The Maternal Female: What Makes A Good Cow?

INTRODUCTION

Females play an important role in the herd. Not only does she contribute 50% of her genetics to her calf, but she is also required to get pregnant, give birth, wean her calf and get back in calf, all while maintaining her own condition at an acceptable level. This article will examine the traits that make a good maternal female, and examine how genetics can help to improve compliance levels within the herd for each of these important life stages.

THE MATERNAL FEMALE

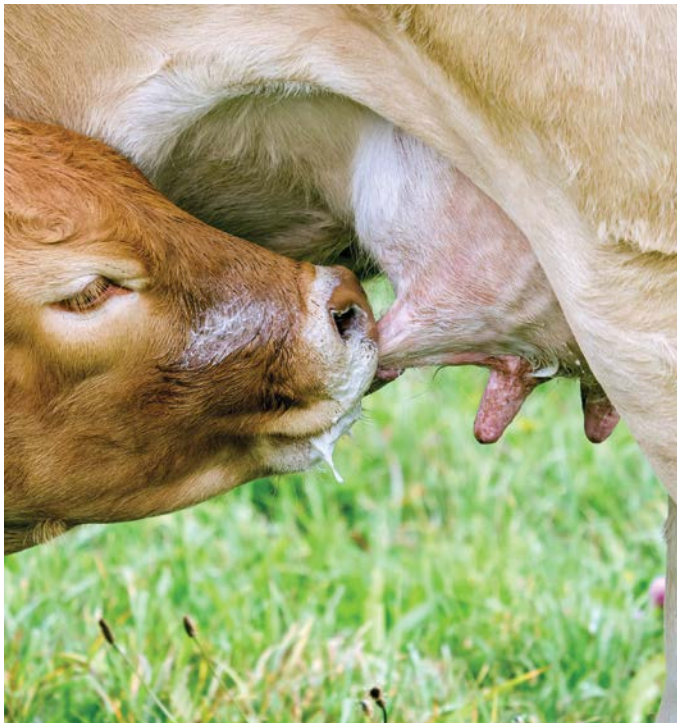
The job of a female (whether a maiden heifer or an older cow) in the breeding herd is to:

1. Get in calf (in the first or second cycle) and carry the calf to term.
2. Give birth to a live calf (without assistance).
3. Wean the calf.
4. Get back in calf, thus repeating the cycle in the next year.

In addition, she should do all of this without consuming excessive amounts of feed (in turn improving the stocking rate for the property, and thus giving producers the option to run more animals).

While beef producers will often cull cows from the herd that do not perform at each step, simply removing the individual cow does not remove the underlying poor genetics from within the herd (as the parents and/or progeny are not culled). Without making genetic improvement within the herd to improve compliance levels at each step, the problems will simply repeat themselves in subsequent calving drops.

A classic example of this is seen in the change in docility in Australian Limousin. While breeders were culling animals with poor temperaments from each calving drop, it wasn't until the Docility EBV was introduced that breeders were able to make informed decisions about which sires and dams to select (previously poor temperament was passed on because the environmental effects confounded the underlying genetics of the trait – e.g. a "quiet" bull who was quiet because he had



been broken in was still producing calves with poor temperament). As genetic progress was made within the breed for docility, the incidence of calves which needed to be culled for poor temperament decreased.

In a similar manner, genetics can be used to improve the percentage of females in the herd which are getting in calf, giving birth to a live calf unassisted, weaning the calf and getting back in calf. Let us explore which of the BREEDPLAN traits are important for a maternal female throughout her life, particularly during pregnancy, calving, while raising the calf to weaning and for her own maintenance.

1. PREGNANCY

The first test for any female is to get in calf and carry the calf to term. Ideally, a female should be getting pregnant in the first or second cycle. This allows the producer to have a short joining period (in a fertile herd, this shouldn't compromise pregnancy rates) and thus calve down over a shorter time (reducing the number of weeks the producer needs to check pregnant heifers and cows for calving difficulties). Calves born from matings in the first or second cycle also have a significant age, and thus weight, advantage over their late-born herd mates.

