

# **Breeding, Birthing and Crias**

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# The Biology of Alpaca Reproduction.

### Males

Although male alpacas reach reproductive age at about 18 months, they should not be allowed to mate until at least 2½ years of age. Earlier matings may result in damage to the penis if the prepuce has not detached from the tip, a process that is not complete in 100% of males until 3 years old [24]. Damage caused by premature matings may then result in associating mating with pain and prevent a successful stud career. Moreover, the testes do not physically mature until 3 years of age and a correlation has been shown between testicular length and the onset of sperm production [72].

#### Females

It is common practice in New Zealand to start mating females at around 2 years old when there is physical and mental maturity and she may breed until she is about 15 years old. Mating can start after shearing in late spring though is commonly done after New Year so that the cria are born during the following summer.

In the wild, South American camelids are seasonal breeders and this is driven by favourable climatic conditions [82]. Farmed female camelids do not have a breeding season but are induced ovulators. Previously, it was believed that the act of mating resulted in the dam ovulating and although this may contribute, it is now known that a stimulating protein factor (known from unrelated studies as  $\beta$ -nerve growth factor) is deposited with the sperm directly into the uterus [3]. As a result, ovulation occurs within 48 hours and the egg is then fertilised. As a result of ovulation, a functional corpus luteum forms 2-3 days later. The fertilized egg may be found in the uterus seven days after mating and this implants at around 30 days. The functional corpus luteum is responsible for the production of progesterone and after about one week post-mating, the increased levels of this hormone start to cause changes in the alpaca's behaviour. There is a clear relationship between progesterone level and being

receptive to males - those females with elevated levels are unreceptive to the advances of a male. Although ovulation occurs equally between left and right ovaries, pregnancies are invariably carried in the left horn of the uterus. An embryo created in the right horn must therefore migrate to the left - the mechanism for this is unclear.

Very occasionally, a corpus luteum remains functional and secreting progesterone even without an active pregnancy. This results in the female being unreceptive to males and is known as a retained corpus luteum. A vet is able to treat this with injections of a prostaglandin,  $PGF_2\alpha$ .

# **Mating Alpacas**

On introduction of a male, a receptive female will kush (sit) for the male to mount her which he does whilst making a distinctive **orgeling sound**, believed to be another contributing factor to the induction of ovulation. It is noteworthy that females can be induced to ovulate by sitting next to an enclosure where mating is happening. Some females will not initially be receptive to the male who may bite at the back legs or rise up and put his weight on the hind-quarters to make the female cush. Other females will be totally unreceptive to the male's advances and do everything she can to avoid mating. The reason for this could include that the female simply does not like the male or perhaps already has a high progesterone level for whichever reason. Later attempts to mate this alpaca pair may be successful but it must be remembered that the females are instinctively selective.

There are two breeding methods:

- Pasture breeding in which a male is put in with a group of females, often for around two weeks. This mimics mating in the wild as although the male will mate with the females, he will graze apart but within close range.
- Managed or in-hand breeding. This involves introducing a male (normally on a halter and lead) to a female within a fenced enclosure. This should ideally be 3 x 3 metres in size, built in a



manner so that legs cannot pass between the rails or boards and

have a clean floor area - some breeders will have carpet laid to ensure that dirt is not introduced into the female.

Apart from giving a clear conception date, the latter method allows for control of the mating time. Extended (>30 minutes) or repeated matings can cause injury to the lining of the uterus and a subsequent infection. The alpaca penis has a hard cartilaginous tip which impacts the uterine lining - blood traces may occasionally be seen on the fleece around the vulva after mating.

#### **Pregnancy Confirmation and Gestation**

Camelids are reported to have a high rate of early abortion, mostly within the first month. The results of a 1993 postal questionnaire indicated that a third of mated female South American camelids in the United Kingdom failed to produce offspring. This did not include abortions or stillbirths at up to 4 per cent and up to 3 per cent of further losses respectively [75]. Other estimations range between 7% [73] and 25% [74] thus making pregnancy confirmation at regular intervals during the first months critical. If pregnancy was not achieved, the dam's serum progesterone level drops back to normal by 14 days after which she will sit ready to be mated again. The induction of ovulation and resulting 14 day progesterone cycle should be considered when mating and remating.

Gestation averages 355 days from the conception date with a few not unpacked (born) for 380+ days. Swelling of the abdomen is noticeable in the last three months with the cria's movements and occasional kicks clearly visible in the last month. It should be added that some dams hide the pregnancy well, even to the experienced eye. It is good practice to record all breeding activities and observations for future reference.

