

## MANAGEMENT - MATING, CALVING, LACTATION, WEANING

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### INTRODUCTION

Herd management of farmed red deer has been described in detail (Moore *et al.*, 1985). This paper covers aspects of management at mating, calving, during lactation and weaning which are concerned with increased production.

With mating management, three areas receiving increased attention are advancement of breeding, the use of wapiti sires over red hinds and the importation of deer from the Northern Hemisphere to improve production.

With the continued high value of breeding stock; calving performance, weaning percentages and weaning weights are of paramount importance to deer farmers and investors.

Recent analysis of prices paid at auction for weaner hinds shows a general price increase of about \$50/kg liveweight (M. Harbord pers.com.). Obviously management effort put into earlier calving, improved feeding of hinds with calves over lactation and weaners, will be highly cost effective.

### MATING

On farms with large numbers of stags, the stags to be used for breeding should be sorted out and run separately from late January. By March, increased fighting and aggression between stags makes yarding and handling difficult. Injuries are likely to occur if large numbers of aggressive stags are yarded.

Any antler regrowth should be removed to avoid stags injuring other animals. Small pieces of antler regrowth tend to get broken off. If stronger regrowth is left on then stag injuries can occur and while sparring the regrowth can result in the pedicles becoming fractured or broken from the frontal bones.

Until required for mating, the breeding stags should be run well away from other groups, fed well and not overstocked. This will minimise premature loss in condition by reducing fence pacing and fighting.

The importance of early sorting of breeding stags and the removal of antler regrowth may seem simple, but if this is not undertaken chances of losing elite breeding stags occur.

#### Use of yearling stags

Well grown yearling stags of known pedigree can be used for mating to increase the rate of genetic gain.

At Invermay one yearling red deer stag is known to have sired 18-21 calves over 16 days when run with 29 yearling hinds. In another trial 28 yearling hinds were run with 5 yearling stags and a further 28 yearling hinds with a 4 year old stag. There was no difference in the subsequent calving percentage or calving spread in these 2 groups of hinds.

However, caution is required in the stag to hind ratio when using yearling stags. Hinds when they come on heat can be repeatedly mated by different spikers in a multisire group. Where multisire mating groups are used, the group size should be limited to the number of hinds one spiker could be expected to successfully mate and 1-3 spikers joined per group. In mating groups of more than 30 hinds the spikers could sexually exhaust themselves by each mating every hind on heat.

#### Joining date

For calving management on large deer farms, a short concentrated period of calf drop is highly desirable. Putting stags out early to obtain the odd early born calf is of little value. The pre-calving management aim is to run hinds in large mobs for as long as possible, with some restriction on feed, before having to set stock in smaller groups over calving. The odd early born calf detracts from this management aim.

In deciding when to join stags the questions are how early will the majority of hinds come into oestrus and could there be a similar effect to the 'ram effect' by the earlier joining of stags?

The earliest calf born at Invermay from natural mating was on 12 November (= mated 24 March) and median calving date has been 3-5 December in the 1981, 1982, 1983 seasons.

Whether or not earlier than normal introduction of red stags can have an effect on calving similar to the 'ram effect' was investigated in 1984. One group of 39 non lactating hinds was run with 2 vasectomised stags for 15 days from March 7 to March 22. Another group of 39 non lactating hinds were run at least a paddock away (250 m) from stags over the same period. On March 22 the vasectomised stags were removed, each group of 39 hinds divided into 2 mating groups and joined with experienced stags for single sire mating.

The calving period of these teased versus non teased hinds is summarised in Table 1. The teased hinds had a median calving date of 20-21 November compared to 26 November for the non teased hinds.

If the vasectomised stags had had an effect similar to the 'ram effect' a significantly higher proportion of the teased hinds would have calved over the period November 10-17. This occurred,  $P < 0.01$ .

Table 1. Calving period of teased and non teased red deer hinds.

