Agriculture Notes

Early Weaning of Beef Calves

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Early weaning has become more popular in recent years for a number of reasons including better utilisation of limited feed and as a drought management tool. There is plenty of experience to show that it can be done well. However if it is not done well the impact on weaner survival rate and performance can be significant. This paper on early weaning has been broken into three sections:

- ***Reasoning behind early weaning.***
- ***Some practical tips for early weaning implementation.***
- ***A decision support list to assist you to decide if early weaning is the right decision for you and your beef production system.***

Key reasons for early weaning

Maintain herd fertility

Early weaning often provides the most cost effective way of maintaining cow condition (measured by fat score)[1] to ensure that they get back in calf at their next joining. For example, weaning spring calving cows before they fall below fat score 3L makes it possible for them to maintain sufficient condition through calving and early lactation to ensure good return to cycling and conception rates. If cow condition has fallen below fat score 3L, weaning before joining will increase their chances of cycling and conceiving.

Better utilise your high quality pasture

If you have limited pasture of very high quality, it does not need to be 'processed' through the cow into milk for the calf to perform. It is more efficient to feed it directly to the calf. By allocating poorer quality pasture to the dried off cows, significant savings in feed costs can result.

Cows that have had their calves weaned early can be shifted to more marginal country, eg. "tussock country" or crop stubble so you are only running the 'growing' stock in the best paddocks.

In drought situations, early weaning enables you to use containment areas to reduce grazing pressure on pastures and control the risk of erosion. Cows maintained in good condition through early weaning also respond quicker when the drought breaks.

Better utilise supplementary feed

On the occasions where you are required to provide high cost, high quality supplementary feed to your herd, the same rule applies as for allocating high quality pasture. It is cheaper to allocate high quality supplementary feed to cows and calves separately, than to provide it to the calf through the cow.

High energy and protein feeds can be fed to young growing stock and lower quality feeds (ie. poor quality hay/straw) to the dry cows.

Save water

Early weaning can reduce water requirements of cows by up to 60%.

A cow with a calf at foot drinks between 80 and 100 litres of water each day. The calf drinks another 10 litres of water, on top of the milk it consumes.

After weaning, the cow only drinks 45 litres of water and the calf about 15 litres, a net reduction in water consumption of between 30 and 50 litres each day.

Increased marketing flexibility

Early weaning enables an earlier sale of non-productive, empty, cull or aged animals reducing feed and water use. Furthermore, weight and condition of these sale animals will be higher and sale value potentially better. In drought situations, you can get your cull females on the market earlier than other producers before the price crash that commonly occurs as seasonal conditions worsen. An earlier sale of cull females will also improve business cash flow and facilitate earlier procurement of supplementary feed. For a breeding herd approximately 30 % of financial returns come from cull cow sales.

Furthermore, you have the option to sell your calves earlier.

Quieter cattle

Producers that have adopted early weaning have found that the calves have become extremely quiet. In terms of labour efficiency, this is rated as significant on many properties

1 Refer www.dpi.nsw.gov.au "Visual and manual assessment of fatness in cattle" PrimeFact 282 for a description of fat scores.

as quieter cattle are far easier to muster and handle than wilder ones.

Key practical tips for early weaning

Age of weaning

The key criterion for early weaning should be cow condition. In most situations you would aim to have calves at least 12 weeks of age or around 100 kg live weight before weaning. By this age they require less protein and they are used to grazing or eating other foods.

If cow survival is of concern, calves can be weaned earlier than this, but calves less than 80 kg are harder to manage. They may require some milk replacer in their diet and concentrates during the rumen development phase.

Calves with dry, coarse coats, ("woody calves"), are almost certainly not receiving adequate milk from their mothers and may do better if weaned onto high quality feed.

Early weaning calf performance is greatly improved if calves are in mobs uniform in size and age. A short calving period and/or a vet ageing the foetuses at pregnancy testing and cows being drafted into calving time groups will help with early weaning management.

Appendix A and B show some scenarios for the energy requirements for cow/calf units versus a cow and calf after weaning. The potential energy savings from early weaning at different weaning weights and a range of calf growth rates is shown. The energy savings available, along with the costs of the available feed sources, can be considered to make a decision of when to wean and what to wean onto.

Pre- weaning

Feed calves some post weaning supplement while they are still on the cow. For example if calves are going to be given silage after weaning, feed silage to the cow-calf mobs a few times before weaning.

Even if calves are being weaned onto good quality pasture, having some of their diet the same before and after weaning, can help them with the change.

