

INTROGRESSION OF THE CALLIPYGE MUTATION INTO A TERMINAL-SIRE COMPOSITE POPULATION

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Callipyge is a mutation that greatly increases lean and decreases fat in sheep. Carrier lambs (CN) receiving the mutation (C) from their sire and the normal form (N) from their dam express extreme muscularity, whereas lambs of all other genotypes (CC, NC, and NN) are not affected. Under this scenario, terminal sire mating systems are ideally suited to produce CN lambs. CC rams of a terminal sire breed would be mated to NN ewes of general purpose or maternal breeds to produce crossbred market lambs that are all CN genotype and extremely muscular. The callipyge mutation originated in the Dorset breed that is widely used as a general-purpose breed. Therefore, the mutation needs to be moved (introgressed) from the Dorset breed into a terminal sire breed to support efficient use of the mutation by the industry.

The experimental objective is to create CC and NN flocks in a terminal-sire composite population. The composite population was formed at the Research Center in 1980 by mating Columbia rams to Hampshire-Suffolk crossbred ewes. CN Dorset rams were mated to NN Composite ewes in 1993. Resulting crossbred sons (1/2 Dorset, 1/2 Composite) that expressed muscularity (CN) were mated to NN Composite ewes in 1994. This process continued until a CN flock of at least 15/16 Composite breeding (1/16 Dorset or less) was established. At that time, genetic markers were available to predict CC lambs from CN ewes mated to CN rams, and a flock of CC Composite sheep was established.

Two flocks of Composite sheep currently exist, a CC flock and a NN flock. These flocks were created from common ancestry during backcrossing (descended from the same 7/8 Composite rams) and are genetically similar except for a region of chromosome 18 containing the callipyge mutation. The purpose of the NN flock is to serve as an experimental control for the CC flock during investigations of important callipyge questions. We discovered the mutation that causes callipyge in 2001 and have now fixed C in the CC flock and N in the NN flock. We are currently selecting to increase genetic resistance to scrapie in both flocks.

The CC and NN ewes are bred in single-sire mating pens in October and December, respectively. Lambs are weighed at birth and at 8 (weaning), 10, and 20 weeks of age. Replacement lambs are selected based on pedigree, daily gain, genetic resistance to scrapie, and structural soundness. Lambs with black fleeces are also culled due to industry interest in the NN flock.