



**DEER HERD HEALTH & PRODUCTIVITY MANAGEMENT :  
DATA COLLECTION AND ASSESSMENT**

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**1. INTRODUCTION**

The Deer industry in New Zealand is almost twenty years old. The service that the veterinary profession provides to the deer industry has evolved from humble beginnings when most veterinarians feared involvement, many actively avoided involvement, and a few keen individuals actively sought involvement. At present almost every rural practice in New Zealand services deer farms, and there has been an active desire on the part of most veterinarians in the recent past to keep abreast of veterinary developments in the deer industry.

To date the veterinarian has been involved largely with emergency work, including attendance of injuries and various diseases and velvetting. In addition, the early days of deer farming saw a large number of post mortems performed. More recently veterinarians have been involved with tuberculosis control and an increasing involvement appears to be in the area of assisting with dystocias. Velvet harvesting has become a standard part of the veterinarian's involvement, but growth in the number of stags being velvetted has not kept pace with the expansion of the industry as a whole. There is no question that the veterinarian's involvement with all the above will continue, and indeed, probably will grow as the national deer herd increases in size. However, the relative importance of emergency work, necropsies, and tuberculosis testing is likely to decrease with time.

I therefore believe that the veterinary profession must look long and hard at its involvement with the deer industry and begin to plan for future events. In my view there is no question that the role of the veterinarian in pastoral industries must change. In our cost-conscious world the farmer will need to be convinced even more that the dollar spent is well spent. Traditionally veterinary fees have been regarded as a cost rather than an investment. Planned animal health programmes for other species, eg: dairy and sheep, have been proven scientifically to result in a handsome financial return for the farmer. Why should planned herd health programmes for deer be different?

In a growing industry such as the deer industry, with high returns per capita, the opportunity for the farmer to make significant financial gains must be excellent. I suspect that in the past, high per-capita returns may have encouraged inefficiencies that need remedies in today's tighter economic environment.

While the veterinarian has been trained with an emphasis on disease rather than health, this should not detract from the skills and understanding achieved in the area of husbandry. It has been stated many times in the agricultural and veterinary literature that the greatest improvements in productivity are generally to be made in the areas of improving management efficiency. It has also been stated (Radostits and Blood 1985) that the veterinarian is the individual best equipped to marry the disciplines and to practice in the area of herd health and productivity.

This paper gives an introduction to consideration of a deer farm as a total unit. It gives an outline of the data which should be considered and some aspects of its assessment. The general principle is that to understand one aspect of the farm requires an understanding of the farm as a whole. Disease, nutrition, reproduction, productivity and profitability are all closely interrelated. I believe that to provide the best service to the farmer an understanding of all those aspects of the operation is necessary.

Nowhere to the author's knowledge has consideration of health and productivity management programmes been considered for deer farms. We are therefore breaking new ice. Many of the comments made in this paper are based on the author's personal experience, and because of the relatively new nature of the industry and veterinary involvement there is often an absence of scientific data to support various contentions. In these instances the basic fundamentals of veterinary training need to be applied: individual goals need to be set, and individual analyses made.

## **2. WHY COLLECT AND ANALYSE DATA ON A WHOLE-FARM BASIS?**

### **2.1 Assessment of the farm**

It is not always possible to gain a very full understanding of a given farm during routine or emergency visits. Such visits may involve investigation of individual animal or specific herd problems, eg: dystocias or yersiniosis outbreaks. During these visits the veterinarian's and farmer's attention is usually focussed on the problem at hand. Often the veterinarian is in a hurry and therefore does not have the inclination to enquire

further into other aspects of the farm. The farmer will often sense that the veterinarian is a busy person, and while the farmer will often wish to discuss other aspects of his farm I believe he will often feel disinclined to do so if it seems that to take up the veterinarian's time would be an imposition.

## **2.2 To understand the farmer**

Gathering data as outlined in the following sections enables the veterinarian to assess the farmer's capabilities, his personality, his goals, achievements, motivation, and ambitions.

