

ELK AND HYBRID MANAGEMENT

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The ideas presented in this paper are generated as much, if not more, from my experience in farming these animals as from my clinical experience in treating them.

Overview

Current economic pressures have clearly indicated to deer farmers that carcasses less than 50 kg are not wanted by the venison exporters.

When farmers primarily slaughtered stags and retained females for breeding this did not present major problems, but now farmers want to retain better males for velvet and slaughter almost all female progeny. Many, if not most, are having difficulty in reaching target weights by 15 months - 2 years with red deer females. For this reason I believe the use of Canadian elk and N.Z. wapiti-type terminal sires will become much more prevalent in future years.

Nutrition

I cannot emphasise strongly enough the importance of good nutrition. It is central to the majority of common disease processes encountered in elk, and life-long economic performance is strongly influenced by feeding levels experienced, particularly in the first 2 years of life.

To most people confronted by elk-type animals for the first time it is easy to be overwhelmed by the sheer size of the animal and many find it hard to make *objective* decisions regarding body condition. It becomes even more difficult in winter when a very thick hair coat can camouflage a very lean body. Because varying degrees of Elk-red hybridisation exist through the N.Z. deer population people dealing with these animals must be able to establish adequate growth rates and critical target weights for a range of animals, from lower grade hybrids, N.Z. wapiti and F₁ types through to pure elk. This is an art that takes some time to develop.

If we compare relative growth rates of red deer, hybrids and pure elk, the elk-type animals underperform compared to results expected by extrapolation from red and cross-bred results.

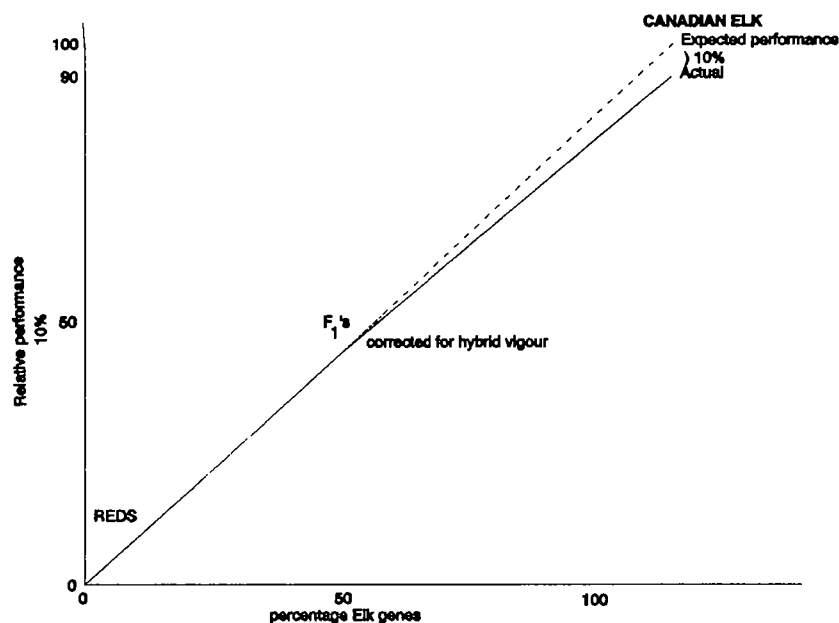


Figure 1 Comparative performance - Elks vs. Red

I believe this performance of elk-types, especially pure bred is a failure to adapt to N.Z. farming systems and the ryegrass dominant pastures we use.

Pasture palatability trials have shown that ryegrass is the least favoured grass species for cervids. When given a choice deer will eat virtually everything else first, red clover and chicory being preferred species. Red deer, evolving in Europe have encountered ryegrasses and will utilize them adequately if necessary, whereas elk in the evolutionary process never ingested ryegrass until N.Z. farmers considered, without consultation, that it would be an ideal food for them. In many cases I believe elk would rather reduce intake than eat poorer quality ryegrasses.

This year I carried out a grazing trial using hybrid hinds mated to elk bulls. The trial group grazed chicory and red clover pasture from just prior to calving through to weaning. The control group were matched for bodyweight, sires and stocking rate and grazed on normal ryegrass and white clover pasture (stocking rate 12 cows/hectare).

Table 1: *Effects of Pasture Type of Lactation*

Pasture Type	Cow Bodyweight - Pre calving	Cow Bodyweight - Weaning	Weaner Weight (Average)	
Chicory & Red Clover	139.0 kg	131.0 kg	Male	68.0
			Female	66.4
Ryegrass & White Clover	139.8 kg	131.3 kg	Male	62.3
			Female	57.8

Male weaners 9% improvement
Female weaners 15% improvement.

