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INTRODUCTION

In view of the different types of deer farmed, and different types of deer farms, it is difficult to make unqualified generalisations about mating management. In common though, should be the aim to realise the potential for natural increase and genetic gains through results. Management in a way is a mixture of science and art; putting what you know into effect within the limitations of the environment. Good nutrition is essential to ensure hinds reach puberty at 16 months of age, and adult hinds are in good condition at mating. Research on populations of wild deer in Scotland with low calving percentages, has clearly shown fertility in hinds is dependent on liveweight and body condition. There should be no reason to repeat this observation on New Zealand deer farms. In view of the high monetary value of deer in N.Z. in relation to feed costs. Basic information on both feeding and mating deer is available in AgLinks produced by the Ministry of Agriculture.

Aspects of mating management considered in this paper are:

1. Premating sorting of stags.
2. Use of yearling stags.
3. Onset of breeding.
4. Weaning time and hind fertility.
5. Detection of stag mounting hinds.
6. Mounting behaviour of sexually exhausted stags.
7. Oestrous behaviour of unmated hinds.
8. Shifting stags over the rut and mustering.
9. Use of replacement stags.
10. Crossbreeding with wapiti.

Premating sorting of stags

When large numbers of stags are held on farms, it will be found easier to sort out the breeding stags in late January rather than pre-rut, when fighting between stags makes shifting and handling difficult.

Any antler regrowth should be removed to avoid stags injuring other animals. Until these stags are required for mating, they should be run away from other groups and not overstocked to minimise fence pacing and fighting with premature loss in condition.

Use of yearling stags

Using yearling stags for mating rather than waiting until they are older, can increase the rate of genetic gain in a herd. However, using spike weight as a selection criteria is not a reliable indicator of a stags potential for later velvet antler production. Spikers should be selected from top ranked hinds. The parameters determining hind rank in this instance would be velvet antler production from their male progeny at 2 years of age.

How many hinds a spiker should be expected to mate is questionable. Last year at Invermay, a red deer spiker was run with 29 yearling hinds for 16 days and sired 18, possibly 21, calves over that period. In a previous trial 5 spikers were run with 28 yearling hinds and another 28 yearling hinds with a four year old stag. Subsequent calving results indicated no difference between calving percentage or calving spread of the 2 groups. However, hinds when they come on heat, can be mated repeatedly by different spikers in a multisire group. Thus with mating groups of more than say 30 hinds, spikers could sexually exhaust themselves by each mating every hind which came on heat.

With mating red deer spikers it is probably best to mate hinds in groups of up to 30 with 1 or 2 spikers per group. If it is necessary to mate hinds in larger groups with more spikers, then it would be advisable to change the spikers after the 1st cycle.

Fallow deer spikers can be used successfully, but too many with one group of does can affect mating ability also. When a doe comes on heat fallow spikers will bunt the one attempting to mount or bunt away the doe being mounted, leading to an unnecessarily difficult mating situation if several spikers are present in the group.

Yearling wapiti bulls are fertile but should be well grown for mating. Wapiti bulls may not develop much sexual interest in females or rutting behaviour until they are 2 or 3 years of age.

Onset of breeding

Stags on farms can commence roaring in February once their antlers have hardened. While this is far earlier than for wild stags, this roaring does not indicate the onset of breeding in the female. Changes in photoperiod (decreasing daylength) is an important factor in causing hinds to commence cycling. This effect of photoperiod on red, wapiti and fallow females limits the earliest time they can be mated naturally. Other important factors which determine how early hinds mate are liveweight and general level of condition. To what extent there may be a stag effect on hinds cycling is being investigated this season by running vasectomised stags for 15 days with one group of hinds, prior to joining, them with entire stags. There may also be a hind effect involved where oestrus in a hind induces the same in others.