## **2.3 Assessment of the farm's productivity**

By analysing all aspects of farm management an assessment of the potential of a property can be made. For example, the farm may have a low stocking rate but high individual animal performance, but returns may improve by increasing stocking rate. Assessment of various parameters to determine whether they reach targets, eg: calving percentage, bodyweight gains, venison production, can highlight areas that need improvement. Usually, sub-optimum performance in one area is interrelated with poor performance in other areas.

## **2.4 Assessment of wastage**

Many procedures carried out by the farmer in good faith may be a waste of time and money. For example, a number of farmers use more anthelmintic than they need and this is costly in terms of purchase of anthelmintic and in time. Vaccine, eg: leptospira, may be used where the risk is non-existent. Many farmers use a range of trace elements but usually without ever having assessed the need. Soil analyses by certain commercial analytical laboratories result in the suggestion that a wide range of elements be applied in the fertiliser when these are often not necessary.

## **2.5 Assessment of the general health of the herd**

Clinical problems usually occur one at a time, and when spread out over a twelve month period they can appear to be relatively minor. Likewise deaths, when they occur individually, do not give the impression of being a particularly serious problem. However, if these are pooled together and investigated over a twelve month period losses and health problems can be put in bold perspective. This can provide the stimulus for the farmer to improve management.

A farmer may accept that a 4% mortality rate is normal, without knowing that it is high. The veterinarian can pinpoint such problems and begin to investigate them.

## **2.6 Financial situation**

It is essential that the veterinarian understands the financial situation of the property to ensure that advice that is given can be implemented. It is easy to suggest that a supplementary feeding programme be commenced for a group of weaners that may be suffering from a yersiniosis problem, but if the farmer's cash flow is inadequate then the advice may not be implemented. Likewise, further subdivision may be necessary to improve pasture production and consequently animal performance. Advice must be tailored to suit the farmer's economic circumstances. It must not be taken for granted that all deer farms are well established financially.

Assessment of the farm's balance sheet may also highlight areas where inefficiencies have arisen. However, I believe the veterinarian is generally not well qualified to advise on financial matters, and in the interpretation and establishment of cash flows, spreadsheets, etc. As with all herd health programmes there must be an area of cooperation and consultation with other farm management consultants.

## **2.7 Assessment of the farmer's need/willingness for advice**

Highlighting areas of deficiency indicates a need for the farmer to improve management. However this has to be balanced with a willingness to accept and act upon advice. Not all farmers are prepared to accept advice - some farmers may well become very defensive if management deficiencies are highlighted. The veterinary input will be tailored to suit the receptiveness of the farmer: not all farmers would be willing to accept an advisory service. Efforts should be concentrated on those who are.

## **2.8 Expression of caring**

Public surveys of the veterinary profession indicate that the most important attribute in the eyes of the public is the apparent knowledge and caring of the veterinarian. This of course can be manifest in many ways. One obvious way for the rural practitioner is to take a more intense interest in the farm as a whole. Many farmers will appreciate the veterinarian's interest and this will serve to stimulate the client's awareness of the veterinary service available, and in my experience has encouraged the farmer to call for a wider range of advice and

information than he would otherwise do. Alternatively, other professionals may be consulted. Gathering an understanding of the property therefore enhances the farmer's perception of his veterinarian. This can only work to the benefit of both parties. It must be an objective of the profession to maintain or improve the financial status of individuals within the profession; by providing cost-effective advice, this can be achieved to the mutual benefit of veterinarian and farmer.

## 2.9 An interrelationship

Few problems stand alone. I wish to give two examples.

(a) After analysis of data on a property it was determined that the major deficiency was in weaning percentage (<80%). This was traced to poor bodyweight, particularly of first calving hinds, and further to poor weaning weights. During the ensuing twelve month period it was determined that the following was occurring:

- i. Hinds were calving on average rather late
- ii. Hind bodyweights at mating were inadequate
- iii. Summer nutrition was poor. This was because of the traditional style of calving to provide lots of cover, ie: rank pasture, therefore summer pasture quality was a major factor contributing to low weaning weights.
- iv. Feed allowances to weaners during winter was inadequate. They were being forced to graze down to approximately 1000 kg DM/haRDM.
- v. A cobalt deficiency was suspected and supplementation introduced.

