

# THE INS AND OUTS OF BREEDING



There are several breeding (or mating) systems utilized in sheep/goat production. They can be broadly classified into two systems: inbreeding and outbreeding. Each of these can be further subdivided, and there are pros and cons to each system.

## INBREEDING

- Inbreeding is the mating of closely related individuals, such as brother to sister, sire to daughter, or son to dam.
- Linebreeding is a mating system designed to maintain a high degree of relationship to a genetically superior individual without causing high levels of inbreeding. It is a milder form of inbreeding.
- Inbreeding increases homozygosity: more pairs of similar (good or bad) genes in the offspring.
- Results in greater uniformity in offspring: prepotency
- Inbreeding in an individual is measured with the inbreeding coefficient (0-1). While it varies by breed, most sheep and goat breeds have inbreeding coefficients between 2 to 5 percent.
- Too much inbreeding can cause an inbreeding depression, a reduction in fitness and reproduction.

## OUTBREEDING

- Outbreeding (or outcrossing) is the mating of individuals often from the same breed but without recent common ancestry (last 4 to 6 generations).
- Crossbreeding is the mating of individuals from different breeds. However, it does not denote the indiscriminate mixing of breeds. The two primary crossbreeding systems are terminal and rotational.
- Grading up is the repeated crossing of ewes and their female progeny to a ram of the desired breed. Nowadays, it is the way many new breeds are established in the US.
- Outbreeding increases heterozygosity (dissimilar genes), genetic diversity, and phenotypic variability
- Outbreeding, especially crossbreeding, results in hybrid vigor (heterosis) superior performance compared to parent breeds.
- Outcrossing/crossbreeding allows combining of desired characteristics from different breeds or lines to create animals with superior performance.

Outbreeding is recommended for most sheep/goat enterprises. Crossbreeding is advised for commercial producers. Inbreeding has less application and is used mostly by seedstock producers. Avoiding inbreeding can be especially challenging for small flock owners and breeds with small genetic pools.

