

How Close Can We Get to a Flock with the Birth Type We Prefer?

By James Morgan, Arkansas Katahdin Breeder

Often, I receive calls to our sheep breed association office about shepherds wanting all twins or more triplets or less singles. Can we achieve a flock that only has twins or only triplets? Before going on, I think it is worth repeating a few of the comments often made by many shepherds. The most frequent comment is that "I want my yearlings to single and my 2 yr and older ewes to twin. I can do without triplets". A few shepherds favor all triplets and a few would live with a few singles if that meant no triplet births.

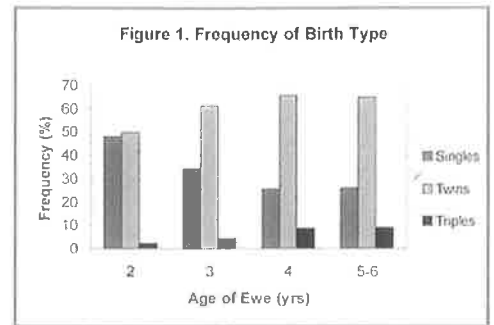
So what is possible? Can we select for a flock that has only twins (> 90%) or a flock with only triplets? If not, what percentage do we have to live with? Can the scientists who study reproduction in sheep help us understand what is possible? Yes, they can tell us what to expect. In a recent study, Randy Borg¹, Dave Notter¹, Larry Kuehn¹ and Rodney Kott² (¹ - Virginia Tech, ² - Montana State University) reported on the distribution of birth types in several Targhee flocks. Dr Notter says that this data is applicable to all breeds. The Targhees are a wool breed commonly used in western range flocks. Range Targhee ewes typically lamb for the first time at two years of age. In this study, the ewes investigated had flock prolificacy averages that varied from 1.4 to 1.7 lambs/litter.

To make the discussion easier, this article will not include discussion of ewes lambing at one year of age. The *number born multiplicative adjustment factor* for ewe age from a yearling ewe is typically 1.5 for most breeds (SID Sheep Production Handbook). On average, ewes from a moderately prolific breed like Katahdins, which single as yearlings, are likely to twin as more mature ewes. Ewes that twin as yearlings are more likely to have triplet litters

as mature ewes.

Figure 1 and Table 1 have several take-home messages. Many of these readily observed in our own flocks.

a) Prolificacy increases with age from 2 years of age to 4 years of age. 5-6 year old ewes have similar number of multiple births to 4 year old ewes. (Note that the older age classes have greater numbers of twin and triplet births.)



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Table 1. Frequency (Percentage) of Litter Type in Targhee Flocks¹

Flock Prolificacy	Ewe Age (yr)	Singles	Twin	Triplets
Low (1.4 lambs/litter)	2	72.2	27.1	0.7
	3	60	38.8	1.2
	4	45.3	52.6	2.1
	5-6	46.8	50.9	2.3
Medium (1.55 lambs/litter)	2	61.6	37	1.4
	3	47.2	50	2.8
	4	33.9	61.3	4.8
	5-6	34.6	60.7	4.7
High (1.7 lambs/litter)	2	47.9	49.8	2.3
	3	34.4	61.4	4.2
	4	25.5	66	8.5
	5-6	26	64.8	9.2

¹ After Borg et al., In Press.

Note, there is a significant amount of information in this table that may seem overwhelming. The word "percentage" may be used instead of the word "frequency". One approach to reading this table is to look at each line individually. Ignore all the other lines while looking at that line.

Here is a sample approach for reading this table:

Start with the first line of data. Ignore the ewe age and just look at the percentage of singles, twins and triplets. When a flock has a singles percentage of 72% (72% of ewes have singles), the flock will typically have 27% ewes with twins and around 1% with triplets. Then look at the second line. The percentage of lambing ewes with singles has decreased, while the percentage with twins has increased and there is a small increase in triplet litters. You can apply this to Katahdins or any breed.

Continue reading more lines down the table. Note that percentage of twins maximizes at 60-65% of the litters. The numbers of singles decreases, twin numbers stay the same and the number of triplet litters increase.