During the following two years changes in management have improved the mean bodyweight of yearlings by 20 kg and the mean weaning percentage (MA and 2-y.o combined) has improved to almost 90%.

(b) On another farm it was discovered that a group of deer were calving as late as March, ie: a four-month calving span. The owner was adamant that it was necessary to do this to ensure a great enough return from his herd to balance the books. An assessment of the whole-farm data similar to that described in a later section revealed that once again feeding management was not up to scratch, and therefore the problem was being perpetuated year by year, ie: poor feeding = poor reproduction = poor financial returns. It became clear that the stocking rate on the property overall was low and that the farm was budgeting for a deficit. At that point a farm management consultant was engaged in

consultation with the veterinarian to advise on the options for improving the financial performance of the property. It was clear that little could be done to improve the management of the property until a position of financial stability could be achieved.

I give this example to demonstrate the importance of understanding the financial position of the farm, as there is an inextricable cause and effect relationship between productivity, management and finances on the property.

### **3. HOW TO COLLECT DATA**

#### **3.1 Ad hoc data collection**

Usually the veterinarian's involvement in the property is to be present to undertake individual animal or individual problem investigations, ie: diagnosis and treatment or routine work such as velvetting or Tb testing. During history-taking and general conversation it may be possible to learn a considerable amount about the property. However, this is usually only a verbal recollection and there is usually no means of reinforcing the information gathered. Data given in this way is usually anecdotal, general and inaccurate.

Likewise the advice given during routine or emergency visits is often out of context, eg: a veterinarian may be called to a farm to assist with a dystocia problem in an over-fat hind. This may be the third or fourth such call that season to the farm. It is very easy for the veterinarian to advise that the farmer not allow his animals to get so fat in future. However, the farmer may not have the confidence or the knowledge to carry out that advice. Indeed, it is eight to ten months before the advice needs to be put into effect. The farmer may well forget, or implement various practices by trial and error. Would it not be more satisfactory for the veterinarian to institute a follow-up visit to give the farmer some concrete advice nearer the time on how to achieve the objective?

Similarly, individual animal problems often cause a great deal of anxiety to the owner or manager, eg: an occurrence of yersiniosis in a weaner stag may be the beginning of an outbreak. When the owner or manager is in a state of anxiety he is less likely to appreciate fully all the advice that is given at the time. A golden opportunity, therefore, exists for the veterinarian to re-visit the property shortly afterwards when the farmer's emotions have subsided and when the time is ripe to tackle the problem in a planned manner. The farmer is usually more receptive to advice when he has had time to consider all the implications

I believe the ad hoc approach is the way that most veterinarians conduct their practice. I would commend the advantages of a more deliberate and planned approach.

### **3.2 Planned data collection**

Should the farmer show a willingness to discuss various aspects of herd health and management (and this can be ascertained by either passive or active promotion of this type of service), then a visit should be planned for a minimum of one half day, and preferably a whole day, in order to "brainstorm" the property.

The technique I use is to follow through the property profile record sheet which is appended to this paper, and go through each aspect of the property one by one.

At the same time as giving the veterinarian the opportunity to gain an understanding of the property and to target areas for future improvement, the farmer will, often for the first time, be forced to sit and think and take stock of the property, his performance, objectives and ambitions. In my experience I have yet to find a deer farmer who ends that day with the same mental attitude that existed at the beginning of the day. Most farmers will be greatly stimulated by the brainstorming approach.

One very useful spin-off of such a brainstorming is the establishment of a set of objectives for the property. Many farming policies are made without a real understanding of the outcome or the reasons why. My favourite quotation (author unknown): "If you don't know where you are going you seldom get there" is very applicable to the farming enterprise. Similarly, targetting areas that need improvement gives the farmer a set of objectives to work to. Often the farmer will not understand the relationship between various production parameters and management procedures. An explanation of these will often come to the farmer as a revelation.

### **3.3 Step-by-step information-gathering and assessment**

The deer property profile sheet attached to this paper will provide the basis for the following discussion.

#### **3.3.1 General data**

These points give a general idea of the farm, particularly accurate detail about the areas and subdivision. An understanding of this is essential for the implementation of management advice.

