DAIRYBEEF 500

Sustainable Dairy Beef Production

Dairy Beef 500

Farm Walks

12th September | 5pm

Pat Collins

Castlemartyr, Co. Cork

teagasc

Agriculture and Food Development Authority

SIGNPOST

Farmers for Climate Action

DairyBeef500 Programme

Sustainable Dairy Beef Production

The DairyBeef500 Demonstration Farmers are sponsored by:

Ballyvadin Demonstration Farm is sponsored by:

For more information please visit: www.teagasc.ie/dairybeef500

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Welcome from the Industry Stakeholders - Volac

Una Hickey

On behalf of all the industry stakeholders I would like to welcome you to this DairyBeef 500 Programme demonstration farm walk and live forum on the farm of Patrick Collins. We are delighted to be involved with Teagasc as industry partners in the Signpost and DairyBeef 500 Programmes.

The funding of this programme by all involved shows a commitment to the beef sector by supporting a programme where the primary objective is to demonstrate a sustainable dairy calf to beef systems that will return a worthwhile margin to beef farmers while also helping to reduce the environmental footprint of Dairy- Beef production.

We hope that the success and knowledge gained from the previous Green Acres Calf to Beef Programmes in terms of calf rearing, animal health and grassland management can support the current participants in producing more environmentally conscious and financially sustainable dairy-beef systems.

We wish all the participants every success for the programme over the next five years.

Sponsors note

MSD

MSD Animal Health is one of Irelands leading suppliers of animal health and technology products to veterinary practitioners and farmers. MSD employs approximately 2800 people across its sites in Ireland, which encompass manufacturing, R&D, commercial and marketing facilities in addition to global support services

Munster Bovine

Munster Bovine is Ireland's market leader in cattle breeding and herd management services. The Munster Bovine technician service is recognized as the leader in its field with over 70 years' experience of carrying out artificial insemination in the Munster and Galway areas. With access to the best genetics, today we offer a complete and integrated range of breeding, milk recording, fertility and performance enhancing services

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Drummonds is a leading supplier of agricultural inputs and animal feeds across the North East of Ireland. Annually at harvest the business processes more than 100,000 tonnes of native grain across nine locations, with manufacturing facilities for seeds and animal feeds in Drogheda and Navan. Drummonds is a trusted provider of essential supplies to the farming community.

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Liffey Mills; Backing those who feed our nation. We work closely with our 10,000 customers to ensure a bright & sustainable future for generations to come in all aspects of agriculture including Dairy, Beef, Sheep & Tillage.

Volac

Volac is a fast-growing, ambitious international dairy business. We turn our passion for dairy nutrition into great products that advance the health and performance of consumers and farm animals. Volac's Animal Nutrition Business is a leading product specialist in Sustainably Advancing Livestock Efficiency in the key areas of young animal nutrition, feed fats forage conservation and feed additives

Corteva

Corteva Agriscience™ is the only major agriscience company completely dedicated to agriculture. By combining the strengths of DuPont Pioneer, DuPont Crop Protection and Dow AgroSciences, we've harnessed agriculture's brightest minds and expertise gained over two centuries of scientific achievement.

Welcome

Alan Dillon

DairyBeef 500 Campaign Manager

On behalf of Teagasc and all the sponsors of the Teagasc DairyBeef 500 Campaign, I would sincerely like to welcome you to our autumn farm walk and seminar as part of our 2023 DairyBeef 500 farm walk series. I would like to express our gratitude to Pat and his family for accommodating us to showcase what has been achieved in recent years through their involvement in the Teagasc Green Acres Dairy Calf to Beef Programme and now the DairyBeef 500 campaign.

Pat has been to the forefront of our calf to beef programmes for a number of years and has shown a deep passion for beef farming over the years. He has demonstrated his open mindedness and ambition to improve profitability of his farm through implementation of technologies to reduce inputs and age of slaughter while maintaining carcass output on the farm.

Pat has recently begun to use some higher quality beef sires, identified from the recently launched Commercial Beef Value (CBV), a tool which will bring more confidence to beef farmers that they can source calves that are of superior genetic merit in terms of carcass weight and conformation than the average dairy beef calf.

I wish to acknowledge the continued support of our programme sponsors: Munster Bovine, Volac, Corteva Agriscience, MSD, Liffey Mills and Drummonds.

Farmer welcome – Patrick Collins

On behalf of the Collins family, I would like to welcome everyone here to Dowerhouse farm, Castlemartyr, Co. Cork today. I am currently farming in a registered farm partnership with my father and we have a great team behind us, who without we could not run the farm as effectively.

We strongly believe that there is a good living to be made from farming going forward, every farm needs to adapt the new technologies on their own farms to see what works for them.

Since joining the Teagasc Green Acres Dairy Calf to Beef and subsequently the Dairy Beef 500 Programmes, we are very conscious of trying new technologies to improve performance, profitability whilst also reducing the gaseous emissions on our farm.

On our farm, slurry is applied using low emission slurry spreaders, we have included red clover and multi species swards in our grassland swards to improve the quality of high protein silage and to reduce chemical nitrogen applications.

There has been a number of small changes taken on farm that have resulted in a more resilient farming system. A number of these changes will be discussed here today and I hope that however small that each and every one can take home something from the event to help make your farming business more streamlined and profitable.

