, expressed in efficiency, profitability and in an overall context of a whole farm package. Emphasis will be on the cost of grass grown, its efficient use and its ultimate conversion into saleable products. These will be expressed as costs in cents/kg DM, and returns per hectare and per stock unit. This will be crucial for the industry for its context amongst a variety of different deer and other livestock enterprises. Integrated livestock farming systems are a major interest, both for revenue generation and for spreading risk, as well as for the wider management implications of pasture control and versatility.

All of the current tools and new technology developments will be important and include a focus on economic sustainability, farm environment sustainability and biological efficiency. This is seen as key to attracting the next generation of farmers and advisors, and the use of new tools like DEER Select Breeding Worth trait analysis, Q graze and Forage Master for Deer. The concept is also embedded within the NZDFA branch structure and seen as a revitalising initiative for field days, technology transfer and branch activity.

Strategy tools – how will the strategy be achieved?

Meeting the goal and objectives of the strategy requires the research capabilities in the “*Growing sustainable venison supply systems*” to be aligned with industry needs, and for the resulting information to be promptly channelled through to producers via Focus Farms, learning packages and other appropriate information transfer methods. These *structural* tools will underpin the *knowledge* tools (described below) that provide the know-how for farmers to innovate and lock in productivity gains. These include:

- Meeting lactation potential – the right genotype for pasture and location and new crop species for strategic feeding. This will be measured as kg of calves weaned per hectare. Increased calving rates – DEERSelect modules, DNA parentage and wider use of DNA based trait identification, measured in terms of efficiency (kg weaners produced per kg hinds wintered).
- Earlier calving – the right genetics in the appropriate environment with the right pasture preparation and management, and consistent with the clear enterprise objectives.
- Enhancing seasonal growth rates – better pasture/forage management, feed budgeting, drought proofing, and efficient overwintering and expressed as kg of venison produced per hectare

Strategy success (The deer industry in 2012) – what part did the productivity strategy play?

The strategy has evolved in part out of the industry's desire to move away from the volatility that has characterised the industry in the past and represents a major step in attempting to optimise elements that are able to be controlled or influenced by farmers and the industry. While this volatility is unlikely to be completely eliminated, the strategy aims to reduce the scale of volatility.

By 2012 the strategy should be well advanced, and if targets have been met the industry could have:

- 10% more calves on the ground, resulting in 80,000 more animals available for slaughter/inclusion into the national herd per annum.
- Increased growth rates by 10% or more over 5 years resulting in either 3000 tonnes of more bone-in-carcass available, or an additional 108,000 animals at 55 kg available for slaughter production by 1st December on a 600,000 slaughter per annum model.
- Over time further emphasis is expected with increasing use and sophistication of DNA technology, allowing genotype mix definition and better planning for production targets, low cost parentage and the potential discovery of further gene-based production traits (e.g. short gestation length, temperament, maternal ability).

Evidence that the strategy has played an important role in achieving these targets will include:

- Genetics and feed budgeting skills are well developed, with new and basic tools being actively used by farmers (e.g. DEERSelect, Forage Master), with current barriers to technology adoption being overcome (it is recognised that much of the core information to improve productivity is already known but poorly understood and applied).
- A wide network of active Focus Farms that attracting large communities of interest.
- Farmers who are well-informed on factors that affect productivity and are knowledgeable of the tools available to maximise productivity.
- Higher and more profitable returns, and happier farmers in an enhanced industry structure through NZDFA and Deer Industry New Zealand funded support.
- Highly visible research, extension and technology transfer programmes communicated at Focus Farm field days that are well supported by industry and wider publications.

The Productivity Strategy's intimate linkage with the Venison Strategy and Industry plans to extend its base of sustainability, remain the driving force in this initiative. Industry leaders believe that this incorporation into the next six years of planned research and extension have an ideal vehicle in the expanded Focus Farms concept and have strong belief, based on the previous successes of similar ventures within the M&WNZ monitor farm project, that the deer industry can build on these successful elements and measure its progress systematically throughout the variety of deer farming environments in New Zealand.

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