

# Increasing Prolificacy and Lamb Production in Sheep

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The number of lambs sold can determine the difference between success and failure in any sheep enterprise. With the price of wool remaining at its low level for decades, and the almost complete absence of an organized market for ewe milk the only source of income is the lamb.

In most sheep enterprises selling one lamb per ewe per year covers the operating costs and the profit is that small fraction of a lamb resulting from the few ewes which weaned twins or triplets. In the most efficient farms this fraction seldom exceeds half a lamb.

To make sheep raising worth the effort and the investment in time and resources, the breeder should be able to make a decent living from his or her herd which can only be achieved if the profit is worth the effort. In this article, we shall review some factors which affect the number of lambs weaned per ewe and some means to increase that number.

## 1. Nutritional means:

Flushing is a term well known by sheep breeders even though most of them apply it erroneously. The wrong procedure is to increase the energy intake over and above what the animals are actually receiving which leads to fat deposition and adversely affects both fertility and prolificacy. This of course occurs when the ewes are properly fed. If they were not, then, the treatment is in fact 'flushing'. For properly fed ewes, they have to start losing some weight before the flushing can be beneficial. The proper procedure is to reduce energy intake about a month before the expected breeding date then increase it (or even restore it to its previous level) two weeks later. There should be no extra costs in flushing the animals, what is saved during the first two weeks should be concentrated in the following two weeks. One thing that breeders should always avoid is to keep a high energy level after breeding. Research has demonstrated that fatness and prolificacy are negatively associated.

## 2. Hormones:

The hormone PMSG (pregnant mare serum gonadotrophin) has been found to increase ovulation in all farm animals and subsequently litter size. There are numerous disadvantages in using PMSG. Among these, we list cost, both of the drug, its administration, and of handling the animals. Also the unpredictability of the outcome, some ewes may ovulate more than their physical ability to bear resulting in higher embryonic mortality and lambing of weak lambs which require attention if they were to survive. PMSG is widely used in ewes bred during the anoestrous period following synchronization. Without it no ovulation occurs.

## 3. Genetics:

Breeds differ in their ability to give multiple births. Whereas some breeds such as the Merino seldom give twins, breeds such as Finnsheep and Romanov seldom give singles. Changing the prolificacy of a breed by selection is a long and uncertain process because the proportion of prolificacy controlled by genetics is very low, usually in the range of five to ten percent.

All breeders unintentionally select for prolificacy when they choose their rams and replacement ewes from those born as twins and triplets. The outcome is always unpredictable which means that many factors other than genetics are involved.

In the last two decades Canada started experimenting with new types of sheep which we call the superprolific breeds. First there was the Finnsheep then the Romanovs. These breeds are different because they were developed from sheep which gave large litters naturally.

Ovulation rate is high and uterine capacity is suitable for accommodating many lambs at once. The outcome are breeds with an average litter size of 2.5 to 3.0 lambs.

The prolificacy of these breeds is transmitted additively, meaning that in crossing them with less prolific breeds the female progeny produces litters half-way between the two parental breeds. Each time we go back to the less prolific breed we lose some of the prolificacy until we reach a level when the performance of the cross is not different from that of the original low prolificacy breed.

The same principle applies if backcrossing is done toward the prolific breed, after a few generations the crosses end up being super prolific themselves.



Traditionally aimed - for lamb crop

One disadvantage of using and crossing with prolific breeds is that the quality of carcass is often inferior to that of specialized meaty type breeds such as the Suffolk, Oxford or Dorset, and wool production and fibre quality are also adversely affected.

A new type of prolific breed has been discovered in the last decade, in which prolificacy is controlled by one single major gene which mutated and resulted in higher ovulation rate and accordingly, larger litter size. The Booroola gene as it is referred to can be transmitted into any breed by crossing with animals carrying the gene.

The advantage of this approach is that, in theory, any breed can become prolific without losing its strong characteristics. The method is to backcross to the original breed while always maintaining the desired prolific gene. The problem, however, is to be able to identify correctly the animals carrying the gene, since phenotypically they look similar to those not carrying it.

One method which proved useful is to check the ovulation by laparoscopy, the carrier animals always have higher ovulation rates than the non-carriers. However, since the two ranges overlap there is always a margin of error.

Work is being carried out in New Zealand to try to associate this gene of prolificacy with other gene or genes, the effect of which can be easily detected or measured. Once the carrier animals are identified and bred together it is possible to establish a line in which all the animals would be carriers and continue to transmit the gene to their offspring.

## Management:

Increasing the number of lambs weaned per ewe per year can also be achieved by increasing the number of lambings per year. In theory, the ewe can produce two lambings each year, using management techniques such as early weaning and/or synchronization and induced ovulation. These techniques are costly to apply and such high intensive production systems take its toll on the ewes and eventually result in reduced fertility and prolificacy.

The acceptable alternative is a system of three lambings in two years i.e. an eight-month cycle. With some breeds known for their long breeding season such as the Dorset and Finnsheep, such a system is easily applicable without the need to synchronize for summer matings, in other breeds synchronization is a must.

Field work has shown that simple management techniques such as light control and teasing with vasectomized rams can stimulate the ewes to breed out of their normal season. Canadian research has also shown that length of the breeding season is a character which can be easily bred into a flock by proper selection.

One point that the breeders should be aware of is that rams undergo a period of reduced fertility similar to the anoestrous period of the ewes, but to a lesser extent, so in breeding out of season attention should also be paid to the rams. A light treatment two months before the breeding season was found to increase libido in rams. Also since sperm production and viability of spermatozoa are greatly reduced in the summer months, a lower ratio of rams to ewes should be applied and the activity of the rams should be continuously monitored.

Manipulating one or more of these factors which influence prolificacy and/or fertility should result in doubling or even tripling lamb production and accordingly returns from the sheep enterprises.

Finally, other sources of return from sheep should be investigated such as the possibility of milking and marketing ewe milk and collecting sheep manure for use as fertilizers. In short, it can be said that sheep production is presently under exploited and progressive imaginative producers can turn sheep raising into a gold mine with some extra effort and little acquired knowledge.