DairyBeef 500 Campaign Introduction

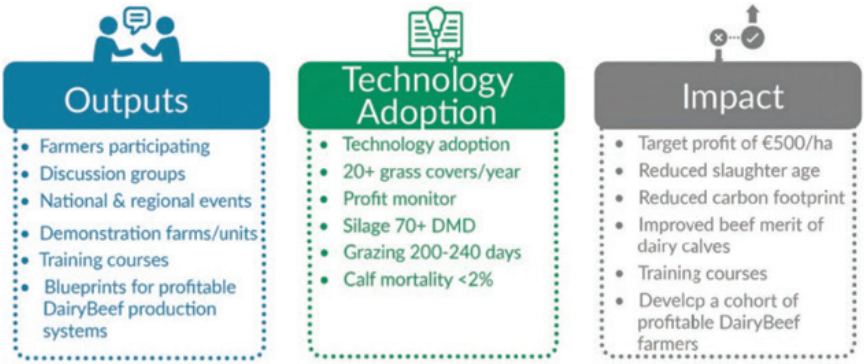
Teagasc has developed a new initiative which focuses on management practices for technically-efficient, dairy-beef systems called DairyBeef 500. The campaign will promote the adoption of technologies identified through research onto commercial farms, while monitoring their impact on farm sustainability.

Programme aims:

- Target a net margin of €500 per hectare, excluding land and family labour.
- Increase the adoption of best practices, especially in relation to grassland management and calf rearing.
- Reduce the environmental footprint of dairy-beef production.
- Establish a cohort of profitable dairy-beef producers.
- Create greater integration between the beef and dairy industries.
- Improve the beef merit of calves coming from the dairy herd.

Key performance indicators

The key performance indicators of the DairyBeef 500 Campaign are across three levels.



Demonstration farms

The 16 commercially-operated demonstration farms enrolled will be a key pillar of the DairyBeef 500 Campaign. The demonstration farms will illustrate key technologies including: calf rearing; grassland management; calf health; nutrition; financial management; animal health and welfare; environmental sustainability; and the appropriate use of dairy-beef genetics.

In addition, the Ballyvadin Farm will demonstrate the deployment of best technologies in sustainable beef production. A joint venture between Teagasc, Dawn Meats and Shinagh Estates Ltd, the farm will be stocked initially with 300 calves, sired by a range of dairy and beef bulls, which will be reared through to beef as steers and heifers.

Farm overview – Pat Collins

Farming outside of Castlemartyr, Co. Cork, Pat Collins and his family, run a mixed farm consisting of both tillage and dairy calf to beef enterprises, on owned and leased lands in a number of different blocks.

The tillage enterprise consists of winter wheat, barley and oilseed rape, spring barley and beans, maize and sugar beet. Many of the crops are retained on farm as winter feed for the beef finishing enterprise and excess cereals and beet etc. are sold off farm.

There are approx. 130 acres currently in grassland, which is made up of traditional permanent pasture, red clover swards and in more recent time's multi species swards.

Although, still in their early years of production, Pat speaks very positively of his experience with multi species swards so far and the simplicity that this grass crop brings. To date, 15 units of chemical nitrogen applied in March is the only fertiliser that the multi species swards has received, whereas the permanent pasture plots have already received 80 units of chemical nitrogen per acre in 2023.

The red clover was cut for the third time on the 20th July and it is planned to cut it again in early September. Following the last cut, the crop received two bags of 0/7/30 per acre.

This spring over 300 calves from around 12 different dairy herds were bought in at two/three weeks of age and reared. They were weaned off milk at approx. ten weeks of age, 85kgs in weight and consuming greater than two kgs of concentrates. Currently on the farm there are five groups of calves at grass and these are receiving no meals.

The calves bought in were mainly Friesian bull calves and 38 heifer calves. The plan is that these heifers will either be sold as stores next year or slaughtered off of grass next October/November.

All male animals on the farm are finished as bulls. There are currently 118 bulls housed and on their finishing diets for the last month, these will be drafted as they become fit with the aim to be slaughtered in September/ October at 19 to 20 months of age.

The remaining 75 bulls were at grass until the 25th August, they have now been housed and have started their transition where they will be built up to a finishing diet with the aim to have all bulls slaughtered before Christmas.

Physical and financial performance

Over the past five years the grassland area dedicated to Pat's dairy calf to beef production system has continued to increase and in 2023 there are approx. 50 hectares used by this enterprise. The stocking rate outlined in the table below appears very high for a calf to beef enterprise but on the ground this is diluted by tillage lands which provide winter feed for the finishing animals. All costs of grain, beet, maize etc. that are used in the finishing period are fully costed against the beef enterprise and credited to the tillage enterprise.

In 2022 the net profit was back compared to 2021, this was largely due to the increased costs of inputs and in particular feed and fertiliser. The bull finishing system that Pat runs would have significant meal and other feed inputs and at increases prices in 2022, it would have impacted the bottom line. Also, similar to all farms, fixed costs took a jump with the increasing cost of energy and labour etc.

Going forward, Pat will continue to seek good quality bull calves and the sourcing of calves in the future will be further focused on their Commercial Beef Value. Maximising performance at grass, whether permanent pasture or multi species swards is critical to have bulls at target weight before the finishing period to maximise output and reduce finishing time.