Failure of a heifer to get pregnant is often due to her not being sexually mature at the time she was out with the bull. A heifer may not be sexually mature because she is a late maturing type (e.g. the tall lanky animal), or because she was born late in the season and is younger than the other heifers (e.g. the small young animal). In both situations, the fertility traits (Days to Calving and Scrotal Size EBVs) are important.

The Days to Calving EBV describes the genetic differences between animals in the time from the start of the joining period (i.e. when the female is introduced to the bull) until subsequent calving, and is expressed in days. Most variation in this trait occurs in how long it takes the female to get pregnant (e.g. did she get pregnant in the first cycle, second cycle or not at all), with only a small amount of variation in this trait being due to gestation length (Figure 1). Lower, more negative Days to Calving EBVs are more desirable, as they indicate shorter Days to Calving (e.g. females that conceive earlier in the joining period).

Similarly, Scrotal Size EBVs are another important indicator of fertility in the female herd. While this may seem counter-intuitive (after all, a heifer does not have a scrotum), research has shown that bulls with higher Scrotal Size EBVs tend to be more early maturing than those with lower Scrotal Size EBVs. In turn, bulls with higher Scrotal Size EBVs tend to have daughters that mature earlier than the daughters of bulls with lower Scrotal Size EBVs.

Thus, the ideal maternal female should have more negative Days to Calving EBVs (indicating a shorter Days to Calving) and more positive Scrotal Size EBVs.

2. CALVING

The next important test for a female in the breeding herd is to give birth to a live calf, without assistance. Calving difficulty has a negative impact on the profitability of the herd due to increased calf, heifer and sometimes even cow mortality, slower re-breeding performance and considerable additional labour and veterinary expenses.

While non-genetic factors can contribute to calving difficulty (it's still important to keep heifers and cows in optimal condition in the lead up to calving), there are a number of genetic factors that also influence calving difficulty. These include birth weight, gestation length, shape of the calf, pelvic area and willingness of the cow to push. These factors are covered by several BREEDPLAN EBVs; namely Calving Ease Direct, Calving Ease Daughters, Gestation Length and Birth Weight.

The Calving Ease Direct EBV describes the genetic differences in the ability of a sire's calves to be born unassisted from two year old heifers, while the Calving Ease Daughters EBV describes the genetic differences in the ability of a sire's two year old daughters to calve without assistance.

Both EBVs are reported as differences in the percentage of unassisted calvings, with higher, more positive Calving Ease EBVs (indicating less calving difficulty) being more desirable. In a self-replacing herd system, where daughters are retained for breeding, both Calving Ease EBVs are of importance. It is important to note that both traits relate to calving difficulty as expressed in two year old heifers; a bull that has had no calving issues when mated to mature cows may still cause trouble for heifers.

