

## EXECUTIVE SUMMARY

Johne's disease (JD) spread steadily through the Deer Industry following its emergence in the 1980s, with often severe animal health consequences. In response, the Johne's Management Limited (JML) programme was established in 2006 to monitor the disease and assist in its control on-farm.

Over the last decade the programme has steadily developed within this brief. Today it plays a significant role in the Deer Industry. Well recognised and with an established reputation, it services 280 farmer clients representing 38% of venison production last season.

Since JML's establishment, JD in the Deer Industry has changed considerably. After years of disease control efforts and raising awareness, evidence collectively suggests it is now present at low levels on most farms. In contrast, severe outbreaks with major losses characterised the early years.

Despite this encouraging progress, it remains a major concern to deer farmers and a cause of lost production. It is also particularly worrying for previously unexposed farms. In addition, it remains a globally recognised potential risk to the public perception of meat and dairy products.

This new situation represents both a challenge and an opportunity. On-farm, JD has become harder to intervene in cost-effectively. But components of the JML programme, the national database and animal

health promotion systems in particular, represent a growing opportunity to the industry. An opportunity that prompted Deer Industry New Zealand to ask JML what additional value it could offer.

This proposal is JML's response. It describes how programme components could be combined with recently developed productivity metrics and benchmarks to substantially broaden its service and increase value to the Deer Industry. Maintaining vigilance on JD would ensure the ground gained there is not lost.

New services to farmers would provide benchmarked production information each year in addition to information on JD. Tallies, carcass weights, and growth rates, along with average kill dates and kill profiles for young deer would be combined into a brief, simple report. Regional and national benchmarks would give reference points for performance.

This report can be produced with no effort on the farmers' part. And it can be produced for any and all deer farmers. It is an ideal prompt and resource to stimulate annual review of deer herd health and productivity with the farmer's animal health advisor.

In addition to this service, the proposal includes incorporating the AgriBase farm identifier into the national deer database. AgriBase would raise the integrity of the database from the perspective of both



biosecurity and an ability to link to other NZ Inc data sources if and when the need should arise.

Besides these changes, the programme would continue as it has done, successfully, in the past. However a change in name would be essential to overcome the entrenched view that it is only about Johne's disease. The recommended new name is DeerPRO.

The annual cost of DeerPRO would differ from the cost of JML by less than five percent. It may increase over time to meet growing demand and this would be considered a success. A one-off transition cost of \$39k has been estimated to implement AgriBase, update promotional material, and conduct stakeholder consultation.

This is an opportunity to build a strong and flexible new programme leveraging off the best aspects of JML, the database in particular. DeerPRO would substantially extend the Deer Industry's analytical and reporting capacity at all levels and it would achieve this for virtually the same running cost as JML.

Our young Deer Industry is embarking on a new phase of growth and development. High quality, tailored information and systems will be essential in achieving our collective goals and robust benchmarks will be essential too, for our achievements to shine above.

DeerPRO can make a significant contribution to this growth and the continued emergence of the Deer Industry as a cohesive and respected entity within New Zealand agriculture.



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## BACKGROUND

### **Programme establishment**

Johne's disease (JD) was first diagnosed in farmed deer in New Zealand in the mid-1980s. Several years later it was clear that the disease was spreading, that the spread was accelerating, and that the animal health consequences were often more severe than observed in other farmed species. Uncertainty was building about the eventual endpoint and the scale of impact the disease would have on the Deer Industry.

In response, the Johne's Research Group was established. From 2007 to 2011 it collated relevant scientific information on JD and deer into a substantial document for veterinary use and a supporting manual for farmers.

A need was recognised to monitor the disease at the industry level and to provide a technology transfer entity to support the practical application of the Johne's Research Group's outcomes. Johne's Management Limited (JML) was established in 2006 to meet this need.

JML's main components are a national slaughterhouse surveillance database for 'JD-suspect' lesions, a network of veterinarians with training in the control of JD in deer, and a technology transfer role to get scientific advances in JD applied practically on-farm. We use several key educational resources, notably a JD manual for veterinarians and another for farmers.

The programme is completely voluntary and funded by all deer processors via a contribution per head of deer slaughtered. Initial funding of 40c rose to \$1, then dropped through 80c to its current level of 70c. The programme currently costs \$300-350k per year to run.

It is small in size, with one full-time Project Manager assisted by a part-time Technical Manager. The primary aims are to monitor and report on the disease at the industry level and to support veterinarians and farmers in the on-farm control of JD. The database functions as a research resource, with anonymised data supplied under contract on a case-by-case basis to support research into JD and deer.

### **Progress review, 2012**

The JML programme was reviewed in May 2012 after 5 years of operation. A panel representing farmers, veterinarians, processors, and researchers, plus professor Scott Wells, an international JD specialist, concluded that JML had faithfully and successfully

fulfilled its mandate to that point. It also felt that the programme had been instrumental in raising awareness and supporting activities to reduce the incidence of JD in farmed deer.

The panel recommended that from 2012 to 2015 JML continue its operations and adapt where possible to meet the broader needs of the Deer Industry. It also recommended a validation of the database.

### **JML today**

The programme has developed significantly since the review in three respects. Firstly, validating the integrity of its core systems. Secondly, extending its data based reporting services. Third, improving its understanding of the state of JD across the industry.

