

Deer Industry Conference FGM  
Hamilton May 2007

Lindsay Fung- Science Manager

## Research and Development for the NZ Deer Industry – the path forward

Today's presentation is titled "Research and Development for the NZ Deer Industry – the path forward", I will spend the next 15 minutes giving you an overview of how I believe science can best serve industry over the next few years.

### Outline

As you will no doubt be aware, DINZ invests in R&D through two organisations: DEEResearch covering non-velvet areas and VARNZ covering velvet related areas and co-products.

Over the past six years DEEResearch has funded fifty five projects, but the majority have been short-term in nature, with only six projects continuing for more than two years. Nevertheless, the projects have produced a wealth of research reports that are available via the DEEResearch website and much of this has been disseminated in conference proceedings and industry publications. The perennial problem with all research is that the information is often not in a form that is a) useable and b) accessible to the end-users and people who paid for it. And as a result may not be taken up effectively.

Up to now funding for DEEResearch has followed a process of calling for expressions of interest on an annual basis ensuring that funds are fully contested. This process is very appropriate for short-term, discrete projects, as it allows all projects to be ranked according to scientific merit and whatever issue is current. The flipside is that research that addresses a long-term problem and requires long-term commitment is seldom given any priority.

Looking ahead, this year the DINZ Board has approved a fixed budget for DEEResearch R&D of \$600,000 p.a. for four years initially plus a further two subject to review. This is a major departure from the previous variable annual allocations which made it much more difficult to plan and commit to strategic research.

You'll see that tactical flexibility is retained to a degree through discretionary R&D, and this amount can be withheld in any given year and allowed to accumulate in order to fund larger pieces of research.

The major item is the project "Venison Supply Systems" – which is in fact a large R&D programme in its own right (more later). Rounding out the spend are industry commitments to pastoral sector research consortia that cover better forage species, solutions to agriculture greenhouse gas emissions, and better understanding and management of JD. In terms of leveraging whereby your dollar is matched by other sources VSS is about 1:5, JD is 1:22, PGGRC is 1:100 and PG is 1:160.

So what is this VSS programme? The previous approach in a sense gave the initiative to research providers in putting forward suggested projects for consideration, so while industry was the final arbiter and funder, it was never truly steering research direction. Conversely research providers voiced frustration over the inability of industry to commit to long-term R&D which provides the researchers the opportunity to fully examine and understand processes around biophysical systems.

The approach in putting together the VSS has removed both these issues:

The R&D plan was developed by extensive and at times intensive consultation with as many stakeholder groups as possible over 2005 and 2006. Researchers now have a very good steer on industry priorities and industry has an understanding of the fundamental science that will help address these priorities. A true partnership approach.

As you can see the total pool of funds is \$2.2m, which equates to a fair chunk of R&D – five times more than what DEEResearch could have purchased on its own.

A little bit more detail about the VSS programme. The Foundation for Research Science and technology or FRST will announce funding decisions on 18 July, and assuming the programme is successful it will commence on 1 October 2007 and run for six years. Timing-wise that fits in well with the Productivity strategy goals that which have a target date of 2012.

It will be split into four objectives:

- Venison market supply systems (overcoming seasonality issues) covers early breeding and optimising feed requirements. **\$856k (38%)**.
- Enhanced on-farm productivity covers parasitology and focus farm support. **\$767k (34%)**.
- Environmentally responsible systems covers maintaining water quality and benefits of extensive systems. **\$345k (15%)**.
- Consistent venison performance covers clostridia (blown pack) and technology such as spray chilling and NIR for venison quality. **\$284k (13%)**.

What follows is a very complicated diagram, but hopefully it conveys a good sense of how information will flow from the programme.

Green boxes represent the research programme and research providers, while blue represents industry bodies or initiatives.

Key stakeholders will include reps from the DFA Exec Committee, DINZ Science sub-committee, VPTC/VMM, Productivity Working Group. DEEResearch is keen to see that industry is both informed and able to inform researchers, as well as actively being involved in strategic decisions.

So now we have covered the formal structure of the programme and the research content, what are we expecting the programme to deliver?

The deliverables of each objective are shown in black and these in turn lead to the following industry outcomes.

For the venison quality objective better risk management of clostridia and better use of the carcass will in turn translate into increased customer satisfaction.

All of these outcomes when taken together should result in better returns, efficiencies and sustainability across all sectors of the industry.

Moving onto VARNZ, the older sibling of the two organizations established in 1994 has similarly produced a wealth of useful research that has been used to support industry positions for velvet and the ability to remove it. You'll all be aware of the residues issue a few seasons ago, which hasn't gone away yet, but work commissioned by VARNZ has helped industry and regulators to approach it in a rationale, planned way. Similarly I'll touch on another welfare issue that is progressing quietly at the end.

A topic that regularly gets raised is where are we at with the wound healing project that has been ongoing since 2002? The plan was to have a fairly complete package of information on the wound healing product, RepaiRx, which would allow VARNZ to seek partners for commercializing the product and we are close to that point: by 30 September this year both DINZ and FRST will be making the decision for continued investment in this line of work.

