BEEF NUTRITION

tech guide

170 years of innovation

FOCUSING ON BEEF NUTRITION & MANAGEMENT TO PROVIDE HELP AND SUPPORT FOR PRODUCTIVE AND PROFITABLE BEEF SYSTEMS

Dugdale Nutrition

Introduction

Beef production systems are varied but nutrition and management should be based on the breed, sex and stage of production of cattle and the resources that are available on farm with the aim to meet the markets ever-changing requirements. The aim of this DN Tech Guide is to outline the main features and management strategies to help make your beef system as productive and profitable as possible.

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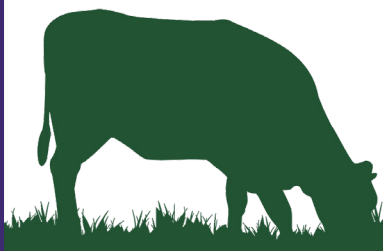
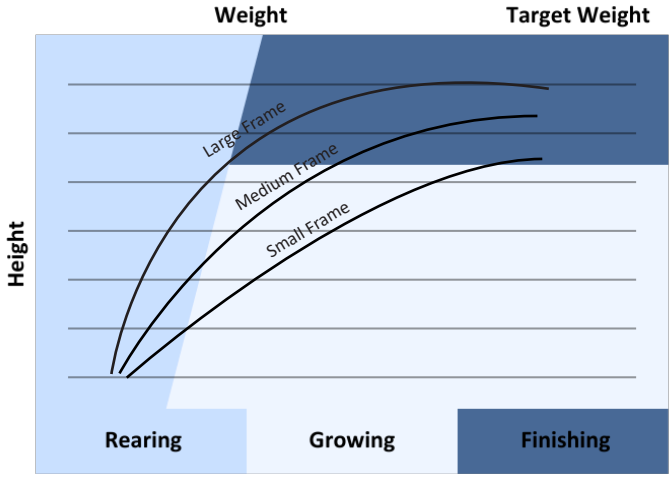


3 Stages of Production

Feeding of growing and finishing cattle comprises of three phases, each will require different ration and nutritional specifications. The length of these three phases will vary depending on the breed, frame size and target market you are aiming for. Native and smaller framed cattle will usually require a longer growing phase and a shorter finishing phase compared to larger continental breeds.



Rearing is the early phase of growth concentrating on milk feeding and weaning. The aim here is to maximise 200 day weight. The next stage is the growing phase, this period needs to focus on controlled continuous frame growth from 200 days until cattle are moved to a finishing ration. The finishing period is the final stage and is a short, sharp period where maximum weight gain is desired. All three of these stages need to be tailored nutritionally specifically to the farming system, cattle type and the market specification.

Nutritional Requirements

The table below highlights the nutritional requirements for the growing and finishing stages. Diets should be formulated to meet these targets in order for cattle to meet market targets and systems to be as productive and profitable as possible.

		Growing	Finishing
Live Weight Gain	Kg/day	0.7-1.3	>1.3
ME	MJ/kg DM	10.5-11.5	>12
CP	%	14-16	13-15
NDF	% in DM	>40	>25
Starch & Sugar	%	<20	>33
Fat	%	<3	<6-8

Cattle Requirements

Main Requirements

The table below outlines the key areas where nutrients are required.

Maintenance	The amount of nutrients required to keep the body functioning with no productive output.
Activity	Nutrients needed for the animals movement such as standing up and waling about. Energy is needed to carry out these activities and is generally small proportion of total requirements so is usually added to maintenance requirements.
Lactation (if applies)	Nutrients required to achieve a given milk production at a given composition.
Growth	Nutrients required for meat production to meet the target weights required and market specifications.

Nutrients Required

These nutrients are required for a number of different processes within the animal. Depending on the stage in production, the animal will have different requirements for these key nutrients.

Macro Elements - animals require a range of mineral elements in their diets, these include, sodium, potassium, calcium, magnesium and phosphorus.

Carbohydrates - use for energy source, there are four main groups of carbohydrates, glucose and simple sugars, starch, pectin and cellulose, hemi-cellulose and lignin.

Trace Elements - these include, manganese, copper, cobalt, zinc, selenium, iodine and iron.

Water - Water is the most essential nutrient required for all animals and is often forgotten about.

