Recommendations for improving performance in deer production systems

Improving weaning liveweight and weaner liveweight gain

N.S Beatson, H.G Judson, A.C Campbell, D.R Stevens and K.R Drew

Abstract

Data collected over 3 years showed herd mean weaning liveweight varied from 42.6 to 46.9kg and 45.1 to 49 1kg for hind and stag fawns, respectively, with stag fawns between 2 6 and 3.8kg heavier at weaning than their hind counterparts

Birth date had a positive effect on fawn weaning liveweight with an increase of 278g and 344g for every day earlier fawns were born to mixed age and rising 2-year-old hinds respectively.

The potential for fawn liveweight gain was highest in late lactation (250-450g/d) and declined to be lowest before winter (mean 75-190g/d) The response to increased energy content of feed was also highest in late lactation (mean 51g/day for each MJ ME unit improvement in feed quality) and declined to a mean of 24g/d for both the early (April) and late (May-June) post-weaning periods.

Mean Liveweight gain during winter was low (63.2g/d). The range between property within years (44-75g/d) and between years over all properties (61-70g/d) was small. This was due to limitations to energy intake of the animal, regulated by day length.

Requirements for rapid fawn liveweight gain in terms of energy content, green leaf percentage and pasture mass are given

1. Introduction

The liveweight of fawns at weaning and their subsequent rate of liveweight gain is important for both breeder and finishers. For breeders, the weight of fawns at weaning is a major contributor to financial return. The weaning weight and the subsequent rate of liveweight gain dictate the final slaughter weight, slaughter date and ultimately the financial return for the finisher.

This reports provides a description of fawn liveweight and liveweight gain prior to weaning and between weaning and winter on commercial farms It also presents some factors which may affect liveweight gain of young deer in an attempt to provide producers with management recommended practices to maximise liveweight and liveweight gain The data comes from the South Canterbury and North Otago Deer Farmers Associations Deer Master project which has been described previously (Campbell, 1998)

2. Data collection

Farmers measured weaning liveweight at intervals throughout the 4-year period. More detailed investigations of factors affecting late lactation and post-weaning growth rates were part of collaborative work between Deer Master and AgResearch, Invermay Pasture botanical composition and feed value were measured as part of these more detailed investigations (see Stevens, these proceedings)

3. Description of weaning data

To permit meaningful comparisons, the weights for weaning have been standardised to March 10 Between 1996 and 1999 average weaning weight of red deer across all participating properties varied from 42 6 to 46 9kg and 45 1 to 49 1kg for hind and stag fawns respectively (Table 1) These weaning weights are similar to those recorded in the Hawkes Bay Richmond/Wrightson's project (44.8-48.5kg) but less than the target weaning weight for this project of 55 and 51kg for stags and hinds, respectively.

Table 1. Mean weaning weight (kg) (corrected to weight on 10 March) of male and female red deer fawns for each year between 1995 and 1999.

Year	Sex	No. farms	No. animals	Wt	SD
95	F	1	136	40.1	6.5
	M	1	97	44 8	7 2
96	F	3	316	44 1	8 8
	M	2	191	46 7	9 8
97	F	6	1015	46 9	9.6
	M	5	758	49 1	7 8
98	F	4	614	42.6	7 2
	M	4	417	45.1	6.8
99	F	4	680	43 6	6.8
	M	4	685	47.4	7.9

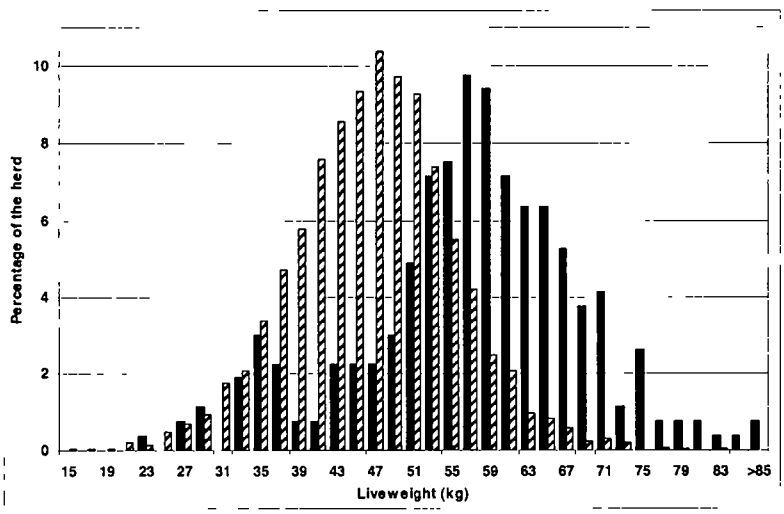
Some of the variation between years is likely to be attributable to differences in feed supply. Low weaning weights in both 1998 and 1999 were partly a result of two successive of "1 in 50-year" droughts in the region Other effects such as the individual sires used, date of birth and the range of management practices influencing fawning date and fawn liveweight gain and the farms participating are also likely to have an effect.