Confirmation of pregnancy can be done by:

- 'Spitting-off'. If fertilisation was achieved, the female will repel any further attempts by the male to mate with her. The term 'spitting-off' is a slight misnomer as although some dams will spit at the male, others (particularly maidens) may run away, scream, kick out or even try to jump out of the pen to escape him. Spitting-off is done by reintroducing the male (on a halter and lead) into a penned area containing the mated female and her behaviour noted. On occasions, the female reaction is so strong that taking the male into the pen is not needed and is very likely to result in the spitting of regurgitated grass. Spitting-off should be done after about two weeks post-mating and again at four weeks if a male is available. Further spit-offs may be carried out every two months to confirm continued pregnancy.
- Ultrasound scanning Usually performed with an external ultrasound probe after 60 days when the pregnant uterus can be seen. This requires a skilled operator, appropriate facilities and cooperative alpacas. The method does carry a risk of false negative results, especially when the alpacas are examined later. One research group has successfully used ultrasound scanning to correlate foetal thorax height and biparietal diameter with age of development [76].
- Serum progesterone level this rises to a peak 7 days after mating and if the mating was successful, the level remains elevated.
- Oestrone (Estrone) sulphate in urine a sample of urine is added to a Oestrone test kit vial. The presence of oestrone causes a colour change. The manufacturers state that there are two testing periods for alpacas, between 21-27 days after mating and at 250-300 days until unpacking and the test has a >92% accuracy. The availability of this testing kit outside of the US is unclear.
- Pregnancy-Specific Protein B Detection of this protein produced by the placenta is by <u>ELISA</u>. The test requires blood serum thus a veterinary is needed to draw the sample. Depending on the antibody used, the assay may be applicable to all ruminants and horses. This test is widely available, including from **Gribbles Veterinary** in New Zealand. Note: Relaxin is a pregnancy-specific hormone used in pregnancy diagnostics for several species, including dogs and cats. A Swedish study [77] has shown that the FASTest relaxin test was unable to detect pregnancy in alpacas demonstrated as pregnant by ultrasound.



Pregnancies are invisible to the eye until the latter months as the foetus is only about the size of a small bird at six months gestation and increasing



staple length disguises any swelling of the abdomen. If the dam is suckling the previous year's cria, she will wean it by refusing to give it further milk. The dam will 'dry off' and growth of the new foetus can then accelerate. Movements of the foetus are evident in the final two months and can be occasionally seen as a rolling motion or kicking of the abdominal wall. Swelling of the udders occurs at about two weeks before unpacking. Note that some females can reach term without showing much, if any, swelling of the abdomen or obvious udder development.

In New Zealand, shearing is frequently done within 30 days of the

unpacking date and even restrained on the shearing table it can be difficult to visually confirm pregnancy. However, some maiden dams will show slight udder development and swollen teats in the final couple of months before term. For all dams, ultrasound is the definitive method confirming pregnancy though for most owners their behaviour towards males is the practical indicator that they remain pregnant. Be aware that some dams, even well advanced in their pregnancy, will present 'mixed signals' when brought near a male showing great interest with their tails raised.

The great majority of dams will unpack within the 340-370 days window with most crias arriving in the warmest hours between 11 am and 4 pm. If the weather conditions are poor or likely to deteriorate, the dam is able to defer going into labour. This is a legacy of evolving at high altitude where the maternal instinct is to time unpacking during good weather. This gives her cria the greatest chance of survival as it must dry, stand and feed quickly. Identifying the typical behaviours of a dam going into labour is not easy and around the expected unpacking date, requires either frequent paddock visits, having a well placed live-feed video camera or ideally, having a birthing paddock next to the house.

# The birthing process (Unpacking).

This can be broken into three stages:

• Stage 1. The start of contractions. The dam may become restless, hum frequently and usually move away from the herd.

She will stop grazing, make frequent visits to the communal midden and may alternate standing and sitting in an effort to become comfortable. The duration of this stage varies considerably but finishes when contractions reach one each two minutes.