Year	Cattle area	Stocking Rate	Gross Output	Gross Output	Gross Output	Variable Costs	Gross Margin	Fixed Costs	Net Profit
	Ha	LU / ha	Kgs/Ha	Kgs/LU	€ /Ha	€ /Ha	€ /Ha	€ /Ha	€ /Ha
2022	36.4	3.85	2,301	598	6,256	3,624	2,633	1,865	768
2021	34.4	3.40	2,461	723	5,314	2,491	2,823	1,531	1,293
2020	30.0	3.29	2,682	814	5,286	2,877	2,409	1,270	1,140
2019	26.5	2.80	2,000	715	3,154	2,105	1,049	1,107	-59
2018	26.5	2.25	1,967	876	3,682	2,068	1,614	1,194	421

Autumn grassland management

As the end of the grazing season approaches, the focus begins to switch from grazing outdoors to feeding indoors for dairy-beef animals. Along with final preparations to housing, the primary focus at farm level over the next number of weeks should be the implementation of an autumn rotation planner.

The primary objective of the autumn rotation planner is to maintain grazed grass in the diet of livestock for as long as possible, thus lessening winter feed costs through reduced silage and concentrate usage over the winter months.

Not only does following such a budgeting tool reduce costs this year, it also sets up the farm to be more profitable next spring. It's often forgotten that the grass grown over the winter months is the starting point for spring grazing next year. By putting a plan in place now to close up a portion of the farm on a weekly basis, a reserve of grass will be created to allow for the early turnout of stock next spring, which once again brings cost savings through improved animal performance, reduced feed costs and lower manure handling charges.

Autumn grazing guidelines:

- Aim for a post-grazing height of 3.5-4.0cm.
- Do not re-graze fields that have been closed.
- Start housing cattle if ahead of your weekly grazed area target.
- Heavier cattle should be housed first if ground conditions deteriorate.

When implementing an autumn rotation plan, the target is to have 60% of the grazing area closed by the end of the first week of November, with the first paddocks closed from October 10 onwards. These target dates are pulled back two weeks on heavier or farms with more challenging soil types. Taking the example of a 130 acre farm, this means that 78 acres should be closed by November 7. To achieve this, the farmer will have to close 20 acres/week to be on track to achieve this target. In circumstances where this area is being exceeded on a weekly basis, more forward or heavier animals should be moved indoors and started on their finishing diets to slow down the areas being grazed on either a weekly or daily basis.

Table 1: Pat Collins Autumn Rotation Planner (130 acres farm)

Dates	%/week	Target area to close per week	Field name/number	Actual area grazed
Oct. 10th – 17th	15%	20 acres	Paddocks 2, 4 & 8	21 acres
Oct. 18th – 24th	15%	20 acres	Reseeded fields	18 acres
Oct. 25th – 31st	15%	20 acres	Lower fields	19 acres
Nov. 1st – 7th	15%	20 acres	Out farm	20 acres
Total by 7th Nov.	**60%**	**80 acres**		**78 acres**

The remaining 40% of the grazing area should then be allocated to lighter animals more suited to achieving the desired graze outs on these swards.

Thought often needs to be given to the order in which paddocks are closed. By putting a structured plan in place, the success of spring grassland management and an early turnout can be maximised. Although still months away, the ideal starter paddocks next spring will have covers of 800-1,200kg

DM/ha – paddocks with a medium covering of grass to allow animals to settle back into the routine of grazing. These will be paddocks closed in the second half of the 60% area closed.

Questions often arise on how much grass will be on the first paddocks closed next spring – those closed in the first half of the 60% of the autumn rotation plan. With a longer growing time, covers on this paddocks will often exceed 1,200kg DM/ha and so they are recommended for grazing between March 1 and March 17. By maintaining these paddocks, it will create a bank of grass at farm level, allowing sufficient time for the first grazed paddocks next spring to recover to begin the second rotation.

Red Clover in dairy calf to beef systems

Red and white clover are both nitrogen fixing legumes however it is slightly different to its white clover cousin. It grows upright and tall and does not creep and spread outwards like white clover. Red clover also has the ability to fix nitrogen in the soil at around 150 -200 kg N/Ha per year, this is equivalent to between four and six 50 kg bags of 27% N per acre. This means it requires no nitrogen fertiliser once fully established. Red clover is capable of producing high yields of highly digestible, high protein silage that cattle perform well on. Due to its upright growth habit and high summer yields red clover is better suited to cutting than grazing. However it will tolerate grazing in good dry conditions. The plant has a deep tap root makes red clover relatively drought tolerant

Establishing and Managing Red Clover

- A typical seed rate for a grass dominant sward is 4 kg/acre of red clover, 8 kg/acre of rye grass and 1 kg of white clover/acre.
- Red clover swards may be established by a full reseeding, over sowing red clover seed into an existing sward typically does not work.
- Red clover performs best on well drained, fertile soils. Conduct a soil test and target soil pH of 6.2-6.5 and Index 3 for P and K for successful establishment.
- Sow from April to July. Ensure a fine, firm and level seedbed, roll both before and after sowing.