Rumen microbial populations can require up to 14 days to completely adapt to a new diet. Consider introducing calves to post-weaning supplements slowly via creep-feeding two weeks before weaning.

Consider vaccinating calves for pinkeye prevention 3 to 6 weeks prior to weaning or the peak onset of pinkeye.

Weaning

Do not combine stressful procedures like castration and dehorning with early weaning. Weaning itself is a very stressful procedure and subjecting a calf to further stress increases its susceptibility to disease and reduced weight gain.

Yard weaning is strongly recommended. Calves should be yarded to allow 4 m2 per calf as a minimum, increasing to 6 to 8 m2 for larger calves approaching 150 kg.

Where possible keep the yards damp to minimise pink-eye. Fly traps and backline insecticides will also reduce flies, a vector for the disease. Eye ointments and patches of heavy material or dust masks will provide relief for affected calves and prevent fly access.

Provide HIGH QUALITY feed such as lucerne hay or silage and clean water troughs. Avoid powdery feed sources that will result in dust irritating eyes leading to rubbing and scratching.

Vaccination for clostridial diseases is important. Early weaned calves, because of the high quality ration they require post-weaning, are at risk of developing pulpy kidney. Vitamin ADE injections are often advisable if the cows and calves have been on dry pasture or a grain diet for 3-4 months. Ensure all needles and tagging gear are kept clean and immersed in a suitable disinfectant to reduce infection rates.

Post-weaning

- ***Nutrition, Nutrition, Nutrition!!!***

Energy and protein

The younger the weaning age of the calf the higher the energy and protein levels need to be. The feed offered to early weaned calves should be at least 11 mega joules metabolisable energy (MJ ME)/kg dry matter (DM) and 16 % crude protein, preferably 18 % crude protein.

Unless the feed quality is high, feed intake and animal performance may be restricted by small rumen capacity. Much of the pasture hay and silage made in Australia is unsuitable for early-weaned calves by itself. Also, if the feed moisture content is too high the small calves physically can't consume enough feed to meet their energy needs, due to their small rumen size at this age. Dry, concentrate-based supplements can be provided to early-weaned calves grazing lush pasture in order to increase the total dry matter level of the diet and to increase its energy density.

Assess pasture weekly before the proposed weaning time, and then following weaning, to ensure that intake is not restricted for the targeted performance level.

Table 1: Nutrient requirements for 0.7 kg/day growth rate.

Age (m)	3-6	6-12	>12
Energy (MJ/kg DM)	10.9	10.3	9.5
Crude protein (%)	16	12	12
Calcium (%)	0.52	0.41	0.29
Phosphorus (%)	0.31	0.30	0.23

Introduce any concentrate (ie. grains) slowly. Introduce initially to calves at 300 grams per head per day and increase the amount by 100 grams per head per day with access to hay. Supplement the mix with a buffer such as sodium bicarbonate to prevent acidosis.

Insufficient protein in the ration of early weaned calves will result in short, dumpy cattle. Likely sources of

protein to be used are lush green pasture, lupin grain, peas, linseed meal, canola meal and soybean meal. Aim for a calf growth rate of at least 0.6 kg/day until they weigh over 250 kg. This will ensure that they retain their potential for growth later in life.

Examples of post-weaning diets which beef producers are using:

High quality legume based silage eg. lucerne silage with 60% dry matter. Add grain if the silage quality is not up to standard.

Lucerne hay, 30 per cent grain & some soy protein or canola meal.

Lucerne pasture

High protein and energy calf/heifer rearer pellets

Minerals

Calcium is the mineral most likely to be needed in a diet for calves. Generally, calcium carbonate (agricultural or microfine lime not builders lime) should be added to a grain based diet at the rate of 1½ parts per 100 parts (that is 1.5%) by weight of the grain in the diet.

Alternatively, complete rations in the form of pellets are available from commercial suppliers.

Roughage

If putting early-weaned calves onto very high quality pastures (eg. Improved spring pasture), consider the role of roughage in maintaining a healthy rumen.

Consider the risk of acidosis, particularly if feeding grain. Fibre is important for preventing acidosis. It creates a 'rumen mat' which slows the rate of fermentation. Fibre in the diet also stimulates secretion of saliva, which contains salts that buffer against acidity. Pellets with carbohydrates that are fermented slowly and have a minimum of fine material are recommended to reduce the risk of acidosis. Wheat is an example of a grain that is fermented quickly, so is not as desirable as other grain types.

