

# Fundamental deer management

Irrespective of the scale or type of deer farming, or the vast array of attitudes to deer handling and behaviour, good production targets can be set and achieved. This applies to live sales, venison or velvet antler production where we can predict realistic goals and responses for appropriate management that is easily learnt and implemented.

However, successful deer production requires management that differs in many respects from that of sheep and cattle. An understanding of these differences is the fundamental key to deer farming. This article, originally prepared for 1986 Deer Expo at Whakatane by Tony Pearse, technical officer, deer research unit, Invermay Agricultural Centre, outlines a basic yearly management schedule and highlights areas where farmers' input creates either reward or disaster.

The research data and the schedule have their origins in an intensive deer farming system based on Red deer where increasing production is the aim of farming management.



Photo: Bill Gibson

## 4 Market prospects

THE DEER industry has its own targets. The most immediate and realistic is the 10-fold increase in tonnage of export farmed venison by 1994, represented by 20 000 tonnes of venison, the output of an estimated 750 000 plus breeding hinds. Meat sales at present are a composite of supply to traditional European markets and the development of new diversified markets that require both consumer education and major marketing strategies. Farmed venison will be the mainstay of both.

In traditional markets, customers will have to be convinced that our farmed venison in the accepted form of frozen primal cuts is better than, or as good as, feral venison. While the image of game as an "animal killed in the hunt" is not always served by the concept of farmed venison, "natural" farming, producing venison that is more tender and of

more consistent quality especially from regions so close to bush, water and mountains, creates room for public relations and promotion.

Diversified markets allow our exporters and processors to promote the advantages of a farmed product with its attendant meat inspection certification, standardisation of subprimal cuts, portion controlled cutting and packaging, supply of aged chilled product and consistent tenderness, taste and above all else, leanness.

As producers we can match our market's constraints and requirements and the important image of our product to a precise seasonal pattern of deer feeding requirements, breeding behaviour and growth abilities to an on-farm production of high quality feed.

As exporters, the industry is spearheaded by the Game Industry

Board now with full legal status and a mandate from the industry (producers, processors, exporters and government) to "promote and assist the orderly marketing of game and products derived from game". Our producer board is composed of leaders from all these fields that define the industry but has its strength and its foundation in the elected members of the New Zealand Deer Farmers' Association. The GIB and NZDFA have no doubt about the size of the marketing task the next years will bring, and the willingness of farmers to provide funds from product-based levies for research and development is proof of confidence in the future.

Our prospects in the speculative and volatile velvet antler market are not so clear cut. In a traditional Asian market place, already oversupplied, NZ Red deer type velvet is third only

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in preference, both in colour and style. Consistent promotion and research by GIB and leading exporters have ensured that we occupy a high profile in the marketplace. Processing techniques have rapidly attained the quality demanded for the dried product. Maximising returns will now rest with the farmer and his perception and production of quality.

Some exporters have great faith in

our velvet antler product. They believe that our farmed mixture of Canadian Elk or Wapiti velvet with the best style of Red, be it New Zealand or imported in origin, and the relatively higher yielding hybrid type velvet will allow an effective supply for Asian market demands.

Increases in production of venison, velvet antler and in the high priced live sale market can therefore be most cost effective.

Intensive skilled deer management will increase reproductive performance and liveweight gain. Estimates of this advantage include a 15 to 20 kg liveweight gain in young stags for meat production (\$50.00 per head); up to 0.5 kg of velvet antler (\$45.00 per head); and \$20.00 per kg liveweight for well grown weaner hinds presented for public auction.

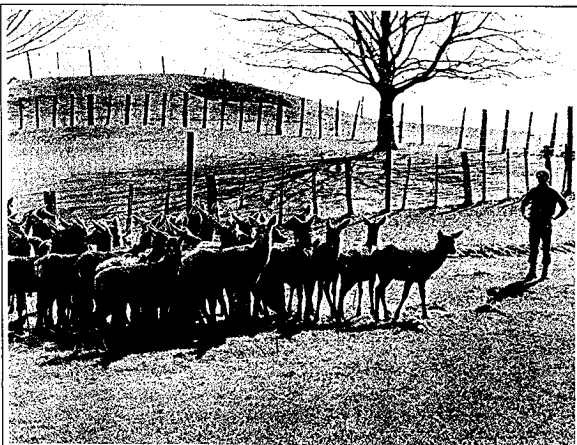


## Animal growth patterns

In calves the potential for growth during autumn and winter is limited because of a winter depression in feed intake, but high and efficient rates of gain are achieved during spring and summer.