### 3.3.2 Stock wintered

Initially, the winter stock units are the most appropriate since the winter generally is the time of greatest feed deficit. In addition an important figure is the summer breeding hind number, since a high number of breeding hinds can often result in a feed deficit during lactation. A gauge of the feed supply and demand pattern is extremely useful in understanding management requirements for a given property.

Deer numbers should be recorded and total stock units calculated. Other classes of stock should be included, but the importance of these will depend on the interrelationship of management of the different types of animal on the property; eg: if no sheep or cattle are grazed on the deer fenced area, the deer unit can be regarded as an isolated entity. Conversely, if sheep or cattle graze the deer unit and/or supplementary feed is taken from one part of the farm and fed to another, then all classes of stock should be considered.

Total stock units wintered gives an assessment of the stocking rate of the property. This can be compared with other properties on similar class of country, and in conjunction with investigation of performance parameters an assessment can be made as to whether the stocking rate can be increased or whether it needs to be decreased.

### 3.3.3 Age structure of herd

This is important particularly for breeding herds and velvetting herds. I have noted in one large herd that 80% of hind deaths in one 12-month period have been of hinds ten years of age or older; ie: the mortality rate logically increases with age. Similarly an aged herd will tend to have more ill-defined problems with thrift and teeth wear.

A further important reason for understanding the age structure is to assess the capability of genetic gains to improve productivity, eg: If a farmer uses the same old stag year after year and allows the mean age of hinds to increase, then genetic progress will be limited.

### 3.3.4 Farming policy

It is necessary to understand whether the herd is static or increasing to enable forward planning, eg: stocking rates, supplementary feed etc. Knowing the farmer's objective - venison, velvet, breeding or stud - will enable you to target areas; eg: venison production requires a different approach to genetics, species selection, recording and feeding, than a breeding operation selling weaners.



It is also essential to understand the farm's development programme. For example, a farm which is intending to ring-fence areas of scrub and poor pasture may be advised to invest in goats to improve the pasture in preparation for a more intensive deer operation.

### 3.3.5 Weights

Bodyweights are amongst the most useful pieces of information that can be gathered as an indicator of herd productivity. Feeding and growth determine ultimate bodyweights of breeding stock, and bodyweights of breeding stock have a dramatic influence on productivity, eg: calving percentage and mean calving date (it has been shown that for each 3 kg extra bodyweight of a hind, that hind will calve on average one day earlier).

Weaning weight is a good indicator of lactation of the hind. This in turn is influenced by feed quality. While feed quality is not the only factor that influences lactation it certainly would be the major factor. Other factors that influence weaning weight could include late mean calving date, low bodyweight hinds, concurrent disease (eg: ticks), or genetic attributes of the hinds and stags.

Growth from weaning gives an excellent indication of feeding in terms of quantity and quality of feed. A plot of the growth curve for animals on the property may highlight certain areas for improvement; eg: a nil growth through winter is not acceptable but is probably commonplace. Growth and nutrition have been considered in previous Deer Branch Course Proceedings (1984 and 1986), and is the subject of a later paper in this Proceedings.

### 3.3.6 Reproduction

#### Stags:

Date joined should be known because if the joining date is delayed beyond the start of the rut then calving will be delayed. Conversely, if the first calves born (see later) are born on the first day of introduction of the stag, then it is possible that some hinds may have cycled before the stag was joined, and therefore the farm may be missing out on some early calves. The desirability or otherwise of a spread calving also needs to be considered.

There is debate about the necessity to change stags but occasionally a stag will be infertile even if proven in previous seasons.

It is important to note the date that the stags are removed from the hinds, and this should be related to the calving percentage; eg: the calving percentage in a herd with a four month mating period will be higher than that of a herd with a 7-week restricted mating period. Therefore beware of the interpretation of a calving percentage. Likewise a low mean weaning weight may reflect a delayed mean calving date due to stags remaining with hinds for too long a period. A long mating period will result in a wide range of weaning weights.

