Farm Production & Practice

Ministry of Agriculture and Fisheries

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# Deer
# Red Deer
## *Velvet Antler Growth and Harvesting*

**Antlers are bony outgrowths from the skull. They are found in most members of the deer family and are normally replaced annually. Except for reindeer and caribou, only males grow antlers.**

Antlers are formed as living tissue covered by a skin with fine hairs — the velvet. The growing antler is well supplied with blood vessels and nerves via the velvet. The antler is initially cartilage which becomes mineralised and is finally converted to bone. At about this stage the blood supply dries up and the velvet dies and is rubbed off.

Horn, on the other hand, consists mainly of keratin filaments (keratin is a class of proteins which include wool, hair and hoof) often surrounding a bony core. Unlike antlers, if a horn is removed there will be no regrowth.

The antler develops on the pedicle, a permanent projection of the frontal bone.

Fig. 1 shows the skull of a red stag with the pedicles and the stumps of the mature bony antlers. The old antler is cast from below the coronet, and new growth arises from the skin around the pedicle.

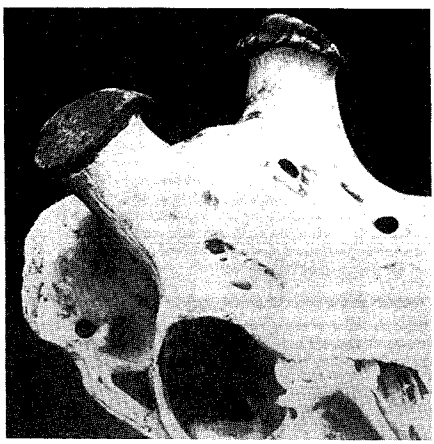

**Fig. 1: Skull of a red deer stag.**

*Antler growth cycle*

The pedicles and first antler normally develop in early spring of a stag's first year. But some calves may develop pedicles in autumn at about 4- 5 months of age. The first pair of antlers are normally single, unbranched spikes. The coronet, marking the pedicle-antler junction, is evident after about 11 weeks growth and forms 5–6 cm above the skull. (Fig. 2). Growth of the pedicle takes about 7–8 weeks.

If the first antler is not cut it will grow rapidly for a period before growth slows down and stops. As the antler matures into bone, the blood supply to the velvet is lost, the velvet dies and is cleaned off by rubbing. The antlers are then in the hard, mature bony state for the rut.

In the following spring the skin around the pedicle expands and grows, initiating new antler growth. The hard antler is cast, skin heals quickly over the exposed pedicle and growth of the new antler begins again.

**Fig. 2: Early antler growth in a spiker red stag.**

**Hormonal control:** The seasonal pattern of the antler growth is related to the events of the sexual cycle. In mature stags, the casting of the hard antler in the spring is associated with a low concentration of male sex hormone (testosterone), whereas velvet shedding is associated with a rising concentration of testosterone in the autumn.

The timing of castration affects antler growth. Castration before puberty prevents pedicle development and subsequent antler growth. If the stag is castrated while in velvet, the antler remains in velvet and continues to grow. Stags castrated while in hard antler, cast them and new antlers are grown. These then remain in velvet.

High rates of testosterone administered to a stag while in velvet antler inhibit antler growth and promote velvet shedding. If the stag is treated with testosterone while in hard antler, casting of the antlers in inhibited. Testosterone given immediately after casting inhibits pedicle healing and antler regrowth.

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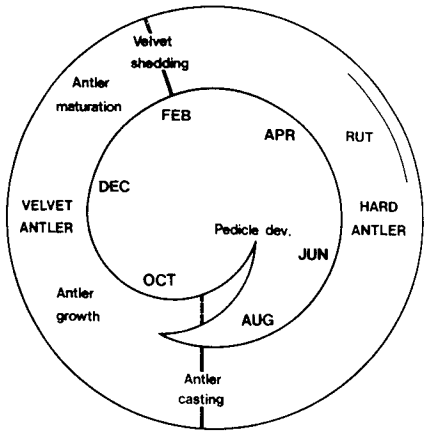


**Fig. 3: Cycle of antler growth.**

*Factors affecting antler growth*

There are three possible approaches to increasing the yield of velvet antler:

**Increasing the length of the antler growing season** may allow higher yields of second growth velvet antler. However, the economic value of antler regrowth is not yet clear.