Adult stags display a considerable and unavoidable weight loss over the autumn rut and a slight loss during winter. Liveweight loss in hinds after calving reflects the demands of lactation. This must be regained pre-rut for maximum breeding performance.

Examination of the annual growth cycle pinpoints major features under direct farmer influence, for example — it is possible with better feeding to achieve maintenance of stags' bodyweight in winter, and with good pasture control, allow hinds to gain weight (140 g/day) over lactation.



### Birth and birthweights

Good calving percentages are influenced most by hind liveweight. Heavier hinds have heavier calves which tend to survive. The 1984 season at Invermay over the whole herd produced a calving mortality of 7.5 per cent. While this figure appears high and to some degree may reflect a research situation, it is not atypical of intensive deer farming. Calf weights were 9.5 kg for males, 8.9 kg for females. Where calves were less than 6.0 kg, 30 per cent died; over 10 kg, 4 per cent died. Wastage is greater for male calves. Deaths were due to starvation (41 per cent), dystochia (34 per cent) or misadventure (19 per cent).

Generally, first calving hinds not only produce smaller calves but have poorer mothering ability. Eartagging at birth, inadequate provision of

shelter or hides for calves and disruption of the herd during calf-hind bonding periods all contribute to this wastage.

The major management balance for the calving hind in late pregnancy involves increasing foetal growth and therefore birthweight but restricting fat deposition in the hinds. This is highlighted in the breeding programme mating Canadian Wapiti bulls to mature Red hinds, to provide the F1 hybrid. Calves range from 10 to 16 kg liveweight (average 13.8 kg) with substantial increases in length of fore and hind legs compared with Reds.

Calving difficulties remain the major problem in mating the large terminal type sire to the smaller productive dam. Consequently restriction of feed intake in late pregnancy is the major management feature for successful hybrid breeding during late spring. This principle also applies in

the normal Red-Red breeding situation.

### Lactation: The first four months

Weaning weights reflect primarily mothering ability, and provide direct comment on milk production and the level of management of pastures during the first 14 weeks. Up to 90 per cent of the variation in calf growth rates from birth to 80 days is accountable from milk intake. Hind milk is high in fat, protein and total energy. By nine weeks 80 per cent of the lactational efforts of the hind have been achieved. Feed requirements during this period are high, twice that of winter or spring, and can only be sustained by offering the highest quality vegetative pasture or supplementary feeding during summer drought.

Practical experience at Invermay has >

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▷ aptly demonstrated the consequence of poor hind nutrition and inadequate pasture quality. In order to provide cover for new born calves, pastures were allowed to become overgrown and rank. Nutritive value was thus lowered. Weaned weights at 14 weeks were in the range 35 to 38 kg. With improved management, namely surplus spring growth made into silage, control using grazing cattle and topping of pastures, calf weaning weights have increased to 46 to 50 kg.

High quality pasture is also required by calves from four weeks of age both to develop the ruminant gut and for good growth rates. Targets in excess of 400 g/day from birth to weaning are possible.

The loss in hind liveweight, however, must be offset by preferential feeding prior to mating to ensure good conception rates and concentrated calving patterns. It is Invermay's experience that the practice of pre-rut weaning most suits this and other

requirements of our intensive management.

### Post weaning growth

Significant growth of calves can be made during the first autumn/winter period in spite of a natural depression in feed intake. Growth is dependent on the quality and quantity of feed offered and aided by minimising stress occurring during this period.

