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Wintering systems for weaners in Otago and Southland

D. LAWRENCE

Browns, R D 1, Winton

ABSTRACT

Low winter temperatures, high rainfall and high incidences of poor draining soils in Southland combine to created potential problems with winter "pugging" and soiled pastures by red deer weaners. Four wintering options presently exist for weaners in this region; pasture grazing, winter brassica grazing, outdoor enclosures and indoor enclosures. While pasture wintering is still the most common system used, the other options are becoming increasingly popular to mitigate against pasture/soil damage. This review contrasts these various options, particularly with respect to outdoor and indoor enclosures, and highlights recommendations for successful adoption of these systems.

Keywords: red deer; wapiti; nutrition; in-wintering; pasture; brassicas.

INTRODUCTION

The winter climate in the lower South Island has always presented challenges to management in the farming of livestock. Deer have been farmed in this area for the last 25 years and over this time a range of wintering systems have evolved. Peculiarities of deer and the climate have led to this. The land area of Southland used for livestock farming represents a variety of soil types (the majority of which are not free-draining) and receives an annual rainfall between 800 and 1200mm.

Traditionally we have a 100-day winter, during which time the average soil temperature is less than 5°C. Consequently, average pasture growth is low. In the Southland environment deer tend to "pug" pastures and can cause pasture damage as well as affecting soil structure. Deer show a reluctance to eat "soiled" pasture, which in turn can lead to fence-pacing. Fence-pacing (the above is only one factor contributing to this) is an undesirable behavioural trait of farmed deer that has serious implications on land erosion and the whole issue of the sustainability of farming deer.

Wintering systems

Essentially there are four basic wintering systems used in Southland; pasture, winter brassica, outdoor enclosure and indoor enclosure.

Wintering weaners on pasture remains the most commonly used system. Set stocking on a slow rotation is usually associated with supplements of silage/baleage and/or grain or concentrates. Problems associated with fence-pacing are most commonly seen with this system. Utilisation of supplements tend to be poor and there is significant waste on many farms. Disease issues with Yersiniosis, Johne's and parasitism are exacerbated on many farms with pasture-based systems, due to inadequate provision of shelter. In recent years, new management of pasture-grazed weaners has overcome a lot of these problems. This simply involves a fast rotation where, quite often, large mobs (up to 500 weaners) are shifted every 2-3 days. In most cases in which this rapid rotation has been applied, there are no supplements fed. This system is not only low-cost but performance in terms of growth rate during winter has been very good. Red weaner stags have been recorded as achieving over 150gms/day.

Swedes are the most common type of winter brassica crop sown in Southland. Yields of 16,000kgDM/ha or more are common. Weaners are either break-fed on swedes or given the whole paddock. While the latter is quite common-place and obviously lower in labour, it does compromise the deer in terms of a balanced ration (once the green feed is gone they only have bulb). Weaners on swedes usually have access to baleage/silage as well. On many farms, the use of brassica is only for specific periods and not for the whole winter, with swedes integrated with pasture through the winter.

Outdoor enclosures, or "feed pads", have been used for more than a decade. These are generally located handy to an already established shelterbelt to provide shelter from prevailing wind and rain. They tend to be a series of pens (often 3-5) which allows for segregation of weaners by weight, sex or origin. Underfoot conditions are very important to minimise pooling of water and excessive contamination by animal waste. On a number of pads, drainage is a problem. Most pads require complete replacement of bedding material or, at the very least, replenishment during the winter period. Bedding material varies from straw to sawdust to bark shavings or chips. Availability and cost of these materials varies considerably from season to season. Disposal of effluent and bedding material is a problem on some farms. The mob sizes per pen should be based on weaner size and area of pen (see later). Feeding systems vary considerably in these enclosures. *Ad lib* baleage/silage tends to be a feature of them all and many supplement with grain or concentrates. The latter tend to be fed in troughs where there is adequate trough space for all to fed at one time, while roughage is fed in a range of feeders. A number of sophisticated self-feeding gates to the face of silage stacks have been developed. Where the roughage needs to be carted to the weaners, the better operators use feeders which minimise feed wastage and the accumulation of feed underfoot. While there are some costs associated with outdoor feedpads (carting, supply and disposal of bedding material) they have a far lower capital cost to establish than an indoor wintering facility. As well, issues of sunlight and ventilation are overcome.

Wintering indoors is a popular option in Southland.