	Median calving date	Mean calving date $\pm$ s.e.m.	Calving spread	Calving %
<b>Teased hinds</b>				
n = 20	20 Nov	22 Nov $\pm$ 1.4	13 Nov-5 Dec	100
n = 19	21 Nov	20 Nov $\pm$ 1.5	11 Nov-4 Dec	89
<b>Non teased hinds</b>				
n = 19	26 Nov	28 Nov $\pm$ 1.6	21 Nov-12 Dec	95
n = 20	26 Nov	25 Nov $\pm$ 1.4	15 Nov-3 Dec	85

Other trial work at Invermay indicates that the effect of earlier introduction of a stag is enhanced when early oestrus is induced in some of the hinds using CIDR's and PMSG (Moore, unpubl.). Current research should provide more detailed information on how to advance calving. Earlier calving in red deer would have the advantage of better utilisation of spring pasture growth on many deer farms.

A management schedule for mating red deer is given in Appendix 1.

#### Crossbreeding wapiti and red deer

Wapiti on average give a higher relative yield of velvet antler than red deer (Moore 1984). Financial returns for their velvet are further increased by the premium (25%) paid for Super A velvet. In Invermay trials over 50% of N.Z. wapiti type bulls aged 3 years produced sets of velvet antler of Super A quality ( $>3$  kg/set) whereas only a small percentage of unselected red stags produce Super A velvet even at maturity. Hybrid stags by 4 years of age produce over 40% of Super A velvet.

Cross breeding wapiti and red deer is one option available for increasing velvet production.

At Invermay crossbreeding trials using N.Z. wapiti type bulls over red deer hinds have resulted in similar calving percentages (91%) to red deer matings (Moore 1984). Further research has investigated the mating of the larger purebred Canadian wapiti to red deer hinds. The Canadian wapiti in this investigation are *Cervus elaphus manitobensis* similar in size to *C. e. nelsoni* but smaller than *C.e. roosevelti* and were imported in April 1981.

Attempts at single sire mating inexperienced Canadian Wapiti bulls to red hinds have not been successful. Hybrid calves have been obtained

through using either multisire mating or an experienced bull for single sire mating.

In April 1981 attempts were made to single sire mate 2 bulls aged 2<sup>3</sup>/<sub>4</sub> years with 10 red hinds each. The bulls exhibited no rutting behaviour, nor any association or interest in the red deer hinds. These 20 hinds did produce 2 hybrid calves from running them later in a multisire situation, but most of the hinds calved later to a red stag used for the 3rd cycle.

In 1983 attempts at single sire mating 3 bulls aged 3<sup>3</sup>/<sub>4</sub> years to 10 hinds each failed, again through lack of interest on the part of the bulls. Oestrus had been synchronised in 10 of the hinds in the groups to facilitate observations. When the hinds were later run in a multisire situation bulls were observed mounting hinds on heat but mating was not observed. The bulls were able to mount the hinds, and gain sufficient flexure of the hind legs to make mating a possibility but the penis either went between the hind legs or to the side of the rump. However, successful matings outside observation periods occurred as 12 of the hinds produced hybrid calves. Three of these hinds had calving difficulties and lost their calves.

In 1984 2 groups of 15 hinds were joined with 3 bulls each for mating. Each group contained an experienced bull which had been used in a previous year to mate the Canadian wapiti cows and 8 hinds in each group were synchronised for oestrus. One of the experienced bulls commenced rutting and was observed to mate hinds. In the second group none of the 3 bulls displayed interest in the hinds on heat and this group of hinds was joined with the group of hinds in which the bull was mating. At calving 24 of the 30 hinds produced hybrid calves of which 20-22 were sired by the experienced bull before he was removed in an exhausted state on April 26. Gestation period for the hybrid calves was about 240 days, a week longer than for red deer.

The hinds used in this trial were well grown averaging 110 kg at mating. Feeding of the hinds over winter and spring was restricted to avoid overfatness and overlarge calves. Only two of the hinds had to be assisted at calving and all calves survived including one set of female twins. Birth weights of these calves are shown in Table 2 in comparison to red deer calves born to hinds averaging about 100 kg at mating.

Table 2. Birth weights of newborn deer from adult red hinds recorded at Invermay in 1984.

	n=	Male birth weight (kg)	n=	Female birth weight (kg)
'Breed' of calf				
Red	44	9.5 ± 0.2	31	8.9 ± 0.2
Canadian wapiti x red hind	15	13.6 ± 0.3	8*	13.9 ± 0.3

\*excludes set of twins weighing 9.6, 10.4 kg

This year 2 groups of 15 red hinds were joined with 2 bulls each in adjacent paddocks. Again only one of the bulls commenced rutting and was given all 30 hinds. In other mating groups 2 experienced Canadian wapiti bulls were each joined with a group of N.Z. wapiti type cows in adjacent paddocks. Only one of the bulls commenced rutting. However the other bull commenced rutting shortly after he and his group of cows had been shifted a paddock away from the other group.