- A typical cutting strategy for red clover would be to harvest first cut in mid-late May with the second, third and fourth cuts at 6-8 week intervals thereafter
- Red clover is a low sugar, low DM crop so wilt for 24-48 hours to achieve 25-35% DM to aid preservation
- Do not use a conditioner mower and avoid excessive handling of the crop to reduce leaf loss
- Slurry and FYM can be applied throughout the year to replenish P and K

Multispecies Swards (MSS)

Multispecies swards are swards that have a variety of plants from various families of plants including grasses, clovers, brassicas and herbs. When combined in a sward setting the various species root at varying depths allowing them to access more nutrients and moisture in the soil. The interaction between the plants in the swards allows them to work off each other the end result is often greater than the sum of the individual parts often ends. Red and white clover are often the engine of these swards that provides the nitrogen to produce high quantities of dry matter production. At Teagasc, Johnstown Castle, multi-species swards with ryegrass, chicory, plantain, red and white clover receiving 150kg N yielded more than perennial ryegrass receiving 250 kg of N under a regular cutting regime.

Establishment and Management of MSS

- A multi-species sward is best established as part of a full reseed. The small seeds of some species struggle to establish in an existing sward, making them unsuitable for over sowing
- Ideally, sow in late April or May but can be sown until mid-August. Early sowing allows better establishment before the winter, which is important for root development

- Control weeds before sowing as there are no options for spraying after it is sown. Avoid sowing in fields with a history of weed problems
- Choose fertile fields with pH 6.3 or above, P & K index 3
- Spray off old sward and remove trash prior to cultivation
- Apply lime as required to help break down the old sward
- Cultivate and roll to create a fine and firm seedbed
- Sow at the recommended rate per acre, no deeper than 5-10 mm, and roll well after sowing. Good soil-to-seed contact is essential for quick and successful establishment
- Apply require P and K
- Graze when plants withstand the pull test and when plantain has six true leaves, perennial chicory seven true leaves per plant (approximately eight weeks after sowing)
- Rotationally graze for best results (e.g. graze 1-3 days, rest 25-30 days)
- Target post-grazing residual of 6cm
- Avoid hard grazing or grazing under poor ground conditions to protect the herbs and red clover from damage and potential loss of productivity and persistency
- Maintain adequate P & K indices. An application of nitrogen in spring may help kick-start growth before clover becomes active in May. Additional nitrogen shouldn't be necessary during the main growing season if the sward contains a good proportion of legumes/clovers

Plant Species	**Weight per pack (kg)**
Perennial Ryegrass (PRG)	6.6
Timothy / other non-PRG grass	0.7
White Clover	1.5
Red Clover	1.5
Plantain	1.0
Chicory	0.7
Total	**12.0**

Fig 1: An example of a multi species mix used

The Commercial Beef Value - A tool for cattle purchasers

Commercial Beef Value (CBV): One of the keys to profitable dairy calf to beef farming is having the right calf in place. This applies to all systems no matter if you're in a Holstein Friesian or a late maturing steer system there is massive variation in the beef merits of these calves even within breeds. Research conducted by Teagasc has shown that calves bred from higher genetic merit beef bulls have higher carcass weights, better conformation and are more likely to meet factory specifications than calves bred from lower genetic beef bulls. However discovering which calf is likely to exhibit good beefing qualities over their lifetime can be difficult when they visually all look the same at a month old. This is where the new Commercial Beef Value (CBV) will make it easier for farmers to know how this calf will perform over their lifetime and as result can determine a realistic value that the calf is worth at a month old.

The CBV is a value that ICBF is now generating on all cattle that are likely to be finished as beef cattle. The CBV comprises seven traits from the Beef sub-index that are important to farmers that are rearing stock that are destined to be slaughtered. A carbon sub-index has also been included to account for the carbon cost of producing these animals.

The carbon sub-index makes up 10% of the average animal's CBV. The CBV of each animal will be based on the genetics of their parents. The beef traits are Carcass weight, Slaughter age, Carcass conformation, Carcass fat, Docility, Conformation Spec, Fat Spec, Carcass weight spec and Feed intake.

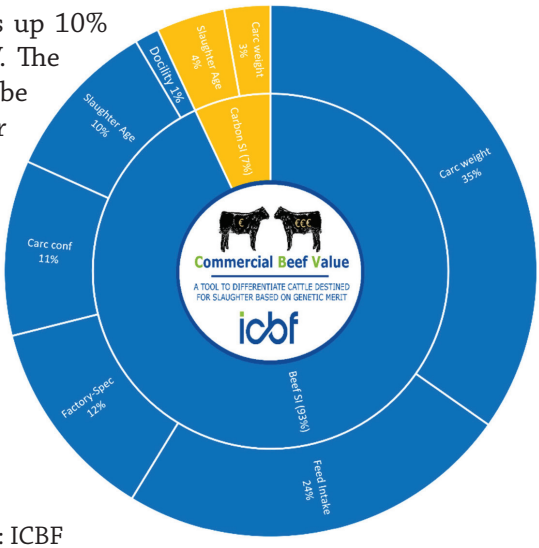


Figure 2: Updated relative emphasis of the DBI. January 2023. Image: ICBF

If for example a farmer is looking to purchase an Angus bull calf and two are presented, one has a CBV of €120 and another has a CBV of €185. The calf with a value of €185 has better beefing characteristics than the one at €120 and should deliver €65 more than the calf with the lower value. The extra value will come as a result of possibly better feed efficiency, carcass weight, conformation etc. CBV values will be a lot more use to the buyer if they compare like with like. Each animal is labelled under one of three breed types: dairy x dairy, beef x dairy or suckler. So if you are in the market for dairy bred bull calves you should be comparing within the Dairy X Dairy type and likewise if you are purchasing Angus calves you will be looking under the Beef x Dairy Type. Knowing whether animals are high or low for CBV allows the buyer to make a much more informed decision about how much should be paid for each.

