

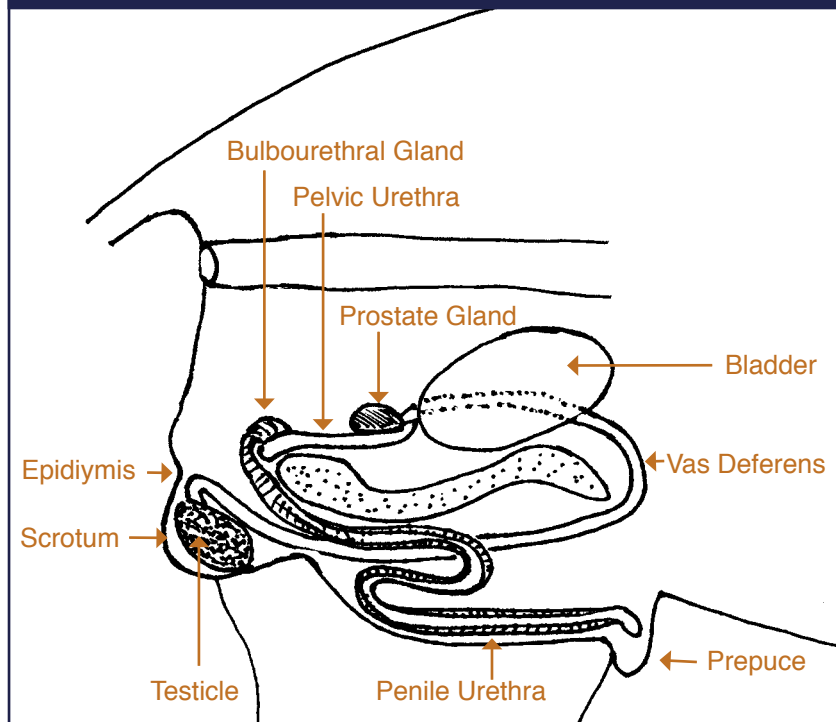


KEY REPRODUCTIVE FEATURES

Male Anatomy

The male has two testicles in a non-pendulous scrotum situated below the anus. The function of the scrotum is to maintain the testicles, which are the source of sperm, at a slightly lower temperature than the rest of the body. The prepuce is the sac holding the penis. This normally points backwards during urination, but when the male is sexually aroused the prepuce points forward and the penis is extruded for mating. The tip of the penis has a slightly clockwise curvature. In young males the penis is adherent to the prepuce and they are usually unable to extrude the penis sufficiently for mating until they are about 2.5-3 years old. Eruption of fighting teeth appears to correlate with approximate time of sexual maturity.

Figure 1 : Reproductive anatomy of a male alpaca

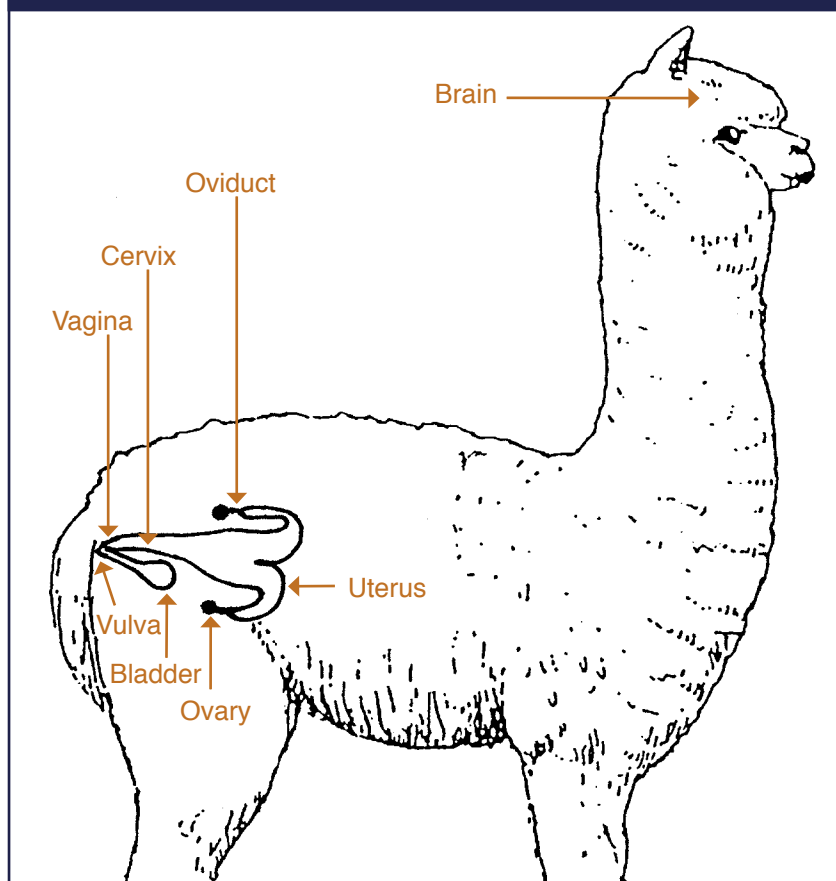


Female Anatomy

The female has a small opening called the vulva situated below the anus. The vulva leads to the vagina which is the actual birth canal and passage for the penis during copulation. (Fig. 2). The vagina leads to the cervix which is the opening into the uterus. The uterus consists of a body and two uterine horns. During mating the male deposits sperm directly into the uterus of the female.