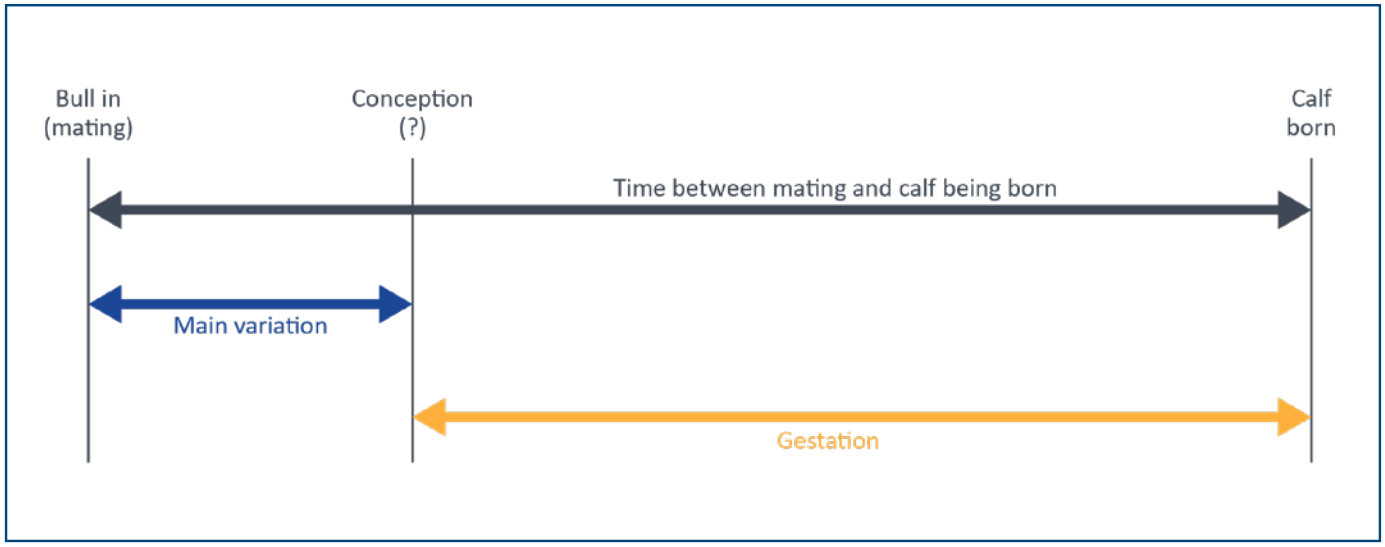


Figure 1. Most variation in the Days to Calving EBV is due to the time taken for the female to get pregnant once she is out with the bull.

The Gestation Length EBV describes the genetic differences between animals in gestation length, and is expressed in days. Lower, more negative Gestation Length EBVs indicate a shorter gestation length and thus are more desirable. In general, a shorter gestation length results in a smaller calf, which is usually born with less difficulty than a larger calf and also gives the cow a longer period of time to rebreed without falling later and later in the breeding season each year.

The Birth Weight EBV describes the genetic differences between animals in calf birth weight, and is expressed in kilograms. Small, or moderate, Birth Weight EBVs are generally more favourable, as they indicate lighter birth weights. In general, a lighter calf at birth is likely to result in less calving difficulty than a heavier calf, although of course there can be exceptions. This is because birth weight, as mentioned above, is not the only factor that influences calving difficulty.

The ideal maternal female should have more positive Calving Ease Direct and Calving Ease Daughters EBVs (indicating less calving difficulty), more negative Gestation Length EBVs (indicating shorter gestation length) and a low to moderate Birth Weight EBV (indicating lower birth weight).

3. RAISING THE CALF TO WEANING

The next test for the female is to raise her calf to weaning. A good maternal cow should provide adequate nutrition to raise the calf to weaning, and wean her calf with an adequate weaning weight. The Milk EBV provides an estimate of the maternal contribution of a dam to the 200 day weight of her calf. The Milk EBV is expressed in kilograms and indicates the expected difference in the weight of the calf at 200 days due to the maternal contribution of the cow.

However, it is important to note that the optimum Milk EBV is dependent upon the production system and the environment in which the cows are run. Selection for increased milk production may be warranted when cows are run under good nutritional conditions (e.g. improved pasture), while other poorer environments (e.g. scrubby rangeland) may not support cows with higher Milk EBVs. In addition, high milking cows may not get back in calf as easily as lower milking cows in the following year. Thus, while the ideal maternal female should provide adequate nutrition to raise the calf to weaning, the optimum Milk EBV for a maternal female will depend on the environment in which she is run.

4. MAINTENANCE

In addition to getting pregnant, giving birth to a live calf, weaning the calf and getting back in calf, a maternal cow should perform all of these tasks without consuming excessive amounts of feed. Given that feed costs are among some of the most expensive costs on a farm, the weight of a mature cow will have a major influence on net profitability. This is because, in general, lighter cows will tend to eat less, thus having lower feed requirements and being less expensive to maintain. Conversely, given live weight is the major determinant in the value of cull cows, heavier cows may provide higher returns when selling cull cows. It is important to achieve an appropriate

balance between feed requirements over the lifetime of the cow and her value as a cull animal.