Stags fawns were between 2 6 and 3 8kg heavier at weaning than their hind counterparts and were heavier at all subsequent times. Stag fawns are known to be heavier at birth and to have a greater liveweight gain during lactation compared with hinds

For the complete data set , 4 years combined, mean mixed sex red deer and hybrid liveweight at weaning (10 March) was 46 0kg and was normally distributed with a standard deviation of 6.3kg (Figure 1)

Compared with red deer, hybrid weaners were on average 10.3kg heavier at weaning with a similar distribution of liveweight at weaning (Figure 1)

Figure 1 *Liveweight distribution at weaning for red deer (shaded) and hybrids (black)*



4. Factors which affect fawn liveweight at weaning

Work was undertaken to determine what factors affected liveweight of fawns at weaning These are discussed below

4.1 Dam age affects birth date

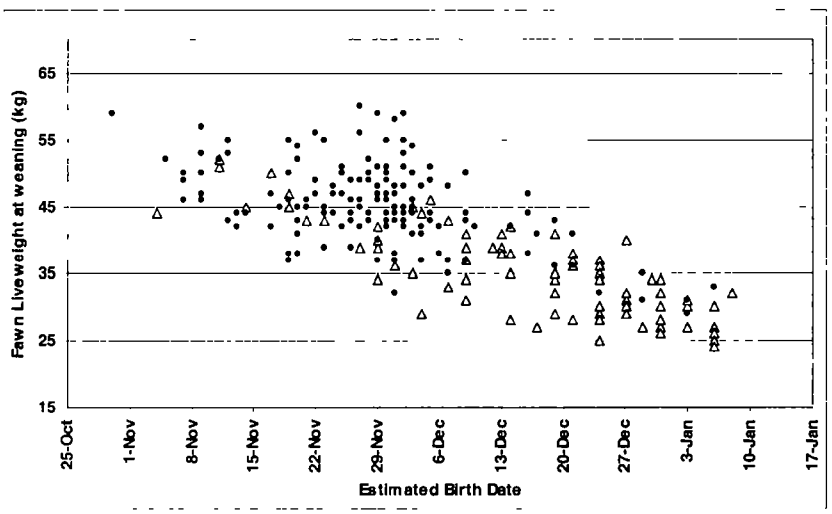
Birth date was estimated from scanning data and plotted against weaning weight (Figure 2). Mean birth date was 1 December and 17 December from mixed age (MA) and rinign2-year-old (R2YO) hinds, respectively

For MA hinds, birth date had a positive effect on weaning weight with an increase of 278g for every day earlier the fawn was born Birth date also had a positive effect on R2YO fawns, resulting in increased weaning weight by 344g for every day earlier the fawn was born

Thus, advancing birth date by 2 weeks would result in fawns that were 4.8 and 3.9kg heavier at weaning for MA and R2YO hinds respectively The range of 16 days between farms in mean birth date of MA hinds recorded in the Deer Master group would explain a range in weaning liveweight difference between farms of 4 4kg

This range of data is similar to that measured by Asher and Adam (1985) who found an average increase in weaning weight of 310g for every day earlier the fawn was born.

Figure 2. *Estimated birth date and subsequent weaning weight (kg) of fawns born to MA (•) and R2YO(△) hinds.*



The standardised mean weaning weight of fawns from R2YO hinds from a sample of herds was compared with the weaning weight of fawns from MA hinds (Table 2). Mean weaning weight of fawns from MA hinds was between 5.1 and 13.2kg heavier than their counterparts from R2YO dams with the mean being 11 2kg

Table 2 Mean weaning weight of mixed sex fawns from R2YO hinds and mixed age hinds for three properties over 5 years.