Table 1: Threshold commercial beef values per star rating and animal type

Star rating	Suckler	Beef x dairy	Dairy x dairy
Five star	>€302	>€124	>€44
Four star	>€265	>€79	>€30
Three star	>€228	>€61	>€18
Two star	>€178	>€44	>€1
One star	<€178	<€44	<€1

In order for a CBV to be generated for a calf, a sire must be recorded against the calf when he is born if you are buying animals directly from another farmer, you can ask them for a print out of the CBV of the stock they are selling. If they don't record the sires and you want to continue buying their stock, ask them to record sires on all births in the future. ICBF is currently working with marts to get the CBV displayed for eligible animals.

How to produce High Commercial Beef Value calves?

- Dairy farmers using the DBI figures need to focus on the Beef Sub Index to produce a calf that has a high CBV. Many of the traits in the CBV are also included in the Beef Sub Index of the EBI for dairy animals and in the Beef Sub Index of the DBI for beef bulls.
- Tables below show the min. beef sub index requird in a bull in order to breed 4-5 star CBV calves from the different cow types

Poor beef merit dam - (EBI Beef Sub Index:-€35)

Target	Bull Beef SI required	No. of bulls in active bull list with less than 5% Calf Difficulty
4 star CBV calf (Top 40% of BXD calves)	€108	28
5 star CBV calf (Top 20% of BXD calves)	€151	8

Average Beef merit dairy cow - (EBI Beef Sub Index:-€2)

Target	Bull Beef SI required	No. of bulls in active bull list with less than 5% Calf Difficulty
4 star CBV calf (Top 40% of BXD calves)	€76	82
5 star CBV calf (Top 20% of BXD calves)	€119	23

High Beef merit dairy cow - (EBI Beef Sub Index: €10)

Target	Bull Beef SI required	No. of bulls in active bull list with less than 5% Calf Difficulty
4 star CBV calf (Top 40% of BXD calves)	€63	102
5 star CBV calf (Top 20% of BXD calves)	€106	31

Animal Health in Dairy calf to beef systems

While purchase price and genetics of the calf are foremost in terms of making a profit on calf to beef systems, calf and animal health is also to the fore in ensuring that the system leaves a margin. An unhealthy animal will prove costly in terms of veterinary treatments, reduced daily gains and potentially higher mortality rates.

The participating farmers in the Teagasc DairyBeef 500 Programme would all have a farm plan developed around ensuring calves receive no setbacks once they arrive to when they leave the farm.

Pneumonia

One of the main issues that affect cattle on dairy calf to beef farms is pneumonia. Pneumonia is the most common cause of death in cattle of all ages over one month old. The word pneumonia basically means inflammation of the lungs. It is a complicated, multifactorial disease which means many things can impact on its onset and course. The highest risk

Common causal viruses and bacteria:		
Viruses	Respiratory syncytial virus (RSV)	Present in most herds, most common.
	Parainfluenza type 3 (Pi3)	
	Bovine rhinotracheitis (IBR) (Bovine Herpes Virus 1)	Less prevalent, more typically seen in older calves. Occurs from mixing or housing of groups of cattle from different sources.
	Bovine viral diarrhoea (IBVD)	Does not cause damage to the lungs and airways, but can impair the calf's disease resistance.
Bacteria	*Mannheimia haemolytica*	Start to colonise the upper respiratory tract and move down towards the lungs, triggering pneumonia. Toxins produced cause tissue damage which can prove fatal.
	Pasteurella multocida	
	Trueperella pyogenes	
	Histophilus somni	
	Mycoplasma bovis	
Parasites	Lungworm	Particular concern for young calves who have been put out on grass early.

periods for pneumonia is at the calf rearing stage and the winter housing periods.

Prevention is always better and cheaper than the cure and a regimental vaccine plan is being implemented on programme farms. There are several pneumonia vaccines on the market today. Some are for the common bacteria that cause pneumonia, such as Mannheimia (formerly known as Pasteurella) and others are for respiratory viruses that cause pneumonia (IBR, BVD, PI3, BRSV). There are also intranasal vaccines that can be used in young calves to prevent pneumonia and are a great benefit to many calves. Remember that correctly administering and storing vaccines is important to improve the success of a vaccination programme. Ideally animals should be vaccinated at least two weeks prior to the risk period however this is not always possible during the calf rearing stage unless a relationship can be built up with the source farm to administer vaccines before arrival on farm. At the same time, no amount of vaccination will overcome a lack of good practices. Factors such as poor ventilation, overcrowding, inadequate nutrition, and passive transfer of immunity from colostrum on the dairy farms need to be addressed along with a vaccination programme to ensure animal performance is not reduced due to pneumonia outbreaks.

