

## Compensatory Growth in Beef Cattle

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### Compensatory Growth

Compensatory growth in cattle is a process where cattle are growing at a faster rate than would be expected as a result of accessing plenty of high quality feed, following periods of slow growth or weight loss during times of under-nutrition.

Under-nutrition can occur in two ways.

1. **Low feed quality:** Commonly seen on the North Coast when the nutritional value of pastures decline as they reach maturity and/or frost off in the winter.
2. **Low feed quantity:** There isn't enough feed available to satisfy animal hunger, given that cattle prefer to graze for a maximum of around 11 hours per day.

Both a decline in feed quality or quantity will restrict the feed intake by cattle, subsequently reducing animal growth rates.

During the period of under nutrition, the body tissue that is most likely to be reduced is the one that would normally be deposited at that time should no feed restriction be in place. In young growing stock this is often muscle and bone, where in older mature stock this is usually fat. Also, less fat is deposited around the gastrointestinal tract which allows feed intake to increase rapidly when adequate high-quality feed becomes available.

When cattle experience a prolonged period of under-nutrition, some classes of cattle can compensate, if and when, feed quality and quantity allows for a high voluntary feed intake. As a guide, on a North Coast pasture based beef enterprise, reasonable compensatory growth can begin to occur in some classes of cattle when pastures are in phase 2 of growth (green, young and actively growing with a high leaf to stem ratio), approximately 2300kg of dry matter per hectare and a digestibility of at least 65%. This is typical of winter fodder crops like oats, or improved pastures e.g. ryegrass in winter, or kikuyu, setaria in spring.

Compensatory growth is important in the nutritional management of any cattle herd irrespective of whether the cattle are sold as stores, finished on property or enter the breeding herd. It can have a significant impact on the economics of the enterprise, as the ability of a beast to express compensatory growth or not often determines sale weights, ages, stocking rates, pasture utilisation and to an extent where supplements should be used.

Figure 1: Following periods of under-nutrition as seen in the below picture, young weaners will quickly resume normal weight gain when introduced to better nutrition, while yearlings can exhibit compensatory growth.

(photo courtesy Todd Andrews NSW DPI)



It is seldom possible to predict for a specific herd how much compensatory growth is going to occur in various circumstances. However there are some factors to consider from significant research by the Beef CRC in this area.

### Factors influencing compensatory growth

The age and maturity of the animal when it goes through a period of under-nutrition has a major effect on the extent it will be able to compensate.

**Calves** with setbacks pre-weaning or early post-weaning have limited capacity to exhibit compensatory growth. When good nutrition becomes available these young

cattle are likely to grow at much the same rate or only slightly better than if they had not experienced a nutritional set back. These animals are likely to never catch up with their contemporaries which were not restricted. Therefore, producers need to be prepared for the fact that sale weights in the future will be lighter if marketed at the same time, or later if they intend to market at the same weights (be careful with dentition). Ossification is likely to be higher in those animals sold MSA direct to slaughter but apart from that meat quality impacts are minimal.

There is some evidence to suggest that in tropical cattle, feedlot performance is actually reduced for calves with early severe nutritional restrictions.

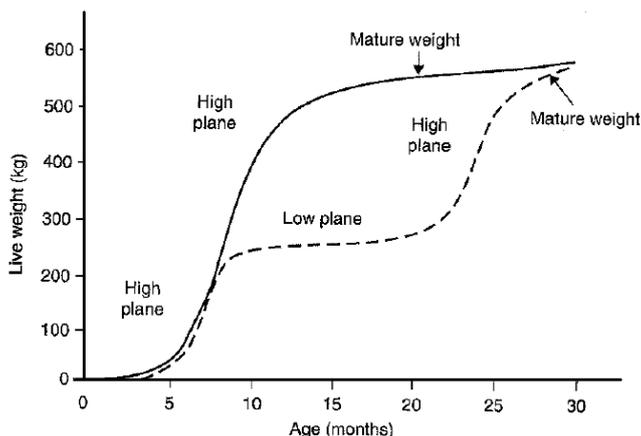
**Yearling cattle** (of at least 300kg liveweight when the restriction occurred) can express compensatory growth to catch up with their contemporaries if they have adequate good nutrition available with minimal impact on meat quality. Plain yearling heifers gained 2.13kg/hd/day on kikuyu pasture for 42 days in one Hunter Valley trial, suggesting that they had gained an additional 1kg/hd/day due to compensatory growth.

It is possible for cattle that have undergone compensatory growth to be leaner than cattle that have remained on a constant high plane of nutrition. However, there are some cases where young cattle have been severely restricted and then allowed to recover too fast on a high energy diet, and as a result they ended up fatter than cattle that have remained on the constant high plane of nutrition.

Final body composition and marbling are most affected by growth during backgrounding and finishing.

The longer and more severe the restriction the less likely the animal will compensate fully and be at the same weight for age as cattle that were not restricted (see figure 2).

Figure 2: The comparative growth of two animals, one reared on a high plane of nutrition throughout (\_\_\_\_), the other transferred from a high plane to a low plane and then returned to a high plane (---), demonstrating differences in the time at which maturity is reached. (Source C.J.C. Phillips, 2010).



## Compensatory growth in breeders

Utilising compensatory growth in breeders is much more complicated. An adult cow has the ability for compensatory growth when dry, but less so when lactating.

Regardless of any potential benefits compensatory growth offers other classes of cattle, there are two very important reasons to try and manage breeding cows to be in good body condition year round and avoid, where possible, severe under- nutrition.

First the breeder needs to be in sufficient body condition, ideally fat score 3 prior to calving, to enable her to be in condition to commence cycling again in a timely manner for the next joining.

Second, breeders calving winter- spring on the North Coast are often grazing poor quality leftover tropical pastures from the previous summer and can lose body condition rapidly once they commence lactating, and often become a problem if the spring break is late. Therefore it is wise to have breeders in good condition prior to calving in case the spring break is late.

## Conclusion

When adequate amounts of good quality feed become available, after a period of under-nutrition and poor growth, weaners will resume growing from where they left off with no impact on meat quality when they eventually fatten. Yearlings can exhibit compensatory growth of up to an additional 1kg/hd/day, again with no impact on meat quality later in life.

## More information

To read the full research paper on the Consequences of nutrition and growth retardation early in life for growth and composition of cattle and eating quality of beef see <http://www.livestocklibrary.com.au/bitstream/handle/1234/20038/19Greenwood.pdf?sequence=1>.

Or contact North Coast Local Land Services on 1300 795 299.

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