Proteins - made up of amino acids, which are synthesised in the rumen by the rumen bugs and are used in mechanical, transportation, enzymatic, mobility and productive functions.

Vitamins - Vitamins A, B group, C, D3 and E.

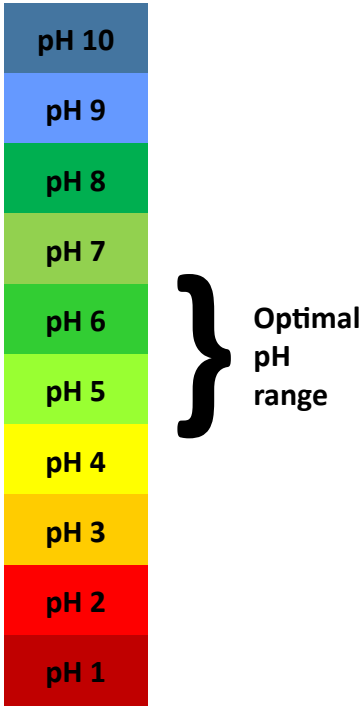
Fats - fats contain carbon, hydrogen and oxygen and are needed for long term energy storage.

Rumen Nutrition

When feeding cattle you are feeding the rumen and the microbes it contains. These microbes are responsible for the breakdown of plant material and produce the majority of the protein which is absorbed within the small intestine. These microbes have their own nutritional requirements which must be met to ensure efficient performance.

Rumen Digestion

The rumen microbes, in order to function effectively and digest the feed stuff, need to be in specific conditions within the rumen. Maintaining a high and healthy population of rumen microbes requires a pH range of 6.2—6.8 within the rumen. A pH below 6.0 will seriously reduce growth and reproduction of these rumen bugs. Continuous low pH within the rumen will result in reduced feed intakes and feed absorption. This is why providing the cattle and rumen microbes with the correct nutrition in order to maintain desirable pH levels is key.



Microbial Growth

Increasing and maintaining the microbial population in the rumen is key in increasing intakes, digestion rates and growth of the animals. Optimal feed digestion especially of cellulose will only take place if all microbial requirements are met.

- **Warmth** – The rumen microbes function best at a temperature of 37°C. heat from fermentation, body temperature and the animals insulation help to maintain this temperature.
- **Water** – microbes work best in a 'soup' of water and food, important that cattle have constant access to water.
- **Anaerobic conditions** - Rumen microbes don't like Oxygen.
- **Optimal pH** – pH 6.2-6.8.
- **Energy** – microbes use the energy produced when cellulose and hemicellulose is broken down for growth and reproduction.
- **Nitrogen** – microbes need nitrogen to synthesise proteins, they require a minimum of 1% nitrogen in feed dry matter to break down plant material.

Dry Matter Intakes (DMI)

Importance of DMI

Dry matter intakes (DMI) are the most important factor relating to diet and health of the animals. Maximising this DMI is vital to optimise the performance of growing and finishing the cattle.

Factors Effecting DMI

Formulation of the ration:

- DMI can be reduced if rations are either very wet or dry. Highly fibrous rations fill up the rumen and are fermented slowly meaning the cattle will not eat as much. If feeding a TMR and mixed rations containing forage, aim for a DM of 40-55%.

Fresh and palatable feeds:

- Poor storage of feeds can effect the palatability due to moulds forming. Not only can this reduce the cattle's intakes but can also cause health issues.
- Consistency of the feed is also important, when diets are changed it can take up to three weeks for the rumen microbes to adapt reducing intakes and growth weight of the cattle.

Access to feeding area:

- Rough, pitted feeding surfaces can limit the DMI and clean up of the feed. Smooth surfaces are preferred for the cattle to eat from.
- If feed barriers are not the correct height and width and there is not enough space for the number of cattle, feed intakes will be reduced. Cattle need to have access to eat as much as they want from the feed troughs.
- Cattle need to have access to feed at all times, push up feed so fresh feed can always be accessed by the cattle.

Access to clean water:

- Water intakes directly correlates to DMI. If access to clean fresh water is limited cattle intakes will drop which will in turn reduce growth rates.

Dry Matter Intakes (DMI)

DMI Targets

This table shows the target for DMI as a percentage of the animals live weight.