Length of the growing season is governed by:

- Date of casting of the hard antlers.
- Date of velvet shedding.

The time from casting to the first harvest (for 'A' grade velvet) is usually 60–70 days. The cut surface of the antler heals in about three weeks, initiating the regrowth. About 50–70 days after the first cut, the antler is ready for a second cut. This means the growing period needed to obtain two maximum harvests is at least 4 months.

Velvet shedding occurs in late January/early February so that second cuts would be taken no later than mid-January. Therefore only those stags which have cast their hard antlers before mid-September (so that the first cut of antlers is harvested in early November) are likely to produce substantial yields of second growth velvet.

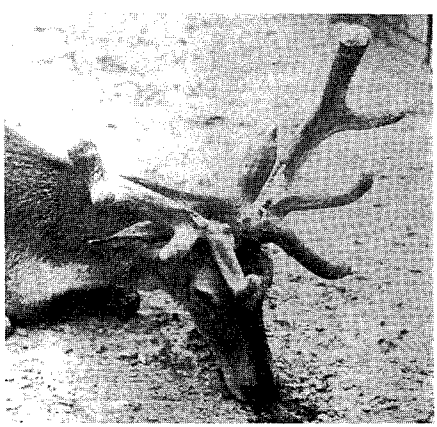

**Fig. 4: Red deer stag at the appropriate stage for harvesting 'A' grade velvet antler.**

**Rate of antler growth** varies among animals. This suggests that the partition of nutrients between antler growth and body growth is important.

Climatic factors may also be important; cold weather could bring about a reduction in blood flow through the antler and so reduce the supply of nutrients for antler growth.

**Selection** of the best velvetting stags for breeding is a common farming practice.

If heritability of velvet yield is sufficiently high, this will eventually result in higher yields of velvet from the progeny of these superior stags.

*Nutrition*

The level of winter nutrition may affect antler growth and velvet antler yields in the spring (Table 1).

**Table 1: Casting date and velvet antler yield for groups of stags fed hay *ad libitum* or hay plus a supplement of deer nuts* in late winter.**

| | *Mean casting date* | | *Mean velvet antler yield (kg)* | |
|---|---|---|---|---|
| *Farm* | *Hay* | *Hay + nuts* | *Hay* | *Hay + nuts* |
| A | 8 Oct. | 27 Sept. | 1.2 | 1.4 |
| B | 19 Sept. | 8 Sept. | 1.4 | 1.7 |
| C | 17 Sept. | 9 Sept. | 1.8 | 1.9 |
| D | 20 Sept. | 18 Sept. | 2.3 | 2.2 |

*Supplements of 1.2–2.4 kg of food nuts. Trials started in late June to mid-July.

South Island research shows that an improved level of nutrition in late winter advances casting date, but the effects of good feeding on velvet antler yield are not yet clear.

In any event, it is sound management practice to feed stags as well as possible over winter and spring in order to minimise live-weight loss.

*Stages of antler growth*

The timing of the stages of antler development for a group of three year old stags is shown in Table 2. This pattern may not apply to two-year-olds which do not all develop full heads, but it is generally applicable to mature stags. Some farmers are mistaking the trez bud for bulbing of the royals, and are harvesting the antler much too soon.

**Table 2: Length of antler growth stages.**

| | *Day* |
|---|---|
| Pedicle swelling | –7 |
| Casting | 0 |
| Brow bud | 16 |
| Bez bud | 30 |
| Trez bud | 44 |
| Harvest (maximum bulbing) | 60–70 |

This pattern of growth means stags can be left for about 7 weeks after casting. This reduces the chance of velvet damage.

*Yields*

Top stags yield 4–5 kg of velvet antler, but average yields are much lower (Table 3). The variation of velvet antler yield within an age group within a herd is such that culling the poorest 10% of velvet producers in a herd could increase the average yield by about 4%, whereas culling the lowest 30% could increase the average yield by about 10%.

**Table 3: Average yields of velvet antler (kg) from red deer on three farms.**

| *Age* | *Invermay (1980)* | *Canterbury (1979)* | *Southland (1979)* |
|---|---|---|---|
| 2 | 1.0 (55)* | 1.2 | 1.0 |
| 3 | 1.6 (65) | 1.5 | 1.6 |
| 4 | 1.7 (65) | 1.9 | 2.0 |
| 5 | 2.1 (66) | – | 2.4 |
| Mature | – – | – | 2.4 |

*Days from casting to harvest.