Several conclusions can be made from this trial.

- 1) Deer, including elk-types are underperforming on the typical ryegrass-white clover pastures.

- 2) When using terminal sires the ability of the cow/hind to produce milk is the limiting factor. On improved pastures the size differential between male and female progeny is decreased because the males meet the lactational barrier before genotypic potential is fulfilled whereas females continue to grow up to their genetic limits. This becomes very important when slaughtering females is a priority.
- 3) Compared to similar trials using red deer the hinds/cows did not put on weight over the trial periods while on chicory-red clover pasture. This is because the faster growing hybrid progeny were able to induce higher peak lactation in the mother, so utilizing the improved feed intake.

Having established that by weaning most N.Z. deer are underperforming, the next critical period to examine is winter.

Winter Growth Rates

Many farmers consider survival plus a modest weight gain adequate for winter performance. Hybrids and elk are capable of good growth rates through winter.

The following table represents growth rates achieved on my property in weaner deer from 2 separate sire types. Trial dates 11 May to 6 September (118 days).

Table 2 *Winter Growth Rates of offspring of two sire types*

Sex	NZ Wapiti Sire	Elk Type Sire
MALES	221 gms/day 26.1 kg Av. gain	249 gms/day 29.4 kg Av. gain
FEMALES	129 gms/day 15.3 kg Av. gain	177 gms/day 20.9 kg Av. gain

(- Maternal side: hybrid cows 120-150 kg).

To achieve this result weaners were grazed on high quality ryegrass and white clover pasture of 2200 to 2500 kg dry matter/ha reducing the pasture to 1600 kg DM residual before shifting. 0.5 kg maize/head/day was also supplied. In wet weather the animals were shifted well before residual targets were reached.

Feed Requirements for Weaner Deer

Table 3 (Kgs DM/head/day) for growing stags (top) and hinds of varying liveweights

STAGS												
<i>Liveweight (kgs)</i>												
Liveweight Gain g/d	40	50	60	70	80	90	100	110	120	130	140	150
0	1.30	1.54	1.77	1.98	2.19	2.40	2.59	2.78	2.97	3.16	3.34	3.51
50	1.48	1.71	1.94	2.15	2.36	2.57	2.76	2.96	3.14	3.33	3.51	3.68
100	1.65	1.88	2.11	2.33	2.54	2.74	2.93	3.13	3.31	3.50	3.68	3.86
150	1.82	2.06	2.28	2.50	2.71	2.91	3.11	3.30	3.49	3.67	3.85	4.03
200	1.99	2.23	2.45	2.67	2.88	3.08	3.28	3.47	3.66	3.84	4.02	4.20
250	2.16	2.40	2.62	2.84	3.05	3.25	3.45	3.64	3.83	4.01	4.19	4.37
300	2.33	2.57	2.79	3.01	3.22	3.42	3.62	3.81	4.00	4.18	4.36	4.54
350	2.50	2.74	2.97	3.18	3.39	3.59	3.79	3.98	4.17	4.35	4.54	4.71

HINDS												
<i>Liveweight (kgs)</i>												
Liveweight Gain g/d	40	50	60	70	80	90	100	110	120	130	140	150
0	1.30	1.54	1.77	1.98	2.19	2.40	2.59	2.78	2.97	3.16	3.34	3.51
50	1.56	1.80	2.02	2.24	2.45	2.65	2.85	3.04	3.23	3.41	3.59	3.77
100	1.81	2.05	2.28	2.49	2.70	2.9-	3.10	3.29	3.48	3.66	3.85	4.02
150	2.07	2.31	2.53	2.75	2.96	3.16	3.36	3.55	3.74	3.92	4.10	4.28
200	2.32	2.56	2.79	3.00	3.21	3.41	3.61	3.80	3.99	4.17	4.35	4.53
250	2.58	2.81	3.04	3.26	3.47	3.67	3.87	4.06	4.24	4.43	4.61	4.79
300	2.83	3.07	3.29	3.51	3.72	3.92	4.12	4.31	4.50	4.68	4.86	5.04
350	3.09	3.32	3.55	3.77	3.97	4.18	4.37	4.57	4.75	4.95	5.12	5.30

Assumption: 1 kg DM = 10.8 MJME

It can be seen that to achieve 250-300 gms/day growth rates in 80-110 kg weaner elk intake needs to be 3.5 kg DM/day.

Put more graphically the food intake of 2 growing weaner elk equals the winter feed requirements of 1 dairy cow.