Historically, indoor facilities have been used since the early 1980s when they were essential in the days of quarantining deer pre-export and where the seasonal changes could be minimised with stock imported from the Northern Hemisphere. Facilities used for indoor wintering vary from conversion of existing buildings (some of which are quite inappropriate for the purpose) through to sophisticated custom-built facilities. Wintering indoors, as for the feed-pad scenario, removes weaners from the slow-growing winter pastures and has the connotations of stock being warm and protected from inclement weather. However, indoor wintering also ensures that the farmer has complete control of the animals' environment. Humans vary greatly in the "standard of living" that is acceptable to them. Consequently, it is not surprising that the conditions in which they winter their weaners also vary greatly. The following description of indoor wintering focuses on the better operators.

Bedding materials are as for feed pads - straw, sawdust, bark shavings/peelings or bark chips. These are usually on a base of gravel, lime or concrete. Bedding requires complete replacement and/or replenishment during the winter. (I have had occasion to assist a farmer "crutch" weaners – have their bellies shorn of balls of mud/hair and faeces - they were rejected at a DSP due to contamination potential.) Provision for the disposal of soiled bedding and effluent must be made. In many cases it is stockpiled appropriately, pending its spread over ground to be cultivated in the spring. Once again, drainage is important; the combination of deer hair and faeces have unique properties in their ability to block most conventional drains. Adequate ventilation is very important and considerations of roof height, vents and airflow must all be taken into account. Ventilation, drainage, feed type (high protein) and bedding are all factors to consider where there are problems associated with ammonia build-up. The provision of adequate sunlight (Vitamin D) may seem obvious, but I have seen problems directly related to this. A continuous and clean supply of water is essential and there is an obvious and direct correlation between water intake and % DM intake of feed provided. Silage/baleage with a low DM content reflects very quickly in moisture levels of the bedding. As with outdoor pads, space is a critical welfare consideration for indoor wintering. The space provided must allow all deer to exhibit normal behavioural patterns relating to resting, rumination and play, and to minimise aggression. Aggressive behaviour results in patchy hair loss and skin damage. Hair loss to the point of baldness is unacceptable at it reflects inadequate environment and/or nutrition. The disturbing aspect is the acceptance by many farmers that, either during or at the end of a period of enclosure, the appearance of weaners like this is just part of the process. On farms where management is good, weaners go out to pasture after 90 - 120 days enclosure with no mud balls and no hair loss.

Stocking density is critical. "Guidelines for the Winter Enclosure of Deer" prepared for the Game Industry Board (Matthews *et al*., 1996) indicated 1.1m^2 per 50kg weaner increasing to 1.5sm^2 at 80kg. Invermay use and recommend 2m^2/head (Suttie *et al.*, 1996), which also allows for growth during the winter. My own experience and observation certainly favours this latter recommendation and, in fact, optimisation of winter growth rates requires 2sqm for red deer (50kg start) and 3m^2 for wapiti (90kg start). Feeding of weaners indoors is usually based on an *ad lib* diet of silage/baleage with some supplement of grain or concentrates. Roughage is fed in racks, feeders or in some sophisticated systems using conveyer belts. Grain or concentrates require troughs where all animals in the pen have access at one time. Some very applicable nutritional research for indoor wintering of weaners has been done (Webster *et al.*, 1998). The increased dry matter intake but equal energy intake as diet energy content is reduced, suggests that appetite is regulated by energy intake during winter. This indicates that lower growth during winter than in spring is "programmed" and that food intake is adjusted to meet this energy demand. Further to this Webster *et al*., (1998) showed that the lack of a dry-matter-intake response to protein suggests that protein intake is not regulated. They showed a positive effect on liveweight gain of increasing diet protein up to 21%, suggesting that protein supplementation of silage-based diets is beneficial.

The change of diet associated with weaners entering wintering systems can pose some problems. While it may seem logical and common sense that dietary changes are introduced gradually, in practice this is very often not the case. "Grain overload" syndrome and polioencephalomalacia cases occur every year.

A number of other diseases are also problems associated with indoor wintering and feed pads. Foot injuries/abscesses are usually the result of unsuitable surfaces or protrusions. The inevitable close confinement can also contribute to problems with Yersinia, Johne's, Avian Tb and parasitism. In respect of parasitism, problems can arise due to timing of treatment. The widespread use of "pour-on's" and their mode of action requiring 5-7 days to effect a worm kill means that the common practise of drenching just prior to entry into their winter enclosure is undesirable.

Manipulation of daylight length during winter to stimulate rapid growth has been documented (Suttie *et al.*, 1996). Originally this concept was viewed with enthusiasm as a further step in our sophistication of deer farming and as a potential tool for farmers to capitalise on the schedule premiums offered by the chilled venison trade in spring. However, signals from the market-place in recent years would suggest that this is going too far and, in fact, compromises the "clean, green farm-raised

TABLE 1: Median winter growth rates for weaner deer, averaged for 2000-2002 from the DeerSouth deer farm monitoring programme.