Sample vaccination plans

Animal age	Vaccine/dose	Prevents	Route of administration
3 weeks	Pneumonia	RSV/PI3/Mannheimia haemolytica (Pasteurella)	Subcutaneous
3 weeks	IBR intranasal	IBR	Intranasal
5 weeks	Clostridia	Clostridial diseases	Subcutaneous
7 weeks	Pneumonia booster	RSV/PI3/Mannheimia haemolytica (Pasteurella)	Subcutaneous
9 weeks	Clostridia	Clostridial diseases	Subcutaneous
12 weeks	IBR live	IBR	Intramuscular
2 weeks pre housing or next risk period	Pneumonia	RSV/PI3/Mannheimia haemolytica (Pasteurella)	Subcutaneous
10 months	IBR live	IBR	Intramuscular
14/15 months	Clostridia	Clostridial diseases	Subcutaneous
16 months	IBR live	IBR	Intramuscular

Animal age	Vaccine/dose	Prevents	Route of administration
1-3 weeks (varies by brand)	Pneumonia	RSV/Pi3	Intranasal
2 weeks	IBR live	IBR	Intranasal
6 weeks	Clostridia	Clostridial diseases	Subcutaneous
10 weeks	Clostridia	Clostridial diseases	Subcutaneous
12 weeks	IBR live	IBR	Intramuscular
6 months	Pneumonia	RSV/PI3/Mannheimia haemolytica (Pasteurella)	Intramuscular
7 months (at least 2 weeks pre housing)	Pneumonia	RSV/PI3/Mannheimi ahaemolytica (Pasteurella)	Intramuscular
9 months	IBR live	IBR	Intramuscular
14 months	Clostridia	Clostridial diseases	Subcutaneous
15 months	IBR live	IBR	Intramuscular

Parasite control

Stomach Worms and Lung Worms

Irish dairy calf to beef production is predominantly grass based, the most successful systems are those that optimise animal performance from grazed pasture and achieve a high proportion of total life time gain from grazed grass. However these systems are particularly exposed to outbreaks of stomach worms and lung worms.

Calves are particularly vulnerable to infection from stomach worms and this can result in ill-thrift, with subclinical infection resulting in reduced growth rate. After their first grazing season cattle generally develop sufficient immunity to prevent clinical disease, however there has being numerous cases where older animals have had high levels of worm burden. Symptoms of stomach worms can include diarrhoea, decreased appetite and loss of weight. Stomach worms can cause severe damage to the stomach and small intestine which will cause parasitic gastroenteritis. Cattle in Ireland are usually infected with a number of stomach worm species, the most common being Ostertagia ostertagi and Cooperia oncophora.

Control of stomach worms on dairy calf to beef farms is usually achieved by the administration of anthelmintic doses. There are currently three classes of anthelmintic licensed for the control of stomach worms in cattle: benzimidazole; levamisole; and, macrocyclic lactone (Ivormec).

The level of worm burden in a herd can be ascertained by counting the number of worm eggs per gram (epg) of faeces (faecal egg count or FEC). Most veterinary practices offer a faecal testing service to help determine if dosing for worms is required. In order to avoid worm resistance building up on farms, farmers should take dung samples to see if a worm dose is warranted or not.

In the case of lung worm monitoring for clinical signs such as a husky cough or difficult breathing is the best way to identify if there is an issue. Heavy infestations can lead to respiratory disease or pneumonia. As regards treatment and control most available anthelminthics are effective against larval and adult lungworms.

Pre-housing dose

About two week's pre housing it is advisable to treat for lung worm to ensure stock are clean of any burden. Heavy burden and treatment post housing can cause unnecessary stress trying to cough up dead larva and this can often lead to respiratory issues.

Controlling Liver Fluke this winter

Lack of thrive, poor appetite and reduced weight gain are all ill effects of liver fluke therefore farmers need to act early to prevent any issue. Once eaten fluke starts to feed and grow. It takes approximately twelve weeks for the flukes to grow to adult stage when they start to lay eggs. These eggs pass out in the faeces of the animal and when conditions are suitable they hatch and use the mud snail to continue the life cycle. During this twelve week period the fluke are classified according to their stage of development:

First 5-6 weeks	–	Early immature fluke
Weeks 6-10/11	–	Immature fluke
Week 11 +	–	Adult fluke

Faecal sampling can be used as an aid in monitoring liver fluke but the fact that eggs are only shed by mature fluke farmers need to be cautious in waiting that long if there an issue on their farm. The beef health check programme on farmer's individual ICBF profiles contains useful information regarding liver damage caused by fluke off cattle that were previously killed on the farm. This will help determine if liver fluke is high in your particular farm.

There are a number of different flukicides on the markets but certain products are only effective again certain stages. Some of the flukicides on the market are only effective against the adult stage therefore careful thought needs to be given when deciding what product to use and the timing of the treatment. If using a product that only treats adult fluke stock need to be in at least 11 weeks to ensure an effective treatment. In areas where burdens are high and farmers need to intervene quick triclabendazole based products which cover all thee stage can be given a few weeks post housing, there is some known resistance to this product in certain parts of the county so precaution is advised. In other cases there are a number of products that also effective again mature and immature and these will give an effective treatment if administered 6 weeks after housing. When selecting a product check the product label to check the stages treated. Table 1 outlines examples of drugs useful in control of liver fluke in cattle and the stages treated.