Preferential feeding of pre-rut weaned calves allows maximum growth rates of 0.2 kg/day during autumn. As feed requirements increase because of increased energy requirements associated with the environment, the ability to continue growth lessens. If this is combined with a post-rut weaning stress, or high worm burdens, young stock show little growth and become at risk to yersiniosis and winter feed stress. Smaller calves may exhibit some

compensatory growth during winter if fed preferentially. This allows target mating weights to be reached by late-born calves. In another trial weaner hinds born during November have been luxury fed. Thirty per cent of the group attained weights better than 67 kg by May at six months of age, and have been proved sexually mature and naturally mated using techniques of oestrus synchronisation. Pregnancy has yet to be confirmed.

### 15 months: Potential for production

Liveweight patterns for Red deer show that a major weight peak occurs at 15 to 17 months of age for both hinds and stags. Weight gains to this point and to the next peak at 24 to 27 months are a function of the seasonal pattern of voluntary intake.

**Stags:** The period nine to 15 months is the best opportunity to exploit potential for growth. Management must be directed to allow actual growth rate, a function of the genetic potential for growth and on-farm factors, ie quality and quantity of feed offered interacting with environmental stress and disease, to become as close as possible to the genetic limits for growth.

Research data suggest that selection for growth rate through sire influence can be beneficial. Puberty and pedicle initiation are a function of liveweight and age. Animals capable of high growth rates have an enhanced potential for ultimate body size, sexual maturity and velvet production.

The two ages that mark the end of these growth periods define the best slaughter age for young stags. Table 1 demonstrates the relationship between liveweight, carcass weight and dressing percentage. The data reflect an "ideal" venison finishing system.

Average industry carcass weights in 1983/84 gave a mean carcass weight of 49.5 kg (range 30 to 74 kg) for yearlings and 61.2 kg (range 42 to 86 kg) for two year olds. Clearly this represents product from small yearlings, and culled velvetting or breeding stags as two year olds.

To ensure that farmed venison remains a very lean product, especially when new and diversified markets are under exploration, it is hoped that processors and the GIB will heavily penalise overfatness. Current schedules (\$4.00 kg) are no ▷

TABLE 1: Slaughter data for different types of deer

Age group:	15 months	27 months	3 years	5 years
<b>Red deer</b>				
Farm liveweight	96-107	133	176	194
Carcass weight	55-61	77	105	106
Dressing %	57.3	57.9	59.7	54.8
<b>NZ Wapiti</b>				
Farm liveweight	156	189	240	298
Carcass weight		97	132	167
Dressing %		51.3	54.9	56.1
<b>Wapiti/Red hybrids</b>				
Farm liveweight	126	165	215	
Carcass weight		91	121	
Dressing %		55.1	56.0	

The following figures each result from the post mortem of one animal:

	Elk X Red F <sub>1</sub>	Pere David	Elk
Estimated liveweight	145	154	344
Carcass weight	80.4	94.4	175
Dressing %	55.1	61.0	49.1
Age	13 months	24 months	44 months

We can note:

- Dressing % increasing with age.
- Figures (57% yearlings, 60% in mature stags) are more than 10 units higher than sheep and 5-8 units higher than cattle.
- Information from Wapiti and hybrids is based on comparatively few animals and should be regarded with some caution.
- Dressing % decreases in two year olds from Reds to hybrids and further to Wapiti-type.
- Dressing allows nothing for loss due to bruising or other damage requiring trimming.
- Hybrids at two years old can be expected to yield an extra 10 to 15 kg of carcass weight at the same age as Red deer.

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▷ disincentive to the presentation of overfat animals.

Long term the industry must base the venison schedule on the fact that carcass lean is strongly related to carcass weight and payout should be on lean per cent content rather than carcass weight. Until current research can define this relationship "overfat limits" have been adopted, based on the GR measurement, ie tissue depth and carcass weight: These are 10, 12, 14 mm GRD for carcasses weighing up to 50 kg (AP1), 50.5 to 70 kg (AP2), and above 70 kg (AP3) respectively. An AF grade (overfat) exists above these limits at all weights.