*Velvet antler removal*

Removal of the velvet antler is the critical stage in velvet production. It is a simple and painless operation, so long as stags are handled quietly and an adequate degree of analgesia (i.e. pain killing, as required by law) is induced.

The whole operation must be carried out with a minimum of disturbance and stress to the animals. Only as many people as are essential to do the job safely should be involved in the operation.

Depending on the size of yards, no more than 30–50 adult stags should be yarded together for velvetting. If the stags are too closely confined, they are likely to stand on their hind legs and box each other with their fore legs, causing damage to velvet antler.

With a large number of velvetting stags it is best to draft them into smaller groups as they cast their old antler stubs. The stags are divided into groups in the order in which they become ready for velvet removal, thus reducing the frequency of yarding required and the possibility of velvet antler damage.

The yarding of stags for velvetting is best done quietly and in cool settled weather conditions. If stags become excited they should be left alone to settle down before attempting to tranquilise them. A small, dark pen permits easier tranquilisation of 'wilder' stags.

**Tranquilisers:** Tranquiliser darts should not be used in the paddock because an excited animal takes longer to succumb, and higher dose rates are usually needed. The tranquiliser commonly used is xylazine (Rompun). Low dose rates are very effective on quiet stags, but higher dose rates are needed for more excited stags.

Dose rates of 0.75 ml/100 kg of 5% Rompun or 1.5 ml/100 kg of 2% Rompun given intramuscularly have proven effective. For quiet stags a 23 gauge needle can be used to inject Rompun into the neck. If the stag is injected in the rump, an 18 gauge needle is suitable. Stags injected intramuscularly take about 15 minutes to become sufficiently tranquilised.

When stags are quiet enough to be held by the head, Rompun can be given intravenously into a jugular vein at a third of the dose rates given intramuscularly. The tranquiliser will take effect very quickly (thus saving time).

After injection stags should be left alone in an uncrowded pen. Noise must be kept to an absolute minimum to ensure the stags relax and the tranquiliser takes effect quickly.

**Anaethesia:** Once the tranquiliser has taken effect the local anaesthetic is given – the sites for local anaesthetic are shown in Fig. 5. Several minutes must be allowed to permit the local anaesthetic to take effect.

No standard velvetting procedure can be recommended. The system and choice of drugs depends on the circumstances and on the experience and preference of the farmer and the veterinarian.

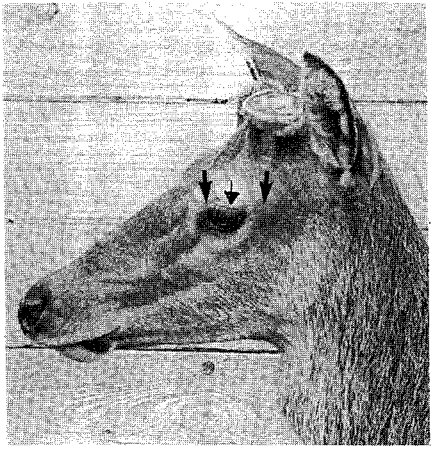

**Fig. 5: Suggested sites for injection of local anaesthetic.**

**Velvet removal and handling:** Before removing velvet antlers a tourniquet should be applied to stags older than spikers. Twine or elastic can be wrapped around the outside of each pedicle, crossing over between the pedicles to form a figure of eight.

The antlers are cut off about 1 cm above the pedicle using a medium toothed saw such as a meat saw. The saw should be kept sharp and disinfected regularly. Tourniquets can usually be removed 5–10 minutes after the velvet antler has been sawn off.

It is important that the cut be clear of the coronet so that the pedicle is not damaged. Research at Invermay suggest that damage to the coronet affects subsequent velveting yields.

Once the velvet antler is removed it should be held upside down, to prevent blood loss from the cut end, and hung on a rack to cool. It should then be sealed in a plastic bag and placed in a freezer as soon as possible.

Records of the weights of antlers cut from individual stags should be kept. These will be important in selecting animals for breeding, continued velvetting, sale or slaughter and evaluating feeding management.

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