- Stage 2. Birthing of the cria. Rupture of the fluid (chorioallantoic) sac starts this phase and is completed by the expulsion of the cria. The process normally lasts between 5 and 30 minutes but may be interrupted by resting periods and can take significantly longer for a dam's first cria, or if she is overweight. Assistance is seldom required, particularly with older females who have unpacked many times. Almost all crias are unpacked head-first, facing downwards, with the majority of dams standing. As contractions increase the head appears, closely followed by one forelimb, the second appearing some minutes later. Strong contractions occur to pass the cria's shoulders and chest. Interestingly, some dams will pause and resume grazing for a period during this stage of labour, with the cria dangling. Time in this position does allow fluid to drain from the cria's lungs however. The remainder of the cria is passed shortly afterwards, with the help of gravity. The dam does not lick the cria once on the ground. The umbilical cord detaches very soon after unpacking.
- **Stage 3.** Expulsion of the placenta. This normally occurs within 20 minutes of the cria unpacking but can take up to one hour. If it has not passed within 8 hours or you suspect that an incomplete placenta was expelled, veterinary assistance will be needed.

It should be emphasised that neither the unpacking cria nor the placenta should be pulled to 'assist' their passage. Doing this can cause serious damage to the dam.

It is advisable to have a birthing kit to hand. It should contain:

- Electronic thermometer,
- A tube of water-based lubricant,
- A cria sling (belly sling) and weighing scale (digital suitcase types are suitable),
- Disinfection spray as described above,
- Clean towels or paper towels,
- Colostrum powder plus appropriate feeding bottle and teats,

• Mobile phone with your vet's number available.

A page containing photographs of a cria unpacking which covers all of the birthing stages has been added for illustration.

Dystocia (abnormal labour) is unusual in alpacas but indicated if stage 1 of labour is longer than 6 hours or the dam shows distress through repeated standing, sitting, rolling and vocalising. Should this be seen, a veterinary must be called immediately. The most common dystocia involves the head and a single leg emerging but the other leg being retained in the uterus - a situation that may be corrected with veterinary intervention.

Care of the newborn (unpacked) cria is now covered on this page.

## **References.**

Most of the literature below can be accessed by clicking on the highlighted link. Some links will access the appropriate web page from which the article can be downloaded but others will immediately start downloading the full reference.

3. Kershaw-Young, C.M., Druart, X., Vaughan , J. and Maxwell, W. M. C. (2012). β-Nerve growth factor is a major component of alpaca seminal plasma and induces ovulation in female alpacas. **Reproduction, Fertility and Development, 24(8): 1093-1097**.

24. Cebra, C., Anderson, D.E., Tibary, A., Van Saun, R.J. and Johnson, L.W. (2014). Llama and Alpaca Care, Ch.15. 1st Ed., Elsevier.

48. Bravo, P.W., Garnica, J. and Puma, G. (2009). Cria alpaca body weight and perinatal survival in relation to age of the dam.

72. Abraham, M.C., Puhakka, J., Ruete, A., Al-Essawe, E.M., de Verdier, K., Morrell, J.M. and Båge, R. (2016). Testicular length as an indicator of the onset of sperm production in alpacas under Swedish conditions. Acta Vet. Scand. 58: 10-19.

73. Pearson, L.K., Rodriguez, J.S. and Tibary, A. (2014). Disorders and Diseases of Pregnancy. In Llama and Alpaca Care. Medicine, Surgery, Reproduction, Nutrition, and Herd Health; Cebra, C., Anderson, D.E., Tibary, A., Van Saun, R., Johnson, L.W., Eds.; Elsevier Saunders: St. Louis, MO, USA. pp. 256–276.

74. Van Saun, R.J. (2008). Effect of Nutrition on Reproduction in Llamas and Alpacas. Theriogenology, 70: 508–514.

75. Wright, A., Davis, R., Keeble, E. and Morgan, K.L. (1998). South American camelids in the United Kingdom: reproductive failure, pregnancy diagnosis and neonatal care. **Vet. Record**, **142(9)**: **214-215**.

76. Gazitúa, F.J., Corradini, P., Ferrando, G., Raggi, L.A. and Parraguez, V.H. (2001). Prediction of gestational age by ultrasonic fetometry in llamas (*Lama glama*) and alpacas (*Lama pacos*). Anim. Reprod. Sci., 66: 81-92.

77. Kero, L.L. (2019). Relaxin as a tool for pregnancy diagnosis in alpacas. **B.Vet. Thesis**, Faculty of Veterinary Medicine and Animal Science, Swedish University of Agricultural Sciences, Uppsala.

82. San Martin, M., Copaira, M., Zaiga, J., Rodriguez R., Bustinza, G. and Acosta, L. (1968). Aspects of reproduction in the alpaca. J. Reprod. Fert., 16: 395-399.

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