**Hinds:** In Red hinds 15 months liveweight is the critical productive limitation. Puberty occurs at two thirds of mature body-weight (65 to 70 kg under intensive conditions). For realistic first calving performance, minimum individual yearling weights must be in excess of 65 kg. (See Table 3.) Yearling and two year old hinds are run separately where feasible so as not to penalise growth rate.

Once threshold mating weights are attained, liveweight has little direct effect on fertility given that estimates of lifetime calving performance have yet to be determined, ie there is no trigger mating weight with advancing age. However, the recovery of body weight in adult hinds prior to mating, aided by pre-rut weaning and preferential feeding, allows the concentration of the spread of calving patterns and may advance the onset of oestrus. Earlier and more concentrated calving of Red deer will have the advantage of better utilisation of spring growth and allows management of calving groups to avoid overfatness in hinds and reduce calf loss through dystochia.

### Adult growth: Stags

Beyond 27 months of age stags show marked seasonal variation in liveweight, an indication of hormonal involvement in the regulation of feed intake. Intake depression and characteristic weight loss over the rut are associated with high levels of testosterone. Antler and sexual cycles are closely linked, with seasonality of each under direct photoperiod control.

Testosterone falls to very low levels in spring and old antlers are cast. Secretion remains low and permits the growth of velvet antler. The stags during this time rapidly increase in

TABLE 2: Fatness in deer carcasses

	Age	Carcass weight (kg)	GRD (mm)	Carcass fat (% carcass weight)
<b>Red deer</b>				
Industry (1984)	15 months	49.5	6.1	8.2*
	27 months	61.2	10.7	11.1*
Invermay	15 months	55	8.0	7.0
	27 months	70	10.0	12.6*
	Mature	107	29.0	18.4*
NZ Wapiti	27 months	88-100	6.0	6.4
	5 years	132	21.0	?
Wapiti-Red hybrid	27 months	82	8.5	10.6
	5 years	121	30.0	?
Canadian Wapiti (1 only)		175	11	3.1

\* Estimate

Note:

- A considerable number of 27 month old Red deer will be overfat on the new stepwise system.
- Wapiti at 27 months at carcass weights of 100 kg have about the same amounts of fat as a Red yearling carcass of 55 kg.
- 27 month hybrids can have big carcasses but be very lean.
- Mature Wapiti and hybrids are overfat for quality venison.
- Mature Red deer are grossly overfat. GRD values up to 50 mm can be recorded in 120 kg carcasses.

TABLE 3: Expected calving percentage for herds of two year old Red hinds as related to mating weight

Meanweight (kg)	% over 65 kg (threshold weight)	Expected calving %
65	47	56
70	74	75
75	91	86
80	98	90

bodyweight. Data from Invermay and DSP's show that by the time of velvetting in November, 80 per cent of the pre-rut gain in weight has been reached and that this is virtually all body fat. (GRD increases from 15 up to 40 mm in 70 days are possible.) Slaughter of adult stags after velvet harvesting is not a suitable time for the production of marketable venison. Fat content of the carcass can be as high as 25 per cent at peak weights prior to the rut. Virtually all of this fat is then lost during the six weeks of rut. Consequently, post rut or winter slaughter provides the only opportunity to produce lean venison from mature stags.

As testosterone secretion increases in late summer/early autumn, velvet antler is cleaned and the stag develops hard antler for the rut when testosterone levels peak. Sexual behaviour involving roaring, flehmen, fighting with other stags for harem control, herding and mating

behaviour is predominant. Management at this time involves a balance to minimise weight loss and reduce damage to other deer, fences and deer handlers.

On intensive farms there is therefore no place for hard antler or velvet antler regrowth. Minimising weight loss over the rut by single-sire mating, and reducing fighting and competition where possible, reduces the risk of "winterdeath" in expensive breeding and velvetting stock. Stags follow the testosterone linked depression in intake during the rut with a high energy demand, but intake is adequate only for liveweight maintenance over winter. Exposure/starvation deaths are a common source of wastage and are combined with greater susceptibility to MCF. ○

**Next issue:** Tony Pearse discusses seasonal feeding requirements and the yearly management cycle.