As it stands now, there are some points worth noting on its success:

- A national database of over 4 million deer processing records.
- Individual animal level information for all of these deer, including age category, sex, weight, and farm of origin.
- The only slaughterhouse surveillance programme for Johne's disease in the world to monitor individual animal level information.
- Independently assessed performance of meat inspector recording (Cayol 2011).
- Independent stakeholder panel review of programme performance (anonymous 2012).
- Independent validation of database (Martin-Collado *et al.* 2014).
- A network of approximately 40 veterinarians and animal health specialists across the country to assist in JD control.
- 30 detailed quarterly reports analysing the statistical and spatial trends in deer processed with JD-suspect lesions.
- 120 on-farm Johne's disease risk management plans, the vast majority involving veterinary and diagnostic testing support.
- 4568 letters sent notifying farmers of a recent high level of JD-suspect lesions in their deer, or the potential emergence of JD in their deer.
- 87 days spent at farm or agricultural field days promoting JD and herd health to deer farmers.
- 63 days spent at deer processing facilities working with AsureQuality meat inspectors and promoting the programme.
- 280 current clients representing 38% of industry venison production in the 2014/15 season.



### **The state of JD in the Deer Industry**

Over the last several years compelling evidence has built up to support a change in the nature of JD. It suggests a transition from epidemic and often severe characteristics through the 1980s and 1990s (Mackintosh and De Lisle 1998) to a more chronic, widespread disease with lower on-farm impact.

For instance, 27 years after its first diagnosis in deer, slaughterhouse surveillance research showed that MAP (*Mycobacterium avium* subspecies *paratuberculosis*), the bacteria which causes JD, could be detected in 45% of processed deer and 59% of the herds supplying them (Stringer *et al.* 2013). This supports our understanding of it being widespread across the deer farm population.

Further support came from a survey of 151 farmers in 2015, in which 82% of respondents felt they had seen the disease in their deer at some stage. Asked about when it first emerged, their responses suggested a typical epidemic outbreak type curve (Figure 1) with a steady rise to a peak, then gradual decline. These farmers represented 28% of deer processed in the 2013/14 season (Martin-Collado *et al.* 2014).

Importantly, three quarters of the survey respondents reported a declining or already low impact of JD.

Recent scientific reviews of JD in New Zealand also conclude that the disease is widespread across the Deer Industry, but a serious animal health issue on a small proportion of farms (Bryan and Cresswell 2011) (Heuer 2016 (in preparation)). Importantly, Heuer's report goes on to point out that the cost effectiveness of controlling JD on-farm remains difficult to determine. This longstanding and widely held conclusion supports JD control as part of a wider herd health plan.

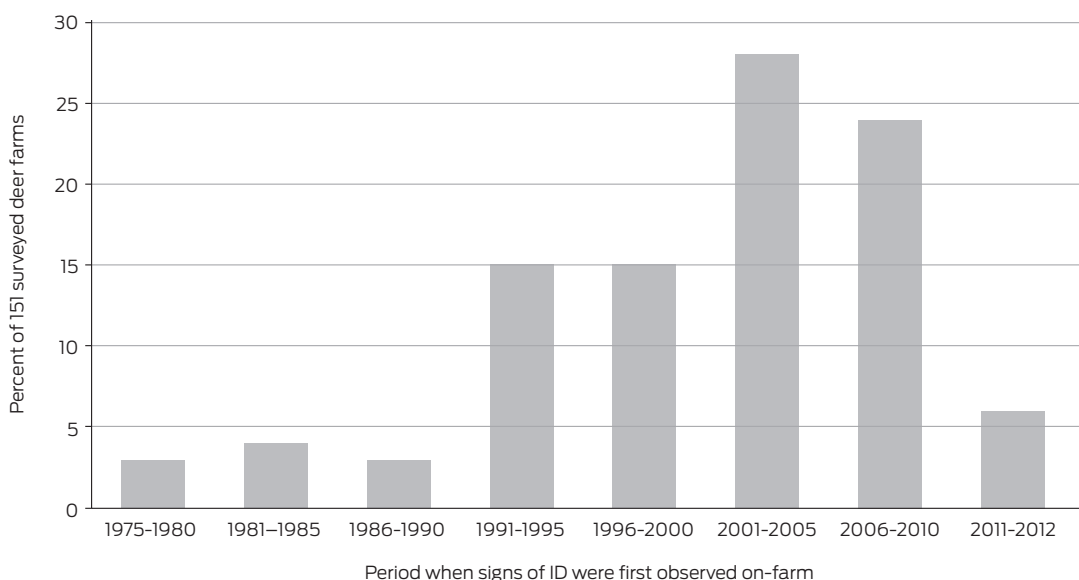
These independent conclusions are consistent with data from JML. We've seen fewer major on-farm outbreaks of disease plus the rate of JD-suspect lesions decrease at the individual animal level, but increase at the farm level (Figure 2).

