DairyBeef500 *Farm Walk*

Thursday, 8 September

on the farm of DairyBeef500 demonstration farmer:
Richard Long,
Ballymacarbry,
Co. Waterford.

Teagasc
Agriculture and Food Development Authority

DAIRYBEEF 500
Sustainable Dairy Beef Production

SIGNPOST
Farmers for Climate Action

DairyBeef500 Programme

Sustainable Dairy Beef Production

The DairyBeef500 Demonstration Farmers are sponsored by:

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Welcome from DairyBeef 500

On behalf of Teagasc and all the sponsors of the Teagasc DairyBeef 500 Campaign, I would sincerely like to welcome you to our first major farm walk of the new campaign. I would like to express our gratitude to Richard Long, his wife Eileen, and extended family for accommodating us to showcase what has been achieved in recent years through Richard's involvement in the Teagasc Green Acres Dairy Calf to Beef Programme and now the DairyBeef 500 campaign.

Richard has been to the forefront of our calf to beef programmes for a number of years and has been fortunate to come from a family with a very strong farming heritage. Richard's brothers, Michael and Liam, run a dairy farm in Ardfinnan, Co. Tipperary. They have demonstrated their open mindedness and ambition to improve calf quality by allowing Richard to have an input into the type of beef bulls used on their cows. This level of integration between dairy and beef farmers is something we must strive to roll out on a wider scale nationwide, with a view to having a constant improvement in genetic gain on calf to beef farms.

This use of higher quality beef sires, identified from the Dairy Beef Index (DBI), along with the recently launched Commercial Beef Value (CBV), will gradually 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.

Alan Dillon
Programme Co-Ordinator,
Teagasc DairyBeef500

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

Welcome from Industry Stakeholders - Volac

On behalf of all the industry stakeholders I would like to welcome you today to the Long's farm in Ballymacarbry, Co. Waterford for the first demonstration farm walk of the DairyBeef 500 Programme.

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 system that will return a worthwhile margin to beef farmers and 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.

Una Hickey
Volac

Welcome from Richard Long, Host Farmer

On behalf of the entire Long family, I would like to welcome you all here to the Nire today.

Since joining the Teagasc Green Acres Dairy Calf to Beef Programme, the farm has undergone changes which have had a positive impact on both the profitability and productivity.

No one area can be pinpointed as the turning point for the farm, but it was more so a series of small changes that have resulted in a more resilient farming system.

A number of these changes will be discussed today, including improving the genetics and animal performance levels, and I hope that you will take home something from the event to help make your farming business more streamlined and profitable.

I have to say a special word of thanks to my brothers Michael and Liam for being open minded when it comes to the genetics being used on their dairy herd to create a win-win for both parties.

And finally, a special mention and word of thanks needs to be given to both my wife Eileen and sister Aine, who both step in and make the operation of this farming business possible at pressure points throughout the year.

Richard Long
DairyBeef 500 Farmer

DairyBeef 500 Campaign Introduction

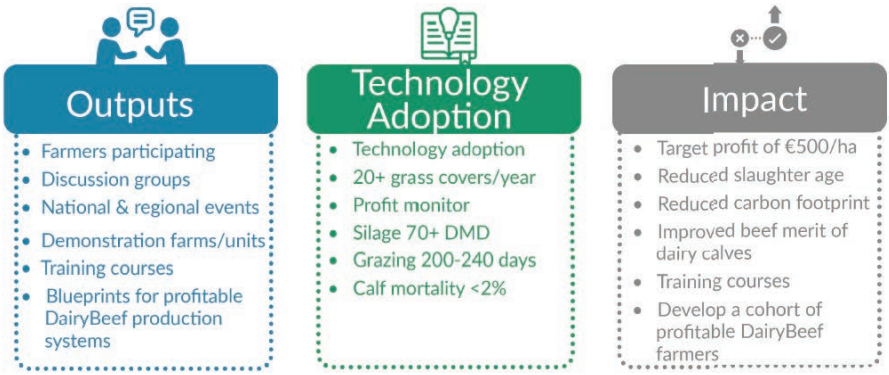
Teagasc has developed a new initiative which focuses on management practices for technically-efficient, dairy-beef systems called DairyBeef 500. The campaign will promote the adoption of technologies identified through research onto commercial farms, while monitoring their impact on farm sustainability.