Ideally, roughage should be chopped and mixed with the other components of the calves' diet, before feeding. Palatability is important to get calves to eat sufficient fibre. Consider adding a sweetener such as molasses or grape marc to a mixed ration for young calves. However, a little molasses is good, more is bad. Sugar in molasses ferments quickly and will rapidly decrease rumen pH, potentially resulting in acidosis.

To monitor rumen health assess the proportion of calves chewing their cud and the consistency of dung pats. Cud chewing is a sign that rumen health is good. Aim to have 50 % of calves not actively eating, chewing their cud. The ideal dung pat can be trailed out with your foot yet does not have visible straw fibres. Bubbles in manure indicate poor rumen health and poor fermentation patterns.

Examples of fibre sources which beef producers are using for early-weaned calves to complement a high quality spring pasture are:

Export sheep pellets (1 kg/head/day) with a relatively high hay/straw content. Large pellets (eg. 9 mm) means spoilage is reduced. If hay is being fed as well it is recommended that the pellets be fed first, to avoid the calves filling up on hay and pellets being wasted.

Barley straw (1/2 kg – 1 kg/day), which is softer than other straw types. Avoid hammer milling of straw as this creates a dust problem; chopping is preferred. If a little moisture is added this aids in the sticking of additives to the straw to prevent them being left behind in the feeder. Chopping the straw at muzzle width (30 – 40 mm), will also prevent calves sorting and leaving behind the more fibrous stalks. If straw fibres are visible in the manure, there is too much fibre in the diet.

Allow 30 cm per head trough space.

Water

Access to good quality water is important. Provide this in a trough; dams are not suitable for calves. Quality control includes checking for salinity, acidity, pollution and algal growth.

It is particularly important to measure water quality over the summer period. Salinity is measured with portable meters. A desirable maximum salt concentration for drinking water for calves is an EC of 6250 microsiemens/cm (equivalent to 4000 mg/L or 4000 parts per million).

Mob size may need to be limited in paddocks depending on trough access and flow rate. A good rule of thumb is that the flow rate should pump enough water for the mob in 2-3 hours.

Water is easily fouled by grain dropping from the calves' mouths. This makes a good breeding ground for bacteria, so regular cleaning of water troughs is important. Having a large bung at the base of the trough can make cleaning quick and easy.

Separate the water and feed troughs to allow shy feeders a chance to access feed while dominant feeders are at the water trough.

- ***Health program***

Young calves are susceptible to worms. Do Worm Egg Count (WEC) tests prior to weaning to determine calf drenching requirements. If the WEC is high enough to require drenching, drench early-weaned calves 1-2 weeks prior or after moving .. This is to mitigate drench resistance. To maximize the ability of weaners to develop immunity to worms, it is important they are moved onto paddocks with good quality pasture. The lower to the ground the cattle are forced to eat and the closer to dung pats they are forced to eat, the higher the risk of exposure to worm larvae. Monitor worm egg counts every 4 weeks if calves are grazing green pasture to determine if drenching is required. Move the weaners onto "safe paddocks" (for example paddocks that have been rotated with sheep) following the autumn break.

In drought situations consider keeping the calves in containment areas rather than letting calves roam barren paddocks. They will tend to rest and feed, conserving energy and minimising damage to paddocks. If calves are

contained tightly the urine and manure keeps the dust at bay, which will reduce pink-eye incidence.

Administer a full 7 in 1 vaccination program.

Six weeks after weaning, draft off tail-enders into a separate management group. Repeat this process four months after weaning.

Is early weaning for me?

Early weaning is not for everyone. Here are a few practical considerations that may assist you to make the right decision for you and your beef production system:

Early weaning requires more intensive management of calves and changes to management practices. There is a risk that if early weaning nutrition and husbandry isn't done properly deaths, infection and stunting can do significant damage.

What is your target market and does early weaning fit? For example early weaning suits a producer who is targeting a feeder steer market more than a producer wanting to turn off vealers.

What is your calving spread? The greater the calving spread, the more difficult early weaning management will be for you and the greater the tail you might expect in your calves. A six week calving spread is ideal, however it is manageable with nine-weeks if you are prepared to draft off tail end calves for separate management.

Early weaned calves probably won't look as good as "sappy" calves weaned off their mothers at an older age.

What is the availability of labour? There is no doubt that leaving calves on their mothers is the easier option in terms of labour resources required and the demand on management skills.

Do you have the required feed storage facilities and feed handling equipment?

Do a feed budget. Will you have the necessary feed on hand? Include all costs in your budget. For example freight, labour, extra equipment and feeders.

Is early weaning for me- still not sure?

