How can a breeding plan help me build a quality flock?

- Decide early on what traits you want to focus on by assessing your management system, marketing strategy and breeding strategy.
- Consider your breeding plan; decide if you want to use a two-way cross with ewes and match them with an appropriate terminal breed.
- If you plan on raising your own replacement ewes, consider using a material breed on some of your best females.
- Plan how you will select your replacement ewes.
- When using a terminal sire decide if you want to focus on feedlot gain, breeding ability or carcass traits.
- If you are increasing the size of your flock it is important to keep your ewe flock uniform with animals of similar size and performance. This will make it easier to meet their nutritional needs.
- Match your ewes to your environment and offspring to market demand.
- In essence, you are creating a job description for your animals; deciding which breeds and breed crosses suit your operation.
- For information on breeds in Canada visit the Canadian Sheep Breeders Association at http://www.sheepbreeders.ca/

Why should I select ewes with maternal traits and terminal sires?

- Doing so will produce heterosis in lambs giving them the ability to perform above the average of their parents.
- It is very difficult to produce a sheep with both exceptional maternal, production and carcass traits.
- It is recommended that commercial producers develop a strategy to take advantage of maternal traits in the ewe flock and introduce production and carcass traits in market lambs through a terminal sire.
What are maternal traits?

• Maternal traits tend to be negatively correlated to production and carcass traits.
• A maternal-type ewe will excel in maternal characteristics such as:
  o Shows estrus at a young age.
  o High conception rate after one exposure to the ram.
  o Milking ability.
  o Higher lambing percentage.
  o Easy lambing.
  o Vigorous lambs at birth.
  o Easy to maintain/trouble-free.
• Examples of maternal breeds include Dorset, Rideau Arcott and Romanov.

How do I select for a terminal sire?

• All the offspring from a terminal sire will go to slaughter – this is because maternal traits like milking ability and number born tend to be negatively correlated to terminal traits like muscling and lean yield.
• When selecting a terminal sire you only have to focus on the survival rate of lambs, their rate of gain, and their carcass quality.
• Examples of terminal sire breeds include Suffolk, Texel, Charollais, Canadian Arcott and Ile de Frances.
• If you’re not buying a terminal sire, you’ll be looking for breeds that specialize in:
  • Fertility or prolificacy (e.g. Finn, Romanov).
  • Lamb survival (e.g. Romanov).
  • Milk production (e.g. East Friesian, Lacaune).
  • Mothering ability (e.g. Dorsets).
  • Flocking instinct/grazing ability (e.g. Rambouillet, Columbia, Merino).
  • Something you don’t have to shear (e.g. Katahdin, Dorper).
What is inbreeding?

- Closely related animals are mated (e.g. sire to daughter, son to dam).
- Essential to the development of animals that have a propensity for transmitting certain heritable traits.
- Only suggested for highly qualified operators who are making an effort to stabilize important traits.
- Generally results in overall lowering in performance in terms of vigour, disease resistance, reproductive efficiency and survivability.
- Also increases frequency of abnormalities.

What is linebreeding?

- Breeding in which the degree of relationship is less intense than inbreeding.
- Degree of relationship not closer than half-brother, half-sister or cousin matings.
- Directed towards keeping offspring related to prized ancestor.

What is purebred breeding?

- Rams and ewes are the same breed.
- Purebred producers often supply ‘seed stock’ to commercial producers, who use purebreds as the foundation for a crossbreeding program.

What is crossbreeding?

- Crossbreeding is an effective tool that can be used to make changes in flock performance.
- Producers often start crossbreeding because they want to try different breeds.
Without a plan on how the crossbreeding will be managed, the flock soon becomes a mix of a bunch of different breeds that are difficult to manage successfully.

The two man benefits are heterosis or hybrid vigour and breed complementarily.

What is heterosis?

• Crossbred offspring often outperform the average of their parents.
• It decreases as the heritability of a trait increases so it is often used to improve performance for low heritability traits.
• For example, two maternal breeds may be crossed to further improve reproductive performance in their offspring.
• This greatly benefits fertility traits, which are of low heritability and do not respond well to selection.
• Crossbred ewes are generally more fertile, productive, and long-lived than purebred ewes.

What is breed complementarily?

• The crossing of two dissimilar breeds in order to combine the best traits of both breeds.
• An example of this would be crossing a well-muscled ram with highly fertile ewes to produce a large crop of high-quality lambs.
• This type of strategy is likely to produce better results than trying to select for highly fertile, heavily-muscled animals within one breed.

What is a two-way cross?

• Rams of one breed are used to breed ewes of a second breed, resulting in crossbred lambs.
• This strategy takes advantage of hybrid vigour and/or breed complementarily in the offspring.
• Breeding is relatively simple as you are only dealing with one breed of ewes and one breed of ram.
• However, since the offspring are crossbred, all replacements must be purchased.

What is a three-way cross?

• This strategy mates the two-way crossbred ewe lambs (‘F1’ lambs) to a ram of a third breed.
• The resulting progeny are a mix of three different breeds.
• This strategy takes advantage of hybrid vigour in the crossbred ewe as well as in the three-way crossed lambs. However, all replacement ewes still need to be purchased.

A three-way rotational cross helps maintain hybrid vigour and eliminates the problem of having to buy in replacements.

What is a three-way rotational cross?

• Similar to the three-way cross.
• Starts with mating a crossbred ewe to a ram of a third breed.
• The crossbred ewe lambs are kept as replacements rather than being sold.
• These three-way cross ewe lambs are then mated to one of the two breeds in the first cross, and the process continues in the same manner.
• This method of breeding helps maintain hybrid vigour and eliminates the problem of having to buy in replacements. However, the breeding season can get complex since there is a need for three separate breeding flocks each year for the three different breeds of rams.
• Accurate record keeping and animal ID are critical with this system.

What is roto-terminal crossing?

• Combines three-way crossing and the rotational crossing programs.
• In this system, a percentage of the ewes from generation 1 would be bred in a two-breed rotational system.
• All of the ewe lambs from this breeding would be kept as replacements.
• The remaining portion of the ewes would be bred to a terminal sire, and these lambs would be marketed.
This strategy produces replacements within the system and retains hybrid vigour in the ewe flock. However, three separate breeding groups are required each year to accommodate the three different breeds of ram, which requires reliable animal ID and record keeping systems.

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