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

Richard Long operates a calf to beef system on 47ha of grassland in Knockaun, Ballymacarbry, Co. Waterford. Calves are sourced directly off his brothers' dairy herd and a mixture of continental and early-maturing sired bulls and heifers are purchased annually.

After initially operating a suckler system, Richard first ventured into calf to beef production in 2014. This also coincided with a period when the dairy herd in Tipperary was about to expand. With an availability of calves from a trusted source, Richard decided to disperse the suckler herd and focus his farming endeavours on calves. The move away from calving and breeding suckler cows was also beneficial to Richard, as the tasks associated with calf rearing were more structured and could be balanced with his off-farm work commitments.

In the early years of this system, Richard was carrying all animals – mainly early-maturing steers and heifers - to slaughter out of the shed at the end of the second winter. At the time, light carcass weights and high volumes of meal consumption during the finishing period were resulting in a loss making operation. With improvements to animal genetics and liveweight gains, Richard's farming system has turned profitable. No one large change to the system is responsible for this improvement, but rather a series of tweaks taking place from the day the dairy cow is inseminated right through to slaughter.

In terms of grazing infrastructure, the farm is serviced by an extensive network of roadways and paddocks; all of which were installed by Richard, who operates a ground working business.

Soil fertility corrections, however, are proving a slow burner. At the commencement of the Teagasc Green Acres Programme, soil testing indicated that 0% of the farm was at the optimum level for pH and just 10% was at index 3. Through an intensive liming and fertility programme, which is still ongoing today, this is slowly improving. 50% of the farmed area is now at either index 3 or 4 for P and further lime applications of 100t are planned for mid-September.

Physical and financial performance

The profitability of Richard's beef enterprise has improved significantly over the past number of years. Back in 2019, the farm generated a net loss of €585/ha (excluding subsidies), meaning that other income streams had to utilised to make up the shortfall. At the time, light carcass weights, poor quality silage and high levels of meal supplementation during the finishing period were making it challenging to generate a gross margin. This resulted in farm subsidies and off-farm income being directed to cover the majority of the farm's fixed costs. In 2021, the farm generated a net margin of €348/ha – a swing of €933/ha or €44,131 since 2019.

The availability of shed space and time were identified as two major challenges during the farm planning stage, so the main avenue available to improve profitability was through increased animal performance. A varied and wide ranging approach was taken to correct this, but the primary focus was placed on increasing daily liveweight gains through better genetics and nutrition.

By implementing practices that allowed for daily weight gain targets to be achieved throughout the animal's lifetime, the output per livestock unit has increased by 38% from 2019 to 2021. On a per hectare basis, this has resulted in an additional 293kg of output being generated (927kg/ha versus 1,159kg/ha). At the same time, improvements in silage quality and an earlier age of finish have resulted in the average animal consuming 216kg of concentrate less over their lifetime, generating a meal saving of approximately 22t annually.

2022 Outlook

Due to relatively strong beef prices at the start of the year, when over 60% of the animals were slaughtered at an average beef price of €4.65/kg, the farm's net margin is projected to rise by €129/ha to €477/ha in 2022. At the same time, significant increases in variable costs are expected; concentrate and fertiliser spending are anticipated to rise by €182/ha and €69/ha, respectively.

However, due to a carryover of silage from last year, the farm is relatively insulated from rising contractor costs, which are expected to climb by just €30/ha as no second cut harvest was completed this year.

In terms of efficiency, denoted by variable costs as a percentage of gross output, similar levels (58%) are expected to be witnessed this year. A target of 50% has been set for this efficiency measure going forward, which can be achieved through improvements in soil fertility, grazing season length and the inclusion of clover in grazing swards to reduce the system's dependence on chemical nitrogen.