Earlier calving would be an advantage on many deer farms to take advantage of the spring flush of pasture production. Stags can mate earlier than is normal, but the hind needs to be treated to induce earlier oestrous and thus earlier calving. In trial work at Invermay, hinds have been induced to cycle earlier than normal by hormone treatments and were mated by stags in early March, producing calves in late October.

Onset of the breeding season varies with deer (Table 1) as does cycle length and gestation period.

Table 1: Onset of the breeding season, cycle length and gestation period for deer.

<u>Type</u>	<u>Onset of breeding</u>	<u>Cycle length (days)</u>	<u>Gestation period (days)</u>
Red	early April	18	233
Wapiti	mid March	21	247-254
Fallow	mid April	26	229

Weaning time and hind fertility

Weaning calves before mating in early or mid March and feeding the hinds well may improve hind reproduction if they are in poor condition. Studies on milk production of Scottish hinds after calving have shown that milk production peaks at about 80 days and then declines. This information indicates that farmed red deer hinds which calve in November or December will only be producing about half as much milk over mating as they did in the early lactation. Hence the costs of lactation in the hind are less than may otherwise have been thought. If the hind is in good condition then early or late weaning may not alter time of mating

Information on the effect of weaning time on calf growth is not conclusive but will largely depend on feeding and management. Data has been collected on the growth

rates of male calves weaned pre and post rut from mid March, and when they were run together in late May until the following February (Table 2). The seasonal difference may reflect weaning check on calves rather than their potential growth. In other words the early weaned calves did less well over autumn, and the late weaned calves less well over winter because of a check at weaning. Growth rates over spring-summer were similar and liveweights at 15 months of age were 3 kilograms higher in the late weaned calves. Late weaning may assist female calves, particularly Wapiti, to reach puberty which is liveweight dependent at 15 months of age, but for males liveweight difference of 3 kg at 15 months is likely to be of little consequence.

Table 2: Comparative growth rates of male red deer calves weaned in March and late May.

	<u>Autumn</u>	<u>Growth rate (g/day)</u> <u>Winter</u>	<u>Spring-Summer</u>
Calves weaned March (n = 15)	106	70	212
Calves weaned late May (n = 13)	173	36	223

Early weaning on intensive farms does facilitate drenching calves over autumn for lungworm control, and young red deer are very susceptible to lungworm. Early weaning on an extensive farm may well be impractical from the point of view of mustering. Time of weaning of calves over 30 kg is probably less important than how they are weaned with regard to their subsequent growth. Weaning should be as least stressful to the calves as possible. Keeping the calves in the yards to settle down for several days has advantages in preventing undue fence pacing and cold stress in the paddock. Weaning during periods of bad weather should be avoided and this is easier in autumn than with late weaning in early winter.

One reason cited for late weaning is to allow the calves to learn to eat supplements from the hinds. This may well be necessary if the calves have to go onto supplements after weaning, to avoid a sudden change in diet. However,

with pre-rut weaning onto grass calves can be successfully introduced to supplements gradually as supplies of pasture dwindle in late autumn. A combination of stresses on calves at weaning are likely to cause stress related diseases and any gain in weaning weights can be lost through mortalities. Weaning fallow after the rut has some advantages in that the fawns are bigger and less liable to injure themselves.

Detection of stag mounting

At mating, particularly with crossbreeding or if experiments require oestrous detection, it is useful to know if stags or bulls are mounting hinds.

An indication of mounting of hinds by a stag can be obtained by applying coloured grease to the underparts of the stag. A light grade grease can be coloured by melting blue or green ram crayon and stirring this into the grease after softening it.

This coloured grease should be applied to the skin areas of the stag which come into contact with the hind at mating - inside of the forelegs, the area around the sheath and inside of the upper hind legs. For this method to work well the stag should not be allowed access to a wallow, wallowing will remove the grease or cover it in mud.

The identification of grease marks in the hinds is easier if a small patch of white canvas is glued onto the hind just above the tail. Before the patch is glued on, the hair should be trimmed back to provide a thicker and flat matt of hair for adhesion.

