



## Management of red deer at weaning

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### Abstract

To summarise knowledge on weaning practices for farmed deer a postal survey of deer farmers in the lower South Island was carried out in conjunction with a review of the relevant literature. Fifty-nine replies were received, mostly from large farms (47 % had > 200 breeding hinds) with red (*Cervus elaphus*) or red x wapiti (*Cervus elaphus canadensis*) deer (93 %).

Most farmers (72 %) carried out pre-rut weaning, and the timing of weaning was mainly determined by hind fertility concerns and mating management requirements. Research literature did not strongly support a common contention that pre-rut weaning aided hind fertility, but indicated that calf growth may be compromised compared with later-weaned calves. The importance of choosing good weather conditions for weaning and/or providing shelter was highlighted by farmers and backed up by research. Opinions on the optimal separation distance between hind and calf groups differed widely but research on adjacent compared with near paddocks indicated that the deer were more settled in adjacent paddocks. A few farmers put calves back into familiar surroundings at weaning. A quarter used indoor confinement for a few days, nearly half used a supplementary feed, and over half put unrelated adults in the weaner group; all of these techniques have been shown by research to have beneficial effects on both behaviour and production. Injuries were most likely to happen during yarding of the calves, especially when too many, inexperienced or unfamiliar people were present.

It was concluded that farmers' experiences and research supported some management techniques but several topics were worthy of investigation, including pre- versus post-rut weaning and optimal separation distances between hinds and calves (including a remote treatment).

### Introduction

In the wild, red deer calves are normally suckled for 7-8 months and continue to maintain an association with their dam after lactational weaning (Guinness *et al.*, 1979). However on deer farms in New Zealand, permanent separation of red deer calves from their mothers at a young age is common practice (Moore *et al.*, 1985). Research literature and anecdotal evidence provide a range of reasons for artificial weaning and a variety of management techniques employed to settle the young stock. The purpose of the following is to summarise this information, through a review of the relevant literature and a survey of farmers' knowledge and experiences with weaning deer.

## Methods

A seven page survey and reply-paid envelope were posted to 350 members of the Otago/Southland Deer Farmers Association. Questions were asked about background details of the farm (number of breeding hinds and deer species farmed), weaning statistics (calves weaned per 100 hinds mated (weaning percentage) and weights), behavioural responses to weaning, the timing of weaning and factors influencing this, the post-weaning environment provided, techniques employed to handle weaners, and feeding regimes and health treatments used.

## Results and Discussion

### Background farm details

A return rate of 17% (59 replies) was achieved. Most of the farms were large (47 % had >200 breeding hinds, and 29 % had >120 hinds), and nearly all (93 %) had red or red x wapiti crossbred deer.

### Weaning statistics

The average weaning weights were 53 kg for red males and 48 kg for red females, with average ranges in weights from 38-65 kg for stags and 35-59 kg for hinds. These figures are similar to average weaning weights found in a survey of farms in the North Island, which ranged from 42-59 kg for stags and 39-51 for hinds (Audige, 1995).

The average weaning percentage was greater for adult hinds (90%) than for first-calving hinds (78%). Similarly, Audige (1995) found that 98 % of adult hinds conceived but 9% lost calves by weaning, while 85 % of first-calving hinds conceived but 17 % lost calves by weaning. In a survey on 50 elk farms in Canada, Friedel & Hudson (1994) reported that weaning percentages were 92 for adults and 74 for 2-year-olds.

### Behavioural responses to weaning

Farmers were asked whether they had observed specific types of disturbed behaviour in newly weaned calves and if so, how long they lasted for. Nearly all respondents had observed vocalisation, fence pacing, and trying to escape through fences, and these behaviours were generally rated as lasting for 1-3 days. A small minority of farmers felt that these behaviours lasted for more than one week (10 %, 4 % and 8 % for vocalisation, fence pacing and attempting to escape respectively). Similarly, in a study of newly weaned elk calves, fence pacing subsided rapidly over the 10 days of the study to virtually zero levels, although calves were still vocalising (infrequently) at 10 days (Haigh *et al.*, 1997).