### **Are these signs of success?**

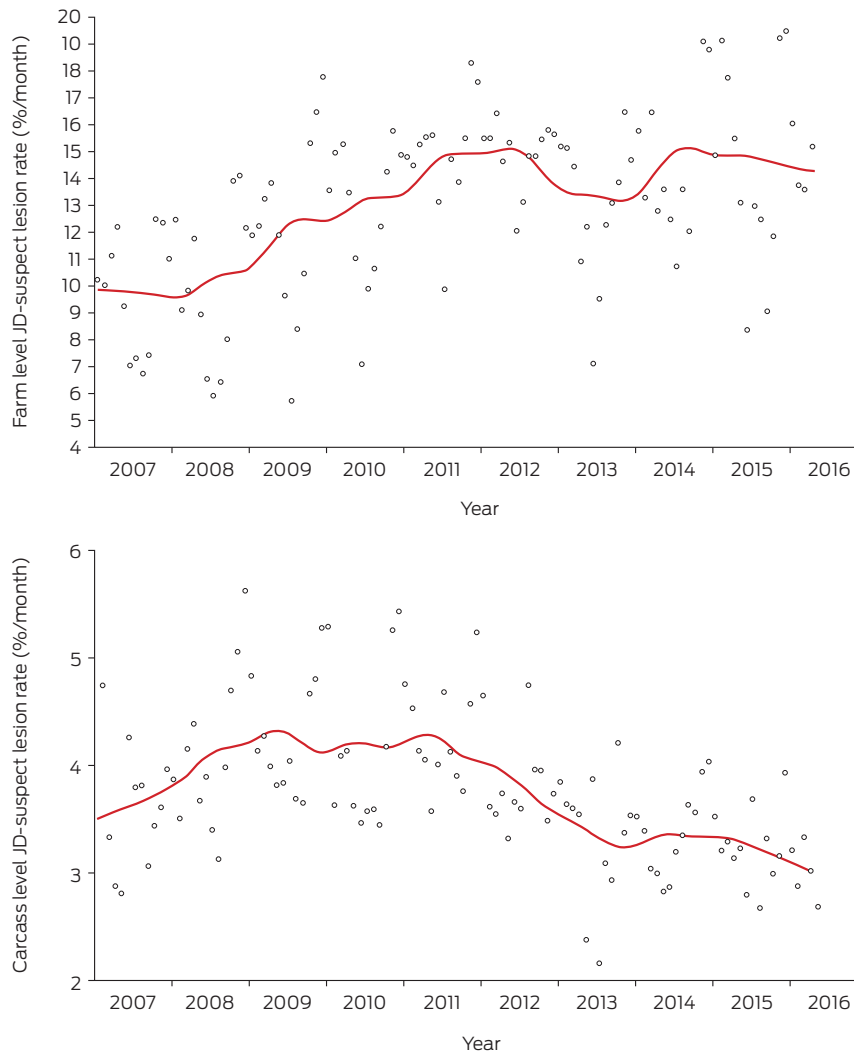
There are elements of our progress that have been a real success.

The disease has not proved ruinous to the industry for one. For another, the industry's understanding of it is at least as comprehensive as that of the dairy and sheep and beef industries after a remarkably short period by comparison.

A third reason is that the industry has engaged successfully and solidly in risk management with



**Figure 1. The time period during which 151 deer farmers first observed JD in their deer showing a peak and decline characteristic of a typical epidemic curve**



**Figure 2.**  
Graphs of the  
monthly incidence  
rate of farms  
sending deer  
identified with  
JD-suspect lesions  
at processing  
(top) and the  
prevalence of  
lesions in all deer  
(bottom)

a national control programme and clear industry position on the disease.

JML has in turn engaged solidly in on-farm risk management support for farmers and veterinarians and this too has proven successful.

A fourth reason is the development of new tools for JD in deer that have real and practical application, notably the Paralisa blood test (Griffin *et al.* 2005) and faecal test (O'Brien *et al.* 2013) from DRL. These tests have been a fundamental component of successful risk management plans.

Establishment of a national database of over 4 million processed deer has been another substantial

success. As a resource it now has tremendous application beyond just JD.

But our successes have not eradicated the disease by any means.

It remains a major concern to most farmers and a drain on productivity.

It can still have significant animal health impacts on farms where deer have not been exposed to it previously. Furthermore, eradication is highly unlikely, even in the long term. So there is still an important role for JML in monitoring and supporting vets and farmers, ideally as part of a broader herd health plan.

Ultimately, at the highest level the disease remains



a global concern and Deer Industry is proactive in responding accordingly.

### **Conclusion**

At least three conclusions should be drawn from our experience.

JML must continue to operate. It should continue to support on-farm JD control, promote vigilance and cost effective disease intervention. It should also continue to monitor at the industry level to ensure the gains we have made do not revert back to an increasing risk over time.

To get the best results on-farm, JML should support risk management plans for animal health that cover more than just Johne's disease. This is because with the disease now widespread but typically with lower impact cost effective intervention for it in isolation is more difficult to achieve. But supporting animal health planning more broadly gives deer farmers and veterinarians much more scope to review and improve productivity.

The third conclusion is that substantially more value can be extracted from the national database than simply the monitoring of Johne's disease. The DINZ Board of Directors have also recognised this opportunity and have approached JML with a request to investigate what might be possible.

Our response is below.

### **New animal health and productivity monitoring**

Since 2006 the JML database has captured animal level data on 99% of processed farmed deer. Amounting now to just over four million animals, this is a unique resource. It includes the NAIT tag, carcass weight, age code, sex, and farm of origin with spatial coordinates for almost all processed deer. It also includes an indicator for the presence of JD-suspect lesions identified by AsureQuality meat inspectors during routine carcass inspection.