Table 1: Active ingredients and stages treated

Active Ingredient	Liver Fluke Stage		
	Early Immature	Immature	Mature
Triclabendazole	✓	✓	✓
Closantel		✓	✓
Clorsulon			✓
Oxyclozanide			✓
Nitroxynil		✓	✓
Rafoxanide		✓	✓
Albendazole			✓

Pat Collins Herd health protocol

Calf sourcing

This year 322 calves are sourced from 15 farms. Pat finds purchasing direct of farms puts less stress on calves due to shorter transport times and also less likelihood of diseases being transmitted due to no mixing of calves in marts. Pat has built up relationships with these farmers and knows proper health protocols in terms of colostrum administration and bedding of calves is carried out in the first 2 weeks of life.

Vaccination policy

Once on the farm a few days and acclimatised an intranasal vaccine to protect against RSV and Pi3 is administered as well as an oral drench against coccidiosis. At turnout calves are given a vaccine against black leg with a follow on booster given after 4 weeks. At housing calves are once again given an intranasal vaccine to protect against RSV and Pi3.

Dosing of calves

This year a Repidose Ready Pulse bolus was administered to all stock in mid-May. The bolus is recommended for cattle weighing between 100 kg and 400 kg at the time the bolus is given and will deliver seven doses of oxfendazole thought out the summer. The bolus will provide treatment of both adult and immature gastro-intestinal roundworms and lungworms and tapeworms at regular intervals of approximately three weeks during a period of about 18 weeks, with the first dose being released within a few hours of administration.

Silage quality and winter diets

Grass silage will typically makes up around one quarter to one third of total feed dry matter (DM) consumed on dry stock farms. When compared to grazed grass it is quite expensive to produce (usually twice the cost per tonne DM), however when taken as part of an integrated grazing system it is good value compared to concentrates and alternative forages.

Recent experiences with national fodder shortages have underlined the value of having a good reserve of quality silage available on beef farms. Fodder surveys completed in recent years by Teagasc showed that while

the majority of beef farms had adequate silage reserves a cohort of 10-12% of farms are consistently running a significant feed deficit of more than 20% of winter requirements. This is a high-risk strategy, especially during periods of fodder scarcity and high input prices. While most beef farms have tended to secure adequate supply of silage tonnage in recent years, average silage quality (as measured by dry matter digestibility, DMD) remains consistently poor on dry stock farms at 65-67% DMD. The principal challenge for beef producers therefore is to balance the dual objectives of having adequate supply of silage, while meeting feed quality targets for good animal performance. The targets for silage production are:

High grass DM yields for first-cut and subsequent cuts, with high total annual grass yield (>14.0 tonnes DM/ha). Guideline yields are 4.8 t DM/ha and up to 6.2 t DM/ha for silage harvested in mid-May and early June, respectively.

Appropriate feed quality for the category of stock to be fed. This is best measured as digestibility of the crop dry matter (DMD); protein content is also important and is positively associated with DMD. Silage quality is a function of growth stage at cutting (leafy swards have higher DMD than stemmy swards).

Clean, stable feed with good intake potential. This is achieved through good fermentation and can be assessed from silage pH (3.9 to 4.2 for un-wilted crops), ammonia (target less than 9%), and lactic acid (target over 8%) content. High DMD (leafy) swards can be well-preserved with good management.

	First-cut silage quality			
DMD%	75%	70%	65%	60%
Harvest date	20 May	2 June	15 June	28 June
Silage yield - t DM/ha	4.8	6.0	7.0	7.7
Daily live weight gain – kg	0.83	0.66	0.49	0.31
Feed efficiency -DMI/kg carcass gain	17.6	21.1	28.1	46.7

Table 1. Effect of silage quality (dry matter digestibility, DMD) on daily weight gain and feed efficiency in growing cattle

Table 2 outlines the potential farm-scale value of taking this approach to achieve the correct target silage DMD. In this simple example, a farm with 40 weanlings and 40 forward store cattle requires 350 silage bales for a standard winter. The cost of total winter concentrates required to maintain target performance is reduced by 47% by moving from national average silage quality to target silage quality for the stock type on hand.

		High DMD	Low DMD
Number of cattle	Weanling cattle	40	40
	Store cattle	40	40
Silage type and quantity of bales needed	High quality bales - 74% DMD	350	0
	Low quality bales - 66% DMD	0	350
Winter concentrate cost @€380/tonne		€5,791	€10,944

Table 2. Effect of silage quality (dry matter digestibility, DMD) on winter concentrate costs for a calf-to-beef farm

Finishing diet considerations

Energy intake is the main determinant of live weight gain of cattle. Therefore, maximising energy intake is important. Steers and heifers have a relatively low requirement for protein during the finishing period. Aim for 11-12% crude protein (CP) / kg diet dry matter (DM). For bulls that are growing (up to 550 kg LW) aim for 13-14% CP / kg diet DM. For finishing bulls (greater than 550 kg LW) aim for 11-12% CP / kg diet DM.