As compensatory growth in spring is inadequate to correct for pre-weaning and winter growth deficiencies many farmers are now left with yearlings which weigh considerably less than their genetic potential would indicate and are now open to a range of problems which people view as elk-specific concerns.

Reproductive Performance

The larger the animal the longer the time to peak body weight and sexual maturity. Puberty in elk as in most other species is greatly influenced by body weight. Most red deer under average N.Z. farming conditions reach puberty by 15 months but the same situation does not apply to elk. Poor growth rates at crucial stages on many N.Z. farms results in far fewer 2 year elk cows producing calves than happens in their farmed counterparts in native Canada. Calving percentages

below 50% are not uncommon in 2 year old elk and elk-cross cows. This result will increase with increasing body weights but because of the slower maturity profile and less favourable conditions in N.Z. 70-80% calving is probably maximum in young elk cows. This problem is specific for animals containing a high percentage of elk genes. F1's (50% elk genes) and lower are not affected to any major degree.

Conception rates in mature elk cows seem to vary greatly between farms, results ranging from 50-90%. Information from Canada suggests that pre-mating weights of mature cows should not be any more than 5-8% less than the weight shortly before calving. If lactational weight loss exceeds this then the drop in cycling activity and conception rates is quite dramatic. Therefore when faced with these problems don't jump to conclusions about bull performance, trace element deficiencies and obscure concurrent illnesses. Let the scales tell the story and build up a logical pattern of farm performance. It may not be a palatable answer and it certainly isn't instant but it may be the only permanent solution. Two-year-old elk normally don't lactate well enough to produce heavy calves at weaning and there is considerable debate as to whether they should be mated at all. Advocates of mating at 27 months claim that they get a bigger animal with a better life-time production.

Male Performance

Probably the most commonly asked question is "Will-2-year old elk bulls serve?" So often I hear "experts" state "No, I wouldn't use them". Fortunately nature's answers are never black and white, only shades of grey. My answer is that each animal is an individual and must be treated on his own merits. I have successfully mated pure 2 year elk bulls over 30-35 cows but I use a strict assessment criteria for their successful mating.

- 1) Pure or high % elk genes 2-year bulls should weigh 245 kg to 290 kg by February.
- 2) They should not be run with older more dominant bulls prior to the rut.
- 3) Run these bulls outside a line of visual contact with older bulls. Preferably 2-3 paddocks between.
- 4) Check animals for mating behaviour:
 - Nose elevated hind herding;
 - Flehmen;
 - Chasing and low mounts;
 - Actual mating - (Not that hard to catch).
- 5) Keep hind numbers low. 15-35 maximum.
- 6) Put in back-ups early.

The main problems I encounter are people using 2-year-old elk which weigh well below their target weights or ones whose brains have been converted from "sex" to "survival" by a bad experience. Good F1 animals should be 205-235 kg pre-rut and higher % elk gened animals 230 -> 290 kg. Many animals catalogued for sale as 2 year sires are below optimum weights. Another successful technique I use with valuable elk-type breeding bulls is to feed supplements during the rut while these animals are with their cows. 1-2 weeks after joining, once the bulls are confident of their territory and have the cows "trained" to behave they can be enticed to the fence to eat palatable concentrates e.g. maize whereas they won't eat pasture, silage etc. By feeding 2-4 kg/day animals emerge from the rut in far better condition to face the winter. The chances of fading are greatly diminished and next year's velvet production is enhanced. Elk never build up the same fat reserves as red stags and so minimising weight loss during the rut is very essential to ensure that sufficient fat cover is preserved to overwinter.

Specific Disease Problems

Fading Complex

Although this problem is mainly seen in relatively pure elk the problem has been observed in Eastern European reds, but at a very low frequency. I don't believe this disease complex has any single pathogen as a cause but occurs through a multifactorial approach. In my opinion pre-rut body condition in both males and females is the most reliable indicator of susceptibility to the condition. Males are the most frequently affected as the rut results in major weight losses from animals which are often sub-optimum to begin with. Once body condition drops below certain levels the condition becomes almost irreversible without drastic intervention. Cows which are below optimum weights at weaning protect themselves by deferring pregnancy but bulls don't have this option.

Some other factors with strong causal associations are:

- 1) Inhibited parasitic larvae in the abomasal lining decrease digestive acid production and prevent effective digestion. Low weight animals may have decreased resistance and build higher worm burdens.
- 2) Insufficient fibre content of diet. Studies show that diets of high lignin content may be required for efficient digestion. Many farmers equate this to feeding diets with increasing amounts of poor digestibility feed or roughage. This will exacerbate the problem. High lignin content diets must also be of high energy, high nutrient value!
- 3) Ryegrass staggers. This can be severe enough to limit feed intake and weight gains.
- 4) Low copper. Elk seem to have higher requirements for copper but don't expect supplementation to solve the problem.