The utility of this resource cannot be under estimated. Independent scientific review has considered it the most robust and comprehensive data available on Johne's disease in New Zealand (Bryan and Cresswell 2011) when analysed in epidemiological studies by Massey University (Hunnam et al. 2013b; Hunnam et al. 2013a; Stringer et al. 2013).

But its utility could be even greater if the age at processing was standardised and used to generate productivity indices relating to carcass weight.

### **Potential for use of age at processing**

Age at slaughter is a key variable in calculating growth rate and time to slaughter information for prime deer (under 18 months old).

At present it is coded differently by different plants but mostly falls into the two categories; under or over 3 years old. JML has devised a system to assign a consistent age format ('young' and 'mature') across the whole industry. While the vast majority of deer in the young category will be under 18 months old, the remainder will be R2 and R3 stock classes.

Having calculated growth rate and time to finish statistics for the 'young' deer, we were interested to see whether these metrics were skewed significantly by the older animals in this age category.

So far, our investigations suggest the metrics are informative at both the farm and industry level.

In our first investigation we compared them against four large finisher only farms, two in Canterbury and two in Otago, producing a total of around 60,000 weaners between 2008/09 and 2014/15 (Figure 3). We found that:

- Our industry average lay between the farm averages in every year
- Our regional averages were closer to the finishers in that region than our industry average.
- The typical seasonal shifts in growth rate on the finishing farms were also broadly reflected in the JML estimates.

In our second investigation we looked at the North Canterbury Focus Farm project which was a breeding and finishing operation. We chose it firstly because it had reported substantial production gains during its time as a Focus Farm and secondly because it would be processing some R2 and R3 deer, much as any breeder-finisher would.

Our growth rates for their young deer showed a clear lift during the Focus Farm period too (Figure 4). This suggests our metrics are sensitive enough to show significant shifts in productivity for prime deer, despite including a few R2 and R3 deer.

Together, the results of these investigations are compelling evidence that the growth rate and time to finish metrics offer meaningful information. While they are not perfect, they could be particularly useful for identifying farms with very low or very high productivity. These farms could then either be prioritised for recommending assistance or approached as examples of best practice. They also have potential as a

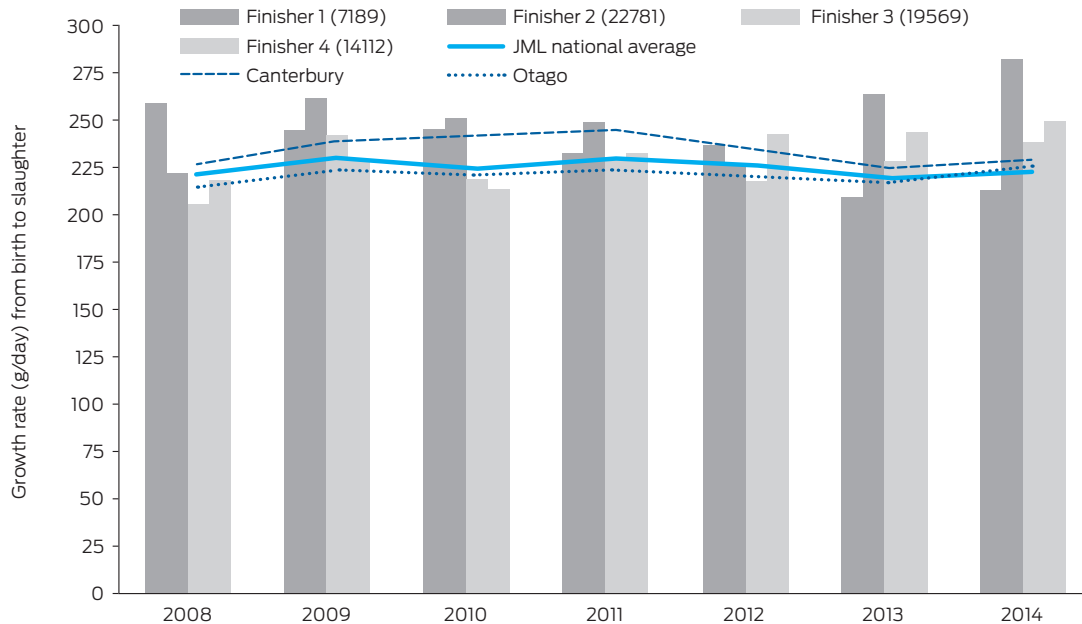


Figure 3. JML average growth rates for young deer for the industry (solid blue line), North Canterbury (dashed blue line), and Otago (dotted blue line) compared with two finishing only farms in Canterbury (dark grey bars), two finishing only farms in Otago (light grey bars)

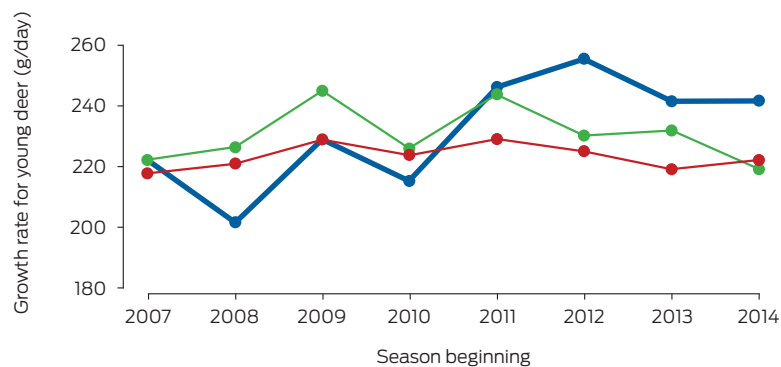


Figure 4. Graph showing average growth rate in young deer from the Focus Farm (blue line) compared with the industry (red line) and North Canterbury (green line) averages

benchmarking resource, to show individual farmers how their deer rank and to give veterinarians and advisors confidence in what to expect for venison production performance.