System	DMI % of Cattle Live Weight
Growing Cattle	2.3%
Finishing Cattle	2.0%
Suckler Cows	Dry Cows - 1.8% Calves at Foot - 2.2 - 2.5%

The Importance of Weighing

Measure & Manage

DLWG is a key measurement of the growth performance of beef animals.

DLWG (kg/day) = (current weight - previous weight) / age in days

Key Performance Indicators		Performing Well	Room to Improve	Review Performance
Daily Liveweight Gain	**Beef Stores**	0.9-0.7kg/day	0.7-0.5kg/day	0.5-0.3kg/day
	Beef Finishing	1.7-1.5kg/day	1.5-1.1kg/day	1.1-0.9kg/day

Weighing regularly can allow farmers to assess if there is room for improvement in growth rates from factors such as:

- Diet Formulation
- Disease Control (Supressed Immune System)
- Inadequate Housing
- Pain / Discomfort

Weight bridges are an easy and effective way of recording weights. More advanced models will calculate DLWG for you.

Weighing also allows for accurate treatment doses to be applied to animals, therefore preventing under/overdosing.


Teagasc, 2022

Improving Feed Efficiency

Feed is one of the major costs in all beef production systems, managing your system to improve feed efficiency can help to improve overall margins. Management, genetic and nutritional factors can all influence feed use and efficiency of a system. Understanding these factors can help to improve feed efficiency and overall animal performance, growth weights and business income, due to a reduction in feed cost/kg/head.

What Effects Feed Efficiency

Nutrition:

- Fibre in the cattle diets is important to help rumen function. Feeds with effective fibre such as haylage or silage are ideal for intensive finishing rations. Feeding a source of digestible fibre alongside straw, such as sugar beet pulp, may help to increase feed efficiency.
- Feed efficiency will reduce when the length of the finishing period increases. Avoid having a long finishing period, selecting cattle carefully can help avoid this and ensure they meet market specifications.

Stress factors:

- Transitioning between diets and between stages can cause stress to the cattle and the rumen, causing a reduction in intakes and growth rates. Careful management and planning of these stages is key in reducing the amount of stress the animals go through and effect this will have on growth.
- Avoid mixing cattle of different ages and sizes as this will increase stress levels and reduce feed efficiency.

Genetic factors:

- Gender will have an effect on feed efficiency. Bulls are the most efficient followed by steers then heifers.
- Different breeds will have different feed efficiency rates. Some will consume less feed but still achieve similar rates of growth as other less efficient breeds. Select breeds which best suit your production system.

Utilising Grass for Grazing

Turning animals out to grazing is often the cheapest way to feed cattle. If the grazing is managed well and sward heights are controlled the quality of pastures will be maintained to support growth of the cattle. Using higher stocking rates in spring when grass is plentiful then reducing later on in the season will help keep control of sward height and quality of the grass.

Managing Sward Height

This table below shows target sward heights to aim for depending on the period and type of grazing system is in place.

Period	Rotational Pre-Grazing Height (cm)	Rotational Post-Grazing Height (cm)	Continuous Grazing Height (cm)
Turnout to May	10-12 cm	5-6 cm	5-6 cm
June to July	10-14 cm	6-7 cm	6-7 cm
August to September	10-15 cm	7-8 cm	7-8 cm

Finishing Cattle on Grass

Later maturing and continental breeds can be difficult to finish on grass and may require supplementary feeding especially during late summer and early autumn for animals to reach target weights and fat cover. Heifers and earlier maturing native breeds are more suitable for finishing on grass and forage based systems.

When feeding concentrates, which is recommended for grazing animals near finishing, 0.5kg of concentrates per 100kg of liveweight is advised. For example, a 500kg animal would require 2.5kg/head per day. If grass quality and supply is poor, a higher feeding rate may be advised in order to reach target growth weights and finish quality.

Utilising Cereal Crops

Using cereals in cattle diets provides a rich source of starch and energy making them ideal to be included in a finishing ration. However, problems with acidosis can occur, especially in finishing animals can be high. This is due to cereals being highly fermentable in the rumen, resulting in a quicker rumen through-put.

Processed Cereals and Digestion

The way the cereal has been processed will have an effect on the rate of fermentation within the rumen, this in turn will affect the risk of acidosis. The diagram below shows the different methods of processing a cereal and the effect on fermentation speeds.