### Timing of weaning

Pre-rut weaning was carried out by 72 % of farmers. Management of hinds at mating and hind fertility were the most common determinants listed for the timing of weaning. The latter result probably reflects the belief that hinds conceive more readily to the first mating in autumn if

their calves have been weaned pre-rut (Hansen, 1997). The evidence supporting this belief is tenuous. Blaxter *et al.* (1988) compared the reproductive performance of red deer hinds which had calves removed immediately before introduction of the stags for mating (early weaned, n=54) or post-rut (late weaned, n=53). There was no significant difference in the subsequent mean calving dates of the hinds, but those weaned early had a significantly *greater* spread in calving dates than the late weaned hinds (12 of the early weaned hinds calved more than 21 days after the first hind calved, compared with only 4 of the late weaned hinds), suggesting that some early weaned hinds either did not conceive to a first service or showed a delayed oestrus (Blaxter *et al.*, 1988).

In contrast to Blaxter *et al.* (1988), in the Canadian survey by Friedel and Hudson (1994), older elk cows whose calves were pre-rut weaned subsequently calved an average of 8 days earlier than cows that were bred with their calves at foot, whereas 2-year-old heifers calved 6 days later if they were weaned as calves before the rut rather than after the rut. In the same survey, pre-rut weaned calves were 8 % heavier at 200 days of age than post-rut calves. However, the authors noted a problem with interpreting the survey results in that farms which pre-rut weaned calves were probably more intensively managed operations (Friedel & Hudson, 1994). An experiment on pre-rut (mid March, with mating in April) versus post-rut (late June) weaning was carried out on fallow deer by Mulley *et al.* (1994), who found no difference in the date of onset of oestrus or pregnancy rates between treatments, but that the unweaned fawns had a higher growth rate from autumn until June. Similarly, in a study of lactation performance of red deer, it was concluded that pre-rut weaning may penalise calf growth rates because hinds were still providing a considerable amount of milk, and it appeared that levels of milk yield had little influence on hind fertility (Loudon *et al.*, 1984).

Another reason influencing the time of weaning was weaner health concerns (35 % of respondents ticked this response). Pre-rut weaning has the advantage of allowing anthelmintic and other health treatments to be administered without having to yard mating mobs, and weather conditions are more likely to be favourable in the autumn than later in the year (Moore *et al.*, 1985). Other factors cited in the literature in favour of pre-rut weaning are allowing indoor confinement of young calves to allow habituation to humans, manipulation of lighting regimes to improve growth, and supplementation with high quality feed (Haigh, 1995), although Moore *et al.* (1985) contended that supplementary feeding was facilitated by the presence of the hinds.

Farmers were asked what factors determined the actual day of weaning, and responded with mainly convenience (64 %) and as well as the weather (55 %). Farmers in the survey by Audige (1995) also chose the day of weaning according to weather conditions. The importance of weaning in good weather was indicated in an immunological study on weaning stress in deer (Griffin *et al.*, 1988), in which a temporary reduction in leucocyte numbers was observed following weaning, and then again 5 weeks later, coinciding with a period of extremely cold weather.

### **Weaning environment**

Most farmers (79 %) weaned their stock all on a single day rather than in successive groups.

Most (66 %) put the separated calves into a different paddock on their farm, while 25 % put their calves indoors, and the remainder either transported weaners to a different farm or put them in the same paddock they were in before weaning. For hinds and calves remaining on the same farm, there was disparity of opinion on how far apart the paddocks for hind and calf groups should be. The majority of respondents separated the weaners and hinds to a moderate distance, with only 11 % of respondents using a distance of > 1k and 13 % using paddocks next to each other. Several farmers (n=12) commented that the deer were most settled when in paddocks as far apart as possible, and that visual and auditory isolation were important. Those using adjacent paddocks for weaning felt that this settled the deer, and that it was better than keeping the deer a short distance apart. However two respondents felt that keeping the hinds and calves in close but not adjacent paddocks was best as the deer could still hear and see each other.

