

# TechNote 12

## Feed the transition cow appropriately

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A focus during late lactation and the dry period should be management of cows to achieve body condition score (BCS) targets at calving. Meeting these targets will simplify management of the transition cow both pre-and post-calving. In contrast, a herd that is not at target and/or has too wide a range of BCS at the start of the transition period will require different management strategies to enable a successful transition.

### 12.1 Identify at-risk cows

Strategies to meet BCS targets during mid/late lactation and the dry period are covered in TechNote 27: Measure and monitor BCS, and TechNote 29: Achieve BCS targets at calving.

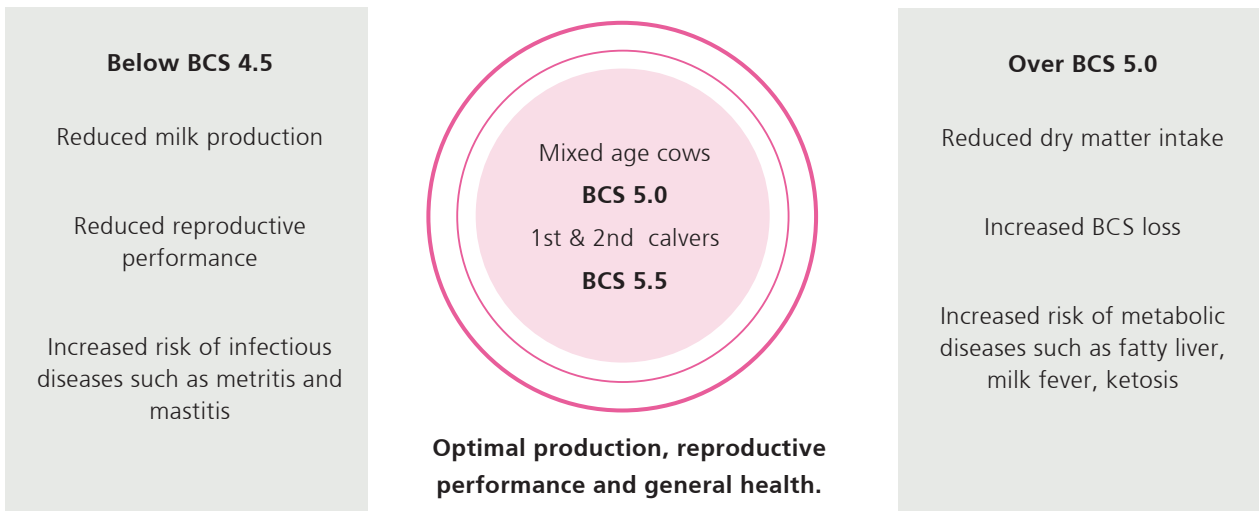
If not already identified, measure BCS one-month prior to calving (use a certified BCS assessor) to determine cows at risk of not reaching BCS targets. Although average BCS values for the herd are useful, it is important to identify individual cows that are at, above, or below targets (Figure 1).

Little can be done to alter the BCS of the cow during the last month before calving as at this stage of pregnancy most of the energy consumed is allocated to the foetus. However, adjusting the dry matter intake (DMI) of cows based on their BCS at this stage can alter post-calving performance.

**Q:** Can cows gain much condition in the last month before calving?

**A:** No, they gain very little condition, even when fed generously, because the energy requirements for maintenance and pregnancy are so high. In fact, attempting to do so can have negative consequences for animal health and performance post-calving.