This observation suggests that the rutting behaviour of a Canadian wapiti bull may suppress rutting behaviour of other bulls nearby.

When cross breeding, it is advisable to synchronise oestrus in some of the hinds to facilitate observations on whether the bull is mating. Coloured grease can be applied to the abdomen of the bull so that hinds are marked when they are mounted. However, grease on the rump of a hind does not necessarily indicate a mating has occurred.

Research to date indicates that it is preferable to use experienced bulls over red deer hinds and that replacement red deer stags should be used over the 2nd or 3rd cycle as insurance against bulls not mating the hinds.

#### Imported deer

Since 1981, hundreds of wapiti from Canada and red deer from Europe have been imported for deer farming in New Zealand. These animals of course take time to adapt to the changed seasons. Deer imported into New Zealand in April are at a stage of their annual cycle equivalent to New Zealand deer in November and should not be expected to mate immediately.

Stags imported in April go through two shortened antler cycles in one year as they adapt to the changed season. They may develop rutting behaviour over winter after their antlers have hardened.

A male and female Canadian wapiti imported into New Zealand in April 1984 are known to have mated at about 15 months of age on about 1 September, 1984, with the calf being dropped on 18 May, 1985 (D. Edmonds pers.com.). In another case an imported Canadian wapiti cow produced a calf in early March after being imported the previous April. Such unplanned calvings hardly assist imported females to begin breeding at regular times.

## CALVING

### Pre-calving

On large deer farms, the management aim should be to keep the hinds together in large mobs with rising 2 year old hinds run separately from older hinds, until 7-10 days before the first calf could be expected. The hinds should be rotationally grazed with some restriction of feed intake to minimise calving difficulties due to overlarge calves. Excessive fatness in hinds should have been removed over the winter period. Over fat hinds can have a large amount of fat in the birth canal which will be an impediment at calving.

When hinds are yarded pre-calving the udder status of hinds should be recorded for reproductive records and also for withholding dry or late calving hinds from the main calving herds. Care is required in recording udder status because nervous hinds can tighten their abdomen making it difficult to discern early stages of udder development.

The calving groups should be set stocked on short vegetative pasture and if there is no natural cover in the paddock some should be provided for the newborn calves. These need be only small areas of long grass which have been previously fenced off with electric fencing, or strips of pasture left when making silage or clumps of small branches. The importance of providing cover for newborn calves is discussed by Cowie *et al.* 1985.

### Intensive husbandry

Hinds which are likely to require close attention at calving, such as those mated to Canadian wapiti, can be remarkably tamed by hand feeding pellets or nuts. Restricted feeding can be continued up to calving and about 3 days after hinds have calved they can be shed off into an adjacent paddock for ad lib feeding. Caution is required when shedding off and calves need to be positively identified to their dams.

When a hind has to be assisted with birth she should be left in the yards with her calf with as little disturbance as possible for 2 days to allow bonding to occur.

Some hinds which have assisted stillbirths fare poorly when reintroduced to calving groups. In the process of trying to seek out

their calf these hinds can be severely victimised by other hinds and lose condition. Leaving these hinds in the yards with their dead calf for 12-24 hours may alleviate this problem.

#### Marking or tagging calves

Unless calf birth dates are required it is an unnecessary labour to tag calves at birth with its attendant disturbance of the herd. Tagging for identification of calf to dam can be done by yarding the calves when they are aged 6-8 weeks. Should some temporary mark be required to identify the odd calf then an aerosol spray dye can be put on the inside of the calf's ear where it is least likely to be licked clean by the hind.

If farmers are concerned with the possibility that their newborn calves may be poached then a small ear mark or tag could be applied. Application of medium sized tags to newborn calves is a possible cause of desertion of calves. Hinds have been observed pawing at tags in the ears of their newborn calves. The contrast of the tag colour with the calves ear may be a factor in calf rejection as well as calf tag size.

When handling or weighing newborn calves they are least disturbed if maintained in their curled up position and the outer eye is covered.

Other aspects of calving management are covered in relation to calving behaviour in the paper by Cowie *et al.* 1985.

