

The Fat Controller

An examination of the role of cow body fat in the maternal productivity of cows

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Introduction

The association of fat with the ability of a cow to conceive has long been accepted by researchers and industry alike, but little effort has been exerted to quantify the effect and consider alternatives to overcome problems. Over fatness as well as under fatness can cause problems but in recent years with the cost price squeeze forcing higher stocking rates and with drier than average seasons the main problem appears to be lack of fat on breeding females.

Keeping cows in reasonable condition (eg. fat score 3 pre-calving) has been promoted as important to increase the chance of re-conception. The challenge for managers of breeding herds is to manipulate cow condition to promote high reproductive rates. Recent research results suggest that both genetic and non-genetic methods can be used.

This presentation briefly looks at some results coming out of CRC research projects and discusses implications of these results for improving maternal productivity in commercial breeding herds.

CRC Maternal Productivity project

CRC research has been investigating maternal productivity in participating industry herds and on research stations in South Australia and Victoria. While results are only preliminary there are some interesting trends that have direct industry application.

1. It would appear that there is a genetic relationship as well as a phenotypic relationship between fat and fertility. It appears that the result will be the same if you use genetics to select your cows to be fat or you feed them to adequate fatness.
2. Surveys of industry herd managers placed them largely in two categories, those who manage the environment to supply adequate feed and those who select animals of the type that will function in the environmental conditions without major modifications to the environment.
3. The importance of adequate fat pre-calving is more important for Autumn than it is for Spring calving
4. Components of the reproductive cycle are highly heritable and progress can be made using genetics
5. Current EBVs can be used to improve maternal productivity

Maternal Productivity

The definition of maternal productivity probably should be something about total calf weight produced per kg of feed eaten by the cow. But the major component of that equation will be the number of calves produced and the weight of those calves. Some of the research is examining the feed efficiency of cows but that is too early to report at this stage.

Cow Fat and Cow Condition

In this discussion most time will be spent talking about fatness of cows as an energy reserve, however it should be noted that muscle can also be an energy reserve so it could be argued that condition score that includes muscle as well as fat could be the better measure of the available reserves of the cow. However many consider that once a cow starts to use her muscle as a reserve she may be too light for optimum reproductive performance

Genetic methods of manipulating cow fatness

The genetic merit of commercial breeding herds is largely a function of sire selection policy. When managers are selecting their new bulls they must be aware of the influence of the sire on herd fertility through his daughters that are kept in the herd. Managers should have a balanced selection policy that includes consideration of female fertility traits and should include fat as a potential indicator of genetic merit for reproduction.

Research shows that the EBVs for fat (P8 or rib) are closely related to fatness of the breeding cow so are valuable selection criteria. But days to calving (DtC) is the best EBV to improve female fertility and there is a hard wired correlation between DtC and fat such that selection on DtC EBV will include some emphasis on fat.

There are also antagonisms between high fat and some traits, especially carcase traits. Retail beef yield exhibits a strong negative correlation with fat so if your market requires (pays you for) high yield then selection for positive fat will compromise your returns. Excessive selection for growth may also reduce fatness.

Cow size is often used as an indicator of the fat of cows at any point in time and while there is a negative relationship between cow weight and condition (smaller cows tending to be fatter) the relationship is not that strong so mature cow weight may not be the best EBV to indicate cow condition. Mature cow weight is likely a good indicator of how much feed the cow will need.

Non-Genetic manipulation of cow condition

Cow condition is a function of having sufficient nutrition available to fulfil the energy requirements of each cow at any point in time. Requirements vary with physiological states of pregnancy and lactation with early lactation requirements nearly twice that of the non-lactating cow in early pregnancy.

The first consideration should be the timing of calving, attempting to align the requirements of the breeding herd with the feed supply in the paddock, but in most environments in which cattle are run there are definite peaks and troughs in feed supply so it is likely that even the best managed herds will experience fluctuations in cow fat at some time in the year. Managing the loss of cow fat such that the reproductive performance is not affected is often difficult.

Reducing stocking rate to the level such that cows maintain adequate fat during the period of feed deficit is one option but it may not be the most profitable option because in peak feed times there will be feed wasted.

Supplementing cow feed is another solution but this can be costly and time consuming and needs to be considered in relationship to overall enterprise cost of production and profit. As a rule calving should be timed such that the cows are supplemented when they require less feed and not at peak requirements such as early lactation.

Early weaning is a strategy that can be considered. Early weaning has been successfully used as a drought strategy but recent work would suggest that if the system is available to look after early weaned calves (4 months) it can be considered as a permanent management strategy. Calves are removed from the cow before they drag the cow fat too low. Cow feed requirement is almost halved and the requirements of the calf are not nearly as great as that of the cow and calf together. However there is a greater quality of feed requirement for the calf and the cost of supplying that quality must be considered. Improved pasture can be adequate with maybe the addition of a small protein supplement. Managers who haven't early weaned before should seek some expert advice as calf losses can be significant if the essentials are ignored.

In most environments Spring calving cows will be harder to maintain body fat pre-calving than Autumn calving cows. In the spring calving situation the cows must survive winter feed deficits prior to calving while Autumn calvers are pregnant in Summer and while dry summers are hard, feed quality tends to be higher and hot conditions are easier for cows to maintain condition. And the environments where Autumn calving predominates are usually associated with hay making areas, so hand feeding is normal.

The research is telling us that the need to have fat on cows pre-calving is more important in autumn than spring calving because the autumn calvers must mate on winter feed. In Spring calving the cows are able to compensate by having the spring/summer flush when mating and lactating. However managers of spring calving cows must balance effect of cow fat pre-calving with reliability and the quality of the spring flush. The management policy for cows will be driven by attitude to risk, balancing the costs of feeding in winter against the chance of spring feed. If the spring fails and you have let the cow fatness slip there is no insurance left. Autumn calvers don't have the same balancing act as they know that the feed during mating will be short and so they must have fat pre-calving.

Take Home Messages

- Managing fatness of breeding cows is an important consideration
- Balanced selection on EBVs will assist in managing the compromises between maximum growth and carcase and maximum reproductive rates
- Herd managers may need to select their preferred policy having either smaller fatter cows that will be more resilient to seasonal feed fluctuations or planning appropriate supplementary feeding at critical points of the year.