Treatment

Intensive and sustained treatment is required for success. My attempts at curing animals in the same environment as the condition developed met with mixed success. Last season I took affected animals from clients' farms back to my own property, where I could monitor feeding, treat as required and monitor progress. This proved much more successful and the 5 animals treated recovered. I now believe that on most properties where fading animals are encountered, the farmers are not in a position to sufficiently increase feed intake, especially the quality of feed offered, to reverse the situation. Initially I tried taking animals off pasture altogether and feeding *Ad lib* grain (maize) and high quality legume hay (peat vine) plus silage. Even in this situation the animals continued to weaken and didn't improve till they were offered the above plus **high quality** pasture. I believe feeding is the key to reversing the problem. Immediate treatment involves.

- 1) Energy supplements e.g. ketol in very weak animals.
- 2) Pour-on ivermectin.
- 3) ± antibiotics and anti-scouring preparations.
- 4) Multivitamins.
- 5) ± Copper bullets.
- 6) Anabolic steroids - increase weight gain once some improvement is seen.

Intakes of 5-7 kg DM are required and it can take 40-60 days before visual signs of weight gain are apparent. No rapid changes can be expected.

Affected animals are susceptible to relapses in the following winter because complete weight recovery is seldom achieved before the onset of the following rut. Consider running these animals in a bachelor mob with a more dominant bull to suppress rutting behaviour.

Some animals will fail to respond to the mentioned treatment and will continue to scour intermittently. I have found these animals will often respond to an alternative pasture species such as chicory and red clover.

Parasite Resistance

Canadian elk in their native environment have never been exposed to our range of internal parasites originating in domestic animals. This means that there has been no natural selection against these parasites until arriving in N.Z. Therefore in elk-type animals resistance takes longer to develop and may never be complete. Young elk-crosses may need drenching, especially for lungworm well past 1 year of age (cf. reds) and adults may need annual treatment to reduce intestinal parasite levels, seldom a problem in adult red deer.

Ryegrass Staggers

Elk are highly susceptible to RGS. It can be so severe that it leads to impaired growth rates and a high percentage of permanently brain damaged individuals. Elk are affected well outside the seasons we normally associate with RGS.

Permanently affected individuals may not have fine head tremors, but subtle gait abnormalities remain. Farmers with reasonable numbers of elk should provide alternative pasture species or endophyte free ryegrass e.g. (Pacific endosafe).

Copper

It has been suggested that elk require higher dietary levels of copper and that deficiencies are more likely to occur. Considering that many animals are under a system of voluntary or enforced intake restraint it is not unexpected that copper levels decrease. It is however difficult to prove that low copper levels are the primary cause of poor performance. Supplementation-growth rate trials have seldom resulted in clear gains so primary copper deficiencies should only be diagnosed after an exhaustive check of other possibilities and always interpreted in the light of feed intake levels.

Animal Handling and Anaesthetics

Elk are large, powerful and often aggressive at close quarters. Nature has taught them that standing your ground with a display of aggression is far more effective than running. Learn to use these traits to your advantage.

- Never handle elk in small pens where their 'personal space' is invaded. Allow them enough area to settle at a happy distance.
- Move animals by allowing them to view the open door through which they are to be moved, then move behind them via another pen and encourage them out via the first door.
- Don't poke or prod elk, it only makes them stubborn.
- Beware of elk bulls during the rut, most are aggressive. Cows can be same at calving.
- Never put elk in pens with only one exit

- Handle animals in high walled races or between circular gates.
- Elk respect height. Injecting with a syringe pole from above is far easier and safer than from ground level.
- Use combination anaesthetics containing Xylazine and Fentanyl citrate (or similar) combined, as xylazine alone is unpredictable.

Summary

To me elk are a majestic and fascinating animal. Their potential to contribute genetical and financially to the N.Z. Deer Industry is great. Deer veterinarians will face increasing exposure to elk and their cross-breds in the future and the challenges will be varied. The answers, unfortunately, seldom come in a bottle and only to those with empathy and a deeper understanding of these animals will solutions be permanent.

Acknowledgements

Fennessy, P.F. and Pearse, A.J. "The Relative Performance of Canadian Wapiti and their Hybrids". Australian Association of Breeding and Genetics. Proc. No. 8. (1990). p.497.

Personal communication and thanks to K. Waldrup, Invermay Research Station Mosgiel; W. Hunt, Grasslands, DSIR, Palmerston North.