### LACTATION

#### Udder development

Development of the udder in pregnant hinds commences about a month before parturition and development is slower in first calvers (Blaxter *et al.* 1974). The udder becomes swollen 1-2 days before parturition but udder size in itself varies considerably between hinds and can not be used to accurately predict calving date (Moore unpubl.).

#### Udder anatomy

The hinds udder has 4 quarters, each with a single teat-canal. Volume of the hind-quarters has been measured as 2.4 times that of the fore-quarters (Arman *et al.* 1974).

#### Composition of milk

Hind's milk is rich, containing 8.5% of fat and 7% crude protein with total solids amounting to 21% in early lactation (Arman *et al.*, 1974). Gross composition of hinds milk is given in Table 3, showing an increase in total solids and gross energy over the period of lactation considered.

Table 3. Gross composition of hinds milk (Arman *et al.* 1974).

Stage of lactation (days)	Total solids	Fat	N x 6.38	Lactose	Gross energy (K cal/100 g milk)
3-30	21.1	8.5	7.14	4.45	130
31-100	23.5	10.3	7.63	4.45	156
100	27.1	13.1	8.59	4.46	185

The level of lactose (4.5%) in hinds milk is low compared to cows and bovine milk replacers. When milk substitutes are required for hand rearing deer calves, ewe milk replacers are preferable to cows milk (Fennessy and Moore, 1981).

#### Milk yields

Estimates of the milk yield of captive Scottish red deer hinds show maximum yields of 1400-2000 g per day. Yields from the heaviest farmed hinds in New Zealand are likely to be considerably higher. With the captive Scottish red deer hinds total milk yield peaked about 8 weeks after birth and started to decline after 15 weeks of lactation (Arman *et al.* 1974). This decline in milk yield after 15 weeks indicates that most hinds, which calve in December, will have lower feed requirements by the onset of the mating season in April. However it has been observed in wild deer that suckling frequency increases again at the beginning of the rut apparently because of increased proximity between mothers and their calves in harems (Clutton-Brock *et al.* 1982).

#### Feeding

The energy requirements of lactating hinds over summer are twice their feed requirements in winter or spring (Fennessy 1981). Pasture in paddocks to be used for calving needs to be kept short to provide good quality feed for the lactating hinds. Taking silage off paddocks provides top quality pasture later for calving.

Over lactation top quality pasture is not only required to ensure hinds milk well but also to provide good quality grazings for the calves which commence eating grass from about a month of age. Topping paddocks over calving may be required to maintain pasture quality.

Under good grazing conditions calves can grow at over 400 g/day from birth to 3 months of age.



## WEANING

### Pre or Post Rut?

The pros and cons of weaning before or after the rut favour pre rut (early) weaning on intensive farms (Moore 1981). Early weaning facilitates anthelmintic treatment of calves for lungworm control over their first autumn. If calves are left on the hinds over the rut it is not often practical to yard mating groups with belligerent stags to drench calves at 3 weekly intervals. Late weaning (post rut) has the added disadvantage that the stress of separation occurs when weather conditions are more likely to be poorer. Late weaning has been considered to have the advantage that hinds can 'teach' calves to eat winter supplements before weaning. This is of course desirable if calves are to be imposed with a sudden and complete dietary change at either early or late weaning. Hand feeding also helps to tame stock considerably. However, with early weaning calves can be run on pasture and supplements introduced gradually as pasture availability declines in late autumn.

Late weaning is likely to remain a common practice on extensive deer farms where mustering hinds with calves off large hill blocks is not practical in March. When feed supply on the hill blocks has become short in early winter, the deer can be enticed into smaller paddocks and 'tamed' with supplements before yarding for weaning.

### Weaning procedure

Care is required at weaning to minimise calf losses. Laneways approaching the yards need to be calf proof and the yards suitably designed to hold the calves in for 3-7 days before release into the weaning paddocks.

Weaning should be carried out in a way that causes the least possible stress on the calves. Holding weaners in the yards for several days prevents undue fence pacing in the weaning paddock and allows association to develop between the calves so that they will move out as one group to the weaning paddock. Endless problems can occur if weaners are let straight out of the yards after separation from their dams.