Table 1: Changes in physical and financial performance

Measure	2019	2020	2021	2022 (Projected)	Difference (2019 vs 2022)
Physical					
Land base (adj.ha)	47.3	47.3	47.3	47.3	-
Stocking rate (LU/ha)	2.17	2.10	1.96	2.24	+0.07
Calves purchased	105	113	108	120	+15
Liveweight output (kg/ha)	927	1,048	1,159	1,220	+293
Financial					
Gross output (€/ha)	1,470	1,851	2,097	2,549	+1,079
Variable costs (€/ha)	1,373	1,144	1,207	1,501	+128
Variable costs *(% of gross output)*	93%	62%	58%	58%	-35%
Gross margin (€/ha)	97	707	890	1,048	+951
Fixed costs (€/ha)	682	689	542	571	-111
Net margin (€/ha) *(excluding subsidies)*	-585	293	348	477	+1,062

Reducing the age of slaughter

Irish agriculture is obliged to reduce greenhouse gas (GHG) emissions by 25% by 2030, as set out in the Climate Action Plan. One of the many strategies being targeted to achieve this is the reduction in the age of slaughter of animals on beef farms by three months, moving from an average of 27 months back to 24 months. This three month reduction in slaughter age will generate a reduction in the quantity of methane emitted from the national beef herd, potentially delivering up to 19kg per animal over their lifetime. The primary way in which this can be achieved is by ensuring animal performance levels are optimised at farm level, something which Richard Long has been working on since joining the Teagasc Green Acres Programme back in 2019. The improvements in animal performance witnessed at farm level, leading to a reduced age of slaughter, are win-win in that greater profitability has been achieved from the beef enterprise, while the quantities of methane being produced have potentially been reduced.

Slaughter performance

At the commencement of the Teagasc Green Acres Programme, an evaluation of Richard's system was completed to identify the strengths that already existed, but more importantly to identify any areas of underperformance. The first area that warranted consideration was animal performance, specifically the carcass weights being achieved at slaughter. Over the duration of the programme, a target was set to improve the carcass weights achieved by both steers and heifers by 20kg, while also aiming for a conformation grade increase of one. This target was achieved by both category of animal, with steer carcasses improving by 29kg and heifers up by 31kg. At the same time, the age at which animals were slaughtered reduced significantly

– falling by three months for steers and two months for heifers, with these improvements arising from improvements in genetics – through improved beef sires used on a more mature cow herd – and improved animal performance on account of better nutrition and health.

Table 2: Changes in slaughter performance on Richard Long's farm

Slaughter performance of steers							
Year born	Age (months)	Carcass weight (kg)	Avg. slaughter date	Grade	Fat Score	Price (€/kg)	Days on farm
2016	26	287	30/03/2018	O-	3=	3.87	769
2019	23	316	29/01/2022	O+	3+	4.63	655
Change	-3	+29	60 days	+2	+1	+0.76	-114
Slaughter performance of heifers							
2016	24	250	31/01/2018	O=	3+	4.07	697
2019	22	281	14/12/2022	O+/R-	3+	4.58	627
Change	-2	+31	48 days	+1.5	-	+0.51	-70

Impact on profitability

To quantify the impact of improved animal lifetime performance on profitability, an analysis was completed using current beef and concentrate prices. The average beef price used in the analysis was a base of €4.80/kg, factoring in QPS, breed and quality assurance bonuses, while growing and finishing concentrate prices were included at €460/t and €420/t, respectively. Changes in the quantity of silage and concentrates required to carry an animal to finish are also highlighted, with the feeding rate of meals dropping by 2kg/head/day during the finishing period on account of improved quality silage. The quantity of silage required for finishing animals did increase by 99kg DM/head for steers and 77kg DM/head for heifers due to a combination of higher animal weights and reduced meal feeding levels, with silage valued at €40//bale or 20c/kg of dry matter.