Further work should verify these metrics more definitively, but they appear promising enough at this stage to warrant use in a revised JML farm report that goes beyond just the rate and impact of Johne's

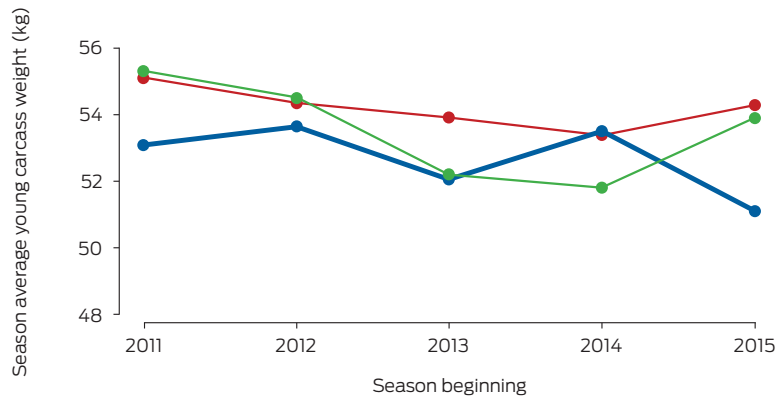
disease. On this basis, options for a new report have been established.

#### **Metrics for deer herd health and productivity**

In addition to information on JD-suspect lesions farm-level metrics of productivity in young deer now include:

- average carcass weights (per season)
- growth rates (grams per day from a standard birth





**Figure 5. Example of annual average carcass weight for young deer for a typical farm with the industry (red line) and Central Otago (green line) averages for comparison**

- date to slaughter)
- days to finish (from birth to slaughter)
- seasonal tallies of deer slaughtered
- total kilograms of carcass produced
- seasonal kill profile (mob size and date processed)

An example of these for one large deer farms is shown in Table 1.

In addition to information on young deer, overall production statistics are also provided (Table 2).

The five year on-farm trend for these metrics is shown graphically with industry and regional benchmarks for comparison where appropriate.

The three year trend in monthly production is also provided for all deer (Figure 6).

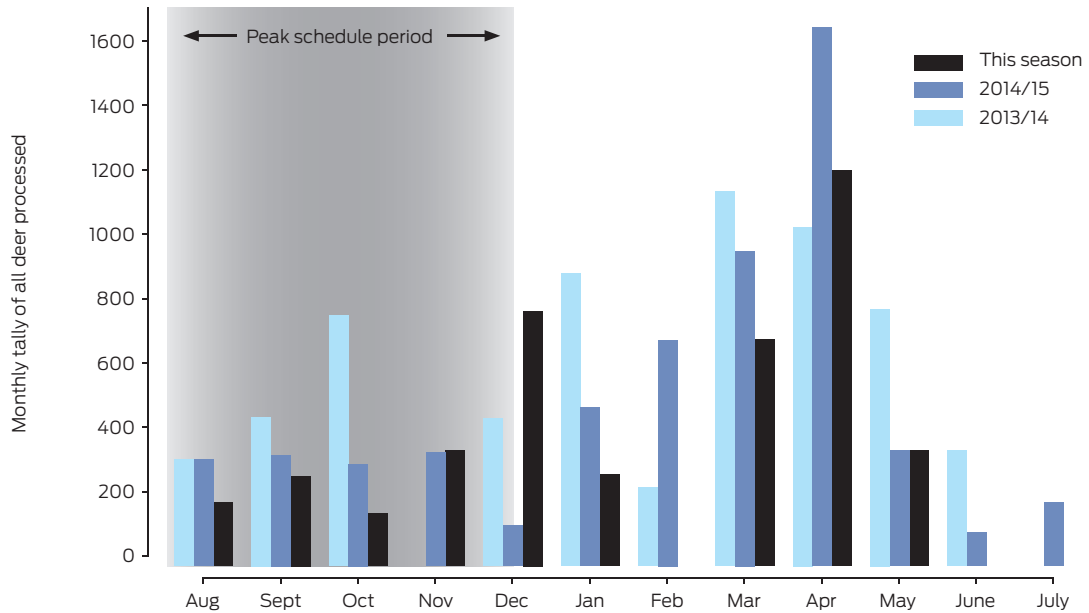
Collectively this information is a useful guide to a deer herd's productivity over time. Combined with reproduction and survival to sale information, the essential elements are there for review and the basis

**Table 1. Example of young deer productivity and JD monitoring**

Season	Tally	Avg weight	Avg days to finish	Growth rate (g/day)	Avg kill date	Lesion rate (%)
2011	2515	53.1	447	199	14/02/2012	2.1
2012	3212	53.6	456	199	23/02/2013	2.6
2013	4613	52.1	443	200	11/02/2014	0.4
2014	2700	53.5	453	200	20/02/2015	0.4
2015	1384	50.8	360	231	20/11/2015	0.4

**Table 2. Example of overall output information for deer unit**

Season	Tally (young)	Wgt (young)	Tally (mature)	Wgt (mature)	Tally (total)	Wgt (total)
2011	2515	133515	677	36481	3192	169996
2012	3212	172323	478	26268	3690	198590
2013	4613	240379	1305	74729	5918	315108
2014	2700	144347	2513	128161	5213	272508
2015	1384	70356	307	15707	1691	86062



**Figure 6. Monthly tally of all deer processed over the last three seasons**

of future production targets or comparison with other deer herds or farm systems.