The effects of different methods of separating hinds and calves on behaviour and productivity have been investigated experimentally. Haigh *et al.* (1997) compared separation of elk cows and calves into adjacent paddocks with separation into paddocks which were 50 m apart. In that study there were no differences in weight gains between the separation treatments but the adjacent-weaned calves showed lower levels of behavioural disturbance (including vocalisation and fence line pacing) compared with the remote-weaned calves. "Soft" weaning was investigated in a different study, in which three-four hinds per day were shifted into an adjacent paddock, and it was considered that this treatment caused less behavioural disturbance than separating all of the deer at once (Friedel & Church, 1994).

While 66 % of farmers in the survey put their calves into a different paddock at weaning, some felt that it was desirable to put them back into a familiar environment. This observation was consistent with a study on newly weaned piglets, which were either released back into familiar surroundings or unfamiliar enclosures (Puppe *et al.*, 1997). The piglets in the unfamiliar environment showed more agonistic behaviour, and greater changes in physiological parameters (the neutrophil/lymphocyte ratio and plasma glucose levels) in response to weaning than piglets in the familiar environment (Puppe *et al.*, 1997).

The 25 % of respondents who put their calves indoors at weaning used a range of confinement periods from 10 hours to all winter (mean=3 days). The benefits of indoor confinement were considered to include settling the calves (it was also felt that they were more settled when eventually released to pasture), ability to "keep an eye on them", better growth rates, and development of tameness with humans and social bonds with other calves. In an experimental study on red deer calves, Pollard *et al.* (1992) observed that indoor confinement was associated with greater weight gains and reduced pacing along enclosure boundaries compared with confinement at pasture. However aggression can be a problem with close, long-term confinement of deer calves (Blaxter *et al.*, 1988; Hanlon & Rhind, 1996; Pollard & Littlejohn 1998).

Farmers were asked to list ways of modifying the environment to reduce stress in newly weaned calves. Shelter was considered important by several (14) respondents. Many respondents (34) put some non-breeding hinds or stags with the weaners, as this was considered to help settle them, and facilitate acceptance of supplements and mustering of the young stock. The practice of putting non-lactating hinds in with newly weaned deer calves

was examined in experiments by Pollard *et al.* (1992) who found that the presence of tame hinds was associated with improved weight gains, reduced fence pacing and other activity, and less fear of both humans and novelty. The unrelated adults may provide leadership in the absence of the calves' dams, similar to the matriarchal social system seen in the wild where an older hind leads the younger hinds (Delap, 1957).

### Handling at weaning

The average weaner mob size used by farmers was 114, with a range between respondents of 20-400. The average paddock area was 9 ha. The most common time period given before shifting weaners again was more than 10 days (48 % of respondents), with only 22 % of farmers shifting them again within 5 days of separation from the hinds. When asked to list techniques to ease handling of weaners, several farmers (9) stated they left gates to adjacent paddocks or yards open so that the calves could become accustomed to moving through them. There was a wide range of techniques used to handle weaned calves, from leaving them completely alone (4 farmers) to shifting them frequently between paddocks using a heading dog (1 farmer), to confining them indoors and hand-feeding or rubbing their heads (2 farmers). Published material emphasises the need for care when handling newly weaned calves, and the use of unrelated adult hinds to facilitate movement of the mobs (Moore *et al.*, 1985; Haigh & Hudson 1993). Wilks (1991) recommended leading the raceway into the deer yards open the night before weaning, and operating the door into the yards remotely, using a rope.

Most farmers (67 %) rated injuries as happening occasionally, and these included hair loss, mouth injuries, cuts and scrapes, and limb damage. Injuries were rated as most likely to happen during yarding of the deer, particularly when dealing with large mobs. Unfamiliar, inexperienced or too many people handling the deer were also thought to lead to injuries. Forty-two percent stated that deaths occurred occasionally at weaning, with the first 7 days following weaning being the time of most risk, and broken necks being the most frequent cause of death (12 respondents) followed by *Yersiniosis* (5 respondents).