Table 3: Impact of improved carcass and animal performance on profitability

Animal Category	2016-born steer	2019-born steer	Difference
Average price (€/kg)	€4.76	€4.96	+€0.20
Carcass weight	287kg	316kg	+29kg
Animal value	€1,366	€1,567	+€201
Growing concentrate (kg)	290kg	440kg	+150kg
Growing concentrate cost	€120	€202	+€82
Finishing concentrate (kg)	811kg	403kg	-408kg
Finishing concentrate cost	€341	€169	-€172
Finishing silage	682kg (DM)	781kg (DM)	+99kg
Finishing silage cost	€136	€156	+€20
Difference between market return and costs			**+€271/head**
	2016-born heifer	**2019-born heifer**	**Difference**
Average price (€/kg)	€4.88	€4.95	+€0.07
Carcass weight	250kg	281kg	+31kg
Animal value	€1,220	€1,391	+€171
Growing concentrate (kg)	290kg	440kg	+150kg
Growing concentrate cost	€120	€202	+€82
Finishing concentrate (kg)	649kg	325kg	-324kg
Finishing concentrate cost	€273	€137	-€136
Finishing silage (kg DM)	350kg	437kg	+77kg
Finishing silage cost	€70	€87	+€17
Difference between market return and costs			**+ €208/head**

The improvements witnessed in both animal performance, in terms of the genetics for beef production and liveweight gains, did have positive impacts on the profitability of Richard's farming system. These improvements, when accounting for the major costs associated with finishing (concentrates and silage), meant that Richard's 2019-born steers were €271/head ahead of their 2016-born counterparts when base beef price was the same for both years, while the heifer difference was €208/head.

Slaughter performance by breed

Table 4 provides a snapshot of the slaughter performance of 2019-born animals on Richard's farm by breed type. Further information on how animals performed on the basis of their Commercial Beef Values is presented below.

Table 4: Slaughter performance of 2019-born steers and heifers by breed type

Breed	Number	Age	Carcass (kg)	Grade	Fat	price (€/kg)
Slaughter performance of 2019 - born steers						
Aubrac	7	24	321	O+	3=	€4.47
Belgian Blue	4	25	340	R=	3-	€4.83
Charolais	1	23	334	O+	2=	€4.37
Hereford	16	22	305	O=/O+	4-	€4.65
Limousin	13	24	318	R-	3+	€4.70
Slaughter performance of 2019 - born heifers						
Angus	4	21	262	O+	3=/3+	€4.60
Aubrac	8	23	289	O+	3+	€4.54
Belgian Blue	12	24	299	R-	3=	€4.63
Charolais	4	24	328	R-	3+	€4.57
Hereford	19	20	252	O+	4-	€4.54
Limousin	13	24	295	O+/R-	4-	€4.61

The Commercial Beef Value - a tool for cattle purchasers

Launched by the Irish Cattle Breeding Federation, the Commercial Beef Value (CBV) is a tool for non-breeding beef farmers, which gives an insight into an animal's genetic merit for beef production based on its parentage. Compromising of five key traits, including: carcass weight; carcass conformation; carcass fat; docility; and feed intake, when used as a selection tool for identifying high merit animals at purchasing, it may allow for the identification of faster growing, better shaped, more feed efficient and more docile animals. Farmers purchasing animals for beef production should request information on the CBV. It is available through the profile section of the ICBF Herdplus account and it is planned to be included on mart boards in the future.

Which animals receive a CBV?

CBV values, expressed as a euro value, will be generated for all cattle that are likely to be finished, including male and female (non-pedigree) stock bred from beef cows, dairy-bred male and female calves sired by a beef bull and male calves sired by a dairy bull, provided a sire is recorded. Animals are assigned to one of three different breed types under the CBV, which is dependent on sire and dam breed. These are: beef x beef; beef x dairy; and dairy x dairy. Similar to the Terminal and Replacement Index, animals are assigned a star rating of one to five, with a five star animal being in the top 20% of the national population within that breed type, whereas a one star animal is within the bottom 20%.