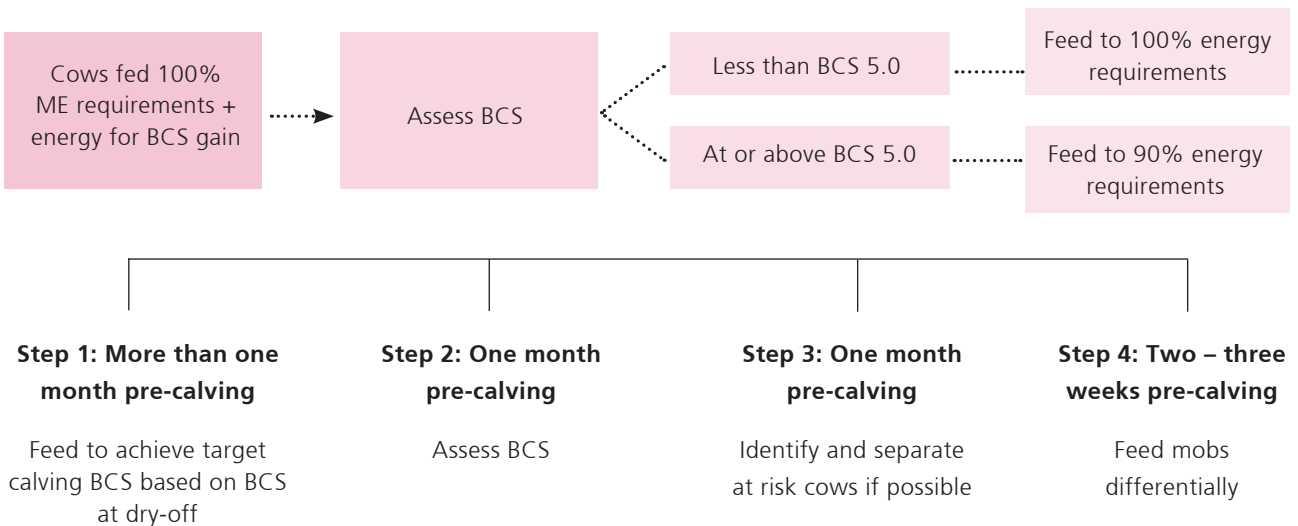
Figure 1. Effect of BCS on performance outcomes post-calving.



## 12.2 Allocate the correct amount of feed

Once BCS is determined pre-calving, there is the opportunity to manage cows that are at, above or below targets differentially according to BCS (Figure 2).

Figure 2. Feeding recommendations after pre-calving BCS assessment.



## 12.3 Avoid overfeeding cows pre-calving

Numerous experiments conducted internationally and in NZ have proven that earlier recommendations to “steam up your springers” or feed as much as possible to pre-calving cows will actually result in greater BCS loss, less DMI and increased risk of metabolic disorders post-calving.

These experiments also revealed that when cows at BCS 5.0 were fed just below energy requirements (90% of energy required for maintenance, pregnancy and activity) for two to three weeks pre-calving, they had a reduced risk of milk fever, ketosis and fatty liver. They also had improved liver function e.g. increased capacity for glucose synthesis and fatty acid oxidation, and in some instances increased milk production.

Further, when cows at a BCS 4.0 were fed just below energy requirements, they showed signs of reduced immune function and had an increased risk of infectious diseases.

Therefore, recommendations are for two to three weeks pre-calving, slightly restrict energy intake in cows that are at or above BCS targets, while cows below BCS targets should be fed to metabolisable energy (ME) requirements (Table 1).

**Q:** Is it true I should steam up my springers?

**A:** No, cows that are at or greater than target BCS should be fed at 90% of ME requirements for 2 – 3 weeks pre-calving. Cows less than target BCS should be fed to requirements.

**Table 1.** Metabolisable energy (ME) and approximate dry matter intake (DMI) requirements for two - three weeks pre-calving\*.

Cows less than BCS 5.0 100% of daily requirement			Cows at or greater than BCS 5.0 90% of daily requirement		
LWT	ME requirements	DMI requirements**	LWT	ME requirements	DMI requirements**
350	85	7.7	350	76	6.9
400	94	8.5	400	84	7.6
450	102	9.3	450	92	8.4
500	111	10.1	500	100	9.1
550	119	10.8	550	107	9.7

\*These are down the throat figures. Allowance needs to include wastage of pasture and supplements.

\*\* ME = 11 MJ/kg DM

These figures are down the throat values and need to be adjusted to allow for feed wastage. For example: a 450 kg cow at BCS 4.5 would require 9.3 kg DM daily (down the throat). If cows were grazing and pasture utilisation was 90%, they would need to be offered 10.3 kg DM daily.



For more details on how to allocate pasture see TechNote 9: Pasture management

It is important to note that individual cows within a herd that have a lower voluntary DMI pre-calving (e.g. less than the herd allowance) may actually have an increased risk of metabolic and infectious diseases postpartum and should be monitored.

## 12.4 Choose the right type of feed pre-calving

Choosing which feeds to use during the pre-calving period should primarily be based on cow energy requirements (MJ ME), and then feed cost and availability. The type of feeds being used pre-and post-calving will determine if feed composition, such as protein, fibre or carbohydrate type, are important considerations. Additionally, the composition of certain feeds and amount being fed can also affect the mineral composition of the diet, which is an important consideration for mitigating metabolic disorders.

### 12.4.1 Ensure dietary protein requirements are met

Prior to calving, cows require 1,020 g protein per day, or approximately 12% of their diet as crude protein. This figure is based on the National Research Council (NRC) recommendations of 900 g/day protein for maintenance and pregnancy, with an additional 120 g/day added on for support of the developing udder and increased synthesis of mammary tissue.