The Mature Cow Weight EBV describes the genetic differences between cows in live weight at 5 years of age, and is expressed in kilograms. A higher, more positive Mature Cow Weight EBV indicates an animal that would produce progeny with a higher mature weight than an animal with a lower Mature Cow Weight EBV. While it is important for producers to optimise the balance between feed requirement and cull value, in general the ideal maternal female should have a low to moderate Mature Cow Weight EBV, as this will reduce her feed requirements over her lifetime.

Another trait that gives a measure of cow maintenance is net feed intake. Net Feed Intake (NFI) EBVs are measures of genetic differences between animals in feed intake at a standard weight and rate of weight gain. The NFI-Post Weaning (NFI-P) EBV is a measure of feed efficiency when animals are in a growing phase, while the NFI-Feedlot Finishing (NFI-F) EBV is a measure of feed efficiency when animals are in a feedlot finishing phase. For both NFI EBVs, a more negative EBV indicates a more feed efficient animal (e.g. animal consumes less feed than expected given its weight and growth profile). While an EBV for net feed intake in cows is not available, research has shown that there is a positive relationship between NFI EBVs and feed intake and feed efficiency of cows. Simply put, selecting for more feed efficient animals using NFI EBVs should also lead to more feed efficient cows.

5. OTHER TRAITS

In addition to the BREEDPLAN traits discussed above, it is important to remember that there are other traits that are important for a good maternal cow in the herd. A good maternal cow must still have good structural soundness; after all, she spends much of her life moving around the paddock feeding and thus needs good foot and leg structure to allow her to move about with ease. In addition, a cow with good structural soundness may last longer in the herd, thus potentially improving her longevity in the breeding herd. In a similar manner, a maternal cow should be in good general health.

While not strictly related to her maternal ability, the horn/poll status, genetic condition status and pedigree of the cow should also be a consideration. Keeping an eye on the pedigree of the cow (and the bull she is being mated to) allows producers to manage inbreeding in the herd at an acceptable level. Similarly, producers may be interested in the genetic condition status of the female as this will allow them to avoid carrier to carrier matings; although this becomes less important when the bulls being used in the herd have been tested free for the relevant genetic conditions. In the same way, producers breeding for polled animals may wish to know the horn/poll status of the females to avoid producing horned calves (unless using a homozygous polled bull). This is less of a consideration for those wishing to breed only horned calves – given horns are recessive, simply select bulls and females with visible horns.

CONCLUSION

A maternal female in the Australian beef herd should get in calf, give birth unassisted to a live calf, raise that calf to weaning and then get back in calf, all the while maintaining herself without needing to consume excessive amounts of feed. BREEDPLAN produces a number of EBVs which are of importance when considering a maternal female; namely Days to Calving, Scrotal Size, Gestation Length, Calving Ease Direct, Calving Ease Daughters, Birth Weight, Milk and Mature Cow Weight. Ideally, a maternal female will have shorter Days to Calving and Gestation Length EBVs than average (more negative EBVs are more desirable), while having larger Scrotal Size, Calving Ease Direct and Calving Ease Daughters EBVs (more positive EBVs are more desirable). She should also have a moderate Birth Weight (lower or moderate EBVs being more desirable), and a moderate Mature Cow Weight (lower or moderate EBVs being more desirable). The optimal Milk EBV will depend on the environment, where producers in good country may prefer more positive Milk EBVs, while producers on more scrubby marginal country may prefer more moderate Milk EBVs.

For further information on using genetics to breed maternal females, or to further discuss any of the topics raised in this article, please contact SBTS or TBTS.

SBTS SOUTHERN BEEF TECHNOLOGY SERVICES
Southern Beef Technology Services
Telephone: (02) 6773 3555
Email: office@sbts.une.edu.au

TBTS TROPICAL BEEF TECHNOLOGY SERVICES
Tropical Beef Technology Services
Telephone: (07) 4927 6066
Email: office@tbts.une.edu.au