Table 5: 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

CBV at slaughter

A study completed by Teagasc Grange examined how animals of varying CBV values performed at slaughter when managed under an intensive grass-based system. Two animal types were examined dairy x dairy (Holstein Friesian steers) and beef x dairy (Angus-sired animals). Overall, Holstein Friesian steers classified as being five star within the dairy x dairy breed type produced 33kg heavier carcasses at slaughter when compared to their one star comrades. For the Angus-sired steers (classified as the beef x dairy breed type), these animals were 27kg heavier at slaughter. Carcass and fat scores for both one star and five star animals of both category were broadly similar.

Making calves more marketable

For breeding farms aiming to maximise the CBV, the use of high-merit sires from the Terminal Index and Dairy Beef Index (DBI) should be a priority to aid in the marketability of animals. Within both these indexes, attention should be given to both carcass and feed sub-indices, while balancing calving difficulty, gestation length and other traits that may be of importance to the breeding farm.

Integration of dairy and beef – the Long brothers' story

Richard has been purchasing calves off his brothers Mike and Liam, who operate a standalone dairy farm across the border in Co. Tipperary, for the past number of years. The close relationship between dairy and beef producer has allowed for more joined up thinking to occur when it comes to the genetics at play; allowing for an animal of improved beef merit to be produced, without having negative consequences on the dairy herd's reproductive performance.

The brothers initially started looking at the genetics being used in the spring of 2019. Richard wanted an animal that would produce a heavier, better-conformed carcass at a younger age, with the aim of having all animals marketed by 24 months of age. Mike and Liam wanted to maintain calving ease and the calving interval of their herd. Therefore, the sires being selected had to deliver on beef traits without having a negative impact on the milk production potential of the dairy herd. The end result was a bull team consisting of Angus, Hereford, Belgian Blue, Aubrac, Limousin and Charolais sires.

Calves from the third year of this breeding policy have taken residency on the farm this spring and are sired by Angus, Aubrac, Belgian Blue, Charolais and Hereford sires. The bull team is positive on carcass weight and conformation, while providing relatively easy calving and short gestation. As a team, the AI sires of the 2022 calf crop had an average Dairy Beef Index Value of €95 (€59-126), calving ease of 5.2% (3.5-7.9%) for dairy cows, gestation length of -0.3 days (-2.57-3.72 days), a carcass weight of +20kg (4.2-40kg) and a conformation score of 1.67 (0.64-2.87).

Table 6: Sires of 2022-born calves on Richard Long's farm

Sire	Breed	DBI (€)	Calving sub-index (€)	Beef sub-index (€)	Cow calving difficulty (%)	Carcass weight (kg)	Carcass conf.	Gestation length (days)
Bull 80254	AA	89	23	66	2.5	13.6	0.86	0.98
AA5280	AA	76	32	44	3.5	8.2	0.67	-2.06
AA6682	AA	117	37	80	3.5	18.9	1.01	-2.47
AU4683	AU	126	13	113	3.7	18.3	1.73	0.61
BB4369	BB	94	-43	137	6.7	21	2.52	1.75
BB5226	BB	114	-41	155	7.5	28.4	2.87	-1.38
FSZ	CH	59	-104	162	7.9	40	2.25	3.72
Bull 91426	HE	31	-14	45	3.8	5.1	1.01	2.48
HE5346	HE	78	29	48	3.5	4.2	0.64	-2.35

Sires with the slightly higher calving difficulty scores were targeted only at mature cows, with a proven history of calving ease. Continental sires with slightly longer gestation lengths were used only in the first half of the breeding season, while shorter-gestation sires were mated in the second half of the breeding season to protect the herd's calving interval.

More early-maturing genetics have been used in the dairy herd's breeding programme this year for two reasons. Richard has to finish about 40% of the animals before housing in October/November of the second year and the early-maturing Angus and Hereford suit this production system. In addition, some of the continental sires were also carrying time in terms of gestation length, even though they were bred relatively early in the season, so the decision was made to replace some of these longer gestation sires with Angus and Hereford.