#### **Conclusion**

JML is well established in the Deer Industry, but it is only associated with JD. Its brand and reputation have been created with considerable effort and in some respects this is a success. But they are also now

barriers to raising industry awareness of the potential that still exists in the programme.

The power of the national deer database and information that can be drawn from it is steadily growing and should be exploited. The logical and most efficient vehicle to do so is JML.





## THE PROPOSAL: DEERPRO

The essence of the proposal is to broaden the scope of JML, so it can deliver productivity related information to deer farmers, while maintaining a focus on John's disease.

It is also to establish an enduring reporting system within the Deer Industry. This is in contrast to JML, which arose from an animal health crisis. DeerPRO would have the power and flexibility to significantly help this very young industry continue its evolution into a cohesive and respected entity within New Zealand agriculture. But functionally, it would be virtually identical to JML.

The proposal is to provide key productivity information to any and all deer farmers each year and with no effort on their part. The goal is to empower their management decision making and veterinarian/ advisor support. This information is an essential part of future production gains. But today it is held by only a very small proportion of farmers.

The main strengths of our proposal are

- capture of the entire industry's deer data
- unprecedented benchmarking capacity
- a focus on supplying basic but informative data to all deer farmers
- the ability to provide this information with no time and virtually no effort on the farmer's part
- an industry based 'at-minimum-cost' funding structure
- a nation-wide network of practicing deer veterinarians, currently known as the John's Consultant Network.
- a biosecurity contingency for the Deer Industry

These are described in more detail below.

### **Maintain focus on John's disease**

DeerPRO would retain a key focus on John's disease. It would continue to support the John's Consultant Network veterinarians and on-farm health risk management planning for JD control. Communications and promotional material would also retain a strong focus on JD. But importantly, rather than considering JD in isolation, DeerPRO would encourage its control as a step in a herd health management plan to lift productivity.

Industry level monitoring would continue.

These are essential components of the Deer Industry JD HACCP plan. A high level plan for JD is crucial for livestock industries in which the disease can be

an issue, for both animal health reasons and the perception of public health (Bryan and Cresswell 2011).

### **Farm-level health and productivity reporting**

The proposed programme would continue to provide annual farm reports. It would also continue to expand its client base. At present, JML supplies these reports to 280 deer farmers and their veterinarians annually. A client list including the date of their last report ensures consistency of supply. The report itself functions as a prompt to review herd performance.

### **Industry level benchmarking and reporting**

DeerPRO has unprecedented capacity to develop benchmark information to suit industry requirements. Production from any group of farms can be collated and compared against a national, regional, or even local average. Examples of where this can be applied include for specific producer groups, or Deer Industry Advance Party groups, or breeder groups (eg Wapiti).

Another interesting example is groups of deer farms in particular water catchment areas where nutrient management regulation is being introduced. The impact of that regulation could easily be quantified by comparing the production on those farms before and after it was imposed. It could also be measured by comparing their production against other nearby groups of deer farms without regulation. Conducting this kind of investigation without the national deer database would be a substantial research undertaking and cost at least \$50k. The same investigation could be completed within a day or two for a tiny fraction of the cost. In addition, that cost of generating this industry good information would be met by all deer farmers.

Besides benchmarking, DeerPRO also has substantial capacity to conduct complex one-off analyses with the results informing complex industry level questions. Examples include industry average kill dates, stock class composition of deer killed, and more recently, the nature and scale of stock retention by farmers in anticipation of increasing their deer numbers. The programme is well positioned to deal with new questions, either on a case-by case basis or with regular reporting if stakeholders saw value in it.

### **A link to NZ Inc and big data**

The deer and the farms producing them must be identifiable using a nationally recognised and accepted system. There are two main alternatives;



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AgriBase and FarmsOnLine with the former being preferred for the following reasons.

- A unique identifier enables personalised communication by the programme and farm-level analysis.
- An AgriBase ID is already in place for the vast majority of deer farms, remaining from 2012 when JML stopped using this resource due to its cost of approximately \$10k per year.
- The AgriBase ID is used byASUREQuality to archive disease event information nationally. It makes sense to use it for Johne's disease and other aspects of deer production too.
- On a national scale AgriBase is probably the most well recognised and most accurate national farm identifier. So it is best suited as the conduit to connect deer data with other agricultural and farm production data, if and when the need should arise.
- DeerPRO, with its proactively updated list of all farms processing deer, and linked to AgriBase, would be a valuable biosecurity contingency for the Deer Industry. In explanation, a recent paper in the New Zealand Veterinary Journal identified several serious exotic incursion response concerns after examining AgriBase and FarmsOnLine (Jewell CP et al. 2016). Notably, it found important differences in their species composition and spatial coverage which called their accuracy into question. It also found that the systems could not be reliably linked, which limits their use in advanced decision support techniques (computer modelling) in a major outbreak.