An option is to try it initially with a portion of your herd. If you are only going to wean one mob early, consider your first calf heifers. They are the most difficult group to get back in calf, especially following a drought, yet one of the most valuable mobs for potential future breeding years and genetics. The other mob to consider as a priority for early weaning is the oldest cows.

Appendix A. Energy requirements (MJ ME/day) for a fat score 3 500 kg cow and 12 week old 100 kg calf comparing an unweaned and weaned scenarios for a range of pastures and animal performance.

Animal performance		**Pasture Available (Herbage eaten 11 MJ/kg dm)**		
	1000 kg dm; 70% dig	**1200 kg dm, 70 % dig**	**1600 kg dm 70% dig**	**Pasture + Pellets**
Lactating cow and calf*				
Calf growing at 0.9 kg/day Cow loses 0.1 fat score/month.	112			
Calf growing at 1.0 kg/day Maintain cow fat score.		118		
Calf growing at 1.1 kg/day Maintain cow fat score.			122	
Cow maintenance after weaning of calf	62	62	62	
Weaned calf growth (kg/day)				
0.6	34	34	34	34
0.7	37	37	37	37
0.9			41	41
1.0				45
1.1				47

* Assumes the calf is getting approximately 43 per cent of its energy requirement from milk.

Appendix B. Energy requirements (MJ ME/day) for a fat score 3 500 kg cow and 18 week old 135 kg calf comparing an unweaned and weaned scenarios for a range of pastures and animal performance.

Animal Performance	**Feed Available**		
	Pasture 1600 kg dm 65% dig, herbage eaten 10MJ/kg dm	**Pasture 2000 kg dm 52% dig, 200 kg dm 70% Dig, herbage eaten 9 MJ/kg dm**	**Pasture + Pellets**
Lactating cow and calf			
Maintain cow fat score Calf growing at 0.8 kg/day	121***		
Cow losing 0.4 kg/day Calf growing at 0.35 kg/day		101****	
Cow maintenance after weaning of calf	63	63	
Weaned calf growth (kg/day)			
0.32	37	37	37
0.6	43		43
0.7	47		47
0.8			48

*** Assumes the calf is getting approximately 24 per cent of its energy requirement from milk.

**** Assumes the calf is getting approximately 19 per cent of its energy requirement from milk.

Appendix A and B show some example scenarios for the energy requirements of cow/calf units versus a cow and calf after weaning for a) calves at 100kg and b) calves at 135 kg. The GrazFeed computer program was used to generate these energy requirements.

The potential saving in energy requirements from early weaning at a range of calf growth rates can be ascertained by comparing the energy requirement for the lactating cow and calf to the sum of the energy requirement for a dry cow and weaned calf.

In many cases the calf performance cannot be maintained after weaning unless the calf is given an improved diet. For example Appendix A illustrates that on a pasture with 1200 kg dm and 70 per cent digestibility (dig) 118 MJ is required for a lactating cow to maintain condition and for the calf to grow at 1.0 kg/day. For the same performance level (ie. to maintain the condition of the cow and for the calf to grow at 1.0 kg/day) a total of 107 MJ is required after weaning a calf at 100 kg. This is an energy saving of approximately ten percent.

As in this example the energy requirements for a desired growth rate, along with the costs and availability of feed sources, can be considered to assist make a decision of when to wean and what to wean onto.

Key messages that can be drawn from the scenarios in these tables are:

Relative to the dairy industry, where calves are weaned at 6 to 8 weeks and hand-fed limited amounts of milk, “early weaning” of beef calves occurs at an age when the proportion of energy the calf is getting from its mothers milk versus pasture is significantly less. For beef enterprises the gains from early weaning come primarily from more efficient allocation of limited high quality pasture. Where other sources of protein and energy have to be provided for early weaning to work, the costs and benefits must be considered carefully.

The major energy saving for a beef system is preventing loss of condition of cows, and therefore avoiding the costly exercise of feeding cows to regain condition. The energy requirement for the cow to regain lost condition (assuming it takes approximately 30 MJ to put on 1 kg) to increase cow fat score from 2 to 3 is 2100 MJ. In a system where stocking rate is increased to take advantage of the spring flush of feed and increase weaner throughput, early weaning could be required as the feed supply decreases over the summer months.

Ultimately the decision of when to wean will vary for producers according to the fat score of their cow herd and the availability and relative cost (including labour considerations) of feed sources throughout the year. If high quality feed required for early weaned calves is not available at a competitive price (cents/MJ equivalent) and cows are not falling below target fat score, the most economical decision might be to leave the calf on the cow for conversion of cheap pasture into good quality calf feed (milk).

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