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Should You Take Your Flock To The Star?

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With five months of gestation and close to a month for uterine involution, a system to breed ewes to achieve two lambings in one calendar year is the biological limit of the ewe. This level of production is seldom attained in practice and is very stressful for ewes which can achieve it. The situation is also complicated by the natural anestrous period which in some breeds can extend for eight months, thus requiring synchronization and ovulation induction with hormones or the control of light. Studies on lambing twice a year have generally met with limited success. On the other hand, the traditional system of lambing once a year fails to capitalize on the full potential of the ewe. In present day intensive farming systems, the need for more lambs marketed to offset the higher cost of production makes one lambing per year less attractive economically, especially with breeds of low and average prolificacy.

An alternative which has been successful is a system of three lambings in two years, with one lambing occurring during the anestrous period once every two years. One of the drawbacks of this system, however, is that ewes which fail to conceive after a mating are rebred only four months later, which amounts to a considerable economic loss.

Drs. Terrill and Lindahl at Beltsville, Maryland, developed the Morlam system, in which ewes are exposed continuously to rams except for short periods during lactation. Management of the animals under this system is rather complicated and hence the application is very limited. A compromise system is to breed ewes as soon as they are diagnosed nonpregnant (usually after 2 months of mating) during prearranged mating periods. This system of five to six mating sessions per year can theoretically result in achieving five lambings in three years or 1.7 lambings per year, compared to 1.5 lambings per year in a system of three lambings in two years. Such a system capitalizes on the natural capacity of ewes without unduly over-stressing them. Other advantages are that lambing can be reduced and the length of the reproductive life increased. The disadvantage of such a system, however, is that it involves much work in planning and executing several breeding and lambing periods per year, and unless the flock is large, each period could involve only a small number of

ewes which may complicate the management. The CAMAL and STAR breeding systems developed in the early 1980s at Cornell University, NY, by Dr. Hogue and Brian Magee were based on these principles. So far, only one research study is available on the merit of the Morlam and CAMAL systems. To succeed with accelerated systems such as the CAMAL, STAR, Morlam or similar systems, it is often recommended that ewes should be of an extended breeding season type to minimize the need to apply artificial means for inducing ovulation.

In Quebec, the author was involved in a study to compare the performance of Polypay and Dorset ewes subjected to two accelerated lambing systems, three lambings in two years (3/2) and five lambings in three years (5/3). The animals were kept under normal commercial management with animals grazing during summer days and housed at night and throughout winters. The only artificial intervention was keeping the animals for the April and June matings under 19 hours of darkness two months before breeding dates. Extracts of the findings are presented in this article.

Both Polypay and Dorset breeds succeeded in attaining 1.5 lambings per year expected under the 3/2 system. The theoretically expected rate is seldom achieved in practice since some ewes would eventually fail to conceive and require rebreeding. For example, Romanov sheep under a 3/2 system managed only 1.34 lambings per year. With Polypay and Dorsets, the ewes were exposed less than eight months apart when the transition between 3/2 and 5/3 systems was underway. Many ewes conceived in less than an 8 months interval, hence the better than expected results observed with

the 3/2 system. Polypay ewes exposed to the 5/3 system averaged 1.51 litters per year, lower than the 1.7 expected in theory. Dorset ewes produced 1.57 litters, however, this average was based on relatively few ewes.

Twenty (74%) Polypay and 19 (70%) Dorset ewes succeeded in producing a litter at least every 8 months under the 3/2 system. To conform to a 5/3 system, a ewe should produce a litter each at least every 7.2 months. Nine (11%) Polypay and 1 (8%) Dorset ewe succeeded in attaining that level. Each missed mating period increased the cycle by 2 to 3 months. Twenty-four percent of the Polypay and 38% of the Dorset ewes missed one, while 31 and 38% of the ewes missed two mating periods, respectively. Of the 80 Polypay ewes under the 5/3 system, 53 (66%) produced a litter every 8 months or better, compared to 11 out of 13 (85%) for the Dorset ewes. On the other hand 15 Polypay ewes (19%) failed to respond to this system of accelerated lambing. Ewes under the 3/2 system showed significantly higher fertility than those under the 5/3 system (97.8 vs. 79.4). However, differences in litter size and weight were generally small and non-significant. It must be recalled that the two systems were tested one after the other; thus contemporary comparisons were not possible, since effect of system was confounded with other environmental effects. Accordingly, all calculations on the merit of the two systems should be considered with this limitation in mind. Number of lambs born and weaned per ewe per year under the 3/2 system (fertility x litter size x number of lambings per year) was 2.77 and 2.53 for the Polypay and 1.95 and 1.61 for the Dorset. Under the 5/3 system, they were 2.11 and 1.79 for the Polypay and 1.82 and 1.60 for the Dorset. At 100 days post-lambing, the Polypay produced 86.5 and 61.2 kg of lambs per ewe per year under the 3/2 and 5/3 systems, respectively. Corresponding values for the Dorset were 54.6 and 54.2 kg, respectively. Higher performance under the 3/2 systems was a direct result of higher fertility since litter size and number of lambings per year were similar in the two systems. It can be stated, however, that both the Polypay and the Dorset sheep responded satisfactorily to accelerated lambing systems. In this study, ewes which failed to conceive

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repeatedly were not culled in order to evaluate the systems. In practice such ewes are usually culled. It is thus possible by this kind of selection to maintain a flock well adapted to intensive system.

Previous studies have indicated that ewe productivity generally increases as the mating system becomes more intensive. Polypay mature ewes under a twice-a-year lambing system produced 2.11 lambs at birth and 1.70 at weaning compared to 1.83 and 1.49 for those on a once-a-year lambing system. A difference of 9 more kilograms weaned favored the accelerated system. In a recent study comparing the Morlam and CAMAL systems the number of lambings per year was 1.28 and 1.21, respectively, which are lower than the 1.7 expected theoretically.

In other studies involving the 3/2 system the annual productivity was 2.13 for Finnsheep x Dorset and 1.67 lambs for the Border Leicester. While in Iceland, 2.58 lambs born per ewe per year were reported.

A study involving more intensive systems showed that Dorset and Finnsheep ewes subjected to a modification of the STAR system lambed every 7.2 m (1.67 lambings/year) producing 2.5 and 5.4 lambs born per ewes per year in the two breeds, respectively.

Almost all the research conducted on intensive management, including the one in Quebec, has shown that the different systems resulted in increased productivity of sheep compared to the traditional once-a-year lambing. Some estimated that increase at 37% for the 3/2 system and 15% for twice-a-year system over lambing only once a year. The important questions to ask are, first, to what extent is the increase in productivity offsetting increase in labor and management cost and is it economically advantageous? Secondly, if economical, what system should a breeder apply to maximize profits? Studies on lambing twice a year have shown limited success and involved intensive management (early weaning, synchronization of estrus, etc...). Less intensive systems such as STAR and CAMAL also involve intensive management and any advantage over a less intensive system such as 3/2 is questionable. The 3/2 system was found by many to provide a reasonable economic advantage with minimum additional management. This conclusion was also supported by a Spanish study analyzing farms practicing different systems. In conclusion, sheep breeders, this may not be the right time to reach for a STAR.



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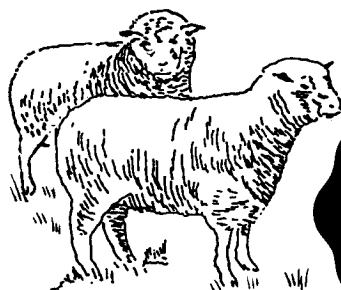
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