However first, a quick re-cap of what HAS been achieved to date.

RepaiRx is an extract from velvet and contains a range of growth factors as you would expect from velvet. The hypothesis is that this extract, when applied topically to chronic wounds, will accelerate the healing process and improve the quality of the healing. The commercial challenge is to show that this product is better than what is currently available in this market.

There are two major stages to address in the process from 'discovery science' to commercial investment:

1. Prove that the extract does what it is meant to do in controlled lab conditions (in-vitro)
2. Prove that the extract does what it is meant to do in animals (in vivo)

Once these parts have been completed proof-of-concept has been shown, and the prospect of commercial application including human clinical trials is a reality.

Where we are now is that we have completed the lab level work and have started some of the live animal work. We are now undertaking work to test the product in live animals to take us to the point where decisions can be made on the future direction of RepaiRx. At the same time we are working on options for cost effective scale-up to production level from the lab-scale.

This brings me to the point that while we set milestones and work towards these, projects especially those that are concerned with product development, rarely follow a smooth orderly path.

That has certainly been the case here. As previously mentioned we had one important set of trials which was struck out, we have also had some changes in project leadership which have been unhelpful and has resulted in some loss of momentum. The project is now at the point where it requires commercial pharmaceutical expertise; to that end VARNZ has contracted the services of Dr John Kernohan who was the founding CEO of UniServices, the commercial research and technology transfer organisation of the University of Auckland that has been very successful in moving science discoveries through to commercialization, starting more than 23 businesses globally and licensing more than 150 technologies.

While this slide is here to convey the concept of punctuated rather than steady progression, VARNZ has regained its momentum in the last year: rounding off the lab-scale work, re-visiting the first rat trial and seeking offshore expertise to complete the animal trial work.

Let's look at the current situation and why VARNZ has confidence in taking development to a logical point for decision-making:

If trials showed that RepairX was not effective and we were trying to think of ways to improve the formula or other tests to counter dud results, DINZ would have pulled the plug on this long ago.

The pre-clinical trial in 2004 using rats showed an extremely good response but due to sloppy experimental design by the contractor that trial had to be repeated, which was done so in 2006. The repeat trial also showed a significant (and positive) response to RepairX. Similarly all other achievements to date reinforce the original hypothesis.

The VARNZ Board has two independent directors who provide a high degree of technical expertise and business acumen to this and all of VARNZ's activities:

Dr Rolleston is co-owner and Production Director of South Pacific Sera Ltd, a company producing animal products for use in human pharmaceuticals; he is a trained physician with extensive knowledge of the biotechnology sector and has 20 years experience in GMP, or Good Manufacturing Practice.

Dr Wilson, a former Senior VP at Boehringer Ingelheim in Germany, has considerable international clinical drug development expertise and interactions with regulatory agencies like FDA.

Industry's position at the start of this programme was that any new market for NZ velvet would result in supply being taken out of traditional markets, driving up prices in those markets; decreased reliance on Korea; new industry revenue streams. These still remain key drivers.

So, to summarise the immediate next steps:

- Complete the in vivo trials that will either confirm or refute 'proof-of-concept'. VARNZ is in advanced discussions with an organization based in Canada and one in France who will examine *quality* of wound healing (i.e. scarring) in pigs and the *rate* of healing in diabetic rats in comparison with the best commercially available product.
- Pigs are a good indicator of how the product might work with humans, so this work will be a very important component of the proof-of-concept 'package'. The diabetic rat model covers two aspects – rate of healing *and* consideration of diabetic subjects which is an important market for chronic wound healing products.
- Consult with other external experts on the ability to scale-up the extraction process to commercial levels.
- From this a business plan will be developed that will identify the appropriate commercial option. We remain focused on working towards 30 September to have sufficient information available to make a rationale decision. The risk is that we do not have prospects for a commercial product – it may be less effective than the current market leader - Regranex or is too expensive to produce in commercial quantities. The rewards are a significant new market for deer velvet, increased prices and royalty streams to fund new industry good research.

Finally, yes there are other things to VARNZ than just RepaiRx. However it is important to remember that in developing this product, our knowledge of this unique mammalian tissue that can regenerate has greatly increased and this world-leading expertise will feed into developing new opportunities for industry and future issues.

This year other work has looked at tourniquet methods in relation to lignocaine residues in velvet and determining if NaturO rings produce effective analgesia. Reports for these are due in June and July and for the NaturO ring work preliminary indications are that there will be a good case to present to NAWAC that they produce sufficient analgesia.

Other work due to start this year and we hope will continue is the use of velvet as a supplement for companion animals. We are in discussion with Canadian researchers who have shown benefits of using velvet to relieve symptoms of osteoarthritis in dogs and with Israeli veterinarians who report improved skin conditions of dogs that are treated for arthritis with velvet.

So if I may make a bold prediction: This time next year I hope to be informing you of some positive results for both these topics – one which will allow cost-effective velveting of spikers to continue and another which adds more marketing value for velvet.

Thank you.