

There is more to milk production and lamb survival

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The mortality of newborn lambs is the biggest limiting factor when it comes to sheep production efficiency. A neonatal mortality rate of 15 to 20%, or even higher in the case of multiples, is not uncommon, especially where animals are farmed extensively. One of the main reasons for this is a ewe's inability to produce enough colostrum and milk, and lambs that are too small at birth.

A complex subject

The milk production of ewes and the physiology of the process is a complex subject with many facets. Several factors affect milk production and quality including nutritional status, body condition, health, birth status, environmental conditions, water quality, genetics and epigenetics, mycotoxins and parasite load. This means that identifying the reasons for poor milk production is not always straightforward.

However, there are a few basic principles that can be followed to ensure that ewes realise their milk production potential and high lamb survival is achieved. In this regard, correct nutritional practices are certainly the most influential.

Udder development and colostrum

Milk production initiation and udder development start as early as eight weeks prior to lambing. The last four weeks of gestation are particularly important in terms of udder development; this is a challenging period for the ewe as it coincides with the development of the foetus(es) before birth. In addition, colostrum production increases the week before lambing. Nutrition during this late phase is therefore crucial and has a major influence on mammary gland cellular differentiation and udder development.

Consequently, heavier lambs at birth and higher milk production can be

achieved when the correct supplementary nutrition is provided during late gestation.

Research shows that insufficient nutrition during late gestation can inhibit colostrum production by as much as 70%, impair subsequent milk production, delay lactogenesis, and increase the viscosity of colostrum. Insufficient energy and high-quality bypass protein are the main reasons for poor colostrum production and so-called 'thick' colostrum.

This leads to lambs, which are often underweight at birth due to malnutrition during late gestation, taking longer to start suckling and often suckling for shorter periods.

Colostrum and lamb survival

Lambs require approximately 200ml of colostrum/kg birthweight during the first 18 hours post birth under moderate weather conditions. Of this, 25% must be available immediately post birth. However, should adverse weather conditions prevail, this requirement increases by roughly 50%.

In addition to the importance of antibodies that transfer passive immunity via the colostrum, a rumen full of colostrum increases the lamb's ability to recognise its mother and strengthens the bonding process between them. Research also links the pressure exerted by the volume of colostrum in the developed udder to better maternal instincts.

This partially explains the poorer survival of lambs from young ewes that lamb for the first time – these ewes often have udders that are not as well developed and colostrum production that is also lower. The consumption of a high amount of colostrum is therefore strongly correlated with lamb survival and vitality.

Manipulation through nutrition

Due to the rapid growth of the foetus(es) during the last four weeks before lambing and the resultant reduction in rumen

capacity, ewes in pasture-based systems, specifically those carrying multiples, are under tremendous pressure to consume enough nutrients to meet their high nutritional requirements.

For example, ewes' energy requirements during late gestation increase by as much as 155 and 220%, and their protein requirements by 175 and 220% for those carrying single and multiple foetuses respectively, compared to the maintenance requirement of a non-pregnant ewe (NRC, 2001). For this reason, concentrated energy and quality protein must be supplemented for optimal foetal development and milk production. Research shows that it is critical for the ewe to build up body reserves during late gestation, as up to a third of her milk production comes from mobilised fat and protein reserves.

In addition, optimal calcium, phosphorus and trace mineral levels must be maintained to limit metabolic disorders such as milk fever, support foetal growth and milk production, and ensure a healthy ewe and lamb(s).

Several researchers have shown that the colostrum production of ewes on grazing can be increased by 90 to 185% when they are also fed grain, compared to ewes that received no supplementation. Excess protein, specifically rumen-degradable protein, has a debatable positive effect on colostrum production. However, there is sufficient evidence of the positive influence of high-quality bypass protein on colostrum production and fluidity where rumen microbial protein production is already optimal.

Research also shows that high levels of essential amino acids are vital for amylase enzyme secretion by the pancreas in order for animals to fully digest the starch in the small intestine.

Quality colostrum, strong lambs

Research and practice have proven over the years that a supplement containing

concentrated energy and high-quality protein can promote colostrum production.

Ewe nutrition during the last eight weeks prior to lambing, specifically the last four weeks, is therefore vital for sufficient colostrum production, quality and fluidity, as well as foetal development. This combination gives the lamb(s) the best chance of survival.

Nutrition during mid-gestation

Late gestation should, however, not be the only focus. Body condition during mid-gestation is equally important and ewes must be kept in optimum condition.

The feed intake of overly fat ewes drops drastically in late gestation, leading to issues such as ketosis and dystocia (difficult births) due to fat accumulation in the birth canal. On the other hand, it is difficult for ewes that are too thin to regain condition before the lambing season, leading to poor milk production and ill-thrift in lambs.

Balance is therefore the key to success and ewes' condition must be monitored throughout.

Hormones and milk production

The placenta mainly produces progesterone during the second half of gestation, with the hormone also being responsible for sustaining pregnancy – for this, it must suppress milk production and normal oestrus cycling. Once the ewe gives birth and expels the placenta, progesterone production decreases.

Milk production depends on the rate at which hormone levels decrease and are removed from the body. In the case of overly fat ewes, the rate is slower due to the progesterone stored in adipose tissue. Malnutrition, on the other hand, impedes its metabolic removal and therefore the initiation of milk production.

The removal of progesterone is driven by two mechanisms: breakdown and increased blood flow through the liver. Around 96% of the progesterone reaching

the liver is broken down and excreted in the manure. Several studies have shown that giving ewes grain during late gestation and early lactation increases blood flow through the liver, removes progesterone quicker, and promotes milk production. Grain, especially maize, which is not fully fermented in the rumen, provides starch and thus glucose directly to the ewe, with the glucose utilised for milk production.

Nutrition for profitability

There is overwhelming evidence that giving correctly balanced supplements containing grain, rumen-degradable protein for microbial action, quality bypass protein, minerals, trace minerals and vitamins during late gestation and early lactation are essential for lamb survival.

Research has also yielded sufficient proof that the nutrition the ewe receives along with good management during gestation and lactation, affects the fertility, weaning weights and wool production of her offspring. ^{SF}

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