Red	
Hinds	44 g/day
Stags	97 g/day
Hybrid	
Hinds	76 g/day
Stags	135 g/day
Wapiti	
Hinds	164 g/day
Stags	204 g/day

TABLE 2: Winter weaner growth rates by system from the DeerSouth deer farm monitoring programme 2000 – 2002.

Farmer	Breed	Sex	System	Growth rategms/day	Weight end Winterkg	Aream²/hd
A	Hybrid	S	Grass + Nuts 2 – 3 day rotation	150	93	N/A
A	Hybrid	S	Grass + Baleage 7 day rotation	118	80	N/A
A	Hybrid	S	Pad + Baleage	90	67	3.3
B	Hybrid	S	Grass 2 – 3 day rotation	170	81	N/A
B	Hybrid	H	Pad + Baleage	102	72	3.0
C	Wapiti	S	Indoor Baleage + Nuts	282	136	3.0
C	Wapiti	H	Indoor Baleage + Nuts	193	118	3.0
D	Wapiti	M/S	Indoor + Lights	250	122	2.25

venison" image that we have. Nevertheless, there are some farmers in Southland and Otago who have very effectively implemented this technology. In fairness to them, almost without exception, from my observation, they do an excellent job and their operations are hard to fault from a welfare perspective. However, the market-place will have the last say.

TABLE 3: Cost of wintering calculated from systems monitored in the DeerSouth deer farm monitoring programme 2000 – 2002.

Option	Cost/head ¢/hd/day	Cost/GM Liveweight Gain¢/gm
Top weaners – Grass & Nuts	24	16
Medium weaners – Grass & Baleage	8.3	0.07
Small weaners – Pad & Baleage	24	0.27

Performance

Growth rate measured in g/day is the standard indicator of weaner performance. To get an indication of what is normal in Otago and Southland, Table 1 details DeerSouth data. DeerSouth is a farmer-driven monitoring and benchmarking group which has operated in the area for several years now. Herd average growth rates for individual farmers are calculated and compared to the median and top performing herd for his/her breed type plus the individual farmer's previous year's performance. Winter growth rate data reflect information from approx 12,000 weaners across 40 different herds. This data is split by herd-type; red, hybrid or wapiti/elk.

The recorded winter growth rates recorded reflect a range of wintering systems for any one breed and gender**.** The DeerSouth system does not have the facility to extract growth rate data by wintering system used. Focus on this type of detail tends to be used as a theme at our field-days. For the purpose of this discussion, Table 2 presents some data reflecting individual farms and the system they have used for wintering weaners.

The areas per weaner on the feed pads for Farmers A and B were generous but both indicated that two-three animals had to be removed during the winter due to "bullying". Farmer A had a mob of 130 selected on similar size, while Farmer B had a mob of 200 (60 lighter weaners were already removed before winter). The variation in growth rates achieved by Farmer A, while reflecting the various systems used, is also compounded by animal size. The larger the weaner, the greater the potential for winter growth.

Farmer C made comment that, in the previous season, his growth rates were down about 25%. While other factors may have contributed, a greater number of weaners meant that area per head was closer to $2m^2$ than $3m^2$ in that year.

Farmer D uses lighting in his indoor system. Fluorescent tubes on a timer provide approx 200 lux for 16h (4.30am to 10.30pm). Four hundred and fifty weaners are in pens of 60-65 based on size (weight). Particular attention was paid to bedding (bark chips) such that after 140 days the deer went directly to a DSP, clean and in full summer coat

Cost of wintering weaners

The real costs associated with wintering weaners are all too often not thoroughly investigated by farmers. At a DeerSouth field-day last year, a start was made to consider the costs relating to the three different options employed by Farmer A (Table 3). The basis to the following cost calculations were:

- grass @ 0 cents/kg DM
- nuts @ $650/tonne
- baleage @ $21/bale

Clearly, feeding mainly grass with a small amount of baleage was the most cost-effective option. The high value of deer nuts made feeding them a costly option but in this case it may have been offset by the higher growth rate, allowing Farmer A to attain the premiums of the early spring schedule. It really opens up more questions than answers - so often the way.

The above example only highlights that the choices farmers make for wintering their weaners interrelates with many other management decisions on the farm. Farm priorities and objectives determine the wintering system used. It may be to improve feed utilisation, farmer convenience, winter growth rates, conception rates in first fawners (especially hybrid and wapiti animals), allow earlier slaughter dates or to allow an increase in stocking rate or to build a "bank" of feed for early spring (velveting bias). The rationale to wintering systems for weaners is varied just as the options themselves are.

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