

## **Yard versus paddock mating**

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### **Take home messages**

Production relies on reproduction. Reproduction relies on use of fertile alpacas, regardless of mating system. Each farm needs to tailor their own breeding program to suit animal numbers, farm layout and labour available.

Understanding normal reproductive anatomy and physiology is essential to optimising reproductive capacity in your alpaca herd (see *Cria Genesis The ins-and-outs of reproduction information sheet*).

### **Male maturity and fertility**

The definition of puberty in alpaca males is two-fold:

- The adhesions between penis and prepuce present at birth, have broken down so the male can physically mate a female; and
- The male is producing viable sperm; usually associated with a mean testicular length > 4 cm (ideally > 5 cm long).

All males should have reached puberty by the age of 3 years, but remember that 10% of yearlings and 70+% of 2 year-olds are fertile. Males over 3 years that have not achieved any pregnancies are considered sub-fertile and should be castrated.

Use fertile males and plan ahead. It takes approximately 60 days for a fertile male to make healthy sperm. It is imperative that all males are subjected to a health check by their owner/manager (and their veterinarian as necessary) at least 2 months prior to the start of the breeding season. During this check:

- Males should be identified (brass ear tag *and* paddock tag so there is no confusion as to who is mating whom!)
- Weighed/body condition scored
- Shorn at appropriate time
- Vaccinated (see *Cria Genesis Vaccination information sheet*)
- Drenched for worms/fluke (depending on faecal egg count results; see *Cria Genesis Liver Fluke information sheet*)
- Any other husbandry performed as necessary
- Males should be certified and have DNA collected if owners wish to register their offspring.

Depending on body condition scores and pasture conditions in the weeks prior to mating, supplementary feeding of males may be indicated. There is no single recipe, but lupin supplementation may be of benefit if pasture is low in protein. Remember that over-conditioned males are prone to heat stress which could result in sperm damage and infertility.

Prior to the joining season, unproven/recently purchased males should be given time to acclimatise to the new property, herd, pasture, management, yards etc. They should also be used in supervised yard matings to confirm their fertility and ability (veterinarians can confirm pregnancies using trans-rectal ultrasounds as early as 18 days after a female is mated). Don't expect a new male to successfully impregnate females the day he arrives.

As a rule of thumb, use a male twice per day during supervised yard matings. There is a spectrum of fertility in males, so whilst some will perform up to 6 successful matings per day, others will go-through-the-motions but fail to achieve any pregnancies. With time, you will identify where your males fall on the spectrum of fertility.

There is no association between copulation length and pregnancy rate.

Australian alpaca farmers have been successfully using supervised-yard matings for the last 25 years. It is imperative that you use fertile males and prepare them 8 weeks prior to joining so they are fertile, fit and healthy. Set up a farm husbandry calendar on your farm in consultation with your local veterinarian to ensure optimal alpaca health, fertility, production and welfare.

### **Ovarian function in non-pregnant females**

Non-pregnant females that have (a) not been exposed to a male in the preceding 2 weeks or (b) given birth at least 2 weeks previously, will have a ripe egg capable of ovulation, most of the time on one or other ovary.

Mating of the female by the male induces ovulation (release of the egg from the ovary). Fertilisation of egg by sperm occurs in the oviduct. A corpus luteum (CL) develops on the ovary at the site of ovulation and produces progesterone (the pro-gestational hormone) to maintain the foetus for the entire pregnancy. Elevated blood progesterone leads to sexual non-receptivity (“spitting off”) for the duration of pregnancy. If a female ovulates but fails to conceive, she will become receptive again approximately 12-14 days after the failed mating.

It is reasonable to give a female three (3) mating opportunities to conceive, given that a male on average will achieve a 50% pregnancy rate (thus after three matings about 90% of the mob will be pregnant). This is true for both supervised yard matings and paddock matings.