Table 7: AI sires used in the 2022 breeding season

Sire	Breed	DBI (€)	Calving sub-index (€)	Beef sub-index (€)	Cow calving difficulty	Carcass weight (kg)	Carcass conf.	Gestation Length (days)
HE5452	HE	51	23	28	4.0	4.10	0.61	-1.35
BB5226	BB	114	-41	155	7.5	28.40	2.87	-1.38
AA5280	AA	76	32	44	3.5	8.20	0.67	-2.06
CH4321	CH	92	-62	154	7.2	40.90	2.22	2.18

Commercial Beef Values

The calves produced from this breeding policy rate relatively highly on the Commercial Beef Value. The CBVs of Richard's calves are highlighted in the below table.

Table 8: Commercial Beef Values of 2022-born animals

Breed	Average CBV (€)	CBV Min (€)	CBV Max (€)
Angus	90	57	122
Aubrac	162	148	175
Belgian Blue	203	172	258
Charolais	220	208	228
Hereford	74	55	112
Commercial Beef Value of 2022 - born calves by sire			
Sire	**Breed**	**Progeny number**	**Average Progeny CBV (€)**
Bull 80254	AA	21	96
AA5280	AA	12	72
AA6682	AA	5	109
AU4683	AU	16	162
BB4369	BB	15	191
BB5226	BB	10	221
FSZ	CH	6	220
HE5346	HE	15	74
Bull 91426	HE	14	75

The monetary differences in CBV value represent the potential additional profit an animal can make at slaughter when compared to comrade calves. If looking at the inbreed example of Angus, the highest rated animal on the CBV has a value of €122, while the lowest has a value of €57, indicating that the difference - €65 in this instance – will be the potential difference in profit at slaughter time between animals.

Table 9: CBV difference (within breed type) of the highest and lowest rated Angus

Tag number	Sire	CBV (€)	Carcass weight	Carcass conformation	Carcass fat	Feed intake	Docility
2354	AA5280	57	-1.5	0.13	0.40	0.15	0.06
2402	AA6682	122	7.4	0.44	0.12	0.19	0.04

Taking the example of the highest and lowest rated Angus calf on Richard's farm (table above), the major differences in the value of CBV is stemming from the carcass weight and carcass conformation metrics, with calf 2402 expected to generate a heavier and better-conformed carcass than calf 2354.

Slaughter performance

Animals from the first year of the integrated breeding policy – 2019-born animals – were slaughtered on Richard's farm last autumn and into the early spring. CBV values were available for 54 animals (30 heifers and 24 steers) housed in October and finished from late December through to early February. Table 10 provides a summary of how animals with various CBV economic values performed at slaughter. In terms of the carcass performance witnessed, five-star heifers generated 33kg heavier carcasses at one conformation score higher. At a base price of €4.80/kg, this increase represents an economic return of €199 in favour on the five-star animal. The difference between the lowest-rated steers on the CBV compared to the highest (one star versus four star) was 28kg of carcass weight, at a carcass grade of 1.5 score ahead.

Table 10: Differences in slaughter performance based on CBV values (2019-born animals)

Slaughter performance of 2019 - born heifers based on within breed type CBV							
CBV Value	CBV Stars	Start weight (kg)	Age (days)	Carcass weight (kg)	Carcass sold / day (kg)	Carcass grade	Carcass fat
€27	One star	470	684	281	0.41	O+	3+
€71	Three star	473	690	299	0.43	O+/R-	3+
€97	Four star	474	704	295	0.42	R-	3+
€141	Five star	491	713	314	0.44	R-	3=
Difference (one vs five)		+21	+29	+33	+0.03	+1 grade	-1 grade
Slaughter performance of 2019 - born steers based on within breed type CBV							
-€5	One star	498	679	304	0.45	O=/O+	4-
€67	Three star	508	711	319	0.45	R-	3=
€94	Four star	524	703	332	0.47	R-	3=
Difference (one vs four)		+26	+24	+28	+0.02	+1.5 grade	-2 grades