While managementally late calves are a nuisance, many farmers are unwilling to restrict the mating period because when values are high, "any calf is better than none". However late calving is a self-perpetuating problem. Late calving and dry hinds are best culled.

Multiple or single sires may be used and a discussion of the relative merits of each system should be undertaken with the farmer. The age of the sires is important since the stag/hind ratio should be lower for younger sires. It is useful to know the origin of stags because some buyers like to maintain certain bloodlines.

Knowledge of whether the stag is experienced or inexperienced may be important in determining the stag/hind ratio. An estimation of the financial value of the stag is important because pre- and post-rut management of very valuable stags may be different to low value stags, particularly if feed resources are low.

Stag selection criteria should be examined, particularly where breeding programmes are being conducted. Usually stags are selected on the basis of general appearance, temperament, body size, and antler weight. Where the farm's objective is clear the relevance of stag selection becomes very important; eg: for a venison production unit it may be more appropriate to use a Wapiti or Wapiti-X sire than a red. For a stud herd every attempt should be made to progeny-test sires. It may be appropriate for the herd to join Deerplan, or to join a group breeding scheme. It may also be appropriate for the farm to engage the services of a skilled geneticist.

### Calving

It is important to know roughly the date of onset of calving and the finish of calving. The calving spread influences weaner

weights and likewise hind weights, and feeding during the rut will influence calving spread. Knowledge of the calving spread can give an indication, therefore, of a number of management practices.

Weaning percentage is a vital indicator of a range of management practices including breeding, feeding, mating management, disease, calving management and handling. It is then essential to investigate the parameters that contribute to a weaning percentage. These include abortions, the number of hinds which are dry dry, number which are wet dry (post-natal calf mortality can be severely influenced by various management procedures, eg: frequent intervention), dystocia problems and outside disturbances.

The number of dystocias is of vital importance as this can be a significant loss factor, in terms of calf losses, hind losses, and veterinary costs.

An estimation of the deaths at birth and between birth and weaning, and hind deaths from calving to weaning, is important. It is surprising how many calves are born dead or die before weaning when accurate figures are collected. There appears to be a considerable wastage factor on many deer farms during this period. Surveys have shown calf losses between birth and weaning to be between 1% and 5%. In my own experience calf losses during this time have reached up to ten percent. In many herds, particularly large herds, accurate calf losses are difficult to gauge.

Where the wet/dry number is high (>4-5%) it is imperative to investigate very thoroughly exactly where the losses are occurring.

The applicability of techniques such as early calving and AI should be discussed with the farmer.

### 3.3.7 Velvet yields

At approximately \$100 per kilogram for A grade velvet there is potential for improvement of returns by appropriate management of velvetting stags, particularly during the winter. An assessment of possible gains can be achieved by examination of average velvet weights for different age groups of stags, and as importantly, the percentage of each category which goes A, B, C or D grade. For example, if down-grading is due to injuries, then management practice must be altered. If down-grading is due to small size, then breeding and selection or culling policies may need to be altered. If damage is occurring during the velvetting process, then that needs to be altered.

### **3.3.8 Venison sales**

An estimation of growth can be achieved by examining carcass weights of each age group slaughtered and note must be taken of the time of the year at which they are slaughtered. Remember, the optimum carcass weight range is 50-70 kg, and if yearlings are below the optimum range or too many mixed age stags above the optimum range, then economic wastage is occurring.

### **3.3.9 Live sales / purchases**

It is important to know of purchases since the herds of origins should be investigated for tuberculosis. If there are a lot of purchases, then the management of new arrivals should be investigated in depth. Deer are susceptible to disease and death while they are adapting to a new environment.

### **3.3.10 Grazing policies**

An indication of the efficiency of the enterprise can be gauged by examination of grazing of different classes of stock. This of course needs to be examined visually at various visits to the herd in future, to ensure that optimum feeding levels are maintained.

It is important to understand the supplementary feeding regime on the property in terms of when this is used, which deer receive what type of feed, and the quantity that is given. The cost-effectiveness should be understood and an analysis carried out to determine that the most cost-effective feeds are indeed being used (calculations are available in the 1984 Deer Course Proceedings .."Feed demands and how to meet them" by K Milligan).