Ewe Age. The main take-home message is that prolificacy increases with ewe age from age 2 to age 4 and we observe only minor variations in prolificacy from age 4 to the 5-6 age class.

b) Even at a high percentage of single births (see 2 yr old ewes in Figure 1 and Table 1), there are still a few triplet litters. It is almost impossible to rid the flock of triplet lambing ewes without taking the flock lambing average to one lamb/ewe. That is a very expensive approach to ridding the flock of triplets.

c) As the ewe increases in age, the percentage of twinning litters maximizes at 60-65% (Figure 1 and Table 1). There is very little difference in the percentage of twins in the 3, 4 and 5-6 age classes of ewes (Figure 1). Numbers of single and triplet births vary more with the numbers of triplet litters increasing as prolificacy increases.

d) If a shepherd wishes to minimize the number of single litters, they will need to greatly increase the number of triplet litters.

Why can't we obtain a ewe flock only twins? If a shepherd selects rigorously for twinning genetics by culling mature ewes who single or triple, shouldn't his/her flock eventually have greater than 60-65% twins? The answer to this question arises from the fact that prolificacy on average is 10% genetic (heritable) and 90% environment (management, nutrition, climate, stress and some random effects). Therefore, even with strong selection for twinning, a little variation in nutrition or some change in stress (for better or worse) during ovulation can push an individual ewe or the flock toward either more triplets or singles.

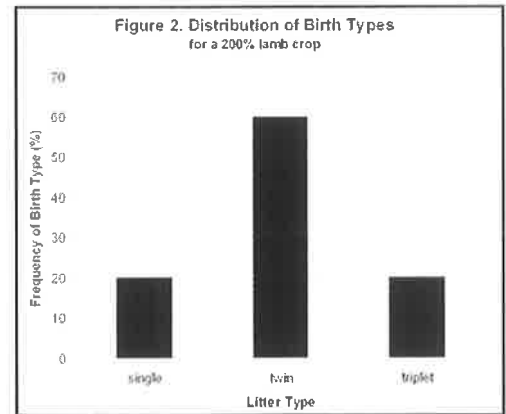
There are several environmental and management practices that will shift a flock's lamb-

ing percentage. These act on the genetics for prolificacy. Some of these factors are included in Table 2. For example, ewes typically are less prolific when bred in the spring rather than in the fall. Therefore, if the goal of a fall lambing flock is to average twins, besides selecting for aseasual ewes, a shepherd will also typically need ewes that are genetically more prolific. Better nutrition increases prolificacy and decreasing nutritional plane typically decreases prolificacy. A shepherd can select for ewes that lamb at the preferred percentage, but if management or environment is changed, their prolificacy is likely to change.

In summary, we can conclude that if the shepherd wishes to have few triplet litters (< 1%) in his/her 2+ year old ewes, they will need to select for a flock that has at least 70% singles. That may not be the best financial choice. If a shepherd wishes to have few single births (<5%) in the flock of 2+ year old ewes, they will need to select for a flock that has greater than 50% triplet litters. To average a 200% born lamb crop, a flock will need

to have around 20% singles and 20% triplets. If yearling ewes are included in goal of a 200% lamb crop, the shepherd will need to select for ewes (2-6 years of age) that have a 40-50% triplet litter rate.

Nature has not dealt us a hand that allows us to have only one birth type in our flocks. Instead, we need to work to get the lambing percentage that our management and marketing programs can handle and accept the variability that comes. For many Katahdin breeders who prefer a 200% number born, they will need to have around 60% twin and 20% single and triplet litters (Figure 2).



Factor	Effect on Prolificacy
Increasing nutrition	Increase
Decreasing nutrition	Decrease
Increasing day length (Spring Breeding)	Decrease
Decreasing day length (Fall Breeding)	Increased
Over weight	Decrease
Under weight	Decrease
Heat stress	Decrease

Reference
 Borg, RC, DR Notter, LA Kuehn, and RW Kott. In Press. "Breeding Objectives for Targhee Sheep". *J Animal Science*.
SID Sheep Production Handbook. Seventh edition. 2003. American Sheep Industry, Inc. Centennial, Colorado.

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