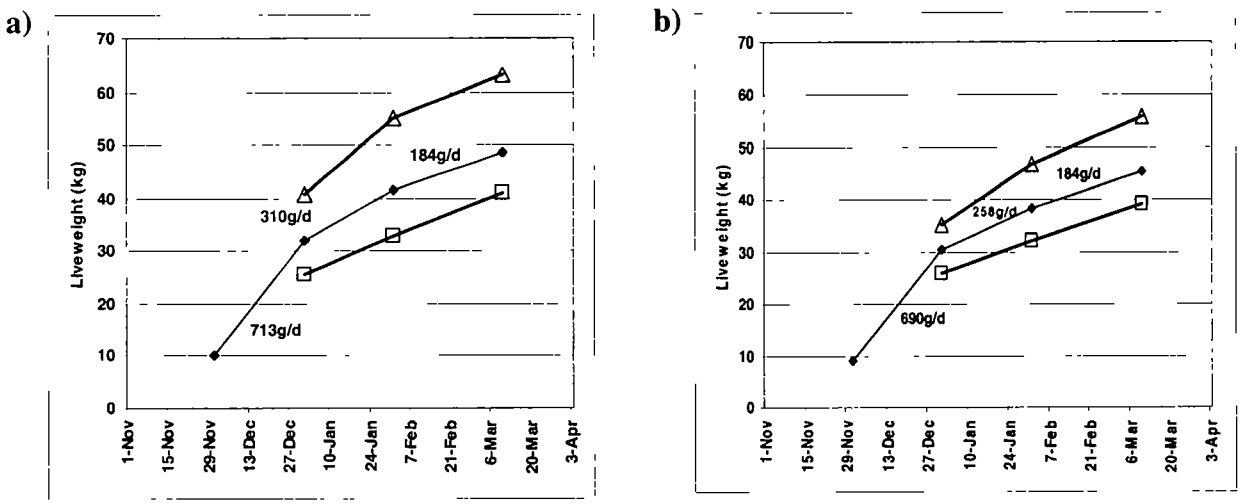
Farm	Year	Dam Age	n	Weaning Lwt (kg)
A	94	R2YO	97	45 8
		MA	189	50 9
	95	R2YO	84	36 8
		MA	221	44.0
	96	R2YO	61	36 2
		MA	173	44.8
	97	R2YO	55	34 4
		MA	215	44 9
B	99	R2YO	79	47 0
		MA	321	59 3
C	99	R2YO	127	49.7
		MA	581	62 9
Mean		R2YO	503	43.1
		MA	1700	54 3

The difference caused by the 17-day later mean calving date would be 5 8kg calculated from the relationship in Figure 2. Further differences are likely to have been the effects of birth weight and dam weight Asher and Adams (1985) documented an increase in birth weight and growth rate to weaning as a result of increased dam weight A birth weight increase of 1kg was associated with a weaning weight increase of 1 4kg An increase in hind weight of 1 kg was associated with an increased birth weight of 0 036kg and weaning weight of 0.074kg The difference between an 85kg R2YO and a 105kg MA hind is associated with an increase in weaning weight of 2.5kg. This adds up to a total of 8 3kg of weaning weight, compared to the 11.2kg that was recorded in this study. Herd differences also contribute to the higher than expected average difference between dam ages.

4.2 Fawn liveweight gain pre-weaning

A frequent weighing programme was implemented on some farms to determine the change in liveweight of fawns between birth and weaning. Fawns were weighed in early January, early February, and at weaning in March The mean liveweight change and the highest and lowest mean herd liveweight on each weighing date is presented in Figure 3

Figure 3. *Overall mean liveweight change(◆) and highest (△) and lowest (□) mean herd liveweight on each weighing date of stag (a) and hind (b) fawns between birth and weaning (10 March).*



In early January fawns averaged 30 5kg with no difference between sexes.