Protein requirements will typically be met in pasture-based systems, where high-quality pastures during winter/early spring generally contain 15 – 20% crude protein.

In systems where pasture makes up a smaller proportion of the diet, and low protein feeds like maize silage or fodder beet are being fed, supplements such as pasture silage can be added to the system during the pre-calving period to meet protein requirements.

For cows fed a total mixed ration, there have been reports of negative effects on production when excessive amounts of rumen degradable protein were fed pre-calving. However, research in pasture-based systems indicated there were no performance benefits when a low protein supplement replaced a proportion of pasture in the diet, and consequently reduced total and rumen degradable protein intake pre-calving.

### 12.4.2 Carbohydrate type is not important in a pasture-based system

In a predominantly pasture-based system, there is no benefit from increasing the proportion of non-structural carbohydrates in the diet of the pre-calving dairy cow.

Previously, it was thought that increasing the supply of non-structural carbohydrates for use as an energy source before calving would stimulate rumen papillae development and provide nutrients for the developing calf, thereby sparing maternal energy stores.

It was also believed that adding non-structural carbohydrates would increase glucose and insulin production and consequently suppress BCS loss in early lactation due to the anti-lipolytic effects of insulin. However, the collective research in this area with pasture-based dairy cows does not indicate any performance benefits (e.g. BCS, milk production, health) of increasing non-structural carbohydrates pre-calving.

**Q:** Should I feed extra sugar or starch pre-calving?

**A:** No, not unless cows will be eating a diet high in sugar and starch post-calving and need transitioning onto this diet.



For more details see TechNotes 3: *What's in a feed*, 5: *Carbohydrate metabolism*, 7: *Lipid metabolism*, and 16: *Determine energy requirements*.

### 12.4.3 Consider carbohydrate type if feeding high levels of supplements post-calving

If cows are to be fed a diet high in non-structural carbohydrates post-calving (e.g. maize grain, barley, fodder beet, molasses), then incorporating similar feeds and slowly increasing the proportion of these non-structural carbohydrates in the diet pre-calving (providing the diet is not too high in energy) can provide rumen microorganisms time to adapt to the different diet, and reduce the transition time and risk of rumen acidosis post-calving.

### 12.4.4 Fibre is important if the diet is high in starch or sugar

Long chop fibre (e.g. hay, straw, silage) is required in the diet if cows are eating high levels of sugar and/or starch (e.g. fodder beet, swedes, maize grain, barley). In this situation, a fibre source is required to maintain recommended NDF content and efficient rumen function. In addition, straw can help reduce the incidences of displaced abomasum by maintaining gut fill if high levels of concentrate are being fed.

If the diet is predominantly pasture, pasture silage or maize silage, there is no nutritional basis for feeding additional fibre (e.g. straw) to springing cows. However, straw or hay can play a role in keeping cows content and reducing pugging damage if trying to control energy intake in a grazing situation during wet conditions.

**Q:** Should I feed straw to my springers?

**A:** Straw can be used to reduce the energy content of the diet; however, it provides no nutritional benefits, unless the diet is high in sugar or starches.



For more details see TechNotes 5: Carbohydrate metabolism, and 8: Fibre metabolism.

### 12.4.5 Avoid feeding supplements high in unsaturated fatty acids

Only limited research exists investigating fat supplements during the transition period. Consistent with other stages of lactation, it is recommended to feed no more than 6-8% of the diet DM as fat. High levels of dietary fat, in particular unsaturated fatty acids, can reduce DMI, rumen function and cow performance.

Although some research has indicated possible benefits from specific fatty acids on liver lipid and carbohydrate metabolism, much of the data have been generated in vitro, often using fatty acids at well above physiological concentrations i.e. at higher levels than those normally present in the body, so it is unlikely that these effects will be realised using traditional levels found in protected dietary fat supplements.



For more details see TechNotes 3: What's in a feed, and 7: Lipid metabolism.

## 12.5 Choose the right type of feed post-calving

During the colostrum period, cows should be offered unrestricted access to good quality pasture or supplements. These animals should be considered the top priority when it comes to allocating feed to different mobs. If cows are removed from high sugar or starch feeds during the colostrum period (e.g. fodder beet), they will require re-transitioning if they are to continue eating this feed through early lactation.



For more details see TechNotes 5: Carbohydrate metabolism, 8: Fibre metabolism, and 16: Determine energy requirements.

## 12.6 Further reading

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