The oviduct carries the egg from the ovary to the uterus and is also the site of fertilization of the egg by sperm. In alpacas most pregnancies occur in the left horn. Young females usually reach sexual maturity at about 12-15 months of age and when they are 45-50kg. This gives the female adequate time to mature and reduces the risk of problems during parturition. Potentially adult female alpacas can remain productive up to 13-15 years of age.

Figure 2 : Reproductive anatomy of a female alpaca



REPRODUCTIVE PHYSIOLOGY

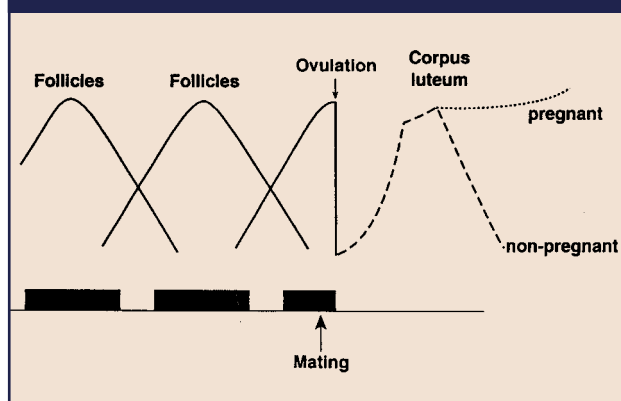
Most domestic species show regular distinct periods of 'heat' or sexual receptivity. At each 'heat' one or more mature follicles (fluid sacs) on the ovaries ruptures spontaneously releasing an egg (ovulation). The number of follicles depends on the species. Alpaca females do not 'come on heat' but show prolonged periods of sexual receptivity during which time they will allow the male to mate (Fig. 3). Ovulation generally does not occur spontaneously and it is the act of copulation itself which induces ovulation. During copulation, the penis of the male stimulates the vagina and cervix of the female. This stimulation causes the release of hormones from the brain of the female which circulate in the blood to the ovaries and cause final development and ovulation of the ovarian follicle (Fig. 2).

In mature alpacas, providing there is an absence of a corpus luteum and progesterone, the female is usually sexually receptive. Generally, only one follicle, on one of the ovaries, reaches maturity. It can remain at this stage for up to 10-12 days. If mating occurs during this time, ovulation may be induced (Fig. 3). If mating does not occur the follicle regresses. However, at the same time, another follicle is generally maturing (on either the same or the opposite ovary). This provides overlapping waves of follicular development and regression. Hence, prolonged periods of sexual receptivity may be shown (Fig. 3). There may be intermittent periods of non-receptivity of 1-2 days' duration, as new follicular waves commence. Ovulation occurs approximately 30-40 hours after mating. After ovulation, as in other domestic species, the cells around the collapsed follicle proliferate and form a corpus luteum,

which secretes the hormone progesterone. Progesterone suppresses receptivity for as long as the corpus luteum remains functional. (Hence spit-offs are a useful tool for seeing if there is a corpus luteum present - an indirect method of pregnancy testing). If the alpaca does not conceive, the corpus luteum remains functional for 10-13 days then regresses, and another follicle begins to develop to maturity (again). As the follicle matures the female once again becomes sexually receptive (Fig. 3). If the female conceives and becomes pregnant, the corpus luteum does not regress but continues to produce the hormone progesterone throughout the entire pregnancy.

Ovulations are generally single, i.e. only one follicle ruptures. Multiple ovulations occur in 10% of natural matings but twin births are extremely rare (approx. 1 in 10,000 births). Spontaneous ovulation occasionally occurs in alpacas.

Figure 3 : Normal pattern of ovarian activity in alpacas



FURTHER READING

Fowler, M.E. (1989).
Medicine and Surgery of South American Camelids.
Iowa State University Press, Iowa, U.S.A.

Hoffman, C., and Asmus, I. (1989).
Caring for Llamas: A health and management guide.
Rocky Mountain Lama Association, Colorado, U.S.A.

Johnson, L.W. (1989).
The Veterinary Clinics of North America,
Volume 5, No. 1: Llama Medicine.
W.B. Saunders Co., Philadelphia, U.S.A..

Johnson, L.W. (1991).
The Veterinary Clinics of North America,
Volume 10, No. 2: Update on Llama Medicine.
W.B. Saunders Co., Philadelphia, U.S.A.

McMillan, E. and Jinks C. & A. (1998).
Alpaca Breeders Reproduction Handbook.
Alpaca Publications Australia. (Available from AAA inc.)

Much of this material has been adapted from An introduction to the unique reproductive physiology and breeding activity of SACs by Dr. Deidre Bourke: Proceedings of the International Alpaca Conference, held in Fremantle, WA 1998, with significant contributions from Dr. Jane Vaughan, Dr. Ewen McMillan, Dr. George Jackson, and Carolyn Jinks.

Australian Alpaca Association (03) 9873 7700
www.alpaca.asn.au