Detection of grease marks can also be improved by the addition of glitter to the coloured grease. When several stags are being used on the some group of hinds or a check on return to service of marked hinds is required, different coloured glitter can be used.

Mounting behaviour of sexually exhausted stags

With mating it is obviously important to recognise sexual exhaustion in a stag and to replace him. There was some debate in the Deer Farmer magazine last year over revelations that unsuccessful mounting of hinds by a stag was not indicative of sexual exhaustion in the stag, but a necessary part of foreplay. Unsuccessful mounting (mounting without mating) does occur as part of foreplay in some cases and it is unsuccessful because the hind is not ready to stand for the stag and moves off. Unsuccessful mounting can also occur if a stag is sexually exhausted because he cannot mate.

The actual act of mating takes less than 5 seconds for a fit stag. Thus onset of sexual exhaustion in a stag is indicated by the stag not being able to quickly mate a hind once she is prepared to stand for him. When the stag is sexually exhausted he demonstrates an inability to penetrate a hind or if he eventually does, failure to exhibit the marked upward pelvic thrust indicative of successful mating. Distinctions of course should be made between temporary sexual exhaustion which may result from mating a number of hinds over a short period and the more chronic form resulting from mating a large number of hinds over a longer period.

Oestrous behaviour of unmated hinds

Observations on hind behaviour can indicate whether the stag is working well or not. At Invermay groups of red deer hinds run with Canadian Wapiti bulls have been observed. Groups where the bull was disinterested in the hinds or not working well provided instances of hinds on heat not being mated or being served after protracted attempts at mating.

Characteristic behaviour of hinds in oestrus were:

1. Approaching the bull.
2. Moving about the front of the bull.
3. Nosing and licking the bull.
4. Mounting the bull from behind.
5. Mounting other hinds.
6. Being mounted by other hinds.
7. Fence pacing, particularly where stags were in adjacent paddocks.
8. Restlessness and agitation in relation to other hinds.
9. Rapid tail wagging.
10. Occasional vocalisation (calling out).

Shifting stags over the rut

Shifting stags over the mating period can be difficult and there are dangers of stags bunting people on foot or denting and scratching vehicles with their antler stumps. Another problem is that of stags standing in open gateways and preventing hinds from going through.

Stags can be enticed out of paddocks using lucerne hay or feed pellets but we have found a better method is mustering on horseback. The size of the horse appears to intimidate the most belligerent stag. However, it would be inadvisable to use a pony on the large wapiti bulls.

Use of Replacement Stags

Cases of infertility in stags are rare but it is still advisable to remove the primary breeding stags in early May and replace them with others as a precaution. There is little point adding new stags without removing the primary sires as these are likely to remain dominant and continue to herd the hinds.

Use of replacement stags is most important when crossbreeding with wapiti type bulls, particularly when one or two year old bulls have been used.

Crossbreeding with wapiti

The use of wapiti type bulls (from Fiordland population) over red deer hinds at Invermay has resulted in similar calving percentages as the straight mating of red stags to hinds (91%) although a higher mortality of hybrid calves (14%) has been recorded than in the red deer calves (7%).

The imported Canadian wapiti at Invermay do not mate as readily with red hinds in single sire situations. In the first year 2 out of 20 hinds calved to wapiti siring as a result of being run in a multisire situation. Most of the other hinds calved to a red stag chaser. Poor performance in their first year may have been attributable to young age (rising 2 or 3 year olds) or delayed adaptations to the change in seasons after importation or lack of breed attraction.

Last calving season 12 out of 30 hinds run with Canadian bulls were mated when run in a multisire situation. Of the 12 hybrid calves born, 3 died through dystocia.

This season a bull which had gained experience mating wapiti cows, and two subordinate bulls were joined with 30 hinds. Observed matings and grease marks on hinds indicate this bull worked well. Seventeen hinds, some of which had oestrus synchronised were marked within a five day period. This bull had to be replaced later in the season when it was evident he had become sexually exhausted.