Based on an average fawning date of 1 Dec and a birth weight of 10kg, mean liveweight gain during this period was 713g/d It is likely those fawns heavier than the mean in early January were born early rather than having extremely high growth rates from birth to early January

Overall liveweight gain between January and February was less than for the earlier period, averaging 310and 258g/d for stag and hind fawns respectively The best herds were able to achieve a gain of 468g/d while the poorer herds gained at 235g/d This suggests management factors influence liveweight gain at this time

Liveweight gain in the month prior to weaning averaged 184g/d.

Overall between an estimated birth weight of 10kg on Dec 1 and weaning (10 March) liveweight gain averaged 387g/d This level of liveweight gain is comparable with Richmond – Wrightsons Project results of 398-426g/d

4.3 Pasture quality in late lactation

Liveweight of fawns during late lactation and the period post-weaning was recorded on several deer herds along with monthly pasture quality analysis. The primary component for this discussion was energy content measured in megajoules of metabolisable energy per kg of dry matter (MJ ME/kg DM)

Fawn growth varied between 200 and nearly 700 g/day during late lactation This depended mainly on feed quality, as feed quantity offered was adequate in most cases, with minimum or post-grazing pasture mass ranging from 1800 to 3500 kg DM/ha, or adequate supplement being offered to offset the effects of drought Several relationships were tested to help define the parameters most affecting fawn liveweight gain at this time.

Fawn liveweight gain in late lactation increased as overall feed quality increased, with this relationship accounting for 71% of the variation (Figure 4). Fawn liveweight gain increased by 51g/day for each unit (MJ ME/kg DM) improvement in feed quality The chicory data (690g/d) was outstanding and was not included in the regression equation.

The quantity of green leaf was also related to fawn liveweight gain during late lactation with liveweight gain increasing by approximately 60 g/d for every 10% increase in green leaf. The use of specialist pastures such as chicory and red clover provided extra improvements to fawn liveweight gain

To achieve fawn liveweight gains of over 400 g/d in late lactation, pastures needed to be more than 60% green leaf, have an energy content over 10.5 MJME/kg and a minimum or post-grazing pasture mass greater than 2500kg DM/ha

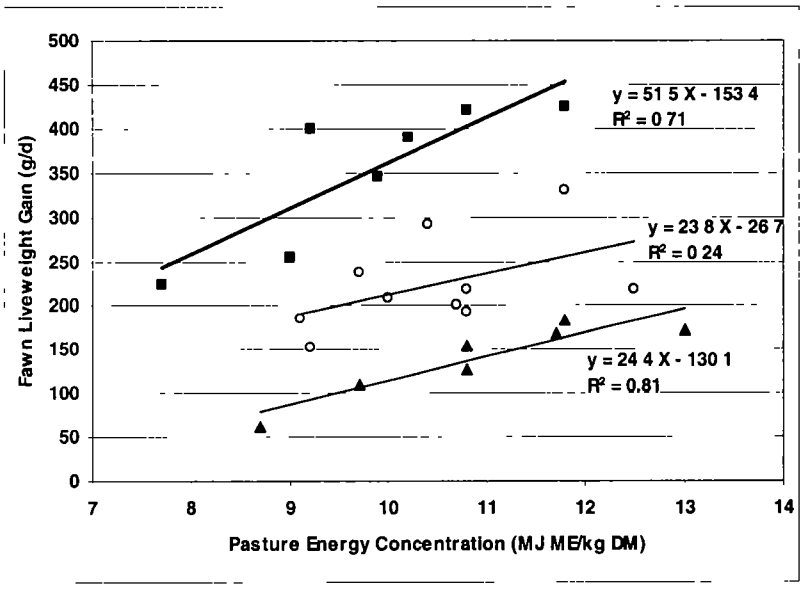
5. Post-Weaning fawn liveweight gain

5.1 Effects of feed value (MJME/kg DM) on liveweight gain in the post-weaning period

Mean liveweight gain of fawns ranged from 0 to over 300 g/day between farms in the March to May period The response of fawn liveweight gain was only partially accounted for by increasing the energy concentration of feed in the early post-weaning period (Figure 4). During this period fawns gained an extra 24g/d for every 1 unit increase in pasture energy concentration (MJ ME/kg DM)

Fawn liveweight gain in the late post-weaning period was related to energy concentration of the feed (Figure 4), with 81% of the variation being accounted for by this relationship. During this period fawns also gained on average an extra 24g/d for every 1 unit increase in pasture energy concentration.