It is important to demonstrate the scale of these findings from a Deer Industry perspective. In the 2014/15 season the JML database shows 1,718 farms sent deer for processing. At that time, AgriBase listed 3,917 deer farms; over twice as many. FarmsOnLine held 5,422 deer registered premises (including processing plants, sale yards etc) but listed a total of only 43 farms with a deer herd size between 101-1000.

Computer modelling of a disease outbreak will be an essential tool in predicting disease spread and in allocating limited resources to overcome it. Model predictions will depend heavily on the size, density, and spatial location of farms. If the input data for those models is incorrect by a factor of 50% or even more, the outputs may be wrong by even more. Thus, it stands that linkability between the national deer database, AgriBase, and these models could be vital in an emergency.

### **Supporting research**

Developing and retaining skilled professionals in all areas of the Deer Industry is essential for its success. DeerPRO would continue to support this process, as JML has done, by facilitating important research. Applications for anonymised data are considered on a case-by-case basis and supplied under time bound contract. Teaching resources can also be created from the database that promote profitable deer farming to tomorrow's veterinarians and farmers.

Confidentiality and security of all data will be protected just as strictly as it has been in the past.

### **Supporting Passion2Profit**

The proposed programme would support the P2P wherever possible. Examples of support would include

- tailor made annually updated reports to farmers
- support of Advance Party data needs
- support of benchmark development for different deer production systems
- support for the Deer Industry's Animal Health Project Manager and the development of on-farm animal health planning process

Certainly as more P2P initiatives commence, opportunities to support them will grow. But the proposal remains to create a programme that can stand alone and continue to provide value after P2P concludes.

### **Possible longer term development**

#### **Mapping and environmental planning support**

Recent analytical developments could potentially be employed in DeerPRO in the future if demand arose. One is a mapping service of deer farms, a second is producing deer related input data for the OVERSEER® nutrient budgeting computer model. Figure 7 shows a demonstration map with point locations for deer farms in Southland.

#### **Interactive website**

There is also potential to develop an interactive 'dashboard' type website linked to the database. The concept is well established, for example in the dairy industry, where farmers and/or their advisors can log in to view benchmarked performance indices for their stock.

The possibility was explored by JML in 2014 with a website offering a log-in portal for farmers, an industry and farm-level dashboard of metrics, plus individual farm reports and newsletters. Design and construction at \$66k was considered high in light of

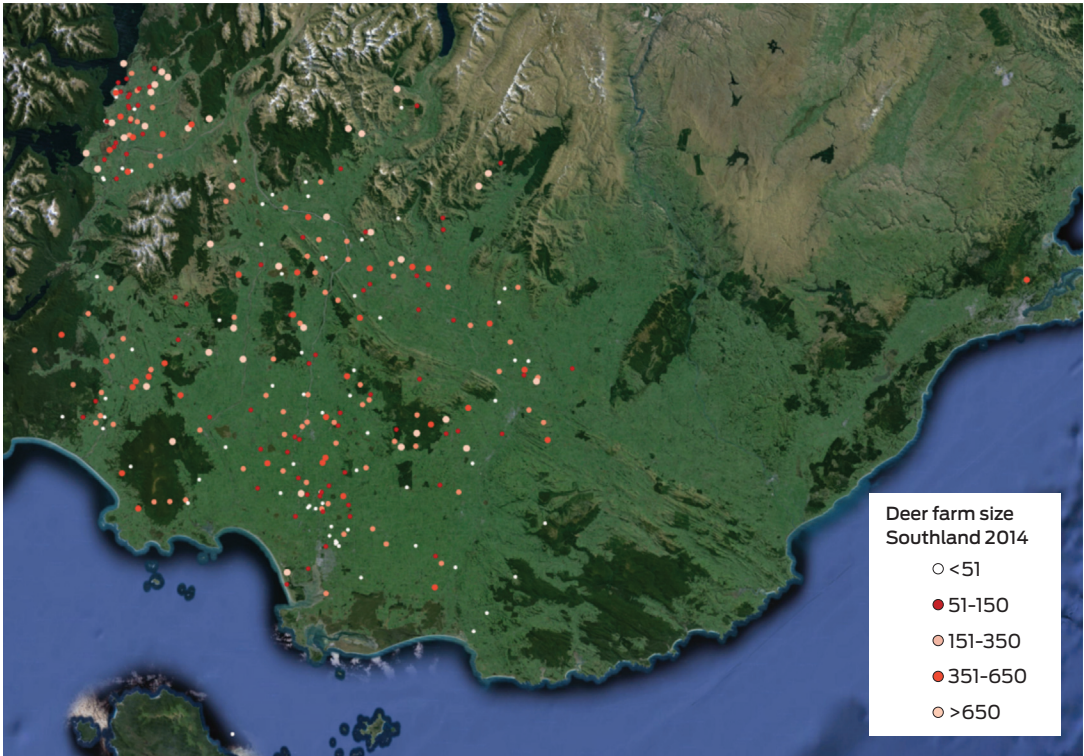


Figure 7. Map of Southland showing location of deer farms graduated by kill size in the 2014 season

demand at that time, but the possibility remains for the future.

Health reporting other than Johne's disease

Another previously explored development could be to extend animal health reporting in DeerPRO to include other information recorded byASUREQuality besides Johne's-suspect lesions. While this information does appear on kill sheets, the trends in defect frequency that could be provided by DeerPRO is far more informative for animal health planning.