Yard pens for holding weaners in should not have gaps through which deer in other pens can be seen as this causes activity in some weaners trying to join animals in adjacent pens. Gates should be flush with the yard walls; calves can easily be lost through a foot becoming jammed in an uncovered gudgeon. Water and feed trays should be recessed into yard walls to avoid soiling of water and feed by the calves. Feed and water consumption increases markedly as the weaners settle. No problems have been encountered with feeding calves on good quality lucerne hay while they are in the yards.

Weaning stress can also be reduced by minimising the amount of handling at weaning. Calves should be sexed, ear tagged and ear marked at least 3 weeks prior to weaning when a pre weaning drench may be desirable and some farmers may be interested in identifying calves with their dams (Table 4). Recording the udder status of hinds for records of their reproductive performance could also be done at a pre weaning yarding rather than left to weaning.

Vaccination of calves for clostridial diseases could be left until the next yarding 3 weeks after weaning when calves are drenched again. Thus at weaning the calves only require a drench and weighing if required, before being allowed to settle.

Hinds and calves are easily hand drafted between pens rather than put through a handling pen to physically push the calves out into separate pens from the hinds.

Table 4. Schedule of events to minimise stress on calves at weaning.

Yarding	Activities
Pre-weaning (mid February) (or 6-8 weeks after birth)	- sex, tag, ear mark, (drench) calves - record udder status of hinds - identify calves to dams if required
3 weeks*	
Weaning (early March)	- separate calves, drench, weigh hold in yards 3-7 days
3 weeks*	
Post-weaning (late March)	- vaccinate, drench calves

\* 4 weeks if drenching with Ivomec.

### Growth rates

Information on the effect of early versus late weaning on calf growth rate is lacking. Table 5 shows comparative growth rates for male calves weaned either in mid March or late May and run together in the same herd until the following February.

Growth rates of calves left on their dams over the rut were higher over autumn but lower over winter following weaning. Spring-summer growth rates of the early and late weaned male calves were similar with liveweights of the late weaned males 3 kg heavier at 15 months.

Such a difference is of little consequence for males but may assist hind calves to reach target liveweights of 75 kg for mating at 16 months.

Table 5. Comparative growth rates of male red deer calves weaned in March and late May. (Cohort born 1980).

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

However, other data suggests hind calves which are light at early weaning (34 kg) can be grown through to 80 kg for mating at 16 months of age (Table 6).

Table 6. Liveweight measurements of light weaned hind calves preferentially fed over winter and their subsequent calving performance in comparison to other hind calves. (Cohort born 1981).

	Light hind calves + s.e.m. (range)	Other hind calves + s.e.m. (range)
Liveweight kg		
1982		
10 March (weaning)	34.3 + 1.0 (30-40)	44.8 + 0.8 (41-54)
12 May	41.8 + 1.1 (39-48)	51.8 + 0.7 (47-59)
15 Sept	51.8 + 0.8 (49-56)	55.6 + 0.8 (50-63)
Winter growth rate g/day	79*	30
1983		
14 April	79.7 + 1.1 (76-88)	89.2 + 1.1 (80-98)
Calving % Dec 1983	80	95

\* preferentially fed.

These light early weaned hind calves were run with other weaner hinds over autumn when good growth rates can be achieved if calves are well

fed. Over winter these lighter hind calves were separated out and preferentially fed, gaining 10 kg. Over spring summer the lighter calves were run back with the other hind calves. At mating the light hind calves, relative to the other hind calves, were 11% lighter compared to 23% at weaning and 7% post winter.

Recommendations for a deer health programme are given in Appendix 2.

#### SUMMARY

1. Breeding stags should be sorted out in late January and run away from other groups to reduce premature loss in condition before joining. Any antler regrowth on stags should be removed to avoid injuries to other animals or fracture of the pedicles during sparring.
2. Yearling stags of known pedigree can be used for mating to increase the rate of genetic gain. Mating groups should be limited to about 30 hinds to avoid sexual exhaustion in the stags.
3. Joining vasectomised stags with hinds in early March resulted in the teased hinds having a median calving date (20-21 November) 5 days earlier than non teased hinds.
4. Observations on cross breeding Canadian wapiti bulls indicate that young inexperienced bulls may not work well in single sire mating but some hybrid calves have been obtained from multisire situations. Success has been obtained by using an older (5 yr) experienced bull and there is some evidence that a rutting bull may suppress rutting behaviour in bulls nearby in adjacent paddocks.
5. Deer imported from the Northern Hemisphere in April can breed in late winter. Sexes should be run separately as they adjust to the changed seasons if the aim is to have females breeding at regular times.
6. Excessive fatness in hinds should be removed over winter to avoid fat deposits in the birth canal causing calving difficulties later. In late pregnancy the feed intake of hinds should be restricted to avoid overlarge calves, particularly when cross breeding with wapiti has occurred.
7. When intensive husbandry is required, such as with hinds that were mated to wapiti, feed intake can be restricted to post partum and the hinds shed off when their calves are about 3 days old. With this practice it is advisable to tame hinds by hand feeding nuts or pellets.
8. When hinds are yarded pre-calving the udder status of the hinds should be recorded and those without udder development - late