### Feeding regimes

Half of the respondents used a specific feeding strategy for weaners. Fifty-eight percent of these respondents used a specific pasture for their newly weaned calves, and 82 % used supplementary feed. The most common supplement used was barley (12 respondents) followed by lucerne (9 respondents). When asked to comment on the benefits of their particular feeding strategy, many respondents (12) commented that weaners settled more rapidly if they were well fed, and three felt that grain feeding in particular had a calming effect. Similarly, Haigh (1995) stated that newly weaned calves need familiar, high quality feed to minimise the stress of weaning. Respondents felt that feeding supplements tamed the calves and facilitated shifting of mobs, while pre-weaning feeding with supplements allowed the hinds to introduce the calves to the feed and prepared them for indoor confinement. Other benefits of supplements listed were the ability to add minerals, improved growth rates and increased disease resistance.

The contention that good feeding is important over the weaning period was supported in a study comparing the performance of newly weaned red deer calves grazed on a pasture with a

sward height of either 10 cm or 5 cm, over a six-week period (Milne, 1993). The calves on the higher sward height showed greater weight gains and none of the calves died, while calves on the lower sward height had lower weight gains and 20 % died from Yersiniosis within 12 weeks of weaning (Milne, 1993).

### Health and other treatments

Table 1 shows the treatments given before and at weaning. Approximately half of respondents treated for parasites and gave the calves Yersiniavax at weaning. Thirty percent applied ear tags at weaning, although Moore (1985) suggested that this should be carried out before weaning to minimise stress.

**Table 1. Percentage of respondents giving calves different health and handling treatments before and after weaning**

Treatment	Before weaning (% of respondents)	At weaning (% of respondents)
ear tagging	61	30
copper bullet	27	20
copper injection	3	0
multimineral drench	15	22
Yersiniavax	44	46
weight recording	3	36
parasite control	44	58
selenium	35	36
clostridial vaccine	6	12

## SUMMARY AND CONCLUSIONS

A postal survey of farmers and review of the literature has highlighted general trends in weaning practices for farmed deer as follows.

Pre-rut weaning was carried out by most farmers, providing the advantage of separate management of hind and calf mobs for health, feeding and other treatments, but the belief that pre-rut weaning “has a positive effect on early conception” (Hansen, 1997) has not been supported by experiments which have been carried out on this topic.

- The importance of choosing good weather for weaning has been identified by farmers and indicated experimentally.
- Farmers disagree on the best separation distance to use between hind and calf mobs after weaning, while research results indicate that keeping them in adjacent paddocks is more settling than keeping them separated to a short distance, and that shifting a few hinds per day into the adjacent paddock rather than separating all hinds and calves at once, is

desirable (although neither separation distance nor technique affected post-weaning weight gains).

- No experimental study has compared adjacent weaning with weaning into widely separated paddocks providing complete visual, auditory and olfactory isolation, although some farmers believe that this is the most desirable treatment.
- Several farmers felt that it was important to return the weaned calves to a familiar environment and this belief has some support from experimental work.
- Indoor confinement of weaners was used by one quarter of farmers, who believed that this helped settle and tame the calves and improved weight gains. The positive effects on disturbed behaviour and weight gain were observed in an experimental study.
- The practice of putting non-breeding hinds or other adult deer in with newly weaned calves was common among farmers and research showed beneficial effects. The adult deer appear to provide leadership which facilitates handling and feeding and settles the young deer.
- Farmers varied widely in their approach to handling weaned calves, from non-intervention to daily handling.
- Injuries and deaths tended to happen during mustering, particularly when large mobs were in the deer yards, and when unfamiliar, inexperienced or too many people were handling the deer.
- Many farmers used supplementary feeding and it was felt that high quality feed settled the deer, improved growth rates and increased disease resistance; these two latter effects were indicated in experimental work on newly weaned deer. Farmers observed that feeding with supplements helped to tame them and eased shifting of mobs, and some felt that feeding with grain in particular was beneficial.
- Treatment for parasites and vaccination against *Yersiniosis* were the most common health treatments at weaning. A range of other treatments, including ear-tagging, were also carried out at weaning by many farmers.
- Areas where research into weaning management would be valuable include the effects of the timing of weaning on hind fertility and weaner growth, the effects of separation distance between hinds and calves on disturbed behaviour and weaner growth (including a remote treatment), the need for shelter for newly weaned calves, the long-term behavioural effects of intensive handling at weaning, and the productive and behavioural effects of feeding supplements.

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