### **Supervised yard mating protocol**

- First breeding of maiden alpacas usually begins from 12+ months of age, if and when females have reached 65 % of their estimated mature body weight. Parous females may be mated 15-20 days after delivery of the cria if parturition was straightforward and unassisted, as ovarian function returns and the uterus recovers quickly after delivery of the cria.
- There is no simple way of selecting “more fertile” females from a group to mate on a particular day. There is no association between the time it takes a sexually receptive female to sit down for mating and likelihood of conception. Some females sit down immediately for mating, but fail to conceive; some females wander around the yard for 1-2 minutes before becoming recumbent for mating, and do conceive.
- Breed each female once when receptive\*. Multiple matings of a single female may lead to uterine infection as the male penetrates the cervix with his penis during copulation and deposits semen into the uterine horns.
- Place the mated female into a yard with a male 7 days after mating to check for ovulation (perform a “spit-off test”). If the female is sexually receptive, ovulation did not occur and

she should be mated again on that day (*\*start protocol again*). If the female is sexually non-receptive (known as “spitting off”) at 7 days then she has ovulated i.e. has a corpus luteum on one of her ovaries and elevated plasma progesterone. So ...

- ... place the female into a yard with a male 14 days after the original mating to check for pregnancy. If the female that was non-receptive at 7 days is now receptive, conception did not occur and the female should be mated again (*\*start protocol again*). Non-receptivity by a female at 14 days indicates continued elevation of plasma progesterone (the hormone of pregnancy) and extended life of the corpus luteum ... and we may *infer* that the female is pregnant. This variable sexual behavior in the presence and absence of plasma progesterone is characteristic of South American camelids, and is a very useful management tool.
- Perform a “spit-off test” in “early pregnant” females regularly (every 2-4 weeks) until ultrasound pregnancy diagnosis at (30 and) 60 days after joining to observe the foetus and thus confirm pregnancy status. There may be 10% embryo losses between a 14 day positive spit-off and 60 days of gestation, so re-mate any female that becomes receptive during this time and minimise stresses such as showing, shearing, transport during the first 2 months of pregnancy to optimise conception rates.
- Perform a “spit-off test” with females intermittently throughout gestation, as up to 5% foetal loss occurs between 60-days gestation and full term. To minimise stress on pregnant females, this procedure may just entail bringing the pregnant females into a yard next to a mating pair. Any female that has aborted will usually walk up to the fence and sit adjacent to the mating pair. These females can be ultrasounded to confirm loss of pregnancy and re-mated depending on the management calendar and birthing pattern of the farm.

\*A female should be given three rounds of this management before seeking veterinary advice for failure to conceive. Assuming males achieve a 50% conception rate per mating, 90% of females will conceive in the first 3 mating attempts after reaching puberty or post-partum (Mate 100 females and 50 conceive; mate non-pregnant 50 females a second time and 25 conceive; mate non-pregnant 25 females a third time and 12.5 conceive = 87.5% pregnancy rate). Ensure that dates and findings are recorded at each mating to assist your veterinarian with further reproductive investigations.

## **Paddock matings**

### **Size and composition of female herd**

Whilst there is a spectrum of fertility in males, it is reasonable to join any stud male with fifteen (15) females for paddock mating. Some males will be able to cover 25-30 females or more, but this needs to be determined on a case-by-case basis.

Females should be examined 2-3 weeks prior to joining:

- Females should be identified (brass ear tag *and* paddock tag so there is no confusion as to who is mating whom!)
- Weighed/body condition scored. Females should have a good body score: 2.5-3 is ideal and over 4 is undesirable as fertility can be adversely affected by obesity (adipose interferes with hormonal function and body temperature regulation). Supplement as necessary (see *Cria Genesis Nutrition information sheet*)
- Shorn or crutched to remove excess fleece/dags around vulva

- Vaccinated (see *Cria Genesis Vaccination information sheet*)
- Drenched for worms/fluke (depending on faecal egg count results; see *Cria Genesis Liver Fluke information sheet*)
- Check the vulval opening is clean and free of discharge. Any female that has had a recent dystocia (difficult birth) should be examined by a veterinarian prior to paddock mating
- Non-receptive females should be scanned to identify pregnancy status
- Any other husbandry performed as necessary.