Where forage makes up a large proportion of the diet, fibre levels are likely to be adequate. When feeding meals ad lib, ensure that animals receive at least 10%-15% of their dietary dry matter as straw, hay or grass silage, in order to maintain rumen function.

All finishing animals should receive appropriate minerals for the duration of the finishing period. For grass silage-based diets this is a general purpose mineral. For diets based on alternative forages (e.g. maize silage) or fodder / sugar beet feed a maize/beet mineral. On ad lib concentrate diets, ensure that the inclusion rate of the mineral matches the feeding rate of the ration.

The water requirement of finishing cattle depends on the proportion of dry feeds i.e. concentrates in the diet. Animals on an ad lib diet will have a much higher requirement for water than animals on a grass silage-based diet. Under normal conditions (free access to feed, silage, etc.) and water), an animal will consume approx. 20 litres of water over a 24-hour period. This could be 1.5-2.0 times greater for ad lib concentrate systems. Water trough size therefore is an important consideration in a beef finishing shed. Small type nose drinkers are unsuitable due to the small volume an animal can ingest at any one time. A trough that can be cleaned easily and quickly on a daily basis is needed also.

Table 3. Ration feeding for finishing cattle

Category	Silage quality	Concentrate feeding rate (Kg/day)
Steers	70%	DMD 5-6
Heifers	70%	DMD 3-4
Bulls	70%	DMD Ad lib

The Signpost Programme: meeting our greenhouse gas emissions targets to 2030+ on beef farms

The main technologies that farmers are being asked to adopt to reduce greenhouse gas (GHG) emissions are those that reduce costs and/or improve profitability while also reducing emissions. These technologies include: improving animal performance through better genetics; reducing age at slaughter; implementing a herd health plan; increasing days at grass; using protected urea to replace CAN and straight urea; reducing chemical nitrogen use through improved soil fertility and in particular liming; optimising the use of organic manures; and incorporating clover into grassland swards.

The Signpost Programme

The Signpost Programme, led by Teagasc, is a collaboration of farmers, industry, state organisations, farm organisations and media all working together to support and enable farmers to farm more sustainably. The main focus of the programme is to reduce greenhouse gas (GHG) emissions but also to improve water quality and enhance biodiversity on Irish farms. The Signpost Programme is taking a holistic view of sustainability, encompassing economic, social and environmental sustainability.

Current technologies to reduce emissions

There are a suite of technologies currently available to beef farmers to reduce our greenhouse gas emissions. The key technologies available to beef farmers include:

1. Reduced age at slaughter

Finishing animals older at slaughter results in higher lifetime emissions from greater quantities of methane produced, additional emissions from slurry stored and spread and dung and urine excreted during grazing. The economic impact of increased weight gain is estimated at €0.21 per kg beef produced for an increase of 100g /head / day in lifetime performance. The impact of increased weight gain on GHG emissions is estimated at 2% per 100 g increase in lifetime average daily gain for beef cattle systems.

2. Health

The implementation of a comprehensive health plan will improve the efficiency of the farming system and reduce GHG emissions by reducing age at slaughter.

3. Grassland

Increasing the grazing season length lowers GHG emissions. Grazed grass has higher digestibility than grass silage resulting in improved productivity and less energy lost as methane. Also, the ensuing shorter housing period means less slurry stored and less slurry to be applied, resulting in less emissions.

4. Protected urea

Nitrous oxide (N2O) is a GHG which has almost 300 times more global warming potential than carbon dioxide (CO2). It is lost to the atmosphere from the breakdown of organic and chemical fertiliser. The spreading of chemical fertilisers including calcium ammonium nitrate (CAN) emit high levels of N2O. Protected urea is designed to slow the rate at which urea is converted to ammonium, reducing N2O emissions. Protected urea is 25-30% cheaper than CAN and grows similar grass yields. Protected urea has 71% lower nitrous oxide emissions than CAN.

5. Reducing chemical nitrogen use

In addition to switching to lower emitting forms of fertilizer, reducing total quantities of chemical N reduces N2O emissions. A reduction in N fertiliser of 10 kg per ha will reduce farm GHG emissions by 1% and improve income by €10 / Ha.

How to reduce farm inorganic fertiliser application rate?

Improving soil fertility and in particular liming

Soil sampling and the implementation of a nutrient management plan are key to reducing chemical N fertilizer use. Spreading lime to increase soil pH has the potential to release up to 80 kg N from the soil and yield a return of €6-10 for every €1 spent on lime.

Optimising the use of slurry

Slurry is a valuable source of fertilizer particularly if it is applied at the right time of the year (spring), using the right equipment (low emissions slurry spreading

(LESS) equipment). Spring application captures an extra 3 units N / 1,000 gals of slurry and using LESS contributes an additional 3 units N / 1,000 gals of slurry. Spring application also reduces the storage period and the associated emissions. A 20% shift to spring application can reduce farm GHGs by 1.3% while a shift to trailing shoe can lead to a reduction of 0.9% in GHG emissions.

Incorporating clover

Incorporating clover into grassland reduces the demand for chemical nitrogen. Therefore, if there is less chemical N fertilizer spread, there is less N2O being emitted into the air. Clover has been shown to 'fix' the equivalent of 100kg inorganic N/ha from the atmosphere.

Notes

Notes

Introducing the DairyBeef500 team

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