ALPACA NUTRITION AND FLEECE DENSITY (Bob Kingwell, 2023)

Density of a fleece is determined by both the size of the alpaca and the number of fibres within the fleece. It is usually expressed in terms of fibre producing follicles as the number of follicles within a given skin area. A density comparison between two alpacas will therefore only be reliable if the two alpacas are of a similar size and body score.

There are 3 types of fibre producing follicles; primary (P), secondary original (So) and secondary derived (Sd). The Sd follicles are produced by and attached to each So follicle and their fibres grow out of the same skin opening as the So fibre.

The ratio of S to P follicles/fibres is referred to as the S/P ratio where S includes both the So and Sd follicles/fibres. Jim Watts found that the average S/P ratio for alpacas was about 10:1 and varied from about 5-15:1. If an alpaca has an S/P ratio of 14:1 and 50% of the fibres are Sd then there would be 1 Sd fibre for every So fibre. The ratio of Sd:So:P would then be 7:7:1. If less than 50% of the fibres were Sd then not all of the So fibres would be accompanied by an Sd fibre. This is consistent with work Cameron Holt was associated with in which very few Sd follicles were identified in skin biopsy samples. Merinos have S/P ratios of about 40:1 with up to 80% of the follicles being Sd. If there were 7 So follicles then each So follicle would be accompanied by 4-5 Sd follicles. The resulting ratio of Sd:So:P would be 33:7:1.

So, what has all this got to do with density! Well, it helps to explains why merinos have a much higher density and therefore fleece weight than alpacas. Although they may have similar numbers of So fibres to every P fibre, merinos have considerably more Sd fibres. It also helps to explain why merinos generally have lower standard deviations of their average fibre diameter (SD) than alpacas due to their higher percentage of the finer secondary derived fibres.

Most of the So fibres start growing during the third trimester and most of the Sd fibres within the first 4-6 months after a cria is born. The number of fibres produced during this period before and after birth is determined by both genetics and environmental influences. Genetics influences the production of So and Sd follicles and the supply of adequate feed to both the mother and cria affects the number of fibres produced.

An abundance of milk supply is critical until the cria is naturally weaned. Premature weaning or insufficient milk from the mother can result in some of the Sd follicles shutting down and results in the loss of their fibres. This can also occur after natural weaning if inadequate feed is available for the weanling.

Fleece density is therefore dependent on both genetics and an abundance of quality feed during both the third trimester and for the first nine or so months following birth.

This suggests that chasing fineness by depriving breeding females and their cria of an optimum nutritional intake is unlikely to improve fleece density of a herd. It also suggests that alpacas with the genetic potential to produce a dense fleece are unlikely to be identified.