Ground

Rolled

Crimped

Whole

Time to Degrade in the Rumen

Rapidly Fermented **Slowly Fermented**

Feeding cattle with a high cereal based diet can increase the risk of acidosis occurring due to the rapid fermentation resulting in rumen pH dropping below optimum levels. This can cause issues with cattle and reduce the performance and growth potential of the animals.

Most systems will include fibre as straw or silage alongside the cereal to help reduce the risk of acidosis occurring. The effective fibre feeds the microbial population in the rumen and ensures the rumen mixes and functions more efficiently . The fibre helps increase cudding which in turn results in larger amount of saliva from the cattle being produced, adding a natural buffer to the rumen. This in turn helps to keep the rumen pH more stable reducing the risk of acidosis.

Case Study: Miller, High Aikton Farm

High Aikton Farm run a cattle finishing unit where cattle of 450kg+ are required to have a daily live weight gain (DLWG) of 1.5kg+. The cattle have dry matter intakes of 10.5kg a day, of a diet consisting of 12-12.5 ME, starch levels of 35-40 and CP 13.5-14.

The smaller growing cattle of 300kg are gaining weight at 1.5kg+ per day with smaller dry matter intakes of 7.7kg. These cattle require 12ME, 25-30 starch and 15-16 protein.

A third of the diet should consist of a forage to reduce rumen damage and ulcers from forming.

The cereals that are included in the diet have been treated using Home 'n' Dry pellets, this creates the cereals to become alkaline meaning safer to be fed to the cattle at higher levels without the risk of acidosis.

Finishing cattle from High Aikton Farm, fed on Home 'n' Dry treated cereal in a forage bases ration.

Use of Home 'n' Dry

Home n' Dry®
the foundation of alkasystems technology

Home 'n' Dry is a 3mm pellet made up of full fat soya and technical feed grade urea. These pellets are mixed with the mature cereal crop, either layered on top of the cereal while it was in the clamp or the cereal is mixed with the pellets before it is ensiled. These pellets when in contact with the moisture of the grain results in ammonia being produced. When this is in contact with the enzymes, another reaction occurs leaving behind ammonium salts. This creates a cereal crop which is alkaline and stable, meaning higher quantities can be fed to cattle without the fear of acidosis occurring. Protein levels and digestibility of the treated grain also increases.

Benefits of Home 'n' Dry

- High levels of cereals can be fed more safely.
- Acidic silages can be utilised if home and dry treated cereals is used along side.
- Rumen function is supported making more efficient utilisation of feed and therefore cattle perform better from less feed input.
- Cattle appear to have a better finish with more meeting market specifications.

Home 'n' Dry pellets being added to the cereal crop before being ensiled.

DN Product Range

Dugdale Nutrition supply a range of beef products to cover all farm situations. Below is an outline of the products DN supplies including the Alka product range.

Alka Rearer

A 6mm fully mineralised nut which is ideal for growing beef cattle. It contains a range of good quality energy sources to support growth rates and Alka grain to support rumen health. A 17% protein nut which provides high quality protein sources to help with frame growth and development.

Alka Finisher

A 15% protein, fully mineralised 6mm nut. It contains very high levels of a range of starch and sugar sources to encourage an excellent finish. Includes Alkagrain to allow for higher starch levels and intakes without damage to the rumen. Also contains Ammonium Chloride to feed safely to bulls.

Super Beef

A fully mineralised, 14% protein nut, high starch and sugars. Includes Acid Buf and Actisaf to help reduce any potential issues with acidosis. Ammonium chloride is added to enable use in bulls. Uses a range of starch sources to enhance performance in finishing cattle. Also includes Availa minerals to support foot health and feed efficiency.

Prime Beef

A nut which is suited for growing and rearing cattle. Moderate starch and sugars, 16% protein and fully mineralised nut. Range of starch and protein sources to grow frame.

Stockmaster

A nut suitable for cattle and sheep. 16% protein, fully mineralised nut. Moderate starch and sugars. Includes lamb minerals and ammonium chloride so can be used as a general all rounder.

Dugdale Nutrition

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Please call your local DN Sales Specialist for further information about any DN product or service.

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