Figure 4. *Fawn liveweight gain at pasture in late lactation (■) the 6 weeks post-weaning (early post-weaning) and (○) and the 6 weeks before 1 June (late post-weaning) (▲) over a range of pasture energy concentrations (pasture quality).*



This data illustrates clearly the effect of time of the year on the liveweight gain response to pasture quality. For example during lactation 413g/d would be expected from a pasture with an energy concentration of 11 MJ ME/kg DM provided the minimum pasture mass was achieved. The same quality pasture offered immediately after weaning would support a liveweight gain of 236g/d and in May/June a liveweight gain of 138g/d.

The response of liveweight gain to pasture energy content was similar for early and late post- weaning (24g/d more per 1unit increase in energy content) but half that recorded in late lactation (51g/d more per 1 unit increase in energy content)

For any given pasture quality, liveweight gain declined from late lactation to early post-weaning to late post-weaning

To achieve maximum liveweight gain benefit from quality pasture (or supplement) it should be fed during lactation

Summer feed crops are more efficient in producing weaner liveweight than similar crops fed in winter

Requirements for post-weaning liveweight gain greater than 150g/d include a green leaf content greater than 90% and a feed energy content greater than 11 5 MJ ME/kg DM

5.2 Post-weaning management

While post-weaning management was not documented, the variability of the liveweight gain in the period immediately following weaning (Figure 4) indicated that weaning management had a large effect in some situations.

In the period immediately after weaning, the weaning check appeared to last no longer than 3 weeks and resulted in a loss of between 1 2-2 1kg Conditions that induced the greatest checks included mixing fawns from different mobs together and moving them to unfamiliar parts of the farm

Severity of the weaning check varied between farms and it is known that management options exist to reduce the effect of weaning on liveweight gain. Options for the Deer Master group included feeding grain pre and post-weaning, weaning into adjacent paddocks or holding weaners indoors on hard feed for a period of up to 1 week.

5.3 Winter Liveweight gain

Winter liveweight gain recorded from 1997 to 1999 on a sample of farms is given in Table 5. Liveweight gain during winter was low (63 2g/d) The range between property (44-75g/d) and between years (61-70g/d) was small

Although no observation was made of the feed source and level offered to weaners during winter, previous authors (Judson and Nicol, 1997) have shown red deer and red x elk hybrids do not show a large response to increasing feeding level during winter.

Table 5. Winter liveweight gain of mixed sex weaner red deer.

Farm	Year	Period	n	LWG (g/d)
A	97	26 June-30 Sept	308	73
B	97	26 July-9 Sept	307	43
C	97	29 July-1 Sept	274	70
C	98	27 May-7 Oct	166	44
D	98	2 June-22 July	270	75
E	99	7 June-22 Sept	186	70
Mean				63 2

This means that the overall response is mainly driven by the climatic conditions for which the animal has to use energy to maintain body heat Therefore the provision of high quality feed at this time tends to replace other available feed, rather than increase liveweight gain (Nicol & Stevens 1999). Although some small increases above this level of liveweight gain may be possible by providing generous allowances of high quality feed, this is unlikely to be efficient in terms of liveweight gain when compared to feeding the same feed at other times of the year, especially late lactation or spring.

6. Summary

- Overall average weaning weight was 46 0kg and 56.3kg for mixed sex red and hybrid fawns respectively
- Drought conditions had a major effect on weaning weights, though could be offset with the use of high quality supplements
- Dam age had a significant effect on weaning weight through average birth date and growth rate to weaning R2YO dams produced fawns which weaned 11 2kg lighter than those from MA hinds.
- Average liveweight gain from birth to weaning was 378 g/d, slowing considerably in late lactation
- Pasture quality was very important to maximise fawn growth in late lactation and during the post-weaning period
- Fawn liveweight gains of over 400 g/d in late lactation were achieved on pastures with more than 60% green leaf, an energy value over 10 5 MJME/kgDM, and a pasture mass of over 2500 kgDM/ha
- Weaning management was important to ensure the continuation of high growth rates.

- Given sufficient mass, post-weaning growth was improved by good quality pasture
- Maximising fawn growth rates in lactation and in the March/April period was the most efficient way to use high quality feeds, as winter liveweight gain was low regardless of the circumstances.

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