### **3.3.11 Fertiliser application**

Fertiliser application is important and this should be equated with soil test results. The veterinarian may collect soil samples for analyses but some assistance may need to be sought in interpretation of data.

Analysis of reproductive and bodyweight records may indicate that feed shortages exist at certain times of the year. Some macro elements may be insufficient for optimum pasture production. Alternatively there may be a case for the use of nitrogen.

### 3.3.12 Financial - see Section

It is vital that the financial situation of the property is understood.

### 3.3.13 Deer deaths

Examination of deer deaths is a vital process in assessing wastage. The following example is an actual case.

#### EXAMPLE 1

Weaners	Hinds	Stags
2 lungworm	4 old age/debilitation	2 paddock injury
1 scour	3 paddock injury	3 collapsed tendons
1 MCF (?)	1 dystocia	1 parapox virus
5 unknown	2 unknown	
10	11	4
<b>TOTAL: 25 (1% of herd)</b>		

Diseases can be classified as preventable or unpreventable. If there is a significant number of preventable diseases resulting in losses, then a target area has been realised.

In my experience a 1-1.2% annual loss rate is not unexpected in big herds, but on average the loss factor is normally higher. Deer farmers usually budget on approximately 2% loss. However, I believe that with the policy of deer farmers retaining all breeding stock for expansion of the national herd, loss factors due to old age and age-related diseases will increase in future. I believe the prudent farmer will cull animals before they reach an age where the death rate begins to increase.

### 3.3.14 Health

#### (a) Parasites

The presence or absence of these must be determined, as the level of parasite burden will influence the control programme that is instigated. A rough guide can be achieved by examination of faecal samples for egg and larvae counts. High counts will result in a more intensive control programme.

In my experience yearling and mixed age hinds rarely need drenching, yet are usually drenched once or twice per year. This, therefore, is usually wasteful. It is usually more cost effective to sample before drenching.

The dilemma that the farmer faces with his drenching programme for weaners is when to stop. If a programme is well integrated, then the number of drenches does not need to be very great.

External parasites may or may not be a problem. If ticks are present then an intensive and detailed programme needs to be instigated.

(b) Vaccinations

It is important to know whether vaccination procedures that are being conducted are efficient and the risk or necessity for vaccination programmes can be assessed by knowledge of the farm as a whole.

(c) Tuberculosis

This subject has been well covered elsewhere.

(d) Trace elements

This is a topical area and many farmers, I believe, place too much emphasis on trace elements as factors affecting their production. Investigation of trace element deficiencies should, first and foremost, take into consideration feeding levels

It is important to know whether previous monitoring has been undertaken and this must be assessed in conjunction with current supplementation programmes. It is my experience that more often than not supplementation is unnecessary, and that often where no supplement has been given, supplementation has been proven necessary.

(f) Whilst the presence of some diseases will have been noted in Section 3.3.13, a number of other conditions causing illness rather than death may have occurred on the property. These are listed. Many are preventable and strategies should be determined where risk factors are high.

#### 4. REPORTING

It is vital to reinforce verbal advice and discussion by forwarding a written report as soon as possible to the farmer. The farmer will often use these as reference points, and receipt of these will often stimulate further contact and discussion with the client.

All data should be included, not just averages and interpretations. Let the client see exactly how the decisions have been made.

Highlight target areas for improved productivity and set out in detail advice, references, normal ranges and targets.

Follow up year by year with new data. A computerised data recording and retrieval system may be an advantage.

#### 5. CONCLUSIONS

A proper understanding of a deer farm can only be achieved by giving detailed consideration to all aspects of management and productivity. Only by understanding all details can rational and planned steps be undertaken to prevent losses, to prevent wastage, and to improve productivity.

This paper has been presented as a guide for veterinarians wishing to become more involved with whole-farm veterinary consultancy work. The ideas and contents of this paper have been developed on the author's personal experience, and there are no doubt many other methodologies which may be employed. It is hoped that this paper will provide stimulus for veterinarians to examine the merits of a more comprehensive service to farmers.

#### References

Text: Radostits and Blood (1985) Herd Health. Publ. Saunders Co.