Stoke 'em up, or starve 'em?

Since the start of deer farming in New Zealand there have been differences of opinion on how to best manage pregnant hinds, particularly in relation to feeding in the two to three months leading up to fawning. In this article, AgResearch Invermay scientist *Geoff Asher* discusses how hinds should be managed during late pregnancy.

The differences of opinion are perhaps best illustrated by considering the two extremes in management styles – recognising that most farmers sit somewhere between these extremes, according to their experiences and specific farm situation.

At one end of the scale is the "stoke 'em up" school of thought, whereby consideration is given to providing the hind and growing foetus with maximum nutrition.

It's rationalised that providing the best possible plane of nutrition avoids any possible constraints on foetal growth, fawn viability and subsequent hind lactational ability.

On the downside, however, are concerns that such feeding regimens may lead to excessive fatness in hinds and oversized fawns, both of which may result in difficult fawnings (dystocia).

This has perhaps been complicated by the frequent use of Wapiti-type sires over smaller Red deer hinds, where there is also a sire effect on fawn birthweight.

At the other end of the scale is the "starve 'em" school, whereby hinds are placed on very tight rations in spring to avoid problems of hind fatness and fawn oversize.

However, there are potential negative consequences of this style of management, including severe retardation of foetal growth that results in the birth of low weight, non-viable fawns.

It's also possible that severe feed restrictions may have carry-over effects on the hind's ability to lactate.

So, what is the right style of management in late pregnancy?

There are no simple answers here because there are so many variables to consider. However, it is true to say that farmers' thinking to date has been generally driven by the issue of dystocia – whether or not particular feeding practices lead to high incidences of difficult births.

Maybe it's time we jumped out of this groove and looked at the wider issue in relation to fawning performance of hinds.

Is dystocia as big a problem on New Zealand Red deer farms as it appeared to be in the early 1980s? Are factors other than nutrition important in causing dystocia, like inappropriate fawning environments; high disturbance rates of parturient hinds; "poor quality" hinds? Perhaps we have blamed overfeeding for too long.

Table 1: Average body condition scores (BCS) and lactation scores at various times during the study

a) BCS

Group	early August (trial start)	late November (pre-fawning)	early February (mid-lactation	late March (weaning)
"High"	2.9	4.1	3.6	3.4
"Medium"	3.0	3.4	2.9	2.9
"Low"	3.0	3.1	3.2	3.2

b) Lactation score (0-5 score on mammary development)

"High"	0	4.5	3.9	3.6
"Medium"	0	4.9	4.0	3.6
"Low"	0	3.8	3.0	3.1

In an attempt to get a handle on the actual effects of different levels of nutrition on deer reproductive performance, scientists at Invermay have teamed up with Dr Robert Mulley at the University of Western Sydney (UWS) in collaborative studies on Red deer (Invermay) and Fallow deer (UWS).

Dr Mulley had completed some previous studies on pregnant Fallow deer does, showing that severe feed restriction during the last third of pregnancy resulted in a disturbingly high frequency of fawn non-viability.

Could the same thing occur in Red deer? Also, what are the long-term consequences of different nutritional regimens of dam body condition and lactational ability?

A trial was set up in 1998 to look at this. Eighteen Red deer hinds were individually housed in indoor pens from July until mid-November (immediately pre-fawning). All had previously been synchronised to be mated on the same day and had been scanned pregnant to that mating.

During the housed period the hinds were subjected to one of three levels of feeding (a nutritionally balanced diet of formulated pellets and chaffed lucerne), with feed intake measured daily.

The "high" group was on a luxury diet of all they could eat (ad libitum intake), whereas the "medium" and "low" groups received 30 per cent and 50 per cent respectively less than the high group. The pattern of intake for the duration of the study is shown in Figure 1.

Hinds were returned to pasture two weeks before the predicted fawning date, at which time they were all back on the same level of nutrition for the ensuing lactation period.

At weekly intervals during housing and up to 12 weeks post-fawning, the hinds were weighed, body condition scored (1–5) and lactation scored (0–5). Also, all hinds were scanned at Invermay's INNERVISION CT Scanner at the start of the trial in July and again 10 weeks later. This was done to assess foetal growth and changes in overall hind fatness.

The nutritional treatments imposed in late pregnancy resulted in marked differences in average liveweight, body condition score and lactation score between the high group and the restricted groups (Table 1). Also, the CT scan showed that feed restriction had significantly retarded foetal growth by 10 weeks (Table 2).

With this data in hand when the hinds were turned out to pasture for fawning, Invermay staff had fully expected to experience some difficulties with fawn survival. However, this was not to be the case, as all hinds produced viable fawns with no hint of difficulties.

What was surprising though, was that gestation was highly variable. Even though the hinds conceived on the same day, there was a 29-day spread in fawning!

In effect, the nutritionally restricted

Table 2: Average measurements of foetal/fawn development

Group	Foetal weight on day 120*	Foetal weight 10 weeks later	Gestation length	Birth weight	Fawn growth rate to weaning	Fawn weight at 12 weeks	Adjusted fawn weaning weights**
"High"	0.67 kg	7.62 kg	231 days	9.5 kg	363 g/day	40.0 kg	40.0 kg
"Medium"	0.72 kg	7.07 kg	235 days	9.3 kg	333 g/day	38.1 kg	35.9 kg
"Low"	0.75 kg	6.86 kg	239 days	8.8 kg	317 g/day	35.4 kg	32.9 kg

* start of differential feeding treatments

** i.e. assuming fawns all reached on the same date equivalent to the 12 week anniversary of the "High" group

hinds extended their gestations to compensate for reduced foetal development. (The "low" group was on average eight days later to fawn than the "high" group.)

The net effect was that there was no significant difference in fawn birthweight or viability, because all fawns survived.

It's interesting to also note that none of the hinds in the "high" group experienced any fawning difficulties despite body condition scores ranging up to 4.5 in some cases (also remembering that these hinds experienced relatively low levels of exercise during late-pregnancy).

Having successfully produced viable fawns irrespective of feed level, one might ask the question 'what does it matter what I feed hinds during late pregnancy if they can compensate?'

Well, the story goes a little deeper than that. Firstly, consider the potential consequences of the 29-day spread in gestation length. That essentially means that through feeding alone it's possible to have a very significant effect on the average fawning date of the herd.

This may go a long way to explaining why there appears to be so much variation in average fawning date between farms despite similar mating practices.

Secondly, further monitoring of hinds in the Invermay trial showed carry-over effects on body condition score and lactation score (Table 1). Previously restricted hinds tended to maintain lower scores throughout the fawn-rearing period despite being on the same plane of nutrition during lactation.

The consequences of this, coupled with later fawning, were reduced fawn growth rates and smaller fawns at weaning (Table 2).

The experiment is being repeated this year with another group of hinds, which will allow further clarification of the preliminary results. On the face of the present data, the practice of highly restricted feeding during late pregnancy is hard to justify. However, it is recognised that other major factors have yet to be investigated. Perhaps one of the most important is the effect of hybridisation; in particular, using Wapiti sires over Red deer hinds. ■