calvers and dry hinds - withheld from the main calving groups. This will allow the main calving groups to be mobbed up earlier to facilitate rotational grazing and ensure late calvers are not overfed in late pregnancy.

9. Tagging calves at birth is an unnecessary labour unless birth date is required. Identification of calf dam pairs can easily be done when the calves are tagged at 6-8 weeks of age.
10. Hinds' milk is rich being a high fat-low lactose milk. Energy requirements of the lactating hinds are twice their feed requirements over winter or spring. Pasture in paddocks to be used for calving needs to be maintained in a short vegetative state to provide top quality feed for lactating hinds and quality grazings for the calves.
11. Weaning the calves prior to the rut facilitates anthelmintic treatment of calves for lungworm control. Late weaning (post rut) has the disadvantage that the weaners undergo separation stress at a time when weather conditions are likely to be poorer. Holding the weaners in the yards for several days helps reduce the stress of weaning and prevents undue fence pacing.
12. Weaned calves can grow at rates in excess of 100 g/day if well fed over autumn. Light weight hind calves averaging 34 kg at weaning (March) do respond to preferential feeding over winter and can be grown to 80 kg for mating at 16 months of age.

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- Tag calves
- Udder check hinds to record reproductive performance as W/W, W/D and D/D\*
- Box groups

\*W = wet

D = dry

Box = join groups together



APPENDIX 2

Deer Health Programme\*

A. Main Activities:

Good nutrition, shelter and a minimum of stress are fundamental to disease prevention. Avoid overfeeding hinds in spring but provide them with high quality feed from 1 week prior to the start of calving. A concentrated calving period should avoid late calvers becoming over-fat.

Stags have relatively high maintenance requirements in winter due to their low fat reserves and poor insulation.

It is preferable to wean calves in March so that they can receive regular drenching and optimal feeding during the autumn/winter period. Shelter should be provided and their feed allowance increased during periods of bad weather.

B. Anthelmintics:

It is essential that calves are regularly drenched during their first autumn from March until June, to prevent lungworm disease. White drenches (benzimidazoles - Systemex, Synanthic, Panacur, Valbazen, Rintal) should be given at 3 weekly intervals and Ivomec at 4 to 5 weekly intervals (because it persists in the body for 1-2 weeks). Two drenches the following spring and summer ensure there is no lungworm build-up in deer which are slow to develop resistance.

Adult deer are relatively resistant to internal parasites but intensively grazed deer may benefit from 2 strategic drenches; hinds precalving and at weaning; stags at velvetting and post rut. Alternatively periodic faecal samples can be checked through your veterinarian for signs of worm build-up.

Recently captured or imported stock should be drenched regularly for up to 6 months after introduction to pasture. Bought in stock should be drenched on arrival.

C. Vaccinations

- (a) Clostridial diseases can occur in deer and it is wise to vaccinate against them. Vaccinate calves with 2 doses 4-6 weeks apart in autumn. Adult stock should receive an annual booster; stags at velvetting and hinds either pre-mating or pre-calving.
- (b) Leptospiral vaccines (*hardjo*, *pomona*) are advisable in those areas where dairy farming and pig-keeping are common. They can be administered at the same time as Clostridial vaccines.

D. Trace-elements:

Selenium (Se), Copper (Cu), Cobalt (Co) and Iodine are the most commonly required trace-elements. Consult your veterinarian for advice. Supplements can be added to drenches, injected or topdressed.

E. Tuberculosis

Only buy Tuberculosis-tested animals. It is also advisable to quarantine bought in or captured deer for the first 30 to 60 days and repeat the Tb-test before introducing them to an existing herd.

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