Herd health protocol for calves

While purchase price and genetics of the calf are foremost in terms of making a profit on calf to beef systems, calf health is important in ensuring that the system leaves a margin. Focusing on hygiene and vaccination is the best policy to ensuring this happens. Pneumonia and scour are the two major illnesses that compromise calf health and reduce lifetime performance. Prevention is always better and cheaper than the cure and a regimental plan is needed. It should be noted that no amount of vaccination can overcome a lack of quality colostrum administered to the calf at birth and the bacterial and viral challenges calves face when the environment they are reared in is substandard.

Prevention of pneumonia and scours

Colostrum Management

All calves must have 4-5 litres of colostrum within 4 to 6 hours of birth to receive adequate immunity. Calves that are not given enough antibodies at birth are at increased risk for pneumonia and scours throughout the entire growing period. The most important step in any calf health management programme is a successful colostrum management programme. When purchasing calves off farm, always ensure the dairy farmer supplies enough colostrum to the calf.

Vaccination

There are several pneumonia vaccines on the market today. Some are for the common bacteria that cause pneumonia, such as Mannheimia haemolytica (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.

Ideally the calves should be vaccinated against pneumonia a week before leaving the dairy farm.

It is advantageous to source calves from farms that vaccinate cows against scour in late pregnancy. This ensures that the cow produces colostrum with increased levels of antibodies which protect against rotavirus, corona virus and E. coli. Feeding the calf enough colostrum will then enhance the protection of the calf against these bugs. Remember that correctly administering and storing vaccines is important to improve the success of a vaccination programme.

Ventilation

Have your veterinarian assess the ventilation in your calf area. In our climate, we often see pneumonia in the winter not due to cold but due to closed up sheds with inadequate ventilation. If you are at calf level and smell ammonia, you have a severe ventilation problem. Calf sheds should have open side walls and ridge caps to allow stale air to escape.

Sample vaccination plans

Table 11 and 12: Vaccination plans covering pneumonia (RSV, Pi3 & Mannheimia haemolytica), IBR and Clostridia

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/Mannheimia haemolytica (Pasteurella)	Intramuscular
9 months	IBR live	IBR	Intramuscular
14 months	Clostridia	Clostridial diseases	Subcutaneous
15 months	IBR live	IBR	Intramuscular

Autumn Grassland Management

Achieving good levels of live weight gain from grass, while also extending the grazing season, is a crucial element in the success of profitable beef systems.

The autumn rotation planner is a tool to help extend the grazing season. The reasons for its use are twofold. Firstly, it allows you to maximise the proportion of grazed grass in the animal's diet for the remainder of the year and, secondly, it ensures that a sufficient supply of high quality grass is available next spring to facilitate an early turnout. The 60:40 autumn rotation planner is based on having proportions of the farm closed by certain dates.

These dates will vary slightly across the country and depend on soil type and the amount of grass that is likely to grow over the winter.

Autumn grazing guidelines

- Graze paddocks to 3.5-4cm to encourage winter tillering of the grass plant;
- Do not re-graze fields that have been closed;
- Start housing some groups of cattle if you are ahead of your weekly target;
- Skip heavier paddocks and graze paddocks with ideal covers to meet the 60% target;
- Heavy cattle should be housed first if ground conditions deteriorate.

Managing grazing during wet weather

- Have a flexible attitude;

- Use the driest / most sheltered paddocks when grazing in very wet weather;
- Strip grazing should be used to ensure minimal damage from poaching and to maximise grass utilisation;
- On-off grazing can be practised to reduce poaching damage and keep animals at grass for longer when the weather gets wet;
- Have multiple access points into a paddock;
- Place water troughs strategically so that they will service several strips or divisions when a strip wire is used.

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; and 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/ha 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 100 kg inorganic N/ha from the atmosphere.

Notes

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DAIRYBEEF 500
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