Paddock mating of *lactating* females can be a tricky issue:

- Management needs to keep females in an annual breeding/unpacking cycle, so females need to be joined a few weeks after giving birth, however, some machos will mate any female that is receptive regardless of its age (or try to join or injure a male cria) i.e. some female crias could reach puberty as young as 3 months and could be mated in the paddock. Beware.
- Body condition scores must be monitored during joining, as females will be reaching peak lactation 2-4 weeks after unpacking (giving birth) and at risk of rapid weight loss if nutrition is inadequate. Supplement as necessary (see *Cria Genesis Nutrition information sheet*).

### **Handling and paddock requirements**

Any type of mating program depends on lots of animal handling. Set up the paddock/paddocks, access lanes, yards and other handling facilities so that stock can be mustered/drafted/yarded quietly (no dogs), calmly and efficiently. Stressful handling of males and females will be detrimental to conception rates.

Within the mating paddock, consider the positioning of water points (females can exclude the male once most of the group has been covered so provide two water points at least), adequate shade, protection from the weather (especially if crias are included with their dams). Move juvenile or other stud males from adjoining paddocks as they will distract the covering sire or “join” the group! Check that all fencing is tight and in good repair.

Ensure the chosen paddock/paddocks have sufficient good feed to adequately feed the mob and to limit feed competition for the duration of the stay. Monitor body condition scores closely and alter nutrition accordingly.

### **Consider seasonal conditions on your farm**

Are you expecting a male to work well during months when the weather is known to be excessively hot, or pasture conditions usually poor? And will you want the majority of your females to be unpacking and lactating in poor seasonal conditions 11.5 to 13 months later?

### **Paddock mating protocol**

When a male is placed in a paddock with a group of fertile, non-pregnant females, he will endeavour to mate them all within a few days as they will all be sexually receptive. The females will mostly ovulate in response to mating and become sexually non-receptive. Females that fail to conceive will become receptive 12-14 days later. Females that conceive will remain sexually non-receptive and continually “spit-off” the male.

Based on these observation (and reproductive physiology of female alpacas!), place a fertile male in a paddock with a group of fertile females for four (4) weeks to give three (3) mating

opportunities for each female (which will occur approximately on Days 0 – 4, 12 – 16 and 24 – 28 during their stay in the paddock with the male).

Trans-rectal ultrasound by a veterinarian 3-4 weeks after the male is removed will allow accurate foetal-ageing to assist with pregnancy management. Any female that failed to conceive could then undergo a reproductive examination on-the-spot to determine treatment options.

Meanwhile, the male could be placed with a second group of females for four (4) weeks immediately after removal from the first group (as most females would have been joined in the first two mating opportunities the male should be fit and fertile). This would give the stud management an eight (8) weeks joining period. Note females from the second group should be scanned 3-4 weeks after the male is removed, too.

Many Australian alpaca farmers are successfully using paddock mating to tighten up their joining/unpacking times and to save time and energy. It is imperative that you use fertile males and prepare them 8 weeks prior to joining so they are fertile, fit and healthy. Set up a farm husbandry calendar on your farm in consultation with your local veterinarian to ensure optimal health, fertility, production and welfare of your alpacas.

In a stud herd, it makes sense to use one male per mating group, so that sire identity is known without DNA testing of progeny. In a commercial herd it is possible to put multiple males in a mating group. If one male breaks down there are other fertile males to assure the joining period is tight. If necessary, the paternity of any progeny can be DNA-assured through blood testing.

USE GOOD HUSBANDRY TECHNIQUES. KEEP GOOD RECORDS. WRITE DOWN TREATMENTS/MATING DATES/MEAT WITHHOLDING TIMES.

NO PRODUCTS ARE REGISTERED FOR USE IN ALPACAS. CONSULT YOUR VETERINARIAN AND ALWAYS READ THE LABEL BEFORE USING ANY OF THE PRODUCTS MENTIONED. NEVER USE ANY PRODUCT IN ALPACAS THAT IS NOT REGISTERED FOR USE IN FOOD PRODUCING ANIMALS.

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