The opportunity has not been pursued further for several reasons, primarily lack of demand from farmers. But also, there are potential costs and logistics, plus often the defects recorded are not definitive, or not related directly to animal health, so their utility for health planning is limited.

**Costs**

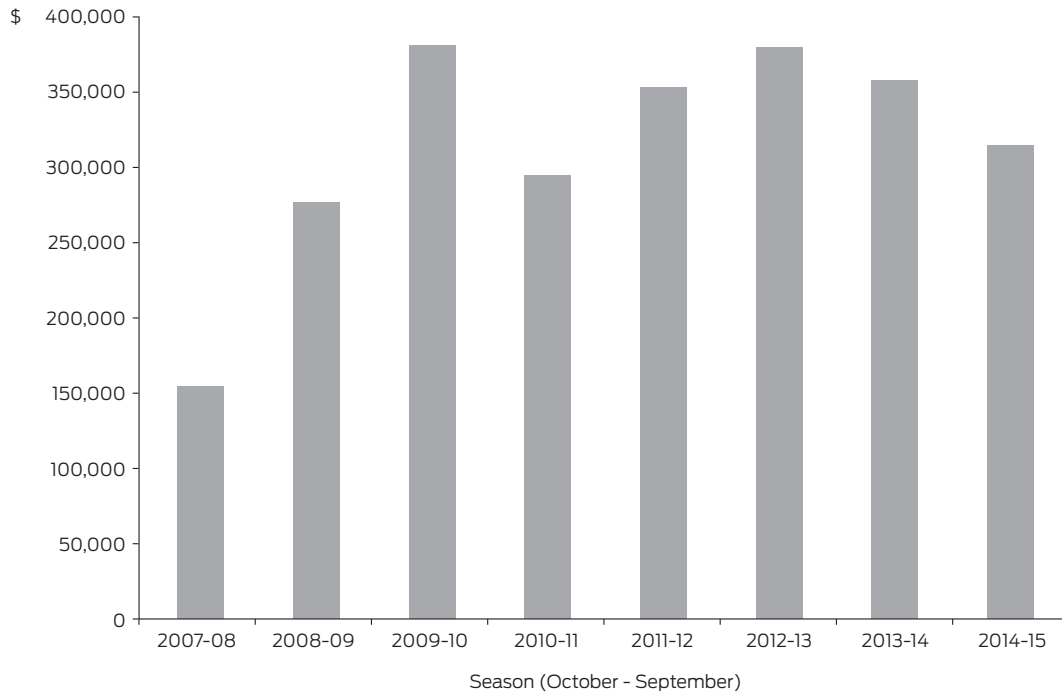
*Transition cost*

The total one-off cost of transition to a new programme has been estimated at \$39k. Over a third of that (38%) would be in re-establishing the AgriBase ID system.

Programme component	Estimated cost of transition
Proposal development (cost met in-house)	\$5,000
Stakeholder consultation process	\$4,000
Change company name and business plan	\$5,000
Re-brand field day equipment	\$4,000
Re-brand promotional material	\$6,000
First year of AgriBase	\$10,000
Technical work in re-establishing AgriBase IDs	\$5,000
<b>Total</b>	<b>\$39,000</b>

*Annual running cost*

The annual running cost of DeerPRO would not differ significantly from that of JML. This tends to be between \$320k and \$340k (Figure 8). There has been a longstanding goal within the programme of operating at a minimum effective cost. Years with higher costs contained significant projects to test and improve the programme which were beyond the



**Figure 8. Total running cost each season for the JML programme**

scope of the business plan. Total programme costs per year are presented below.

If the client base grew by two or three fold, which is the goal, a second full time equivalent position would almost certainly be required. While this would increase the annual running cost, the direct link to increased industry demand would be considered a success.

Today the programme is industry funded by a voluntary contribution per head of deer processed. Starting at 40c in 2006, it rose to \$1 in 2009 – 2010,

then declined through \$0.80 (2011 – 2013) to \$0.70 since December 2014. At the current contribution rate an annual kill of around 460k – 490k is needed to operate.

#### **Governance**

The present governance structure as a subsidiary of Deer Industry New Zealand and a limited liability company in its own right has proven successful over the years. It affords autonomy in setting policies to meet programme objectives and industry interests. It also enables timely decision making. A continuation of this structure is recommended for DeerPRO.





## CONCLUSION

This is an opportunity to build a strong and flexible new programme that leverages off the best aspects of JML, the database in particular. DeerPRO would substantially extend the Deer Industry's analytical and reporting capacity at all levels and it would achieve this for virtually the same running cost as JML.

Looking back, JML and the wider Industry have made encouraging progress in the control of Johne's disease. The worst of the outbreaks appear to be declining and despite widening spread, the overall impact of the disease seems to have peaked. However continued effort and vigilance is essential to consolidate our gains and reflect our attention to international sentiment.

Looking forward, this young industry appears to be embarking on another phase of growth and development, with exciting new markets and a collective push to lift productivity and financial returns. Achieving this growth will require good quality, individually tailored information to assist farmers and their support networks, just as it will require benchmarks and methods to demonstrate progress.

DeerPRO can take the best out of what we have seen and use it to help make the best out of what we will see in the future. It will make a significant contribution to the ongoing emergence of the Deer Industry as a cohesive and respected entity within New Zealand agriculture.

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